



A Partnership to Restore and Protect the Sound

**2000 CCMP
IMPLEMENTATION
TRACKING REPORT
January-December 2000**

**The
Comprehensive
Conservation and
Management Plan
August 2001**

**THE
LONG
ISLAND
SOUND
STUDY**



ACKNOWLEDGMENTS

This Report is the product of the Long Island Sound Study partnership of Federal, state, local and private agencies and organizations. The diversity of the Comprehensive Conservation and Management Plan for Long Island Sound increases the difficulty and complexity in obtaining the information and data for this report. We wish to thank the states of Connecticut and New York for their invaluable assistance in compiling the data for the report and in coordinating their efforts with the many other state and local agencies and organizations participating in the Study.

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About the 2000 Report



UNDERSTANDING THIS REPORT

As in 1999, this 2000 CCMP Implementation Tracking Report is organized into seven sections, each corresponding to the seven priority management areas identified in the CCMP:

- 1) Continuing the Management Conference;
- 2) Hypoxia;
- 3) Pathogen Contamination;
- 4) Toxic Substances;
- 5) Floatable Debris;
- 6) Management and Conservation of Living Resources and Their Habitats; and
- 7) Public Involvement and Education.

Each of these sections contains a brief narrative that highlights accomplishments of the Management Conference in that area in 2000.

Unlike the previous CCMP Implementation Tracking Reports, this report does not provide details on each of the 232 individual action items in the CCMP. The report instead provides information in the 36 CCMP subcategories outlined in the Index to the report.

As in prior year reports, the charts following each narrative section correspond to the appropriate table in the CCMP for each priority area.

The charts contain self-explanatory information under the 36 action areas identified in the CCMP, such as:

- ! *Description*; and
- ! *Planned Action*

The Appendix contains the entire set of 232 CCMP actions indexed to the detailed charts in the report.

An Annual Snapshot of Progress

Because of the inherent long-term nature of initiating and assessing the results of environmental restoration and improvement efforts, this report should be viewed as a one-year snapshot of accomplishments against the 36 action areas identified in the CCMP. This report is not an expression of environmental results.

Environmental Indicators

The LISS has developed a basic set of environmental indicators for Long Island Sound, with an ultimate goal of linking progress on the CCMP to actual environmental improvements in the Long Island Sound ecosystem.

In this way, environmental results may be used in the future to assess the effectiveness of CCMP actions, and the Management Conference will be in a better position to consider and adjust CCMP plans, actions, and resources according to the environmental results desired or achieved.

The LISS environmental indicators are accessible on the LISS website at: <http://www.epa.gov/region01/eco/lis>.



Foreword



This 2000 report documents the sixth year of implementation of the *Long Island Sound Study (LISS) Comprehensive Conservation and Management Plan (CCMP) for Long Island Sound (LIS)*. This Report summarizes the continuing work of the *LISS Management Conference* partners in carrying out the CCMP.

The LISS Management Conference is sponsored by the U.S. Environmental Protection Agency (EPA), the New York State Department of Environmental Conservation (NYSDEC), and the state of Connecticut Department of Environmental Protection (CTDEP). Additional partners include:

- ❖ **Interstate Environmental Commission (IEC);**
- ❖ **U.S. Department of the Interior's Fish and Wildlife Service (USFWS);**
- ❖ **U.S. National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS);**
- ❖ **New York City Department of Environmental Protection (NYCDEP);**
- ❖ **U.S. Department of Agriculture Natural Resource Conservation Service (NRCS);**
- ❖ **New York State Department of State;**
- ❖ **New York and Connecticut Sea Grant College programs**
- ❖ **LISS Technical Advisory Committee (TAC); and**

- ❖ **LISS Citizens Advisory Committee (CAC).**

Many other federal, state, municipal academic, and local public and private organizations contribute to implementation of the CCMP. Among these are the:

U.S. Army Corps of Engineers (ACOE);

U.S Geological Survey (USGS);

U.S. Department of Agriculture's Cooperative Extension Service;

Connecticut Department of Agriculture Bureau of Aquaculture (CTDOA/BA);

New York and Connecticut state Departments of Health;

New England Interstate Water Pollution Control Commission;

University of Connecticut (UConn); and

State University of New York (SUNY).

Together, these Federal, state, local, academic, and citizen partners combine their efforts to achieve the common CCMP vision for the long-term health, restoration, and economic well-being of Long Island Sound, its watersheds and tributaries, and living marine and marine-dependent resources.



Executive Summary



The Long Island Sound Study released its first comprehensive public report on the health of Long Island Sound in April 2001. *Sound Health 2001* provides an in-depth review of 15 principal environmental indicators of the health of the Sound over the last 10-15 years. The report presents data and trends in such areas as water quality, habitat restoration, toxics and pathogen contamination, as well as the status of important living resources native to the Sound or dependent on its health. An expanded suite of 45 indicators of the health of the Sound is posted on the LISS website.

This 2000 CCMP Implementation Tracking Report should be viewed in concert with *Sound Health 2001* indicators. These reports, when considered as a whole, can provide an overview of the impact of management actions on the health of the Sound, and can help managers to refocus priorities if a desired environmental outcome is not being achieved. These reports are available on the LISS homepage at: <http://www.epa.gov/region01/eco/lis>.

SUMMARY OF 2000 ACCOMPLISHMENTS

Nitrogen TMDL Approved

The most significant accomplishment in 2000 was the development of the final Total Maximum Daily Load (TMDL) for nitrogen in Long Island Sound, with EPA approval following in 2001. The states of Connecticut and New York submitted the TMDL in January 2001 and EPA approved it in April 2001. The TMDL allocates responsibility for reducing nitrogen loads among all nitrogen sources.

Nitrogen Loading Continues Downward Trend

In 2000 the total point source nitrogen load to the Sound was estimated at 157,631 lbs/day, a decrease of over 29,000 lbs/day from 1990 levels. New York loadings totalled 109,518 lbs/day; Connecticut loads totalled 48,113 lbs/day. The total nonpoint source (NPS) load nitrogen to LIS was estimated to be about 28,000 tons/yr, about

9,000 tons below the highest load over the last decade in 1991 of 37,000 tons/yr. The LISS plans to revise these estimates using a US Geological Survey report to be released in 2001.

Hypoxia Indicators Lessen

The areal extent and duration of low (< 3mg/l) dissolved oxygen (DO) was less in 2000 than the 14 year average. In 2000 the maximum area of low DO in LIS was estimated at 173 square miles (mi²), with an overall duration of 35 days compared to the 14 year averages of 203 mi² and 56 days.

Continued Progress on Habitat Goals

The states of Connecticut and New York made good overall progress toward the LISS goal of restoring 2000 acres of tidal wetlands and 100 miles of river corridors for anadromous fish access by 2008. Since 1998, Connecticut has restored over 308 acres of tidal wetland habitat, treated or retreated many acres of phragmites-infested habitat, and restored 34.9 miles of river corridor to anadromous fish passage. Since 1998, New York has restored over 65 acres of tidal wetlands in the LIS watershed.

Addressing Toxic Contamination, Pathogens and Floatables

Communities on and around the Sound are continuing watershed management-based approaches to controlling sources of pollution to the Sound, including point and nonpoint sources, CSOs, and land use practices. Many communities have formed watershed management committees or groups that cross local, municipal, or even state jurisdictions, to work together in addressing environmental management problems that have no boundaries.

LIS Research Ongoing

The Management Committee continued to make funding available for the LIS research fund in

Long Island Sound Study

2000. The New York and Connecticut Sea Grant programs contributed \$25,000 each for a total 2000 fund of \$240,000. The LISS selected 3 research projects for funding in 2000, which will study historical environmental trends in the Sound over the past 400 years; investigate the causes of the 1999 lobster mortalities in the Sound; and study various factors that may affect phytoplankton growth in the Sound.

Citizen Action

The Citizens Advisory Committee (CAC) met in March, June, September, and December in 2000, and developed key recommendations to the Policy Committee, especially endorsing the creation of a Long Island Sound Reserve system, as called for in the CCMP. The CAC supported increased Federal funding to match the significant state financial commitments to the Sound -- as noted elsewhere in this report, the *Long Island Sound Restoration Act of 2000* was passed, increasing the appropriations authorization to \$40 million through 2005.

2000 CCMP Tracking Report

Reaching and Educating the Public

The LISS outreach and education programs continued to conduct many meetings, conferences and workshops attended by hundreds of public officials and concerned citizens.

The LISS produced and distributed many thousands of copies of its LIS newsletter, *UPDATE*, as well as fact sheets, publications, and brochures covering timely and critical LIS topics. Many of these documents were posted on the LISS web page: <http://www.epa.gov/region01/eco/lis>. The LISS webpage continued to be one of the most visited pages on the EPA New England Region website, with nearly 60,000 recorded site visits in 2000.

LISS staff continued to: provide LIS displays at annual public events, such as Earth Day and LIS Days in Connecticut and New York; address scores of teachers, educators, school children, groups and classes; issue LIS press releases, make public service announcements, and give radio and press interviews on LIS issues.



Continuing the Management Conference

Carrying out the CCMP is the combined responsibility of the Management Conference partners. Through their ongoing programs and day-to-day program operations, and through Federal, state, local, and private LIS funding initiatives and activities, CCMP priorities are assessed, implemented, and reported.

CCMP Strategy:

An essential element of the Long Island Sound Study strategy to implement the CCMP was to continue the Management Conference partnership in carrying out the plan to restore and protect the Sound. The states and EPA first signed a LIS Agreement in 1994 and again in 1996, which formally committed EPA and the states to the Management Conference partnership as the primary means of implementing the CCMP. Most of the 13 CCMP actions to address this strategy have been achieved, and continue to be key to the viability of the LISS partnership. Federal legislation in 1990 created the EPA Long Island Sound Office to bridge the bi-state, multi-agency, public/private efforts to restore and protect the Sound.



2000 Highlights:

- **The Long Island Sound Restoration Act of 2000 [P.L. 106-457] reauthorized the LISS through 2005 and increased the appropriations ceiling to \$40 million annually. Congress appropriated \$5 million for the LISS in 2001.**
- **The LISS Policy Committee directed the Management Conference partners to update the 1996 LIS Agreement to identify measurable environmental goals for implementation of CCMP priorities over the next 5-10 years. The 2001 LIS Agreement is to be signed by the New York and Connecticut Governors and the EPA Administrator by September 2001.**
- **In September 2000 the Policy Committee signed the LIS Habitat Restoration Memorandum of Understanding (MOU) along with several Federal, state, and local agency partners. The MOU establishes roles and responsibilities of the partners in implementing the LISS 1998 Habitat Restoration Strategy goals of restoring 2,000 acres of habitat and reopening 100 river miles to anadromous fish passage by 2008.**
- **The Management Committee met in January, April, July, and October 2000. The Committee set aside a special period in its meetings for public comments, enabling citizens to directly convey their concerns about Long Island Sound to the Committee. In 2000 the US Fish & Wildlife Service accepted the Committee's invitation to participate as a full Committee member, formalizing its longstanding role as a key CCMP implementation partner.**
- **The Management Committee continued its commitment to understanding the science of the Sound, providing \$190,000 to the LISS research fund in 2000. The Connecticut and New York Sea Grant College Program partners each also contributed \$25,000 to this fund in 2000 for a total LISS research fund of \$240,000.**
- **The LISS sponsored the second biannual municipal conference, co-hosted by the Mayors of Stamford and Glen Cove. Over 100 Federal, state, municipal and local officials attended the conference, with several reaffirming their commitment to preserve, restore and improve the Sound by signing the Bi-Coastal Municipal Partnership pledge.**
- **The LISS Citizens Advisory Committee (CAC) met quarterly in March, June, September and December 2000, recommending a number of actions on CCMP implementation to the Policy Committee. The CAC formed a new living marine resources (LMR) subcommittee to better assess and address this vital area.**

SUMMARY OF CCMP MANAGEMENT ACTIONS: CONTINUING THE MANAGEMENT CONFERENCE

M-1. SUPPORTING IMPLEMENTATION (CCMP TABLE 50, P. 141)

Key Elements: The CCMP committed the LISS to formally extend the Management Conference to guide CCMP implementation, and to continue its Citizens Advisory Committee as an integral part of the conference. The plan also called for the EPA LISO to continue and expand its efforts to coordinate among Management Conference participants in support of CCMP implementation by providing funding and staffing, conducting education, outreach, monitoring, and data management, and ensuring consistency with other Federal and state goals and policies.

Description	2001 Planned Action
The <i>Long Island Sound Restoration Act of 2000</i> [P.L. 106-457] was enacted, reauthorizing the LISS through 2005 and increasing the appropriations authorization to \$40 million annually.	
EPA and Congress continued to provide support for the LISS in FY2000 under Section 119 and 320 of the CWA.	EPA's FY2001 President's Budget included a line item of \$500,000 for the LISO, with Congress earmarking an additional \$4.5 million. The LISS also received \$330,000 under EPA's National Estuary Program for LIS in FY2001.
In September 2000 the policy committee charged the management conference partners with revising the 1996 Long Island Sound Agreement for 2001 to include quantifiable goals in CCMP priority areas over the next 5-10 years.	Development and implementation of the LIS 2001 Agreement.
The LISS continued to provide support for state program coordination and involvement and for the LISS public outreach and education and habitat restoration programs.	
The CAC supported increased Federal appropriations for the LISS in 2000 through briefings conducted for members of the LIS caucus in October 2000.	The CAC will continue to advocate for the full \$40 million appropriation for the LISS.
The management committee supported earmarking LISS funding for CCMP implementation projects in the FY01 LISS budget request.	Continued support for CCMP implementation projects.
The policy committee signed the LIS Habitat Restoration MOU that establishes the roles and responsibilities of the signatories in implementing the 1998 habitat restoration strategy goals of restoring 2,000 acres of habitat and 100 river miles to anadromous fish passage.	Continue habitat restoration projects.
The USFWS accepted the management committee's invitation to participate on the committee as a full member, and participated in the quarterly meetings in 2000.	The USFWS will continue as an active participant in the management conference.

Eliminating Adverse Impacts of Low Dissolved Oxygen in the Sound

The Long Island Sound Study identified low dissolved oxygen (hypoxia) as the most significant water quality problem in LIS. Long Island Sound's waters comprise the largest single habitat for living marine resources in the watershed. Since 1990, EPA and the states of Connecticut and New York have implemented a phased program that first capped, and subsequently reduces human-caused nitrogen loads to LIS over a 15-year period.

CCMP Strategy:

The CCMP identified a five part strategy to address the elimination of adverse impacts of low dissolved oxygen in the aquatic habitat of the Sound: 1) reduce nitrogen from sewage treatment plants (STPs) and other point sources; 2) reduce nitrogen loads from nonpoint sources; 3) continue management of hypoxia; 4) fund implementation of hypoxia management plans; and 5) monitor and assess hypoxic conditions in the Sound.

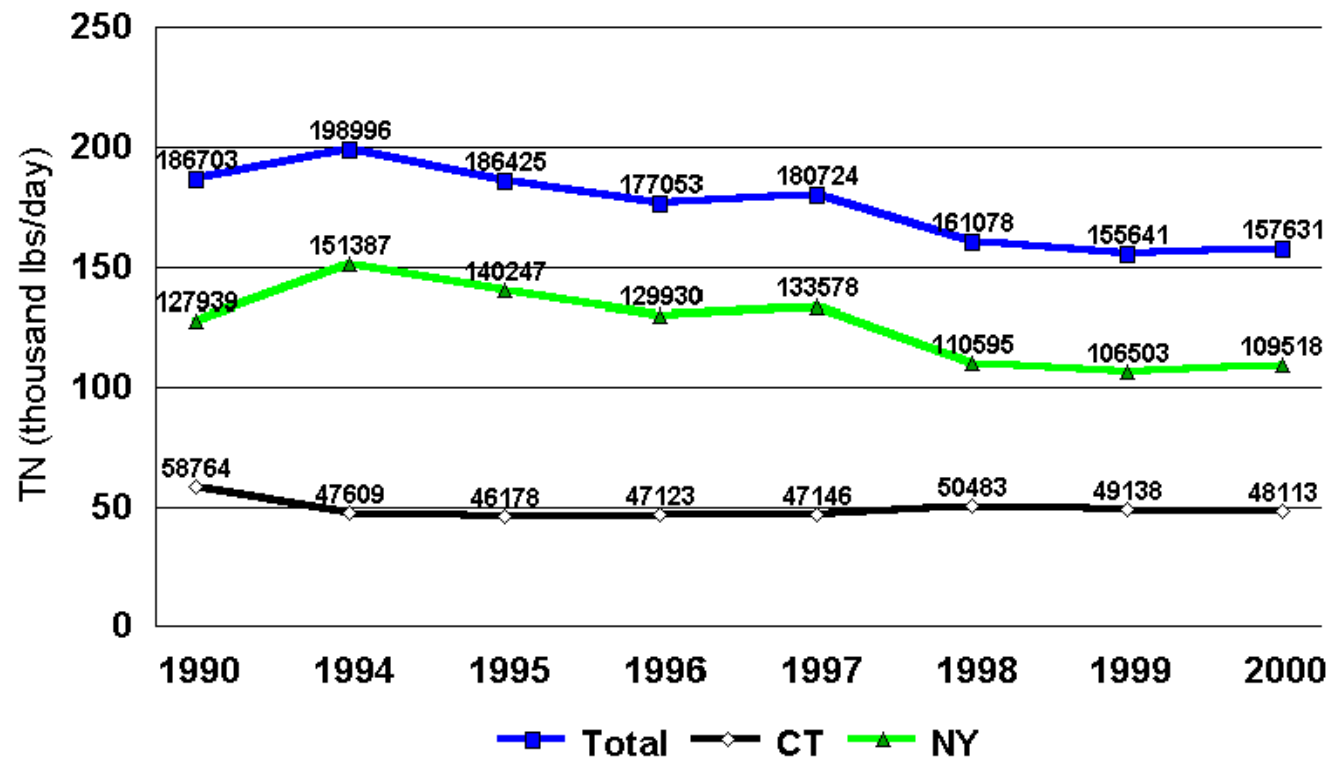


2000 Highlights:

- The states of New York and Connecticut held a series of public meetings in 2000 to gather public comments on the proposed waste load allocations to be included in the TMDL. Both states provided written responses to the public comments that were included with the TMDL submission.
- The states of New York and Connecticut completed the Total Maximum Daily Load (TMDL) for nitrogen and submitted the TMDL for EPA approval in January 2001. The TMDL is consistent with the July 1998 *Phase III Actions for Hypoxia Management*, the LISS bi-state agreement calling for a 58.5 percent reduction in human-caused (anthropogenic) nitrogen loads to the Sound over a 15 year period beginning in 1999. EPA approved the TMDL in April 2001.
- The estimated nitrogen load from STPs in the LIS drainage basin that entered the LIS in 2000 is approximately 158,676 lbs/day, a decrease of over 28,000 lbs/day from 1990 levels. This is a slight increase from the 1999 levels due to more accurate reporting by the states.
- New York's 2000 point source nitrogen loading was 110,563 lbs/day, compared with 105,759 lbs/day in 1999. Connecticut's point source nitrogen loading was 48,113 lbs/day in 2000 compared with 49,138 lbs/day in 1999. Figure 1 shows the total point source nitrogen load and the trends in New York and Connecticut since 1990. The total estimated nonpoint source load to LIS is estimated to be 27,937 tons (1999 figures), a reduction of 9,110 tons from the peak year of 1991 at 37,047 tons.
- In 2000, the maximum area and duration of dissolved oxygen (DO) levels less than 3 mg/l in LIS was 173 mi² and 36 days. This was a somewhat larger area than the 1999 hypoxic area of 121 mi², but the duration of hypoxic conditions was somewhat less than the 50 days recorded in 1999. Figure 2 shows the timing and duration of hypoxia in LIS since 1987.
- The City of Waterbury's new STP came on line in 2000, increasing its nitrogen removal capacity by 75 percent, to 4mg/l. The new plant has capacity for processing 52 MGD and up to 82 MGD of primary effluent for storm water overflows.
- As of 2000, 19 municipal STPs in Connecticut have completed nitrogen removal projects totalling over \$250 million; 5 STPs currently have nitrogen removal upgrades in progress totalling \$80 million; and 6 STPs currently are under design for nutrient removal with design grant costs totalling over \$116 million. (See Figure 3)

Figure 1

Point Source Nitrogen Load to Long Island Sound



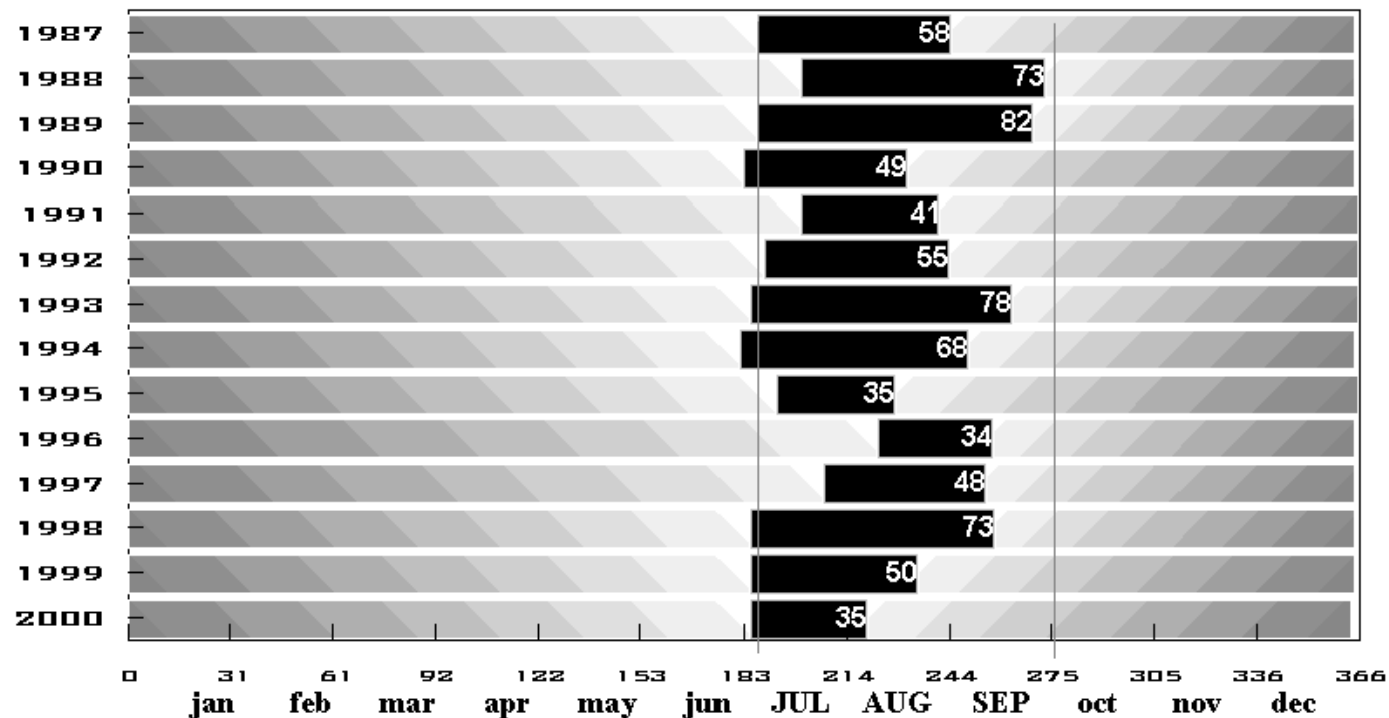
These estimates include 98 municipal, 4 state, 3 private, and 4 industrial discharges = 109

CTDEP adjusted its data in 2000 to include estimates for STPs that did not report nitrogen loads in the past.

Figure 2

Timing and Duration of Hypoxia in Long Island Sound

1987-1990 UNIVERSITY OF CONNECTICUT
1991-2000 CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION



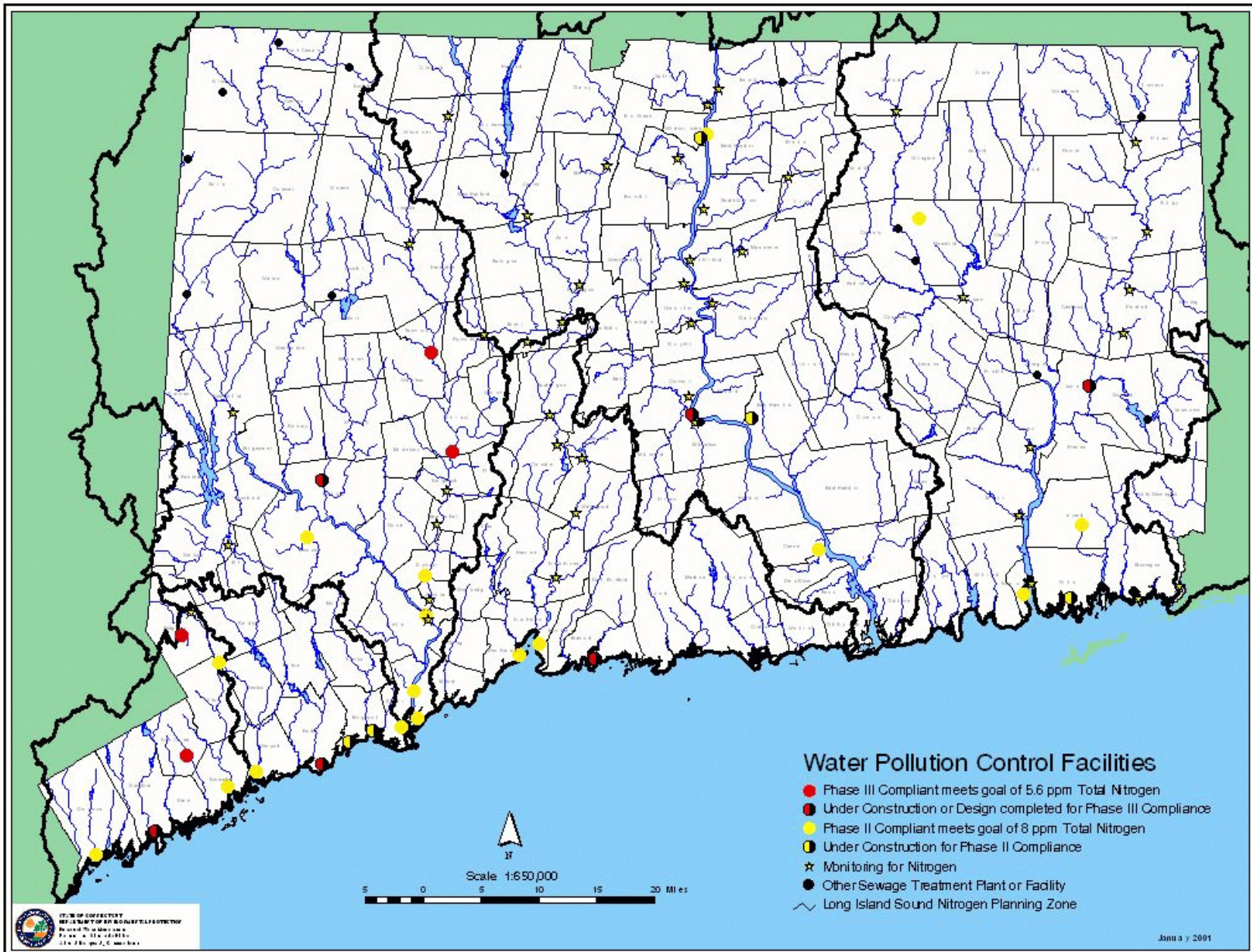


Figure 3

SUMMARY OF CCMP MANAGEMENT ACTIONS: HYPOXIA

H-1. REDUCING NITROGEN FROM SEWAGE TREATMENT PLANTS AND OTHER POINT SOURCES (CCMP TABLE 4, P. 32)

Key Elements: The states of Connecticut and New York committed to reducing nitrogen loads throughout the Long Island Sound basin using a mixed approach of retrofits, pilot studies and upgrades under existing permitting authorities. With adoption of the TMDL, state requirements to remove nitrogen loads will be formalized and expanded well beyond the commitments specified in the CCMP. In anticipation of TMDL adoption, the states have been using a variety of legal, voluntary, and funding mechanisms to promote nitrogen removal from point sources, with considerable success.

Description	2001 Planned Action
The total estimated point source load to LIS in 2000 is 157,631 lbs./day, a decrease of over 29,000 lbs/day from 1990 levels. New York loadings totalled 109,518 lbs/day; Connecticut loads totalled 48,113 lbs/day.	Continued emphasis on TMDL targets.
In Connecticut as of December 2000, 19 municipal sewage treatment plants have completed nitrogen removal projects totalling nearly \$251 million, e.g., Derby, CT -- an aeration modification and upgrade for nitrogen removal (to less than 8 mg/l) was completed July 2000; Waterbury, CT -- the new Waterbury municipal sewage treatment plant was completed on April 30, 2000. The nitrogen concentration of the new plant's effluent, to the Naugatuck River, is anticipated to be 4 mg/l, about a 75% reduction from previous nitrogen concentrations	Continue to assist municipalities with upgrades to STPs. The Portland and New London STPs are scheduled for completion of nutrient removal upgrades in 2001. Groton is expected to begin construction of nitrogen removal upgrades in 2001 utilizing \$17 M in state funding. Anticipated completion of the Fairfield STP by the end of 2001.
5 municipal STPs currently have nitrogen removal upgrades in progress totalling nearly \$80 million, e.g., Branford, CT -- facility planning and design have been completed and construction of the facility upgrade was begun in February 2000; Fairfield, CT -- began construction of nitrogen removal upgrades and was awarded an additional \$8,118,067 grant and loan from the CT Bond Commission bringing the total bond funding for this project to over \$41.2 M.	
6 municipal STPs are currently under design for nutrient removal with design grant costs totalling over \$116 million.	
New York City is completing a comprehensive watershed management plan for the East River to address continuous sewer overflow impacts on the East River and Western Long Island Sound.	
The Village of Great Neck Sewer District and Great Neck Water Pollution Control District are conducting an engineering feasibility study to evaluate diversion of current flows outside the Long Island Sound Basin.	
NYCDEP has completed an evaluation of nitrogen control feasibility alternatives for all East River water pollution control plants.	
Westchester County, using \$3.8 million in Clean Water/Clean Air Bond Act Funds, will begin construction of a full scale nitrogen control demonstration project at the Mamaroneck Sewer District employing high biomass technology.	
Belgrave Sewer District, with assistance of \$110,000 in Clean Water/Clean Air Bond Act Funds will install upflow fluidized bed technology to evaluate treatment of effluent from a trickling filter facility.	
New York and Connecticut have conducted training programs for sewage treatment plant operators to optimize existing treatment facilities nitrogen removal capabilities.	
NYSDEC has modified NPDES permits for New York City, Westchester, Nassau, and Suffolk county dischargers to limit discharges of nitrogen to 1990 load levels.	
NYCDEP has implemented control at Upper East River facilities to reduce loads to below 1990 levels. <ol style="list-style-type: none"> 1) Separate centrate treatment at Wards Island, Hunts Point, and Bowery Bay. 2) Basic Step Feed BNR at Bowery Bay, Tallman Island, Hunts Point, and Wards Island. 3) Increased sludge age at Wards Island. (Total cost of these improvements exceeds \$11,000,000. Grants from the Clean Water/Clean Air Bond Act totaling \$3.8 million will assist NYCDEP)	

Description	2001 Planned Action
<p>Clean Water/Clean Air Bond Act grants in the following amounts have been provided to the following to construct new nitrogen removal facilities:</p> <p>Glen Cove, \$3.3 million; emergency construction started in 2000. Huntington Sewer District, \$3.24 million Oyster Bay Sewer District, \$3.7 million Kings Park Sewer District, \$3.152 million Village of Northport, \$977,50 Town of Huntington, Huntington Sewer District, \$5.682 million Suffolk County DPW, Port Jefferson facility, \$3.048 million NYC \$30.828 million for phase I upgrade of the Hunts Point STP. Port Washington Water Pollution Server District, \$222,000 to convert existing tankage to create nitrification/denitrification zones to demonstrate nitrogen removal at this trickling filter facility</p>	<p>Major construction to start in 2001. Construction should commence in calendar year 2001.</p> <p>Construction should commence in calendar year 2001</p>
<p>NYC is required to rebuild and upgrade its Newtown Creek Facility in the Lower East River to denitrify the effluent and provide at least 50% reduction of influent nitrogen.</p>	<p>The project will cost over \$1.0 billion</p>

H-2. REDUCING NITROGEN LOADS FROM NON-POINT SOURCES (CCMP TABLE 5, P.34)

Key Elements: The states of Connecticut and New York have broad authorities to manage nonpoint sources of pollution and have agreed in the CCMP to emphasize control of nitrogen in ongoing state and federal programs. These include state nonpoint source programs (CWA Sec. 319), the coastal nonpoint source control program (CZARA Sec. 6217), and stormwater permitting programs. Most of the site specific studies and activities identified in the CCMP have been completed. The states have committed to using nonpoint source control programs to begin the difficult task of reducing nonpoint sources of nitrogen and anticipate continuing those efforts as the primary means to meet the reduction goal specified in the TMDL upon adoption. In addition to the regulatory and funding programs, the states have made commitments to promote essential technical assistance and training programs through NRCS and NEMO as well as agency watershed and nonpoint programs that have become widespread since development of the CCMP.

Description	2001 Planned Action
<p>Nonpoint sources of nitrogen cannot be easily monitored and are subject to wide variations depending on weather conditions, especially rainfall. Rough approximations of nonpoint source nitrogen loads have been constructed using a mix of stream monitoring data and export estimates based on land cover. These data show the 1999 nonpoint nitrogen load to be about 28,000 tons/yr, about 9,000 tons below the highest load over the last decade in 1991 of 37,000 tons/yr.</p>	<p>The LISS plans to revise these estimates using a USGS report to be released in 2001.</p>
<p>The LISS provided a fourth year of funding in FY00 to the University of Connecticut/Cooperative Extension System (UConn/CES) to continue its Nonpoint Education for Municipal Officials (NEMO) program in Long Island Sound coastal tributary watersheds. The scope of the program, which originally was targeted at the seven towns in the Norwalk River watershed, then expanded to include towns and watersheds in other parts of Fairfield County and in Westchester County, NY, focused primarily on assisting the NY Sea Grant Program establish a counterpart NEMO program on Long Island. project.</p> <p>In 2000, the NEMO program was expanded to include a new coordinator and office in SUNY Stony Brook, New York. The New York NEMO program is working with the Hempstead Harbor and Manhasset Bay Protection Committees in briefing local boards and commissions and in conducting two basic NEMO workshops for municipal officials in those communities. In three and a half years, the LIS NEMO program has conducted 110 workshops reaching more than 2400 participants in approximately 30 communities. The LISS provided a total of \$194,000 in FY96 and FY98-00 to support the Long Island Sound NEMO</p>	<p>Continued LISS support for NY NEMO in FY2001 was approved by the Management Committee.</p>
<p>The LISS continued to provide staff support to the Norwalk River Watershed Initiative. Implementation of the Norwalk River Watershed Action Plan is being guided by the Norwalk River Watershed Advisory Committee, with representatives from EPA, the USDA Natural Resources Conservation Service (NRCS), CT DEP, the seven watershed communities, several citizen groups, and area residents. From FY98-01, EPA awarded \$340,000 in Clean Water Act section 319 funds to support several high priority implementation activities, including hiring a "watershed coordinator" (in February 2000), riparian buffer restoration, stormwater management, road sand/salt reduction, and septic system outreach and education.</p>	<p>Continued LISS support for the NRWI in FY2001.</p>

Description	2001 Planned Action
CTDEP expanded its Watershed management program in 2000 by filling 5 watershed coordinator positions within the Bureau of Water Management Planning and Standards Division.	Work with other watershed stakeholders to plan and implement watershed management activities.
Currently CTDEP is implementing 104 active §319 projects from FY94-2001 grants. Twenty four (24) new projects were funded under §319 for the year 2000 and 12 projects were closed out.	
CTDEP completed a §104(b)(3) watershed modeling project in December 2000. Section 104(b)(3) funds were utilized to develop a Long Island Sound watershed model, similar to that used by the Chesapeake Bay Program, to guide nonpoint nitrogen and watershed management in general. CT DEP contracted to develop a watershed model that will serve to (1) assess nonpoint source contributions of nitrogen, phosphorus, and carbon to Long Island Sound, and (2) assist CT DEP in managing these nutrients to reduce hypoxia. Last year, CT DEP contractors completed the LIS Watershed Model and presented their preliminary findings at the 2000 National Monitoring Projects Symposium in Connecticut.	A final report is due in 2001. CTDEP will make the modeling report available to environmental managers and professionals.
NYSDEC is providing funding support to Westchester County to conduct a special monitoring project to measure nonpoint source and tributary loads from Westchester County.	
NYSDEC completed a report which evaluated nonpoint source nitrogen loads to LIS from Nassau and Suffolk Counties.	
Westchester County Department of Planning, with funding support from NYSDEC, is continuing to develop watershed management plans for Westchester County (Zone 7). Watershed Advisory Committee 4 completed a draft management plan for the Sheldrake and Mamaroneck rivers and Mamaroneck Harbor.	Finalize WAC 4 management plans.
In 2000, the Suffolk County Department of Health, with funding support from NYS DEC began preparation of a Suffolk County Watershed Management Plan for Suffolk County (Zone 11).	
NYSDEC is working with the coalition of Nassau County dischargers to develop a work program for the development of a watershed management plan for Nassau County Zone (10).	
Local watershed planning efforts for Hempstead Harbor and Manhasset Bay, led by local municipalities, continued in 2000.	

H-3. CONTINUING MANAGEMENT OF HYPOXIA (CCMP TABLE 6, P. 39)

Key Elements: The actions specified in the CCMP primarily reference research, monitoring and modeling activities and the use of that information and those tools to improve understanding and management of hypoxia in the Sound. Much progress has been made in this area to provide the scientific basis for the TMDL and the TMDL specifies the implementation steps recommended in the CCMP to control hypoxia. Finally, the action to continue appropriate modeling and research and periodically review management plans is central to the adaptive management approach promoted in the TMDL.

Description	2001 Planned Action
A series of Public Informational Meetings for the WLA were held in Connecticut and in New York in 2000. The final TMDL with WLA was completed by the states and submitted to EPA in early 2001.	Begin implementation of TMDL.
EPA, CTDEP, NYSDEC and NYCDEP continued to address the System-Wide Eutrophication Model (SWEM) as a successor to the LIS 3 model. The agencies met in 2000 several times to review information and data collected as part of the refinement process.	A final agreement on the use of the SWEM is expected in 2001. The management conference provided funds in the FY2001 LISS budget for additional SWEM work.

H-4. FUNDING TO IMPLEMENT HYPOXIA MANAGEMENT PLANS (CCMP TABLE 7, P. 41)

Key Elements: The intentions of the CCMP actions were to fully fund existing nonpoint source (CWA Sec. 319 and CZARA 6217) programs, have states supplement state revolving fund programs, and to appropriate additional federal funds for management, emphasizing the Phase III management efforts incorporated in the TMDL.

Description	2001 Planned Action
<p>In 1996-2000, CT committed \$390 million for sewage treatment plant reconstruction projects that will benefit LIS and estimates that Clean Water Funding will be adequate to finance Phase III upgrade requirements. In CT the 2000 funding was \$37.9 million. Total CT funding through 2000 including all completed projects, projects still under construction, and projects still in the design phase totals over \$447 million.</p>	<p>For 2001 the CT Bond Commission approved over \$11.6 M in grant & loan for design and upgrades to STPs for advanced nitrogen removal.</p>

H-5. MONITORING AND ASSESSMENT OF HYPOXIA (CCMP TABLE 8, P. 4)

Key Elements: The CCMP recognized the importance of continuing and expanding monitoring efforts to answer fundamental questions on the health of LIS and to identify trends and changes that may be related to management activities. Most of the recommended monitoring was to be directed towards oxygen and nutrients because of the hypoxia problem in LIS. In addition, several specific monitoring/research projects were listed, most of which were completed shortly after the CCMP was released. Lobsters were identified for special attention because of disease problems that pre-date the recent lobster die-off in western LIS. The CCMP also recommended EPA complete their dissolved oxygen criteria report to be used by the states to develop new criteria, if appropriate.

Description	2001 Planned Action
<p>The LISS partners continued ambient monitoring of LIS in 2000. NYCDEP performed ambient monitoring of NY waters in western LIS. IEC continued its summer hypoxia monitoring in LIS by collection and weekly measurements of DO, temperature, salinity, chlorophyll a at 21 stations; at a subset of stations, samples were collected for phytoplankton and pfiesteria</p> <p>During the summer of 2000 CTDEP's LIS ambient water quality monitoring program took part in the EPA's National Coastal Assessment (or Coastal 2000) program. Along with the usual water quality parameters taken by the program, sediment samples were collected once from half of the fixed (sampling point) stations in LIS. In September 2000, the CT DEP produced its <i>Summer Hypoxia Monitoring Survey 1991-1998 Data Review</i>, an 84 page summary of 8 years of LIS water quality monitoring by CTDEP.</p>	<p>In the summer of 2001 the CT DEP will continue to participate in the National Coastal Assessment by recording usual water quality parameters and collect sediment samples from the other half of the fixed (sampling point) stations in LIS.</p>
<p>Hypoxic conditions in LIS were estimated to have extended for a period of 35 days and to cover a maximum area of 171 square miles. This compares favorably with the 14 year averages of 56 days and 206 square miles.</p>	<p>Continued ambient monitoring of LIS.</p>
<p>EPA published the <i>Ambient Aquatic Life Water Quality Criteria for DO (Saltwater): Cape Cod to Cape Hateras</i>, EPA-822-R-00-012, November 2000.</p> <p>CTDEP proposed a revision to its water quality criteria for DO based on the EPA criteria document.</p>	<p>EPA approved and DEP adopted new DO criteria for saltwater in 2001.</p>
<p>The University of Connecticut Department of Marine Sciences at Avery Point, Connecticut, continued to operate and maintain its real-time water quality monitoring network, MYSOUND through the third year of a three-year EPA grant under the EMPACT (Environmental Monitoring for Public Access and Community Tracking) program. The MYSOUND project added monitoring stations in the Western Sound, maintained by the Indian Harbor Yacht Club and Hempstead Harbor, maintained by the Coalition to Save Hempstead Harbor. The MYSOUND stations monitor surface and bottom waters for dissolved oxygen, temperature, salinity and selected other parameters at specific sites. The MYSOUND website address is: http://www.mysound.uconn.edu.</p>	<p>The LISS will fund an additional year of MYSOUND monitoring in FY2001.</p>

Controlling Major Sources of Pathogens

Pathogens can cause illness in people exposed through bathing in, or consuming fish or shellfish from, contaminated waters. Pathogen contamination results in closed beaches, fisheries, or shellfish areas, hurting local economies and damaging public perception of the ecological health of the Sound.

CCMP Strategy:

The CCMP identifies a seven part strategy to control pathogen contamination to LIS from: 1) combined sewer overflows (CSOs); 2) non-point sources (NPS); 3) sewage treatment plants (STPs); 4) vessel discharges; and 5) individual on-site systems/discharges. The final two elements of the strategy are to control pathogen contamination through: 6) public education; and 7) monitoring and assessment of pathogens.



2000 Highlights:

- Phased combined sewer overflow (CSO) abatement projects to alleviate pathogen problems continued in both states in 2000. Connecticut anticipates spending \$560 million over the next 15 years to complete these CSO projects.
- New York City continues its \$1.5 billion program to abate CSOs; NYC's comprehensive sewer abatement program is scheduled for completion between 2001 and 2006.
- New York has increased capture of CSOs from 18 percent to 40 percent, and is in almost complete compliance with EPA's minimum standards for CSO controls.
- The City of Waterbury Connecticut's new STP can process up to 82 MGD of primary sewage for storm water events. The upgrade included a new state of the art ultraviolet disinfection unit to eliminate pathogens and reduce the chlorine toxicity resulting from traditional chlorine disinfection systems.
- As of 2000, Connecticut has 63 land-based pumpout facilities and 8 pumpout boat; of the 71 pumpouts, 70 are accessible to the general public; there are 15 total dump stations, 14 of which are accessible to the public. In the NYS coastal area, 2 additional pumpout stations were completed during 2000. This brings the total number of pumpouts along LIS in NYS to 41.
- Broader efforts are underway in both states to address nonpoint sources of pollution, and storm water management will also contribute to the control of pathogens to the Sound.
- In 2000, EPA approved CTDEP's TMDL for the Sasco Brook. The TMDL was approved using pathogen (fecal coliform indicator bacteria) from nonpoint sources under the *Human Contact Use* water quality parameter.

SUMMARY OF CCMP MANAGEMENT ACTIONS: PATHOGEN CONTAMINATION

P-1. CONTROLLING PATHOGEN CONTAMINATION FROM COMBINED SEWER OVERFLOWS (CCMP TABLE 31, P. 83)

Key Elements: Many municipalities with older sewerage facilities have combined stormwater and sanitary systems. These systems overflow during rainfalls, causing untreated sewage to reach the Sound. Abatement of combined sewer overflows (CSOs) will reduce a major source of pathogens to the Sound. CSO abatement programs are underway in New York and Connecticut.

Description	2001 Planned Action
<p>CTDEP awarded \$24 million in Clean Water Fund financing to New Haven for sewer separation contracts. New Haven has also finalized their Long Term Control Plan (LTCP) for CSO control.</p> <p>Bridgeport has continued work on their LTCP. (Total expected state grant & loan funding is over \$5 M)</p> <p>The CT State Bond Commission awarded over \$36.7 M toward CSO projects statewide in 2000. (Including the New Haven project)</p>	<p>The New Haven LTCP will be formally submitted in 2001.</p> <p>Bridgeport will formally submit their LTCP in 2001.</p> <p>Allocate funding for additional projects in 2001.</p>
<p>Bronx River CSO Storage Conduit Project will provide storage capacity. Meetings and field investigations have taken place</p>	
<p>Flushing Bay CSO Retention Facility is an underground storage tank which has a storage capacity of 43 million gallons, 48 MG in the tank and 15 MG in upstream sewers. The design has been completed with phase I construction of tank 75% complete.</p>	
<p>Hutchinson River CSO Storage Conduit Project will provide storage capacity. Meetings and field investigations have taken place.</p>	
<p>Alley Creek drainage area improvements/CSO abatement Facilities project has three components. The Alley Creek drainage area improvements, Alley Creek CSO abatement facility, and the Oakland Ravine Stormwater Treatment System. Meetings and field investigations have taken place.</p>	
<p>Westchester Creek CSO Storage Tank Project will include construction of a 12 MG underground storage tanks. Meetings and planning on take place.</p>	

P-2. CONTROLLING PATHOGEN CONTAMINATION FROM NONPOINT SOURCES (CCMP TABLE 32, P. 84R)

Key Elements: LISS has determined that nonpoint sources, including urban stormwater runoff, is one of the two most significant sources of pathogen contamination in Long Island Sound. Urban stormwater runoff containing pathogens can originate from many sources. Therefore, it presents a challenge to manage pathogens from nonpoint sources. Methods of controlling pathogens from nonpoint sources include (although are not limited to): best management practices; permitting activities; changes in building codes; consent agreements; and education.

Description	2001 Planned Action
<p>In 2000 the USEPA approved CTDEP's TMDL for the Sasco Brook. This TMDL was approved using pathogen (fecal coliform indicator bacteria) from nonpoint sources under the "Human Contact Use" water quality parameter.</p>	<p>Implement the plan and monitor.</p>
<p>CT Dept. Of Agriculture's Division of Aquaculture continued its annual monitoring of shellfish beds for pathogens, providing invaluable information to the shellfish industry and the public on the classification and condition of shellfish beds.</p>	<p>Continue to monitor shellfish beds for health and viability.</p>

Description	2001 Planned Action
<p>The NYSDEC Phase II storm water implementation plan will involve the permitting of many storm sewer systems which discharge to the Long Island Sound. NYSDEC is also looking into a phase-in approach (statewide) and have discussed the possibility of LIS being one of the first areas to begin this effort with.</p>	<p>NYSDEC has made some progress, but will need to have SPDES permits in place for these discharges by 3/10/2003.</p>
<p>The LISS provided a fourth year of funding in FY00 to the University of Connecticut/Cooperative Extension System (UConn/CES) to continue its Nonpoint Education for Municipal Officials (NEMO) program in Long Island Sound coastal tributary watersheds. The scope of the program, which originally was targeted at the seven towns in the Norwalk River watershed, then expanded to include towns and watersheds in other parts of Fairfield County and in Westchester County, NY, focused primarily on assisting the NY Sea Grant Program establish a counterpart NEMO program on Long Island. project.</p> <p>In 2000, the NEMO program was expanded to include a new coordinator and office in SUNY Stony Brook, New York. The New York NEMO program is working with the Hempstead Harbor and Manhasset Bay Protection Committees in briefing local boards and commissions and in conducting two basic NEMO workshops for municipal officials in those communities. In three and a half years, the LIS NEMO program has conducted 110 workshops reaching more than 2400 participants in approximately 30 communities. The LISS provided a total of \$194,000 in FY96 and FY98-00 to support the Long Island Sound NEMO</p>	
<p>The LISS continued to provide staff support to the Norwalk River Watershed Initiative. Implementation of the Norwalk River Watershed Action Plan is being guided by the Norwalk River Watershed Advisory Committee, with representatives from EPA, the USDA Natural Resources Conservation Service (NRCS), CT DEP, the seven watershed communities, several citizen groups, and area residents. From FY98-01, EPA awarded \$340,000 in Clean Water Act section 319 funds to support several high priority implementation activities, including hiring a "watershed coordinator" (in February 2000), riparian buffer restoration, stormwater management, road sand/salt reduction, and septic system outreach and education.</p>	
<p>The LISS funded a project under the Small Grants program for Friends of the Bay in partnership with the incorporated Villages of Bayville and Lattintown and the Davis Park Civic Association, to conduct an education and action program for residential waste water systems. The project produced 2500 copies of a septic system record keeping file and owners guide, which were used for residents in the project area and were distributed to other interested organizations.</p>	<p>Organizations in Westchester, Port Washington, Port Jefferson, and Hempstead Harbor have expressed an interest in using these in their communities.</p>

P-3. CONTROLLING PATHOGEN CONTAMINATION FROM SEWAGE TREATMENT PLANTS (CCMP TABLE 33, P. 85)

Key Elements: If they are operating properly, most sewage treatment plants (STPs) contribute a relatively small percentage of pathogens to the Sound. However, malfunctions, illegal sewer hookups, and wet weather overflows can cause problems at STPs.

Description	2001 Planned Action
<p>Branford and Fairfield Connecticut continue major plant upgrades including improved disinfection systems which will reduce pathogen contamination.</p>	<p>Construction will continue in 2001.</p>
<p>The Waterbury Connecticut STP upgrade was completed in April 2000 and included a new state of the art Ultraviolet (UV) disinfection unit to eliminate pathogens and reduce the chlorine toxicity resulting from traditional chlorine disinfection systems.</p>	<p>Continue to operate the new facilities and closely monitor for efficiency.</p>
<p>South Windsor Connecticut was awarded a grant and loan of \$1.02 M for the construction of an ultraviolet disinfection system to destroy pathogens in its discharge to the CT River.</p>	

P-4. CONTROLLING PATHOGEN CONTAMINATION FROM VESSEL DISCHARGES (CCMP TABLE 34, P. 86)

Key Elements: Although they are not a primary source of pathogens in the Sound, vessel discharges can be a cause of local water quality problems in poorly-flushed embayments. Creation of vessel No-Discharge Zones, use of best management practices, and increasing the number of vessel pumpout stations are major actions to manage pathogen contamination from vessel discharges.

Description	2001 Planned Action
<p>A decision on Federal FY 2000 funding for CT was received in April 2000. \$627,000.00 was received from F&WS for FFY 2000. Two additional boats were operational for the 2000 boating season. In CT by the end of the 2000 boating season there were 71 total pumpouts (8 of which are boats) 70 of which are available to the general public and 15 dump stations (including one floating rest room) 14 of which are available to the general public.</p> <p>CTDEP pumpout boat "Sound Choice" was donated to the town of Groton for operation in the Mystic Harbor area. In 2000 CTDEP purchased an additional pumpout boat for education and outreach purposes and the servicing of boats in the Lower Connecticut River, the Niantic River and the Thames River</p>	<p>A decision on Federal FY 2001 funding for CT is anticipated in April 2001. CT has proposed to construct 3 additional stationary pumpouts and develop two boat programs in 2001/2002 in addition to the 9 stationary facilities and 1 boat currently in process.</p> <p>The Mystic boat will be operated and maintained by the Towns of Groton and Stonington with a CVA grant. The DEP boat will continue its education and outreach mission exclusively in the Connecticut River for the 2001 boating season.</p>
<p>Publication in the "Embassy Guide" of the locations of pumpouts in all of Long Island Sound was coordinated between staff of the CT and NY CVA programs.</p>	<p>This biennial publication will again be prepared prior to the 2003 boating season</p>
<p>Education of boaters continued to be a focus of the CT CVA program. Boat shows were attended with displays and individual boater contacts were made. Annual meetings of the Connecticut Marine Trades Association and the Connecticut Harbor Management Association were attended with outreach materials displayed.</p>	<p>The same basic work plan will be implemented in 2001.</p>
<p>Preliminary internal discussions were conducted on the possibility of the establishment of EPA designated no discharge areas in two harbors in eastern CT.</p>	<p>It is anticipated that work will proceed on the establishment of no discharge areas for the CT side of the Pawcatuck River (the RI side is already so designated) and for the Mystic Harbor area.</p>
<p>CTDEPs <i>Best Management Practices Manual for Coastal Marinas</i>, completed in 1992, encourages marina operators to accept responsibility for providing proper boat sewage disposal facilities to boaters. A new 'Clean Marina Program' is being implemented including the use of the BMP Manual and other education outreach tools.</p>	<p>DEP-OLISP and Boating Division are developing a Clean Marina Program. As part of this new initiative, CT-DEP will update <i>Best Management Practices for Coastal Marinas</i>. This document will include practices for marinas owners and operators to reduce their pollution potential, and will include sections on minimizing impacts to living marine resources and habitats, and preventing the spread of pathogens. The program will include a boater outreach and education component, part of which will address proper disposal of boat sewage to prevent the spread of pathogens.</p>

P-5. CONTROLLING PATHOGEN CONTAMINATION FROM INDIVIDUAL ON-SITE SYSTEMS/DISCHARGES (CCMP TABLE 35, P. 87)

Key Elements: When they are appropriately sited, functioning properly, and well-maintained, septic systems should not be a source of pathogens to the Sound. When not properly sited or maintained, they become a source of pathogens to the Sound. Both states' and local governments must play a role in managing pathogen contamination from individual on-site systems to the Sound.

Description	2001 Planned Action
<p>NYSDEC is using CWA Section 319 funds to support development of an on-site training center. A demonstration facility is located at the campus of the SUNY College at Morrisville, New York. Part of DEC's funds subsidize tuition for public officials that take the training. The schedule for training courses through September 30, 2001 was recently distributed to DEC Regional Offices and to County Water Quality Coordinating Committees.</p>	
<p>The Nonpoint Source Coordinating Committee, coordinated by the NYSDEC Division of Water, NPS Management Section, convenes a On site Wastewater Treatment System Work Group. The work group is comprised of stakeholders interested in the proper siting, design, installation, and operation and maintenance of septic systems.</p>	
<p>The NYSDEC and NYSDOS are drafting a management strategy for Onsite Wastewater Treatment Systems (OWTS), in conformance with the provisions of the Coastal NPS Management Program under Section 6217 of the CZMA. Specific issues being addressed are the periodic inspection of operating systems, and the possible impact on nitrogen limited waters.</p>	

P-6. CONTROLLING PATHOGEN CONTAMINATION THROUGH PUBLIC EDUCATION (CCMP TABLE 36, P. 88)

Key Elements: In many cases, a simple lifestyle change can reduce or eliminate a source of pathogen contamination in the Sound. The CCMP calls for development and implementation of public education plan, targeting specific audiences, in cooperation with federal, state and local public outreach experts and environmental educators.

Description	2001 Planned Action
<p>The LISS developed and distributed thousands of copies of a four-part poster series highlighting nonpoint source pollution problems. The posters humorously illustrate four common nonpoint pollution problems for the Sound, including runoff from car washing, fertilizer, leaking automotive oil, and pet waste. The posters were adapted for LIS from the Washington State Department of Ecology's posters for Puget Sound.</p>	

P-7. MONITORING AND ASSESSMENT OF PATHOGENS (CCMP TABLE 37, P. 89)

Key Elements: Monitoring of pathogens is a tool that will allow assessment of the success of the pathogen reduction activities called for in the CCMP. Monitoring and assessment are essential to improved understanding of pathogen contamination in the Sound. A well-designed monitoring program is an essential element for effective management of Long Island Sound and its watershed.

Description	2001 Planned Action
<p>The <i>Beaches Environmental Assessment and Coastal Health Act</i> (BEACH), P.L. 106-284 was enacted on October 10, 2000. The Act will ensure standards for pathogens that protect human health; establish monitoring and notification measures and provide initial development and implementation grants to states.</p>	<p>The states of Connecticut and New York will determine appropriate actions to implement Beach Act requirements.</p>

Protecting the Sound from the Adverse Effects of Toxic Substances

Toxic substances can cause adverse human and ecosystem health effects, and can result in significant negative economic impacts on the value of the natural resources of the Sound.

CCMP Strategy:

The CCMP strategy to address toxic contamination in LIS has five principal elements: 1) toxic contaminant source controls and prevention; 2) addressing sediment contamination; 3) improving human health risk management; 4) monitoring and assessment of toxic contaminants; and 5) research to investigate toxic contamination.



2000 Highlights:

- EPA and ACOE continued to work together on the Environmental Impact Statement (EIS) for designation of open water disposal sites in LIS. The agencies jointly held public meetings in Connecticut and New York in 2000 to gather public comment and input on the site designation process, proposed workplan, and site selection evaluation criteria and methodology. The designation process is expected to be completed by March 2002.
- CTDEP continued development of a Long Island Sound Sediment Quality Information Database (SQUID) using GIS and associated databases, which include such spatial and attribute data as: sewage treatment plant outfalls; combined sewer outfalls; industrial discharges; oil & chemical spills; landfills; stormwater outfalls; and locations in the Sound and harbors where sediment testing has been conducted.
- As a part of New York's State Pollution Discharge Elimination System (SPDES) permit/toxic reduction program NYSDEC developed total residual chlorine limits for the following 15 STPs in the Long Island Sound basin. The facilities are: Port Washington; Greenport (V); Great Neck (V); Great Neck – PCD; Glen Cove; Belgrave; Huntington (T); Oyster Bay; New Rochelle; Blind Brook; Port Chester; Northport (V); SUNY- SCSD #21; Port Jefferson-SCSD #1; and Kings Park - SCSD #6.
- In 2000, over 95% of the 84 Connecticut STPs discharging into the Sound or its tributaries passed toxicity testing. This is a 26% increase from 1999 in the number of facilities that discharge treated water that is safe for most aquatic life.
- EPA approved CTDEP TMDLs for copper, lead, and zinc for Factory Brook and for chlorine for Belden Hill Brook. This latter plan essentially required that a discharge to a *Class A* stream be removed. A single treatment facility installed an ultraviolet disinfection unit to replace an old chlorination unit and moved its discharge from the brook to a ground discharge.

SUMMARY OF MANAGEMENT ACTIONS: TOXIC SUBSTANCES

T-1. TOXIC CONTAMINANT SOURCE CONTROLS AND POLLUTION PREVENTION (CCMP TABLE 21, P. 65)

Key Elements: Permit programs and enforcement activity for both direct and indirect discharges, including toxicity testing of those discharges, are responsible for greatly reducing toxic substance loads over the past 25 years. LISS' priority management recommendation for toxic substances is to continue these successful activities, all of which are funded under current programs. Other programs that are designed to prevent pollution and reduce pollutant loads must also be supported as part of a comprehensive program to manage toxic contamination in the Sound.

Description	2001 Planned Action
A base Geographic Information System (GIS) project for the Sediment Quality Information Data (SQUID) system has been created for New Haven Harbor; A User Manual has been created.	User training of EPA, ACOE, NYSDEC, and NMFS staff is planned for February-March. A Technical Manual is under development.
The CT Bond Commission awarded South Windsor a grant & loan of \$1.02 million to install an ultra-violet disinfection system to replace an old chlorination system that was causing a condition of chlorine toxicity in the Connecticut River, effectively eliminating the toxicity.	Encourage other municipal STP upgrades to include UV technology in their disinfection processes.
CT DEP submitted to EPA a TMDL for chlorine for Belden Hill Brook. EPA approved the Belden Hill Brook TMDL on June 9, 2000. This plan essentially required that a discharge to a Class A stream be removed. A single treatment facility (small) installed an ultra-violet disinfection unit to replace an old chlorination unit and moved its discharge from the brook to a ground discharge.	Follow up monitoring will be conducted under the rotating watershed basin sampling plan.
CT DEP submitted to EPA a TMDL for copper, lead, and zinc for Factory Brook. EPA approved the Factory Brook TMDL on February 3, 2000.	Follow up monitoring will be conducted under the rotating watershed basin sampling plan.
Over 95% of the CT STPs passed toxicity testing in 2000; this is a 26% increase in the number of facilities that discharge treated water safe for most aquatic life.	As more STPs upgrade their facilities, the expected goal of 100% discharge passing the toxicity test will be reached.
As a part the SPDES permit program/toxic reduction program, NYSDEC developed total residual chlorine limits for the following fifteen (15) sewage treatment facilities in the Long Island Sound Basin. These limits were developed using the CORMIX model and acute and chronic standards of 13.0 ug/l and 7.5 ug/l, respectively. The facilities are: Port Washington, Greenport (V), Great Neck (V), Great Neck – PCD, Glen Cove STP, Belgrave, Huntington (T), Oyster Bay, New Rochelle, Blind Brook, Port Chester, Northport (V), SUNY- SCSD #21, Port Jefferson-SCSD #1, and Kings Park - SCSD #6.	

T-2. ADDRESSING SEDIMENT CONTAMINATION (CCMP TABLE 22, P. 67)

Key Elements: To begin the process of remediating sediments, LISS will conduct further assessments of toxic contaminant distribution in sediments of western Long Island Sound and embayments identified as having elevated toxic contaminant burdens. Based on these assessments, it will be possible to determine the feasibility, value, and cost of remediating contaminated sediments, where remediation may be necessary.

Description	2001 Planned Action
EPA and the ACOE continued work on the EIS for dredged material disposal site designation in LIS. A number of public meetings were held to present and discuss elements of the EIS.	The EIS process is ongoing.

T-3. IMPROVING HUMAN HEALTH RISK MANAGEMENT (CCMP TABLE 23, P. 68)

Key Elements: The objective of human health risk management is to determine the likelihood that exposure to a toxic substance will have adverse impacts on human health and to estimate the degree of the effects. In the case of Long Island Sound, the states of Connecticut and New York have issued advisories on consumption of selected seafood taken from the Sound. By improving communication of consumer advisories, it is anticipated that public health risk will be improved.

Description	2001 Planned Action
CTDEP continued to support UCONN researchers conducting research and monitoring for air deposition of mercury in LIS.	

T-4. MONITORING AND ASSESSMENT OF TOXIC CONTAMINANTS (CCMP TABLE 24, P. 71)

Key Elements: The LISS toxic contaminant monitoring program will focus on water, sediment and tissue media. The data collected from the monitoring program will be used to answer questions about resource and human health risks and sources of toxic contaminants.

Description	2001 Planned Action
<p>CTDEP participated in the EPA-sponsored Coastal 2000 monitoring program.</p> <p>Under the EIS process for designation of dredged material disposal sites in LIS under MPRASA, the ACOE and EPA conducted sampling and characterization of sediments at disposal sites in LIS. Sediments were analyzed for texture, chemistry and toxicity. Results are pending additional and complementary work under the EIS.</p>	

T-5. RESEARCH TO INVESTIGATE TOXIC CONTAMINATION (CCMP TABLE 25, P. 73)

Key Elements: Toxic contaminants identified in Long Island Sound are numerous; their pathways to the Sound are varied, and their effects on the environment, marine life and human health are not fully understood. These factors must be understood if effective management is to be accomplished. These needs are identified as recommendations at this time, though continuation of work begun by LISS through the EPA Long Island Sound Office should recognize these recommendations as priority research topics.

Description	2001 Planned Action
<p>The Hudson River Foundation is overseeing the development of the CARP (Contaminant Assessment Reduction Project) project, a model to assess in-place loadings and levels of toxics in New York Harbor. This project is funded through Port Authority of NY and NJ funds. Once completed in 2004, the model will enable managers to more accurately evaluate what toxic source controls are necessary in order to render newly deposited sediments cleaner. The model will also be the tool used to develop TMDLs for the Harbor, which could in turn, influence levels of toxics in LIS.</p> <p>The LISS funded the Marine Science Research Center, SUNY Stony Brook to investigate the effects of trace metals, organic carbon and inorganic nutrients in surface waters of LIS on phytoplankton growth. (DR. Wilhelmy, P.I.) The LISS also supported research that will investigate metal contaminant concentrations in LIS sediments over time (Dr. Varekamp, P.I.) These two-year research projects are ongoing.</p>	<p>After extensive review, the contractor for the CARP was selected and will begin work November 1, 2001.</p>

Reducing Floatable Debris in the Sound

Litter, debris, and trash floating in LIS coastal waters and washing up on LIS shorelines can be a nuisance to, or hazard for boaters, beach-goers, bathers, fishermen, and other recreational or commercial LIS users. Floatable debris can harm wildlife and living marine resources, and it diminishes the aesthetic enjoyment of the Sound as well as the surrounding environment.

CCMP Strategy

This CCMP priority area has two principal management actions: 1) controlling floatable debris from combined sewer overflows (CSOs) and storm sewers; and 2) increasing floatable debris cleanup efforts.



2000 Highlights:

- Efforts to control combined sewer overflows (CSOs) and improve stormwater management, described under *Pathogens*, are also helping to reduce the amount of litter reaching the Sound. Communities around the Sound are adopting watershed management approaches to control sources of pollution entering the Sound, including point and nonpoint sources, CSOs, and land use practices. Many communities have formed watershed management committees or groups to work together in addressing environmental management problems that have no jurisdictional boundaries.
- As a result of National Beach Clean Up Day in September 2000, 1,674 volunteers from New York removed 34,300 pounds of debris from the shoreline along the Sound at 73 sites. In Connecticut, over 475 volunteers removed over 5,650 pounds of trash from 24 miles of shoreline.
- CTDEP's *Best Management Practices for Coastal Marinas* guide encourages marina operators to accept responsibility for litter control and recycling. The guide is being updated as part of CTDEP's Clean Marina Program.

**SUMMARY OF CCMP MANAGEMENT ACTIONS:
FLOATABLE DEBRIS**

F-1. CONTROLLING FLOATABLE DEBRIS FROM CSOs AND STORMWATER SEWERS (CCMP TABLE 38, P. 96)

Key Elements: Ongoing programs conducted by state and municipal governments to reduce floatable debris; and long-term CSO abatement and NPDES stormwater permitting programs.

Description	2001 Planned Action
<p>DEP-OLISP and Boating Division are developing a Clean Marina Program. As part of this new initiative, CT-DEP will update <i>Best Management Practices for Coastal Marinas</i>. This document will include practices for marinas owners and operators to reduce their pollution potential, and will include a section on reducing floatable debris. The program will include a recreational boater outreach and education component, part of which will address control of solid waste on boats. Part of the outreach will utilize producing and distributing laminated "Clean Boating Tips" cards detailing methods to minimize the environmental impacts of common boating practices.</p>	<p>CTDEPs <i>Best Management Practices for Coastal Marinas</i> encourages marina operators to accept responsibility for litter control and recycling.</p>

F-2. INCREASING FLOATABLE DEBRIS CLEANUP EFFORTS (CCMP TABLE 39, P. 99)

Key Elements: Anti-litter educational campaigns, annual beach clean-ups, litter control demonstration projects and storm drain stenciling programs.

Description	2001 Planned Action
<p><i>National Beach Clean Up Day</i> in September 2000 resulted in 1,674 volunteers from New York picking up over 34,000 pounds of debris at 73 sites on LIS. In Connecticut, over 475 volunteers removed over 5,650 pounds of debris from 24 miles of shoreline.</p>	<p>Save the Sound, Inc., in cooperation with the CT Sea Grant program and the American Littoral Society in New York will promote National Clean Up Day in 2001.</p>

Managing and Conserving Living Resources and Their Habitats

The overall abundance and diversity of habitats and living marine resources in the Sound is a strong indicator of the health of the ecosystem. Years of neglect, mismanagement, and damaging actions have diminished the abundance and diversity of the habitats and living marine resources of the Sound. These actions have caused water quality problems, adversely affected critical habitats, and contributed to damaging economic impacts from flooding, erosion, and runoff pollution.

CCMP Strategy:

The CCMP identified the following elements to preserve, protect and enhance LIS living marine resources and their habitats: 1) restoration and enhancement of aquatic and terrestrial habitats; 2) habitat protection and acquisition; 3) inventories and management strategies for aquatic and terrestrial habitats; 4) managing endangered and threatened species; 5) managing harvested species; 6) managing exotic and nuisance species; 7) educating the public; 8) developing databases; 9) Sound-wide and site-specific research and monitoring; and 10) living resource s and habitat research.



2000 Highlights:

- The states of Connecticut and New York made excellent overall progress toward the goals of the 1998 Habitat Restoration Strategy. As of 2000, over 300 acres of tidal wetland have been restored and 36 miles of river corridor has been reopened to anadromous fish passage against the goals of 2000 acres and 100 miles by 2008. A fishway was completed at Ed Bills Dam on the east branch of Eightmile River, which opened up 6 miles of river; a fishway was reconstructed at Whitford Brook in Mystic that opened up 3 miles of river.
- During 2000, Connecticut acquired 1391 acres of land, purchased the development rights for 427 acres, and awarded Open Space grants to municipalities and land trusts to purchase an additional 2, 881 acres at a cost of \$10.5 million.
- Save the Sound, Inc., the National Audubon Society of New York State, and the Regional Plan Association sponsored a series of 10 public hearings from May-June 2000, *Listen to the Sound 2000*, to gather public input for the creation of a Long Island Sound Reserve system. Over 200 people testified at the hearings with over 500 attending the series of meetings held around the Sound.
- The CAC strongly endorsed the creation of a LIS reserve that would identify and protect key LIS recreation, public access, open space, and underwater habitats in the Sound. A coalition of interest groups is working to implement this CCMP action.
- Connecticut DEP, the City of Waterbury, the Naugatuck Chapter of Trout Unlimited, the Naugatuck Watershed Association and the Fish and Wildlife Foundation worked together to open up over 18 miles of the Naugatuck River to fish passage. Four dams have been removed and a fish ladder installed on a fourth dam. In 2001 three more dams will be removed and a fish bypass channel on a fourth will open up a total of 30 miles of the river once again to anadromous fish. These actions, combined with the water quality improvements from the new Waterbury STP, will restore the Naugatuck River system to a condition not seen since before the Industrial Revolution.
- CTDEP completed brackish marsh restorations at Nott Island (Connecticut River) 40 acres; Hammonasset Beach State Park, 5 acres; Davis Pond Marsh, 10 acres; and Lord Cove, 200 acres.



**SUMMARY OF CCMP MANAGEMENT ACTIONS:
MANAGEMENT AND CONSERVATION OF LIVING RESOURCES
AND THEIR HABITATS**

L-1. RESTORATION AND ENHANCEMENT OF AQUATIC AND TERRESTRIAL HABITATS (CCMP TABLE 40, P.107)

Key Elements: Continue and enhance programs to restore tidal wetlands and other habitats. Develop a coordinated strategy to inventory and prioritize habitat restoration and enhancement needs.

Description	2001 Planned Action
<p>Connecticut continues to restore degraded tidal wetlands through its existing programs and in collaboration with the Long Island Sound Study Habitat Restoration plan which funds a restoration coordinator. DEP has established a Tidal Wetland Restoration Team (i.e., USFWS, NMFS, NRCS, Save the Sound) which identifies annual work priorities. In 2000 construction was completed at Hammonasset State Park, DOT approved the design contract for Old Field Creek, permitting and procurement of 319 funds for Wilson Cove in Norwalk.</p> <p>Connecticut continues to use the Coves and Embayments Program to fund preliminary engineering, design and construction for the restoration of degraded coves especially those dominated by tidal wetlands.</p>	<p>The preliminary work plan for 2001 has nearly 20 wetland restoration projects identified - this includes preliminary engineering, design and construction activities.</p>
<p>Connecticut has established a coastal barrier habitat restoration team.</p> <p>Connecticut DEP Office of Long Island Sound Program and specifically the LISS Habitat Restoration coordinator has been the lead for removal of the invasive aquatic plant water chestnut from Connecticut River waters. Funds for this project were received from USFWS, National Fish & Wildlife Foundation, NMFS, and The Nature Conservancy.</p>	<p>Invasive species control is planned for Black Point Beach in E. Lyme and the Team will be identifying a work plan for 2001.</p> <p>Continue to harvest water chestnut for Connecticut River sites.</p>
<p>DEP has been assisting corporations and Coastal America to develop a Corporate Wetland Restoration Program in Connecticut. Several corporations have become partners and provided funding support for restoration activities. They include Northeast Utilities and Boehringer-Ingelheim. The goal of the program is have 18 partners and 1 million dollars of funds by June 2001.</p>	<p>Continue to work with Coastal America and the corporate partners to create the CWRP.</p>
<p>In 2000 Connecticut used the following sources of non-state funds to support habitat restoration: National Fish & Wildlife Foundation, USFWS, EPA 319, The Nature Conservancy, Intermodal Surface Transportation Efficiency Act, Corporate Wetlands Restoration Partnership funds, Ducks Unlimited, Connecticut Waterfowl Association, CT Conservation Stamp Program, Connecticut Valley Waterfowlers Association, Connecticut Audubon, and NRCS.</p>	<p>On-going</p>
<p>The following brackish marsh restorations were completed: Nott Island (CT River) - 40 acres, Hammonasset State Park - 5 acres, Davis Pond Marsh - 10 acres, and Lord Cove - 200 acres.</p>	<p>Phragmites control work will continue in 2001 at Lord Cove, Great Island and Upper Island.</p>
<p>NYSDOS awarded the Town of Oyster Bay a grant of \$25,000 to prepare a Glenwood Landing Waterfront Redevelopment and Revitalization Plan.</p>	<p>The Hempstead Harbor Protection Committee will prepare a Waterfront Redevelopment and Revitalization Plan.</p>
<p>The Hempstead Harbor Protection Committee completed an aquatic habitat restoration study of the lower portion of Hempstead Harbor with the Army Corps of Engineers.</p>	<p>The Town of North Hempstead will assume the role of project sponsor on behalf of the Committee and will sign a letter of intent with the Corps to prepare a detailed feasibility, cost, and environmental assessment study for two areas proposed for restoration in the lower harbor.</p>
<p>The Village of Great Neck Estates received a NYS Clean Water/Clean Air Bond Act Grant of \$28,297 to remove road sand washed into the Pond Park pond to restore habitat for fish and wildlife and install sediment containment rings in the existing storm drain lines to prevent future sediment loads and improve water quality in the pond which is adjacent to Little Neck Bay.</p>	

Description	2001 Planned Action
<p>Nassau County received a NYS Clean Water/Clean Air Bond Act Grant of \$644,125 to repair severely eroded stream and pond banks in the Manhasset Valley Park, in the Manhasset Bay watershed. The project includes dredging portion of the pond and stream areas to remove sediment and improve habitat. Wetland plantings will be established to increase cover for migratory waterfowl.</p>	
<p>Nassau County received a NYS Clean Water/Clean Air Bond Act Grant of \$500,000 to repair severely eroding streambanks to reduce the amount of sediment entering Whitney Lake, in the Manhasset Bay watershed. Nassau County will install sediment traps at the lake inlet to capture sediment before it enters Whitney Lake. Dredging and planting wetland vegetation will increase habitat and help restore the warm water fishery.</p>	
<p>The Town of Smithtown received a NYS Clean Water/Clean Air Bond Act Grant of \$125,000 to install drainage structures along St. Johnland Road and replace a failing culvert under the road to reduce stormwater runoff and sediment entering the Nissequoque River, which is expected to improve water quality for a variety of aquatic life.</p>	
<p>The USFWS, in partnership with CT DEP, NRCS, New Haven Land Trust, and Northeast Utilities, installed a fish ladder at the Pond Lily dam on the West River in New Haven. This passage restores river herring to 164 acres of habitat from which they had been excluded since 1794.</p>	

L-2. HABITAT PROTECTION AND ACQUISITION (CCMP TABLE 41, P.110)

Key Elements: Maintain the effectiveness of permit programs (e.g. for wetlands, stormwater, dredging) to regulate use and development affecting aquatic resources and critical habitats. Expand acquisition programs and efforts to protect habitats from development and establish a reserve system of areas of land and water of outstanding or exemplary scientific, educational, or biological value.

Description	2001 Planned Action
<p>Land acquisition of open space in CT continues under the Recreation and Natural Heritage Trust Program (RNHT) using state bond funds. The RNHT plans to provide \$166 million in state bond funds for open space acquisitions by the year 2023. During 2000 the State of CT purchased 1391 acres of land, purchased the development rights for 427 acres, and awarded Open Space grants to municipalities and land trusts to purchase an additional 2,881 acres at a cost of \$10.5 M.</p> <p>Since the establishment of the Governor's Open Space Program more than 14,000 acres has been protected at a cost of approximately \$40 million. In addition to the \$20 million spent in partnership with towns, conservation groups and water companies, the state has spent an additional \$20 million on direct purchases of open space that is now part of the state's inventory of public land.</p>	<p>CT anticipates acquiring over 15,000 acres of open watershed land from a water utility company assuring preservation for generations to come.</p>
<p>In December 2000 Connecticut Governor Rowland designated 8 parcels of state-owned land as Natural Area Preserves, a special designation to protect the unique ecological characteristics and species of an area. To become part of Connecticut's Natural Area Preserve System, an area must be an area of land or water containing or potentially containing, plant or animal life or features of biological, scientific, educational, geological, paleontological or scenic value worthy of preservation in their natural condition</p> <p>The new designations, totaling 1,192 acres, raise the amount of Natural Area Preserves in Connecticut to over 6,700 acres. The 8 state-owned areas, are Bluff Point in Groton, Duck Island in Westbrook, Gold's Pines in Cornwall, Roger Tory Peterson Wildlife Area in Old Lyme, Lord Cove in Lyme/Old Lyme, Matianuck Sand Dunes in Windsor, Merrick Brook in Scotland, and Sandy Brook in Colebrook.</p>	
<p>Under the LISS, the USFWS proposed a 2 year project to identify ecological components for a potential LIS reserve program.</p>	<p>The management committee approved 2001 funding for identification of ecological components of a LIS reserve.</p>

Description	2001 Planned Action
<p>In the Town of North Hempstead a new dedicated fund in the amount of \$15 million to establish an Environmental Legacy Fund was approved by voters on 7 November 2000. Purposes and allocation of funds are to be specified in a local law, along with the establishment of an Advisory Review Committee to assist and make recommendations to the Town Board on the uses of the funds.</p>	<p>Funds will be used over several years for three general purposes: Open Space Acquisition, Restoration and Protection of Environmentally Sensitive Areas, and Improvement and Enhancement of Coastal Areas and Waterways.</p>
<p>Voters in the Town of Oyster Bay voted to approve a \$30 million Bond Proposition, which allocates funds for the acquisition, preservation and protection of environmentally sensitive land, and enhancement of park and recreational facilities. It provides \$20 million for land conservation/acquisition and \$10 million to fund improvements to existing parks and recreational facilities.</p>	<p>An Advisory Committee will conduct research on environmentally sensitive lands for possible acquisition and/or enhancement of park facilities and make project recommendations to the Town Board for approval.</p>
<p>New York state has converted 153 acres of the former Kings Park Psychiatric Center into the Nissequogue River State Park, which includes 4 miles of river front.</p>	<p>Although portions of the remaining property may be sold, there is a stipulation that for every acre developed, 3 are to be set aside for open space.</p>
<p>Shortly after the <i>Listen to the Sound 2000</i> series of public meetings on LIS, Suffolk County acquired the Chandler Estate for preservation, a 40 acre property on the east shore of Mount Sinai Harbor.</p>	
<p>New York State passed legislation permitting a municipality to regulate and prohibit the use of personal watercraft within its waterways.</p>	

**L-3. INVENTORIES AND MANAGEMENT STRATEGIES FOR AQUATIC AND TERRESTRIAL HABITATS
(CCMP TABLE 42, P.112)**

Key Elements: Develop habitat management strategies for specific complexes or regions using a watershed perspective.

Description	2001 Planned Action
<p>CT DEP requested that NOAA consider revising the 15+ year old Environmental Sensitivity Maps for Connecticut. NOAA secured some funding for this project but the region was expanded to include New York and New Jersey. NOAA's contractor compiled data from DEP staff and have prepared a preliminary set of maps.</p> <p>These data will be used to develop protection strategies to protect sensitive coastal habitats and living resources.</p>	<p>The contractor will finalize the maps and NOAA will ultimately distribute hard copy and electronic copy.</p> <p>The electronic data will be incorporated into DEP's Oil Spill GIS.</p>
<p>The Hempstead Harbor Protection Committee was awarded \$20,000 out of the State Quality Communities Demonstration Program. The Committee applied for this grant in April to prepare an assets and opportunities inventory of major waterfront parcels on Hempstead Harbor.</p>	
<p>The USFWS hosted a workshop to improve integrated surveys of colonial water birds in and around the Sound. CTDEP and NYSDEC specialists participated with researchers to explore avenues to more reliably measure nesting populations. Trials of techniques to verify survey accuracy were completed.</p>	

L-4. MANAGING ENDANGERED AND THREATENED SPECIES (CCMP TABLE 43, P.116)

Key Elements: Continue endangered species programs and develop lists of Long Island Sound endangered species to aid management programs

Description	2001 Planned Action
<p>The Corps of Engineers is proposing to dredge Southport Harbor. Since the time of last dredging (circa 1960), sandy beach and dunes have formed between the east breakwater and channel. Not only does this support rare dune habitat, but portions of the site supported a coastal grassland species, which is listed as state threatened. The Environmental and Geographic Information Center and the Office of Long Island Sound Programs has assisted the Corps in identifying the federal consistency (with Connecticut's Coastal Management Act) and endangered species issues including mapping the specific location of the threatened species. The Corps is developing an environmental assessment and will be investigating alternative actions to avoid or minimize impacts to dunes and especially the threatened grass.</p>	<p>Receipt of an environmental assessment from the Corps of Engineers and the issuance of a federal consistency determination.</p>
<p>The NYSDEC Natural Heritage Program is updating its Rare Plant List, which will include the status of each species.</p>	<p>Updated list planned for 2001.</p>
<p>The USFWS managed the stabilization of Faulkner Island, a key nesting site for the endangered roseate tern. The monitoring of the stabilization effects and black-crowned night heron predation on tern nesting continues.</p>	

L-5. MANAGING HARVESTED SPECIES (CCMP TABLE 44, P.117)

Key Elements: Ensure safe consumption and enhanced production of harvested species through fishery management plans, improved fish passage and habitat improvements. Support related programs such as oyster cultch placement, artificial reef development, dredging windows, and incidental take of nontarget species or entrainment/impingement at industrial facilities

Description	2001 Planned Action
<p>CT DEP continues to award grants and participate in restoration of riverine migratory corridors for anadromous fish in the streams and rivers of the state. In 2000 a fishway was completed at Ed Bills Dam on the east branch of Eightmile River that opened up 6 miles of the river.</p> <p>A fishway was reconstructed at Whitford Brook in Mystic that opened up three miles of migratory corridor. A total of 36 miles of RMC have been restored since 1998. The goal is to restore 100 miles by 2008.</p>	<p>Continue to work with partners to open up additional fish passages and provide funding for design and construction of fish bypasses and ladders.</p>

L-6. MANAGING EXOTIC AND NUISANCE SPECIES (CCMP TABLE 45, P.120)

Key Elements: Develop measures to prevent the introduction of undesirable species and implement a program to reduce the abundance of mute swans.

Description	2001 Planned Action
<p>On June 30, 2000, Connecticut DEP Office of Long Island Sound Programs spearheaded a group of volunteers from the Nature Conservancy, the Town of East Hartford, The Connecticut River Watershed Council, the U.S. Fish and Wildlife Service (USFWS), the Hockanum River Watershed Association, and volunteers from the United Technologies Corporation in the removal of the invasive aquatic plant water chestnut from a 7 acre site in the Hockanum River.</p> <p>NYSDEC has awarded Bond Act funds for projects as the Edith Read Sanctuary and the Nature Study Woods, both in Westchester County, to remove invasive species from 50 acres of forested area.</p>	<p>Monitoring of this site and the entire river will be ongoing for as long as 7-10 years.</p> <p>Invasive species control is planned for Black Point Beach in E. Lyme and the Team will be identifying a work plan for 2001.</p> <p>Continue to harvest water chestnut for Connecticut River sites.</p>

L-7. EDUCATING THE PUBLIC ABOUT THE PLANTS AND ANIMALS OF LONG ISLAND SOUND (CCMP TABLE 46, P.120)

Key Elements: Educate the public about the plants and animals of Long Island Sound and elicit volunteers assist plants and animals monitoring programs.

Description	2001 Planned Action
<p>CT DEP continues to provide support to a volunteer Secchi Disk network which is attempting to evaluate trends in light availability to help identify appropriate times or locations for restoring eelgrass.</p>	<p>Continue data collection efforts.</p>

L-8. DEVELOPING AN INFORMATIONAL DATABASE ABOUT LIVING RESOURCES AND THEIR HABITATS (CCMP TABLE 47, P.122)

Key Elements: Develop and expand informational databases on living resources and their habitats with an emphasis on GIS data for resource management

Description	2001 Planned Action
<p>The Office of Long Island Sound Programs continues to create coverages of coastal resource information to support oil spill response. OLISP recommended to NOAA to revise and update the over 15 year old Environmental Sensitivity Maps (see Table L-3). Funding was secured for this project and NOAA's consultant has produced draft ESRI maps based upon data provided by DEP staff. Other draft coverages that have been developed are breakwaters and navigation channels.</p> <p>Through the NOAA Coastal Services Center's Coastal Fellow program, OLISP has a coastal fellow completing the second year of the Sediment Quality Information Database (SQUID) to manage data related to sediment dredging and quality.</p>	<p>Develop an anadromous finfish GIS project. Continue to finalize the SQUID project.</p>

Description	2001 Planned Action
<p>Connecticut DEP continues to compile information regarding trends in eelgrass populations. Anecdotal information would suggest that most, if not all, southeast coves are continuing to see declines in eelgrass abundance. Several likely causes have been identified including nonpoint source nitrogen enrichment, STP's in the case of Little Narragansett Bay/Pawcatuck River and possibly warmer than normal temperatures associated with El Nino and La Nina.</p> <p>The University of Connecticut Marine Sciences Center is conducting some preliminary studies of southeastern coves to evaluate and model the impacts of nitrogen upon biological communities.</p>	<p>DEP has submitted a request to the LISS study to fund a remapping of eastern Long Island Sound and Fisher's Island Sound beds to determine long term trends.</p>
<p>CT DEP received \$1 million for the LIS Research Fund to help to identify the causes of recent lobster mortality in western Long Island Sound and shell disease in eastern Long Island Sound. Congress appropriated funds for this purpose also and DEP has collaborated with NMFS and Sea Grant in the release of a joint RFP for lobster research. An RFP was released in late summer and full proposals were received in December.</p> <p>The Long Island Sound License Plate program continues to provide small grants for research. This program annually publishes research priorities - for the 2001 grants, this information was posted on the web. In 2000, three projects were funded for research totalling \$47,883.70</p>	<p>Complete the selection of research proposals for lobster research and issue awards. Continue to fund priority research through the LIS License Plate program.</p>

L-9. SOUND WIDE AND SITE-SPECIFIC RESEARCH AND MONITORING (CCMP TABLE 48, P.123)

Key Elements: Continue and enhance monitoring of living resource populations with an emphasis on fishery surveys, colonial water birds, submerged aquatic vegetation, and lobsters.

Description	2001 Planned Action
<p>See description under L-10 below.</p>	

L-10. LIVING RESOURCES AND HABITAT RESEARCH (CCMP TABLE 49, P.124)

Key Elements: Identify priorities for research to fill gaps in our understanding of the Long Island Sound ecosystem and to assist management of living resources.

Description	2001 Planned Action
<p>The LISS funded 3 research grants in 2000 to examine the cause(s) of the lobster mortalities in LIS; investigate the historical environmental trends in LIS over the past 400 years; and study various factors that may affect phytoplankton growth in the Sound.</p>	<p>Work planned under the research grants is continuing in 2001.</p>
<p>The management committee approved a LIS research fund of \$190,000 in 2000 supplemented by the New York and Connecticut Sea Grant College programs of \$25,000 each for a total LISS research fund of \$240,000.</p>	<p>The management committee approved a LIS research fund of \$350,000 in 2001.</p>

Raising Public Awareness and Participation Through Education and Outreach

A significant factor toward long-term CCMP effectiveness is the ability to increase public awareness of and participation in day-to-day activities designed to protect LIS. Educating LIS watershed residents and increasing the number of people that take an active interest in protecting and restoring the Sound helps to nurture long-term stewardship ideals in local communities. As the Sound is restored to a healthier state, public support based on these ideals will help ensure continued progress.

CCMP Strategy:

The CCMP public awareness and outreach strategy has six major elements: 1) increasing community awareness and stewardship; 2) promoting understanding; 3) facilitating public participation; 4) increasing communication and cooperation; 5) enhancing education at all levels; and 6) securing funding.



2000 Highlights:

- In 2000, the LISS outreach program responded to 553 information requests, developed and staffed displays at 14 public events that reached over 2,000 people; and provided 9 presentations to combined audiences of 675.
- The LISS public education and outreach program developed and distributed quarterly LISS Newsletters covering timely LIS topics to over 4,000 addressees in 2000: 1) *LIS Environmental Indicators*; 2) *LIS Habitat Restoration*; and 3) *LISS Summit*.
- The LIS Educators Conference was held in March 2000 in cooperation with the Maritime Aquarium in Norwalk, Connecticut. Over 220 educators attended the conference that featured 40 exhibitors and 25 workshops on a variety of critical LIS areas of concern.
- The CTDEP Long Island Sound Fund awarded \$80,000 in grants for education projects, including development of a teacher resource guide to environmental education programs, public education for septic system maintenance, groundwater contamination and nonpoint source protection and community-based programs at Cove Island Park in Stamford, creating 100 year-round environmental education activities about the Sound for a wide range of age groups.
- In 2000, the LISS World Wide Web page continued to be one of the most popular sites on the EPA Region I host server, with nearly 60,000 "hits." The LISS site includes LIS fact sheets, slide shows, newsletters, LIS links, and key Federal and state LIS personnel contact information. The LISS web page address is: <http://www.epa.gov/region01/eco/lis>.
- NYSDEC, CTDEP, and EPA conducted workshops, seminars, symposia, and conferences on LIS issues in various locations throughout the LIS area during 2000. Included are the Municipal Conference in June 2000; four NRCS Watershed Community Collaboration Workshops held in Connecticut in November 2000; and a series of public comment meetings on the LIS TMDL held in New York and Connecticut during Summer 2000.
- Through 2000, the LISS public information and education Small Grants Program has provided funds for 58 educational, informational and construction projects totaling over \$211,000. These projects assisted hundreds of teachers and thousands of school children, and produced over 20,000 pieces of LIS literature. In 2000, the LISS provided funds totaling \$74,000 for 17 local community environmental education projects in New York and Connecticut.

- **The Nonpoint Education for Municipal Officials (NEMO) project continued to present its four-part series on nonpoint source pollution prevention and the link between land use and water quality. NEMO conducted 17 workshops in Connecticut and 19 in New York for over 760 persons in attendance. Municipal representatives included town selectmen/women, planning and zoning boards, health departments, conservation and environment commissions, highways and parks and recreation departments.**
- **In 2000 the NEMO program was expanded to include a new coordinator and office in SUNY Stony Brook, New York. The New York NEMO program is working with the Hempstead Harbor and Manhasset Bay Protection Committees in briefing local boards and commissions and in conducting two basic NEMO workshops for municipal officials in those communities.**

SUMMARY OF MANAGEMENT ACTIONS: PUBLIC INVOLVEMENT AND EDUCATION

E-1. COMMUNITY AWARENESS AND STEWARDSHIP (CCMP TABLE 51, P.146)

Key Elements: The CCMP emphasized existing, and enhanced public involvement and education programs at local, regional and national levels to promote understanding and management of LIS. The development of informational materials for specific audiences including printed materials, public exhibits, educational curricula, and research programs were identified as primary outreach and education mechanisms.

Description	2001 Planned Action
CTDEP held six regional workshops geared toward municipal land use decision makers in coastal communities. A Connecticut Coastal Management Manual produced by CTDEP was made available to participants. A data-based presentation was given that focused on CT's coastal resources and guidance in utilizing existing tools to assist in improved land use decisions. Over 129 individuals attended representing 27 coastal communities.	Additional sessions are planned for 2001 and copies of the CT Coastal Management Manual will be distributed upon request.
LISS communications staff led the development of the first LISS environmental indicators report on the health of Long Island Sound -- SoundHealth 2001. The report summarizes data gathered for 15 environmental, human health, ecological and natural resource indicators of the health of the Sound over a 15 year period.	Produce a number of updated fact sheets based on information produced in the Sound Health 2001 Report; develop a web-based expanded version of the report.
The LISS modified a series of 4 nonpoint source public educational posters originally developed by the State of Washington, and adapted them for LIS. The posters were produced in 3 sizes and distributed to a broad audience.	Continue to distribute posters and explore other venues for the nonpoint source messages.
CTDEP and NYSDEC staff organized and held a series of public informational meetings in NY and CT on the LIS Waste Load Allocation for the proposed TMDL.	Produce a series of fact sheets and a FAQ (Frequently Asked Questions) on the TMDL and proposed Credit Exchange Program.
<p>The LISS Outreach Program:</p> <ul style="list-style-type: none"> -responded to 553 information requests, developed and staffed displays at 8 events that reached 1,950 people; and provided 3 presentations to a combined audience of 525. -gave LIS presentations to one elementary, three high school, and two college classes informing over 150 students about LIS issues, concerns, and ecosystem value. -direct mailed to all coastal NY Public Libraries and municipalities a free set of the nonpoint source pollution posters. -published <i>UPDATE</i> newsletters focusing on: Habitat Restoration; Environmental Indicators; and LISWA Citizens Summit. -produced and distributed three issues of the LIS newsletter <i>Sound Outlook</i> to a circulation of over 2,500. 	Staff will continue to respond to requests for information, provide presentations, staff displays at events, and publish the newsletter and other pertinent materials.
The LIS Educators Conference was held in March 2000 in cooperation with The Maritime Aquarium, Norwalk, CT, and other LISS partners. The conference was attended by 220 educators from Connecticut, New York, New Jersey, and Massachusetts. There were 40 exhibitors and 25 workshops.	
The LIS Research Conference was held in November 2000 in cooperation with the Connecticut Sea Grant College Program, the LIS Foundation, the LIS Councils and Assembly and the New York Sea Grant Institute. The conference addressed historical trends in LIS; non-point source pollution; marine ecosystems; diseases and pathobiology; sediment forms and monitoring; water quality and nutrients and algae. Over 150 people attended the 2 day session at UCONN Stamford.	Planning for the 2002 research conference is underway.
NY Sea Grant hired a student intern from SUNY Stony Brook to assist with the LISS Small Grants program through funding provided by NYSDEC.	NY Sea Grant plans to hire a federal work study student to continue assisting with the small grants.

E-2. PROMOTING UNDERSTANDING (CCMP TABLE 52, P.147)

Key Elements: An important component of the Public Involvement and Education priority of the CCMP is keeping the partner agencies and municipalities informed and abreast of LIS issues. It was the intent of the CCMP to have the states of Connecticut and New York incorporate LIS information into all related programs wherever possible. All coastal municipalities are to be provided with information on CCMP implementation and how it would affect their cities and towns. Additionally, the partners are to provide briefings to user groups and assess and support opportunities for training and educating the environmental decision making community and regulated community on LISS CCMP actions.

Description	2001 Planned Action
<p>In September 2000, the CTDEP produced its <i>Summer Hypoxia Monitoring Survey 1991-1998 Data Review</i>, an 84 page summary of 8 years of LIS water quality monitoring conducted by CTDEP.</p>	<p>Participate in producing and updating the LIS indicator report, <i>Sound Health 2001</i>.</p>
<p>CTDEP LISS Outreach staff continued as contributing editor for the CTDEP newsletter <i>Sound Outlook</i>, the a Long Island Sound newsletter. This newsletter is a cooperative effort between the Coastal Zone Management and National Estuary Programs at the state level. <i>Sound Outlook</i> has a circulation of 2,300 and in the year 2000 was made available on the DEP web site.</p>	<p>Continue to publish <i>Sound Outlook</i> and cooperate with the LISS newsletter <i>UPDATE</i>.</p>
<p>NYSDEC and the LISS provided support for the creation of a LI NEMO (Nonpoint Education for Municipal Officials) coordinator housed at the NY Sea Grant offices in Stony Brook. The coordinator was hired in May 2000 to work with the Hempstead Harbor and Manhasset Bay Protection Committees. Staff has introduced NEMO at over a dozen watershed protection committee and municipal board meetings. Two NY NEMO basic workshops were provided for municipal officials and staff in the Hempstead Harbor and Manhasset Bay watersheds.</p>	<p>Continue the LI NEMO with expansion to other coastal communities and expand into Westchester County.</p> <p>Develop "follow up" workshops and continue to provide "basic" workshops in Hempstead Harbor and Manhasset Bay watersheds</p>
<p>The LISS website at http://www.epa.gov/region01/eco/lis was one of the most visited sites on the EPA Region I server, with nearly 60,000 hits in 2000.</p>	<p>Formation of a LISS web development team to recommend site improvements.</p>

E-3. FACILITATING PUBLIC PARTICIPATION (CCMP TABLE 53, P.148)

Key Elements: The intent of the CCMP in terms of public participation is that "the public must be involved in setting policy for the Sound . . . as well as participating in the cleanup of the Sound through hands-on activities". The LISS partners are to provide financial and technical support for such activities as beach cleanups, habitat restoration projects, and storm drain stenciling. The EPA and states of Connecticut and New York are to promote citizen involvement in educational and volunteer monitoring activities in and around the Sound and providing technical assistance as needed.

Description	2001 Planned Action
<p>The LIS CAC met quarterly in 2000 to identify and address issues concerning LIS and the CCMP.</p>	<p>Quarterly meetings are planned for 2001.</p>
<p>The LISS funded 17 small grants projects in 2000. For example, the Friends of the Bay project produced septic system maintenance folders; and the Riverhead Foundation produced laminated cards to aid the public in the identification of stranded animals.</p> <p>The LISS produced a flyer explaining the grant program and how to obtain a grant.</p> <p>NY Sea Grant and Cornell Cooperative Extension produced a flyer for Senator Carl Marcellino's district about <i>Home Underground Storage Tanks</i>.</p>	<p>LISS Small Grants funded 15 projects for FY 2001.</p>
<p>NY Sea Grant revised and updated the storm drain stenciling brochure detailing how to organize a storm drain stenciling project.</p>	<p>New York Sea Grant will continue to distribute the new brochures and stencils to interested groups.</p>

E-4. INCREASE COMMUNICATION AND COOPERATION (CCMP TABLE 54, P.150)

Key Elements: The CCMP commissioned the EPA and the states of Connecticut and New York, in combination with a Management Conference public outreach workgroup, to help coordinate ongoing governmental and non-governmental public outreach efforts. During the CCMP implementation phase, and thereafter, the partners are to encourage private and non-profit groups to continue to develop and implement LIS educational and outreach programs.

Description	2001 Planned Action
<p>CTDEP LISS Outreach staff continued to provide technical information and resources (about LIS and LISS CCMP actions) to their own agency staff and to other state and federal agency partners to facilitate cooperation and outreach with each other and the public at large.</p>	<p>Continue to provide information and resources to state and federal agency staff.</p>
<p>CTDEP LIS monitoring and outreach staff participated in the biennial Long Island Sound Research Conference (held in November 2000), providing a report and technical data based on the monitoring efforts over the last ten years.</p>	
<p>LISS staff participated in the LIS Total Education Network (LISTEN) meetings organized by Save the Sound.</p> <p>LISS staff participated in the EMPACT meetings to discuss opportunities for outreach activities.</p>	<p>LISS outreach staff in NY, CT, and EPA-LISO will continue to participate in LIS Educators meetings organized by Save the Sound and held quarterly at various locations around the Sound.</p> <p>Staff will continue to attend EMPACT meetings.</p>

E-5. ENHANCE EDUCATION AT ALL LEVELS (CCMP TABLE 55, P.151)

Key Elements: A key objective for the LISS involvement and education program is to develop, among the citizens of CT and NY, a long-term sense of environmental appreciation for and understanding of the Sound by enhancing educational opportunities at all age levels. The States of Connecticut and New York are to work with appropriate school districts in their respective states to develop Long Island Sound educational materials to integrate into existing primary and secondary school curricula. The partners are to encourage natural history museums and nature centers to promote LIS issues within their programs and provide support for teacher training and workshops integrating LIS issues.

Description	2001 Planned Action
<p>The CTDEP LISS Outreach Coordinator gave LIS presentations to one elementary, three high school, and two college classes informing over 150 students and participated in an LIS day reaching 4th thru 8th grade students in Westbrook, CT.</p>	<p>Continue to bring presentations and resources to area schools.</p>
<p>The CTDEP Long Island Sound License Plate Fund awarded nearly \$80,000 in grants for education projects. Projects included a <i>Teacher Resource Guide to Environmental Education Programs</i>, Public Education pertaining to Septic System Maintenance, Groundwater Contamination and NPSP, <i>Sound Connections</i> (An education and outreach program for urban students to promote the prevention of litter in LIS and a non-point source pollution program for 4th graders), and <i>Community-Based Public Programs at Cove Island Park</i> (creating 100 year-round environmental education activities about LIS that will reach a wide age range of people).</p>	<p>Continue to promote the LIS Fund grant program and facilitate education and outreach projects.</p>

E-5. ENHANCE EDUCATION AT ALL LEVELS (CCMP TABLE 55, P.151)

Key Elements: A key objective for the LISS involvement and education program is to develop, among the citizens of CT and NY, a long-term sense of environmental appreciation for and understanding of the Sound by enhancing educational opportunities at all age levels. The States of Connecticut and New York are to work with appropriate school districts in their respective states to develop Long Island Sound educational materials to integrate into existing primary and secondary school curricula. The partners are to encourage natural history museums and nature centers to promote LIS issues within their programs and provide support for teacher training and workshops integrating LIS issues.

Description	2001 Planned Action
<p>NY Sea Grant is a member of the Executive board for NYS Marine Education Association. Staff distributes new LISS materials to members and keeps them informed of LISS activities.</p>	<p>Staff will continue as a board member and distribute information. Staff will also assist with the organization of the yearly conference held at Southampton College June 8-10, 2001.</p>
<p>NY Sea Grant conducted two grant small grants writing workshops to help prepare potential applicants for the LISS Small Grants program; one each in CT and NY.</p>	<p>Staff will hold two grant writing workshops once the 2002 small grants call is announced.</p>

E-6. SECURE FUNDING (CCMP TABLE 56, P.152)

Key Elements: Connecticut, New York and the EPA are to publicize grant opportunities whenever possible and to encourage all organizations associated with the public involvement and education effort, both governmental and non-governmental, to take advantage of the various grant programs available that provide funding for educational activities and products. Private sector funding should also be sought when and wherever possible and identify other grant programs for which LIS projects would be eligible.

Description	2001 Planned Action
<p>The <i>Long Island Sound Restoration Act</i> of 2000, P.L. 106-457 was enacted, which extended the LISS through 2005 and increased the appropriations ceiling to \$40 million annually.</p>	<p>Congress earmarked \$4.5 million for LIS; EPA allocated \$500K for LIS in the 2001 budget.</p>
<p>The CT State Bond Commission approved a grant in aid to SoundWaters, Inc. for \$350,000 for funding environmental exhibits relating to Long Island Sound.</p>	
<p>The CT DEP Long Island Sound Research Fund gave out over \$181,000 for projects that enhanced education and outreach and facilitated public involvement in research and habitat restoration.</p>	
<p>Since the inception of the LIS Small Grants Program, the LISS has provided funds for 58 projects totaling over \$211,000. These projects assisted hundreds of teachers and thousands of school children, and produced over 20,000 pieces of literature. In 2000, the LISS provided grant funds totaling \$70,000, with an additional \$4,000 from NYSDEC for 17 local community environmental projects in CT and NY.</p>	<p>15 projects will be underway in 2001. The call for proposals for 2002 will go out in the summer 2001.</p>

Long Island Sound Study Comprehensive Conservation and Management Plan Actions

CONTINUING THE MANAGEMENT CONFERENCE

M1-1. Formally extend the Management Conference for a minimum of five years to continue coordination and oversee implementation of the management plan. The Citizens Advisory Committee will remain part of the Management Conference structure.

M1-2. Continue and expand the role of the EPA Long Island Sound Office, consistent with the requirements of the LIS Improvement Act of 1990. Funding is available in FY 1994, but will be required in future years.

M1-3. Continue state program coordination and involvement in the Management Conference. Funding is available in FY 1994, but will be required in future years.

M1-4. Maintain public involvement and education efforts with an added focus on local government involvement. Funding is available in FY 1994, but will be required in future years.

M1-5. Establish delegation of authority to allow the EPA Long Island Sound Office to support projects of studies as authorized by the Long Island Sound Improvement Act.

M1-6. Advocate modification to Clean Water Act § 320(g)(2) to allow the EPA to provide base funding through cooperative agreements to National Estuary Programs that complete their management plans.

M1-7. Develop a coordinated monitoring plan to assess the effectiveness of implementation, considering innovative approaches and building upon existing programs.

M1-8. Coordinate data management efforts between Long Island Sound and New York-New Jersey Harbor Estuary Program (HEP), including support for a system wide data manager.

M1-9. Modify the current structure of the LISS as needed to oversee implementation of the plan.

M1-10. Ensure that the LISS is consistent with existing state coastal zone management (CZM) policies.

M1-11. Incorporate relevant elements of the plan into the state CZM program for federal consistency review.

M1-12. Continue to support and enhance data management, analysis and reporting.

M1-13. Prepare an annual progress report on implementation including recommendations to redirect efforts.

HYPOXIA

H1-1. The states of New York and Connecticut will continue their point and non-point source permitting and enforcement programs as a primary mechanism of pollutant load reduction. Fundamental to the direction of these programs are the states' water quality standards and classifications that provide the basis for management policies and decisions.

H1-2. The state of New York will ensure compliance with the consent order to upgrade the Newtown Creek plant to provide secondary treatment with biological nutrient removal retrofit modifications.

H1-3. The state of Connecticut will freeze nitrogen discharges and, if appropriate, explore opportunities to reduce nitrogen discharges at three industrial facilities with significant nitrogen discharges.

H1-4. The municipalities in the states of Connecticut and New York will implement biological nutrient removal retrofits to reduce the load of nitrogen to the Sound on an interim basis.

H1-5. Conduct feasibility studies and pilot demonstrations for nitrogen removal at 13 of its [NYC] 14 sewage treatment plants, with actual design for Newtown Creek.

H1-6. Westchester County will investigate sludge re-handling at their four facilities to determine if opportunities exist for nitrogen load reduction.

H1-7. The state of New York will continue to seek to reach agreement with Belgrave, Great Neck East Shore, Huntington, Oyster Bay, Port Washington, and Kings Park on permit modifications for implementing the no net increase in nitrogen policy.

H2-1. The states of Connecticut and New York will continue to use their existing authority to manage non-point source pollution and appropriate federal grants such as CWA§ 319, 604(b), and 104(b) to carry out projects that will help prevent increases and, to the extent practicable, achieve reductions in the non-point source loads from high priority drainage identified in the CT and NY portions of the watershed.

H2-2. The states of CT and NY are developing their coastal non-point source control programs, as required by §6217 of the Coastal Zone Management Act.

H2-3. The states of CT and NY will continue to implement general storm water permit programs to control the discharge of storm water from industrial, construction, and municipal activities, in accordance with EPA's national program regulations. These permits will regulate discharges from construction activity greater than five acres and from eleven industrial categories.

H2-4. The states of CT and NY will continue to implement their existing permitting programs, such as the inland and tidal wetland programs, to address non-point nutrient control with respect to LIS management needs, as appropriate.

H2-5. The states of CT and NY will implement the requirements of the reauthorized Clean Air Act to achieve additional nitrogen emission controls. Major actions include reduction of nitrous oxide emissions through adoption of statewide enhanced vehicle inspection and maintenance programs and stricter emission controls for stationary sources such as power plants.

H2-6. The EPA will make non-point source management of nitrogen and other pollutants identified by the LISS, through wetlands and riparian zone protection as well as best management practices implementation, high priorities for funding under §319, 104(b), and 604(b) of the Clean Water Act.

H2-7. Investigate expansion of storm water permitting programs to regulate communities with populations fewer than 100,000 that border Long Island Sound within high priority management zones.

H2-8. In cooperation with the state of New York, Westchester County is developing a non-point source management plan that will include implementing best management practices for non-point source nitrogen control, monitoring their effectiveness and establishing a Westchester County management zone (or bubble) for assessing compliance with the nitrogen load freeze.

The LISS will explore extending the bubble concept to other management zones throughout Connecticut and New York state portions of the Long Island Sound drainage.

H2-9. Westchester County will implement the recommendations of the County Executive's Citizens Committee on Non-point Source Pollution in Long Island Sound.

H2-10. Point and non-point nitrogen load estimates will be made in the City of Stamford to assess feasibility of a point/non-point source *trading* program. A cost-effective mix of management options will be proposed that may be used to help decide how nitrogen reduction targets can be met once they are established.

H2-11. New York state will pursue the expansion of the State Building Code to include provisions for erosion and sediment control and storm water practices for all construction activities in order to prevent increases in non-point nitrogen runoff.

H2-12. Provide technical assistance to coastal municipalities to address impacts of hypoxia in their municipal regulations and plans of development, as required by law.

H2-13. Advocate the use of the June nitrate test on agricultural lands to ensure that fertilizer applications to crops do not exceed crop needs.

H2-14. In addition to continuing general storm water permitting programs, the state of New York should determine if the general permit adequately regulates nitrogen from activities subject to national storm water regulations.

H2-15. Explore the expansion of current requirements for federally licensed or permitted projects to obtain a water quality certification in New York to protect water quality from sources of pollution to include all projects adjacent to wetlands and other sensitive areas (e.g., adjacent to wetlands) or those that exceed a minimum size (e.g., greater than one acre).

H2-16. The states of Connecticut and New York should develop a habitat restoration plan that includes a list of potential project sites and priorities. Wetland projects that are in close proximity to priority nitrogen management areas should be highlighted.

H2-17. Evaluate Maryland's *Critical Areas* regulations and the reported nutrient reduction benefits and make recommendations of the potential value of a similar program for Long Island Sound.

H3-1. The LISS will complete work on the LIS 3.0 model and the necessary management scenario projection runs.

H3-2. Develop LIS 3.0-based dissolved oxygen targets and nitrogen load reduction targets for each management zone.

H3-3. Establish a firm timetable for achieving, within 15 years, the load reduction targets by zone, with progress measured in five year increments.

H3-4. Develop zone-by-zone plans to achieve the nitrogen load reduction targets.

H3-5. Encourage and support development of innovative, cost-effective technologies to reduce point and non-point sources of nitrogen.

H3-6. Periodically recalibrate LIS 3.0 to reflect the changing conditions of the Sound and use it to explain these changing conditions and to evaluate proposals to modify the management plan, as necessary.

H4-1. Increase funding of the Connecticut and New York State Revolving Fund Programs to meet statewide wastewater control needs, including Long Island Sound nitrogen control needs.

H4-2. Appropriate \$50 M to fund a *Long Island Sound Challenge Grant Program*, a significant portion of which would be used to ensure that the Phase III nitrogen control efforts get off to a fast start with full local government cooperation.

H4-3. Fully fund the non-point source control programs under §319 of the Clean Water Act and §6217 of the Coastal Zone Act Reauthorization Amendments to support additional non-point source management activities.

H5-1. The states of Connecticut and New York, New York City, and the Interstate Sanitation Commission will monitor dissolved oxygen and nutrients in Long Island Sound, its major tributaries, and key sewage treatment plants.

H5-2. Develop a coordinated monitoring plan to assess the effectiveness of implementation, considering innovative approaches and building upon existing programs.

H5-3. As part of a combined National Estuary Program Action Plan Demonstration Project and a CTDEP Long Island Sound Research Fund project, the EPA and the state of Connecticut will complete a demonstration project designed to evaluate and quantify the benefits of a riparian zone in the denitrification process.

H5-4. The state of Connecticut, through its Long Island Sound Research Program, has solicited proposals to identify the role of riverine transport in attenuating the load of nitrogen delivered to the Sound in the Housatonic or Naugatuck Rivers. If an acceptable proposal is identified, it will be a priority for funding in 1994.

H5-5. The state of Connecticut, through its Long Island Sound Research Program, will continue to fund atmospheric deposition monitoring of nitrogen at two coastal locations through May, 1994.

H5-6. The EPA Office of Research and Development will continue to develop regional dissolved oxygen criteria for marine and estuarine waters.

H5-7. The NYSDEC will complete its initial study on the effects of hypoxia and disease on Long Island Sound lobsters.

H5-8. Continue long-term dissolved oxygen and nutrient monitoring of the Sound, its major tributaries, and key sewage treatment plants.

H5-9. Continue to monitor finfish and crustaceans of the Sound with emphasis on determining population response to low dissolved oxygen.

H5-10. Continue to monitor the effects of hypoxia on disease of lobsters.

PATHOGEN CONTAMINATION

P1-1. Continue CSO implementation and update overall management plans to assure implementation addresses bathing beach and shellfish closures and is consistent with water quality standards.

P2-1. Implement the state nonpoint source management initiatives supported from Section 319 funding

P2-2. Develop state coastal nonpoint source control programs, as per Section 6217 of the Coastal Zone Management Act to address the nonpoint source pathogen load from the LIS coastal zone.

P2-3. Implement general storm water permit programs to control the discharge of storm water from industrial, construction, and municipal activities, as per EPA regulations.

P2-4. Provide technical assistance to coastal municipalities to address impacts of pathogens in their municipal regulations and plans of development, as required by state law.

P2-5. Pursue changes of the State Building Code to include provisions for storm water management.

P2-6. Initiate a pilot program to control storm water discharges using enforceable instruments (i.e., permits or consent agreements). Connecticut and New York will evaluate the effectiveness of the pilot program for more widespread implementation.

P2-7. Expand current requirements for federally licensed or permitted projects to obtain a water quality certification to include all projects in sensitive areas or where a contaminant or parameter is found to exist at or exceeding a threshold value.

P3-1. Minimize malfunctions of treatment systems and eliminate dry weather overflows and illegal hookups to storm sewers through aggressive management programs. Ensure prompt notification and response and take quick enforcement action.

P3-2. Identify and take priority enforcement actions to control wet weather overflows from sewers caused by excessive infiltration and inflow.

P3-3. Implement a beach and shellfish closure action plan to take immediate corrective and priority enforcement actions addressing improperly treated municipal discharges. Preventable incidents involving beaches and shellfish areas will be emphasized.

P4-1. During the permitting process, minimize the impacts of boat dockage facilities and temporary live-aboard anchorages by considering their proximity to productive and certified shellfish waters, existing boat channels, wetlands, and critical habitat areas, and tidal flushing.

P4-2. Consider the impacts of vessel discharges through appropriate resource management and recovery programs and limit or condition the siting or operation of boating facilities as necessary to minimize such impacts.

P4-3. New York and Connecticut will apply to the EPA to create vessel *No Discharge* areas in specific embayments and harbors after ensuring the sufficient availability of pump-out stations and treatment facilities.

P4-4. New York state has identified Huntington and Lloyd Harbors as areas requiring additional protection and the EPA has Public Noticed its tentative determination that there are adequate pump-out facilities in these areas.

P4-5. Connecticut, through a 319 grant, will ensure completion of a marina and mooring area water quality assessment guidance document. Connecticut has also completed a marinas *best management practices* project report for nonpoint sources of pollution, which may be used to develop requirements for use of certain best management practices at marinas. New York state will review these documents for potential incorporation into state management programs.

P4-6. Complete regulations to require pump-out facilities as required by, and in accordance with, state law.

P4-7. The states of Connecticut and New York have received funding from the Federal Clean Vessel Act to conduct a pump-out needs survey, determine the effectiveness of existing facilities, develop and implement plans for construction of additional pump-out stations by marinas and prepare education/information plans.

P4-8. Collect information on sewage discharge controls in Long Island Sound, disinfection chemicals used, boater education and sewage treatment plant acceptance of pump-out wastes. Evaluate availability of treatment capacity for pump-out wastes and secure commitments from municipalities to accept these wastes.

P5-1. Connecticut and New York are coordinating management actions with local governments when on-site septic systems are found to be failing and impacting shellfish growing areas and bathing beaches.

P5-2. Continue and enhance management actions with local governments when on-site septic systems are found to be failing and impacting shellfish growing areas and bathing beaches.

P5-3. Evaluate existing septic system controls (including system monitoring, required maintenance and repair and replacement of failing systems) to determine if they are sufficient to protect coastal ecosystems and recommend changes to local governments.

P6-1. Develop and implement a public education plan, targeting specific audiences, in cooperation with federal, state and local public outreach experts and environmental education.

P7-1. Review existing data and reports and the recommendations of the Monitoring Workshop to identify shell fishing or bathing area in need of further assessment.

P7-2. Perform bacterial surveys of harbors and embayments to identify contaminated shellfish areas and potential sources of pathogens as required by the National Shellfish Sanitation Program.

P7-3. Use seasonal or conditional certification of shellfish harvest areas, as may be warranted by water quality variations, under guidelines provided by the National Shellfish Sanitation Program.

P7-4. Meet annually with health directors of coastal municipalities to refine monitoring and bathing beach closure protocols and share information

P7-5. Evaluate existing monitoring programs and, as necessary, make recommendations for enhancements.

P7-6. Conduct a workshop to determine appropriate and consistent methods for bathing beach monitoring and laboratory analysis and work to adopt, if feasible, common methods.

P7-7. Implement the recommendations of the LISS Monitoring Plan to enhance pathogen monitoring.

P7-8. Develop and conduct a dry and wet weather sampling program for specific drainage basins. Both states will evaluate this pilot program for possible expansion.

P7-9. Assess the impacts of identified point and nonpoint sources and assign priorities to areas where management actions are most likely to be beneficial. Priority criteria will include viability of the resource, feasibility and cost-effectiveness of management. Enhance state bacterial surveys of harbors and embayments to identify contaminated shellfish areas and potential sources of pathogens.

P7-10. Support the efforts to develop a better understanding of the relationship between pathogen indicators and the risk to public health such as the National Indicator Study.

P7-11. Along with supporting the National Indicator Study, investigate funding for a regional epidemiological survey to determine the relationship between waters of varying indicator quality and public health.

TOXICS CONTAMINATION

T1-1. The states of Connecticut and New York and the Army Corps of Engineers will continue to regulate dredging and the disposal of dredged sediments through the existing permit programs.

T1-2. The states of Connecticut and New York and the EPA will continue their pretreatment programs to ensure that toxic discharges to sewage treatment plants are controlled. The states of Connecticut and New York, through their Pollution Discharge Elimination System Programs, will continue to ensure that facilities comply with their permit limits.

T1-3. The states of Connecticut and New York and the EPA will apply pollution-prevention techniques, as appropriate, to both direct and indirect discharges of toxic substances by emphasizing wastewater minimization, recycling of wastewater, and alternative processes and chemicals to reduce toxicity and toxics loads and to minimize effects on all environmental media.

T1-4. The states of Connecticut and New York will review municipal and industrial discharge permits to surface waters to reduce the allowable concentrations of toxic pollutants from the previous permitted values.

T1-5. The LISS will encourage adequate funding to continue and expand pollution prevention site visit programs targeting industrial dischargers to the Sound and its tributaries.

T1-6. As part of the NY-NJ Harbor Estuary Program, total maximum daily loads, wasteload allocations for point sources, and load allocations for nonpoint sources will be developed to ensure that water quality standards for mercury are met in the Harbor, the East River, and Long Island Sound.

T1-7. As part of the New York - New Jersey Harbor Estuary Program, the states of New York and New Jersey will establish water quality-based effluent limits for copper, mercury, and six other toxic metals, as necessary. Permits will be subsequently modified.

T1-8. Support education on the environmental impact of using home, garden, and commercial hazardous chemicals and pesticides and continue to provide guidance on how to minimize use of these chemicals and properly dispose of them through household hazardous waste collection.

T1-9. Evaluate mass loadings of toxic contaminants and determine their relationship to ambient water and sediment quality.

T1-10. Identify and assign priorities to toxic substances which should be banned from use and for which *virtual elimination of discharge* should be the goal.

T2-1. The LISS will review the National Oceanic and Atmospheric Administration (NOAA) 1991 sediment chemistry and toxicity survey results of harbors and embayments, when available in the Spring 1994.

T2-2. The LISS will provide a preliminary review of the data on sediment contamination on a site-by-site basis. State and federal experts will evaluate the problem at each site and recommend additional assessments needed to fully characterize the problem, ascertain the need for and feasibility of remediation and prepare a remediation plan.

T2-3. The City of Glen Cove plus their Review Committee will evaluate the contamination of Glen Cove Creek.

T2-4. The LISS will review and evaluate sediment remediation approaches developed in the Great Lakes ARCS Program and HEP.

T2-5. Conduct further assessments and develop site plans addressing the feasibility, technical approach, cost and value of conducting remediation activities for Black Rock Harbor and Glen Cove Creek, where data may be sufficient to conduct case study analyses. Recommend other harbors for characterization and feasibility studies to be conducted at a rate of two harbors per year.

T3-1. The LISS will advocate the coordination between the states of Connecticut and New York to review health risk and advisory recommendations and formulate plans to ensure consistency.

T3-2. Develop strategies for controlling loadings of contaminants for which seafood consumption advisories have been issued.

T3-3. Develop a strategy for identifying toxic substances of human health risk concern in Long Island Sound seafood species and tolerance levels for those substances.

T4-1. The mussel watch and benthic surveillance components of NOAA's Status and Trends Program and the EPA's Environmental Monitoring and Assessment Program provide regular and systematic sampling of contaminant levels in the Sound.

T4-2. A monitoring workshop was held to integrate findings of the LISS and develop a comprehensive, Soundwide monitoring plan for toxic substances.

T4-3. Under the auspices of the New York- New Jersey Harbor Estuary Program (HEP), the U.S. Army Corps of Engineers has agreed to develop a work plan and budget to develop system wide models for PCBs, mercury, and other toxic pollutants that will provide the technical foundation for comprehensive efforts to eliminate these contamination problems in the Sound-Harbor-Bight system. The Corps of Engineers and other participants have agreed to seek the funding necessary to complete these models. Special attention will be directed to fully account for nonpoint sources of mercury.

T4-4. Monitoring initiatives will be coordinated with the EPA Regional - Environmental Monitoring and Assessment Program (EMAP) to further the understanding of sediment toxicity and benthic community structure gradients in western Long Island Sound.

T4-5. Conduct site-specific characterization surveys of water, sediment and biota in harbors where active sources of toxic substances are believed to persist at a rate of two harbors per year.

T4-6. Identify sources and sites of PCB loadings to the Sound ecosystem from in-Sound and NY-NJ Harbor Estuary sources. Focus on reducing and eliminating PCB loadings on a priority basis, concentrating on areas of known contamination such as Black Rock Harbor.

T4-7. Monitor contaminant levels in selected estuarine organisms to ascertain their effects on the biology of the species and their effects on the edibility of the species.

T4-8. Implement the recommendations from the LISS Monitoring Plan to improve contaminant monitoring.

T5-1. The relationship between organism body burdens and their toxic response needs to be investigated as an important mechanism of toxic impact.

T5-2. Trophic level transfer and bioaccumulation effects of contaminants up the food chain need to be quantified to better manage both the aquatic community and human health risk.

T5-3. While toxicity testing of sediments and waters is an efficient means of identifying toxicity problems, the relationship between toxicity and specific causative agents needs to be determined.

T5-4. Evaluate the use of an ecological risk assessment approach, demonstrated in the LISS Black Rock Harbor Action Plan Demonstration Project, for more widespread application to identify toxicity and its sources in embayments and harbors of the Sound.

T5-5. Continue to monitor finfish and crustaceans of the Sound with emphasis on determining population response to low dissolved oxygen.

FLOATABLE DEBRIS

F1-1. Continue implementation of long-term CSO abatement programs to manage or eliminate all CSO areas remaining in the Long Island Sound region.

F1-2. Control discharge of stormwater from industrial, construction, and municipal activities in accordance with EPA's national program regulations.

F2-1. Continue to implement the *Pack It In/Pack It Out* anti-litter campaign.

F2-2. The New York-New Jersey Harbor Estuary Program has developed detailed short- and long-term floatable debris action plans for the New York-New Jersey Harbor.

F2-3. National Beach Cleanup Program. As part of this program, annual cleanups of Long Island Sound shorelines have taken place since 1988. This program costs \$10,000 per year per state to coordinate and support volunteer efforts.

F2-4. Continue to implement *Clean Streets/Clean Beaches* anti-litter campaign.

F2-5. Conduct a demonstration project to encourage proper solid waste handling and recycling at five marinas.

F2-6. Expand involvement in *Coastweeks* program to include a second beach cleanup in the spring, prior to the beach season.

F2-7. Continue to coordinate volunteers to paint stenciled messages on storm drains, such as *Don't Dump - Drains to Long Island Sound*.

F2-8. Maintain clean beaches and minimize resuspension of debris back into Long Island Sound waters by: -Cleaning beaches in the evening to prevent resuspension overnight; -Using solid waste receptacles with lids instead of the open mesh type; -Providing recycling containers in convenient locations; -Using environmentally responsible containers for food and beverages at concession stands.

F2-9. Distribute a directory of volunteer groups in the Long Island Sound watershed that work on projects and activities to reduce marine debris.

F2-10. Encourage the public and manufacturers to promote recycling, use less packaging, and substitute products made from degradable material whenever possible.

F2-11. Encourage marina operators to accept responsibility for litter control and recycling.

F2-12. Require floatation materials that are resistant to decomposition and fragmentation.

LIVING RESOURCES AND THEIR HABITATS

L1-1. Connecticut, New York, and federal agencies will continue to pursue restoration of degraded habitat.

L1-2. Through Connecticut's coastal permit programs and consistency with the CT Coastal Management Act, applicants may be required to protect, restore or enhance aquatic resources.

L1-3. Connecticut preparing a tidal wetland management plan that includes an identification of potential wetland restoration sites.

L1-4. Connecticut will continue the Coves and Embayments Restoration program to restore degraded tidal and coastal embayments and coves.

L1-5. Connecticut, New York, and federal agencies currently administer programs for the restoration of habitats other than tidal wetlands such as dunes, submerged aquatic vegetation, and coastal woodlands.

L1-6. New York is phasing out, and Connecticut prohibits, maintenance ditching of mosquito ditches in favor of selective use of open marsh water management techniques to control mosquitos and restore pools and ponds on tidal wetlands.

L1-7. Coastal America, a cooperative effort of several federal agencies, is conducting a study in Connecticut to evaluate the impacts of transportation facilities upon ten tidal wetland sites. This study is sponsored by the CTDEP and undertaken by the USACE. When the study is completed, restoration plans will be developed for those sites where a transportation facility is shown to be the cause of degradation. Restoration is expected to be implemented through a combination of ISTEA, Water Resources Development Act, Long Island Sound Cleanup Account funds, New York's Environmental Protection Fund, and, where appropriate, natural resources damages recovered under CERCLA or OPA90.

L1-8. Connecticut's Coves & Embayments Program will complete nine restoration projects in progress and commitments to begin three new projects.

L1-9. Connecticut and New York should continue to pursue the use of funds from the following programs, and explore additional funding sources, to support restoration and enhancement activities described in the previous recommendation: The Land and Water Conservation Fund, the Intermodal Surface Transportation Efficiency Act (ISTEA) Enhancement Program, the Partners in Wildlife Program, § 319 of the Clean Water Act, Army Corps of Engineers Section 22 Planning Funds, the Water Resources Development Act, National Coastal Wetlands Conservation Grants, the North American Waterfowl Management Plan, Connecticut's Long Island Sound Cleanup Funds, and the Coastal Zone Management Act.

L1-10. The rapid displacement of native brackish and fresh tidal plant communities on the Connecticut River has been identified as the single most significant habitat problem in this estuary. A specific restoration program for the control of common reed in these tidal wetlands needs to be implemented to check and reverse the spread of common reed and develop the most efficient means of effecting this restoration. Control techniques need to be evaluated for the full range of wetland habitat types on the river. Baseline surveys will be established and post-control monitoring over multiple years will be conducted.

L1-11. New York should continue to phase out maintenance ditching for mosquito control. These programs should receive additional support for selective use of open marsh water management techniques to control mosquitos and restore pools and ponds on tidal wetlands.

L1-12. Obtain long-term funding for Connecticut wetland restoration staff.

L1-13. Connecticut and New York should develop a restoration plan for the full range of coastal terrestrial and estuarine aquatic habitats adjacent to and in Long Island Sound. The restoration plan will include a list of potential restoration projects and a priority listing of projects to be implemented. Preliminary sites identified for future restoration in New York include: City Island (\$300,000); Pelham Bay Park (\$400,000); Wading River (\$50,000); Sunken Meadow Creek (\$50,000); Crab Meadow (\$50,000); and Mattituck Creek (\$100,000). Other sites in New York where costs have not been estimated include Pugsley Creek, Udall's Cove, Oak Neck Creek, Frost Creek, and East Creek. Connecticut has estimated that ten priority sites could be restored for \$750,000, or approximately \$75,000 per site.

L1-14. New York should strengthen their capabilities for implementing programs that restore degraded habitats. This should be undertaken in cooperation with the implementation of the Long Island Sound Regional Coastal Management Plan.

L2-1. The states of Connecticut and New York and the USACE will continue to implement their permit programs and coastal consistency provisions of states' Coastal Management Programs to regulate use and development of aquatic resources and critical habitats such as tidal and freshwater wetlands, intertidal flats, submerged aquatic vegetation beds, beaches, and dunes.

These programs also regulate dredging and the disposal of dredged sediments at designated sites in Long Island Sound. Open water disposal is only permitted at the designated open water sites and may only occur if the disposal will not cause adverse impacts to estuarine organisms.

L2-2. Connecticut will continue to reduce habitat degradation caused by storm water runoff projects (e.g. chronic dilution effects and sedimentation) through the goal of retaining the first one-inch of runoff.

L2-3. Connecticut and New York have programs to acquire by easement, fee simple acquisition, or other means habitats important for populations of plants and animals. These programs include the development of priority listings for acquisition and protection.

Connecticut and New York have land acquisition and management programs that use state funds and federal fund programs such as the Land and Water Conservation Fund, the National Coastal Wetland Conservation Program, and the North American Waterfowl Management Plan to protect and acquire coastal lands and wetlands.

L2-4. The USFWS maintains a national system of refuges, which includes the Stewart B. McKinney National Wildlife Refuge in Connecticut (i.e., Salt Meadow, Chimon Island, Sheffield Island, Goose Island, Milford Point and Falkner Island Units) and Long Island National Wildlife Refuge Complex in New York (i.e., Oyster Bay and Target Rock units).

L2-5. Congress has authorized the creation of the Silvio Conte Connecticut River National Fish and Wildlife Refuge within the Connecticut River Watershed for the purpose of conserving, protecting and enhancing the Connecticut River Valley populations of plants, fish, and wildlife; preserving natural diversity and water quality; fulfilling international treaty obligations relating to fish and wildlife; and providing opportunities for scientific research and education.

L2-6. Connecticut has established a Migratory Bird Conservation Stamp Program, the proceeds of which can be used for acquisition and management. The newly created state income tax form check off for endangered species, natural areas preserves, and watchable wildlife creates a fund that can be used for the identification, protection, conservation, management, and education activities related to the above listed wildlife and habitats.

L2-7. Create a Long Island Sound Reserve System consisting of areas of land and water of outstanding or exemplary scientific, educational, or biological value to reflect regional differentiation and variety of ecosystems and to include representatives of all of the significant natural habitats found in the Sound. Where appropriate, sites will be selected from existing lands and wetlands held for conservation purposes so that acquisition funds will be directed towards those lands in private ownership that are needed to complete the reserve system.

The primary activities in the recommendation include site identification (2 years) and site protection through the development of management plans, acquisition where necessary, and site management.

L2-8. Connecticut and New York should continue to acquire or protect through less than fee simple means, significant coastal habitats through funding sources such as the Land and Water Conservation Fund, the National Coastal Wetland Conservation Program, the North American Waterfowl Management Plan, Connecticut's Recreation and Natural Heritage Trust Program, Connecticut's Migratory Bird Conservation Stamp Program, New York's Environmental Protection Fund, and, where appropriate, natural resource damages recovered under CERCLA or OPA90.

L2-9. Acquire and protect those sites that are considered for acquisition in the New York State Open Space Conservation Plan. Sites include Oyster Bay Harbor (\$5 million); Porpoise Channel (\$2 million); Plum Point (\$1 million); Udall's Cove (\$8 million). Other sites on Long Island Sound that are among the state's highest priority acquisition sites include: Bronx River Trailway, Udall's Ravine, Alley Creek (\$750,000); Long Creek and Mattituck Creek (\$340,000); Premium River (\$750,000); and Cedar Beach Creek (\$186,000).

L2-10. Acquire and protect those sites that are considered priorities for acquisition in Connecticut. The Great Meadows site is the highest priority. (See also Ongoing Programs portion of this table in the CCMP.)

L2-11. Encourage activities of existing Long Island Sound-specific land trusts and encourage formation of new trusts, to seek donations and easements of localized habitat areas for the plants and animals of Long Island Sound.

L3-1. Connecticut, New York and The Nature Conservancy will continue the Natural Diversity Database in Connecticut and the Natural Heritage Program in New York. These programs collect, maintain, and update information pertaining to significant terrestrial and aquatic habitats.

L3-2. The USFWS will continue the Southern New England-New York Bight Coastal and Estuary Project. The project focuses on assessing and monitoring the regional geographic distribution and population status of a large number of key species called *Species of Special Emphasis* and their habitats including evaluating the threats to physical integrity of these habitats and the viability of species populations. Primary objectives are to determine and delineate those regionally important habitats and species populations requiring both immediate and long term protection, conservation, enhancement, and restoration.

L3-3. The NYSDEC will, on a pilot basis, develop a site-specific habitat management strategy for the Oyster Bay/Cold Spring Harbor complex. Phase II will entail implementation of the identified strategy.

L3-4. Connecticut is identifying wetland complexes of statewide significance and general wetland protection strategies for areas located in Long Island Sound and the Connecticut River. This project has been funded by the EPA under §104(b) of the Clean Water Act.

L3-5. Develop a nomination document to recommend the designation of the Connecticut River estuary as a *Wetland of International Importance* for the purpose of establishing a formal designation of this area to recognize the ecological significance of this ecosystem and to foster increased protection of its significant habitat complex and living resources.

L3-6. Develop a strategic plan for the estuarine portion of the Connecticut River that will identify habitat and species issues/problems, monitoring, and research needs and recommendations to foster increased protection of this nationally significant ecosystem.

L3-7. Develop and periodically update a list of significant habitats, habitat complexes, and sensitive areas for protection and management. When completed, habitat management plans will be developed for these areas. In New York this should be undertaken in cooperation with the implementation of the NYSDOS Long Island Sound Regional Coastal Management Plan.

L3-8. Expand the Southern New England-New York Bight Coastal and Estuary Project to: 1) include the watersheds of Long Island Sound; and 2) reexamine the habitat complexes previously identified in Long Island Sound based upon the most current listing of Species of Special Emphasis. Examine the complexes more carefully to fine tune the management recommendations and implement these recommendations through state, county and municipal agencies.

L3-9. Federal habitat programs should develop a watershed approach to protection of living resources of Long Island Sound and their habitats, such as development of a Connecticut River/Long Island Sound Management Unit by the USFWS.

L3-10. Designate portions of the Connecticut River estuary as a National Estuarine Research Reserve. A reserve designation will result in promoting research that is directed towards resource management issues and provide facilities and programs for public education and interpretation.

L4-1. Connecticut, New York, and federal agencies will continue to implement their Endangered Species Programs in order to protect endangered and threatened species that live in and adjacent to Long Island Sound.

L4-2. Develop a list of endangered and threatened invertebrates. Maintain and update the diversity database. Periodically revise the list of threatened and endangered species. Expand the monitoring program, identify essential habitats, and develop recovery plans.

L4-3. Develop legislation or regulations in New York state that will minimize disturbance to the essential habitats of rare plants and animals.

L4-4. Revise and publish a list of rare and sensitive species associated with the coastal lands and waters of Long Island Sound.

L5-1. Development and implementation of fishery management plans, including research, monitoring, and conservation law enforcement activities.

L5-2. Management of shellfish aquaculture activities including resource monitoring.

L5-3. Improvement of anadromous fish passage opportunities including associated research and monitoring activities.

L5-4. Wildlife management, including research and monitoring activities in support of management programs.

L5-5. Activities that minimize mortality due to entrainment and impingement of eggs, larvae, and juvenile and adult aquatic organisms at industrial facilities.

L5-6. Define, revise, and coordinate the establishment of seasonal restrictions for dredging that minimize adverse effects on aquatic organisms, especially finfish and shellfish and their habitats.

L5-7. Enhance implementation of interstate fishery management plans for Long Island Sound fishery resources.

L5-8. Expand efforts to bypass obstructions to anadromous finfish migrations on Connecticut tributaries to Long Island Sound and the Connecticut River by constructing or installing fishways or fishlifts.

L5-9. Enhance municipal shellfish restoration programs.

L5-10. Enhance the Connecticut Oyster Restoration Program on public beds in state waters by stocking settling habitat (cultch) and conducting related activities (e.g., resource sampling).

L5-11. Develop a marine biotoxin assessment program for shellfish.

L5-12. Develop artificial reefs in appropriate areas of New York waters to increase fishing opportunities, consistent with the New York State Artificial Reef Development Plan. Plans have been developed to construct reefs in New York waters of Long Island Sound off Matinecock Point, Eatons Neck, Miller Place/ Mt. Sinai, and Mattituck Inlet.

L5-13. Develop methods to reduce the incidental take of nontarget species and undersized individuals in fishing activities.

L6-1. Develop measures to prohibit or prevent the induction or release to Long Island Sound and its watershed of known or potentially undesirable species.

L6-2. Implement a management program to reduce abundance of mute swans that are causing losses of certain aquatic habitat types such as submerged aquatic vegetation and certain types of emergent tidal wetland vegetation.

L7-1. Develop an outreach program to inform and educate the public about the plants and animals in Long Island Sound.

L7-2. Develop a citizens monitoring program specific to the plants and animals of Long Island Sound sufficient to aid managers in identifying problems and assessing the effects of management efforts.

L8-1. Connecticut will continue its statewide Geographic Information System (GIS) Program to digitize spatial information and data for resource management purposes.

L8-2. Connecticut has created a Long Island Sound Resources Center for the purpose of : 1) developing the full potential of estuarine related GIS applications; 2) computerizing pertinent literature and data for rapid access through standard word search and spatial basis; and 3) completion of the estuarine geology of Long Island Sound. Additionally, this Center is taking a leadership role in the development of side scan sonar mapping of Long Island Sound that is now being overlaid with benthic community information. This will become the foundation of future living species and habitat management programs.

L8-3. Identify spatial data for living resources and habitat on a Sound wide basis and digitize priority data sets for incorporating into a Sound wide Geographical Information System.

L8-4. Expand the data layers for living resources and their habitats on a Sound wide basis.

L8-5. Develop and maintain state databases and an integrated Long Island Sound database describing the living resources of Long Island Sound and their habitats.

L8-6. Expand the side scan sonar/benthic habitat mapping program in order to create baseline information for management and conservation purposes.

L8-7. Maintain and enhance the Long Island Sound literature, indexing and GIS capabilities of the Marine Sciences Research Center at SUNY, Stony Brook.

L9-1. Connecticut conducts a Sound wide open water fishery survey that has become an integral component of the LISS monitoring and Management programs. In addition, Connecticut conducts a nearshore finfish survey, and surveys of lobster, shad, anadromous herrings, Atlantic sturgeon, and shortnose sturgeon (the latter is listed by the federal government as an endangered species). Other marine surveys include a survey of oyster recruitment (Connecticut Department of Agriculture, Aquiculture Division) and recreational and commercial fishery statistics activities.

L9-2. Connecticut conducts nesting surveys of colonial water birds, Least Tern and Piping Plover, Osprey, waterfowl, a mid-winter eagle survey, and surveys of diamond-backed terrapin, threatened and endangered terrestrial species, and other species of special concern.

L9-3. New York conducts an American lobster mortality project funded by the LISS. In addition, New York conducts the NMFS's Recreational Fishery Statistics Survey, surveys of commercial fishery landings, seabird surveys, (e.g., ospreys, piping plovers, least terns), surveys of threatened and endangered species and species of special concern, and other surveys as needed.

L9-4. Connecticut should pursue the construction and staffing of a marine science technology center at Avery Point with a research focus on Long Island Sound.

L9-5. Enhance wildlife monitoring activities (e.g., seabirds, waterfowl, and marine turtles).

L9-6. Monitor the status and trends of eelgrass in the Sound and all species of submerged aquatic vegetation in the Connecticut River using remote sensing and ground surveys.

L9-7. New York should initiate a nearshore fishery independent survey of Long Island Sound.

L9-8. Continue the lobster mortality and disease monitoring project in Long Island Sound.

L10-1. Connecticut will continue the Long Island Sound Research fund. This fund is used to foster research that addresses priority management issues in Long Island Sound including living species and their habitats.

L10-2. Connecticut has funded the following living resources and habitat research: evaluation of the causes of declines of eelgrass; assessment of contaminant levels in the greater scaup; changes in the phytoplankton community resulting from nitrogen enrichment; effects of hypoxia on bottom feeding fish; vegetation changes in a restoring tidal wetland; and mapping of benthic communities.

L10-3. Identify priorities for management-oriented research about the living resources of Long Island Sound and their habitats.

PUBLIC INFORMATION & EDUCATION

E1-1. The LISS and state public involvement and education programs are: developing printed and other educational materials for specific audiences; exhibiting LIS materials at regional and local fairs and events; encouraging education and information on the Sound for urban populations; promoting the importance of the Sound's resources to children in the region; and, using public educational material of non-profit organizations.

E1-2. Support research conferences such as: the CTDEP conference to highlight its LIS Research Grant Program; the LIS Watershed Alliance *Citizens' Summit* annual conference on the Sound; and the bi-state LIS research conference sponsored by local universities, Sea Grant programs, and the states.

E1-3. *Coastweeks*, an annual three week celebration of marine and coastal environments is supported by both states.

E1-4. Enhance the LISS and state public involvement and education programs to provide additional funding to build upon the current outreach and education activities with a new focus on interpretation and implementation of the management plan.

E2-1. Incorporate LIS information into all related programs conducted by state staff wherever possible.

E2-2. Provide information to all municipalities on the LISS and the importance of protecting and restoring the Sound. Special attention will be given to coastal municipalities in the form of briefings by state officials to explain exactly how implementation of the plan will affect that particular city or town and how to work cooperatively together to implement the management plan. Briefings will also be held for specific user groups, local officials, and elected representatives.

E2-3. Assess opportunities for training and educating the environmental decision-making community and provide technical information and assistance on implementation of the plan to the regulated community.

E2-4. Utilize the Bi-state Marine Resources Committee to ensure Long Island Sound related legislation moves on a parallel track in both Connecticut and New York and to help educate local governments and the public about the importance of the Sound and the successful implementation of the LISS recommendations.

E2-5. Pursue reestablishment of funding for the Long Island Sound Resource Center at Avery Point and further development of a similar resource center in New York to serve as clearinghouses and depositories for information about the Sound and investigate ways to improve funding for these centers.

E3-1. Encourage public participation in activities relating to the cleanup and protection of the Sound and provide support for activities including storm drain stenciling, beach grass planting, and beach cleanups.

E3-2. The LISS Citizens Advisory Committee will continue to provide guidance to the Management and Policy Committee and serve as a link between the public and LISS management agencies. The CAC has been instrumental in providing guidance to the Study and serving as a conduit between the Management Conference and the public.

E3-3. Enhance funding for hands-on activities such as storm drain stenciling, beach grass planting and beach cleanups to allow the public to actively participate in the cleanup and restoration of the Sound and learn more about its ecosystem.

E3-4. Promote citizen involvement in educational and monitoring activities in and around the Sound and consider:

- Providing technical assistance to citizen monitoring groups;
 - Developing a reward system for citizens participating in Long Island Sound protection and restoration programs;
 - Developing environmental habitat kits and guide maps;
 - Production and distribution of videos of Long Island Sound research cruises.
-

E4-1. Increase efforts to coordinate ongoing governmental and non-governmental public outreach efforts as the plan becomes implemented and encourage private and nonprofit groups to continue to develop and implement Long Island Sound educational and outreach programs.

E4-2. Establish a public outreach work group to guide the implementation of the public involvement and education commitments and recommendations. The work group will work closely with and serve to complement the ongoing public outreach and education efforts of the Citizens Advisory Committee. The group will also be charged with determining funding resources for implementation of public involvement and education recommendations, consulting with staff on tactics, working to provide coordination of public outreach efforts from both an internal and external basis, and assessing program effectiveness.

E5-1. Support ongoing actions that assist teachers in their efforts to integrate LIS issues into existing curricula.

E5-2. Continue Connecticut's Long Island Sound High School Research Grant Program, initiated in 1990. This program provides funding for students to conduct research on the Sound and its watershed.

E5-3. Encourage natural history museums and nature centers to promote Long Island Sound issues within their programs.

E5-4. Work with school districts and, where appropriate, the Department of Education, in Connecticut and New York to develop Long Island Sound educational materials and outreach programs for primary and secondary schools. Help teachers integrate Long Island Sound information into their curricula and provide materials wherever possible. This should include hiring a Long Island Sound education coordinator.

E5-5. Enhance ongoing actions to assist teachers in their efforts to integrate Long Island Sound issues into their existing curricula including the development and support of teacher workshops.

E5-6. Consider a Long Island Sound High School Research Grant Program to provide resources to allow a variety of high schools to conduct research on the Sound and its watershed.

Glossary of Acronyms

A

ACOE Army Corps of Engineers

B

B Billion

BAT Best Available Technology

BMP(s) Best Management Practice(s)

BNR Biological Nutrient Reduction (Removal)

BOD Biological Oxygen Demand

C

CAC Citizens Advisory Committee

CCMP Comprehensive Conservation and Management Plan

CD Compact Disc

CD-ROM Compact Disc - Read-Only Memory

CERCLA Comprehensive Environmental Response, Compensation and Liability Act (Superfund)

CES Cooperative Extension Service

CSO(s) Combined Sewer Overflow(s)

CT Connecticut

CTDEP Connecticut Department of Environmental Protection

CTDOA Connecticut Department of Agriculture

CTDOA/BA Connecticut Department of Agriculture Bureau of Aquaculture

CTDOHS Connecticut Department of Health Services

CTDOT Connecticut Department of Transportation

CVA Clean Vessel Act

CWA Clean Water Act

CZM Coastal Zone Management

CZMA Coastal Zone Management Act

D

DO Dissolved Oxygen (expressed in milligrams per liter [mg/l])

E

EIS Environmental Impact Statement

EMPACT Environmental Monitoring for Public Access and Community Tracking (EPA)

EPF Environmental Protection Fund (New York State)

F

FY Fiscal Year

FFY Federal Fiscal Year

G

GIS Geographic Information System

H

HEP Harbor Estuary Program (New York/New Jersey)

Hg Mercury

I

ICM Integrated Crop Management

IEC Interstate Environmental Commission

I Cont'd

IPM Integrated Pest Management
ISTEA Intermodal Surface Transportation Efficiency Act

K
K thousand
k kilogram
km Kilometer
Km² Square kilometer

L
l liter
LA Load Allocation
lbs pounds
LIS Long Island Sound
LISO Long Island Sound Office (EPA)
LISS Long Island Sound Study
LISWA Long Island Sound Watershed Alliance

M
M Million
MC Management Committee
MEG Model Evaluation Group
mg milligrams
mgd million gallons per day
mg/l milligrams per liter
MPRSA Marine Protection, Research and Sanctuaries Act
MSD(s) Marine Sanitation Device(s)
MSRC Marine Science Research Center (SUNY)

N
N Nitrogen
NDD National Diversity Database
NDZ No Discharge Zone
NEIWPCC New England Interstate Water Pollution Control Commission
NEMO Nonpoint Education for Municipal Officials
NJDEP New Jersey Department of Environmental Protection
NMFS National Marine Fisheries Service
NOAA National Oceanic and Atmospheric Administration
NO_x Nitrous Oxide
NPDES National Pollutant Discharge Elimination System
NPS Nonpoint Source(s)
NRCS Natural Resource Conservation Service
NRWI Norwalk River Watershed Initiative
NY New York
NYC New York City
NYCDEP New York City Department of Environmental Protection
NYDOT New York Department of Transportation
NY/NJHEP New York/New Jersey Harbor Estuary Program
NYS New York State
NYSDEC New York State Department of Environmental Conservation
NYSDOH New York State Department of Health
NYSDOS New York State Department of State
NYSOPRHP New York State Office of Parks, Recreation and Historic Preservation

O

ODA Ocean Dumping Act
O&M Operations and Maintenance
OLISP Office of Long Island Sound Programs (State of Connecticut)

P

P.A. Public Act
PCB(s) Polychlorinated Biphenyl(s)
PIE Public Information and Education
PS Point Source

R

RFP(s) Request for Proposal(s)
RNHT Recreation and Natural Heritage Trust (State of Connecticut)

S

SAV Submerged Aquatic Vegetation
SEP State Environmental Protection (fund, CT)
SFY State Fiscal Year
SIP State Implementation Plan
sq. mi. Square Miles
SUNY State University of New York
SPDES State Pollution Discharge Elimination System
SRF State Revolving Fund
STORET STORage and RETrieval System (EPA Data System)
STP(s) Sewage Treatment Plant(s)
SWEM System-Wide Eutrophication Model

T

TAC Technical Advisory Committee
TMDL Total Maximum Daily Load

U

UConn University of Connecticut
USACOE United States Army Corps of Engineers
USCG United States Coast Guard
USDA United States Department of Agriculture
USDOI United States Department of the Interior
USEPA United States Environmental Protection Agency
USFWS United States Fish and Wildlife Service
USGS United States Geological Survey

W

WAC(s) Watershed Advisory Committee(s)
WLA(s) Waste Load Allocation(s)
WMA Wildlife Management Area
WWW World Wide Web