

Chapter 3. Environmental Health

Long Island Sound Water Quality Monitoring

Given the scope and variety of water quality challenges to Long Island Sound (LIS), obtaining baseline data and conducting frequent monitoring is crucial to scientifically informed management. There are many monitoring programs undertaken by agencies and citizen groups to assess the overall health of Long Island Sound. The information in this chapter is limited to those factors that directly affect shellfish.

Since 1991, the Connecticut Department of Energy & Environmental Protection (CT DEEP) has conducted an intensive year-round [water quality monitoring program](#)⁸ in Long Island Sound (LIS) by staff aboard the Department's Research Vessel *John Dempsey*. The program collects physical and chemical information such as temperature, salinity, dissolved oxygen, nutrients, pH, and chlorophyll a at stations across the Sound, and at various depths within the water column. The program also collects information about plankton communities on a more limited spatial basis. In 2016, the agency began to develop a pilot volunteer embayment water quality monitoring program.

The Connecticut Department of Agriculture Bureau of Aquaculture (DA/BA) is responsible for regulating shellfish harvesting in accordance with the Interstate Shellfish Sanitation Conference (ISSC) National Shellfish Sanitation Program Model Ordinance (NSSP-MO) and Connecticut General Statutes. DA/BA, along with local shellfish commissions, are responsible for frequent collection of water quality samples in areas where shellfish are harvested commercially and recreationally following guidelines in the [NSSP-MO](#)⁹.

Academic researchers, volunteer monitoring groups, and non-governmental organizations collect data on LIS embayment water quality. They compete for grant funds to conduct this monitoring available through the Long Island Sound Study and other granting agencies.

Total Maximum Daily Loads: Plans to improve water quality in areas with an impaired shellfish harvesting use

Shellfish harvest is not permitted from waters that have high counts of fecal indicator bacteria. By taking measures to reduce this bacterial contamination, water quality is improved and waters can eventually be reopened for shellfish harvest. A Total Maximum Daily Load (TMDL) provides the framework for the restoration of impaired waters by establishing the maximum amount of a given pollutant that a body of water can receive without adverse effects to wildlife, fish and recreational uses. Under the Clean Water Act, [TMDLs](#)¹⁰ are required for impaired waters, and lead to the development of a Water Quality Management Plan that lays out tangible, quantitative goals to reduce pollutants (in this instance, bacteria) to acceptable levels.

Establishing a TMDL for an impaired waterbody is the "first step to recovery". This involves the identification of sources of impairment and an outline of a plan to fix the problems. Sources of impairment impacting bacteria levels include problems such as failing sewer lines, large populations of waterfowl, and stormwater runoff.

CT DEEP has developed 14 Shellfish TMDL documents since 2012. An additional estuary TMDL covering shellfish uses and impairments is currently under development by CT DEEP for the shoreline area of the Town of Westbrook. This document should be released to the public in 2016. CT DEEP is also developing a watershed prioritization list including several sub-estuaries and embayments. CT DEEP will develop plans to achieve the water quality goals established for each water body included on this list.

“No discharge zones” are bodies of water in which boats are prohibited from discharging treated or untreated sewage. The establishment of “no-discharge zones” across all of Long Island Sound expanded the areas available for shellfish harvest, by reducing the risk of bacterial contamination from recreational and commercial boaters. Connecticut was declared a no discharge zone in 2007, and this was expanded to all of Long Island Sound in 2011. Shellfish harvest is still prohibited within marinas according to the NSSP model ordinance. Although the prohibition of boat sewage discharge has greatly reduced sources of bacterial contamination, inadvertent or illegal discharges represents too great of a potential risk to consumers to allow shellfish harvest during times of year when boats are present.

LIS Report Card

An inaugural [report card](#)¹¹ was developed for Long Island Sound by the Integration and Application Network at the University of Maryland Center for Environmental Science in June 2015. The report card currently examines five water quality indicators using data provided by CT DEEP. The group hopes to include ecological indicators such as shellfish and bacteria in future report cards.

Nutrient Bioextraction by Shellfish

Shellfish aquaculture has been identified as a tool to improve water quality through the reduction of excess nutrients in Long Island Sound. Nutrient overenrichment of Long Island Sound has been linked to a variety of environmental problems, including nuisance algal blooms and hypoxia. . Since the 1990s, the Long Island Sound Study partners have reduced land-based sources of nutrients through wastewater treatment plant upgrades, stormwater management, wetland restoration, and the installation of riparian buffers. Nutrient bioextraction, also called bioharvesting, is the practice of farming and harvesting shellfish and seaweed for the purpose of removing nitrogen and other nutrients from natural water bodies. Bioextraction can increase the capacity of aquatic ecosystems to assimilate nutrients, making ecosystems more resilient to nutrient loading, and is the only method available that removes nitrogen after it has entered the Sound. The Long Island Sound Study is exploring ways to credit shellfish growers for the water quality benefits they provide.

Climate Change and Shellfish in Long Island Sound

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