



GREAT BAY MUNICIPAL COALITION

March 23, 2012

Thomas Burack, Commissioner
Department of Environmental Services
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

Harry T. Stewart, P.E., Director
NHDES Water Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

Re: Squamscott River Report

Dear Commissioner Burack and Mr. Stewart:

In accordance with the Memorandum of Agreement (MOA) between the Department and the Coalition, a detailed study of the Squamscott River was initiated. The final report is attached for your review. As demonstrated by the detailed monitoring and analysis conducted by HydroQual, with assistance from the Jackson Marine Laboratory, the DO regime of the Squamscott River is far more complicated than originally determined by the Department in its 2009 Numeric Nutrient Criteria for Great Bay (2009 Criteria Report). This new information confirms that periodic low DO and elevated algal growth does occur, but not as a direct result of elevated TN levels as originally assumed in the 2009 Criteria Report. The low DO occurs primarily when algal levels *decrease* and therefore less oxygen is pumped into the system from photosynthesis. High algal levels occur primarily as a result of greatly elevated algal levels discharged from the City of Exeter lagoon system. This external algal input skewed the dataset for this river system (in comparison to other tidal areas within the Great Bay system). This artifact, unique to the Squamscott River, made it wholly inappropriate for that data to be plotted along with data from other tidal areas of the bay to predict DO changes due to changing algal growth. Therefore, the Department's prior conclusions that (1) instream TN levels causing increased algal growth was the direct cause of periodic low DO readings in the river and (2) reducing algal levels and TN will achieve the 5 mg/l DO criteria were misplaced. Thus, this Squamscott River study confirms that the 2009 Criteria Report needs to be updated to be scientifically defensible.

We fully expect that DO will increase when the existing Exeter algal discharge is eliminated once the upgraded facilities are constructed. However, modeling the further effects of TIN reduction on the system is not practical at this time since the impact of TIN is masked by the high algal levels that artificially occur due to the lagoon

system. Once those system inputs are eliminated, and the system sediment oxygen demand has stabilized, it will be possible to accurately model the improvements that would be anticipated by reducing TIN levels from the Exeter WWTF discharge. Until that point, we suggest an adaptive management approach be utilized to institute common-sense improvements that will help to protect this system.

Please let the Coalition know if you have any questions regarding this report and whether the Department plans to update the 2009 Criteria Report to reflect this new information as required by the MOA.

Sincerely,

Dean Peschel for the Coalition

cc. Coalition Members

John C. Hall

Thomas Gallagher