IMPLEMENTING NITROGEN CONTROLS TO ALLEVIATE LONG ISLAND SOUND HYPOXIA

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Much like the Barnegat Bay – Little Egg Harbor (BB-LEH) estuarine system, excess nitrogen loading to Long Island Sound (LIS) has altered its ecosystem and impaired uses. In particular, increased nitrogen loading is implicated in the hypoxia that severely impacts its western basin. LIS has a large (16,000 mi^2) watershed that drains nearly all of CT and significant portions of NY, MA, NH, and VT. High coastal population densities in the NY City metropolis and major CT cities result in significant nitrogen loads from sewage treatment plants (STP) to LIS, unlike the BB-LEH complex where nonpoint and stormwater are dominant sources. Nonpoint and stormwater runoff, particularly from urbanized areas, are also an important source of nitrogen to LIS. Midwestern and local nitrogen oxide emissions add to atmospheric nitrogen deposition rates that rank among the highest in the nation.

To address this complex array of sources and jurisdictions, CT, NY and the Long Island Sound Study developed a Total Maximum Daily Load (TMDL) that was approved by EPA in April 2001. The TMDL requires a 50% nitrogen load reduction from baseline by 2014 and allocates responsibility among multiple sources. STPs in CT and NY are practicable, but expensive, sources to manage and CT has established a nitrogen-trading program to achieve a 64% reduction requirement sooner and at less cost than traditional approaches.

More relevant to the character of the BB-LEH estuary, the LIS TMDL also establishes a 10% nitrogen reduction goal from urban and agricultural nonpoint and stormwater sources. This load allocation will be much more difficult to attain in the face of new development, atmospheric loads from out of state, the inefficiency of best management practices retrofit into existing development, and the nature of nitrogen, which resists physical trapping and requires special conditions for biological removal. CT and NY have not initiated new programs to meet this challenge, but are instead relying on existing authorities such as Clean Water Act Section 319 programs, Coastal Zone Act Reauthorization Amendments Section 6217 programs, and Phase II stormwater permitting among others.

The lessons learned from the development of the LIS TMDL, the success of CT's point source nitrogen trading program, and prospects for attaining the nonpoint source/stormwater goal will be explored and may be helpful to BB-LEH management efforts.

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