



CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

CONNECTICUT'S NITROGEN CONTROL PROGRAM THE LONG ISLAND SOUND TMDL

October 2005

Gina McCarthy, Commissioner

Nitrogen TMDL to Control Hypoxia in Long Island Sound

What's a TMDL?

TMDL stands for "Total Maximum Daily Load." Under the federal Clean Water Act, a TMDL analysis must be undertaken for waterbodies that do not meet state water quality standards. In the case of Long Island Sound, Connecticut's dissolved oxygen standard of 6.0 mg/l is violated each summer in the bottom waters from New Haven west to Greenwich. Similarly, New York's standard of 5.0 mg/l is violated in the western half of the Sound.

The primary pollutant causing the low dissolved oxygen condition, or hypoxia, is nitrogen. Nitrogen fuels the growth of algae in the Sound, which eventually decays, consuming oxygen in the process. There is enough nitrogen added by human activity to cause a severe hypoxia problem each summer, often with oxygen levels falling below 1 or 2 mg/l. Hence, Connecticut and New York have developed a TMDL for nitrogen that specifies the maximum amount, or the Total Maximum Daily Load, of nitrogen that can be discharged to Long Island Sound without significantly impairing the health of the Sound. On April 3, 2001 the USEPA approved the Long Island Sound TMDL for implementation.

What are the Components of a TMDL?

A TMDL must specify where the pollutant of concern is coming from and where and when reductions will be implemented to improve surface water quality and meet state standards. CT DEP, working through the Long Island Sound Study (LISS) has detailed nitrogen loadings from throughout the Long Island Sound watershed. The sources of nitrogen are well understood and are dominated by sewage treatment plant (STP) contributions.



Figure 1. Dots show location of Sewage Treatment plant discharges to LIS and its watershed.

The TMDL specifies how much nitrogen sewage treatment plants and other point sources in CT and NY will be allowed to discharge, known as a Wasteload Allocation (WLA). Similarly, nitrogen reductions from nonpoint sources, such as urban stormwater runoff and atmospheric deposition, need to be specified. The nonpoint source maximum allowable load in the TMDL is called a Load Allocation (LA).

The TMDL must also account for seasonal variations and incorporate a Margin of Safety to assure water quality standards will be met. Collectively, the TMDL is equal to the point source wasteload allocation plus the nonpoint source load allocation plus the margin of safety.

How much Nitrogen will be Removed?

The TMDL, which was approved by the USEPA, specifies a 58.5% reduction in human generated nitrogen from point and nonpoint sources as the next phase of management. Connecticut proposes to remove about 6,670 tons of nitrogen each year delivered to Long Island Sound from 81 municipal, state, and private sewage treatment plants and three industrial dischargers located throughout the state that contribute significant loads of nitrogen. Another 400-ton nitrogen reduction is planned for nonpoint sources. New York's expected nitrogen load reduction from point and nonpoint sources will be about 17,150 tons/year.

Is 58.5% Nitrogen Control Enough?

No. Additional phases of nitrogen reduction from sources in other states north of Connecticut that drain to Long Island Sound and from atmospheric sources are also proposed in the TMDL. Alternative technologies, such as aeration in the Sound, are being considered and it is likely that existing state water quality standards for dissolved oxygen will be modified in the next few years. Long Island Sound Study sponsored research shows that oxygen levels as low as 3.5 mg/l may be adequate to protect most aquatic life in Long Island Sound provided they do not persist for an extended period. CT DEP proposed to revise its marine DO criteria based on an EPA criteria document that was recently published.

How soon will the next Phase of Nitrogen Removal be Implemented?

The TMDL schedules the 58.5% nitrogen removal plan over 15 years with full implementation of this phase by the year 2014. The TMDL also requires periodic review and updating at five-year intervals. That will allow for incorporation of any new water quality standards that are adopted, better understanding of hypoxia in Long Island Sound from ongoing research and monitoring efforts, enhancement of plans for following phases of management, and evaluation of new management technologies that might accelerate nitrogen control at a lower cost. Although the TMDL was planned to begin implementation in August 1999, adoption of the TMDL was delayed until 2001. Despite the delay, the 15-year nitrogen reduction target will still be met by 2014. Any additional planning, permitting, and implementation will be compressed into the first five years of implementation to keep the 15 year time frame on track.

Will the WLAs and LAs be Flexible?

The total nitrogen reduction, i.e. the 58.5% reduction specified in the TMDL for the next phase of implementation, must be met. However, there are an infinite number of ways the total target could be met in Connecticut.

The CT DEP has proposed to the Legislature the creation of a unique and innovative Nitrogen Credit Exchange Program. If approved by the Legislature, it will provide a great deal of flexibility for the regulated community. (See the CT DEPs fact sheet on the Nitrogen Credit Exchange Program.)

Has any Progress been made in Nitrogen Control?

Yes. In earlier phases of nitrogen control, CT DEP, in partnership with several municipalities, has made great strides in reducing the nitrogen load to Long Island Sound. Fifteen sewage treatment plants in Southwestern CT have achieved more than a 25% reduction in their aggregate nitrogen load through a low-cost retrofit program. In 1996-1997 CT DEP awarded a record \$250 million in Clean Water Fund loans and grants to upgrade sewage treatment plants, including major nitrogen removal projects in Norwalk, New Canaan, and Waterbury. Since 1990, Connecticut has managed to reduce the statewide point source nitrogen load by an estimated 15% through cooperative state-municipal-private efforts.

For more Information...

Contact:

Paul E. Stacey, Long Island Sound Study
Coordinator
CT DEP, Water Management Bureau
79 Elm Street
Hartford, CT 06106-5127
(860) 424-3728
paul.stacey@po.state.ct.us

Mark A. Parker, Long Island Sound Study
Public Outreach Coordinator
CT DEP, Water Management Bureau
79 Elm Street
Hartford, CT 06106-5127
(860) 424-3276
mark.parker@po.state.ct.us

CT DEP Web site: www.dep.state.ct.us