

Eliminating Adverse Impacts of Low Dissolved Oxygen in the Sound

The 1994 CCMP identified low dissolved oxygen (hypoxia) as the most significant water quality problem in LIS, affecting critical life cycles of living marine resources. Since 1990, EPA and the states of Connecticut and New York have implemented a phased program to reduce human-caused nitrogen loads to LIS and Improve dissolved oxygen levels to meet water quality standards.

OVERALL CCMP STRATEGY:

The 1994 CCMP identifies a five-part strategy to address the elimination of adverse impacts of low dissolved oxygen on the aquatic habitat and living marine resources of the Sound by: 1) reducing nitrogen from sewage treatment plants (STPs) and other point sources; 2) reducing nitrogen loads from nonpoint sources; 3) continuing the coordinated management of hypoxia; 4) funding implementation of hypoxia management plans; and 5) monitoring and assessing hypoxic conditions and impacts.

LIS 2003 AGREEMENT GOAL:

N/A

ENVIRONMENTAL INDICATORS/RESULTS/TRENDS:

Total point source nitrogen loads delivered to Long Island Sound by 2015 decreased by more than 40,000,000 pounds annually from the baseline. There had been relatively flat progress in reducing point source nitrogen to the Sound since 2005 because New York City STPs have been under construction for nitrogen removal upgrades and storage and processing capacity has been reduced as a result. This "bulge" in the nitrogen reduction curve lasted for several years until STP upgrades are completed. Weather and rainfall also affect STPs ability to effectively remove nitrogen, and the environmental response of the ecosystem is unpredictable. In Summer 2015, the maximum area of hypoxia (less than 3.0 mg/l dissolved oxygen (DO)) covered an estimated 38 square miles at peak, and lasted 57 days.

2015 HIGHLIGHTS:

- [could not update for 2015 b/c I don't have CT numbers CB]The estimated nitrogen load from STPs in the LIS drainage basin in 2015 is approximately [new figure] compared with 28,838 TE lbs/day in 2014, a decrease of [xx,xxx] TE lbs/day from the baseline. See Associated Files for Appendices B and C that show the plant-by plant loads in New York and Connecticut for 2015.
- In 2015 the maximum area and duration of dissolved oxygen less than 3 mg/l observed in LIS was 38 square miles and 57 days. The 13-year pre-TMDL averages are 208 square miles and 57 days. The post-TMDL (16 year) averages are 162 square miles and 56 days.
- The five year rolling average for the maximum area of hypoxia is 124.6 square miles.

SUMMARY OF CCMP MANAGEMENT ACTIONS:

ELIMINATING ADVERSE IMPACTS OF LOW DISSOLVED OXYGEN IN THE SOUND

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 reduce nitrogen loads in their portions of the Long Island Sound basin using a mixed approach of STP retrofits, pilot studies and upgrades under existing permitting authorities. With adoption of the TMDL, state requirements to remove nitrogen loads have been formalized and expanded beyond the original commitments in the CCMP.

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<p>1 TO BE UPDATED: The total estimated point source (end of pipe) nitrogen load to LIS in 2015 was xx,xxx Trade-Equalized lbs/day, a decrease of more than xx,xxx TE lbs/day from the base TMDL level of 59,148 TE lbs/day. Trade-Equalized (TE) pounds consider the transport efficiency factor of each Management Zone established in the TMDL. Factors vary from 1.0 to 0.13 depending on calculated efficiency of nitrogen transport to the Sound. For example, a pound of nitrogen from the Stratford, CT STP would be equivalent to 0.62 pounds of nitrogen from a Glen Cove, NY STP.</p>	<p>Continue emphasis on achieving nitrogen reduction targets.</p>
<p>2 Westchester County had entered into a Consent Order with the DEC which requires the County to addresses five WPCPs (Blind Brook, Mamaroneck, New Rochelle, Port Chester and North Castle). This Order implemented a SPDES requirement for a 12-month rolling average (12-MRA) for each facility but also included a “4 WWTP Aggregate 12-MRA” for the Blind Brook, Mamaroneck, New Rochelle, and Port Chester WPCPs. This CO requires the County to be in compliance with the 2014 WLA no later than 2017. Construction of the Phase I BNR upgrade for the New Rochelle plant is approximately 49% complete as of December 31, 2012. Construction of the BRN Phase I work at the Mamaroneck WWTP is approximately 89% complete as of December 31, 2012.</p>	<p>Ongoing work at the New Rochelle and Mamaroneck Plants. Approval of the Deign for the Phase 1 work at the Port Chester WWTP.</p>
<p>3 NYSDEC and NYCDEP reached an agreement in 2012 on an enforcement order to improve water quality. NYC has invested \$187 million and will invest \$2.4 billion over the next 14 years to install green infrastructure technologies. This will reduce stormwater entering the City’s CSOs. NYCDEP estimates that approximately 1.5 billion gallons of CSO flows will be removed annually by 2030. Under the provisions of the agreement, the City agrees to pay a \$200,000 penalty; provide \$150,000 to support a water quality evaluation of the Hutchinson River; and fund \$5 million in environmental benefit projects.</p>	<p>Five year milestones must be met in order for the City to stay in compliance with the Order.</p>
<p>4 The following present’s activities and progress by Management Zone in New York (please note that costs presented include disinfection upgrades as needed; all funding for LIS from the NYS Clean Air/Clean Water Bond Act has been committed). Disinfection projects are identified in the “Controlling of Pathogens” section of this report:</p>	<p>All facilities that are required to upgrade to met the 2014 WLA are either completed or in various stages of design or construction.</p>

Zone 7 – Showed an 8% reduction in nitrogen discharges from baseline.

- New Rochelle WWTP - Phase 1 is required to be completed by June 30, 2014, and be meeting the 12-MRA for New Rochelle and Mamaroneck WWTP by December 31, 2014. The cost for this upgrade is estimated at \$331 million, however these costs include costs beyond the BNR upgrades.

- Mamaroneck WWTP – Phase 1 was required to be completed by December 31, 2012, meeting their individual 12-MRA by June 30, 2013 however delays in construction were experienced. The construction is 89% complete. The cost for this BNR upgrade is estimated at \$54 million.

- Blind Brook completed an MLE upgrade to the aeration tanks in 2010. This upgrade was not required under the Consent Order. The cost for this upgrade was \$43 million

- Any additional construction identified as being required to meet the Final/4 WWTP 12-MRA must be completed by December 31, 2016. Compliance with the Final/4 WWTP Aggregate 12-MRA must be demonstrated by August 1, 2017.

Zone 8 – Showed a 43% reduction in nitrogen discharges from baseline. The costs to upgrade this Zone for BNR portions only are estimated at \$1,100,000,000.

- Bowery Bay - Phase I Construction of the BNR upgrade was completed June 29, 2012. Phase 2 (carbon addition) of the nitrogen upgrade is expected to be completed by 7/1/16. The estimated cost for this project is \$289 million

- Hunts Point – Phase I BNR construction is complete. Phase 2 (carbon addition) is expected to be complete by 8/1/15. This is an estimated \$206 million project.

- Tallman Island – Began construction of the nitrogen upgrade May 2006 with an expected completion date of May 31, 2013. Phase 2 will be completed by 2017. This is an estimated \$350 million project.

- Wards Island – Began construction of the nitrogen upgrade April 2006. This is the full build-out for nitrogen treatment which will be used as a pilot for determining what is needed (Phase 2) at the other three plants. This project is due for completion by 10/31/13. The SHARON construction was completed 12/31/11. This is an estimated \$236 million project.

Zone 9 – Are the NYC WPCPs Red Hook and Newtown Creek. In a 2006 Consent Order, NYC negotiated the ability to trade between the two NYC zones. As such, all of the required reductions in nitrogen loading from the NYC zones will come from Zone 8. There have been major upgrades to the secondary process at the Newtown Creek WWTP. This zone has seen a 34% reduction from baseline however the actual reason for this reduction could be due to a number of factors including lower than average flows.

Zone 10 – Saw a 48%% reduction in nitrogen discharges from the baseline. The costs to upgrade this Zone are currently estimated at \$82,900,000. Four of the six facilities in this Zone are meeting the 2014 WLA.

- Great Neck Sewage District and Great Neck Village – Have entered into a Consent Order with the DEC to combine the two plants,

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with upgrades being made at the Great Neck Sewer District Plant. This construction is expected to be completed by June 2014.

- City of Glen Cove – This Facility has been meeting its 2014 WLA since 2003.

- Oyster Bay SD – This Facility has been meeting its 2014 WLA since 2006.

- Port Washington – This plant's BNR upgrade was completed in April 2011 and is meeting its 2014 WLA. The project cost was \$11 million.

- Belgrave – This Facility was awarded \$2.9 million in 2003 to upgrade their biological filters to add methanol feed. Upgrades to this facility were completed in August 2012. This plant is now meeting its 2014 WLA.

Zone 11 – Saw a 72% reduction in nitrogen discharges from baseline. The costs to upgrade this Zone are approximately \$47,200,000. Two of the six facilities in this Zone are meeting the 2014 WLA.

- Greenport (V) - The Village of Greenport has submitted an engineering design report for BNR and UV upgrades. The BNR upgrade will meet the 2012 limit. This upgrade was completed in 2011. This Facility's WLA will be re-evaluated as part of the TMDL reassessment via trading within the Zone 11 bubble limit.

- Huntington SD – This Facility completed its nitrogen removal upgrade in April 2008 and had been meeting the 2014 WLA; however, it has not been meeting the limit for the past couple of years. The DEC is working with the facility to understand what the problems are..

- Port Jefferson (Suffolk Co SD#1) – The nitrogen upgrade at this Facility has been completed and the Facility has been meeting the 2014 WLA since September 2008.

- Kings Park (Suffolk Co SD#6) – The nitrogen upgrade at this facility was completed in 2010 and the Facility is meeting the 2014 WLA. The cost for this project was \$7.9 m.

- SUNY (Suffolk Co SD#21) – This Facility is currently under a Consent Order, effective 9/3/08 requiring The Phase 1 Design Plan and Specifications for an interim recharge facility to meet the 2009 nitrogen limit has been submitted.

Northport (V) – The BNR upgrade was completed in 2005; however the facility is not yet meeting the 2014 WLA. The Community did submit an Engineering Report detailing how the 2014 limit will be met. The Phase II nitrogen upgrade will cost an additional \$3.7 million and is expected to be completed in 2014.

5 Connecticut's Nitrogen General Permit was reissued on December 29, 2010. The reissued general permit for Nitrogen Discharges covers the 5-year period January 2011-2015.

With Connecticut's final permit limit set for 2014, and the TMDL requirement that that limit not be exceeded in aggregate thereafter, the NCAB will be reviewing the future of the program and how to maintain a very successful NCE that has accelerated progress toward that goal, and saved substantial costs to the State's municipalities.

6 New York loads in 2015 totaled 14,513 TE lbs/day compared with

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15,962 TE lbs/day in 2014.

- 7 The project upgraded a manure digester to incorporate new technologies that reduce equivalent of 6,500 pounds of Nitrogen and 2,500 pounds of Phosphorus from operations of a dairy farm near the Blackberry River.

- 8 The Connecticut Farm Bureau Association will upgrade a manure digester to incorporate new technologies that reduce the equivalent of 5,928 pounds of Nitrogen and 2,282 pounds of Phosphorus solids from the Freund dairy farm in the Blackberry River sub-basin, which flows into the Housatonic River and then to LIS. The project was funded with \$91,000 from EPA and matched by \$64,533 in non-federal contributions.

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.

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- 1 The LISS TMDL Writing Team in conjunction with the Connecticut River Work Group identified 11 new nutrient reduction management scenarios and had a contractor run these scenarios using the System-Wide Eutrophication Model (SWEM). None of these model runs resulted in full water quality compliance in all places at all times. The 2000 TMDL is expected to reduce hypoxia by 90%, while the most aggressive new management scenario only achieved a 98% reduction. The combined group is continuing to evaluate options for achieving water quality in LIS including the use of bioharvesting.

Continue evaluate options and the timing for completing the TMDL reassessment

- 2 The 2013-2014 projects managed by CT and NY Sea Grant, (Nickitas Georgas of Stevens Institute of Technology; Vaudrey, UConn) were completed in 2015. Final reports of the completed research projects were made available. Three new research projects for the 2015-2017 period began on 3/1/2015 (Craig Tobias, UConn; Wally Fulweiler, Boston University; and Mark Altabet, UMass Dartmouth). Prior to the final awards being made, CT and NY Sea Grant met with the PIs to discuss synergies among the proposed biogeochemical cycling-focused projects, and agreements made that fostered collaboration and efficiency with respect to both time and cost. (2015)

The new projects will continue in 2016. The RFP process for 2017-2019 projects will be initiated in 2016. The 2016 LIS Research Conference is scheduled for May 13. PI Georgas will present a summary of his findings to the STAC in February 2016.

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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 §319), the Coastal nonpoint source control program (czara §6217), and storm water 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 reducing nonpoint Sources of nitrogen and anticipate continuing those efforts as the primary means to meet the reduction goal specified in the TMDL.

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| <p>1 In 2011-2012 Connecticut continued administering its 319 NonPoint Source and 6217 Coastal NonPoint Source programs.</p> | <p>Connecticut's 319 and 6217 NPS Coordinators are assisting in resending a Green Infrastructure and Low Impact Development Symposium to Connecticut municipalites in 2013.</p> |
| <p>2 IEC performs inspections of Combined Sewer Overflow (CSO) and Municipal Separate Storm Sewer System (MS4) outfalls throughout its District to detect illicit discharges and work toward their elimination.</p> | |
| <p>3 In December 2009, CTDEP issued a Notice of Request for Proposals for development of a study to evaluate Connecticut's stormwater general permits to promote better site design and incorporation of low impact development practices to minimize stormwater runoff volume and pollutant loads for new land use development projects. The goal of this project is to evaluate improved and innovative approaches for more effectively controlling stormwater quantity and quality through the Connecticut Stormwater General Permits (SGP). Objectives of the project are to: 1) Establish performance goals and criteria for management practices common to SGP implementation; 2) Identify how the performance goals and criteria can be most effectively incorporated into the SGP to meet permit limits and conditions; and 3) Identify mechanisms for incorporating Low Impact Development (LID) best management practices (BMP) and pollution prevention practices into the SGP for priority attention. The project will focus on Connecticut's Stormwater Construction General Permit but with applicability to DEPs other storm water permits and programs.</p> | <p>A contract will be awarded by CT DEP to a consultant that will work with CT DEP and external stakeholders to coordinate the project and revise applicable DEP guidance documents. The contractor will provide quarterly progress reports and a draft report by January 30, 2011. It is anticipated a final report and final revisions incorporated into the guidance manuals for stormwater and erosion and sediment control by August 2011.</p> |
| <p>4 The Long Island Sound Futures Fund supported a project to overcome barriers to green infrastructure adoption. The National Wildlife Federation used a collaborative planning process including 2 workshops and one public meeting, a survey and development of a strategy by 50 participants focused on identifying and overcoming barriers to the adoption of green infrastructure to reduce stormwater pollution in the Northport/Huntington Harbor Complex (Town of Huntington, Villages of Asharoken, Huntington Bay and Northport and the Suffolk County Planning). The project: 1)identified barriers to adoption of green</p> | |

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<p>infrastructure, 2)explored whether a collaborative planning process can help communities collectively overcome barriers and develop strategies for broader green infrastructure adoption, 3)created a collective Green Infrastructure Action Agenda, 4)considered modifications to codes, ordinances, and land use policies to encourage green infrastructure techniques, and 5)seeked commitments from public agencies to install 1-2 demonstration projects. Project results were disseminated to 40,000 people through websites and newsletters. Project partners included Citizens Campaign for the Environment and Town of Huntington.</p>	
<p>5 NYS has prepared and issued the renewal of the SPDES General Permit for Storm Water Discharges from Municipal Separate Storm Sewer Systems (MS4s) Permit No GP-0-15-003, effective May 1, 2015 and expiring April 30, 2017.</p>	
<p>6 In Connecticut, the NCAB has previously set aside \$100,000 in 2007 for a study of combined sewer overflows (CSO), sanitary sewer overflows (SSO) and stormwater separation effects on nitrogen loads and other urban stormwater and sewage pollutants. In 2008, total project funding of \$741,854 was recommended by the Board and approved by the Commissioner. DEEP has partnered with the University of Connecticut center for Environmental Science and Engineering (CESE) to evaluate the relative benefits and impacts of sewer separation and delivery of nitrogen to the receiving water via the POTW and direct storm sewer discharge. The project is ongoing.</p>	<p>Ongoing project evaluating effectiveness of storm sewer separation.</p>
<p>7 The Long Island Sound Futures Fund supported a nutrient bioextraction project in Long Island Sound. This project demonstrated the potential to use kelp, a native seaweed, to naturally bioextract pollution from Long Island Sound resulting in improvements in water quality. This small-scale project aimed to remove 53 lbs. of nitrogen and 343 lbs. of carbon and then model the potential large-scale nutrient removal capacity of seaweed. The overall objective was to show that seaweed aquaculture is a feasible and effective tool to remove nitrogen pollution from and restore ecosystem services in North American coastal waters.</p>	
<p>8 The Town of Oyster Bay built a 1,200 sq. dt. raingarden and installed two 50 gallon rain barrels to treat 1,255 gallons of stormwater runoff from a 5,000 sq. st parking lot discharging into Long Island Sound. This project was supported through the Long Island Sound Futures Fund.</p>	
<p>9 In October of 2015, the Nassau County Soil and Water Conservation District, in partnership with the Hempstead Harbor Protection Committee, was awarded a grant that will construct three demonstration raingardens on the north shore including one at Cedarmere in Roslyn</p>	

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Harbor. The grant will also provide for workshops for local residents and municipalities to learn how to construct their own raingardens.

H-4. Funding to Implement Hypoxia Management Plans (CCMP Table 7, P. 41)

Key Elements: The CCMP envisioned fully-funded nonpoint source (CWA ?319 and CZARA ?6217) programs, federal and state funding of state revolving fund programs, and appropriation of additional federal funds for management, emphasizing the phase III management efforts incorporated in the TMDL.

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| <p>1 In addition to state funding, the State of Connecticut has been awarded approximately \$48.5 million in federal economic stimulus funding from the American Recovery and Reinvestment Act of 2009 (ARRA) for wastewater infrastructure. Consistent with the Clean Water Fund Regulations and the ARRA program requirements of EPA, the DEP amended its FY 09 Priority List to reflect the additional funding, make necessary changes to projects that had previously been listed, including costs and schedules, and added potential new projects to the list. This \$48.5 million in new federal funding will be deposited into the Clean Water Fund and \$24.25 million will be used for grants. CTDEP, through the efforts of the Treasurer's Office, is able to leverage the stimulus funds and create a purchasing power of \$85 million in new project value.</p> | <p>With this \$85 million, the amended priority list extends funding for the construction of two treatment plant upgrades in New Milford and South Windsor and provides supplementary construction funding to fully fund treatment plant upgrades in Meriden, Southington and Groton.</p> |
| <p>2 Connecticut's Nitrogen Credit Advisory Board (NCAB) provided supplemental funding to the USGS for enhanced Connecticut River monitoring. \$160,000 had been allocated in November 2007, but the Board requested an addition of \$20,000 to continue with monitoring in 2008. Because the Connecticut River is tidal, the loads along the river from Thompsonville to Long Island Sound are poorly understood. The Board allocated an additional \$90,000 for fiscal year 2011-2012 to continue monitoring. USGS monitored nitrogen loads during different seasons and during the storms in 2011. The report will be submitted this year to the DEEP.</p> <p>The NCAB funded enhanced nutrient monitoring statewide by partnering with the USGS. In 2008, \$240,000 was provided for monitoring to be conducted on rivers throughout the state to better determine nitrogen loads from within and outside of Connecticut. An additional \$323,500 was allocated to keep monitoring in federal fiscal year 2011 (\$45,000) and 2012 (\$45,000). Using those data along with their existing database, USGS will comprehensively analyze and report on nitrogen loads and trends to Long Island Sound. The report will be submitted to the DEEP this year.</p> | <p>Continue to work with USGS to complete monitoring report and evaluate monitoring results to assist management decisions.</p> |
| <p>3 The NCAB is funding enhanced nutrient monitoring statewide by partnering with the USGS. In 2008, \$240,000 was provided for supplemental monitoring to be conducted on rivers throughout the state to better determine nitrogen loads from within and outside of Connecticut. Using those data along with their existing database, USGS</p> | <p>USGS to complete analysis of monitoring results. Complete report.</p> |

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will comprehensively analyze and report on nitrogen loads and trends to Long Island Sound for 1999 - 2008.	
<p>4 In 2009 the NCAB also approved a monitoring equipment funding program for dissolved oxygen and nitrogen sampling equipment purchases by municipal treatment plants. The equipment will help optimize the denitrification process. By constantly monitoring dissolved oxygen and nitrate levels facilities will be better able to control the amount of dissolved oxygen entering the anoxic zones and optimize nitrate recycles and supplemental carbon.</p>	It is estimated that an additional 1,374 eq lbs N/day will be removed from the facilities that acquire analyzers to be used for process control.
<p>5 The Nitrogen Credit Advisory Board continues to explore ideas for the use of surplus funds for training and improvements in treatment plants for the benefit of the NCE program and to ensure that the program achieves the TMDL limit.</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 actions. 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 predated the 1999 lobster die-off in western LIS.

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<p>1 In Summer 2009, hypoxic conditions (3mg/l DO) in LIS were estimated to have extended for a period of 45 days and covered a maximum area of 169 square miles compared to the pre-TMDL year averages of 57 days and 208 square miles. Hypoxic conditions began in early July and lasted through mid-September. LIS monitoring information is posted at: http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325534&depNav_GID=1654. EPA has included this area as an environmental indicator in its Strategic Plan for 2006-2011 under Goal 4, Healthy Communities and Ecosystems.</p>	The LISS is continuing to fund the CTDEP ambient monitoring of LIS in 2010.
<p>2 The UConn Department of Marine Sciences at Avery Point, Connecticut, continued to operate and maintain a real-time water quality monitoring network, MYSound, in 2012 under LISICOS, the Long Island Sound Integrated Coastal Observing System, an expanded regional monitoring initiative. MYSound stations monitor surface and bottom waters for dissolved oxygen, temperature, salinity and other selected parameters, such as wind speed, at eight sites. The MYSound website address is: http://www.mysound.uconn.edu.</p>	Continue to operate and maintain the MYSound stations and website as funding allows.
<p>3 The LISS partners continued ambient monitoring of LIS in 2012: CTDEEP continued its ambient monitoring of LIS stations. CTDEEP's scope of monitoring parameters supports the changing ecosystem perspective. Currently 17 stations are monitored on a monthly basis,</p>	Continue the ambient monitoring program.

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<p>year-round with up to 48 stations being sampled during each survey for in situ parameters from June-September. Maps and summaries are available on the at: http://www.ct.gov/deep/cwp/view.asp?a=2719&Q=325532&deepNav_GID=1654 . NYCDEP performed ambient monitoring of NY waters in Western LIS. Its findings are summarized in the NYCDEP Harbor Water Quality Monitoring Report produced annually. IEC continued summer hypoxia monitoring in LIS by weekly measurements of DO, pH, temperature, salinity and Secchi depth at 21 stations; and bimonthly, samples were collected for chlorophyll a. IEC made weekly data transmissions to LISO, CTDEEP, NYCDEP, NYSDEC, CSHH, HydroQual, Nassau County HD, Westchester County HD and Sea Grant.. The IEC Annual Report details all monitoring activities which can be viewed on the new and improved IEC website at: www.iec-nynjct.org. All IEC data are entered into the EPA database, STORET.</p>	
<p>4 Friends of the Bay in Oyster Bay NY completed their 18th ambient water quality season in 2015. Sampling took place once a week from the first week in April to the last week in October. Reports are available on the FOB website at www.friendsofthebay.org.</p>	<p>Water quality monitoring activities are planned to continue in 2016.</p>
<p>5 Hempstead Harbor Protection Committee, with help from the Coalition to Save Hempstead Harbor and the Town of Oyster Bay, continued their water quality monitoring program and annual report.</p>	<p>Monitoring will continue in 2016.</p>
<p>6 The Manhasset Bay Protection Committee continued their monitoring in conjunction with the Town of North Hempstead's Bay Constable.</p>	<p>Continue the coordinated monitoring effort.</p>
<p>7 In Fall of 2012 the UConn Center for Land Use Education and Research (CLEAR) completed its two-year study to provide seamless land cover change data for the lower LIS watershed area. The study covers the 25-year period 1985-2010 and includes data on basic land cover, riparian cover, and impervious cover. Results and maps are posted on an interactive web mapping site at http://clear.uconn.edu/projects/landscapeLIS/index.htm</p>	
<p>8 Connecticut's Nitrogen Credit Advisory Board (NCAB) has recommended \$1,966,500 (NCE money) to be used for funding for the purchase of on-line (automated) or portable analyzers for dissolved oxygen (DO) and nitrogen analyzer equipment for those WPCFs that don't currently have equipment, or adequate equipment. WPCFs will be reimbursed 75% of the purchase price, which is estimated to be \$40,000 for two on-line analyzers and \$3,000 for portable analyzers.</p>	<p>The Advisory Board continues to explore ideas for the use of the funds for training and improvements in treatment plants to enhance nitrogen removal and to ensure that the program achieves the TMDL limit.</p>

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<p>Twenty-one plants in 2012 have requested money for reimbursement. The plants that have installed the equipment have improved nitrogen removal capabilities beyond their current performance through computerized controls. The project is ongoing.</p>	
<p>9 The CTDEEP continued the Water Quality Monitoring program in LIS and its annual Summer Hypoxia survey. In summer 2012 the maximum area of hypoxia (below 3.0ppm) was 288.5 sq. mi. and duration was 63 days beginning on July 10 and ending on Sept. 10. Which is 158 sq.mi. and 9 days more than 2011.</p>	<p>CTDEEP in consultation with a special working group on LIS monitoring will continue to conduct a year round water quality monitoring and a Summer Hypoxia monitoring program supplemented with stationary buoy real time water quality monitoring of the MYSound/LISCOS program.</p>
<p>10 The Long Island Sound Futures fund continues to support the Hempstead Harbor water quality monitoring program. The Incorporated Village of Sea Cliff collected water quality data to help monitor 14 different sources of pollution at 18 locations to track improving and declining water quality in inner and outer Hempstead Harbor. The data collected included bacteria, dissolved oxygen, salinity, water temperature, pH, nitrite, nitrate, ammonia, clarity, turbidity, physical observations, and precipitation. An annual report was published and the results were posted on a website for use by communities and public agencies.</p>	