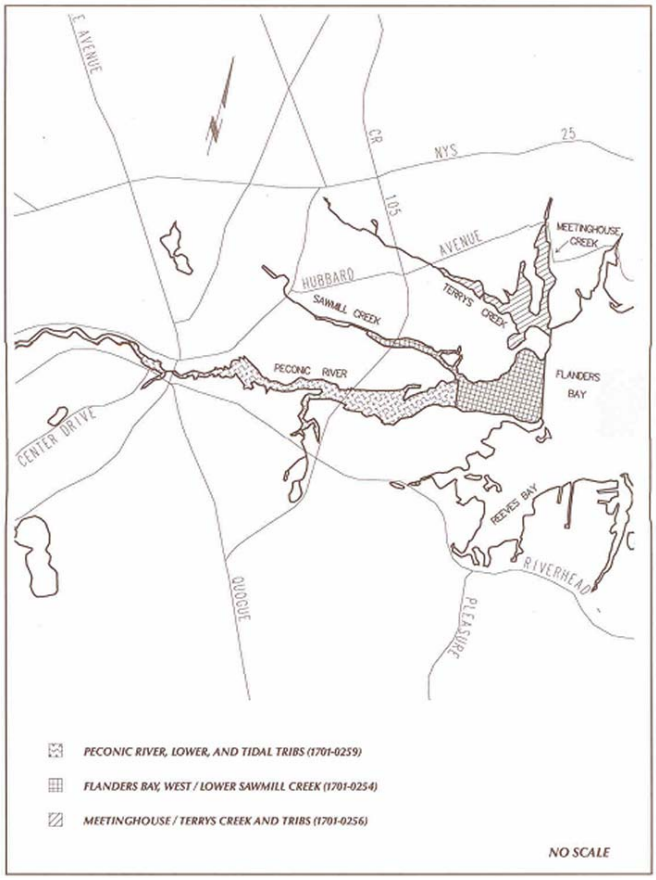
# Response to Public Comments

Total Maximum Daily Load for Nitrogen in the Peconic Estuary Program Study Area, Including Waterbodies Currently Impaired Due to Low Dissolved Oxygen: the Lower Peconic River and Tidal Tributaries; Western Flanders Bay and Lower Sawmill Creek; and Meetinghouse Creek, Terrys Creek and Tributaries

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**This Document was prepared jointly by:**

United States Environmental Protection Agency

New York State Department of Environmental Conservation

Suffolk County Department of Health Services

Peconic Estuary Program

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# Response to Public Comments

## Total Maximum Daily Load for Nitrogen in the Peconic Estuary Program Study Area, Including Waterbodies Currently Impaired Due to Low Dissolved Oxygen: the Lower Peconic River and Tidal Tributaries; Western Flanders Bay and Lower Sawmill Creek; and Meetinghouse Creek, Terrys Creek and Tributaries

## I. Introduction

This document is a collaborative response by the United States Environmental Protection Agency (EPA), the New York State Department of Environmental Conservation (DEC), Suffolk County Department of Health Services (SCDHS), and Peconic Estuary Program (PEP) to public comments on the DRAFT Total Maximum Daily Load (TMDL) for Nitrogen in the Peconic Estuary Program Study Area, Including Waterbodies Currently Impaired Due to Low Dissolved Oxygen: the Lower Peconic River and Tidal Tributaries; Western Flanders Bay and Lower Sawmill Creek; and Meetinghouse Creek, Terry Creek and Tributaries.

Seven (7) comment letters were submitted and received, each addressing several aspects of the DRAFT TMDL. EPA, DEC, SCDHS, and PEP evaluated these comments which provided input to the finalization of the TMDL document.

## II. Public Participation

Notice of availability of the DRAFT TMDL was announced several ways:

1. State Environmental Notice Bulletin (ENB) on July 18, 2007. The ENB publication announced the availability of the DRAFT TMDL document for comment and provided contact information for accessing the DRAFT TMDL Document and information on the public meeting.

2. PEP e-mail sent to several hundred State, County, local stakeholders and other interested parties on July 19, 2007. The email announced the July 18, 2007 ENB publication and ENB link (http://www.dec.ny.gov/enb/20070718_not1.html), the file transfer protocol (ftp) website to obtain the DRAFT TMDL document ftp://ftp.dec.state.ny.us/dow/tmdl/071807tmdl.pdf and information on the public meeting.

3. PEP letter sent to approximately 25 local stakeholders, the week of July 23, 2003. The letter announced the July 18, 2007 ENB publication and ENB link (http://www.dec.ny.gov/enb/20070718_not1.html), the ftp website to obtain the DRAFT TMDL document ftp://ftp.dec.state.ny.us/dow/tmdl/071807tmdl.pdf, a copy of the DRAFT TMDL document, and information on the public meeting.

A 30 day public review period was established for soliciting written comments from stakeholders prior to submitting the final TMDL to the United States Environmental Protection Agency (EPA)

for approval. The deadline for submitting comments to DEC for consideration was August 17, 2007.

DEC held one (1) public meeting to discuss and answer questions on the proposed TMDL on August 2, 2007 at the Cornell Cooperative Extension Education Center, First Floor Conference Room, 432 Griffing Avenue, Suite 100 Riverhead, NY 11901-3071, at 1pm. Staff from the DEC, EPA, SCDHS, and PEP were present at this meeting; 25 stakeholders attended. DEC and EPA personnel discussed issues related to water quality standards, nitrogen as the pollutant which contributes to the causes of low DO levels, and development of a TMDL as a vehicle address water quality impairments and preserve water quality in the remaining waters of the Peconic Estuary.

Seven (7) commenters, as identified below, provided comments concerning various aspects of the TMDL which were considered in finalizing the TMDL.

| **Name(s)** | **Associated Organization** |
|---|---|
| Phil Cardinale, Town Supervisor | Town of Riverhead |
| Rebecca Wiseman, Agricultural Stewardship Coordinator | Cornell University Cooperative Extension of Suffolk County, Agricultural Stewardship Program |
| Dale D. Moyer, Agriculture Program Director | Cornell University Cooperative Extension of Suffolk County |
| Christopher J. Gobler, PhD, Associate Professor | State University of New York at Stony Brook, School of Marine and Atmospheric Sciences, Marine Sciences Research Center |
| Matthew R. Atkinson | Peconic Baykeeper, Inc. |
| Sarah G. Newkirk, Coastal Program Director<br>Wayne L. Grothe, Peconic Estuary Conservation Site Director | The Nature Conservancy |
| Robert J. Kent, Senior Extension Associate | New York Sea Grant, Cornell University Research and Extension Center |

## III. Comments and Responses to Comments

Seven (7) sets of comments have been received; consisting of forty eight (48) individual comments. These comments and their responses are presented below in six (6) topical groupings related to the DRAFT TMDL Document: General Comments and Overall Approach; Underlying Data and Assumptions upon which the TMDL is based; Margin of Safety/Critical Period; Implementation; SPDES Permitting and Related Topics; and Consistency with Clean Water Act Requirements, including the Appropriateness of Mechanical Aeration. In some cases, comments on similar themes are grouped and a single response is provided.

### A. General Comments and Overall Approach

**Comment 1**: It is positive that steps are being taken to mitigate the nutrient loads, that a build-out scenario is included, and that the entire Estuary is considered. (Peconic BayKeeper)

**Response 1**: Given the current water quality problems of impaired waterbodies and the potential for water quality to worsen in both these waters and in other areas if current loading trends continue, it has become increasing clear that it is necessary to: reduce current loadings, consider nitrogen loads associated with future development at build-out, and address loadings for the entire Peconic Study Area, not just the watersheds of the currently impaired waterbodies.

**Comment 2**: The efforts of the NYS-DEC, Suffolk County, US-EPA and the PEP and are applauded for their ongoing efforts to develop a scientifically rigorous, effective Total Maximum Daily Load. (TNC)

**Response 2**: This TMDL is indeed based on good science, including the underlying data which served as inputs to the hydrodynamic/water quality model.

**Comment 3**: The TMDL report should mention more clearly that the changes in the Estuary are very complex and not completely understood, and we can not predict with certainty what will happen if we reduce nitrogen loads. (Sea Grant)

**Comment 4**: In upstate New York, programs aimed at reducing phosphorus levels in the Great Lakes have resulted in many unexpected ecological consequences. Since this TMDL asks many people to change their behavior, and in some case to incur a financial cost, it seems that people will need help understanding the uncertainty involved in taking actions intended to restore the Estuary. (Sea Grant)

**Response 3/4:** The TMDL Report addresses the complexities of estuarine systems, with statements such as "The relationship between nitrogen loading, ambient nitrogen concentration, and DO conditions is complex, often nonlinear, and typically requires calibrated and verified mathematical models to account for the controlling hydrologic, physical, chemical, and biological interactions." In the Final TMDL Document, additional language addressing this point has been included under the heading "Summary of Baseline Nutrient Loads and Uncertainties."

The relationship between excessive nitrogen and low dissolved oxygen levels in estuaries is well documented. In order to meet dissolved oxygen (DO) water quality standards in the Peconic Estuary, including currently impaired waters, nitrogen loads must be reduced. Managing nutrient loads can help prevent nuisance phytoplankton and macroalgal blooms, which in turn can help prevent low dissolved oxygen conditions and improve water clarity.

Unfortunately, we cannot predict with certainty what effects these necessary nitrogen load reductions will have on the complex ecosystem functions and relationships within the estuary.

The Peconic Estuary Program (PEP) and the Comprehensive Conservation and Management Plan (CCMP) includes a public participation and education/outreach element. Communicating with and educating municipal officials and citizens on various nitrogen reducing efforts and actions to justify altered behavior is an ongoing effort.

While a variety of programs were put in place to reduce phosphorus loads to the Great Lakes, among the most significant factors in reducing ambient phosphorus levels in the lakes was perhaps the accidental introduction of the invasive zebra mussel, which also likely contributed to some or all of the observed ecological consequences alluded to in the comment. The introduction of this invasive species has contributed to numerous shifts and changes in the food web there. It is beyond the scope of this TMDL to assess the likelihood of, or impacts from, a similar situation in the Peconic System.

**Comment 5**: In the National Estuary Program Coastal Condition Report, the water quality index for nitrogen in the Peconic Estuary is rated as good. Even so, in the areas rated as good, there is an absence or a very minimal population of eelgrass, scallops and hard clams. If this is the case, it should be made clear in the TMDL report. (Sea Grant)

**Comment 6**: The TMDL report implies that by reducing nitrogen in areas with elevated nitrogen (Western Flanders Bay and its tributaries) conditions will improve for eelgrass, scallops and hard clams. It seems perhaps that this will not be the case, since those species do not thrive at this time in areas rated as having "good" nitrogen water conditions. (Sea Grant)

**Response 5/6**: The water quality in the Peconic Estuary is generally good, especially as compared to other estuaries across the county. The vast majority of the estuary meets water quality guidelines. The objective of the Peconic TMDL is to restore beneficial uses to those areas that are impaired with respect to dissolved oxygen levels and to prevent other areas from experiencing these problems in the future. Ambient nitrogen water quality levels should not be considered the only indicator of eutrophication stress. For example, nitrogen concentrations in the western Peconic Estuary appear to be decreasing, possibly due to some reductions in loadings to the system, increased uptake in the food web, or some combination of these two mechanisms (and perhaps others). The roles macroalgae, sediment nutrient flux, and filter feeders play in affecting both the surface and bottom water concentrations of nitrogen are believed to be significant and are not captured in nitrogen concentration measurements. As stated in the response to the above comment, this point is now more clearly made in the report.

In spite of the overall good water quality of the Peconic Estuary, current eelgrass and scallop populations are only a fraction of former documented abundances. Nitrogen loads need to be managed in order to achieve DO objectives. Managing nitrogen loads should also have the benefit of improving water quality conditions necessary to support other ecological objectives, such as restoring eelgrass, scallops, and hard clams. As stated in the TMDL Document, nitrogen is essential to a productive ecosystem. Achieving desirable and balanced loadings and ambient waterbody concentrations of nitrogen is only one aspect of what is necessary to restore these three species mentioned, and others. For example, a slime mold present since the 1930s likely played a role in the decline of eelgrass, while the persistent brown tide (*Aureococcus anophagefferens*) blooms of the 1980s further contributed to losses. Eelgrass beds are also known or suspected of being adversely impacted by competition from invasive plants present in the system, predation from crustaceans and wildlife, and disturbances from boating, dredging

and shellfish harvesting. Loss of genetic diversity and pesticides are also suspected of playing a role in eelgrass declines. Similar discussions can be provided for scallops and hard clams. In summary, nitrogen management is one of many objectives that must to be pursued in order to improve the quality of estuaries, habitats and living resources.

**Comment 7:** The TMDL uses both pre-colonial and post colonial nitrogen loads to help establish goals for reducing nitrogen levels in the estuary. Yet, some 30 years ago or so, the Estuary was very productive with healthy eelgrass beds and large harvests of scallops and hard clams. Why do we need to go back to pre-colonial nitrogen loads for contrast when the bays were still productive only several decades ago? (Sea Grant)

**Response 7**: This TMDL does not call for returning to pre-colonial nitrogen loads, though estimates of what the pre-colonial load is presented for comparison purposes. Requirements for reducing nitrogen loads are based on achieving dissolved oxygen standards. The significant declines in the extent of eelgrass beds and scallop and hard clam harvests witnessed over the course of the past several decades can be attributed to numerous factors, not just specifically eutrophication. Declines in the abundances of eelgrass and commercially and recreationally important filter feeders play a role in nutrient cycling in the Peconic Estuary system, and is one of the reasons eelgrass and shellfish restoration efforts are underway through the Peconic Estuary Program and its partners. These efforts are mentioned in the Implementation Section of the TMDL Document. Nitrogen management is one of many objectives that must be pursued in order to improve the quality of estuaries, including the habitats and living resources that make up the estuarine system.

**Comment 8**: Provide additional rationale for the statement in the TMDL report which states that in order to improve nitrogen levels in areas of elevated nitrogen, "it is necessary to look at the nitrogen contributions from not only their contributing watersheds, but nitrogen loads from the entire Peconic Estuary Watershed." Further, explain why the "clean" waters aren't already flushing out the areas with elevated nitrogen. (Sea Grant)

**Comment 9:** In reference to reducing the loading of N into groundwater, it seems logical to focus the change in practices on the land impacting the areas of concern such as Meetinghouse Creek and Western Peconic. Please provide clarification and documentation that would show the need to reduce nitrogen concentrations in areas where the water quality is rated as good. (CCE)

**Response 8/9**: The water quality of defined waterbody segments is affected by loadings from the associated watershed (which includes not only the traditional surface water contributing area, but also the groundwater and stormwater contributing areas, along with direct point sources), direct atmospheric deposition on the water surface, and loads from outside the segment across waterbody segment boundaries. The quality of water moving across boundaries is particularly important for impaired segments – the "cleaner" the water moving across the boundary, as compared to concentrations within the impaired segment, the more likely the currently impaired segment will be able to achieve established standards (along with other fate and effect considerations for the pollutants). In the currently impaired segments, the current loads from all sources are too great to be flushed clean by boundary waters. Achieving standards systemwide in the future necessitates aggressive reduction goals for point and nonpoint source loads to impaired waters and continued management in the balance of the Peconic Estuary watershed and study area.

**Comment 10**: The Town of Riverhead has always taken a proactive approach to improving water quality of the estuary as demonstrated by the upgrade of the facility from a 1950s trickling filter plant to an advanced wastewater treatment facility using state of the art activated sludge technology and ultraviolet disinfection to achieve discharge levels better than the 170 pounds per day of total nitrogen allowed under the SPDES permit. The Town's commitment to preserving the environmental integrity of the Peconic Estuary should be favorably considered (Town of Riverhead)

**Response 10**: The Town of Riverhead is commended for making upgrades to its wastewater treatment facility so that it now includes nutrient removal, utilizing over $7 million made available through the State Clean Air/Clean Water Bond Act made available for this purpose, consistent with the recommendations of the Peconic Estuary Program Comprehensive Conservation and Management Plan. In spite of this upgrade, water quality standards are still not being achieved in waters impacted by the discharge, in part due to the location of the outfall pipe in a sensitive and poorly flushed section of the Tidal Peconic River. This in turn leads to requirements for additional reductions in nitrogen loads from point and nonpoint sources described in the TMDL. The TMDL set the allocations to capitalize on the investment in existing facilities and the diversion capability under development.

## B. Underlying Data and Assumptions upon which the TMDL is based

**Comment 11**: Regarding the groundwater quality assumptions for calculating loads: is the assumption for calculating loads the 9 mg/L of nitrogen as stated (page 23) in the first paragraph or 13 mg/L as stated in the second paragraph? In addition, should levels be referred to as mg/L of nitrates not nitrogen? (CCE)

**Response 11:** Nitrogen levels in groundwater in agricultural areas were estimated at a concentration of 13 mg/L for the baseline scenario, based on a significant data base assembled by the Suffolk County Department of Health Services. In the practical load reduction scenario of the TMDL, best management practices were estimated to be able to reduce the concentration in groundwater by 25% to 9.75 mg/L (or if aggressively managed in the watersheds of the impaired waters, by 50%). The 9 mg/L refers to nitrogen concentrations in the north fork groundwater management zones that support significant agriculture. Referring to the concentrations as nitrogen is correct as it refers to the levels of nitrate nitrogen measured in groundwater. The report "Impacts of Agriculture on Shallow Groundwater in Suffolk County NY" (Suffolk County Department of Health Services, December 2002) is now included in the references section of the Final TMDL Report. Per that report, free ammonia and nitrite nitrogen were seldom detected and did not contribute to the total nitrogen content.

**Comment 12**: The TMDL report (page 40) recommends 25% total nitrogen reduction from all protected agricultural parcels and 50% reduction in the Meetinghouse Creek (MC) and Peconic River –East (PR-E) groundwater management zones. Are these reductions in concentrations of nitrogen (nitrate) in the groundwater? Is the 25% reduction in the loading of N to groundwater or the fertilizer rates a grower would apply to crops? If the recommendation is to reduce fertilizer rates by 50% and in some cases by 25%, it would not be economically feasible to grow many crops. However, with the use of technology and best management

practices, it may be economically viable to reduce the concentrations of nitrates in groundwater by 25% and 50%. (CCE)

**Response 12**: The stated reductions are for the resulting nitrogen concentrations in groundwater, not to fertilizer rates to be applied by growers. The reduction in groundwater concentrations would result from decreasing the net loss of nitrogen fertilizer (excess N).

**Comment 13:** The PEP CCMP attributed the major source of nitrogen loading to be sediment flux as cited on page 3-8 of the CCMP as follows: The (sediment flux) sources comprised 51% of the total nitrogen loading to the estuary." The TMDL document does not adequately address this issue. The Final TMDL should include a comprehensive discussion and a definitive supporting resolution of this issue. (Town of Riverhead)

**Response 13**: As discussed in the Water Quality Model write-up contained in Section V of the TMDL document, one of the advanced features of the EFDC model used to develop this TMDL is the sediment processes submodel, which provides dynamic simulation of benthic nutrient fluxes and sediment oxygen demand in response to variations in external loading of organic material to the system. Model tests indicated that the sediment requires about six years to reach a new dynamic equilibrium in response to a reduction in nutrient loading to the model. Therefore, each of the alternative model simulations, including the baseline and pastoral scenarios, was run for a total of six years. In other words, the two-year simulation period (October 1, 2000 to September 30, 2002) was repeated three times with the water column and sediment conditions at the end of each run being input as initial conditions for the beginning of the next two-year run. The model predicts that there will be a six-year lag time between the implementation of nutrient controls and the corresponding full response of improvements to water quality in the estuary. The model reproduced the principal interactions among density-driven circulation, nutrient inputs, sediment nutrient flux processes, and phytoplankton abundance on an annual cycle. Sediment fluxes of nutrients and sediment oxygen demand are especially important in the shallow waters of the western estuary. The model adequately reproduced the temporal and spatial distribution of sediment flux rates that were measured in the Estuary. For these reasons, and unlike the PEP CCMP, sediment nutrient fluxes are not cited as a separate or distinct load or source in the TMDL; no changes to the TMDL or the Final TMDL Document are necessary.

**Comment 14:** The Town of Riverhead's Advanced Wastewater Treatment Facility came on-line in May 2001. The TMDL should analyze the tidal portion of the Peconic River since 2001 in consideration of the plant discharging approximately 50 pounds of total nitrogen each day instead of the SPDES permit limit of 170 pounds per day. The Tetra Tech model should have considered the impact that the new plant has already had on the Estuary since a major aspect of the TMDL is reduction of nitrogen from the Town of Riverhead's Advanced Wastewater Treatment Facility. (Town of Riverhead)

**Response 14**: The modeling scenarios employed in the TMDL analyses considered various levels of discharge at the Riverhead Sewage Treatment Plant, from the currently permitted load to the elimination of the discharge (for comparison purposes). The model always demonstrated that the STP discharge significantly contributed to low dissolved oxygen conditions, particularly during warm weather (defined as May 1 through September 30), due to the location of its outfall in the poorly flushed and already nutrient enriched Tidal Peconic River. State water quality standards for dissolved oxygen are not currently achieved in the area near the

outfall. The DO sag occurs despite the existence of the advanced wastewater treatment system and that the facility is discharging well below its permitted maximum flow and permitted nitrogen load. Numerous modeling scenarios investigating a variety of point and nonpoint source load reductions demonstrated that it is necessary to reduce this particular point source load, particularly during the critical warm weather months, in order to achieve water quality standards for dissolved oxygen. This will be achieved via the specified wasteload allocation and revised SPDES permit.

**Comment 15**: The Land Use Projection Analysis was based on zoning prior to 2004 when residential potential in the Town of Riverhead was halved due to town wide upzoning. The resulting number of potential dwelling units is overstated. (Town of Riverhead)

**Response 15:** The TMDL is based on the best information that was available at the time data was being compiled for incorporation into the modeling effort. For the purpose of TMDL implementation, upzoning is an important regulatory municipal tool to land protection which serves to reduce potential nitrogen loads and achieve other desirable environmental and societal goals. Because implementation to achieve the TMDL and load allocations relies on a number of approaches to manage and reduce nitrogen loads, changes in any one element (such as zoning) likely does not significantly alter the overall calculation. Because the watersheds for the three impaired waters include lands within the Town of Riverhead, this upzoning is an important positive step and together with other actions, will contribute to reducing loads and improving water quality.

**Comment 16**: The wastewater reuse project would divert approximately 350,000 gallons per day to the Indian Island Golf Course during the irrigation season. The highly treated reused wastewater also contains nitrogen which theoretically reduces the fertilizer requirements for the course. The TMDL did not credit the reduction of fertilizer to the pounds of nitrogen being discharged via the Peconic River outfall. (Town of Riverhead)

**Response 16** The TMDL does "credit" the Riverhead STP with a nitrogen load reduction by virtue of recognizing that wastewater (and the nitrogen contained therein) beneficially reused for irrigation purposes is not discharged directly to the Peconic River. Beneficially reusing the STP effluent to irrigate the adjacent Indian Island Golf Course will offset the need for traditional fertilizer applications there. The model did not consider the amount of fertilizer application, only the losses as resulting in groundwater concentrations. See response 11, above. Full scale implementation of the effluent reuse project has been funded through the New York State Clean Air/Clean Water Bond Act. As described in the TMDL Document, an initiative of the Peconic Estuary Program and Suffolk County will result in the preparation of nitrogen management plans for Indian Island and other east end golf courses, and will consider the "fertigation" occurring there.

**Comment 17**: Using the Indian Island Golf Course does not provide a constant outfall that would reduce nitrogen mass loading. For example, during a rainy summer season, the golf course would irrigate less, thus using less reused wastewater, stormwater discharge would increase because of the heavy rainfall thus increasing nitrogen associated with stormwater runoff and atmospheric deposition of nitrogen would increase. The Tetra Tech model should have taken these factors into account. (Town of Riverhead)

**Response 17**: Because there are limitations associated with using a portion of the Riverhead STP to irrigate the adjoining Indian Island Golf Course, including that the golf course would irrigate with less STP effluent during a rainy summer season, the Town of Riverhead may need to review alternatives as noted in Responses 38 and 39.

The water quality model documented that due to the location of its outfall in relation to the critical DO sag point in tidal Peconic River, the Riverhead STP warranted special attention for seasonal management of nitrogen, and therefore our emphasis on reducing this point source load. The point source represents a higher concentration of nitrogen than the wet weather stormwater and rainfall. The hypoxia resulting from night time respiration and the decay of phytoplankton is due to both long-term nitrogen loadings and daily or short-term nitrogen-oxygen dynamics. The overall impact of the beneficial reuse of the STP effluent to irrigate the golf course will be an overall reduction in the point source load of nitrogen to the tidal Peconic River during the critical warm weather months, though due to rainfall, the point source reductions may vary.

**Comment 18**: The final report should quantify the nitrogen load from residential cesspools in the Southampton area directly opposite the area served by the Riverhead Sewer District. This should include the benefits associated with the sewering of that area of Southampton. (Town of Riverhead)

**Response 18**: Nitrogen loads from cesspools and other on-site disposal systems are taken into account in the loading analysis and determinations for nitrogen contributions via groundwater. The TMDL does incorporate existing and future loads from on-site disposal systems in the Peconic Study Area, including the area of Southampton referenced. Both the Implementation section of the final TMDL Document and the PEP CCMP recognize that traditional sewering and microsewering may be appropriate strategies to lessen impacts from on-site systems. This area, in the watershed of a nitrogen sensitive Tidal Peconic River, would be a candidate for evaluation.

**Comment 19**: The calculated N loading from atmospheric deposition seems high. Using methods according to Paerl (1993) or Hu et al (1998), the N loading from atmospheric deposition rates work out to be substantially lower than those accounted for by the plan. Moreover, management plans for Narragansett Bay indicate N loading from atmospheric deposition represents < 5% of the total N input. For Long Island Sound, it is 2.5% (Hu et al 1998). In comparison, the PEP indicates atmospheric deposition is 56% for the Peconic. These are large differences. Even as an absolute loading rate, the TMDL's estimate of N loading from atmospheric deposition of (3 millions pounds of N for 218 km^2) is far greater on a per area basis than the amount determined for Narragansett Bay and Long Island Sound which are the two nearest estuaries. However, the independent studies of N loading from atmospheric deposition for Narragansett and Long Island Sound agree with each other and with Pearl (1993). Why do these three studies agree with each other, but disagree with the Peconic TMDL calculations? References cited: Paerl HW (1993) Emerging role of atmospheric nitrogen deposition in coastal eutrophication: biogeochemical and trophic perspectives. Can J Fish Aquat Sci 50:2254–2269. Hu HL, Chen HM, Nikoladia NP, Miller DR, Yang X (1998) Estimation of nutrient atmospheric deposition to Long Island Sound. Water Air Soil Pollut 105:521–538

**Response 19**: Given the overall absence of large point sources discharges (vs. the Long Island Sound study area), and the relatively low population density (vs. the Narragansett Bay

study area) and the large surface area of the Peconic Estuary's surface water as compared to the watershed area, atmospheric deposition would be expected to contribute a large percentage of the overall load of nitrogen to the estuary as a whole. However, as noted in TMDL Tables V3 to V5, atmospheric deposition is less important to the impaired waters in the western portion of the estuary, particularly the Lower Peconic River, where point sources are more important, and atmospheric deposition is estimated to be about one percent of the total load.

The Peconic Estuary Program model documentation presents atmospheric deposition rates (pre implementation of Clean Air Act Amendments) and includes wet and dry deposition of organic and inorganic nitrogen, and translates to approximately 21 kilograms per hectare per year (18.7 lbs./acre). This deposition rate is now presented in the TMDL Document. Approximately 8 kilograms per hectare per year of this deposition is as inorganic nitrogen, which compares with deposition values presented in the literature. These rates vary due to proximity to urbanized areas, local precipitation, and other factors. The remaining two thirds of the deposition was estimated to be organic forms of nitrogen, based on measurements taken in the estuary, during a wet year. This maximum air deposition rate was applied to the whole estuary even for the drier year to estimate the maximum impact on dissolved oxygen. This is why the estimate for organic forms of nitrogen is much higher than deposition values presented in the literature, or other estimates for other estuaries. While this adds to the uncertainty of the loading estimates, it is not likely to substantially affect the needed load reductions to the impaired segments, because atmospheric deposition is such a relatively small fraction of the estimated load to those segments.

**Comment 20**: The plan acknowledges and data shows (see below) that N levels and chlorophyll are dropping in the estuary, but does not account for the mechanism driving this decrease. What mechanisms are driving these changes? Are loads decreasing without the efforts of the TMDL plan? If so, how will that effect projected changes in nitrogen levels in the system? What will be the consequences for the ecosystem as a whole, since chlorophyll levels are also declining? Narragansett Bay is now reconsidering their N-reduction plan based on similar natural changes in nitrogen and chlorophyll which have occurred in the system and on the realization that the declines become a negative feedback loop which is out of the control of managers (see July 2007 Nature paper out of Scott Nixon's lab: Fulweiler et al 2007; Nature 448: 180-182). Because the Peconics are going through rapid changes in N already, the Peconic TMDL should seriously consider these trends and these new findings from Narragansett Bay (Fulweiler et al 2007) before implementing the plan. (Goebler)

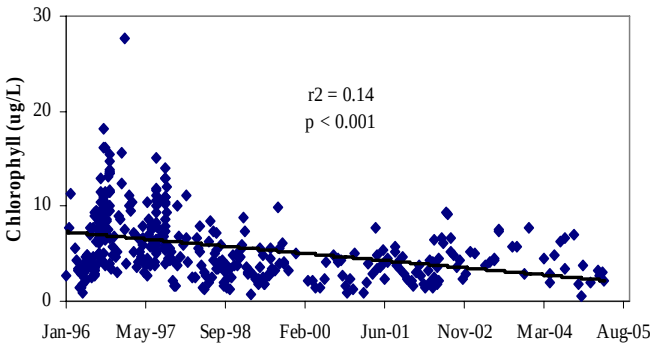


**Figure 3.** Concentrations of chlorophyll a in Great Peconic Bay, 1996 - 2005 (SCDHS 1976 – 2005)

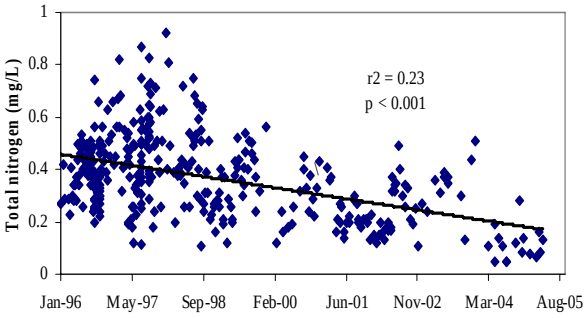


**Figure 2.** Concentrations of dissolved inorganic nitrogen in Great Peconic Bay, 1996 -2005 (SCDHS 1976 – 2005)

**Response 20**: Estuaries are complex systems. While ambient monitoring reveals that nitrogen and chlorophyll levels are decreasing in some areas, portions of the estuary continue to be impaired due to low dissolved oxygen conditions. It is not known if the decreases in ambient nitrogen levels are due to the fact that some programs to reduce nitrogen loads are being already implemented (such as those under the Clean Air Act and nitrogen removal at sewage treatment plants), increased uptake in the food web (including undesirable macroalgae), or these factors in combination with others. Nitrogen load reductions may also be taking place due to agricultural conversions from row crops to vineyards or from row cops to residential development. The roles macroalgae, sediment nutrient flux, and filter feeders play in affecting the surface water concentrations of nitrogen are believed to be significant and are not necessarily captured in ambient nitrogen concentration measurements. Similarly, the causes for declines in chlorophyll levels is not known.

The full implementation of a suite of programs cited in the Final TMDL Document and PEP CCMP, from critical land protection, vegetation preservation requirements, and open space preservation, to agricultural stewardship, and decreasing fertilizer losses from turf and landscape maintenance, will all play a role in achieving a balanced and sustainable nitrogen load. The Peconic Estuary Program, Suffolk County and other collaborators are also supporting efforts to restore shellfish populations and eelgrass, which can also help to establish a healthy, balanced ecosystem. While we cannot predict with certainty what will happen if we reduce nitrogen loads, the relationship between excessive nitrogen and low dissolved oxygen levels in estuaries is well documented: managing nutrient loads can help prevent nuisance phytoplankton and macroalgal blooms, which in turn can help prevent low dissolved oxygen conditions and improve water clarity.

The DEC and the PEP will continue to evaluate the state of the science, including efforts of other participants in the National Estuary Program, such as the Narragansett Bay Estuary Program, in order to gain a greater understanding of the complex interplay of climate and biology as they influence biogeochemical cycling, and new emerging models for nitrogen dynamics in coastal systems (per R. W. Fulweiler, et al "Reversal of the net dinitrogen gas flux in coastal marine sediments" Nature 448: 180-182).

## C. Margin of Safety/Critical Period

**Comment 21**: The margin of safety discussion on page 55 assumes that using the years 2000-2002 as a baseline incorporates a margin of safety since that time frame had the most "severe periods of hypoxia on record" for the years 1988 through 2002. Id. at p. 55. It is unclear on what data this conclusion rests. The data provided, Table VI.11 (p. 56) suggests that 1996-1997 was considerably more hypoxic, although neither the total number of samples nor the sampling station(s) are provided (the very high 2002 number is explained by the continuous monitoring employed that year, thus it cannot be directly compared to earlier years). The document does not discuss if conditions continued to deteriorate or improve after 2002. Thus, the only data provided in table form would appear to contradict the characterization that 2000-2002 was the period of greatest hypoxia. (Peconic BayKeeper)

**Response 21**: The period October 1, 2000 to September 30, 2002 remains the critical period for the modeling effort and establishment of TMDL, though the Final Document has been revised regarding the selection of this period. It is important to understand how the data

associated with the "critical period" of 2000-2002 is used in the modeling effort in addition to understanding how it is related to the margin of safety. Much of this information that follows was included in the Draft July 2007 TMDL Document. The Environmental Fluid Dynamics Code (EFDC) model was calibrated using an eight-year period from October 1, 1988 to September 30, 1996. The model was verified using a six-year period from October 1, 1996 to September 30, 2002. Details of the calibration and verification are documented in the hydrodynamic and water quality model reports (Tetra Tech, 2000, 2005). The 14-year period covered by the calibration and verification included all seasons of the year as well as extreme wet and dry years. The EFDC model reproduced both the temporal and spatial trends in observed data and successfully simulated the 1988-2002 conditions. Water year 2001 was relatively wet followed by a relatively dry water year 2002, which is important to satisfy the seasonality aspect of the Peconic Nitrogen TMDL. This fact, together with a review of the monitoring data collected by SCDHS (including the number, frequency, and timing of samples), indicated that relatively speaking, the October 2000 to September 2002 time frame was the most severe period in terms of the number of DO observations below the New York State water quality standard of 5 mg/L. For these reasons, the period October 1, 2000 to September 30, 2002 was selected as the critical period for the TMDL model runs. Because 2000-2002 was a severe period, average year conditions would predict better water quality conditions. Thus, by using the severe conditions of 2000-2002 as the TMDL modeling period, a conservative level of nitrogen reduction is identified, thereby providing a margin of safety (MOS) for average years.

One of the advanced features of the EFDC model is the sediment processes submodel, which provides dynamic simulation of benthic nutrient fluxes and sediment oxygen demand in response to variations in external loading of organic material to the system. Model tests indicated that the sediment requires about six years to reach a new dynamic equilibrium in response to a reduction in nutrient loading to the model. Therefore, each of the alternative model simulations, including the baseline and pastoral scenarios, was run for a total of six years. In other words, the two-year simulation period (October 1, 2000 to September 30, 2002) was repeated three times with the water column and sediment conditions at the end of each run being input as initial conditions for the beginning of the next two-year run. It is important to remember that the model predicts that there will be a six-year lag time between the implementation of nutrient controls and the corresponding full response of improvements to water quality in the estuary.

The data in Table VI.11 in the July 2007 TMDL Report provided the absolute numbers of DO samples less than 5.0 mg/L. This included results from continuous monitoring devices deployed in the tidal Peconic River during the summer and fall of 2002 that documented water quality conditions every 15 minutes and resulted in the identification of a total of thousands of data points where the DO level was less than 5.0 mg/L. Because of difficulties in comparing these continuous monitoring device results to a long term data set of results from the routine (vessel based) water quality monitoring program, the continuous monitoring device results are now not included in the revised table in the Final Document, though a revised footnote is provided. The number of DO samples less than 5.0 mg/L for 2002 based on the routine (vessel based) water quality monitoring program is 20. At the present time, information on the total number of samples collected or the percentage that were below 5 mg/L could not be assembled. There are however a correlations between years when there was an increased sampling effort are associated with years with more exceedances of the D.O. criterion (i.e., in 1991-1998 stations

were sampling 86 times per year on average; from 1999-2003, stations were sampled 25 times per year on average).

Unfortunately, data collected after 2002 were not included in this report and are not readily available, nor has the post-2002 data set been rigorously evaluated. The Peconic Estuary Program does prepare a periodic Environmental Indicators Report which evaluates dissolved oxygen levels. The most recent PEP Environmental Indicators Report is dated March 2005 and evaluated DO data through 2002.

**Comment 22:** The margin of safety cites using the maximum permitted discharges from the Riverhead STP, not the actual discharges that are substantially less. Id. at p. 55. However, the TMDL is supposed to be based upon a built-out watershed, with some preservation. It is unclear what the effluent flow would be from the Riverhead STP if the sewer district were fully built out according to the relatively new master plan. Unless the flow from a full build-out of the Riverhead Sewer District would not exceed existing permitted capacity, then this element of the margin of safety is illusory. Insufficient information is provided to make this determination. (Peconic BayKeeper)

**Response 22**: The discussion of the Margin of Safety in the Final Document now states that, for sewage treatment plants, the model uses the maximum nitrogen loading associated with the (seasonal) TMDL, recognizing that it is unlikely that the maximum loading will be continuously discharged. This is what provides an additional margin of safety in the analysis and establishment of the TMDL. While the current maximum permitted load was also used as an input for the baseline condition, this information is for background and comparison purposes only and does not contribute to the margin of safety in the TMDL.

The analysis for full build-out and the TMDL assumed that development would take place within the existing boundaries of sewer districts, that such development would tie into the sewer systems, and that the additional flows and influent pollutant loads could be treated within the limits established by the TMDL, wasteload allocations, and ultimately the SPDES permit. The analysis was completed based upon the information that was available at the time of the cited reports, but was comprehensive; for example, the data input for the TMDL analysis estimated that there were a total of 63.73 acres of vacant or developed but sub-dividable lots within the Riverhead Sewer District. The flows and loadings from these acreages would need to be managed within the limitation of the SPDES permit. This and similar information is now included in an Appendix of the Final TMDL Document.

## D. Implementation

**Comment 23:** The Implementation section largely lists initiatives that are in place, and are largely voluntary, or exhortatory. It also calls for further study and analyses under the PEP. The Reasonable Assurances section relies heavily on Phase II Stormwater implementation and various cooperative initiatives. There is an editing error that includes seeking a No-Discharge-Zone for the Peconic Estuary, p. 66, that has already been accomplished through a cooperative petition by Department of State and Peconic Baykeeper. (Peconic BayKeeper)

**Response 23**: The Implementation section appropriately addresses how point sources (including sewage treatment plant/surface water discharges under SPDES and municipal separate storm sewer systems (MS4s) regulated under the Phase II Stormwater Program) and nonpoint

source management programs can achieve the TMDL. Point sources will be addressed through the permitting process. Nonpoint sources are, by their nature, better suited for voluntary and cooperative efforts. There are a suite of nonpoint source programs in the Peconic Estuary Watershed aimed at reducing or preventing nitrogen loads. These include programs that are in place and relatively well funded; in place but not fully funded; in place but unfunded; and proposed initiatives which have not moved forward. Additional steps must be taken to advance implementation and secure funding for these nonpoint source control programs. The Peconic Estuary Program and the three sponsoring agencies, EPA, DEC, and Suffolk County are committed to carrying out programs that address nutrient over-enrichment which is identified as a priority topic in the Comprehensive Conservation and Management Plan.

The vessel waste no discharge program is indeed in place, based on DEC's designation and EPA's approval. The Final TMDL Document has been corrected in this respect.

**Comment 24**: While the proposed measures are laudable, the Implementation Plan is really guidance for the development of an actual Implementation Plan. What is required are concrete programs and model legislation to protect natural vegetation, require the upgrade and maintenance of OWTSs, require the upgrade of STPs, require the development and implementation of best management practices for agriculture, and extend the stormwater requirements to the non-urbanized East End. Without identifying such concrete steps, there is little assurance, reasonable or otherwise, that water quality shall be restored. Indeed, the TMDL itself acknowledges that measures need to be identified and implemented for the TMDL to succeed. Such acknowledgement is appropriate, since the WLAs and LAs identified are insufficient to restore water quality. (Peconic BayKeeper)

**Response 24**: The scope and detail provided in the Implementation section of the TMDL Document is appropriate; some clarifications and modifications have been made and are now included in the Final TMDL Document. Overall, it includes actions and programs that are in place and underway (Clean Air Act implementation, open space preservation, STP upgrades, shellfish restoration efforts), some that are in place though not necessarily fully funded (agricultural stewardship, preparation of golf course nutrient management plans), others that have been initiated though additional work is needed (reducing fertilizer losses associated with turf and landscape maintenance), ones where requirements have been proposed though not comprehensively adopted (establishing vegetation preservation requirements for vacant and sub-divided properties), and others that need to be evaluated (dredging to remove highly enriched bottom sediments, microsewering, on-site treatment systems). *Adaptive* implementation will play a role as these and other programs are carried out. As information, research, and evaluations become available, programs may be modified to improve their effectiveness. DEC will ensure that permits for point source discharges, including municipal separate storm sewer systems (MS4s) are in compliance with the TMDL. Meeting the WLAs and LAs will result in the achievement of water quality standards, though according to our modeling efforts, mechanical aeration during critical conditions. Additional efforts to reduce nitrogen loads not previously accounted for may reduce or eliminate the need for mechanical aeration. The Peconic Estuary Program and its partners (including DEC) will remain a primary vehicle for evaluating programs and periodically evaluating their success, along with monitoring of environmental quality.

**Comment 25**: While taking no position on the legal sufficiency of supplementing load reduction with artificial addition of oxygen, the TMDL document should – at a minimum –

provide reasonable assurance that the load reductions prescribed can and will be attained. The document as drafted does not do so. The "Implementation" section consists of nothing more than a list of existing programs with vague descriptions of their nexus with the TMDL's nitrogen reduction goals. Significantly, the section lacks any information that would allow the reader to evaluate whether the quantitative load reduction goals can be met under these programs – many of which are either voluntary (e.g., agricultural nutrient management), require integration with other regulatory programs (e.g., Atmospheric Deposition, Requirements for New Development), or are so focused on education and outreach that an attempt to ascribe quantitative nutrient reductions to them would be futile (e.g., Turf and Landscape Management).[1] (TNC)

**Comment 26**: The TMDL should not be approved by the USEPA until a detailed Implementation Plan, with a timeline and interim benchmarks defining success toward meeting the TMDLs overall nutrient reduction goals is developed. The Implementation Plan should clearly describe how each of the programs it relies on to achieve nutrient reductions will work, and how much of a reduction each is expected to achieve. An important component of the Implementation Plan is a comprehensive groundwater quality monitoring program to ensure that the load reductions from agriculture, residences, and golf courses are being met. The information produced by such a monitoring program would be useful for refinement of the TMDL model, and adaptation of the program in the future. (TNC)

**Response 25/26:** Under Section 303(d) of the Clean Water Act and implementing regulations at 40 C.F.R. Part 130, implementation plans are not required for TMDL approval. Despite the fact that an implementation plan is not required, DEC included a nitrogen reduction plan to achieve water quality standards. The Implementation section of the TMDL document is appropriate, including the assemblage of existing and new or proposed programs, regulatory and voluntary actions, and permit or education based initiatives. In the future, it is possible that based on additional data, refinements could be made to the implementation section and to the TMDL modeling framework. The PEP has committed to tracking and reporting on progress in implementing and achieving the TMDL at five year intervals (See Section VIII.D of the Final TMDL document). Surface water and groundwater monitoring efforts by the Suffolk County Department of Health Services will also assist in determining if nitrogen load reductions targets and state water quality standards are being achieved.

**Comment 27**: People have left a huge footprint on this estuary. What is "practical" must ultimately be defined by what it takes for humans to occupy this spot without destroying it: that is the real cost of doing business – of living, recreating, and working in the Peconic Estuary. In this case, it is the cost of cleaning up our nitrogen waste. (Peconic BayKeeper)

**Response 27**: Nitrogen loads need to be managed to eliminate current water quality impairments and prevent additional problems form occurring in the future. Meeting the load reductions specified in the Practical Load Reduction Scenario specified in the TMDL Document is necessary to achieve this end.

**Comment 28**: Cornell Cooperative Extension continues to conduct research into developing and implementing nutrient best management practices to reduce the nitrogen loading to the Peconic Estuary. It is important that funding for this research and development continue. In addition, cost sharing programs for the growers will assist in the adoption of these practices. (CCE)

[1] Peconic Nitrogen TMDL § VII, at 57.

**Response 28**: The Agricultural Stewardship Program elements that lead to improved nitrogen management and decreased nitrogen loadings to groundwater and runoff are an important part of the overall effort that will lead to achieving the TMDL. Funding for research, development and implementation is likewise important, including cost share programs necessary for growers to assist in the adoption of nutrient reduction practices. Including the need for nutrient reduction in this TMDL should help secure more state and other funding. Consistent with the PEP CCMP, the PEP supports the allocation of federal, state, county and local funding to fully implement this program.

**Comment 29**: Minimum native vegetation protection codes for all towns within the Peconic watershed should be incorporated into the final TMDL; implementing these codes will be a requirement of the TMDL. Clearing restrictions and re-vegetation programs are important tools in reducing nitrogen inputs from both new and existing development. The Nature Conservancy, as part of a contract with Suffolk County, developed a model native vegetation protection code. This model code, which was presented to the five east end towns, may well serve as the template for new town code resulting in a reduction of residential nitrogen loading as required in this document. (TNC)

**Response 29:** Native vegetation protection requirements can help eliminate or reduce the areal extent of nitrogen dependent turf and landscaping and provide other beneficial environmental attributes related to habitat protection. Such requirements are particularly relevant for coastal properties, vacant lands, and developed but subdividable properties. Native vegetation protection is specifically included in the implementation section of the TMDL Document. While many of the municipalities in the Peconic Estuary Program Study Area have vegetation preservation requirements applicable to part of the watershed, the Peconic Estuary Program supports the comprehensive adoption of such requirements across the watershed. The model code that was provided has not yet been reviewed or endorsed by the Peconic Estuary Program, but is included in this response to comments document. Because it does not effect load reduction, the model code is not incorporated in the TMDL. MS4s may opt to use such a code to demonstrate controls on increases to their permitted stormwater loads.

**Comment 30**: The TMDL should promote the continued investigation of new On-site Wastewater Disposal Systems (OSDS) that remove nutrients and the possible need for micro-sewering and traditional sewering. (TNC)

**Response 30**: The TMDL Document does promote the continued investigation of new On-site Wastewater Disposal Systems (OSDS) technologies that remove nutrients and the possible need for micro-sewering and traditional sewering. However, reductions in nutrients were not quantified, because of the relatively low impact on nitrogen reductions that would likely occur.

**Comment 31**: The TMDL should promote further upgrades to the Riverhead sewage treatment plant (STP) to reduce effluent nitrogen levels from the present 10mg/L to 4mg/L. Although the TMDL document rightly requires the Riverhead STP to freeze effluent discharge levels at the present levels (700,000-800,000 gallons per day), the technology exists to improve the nitrogen content of the discharge. An investment in this technology now would provide huge benefits to the estuary into the future. (TNC)

**Response 31**: The TMDL specifies a wasteload allocation for the Riverhead STP. The practical load scenario associated with the TMDL does not mandate further upgrades to the STP, though further upgrades might become necessary should the facility increase its influent flow or should there be other changes in the influent quality (such as more widespread use of water conservation fixtures that increase the strength of the wastewater). The TMDL does not limit the effluent flow from this facility from what is allowed according to the SPDES permit (i.e., 1.3 million gallons per day). As described in the TMDL document, implementing STP upgrades to the current limit of technology could potentially improve the effluent quality to 5 mg/L of total nitrogen, though the costs or feasibility of such upgrades has not been calculated or determined.

**Comment 32**: Atmospheric deposition is mentioned as a major source of nitrogen to the Estuary, and during the public meeting it was mentioned that automobile emissions are the major source of nitrogen. Given that, it seems that the TMDL should be encouraging people to drive their cars less. This can be done by promoting smart growth which encourages mixed development where people can walk to stores, schools, libraries, restaurants and other community centers. Improving mass transit in the watershed should also be seen as a priority. (Sea Grant)

**Response 32**: The Implementation section of the TMDL Document did cite the adoption of low emission vehicle standards as important in reducing nitrogen loadings via atmospheric deposition. Unfortunately, the airshed for the estuary includes a much larger area than the watershed, including the metropolitan tri-state area.

**Comment 33**: The report did not describe an evaluation effort that will be undertaken. As many municipalities, businesses, and individuals will be asked to make changes in their behaviors which may have accompanying financial costs, it seems that they should get feedback from the Peconic Estuary Program on whether their efforts made a difference, not only in reducing nitrogen loads into coastal waters, but whether or not larger restoration goals of restoring eelgrass, scallops and hard clams were met as a result of reducing nitrogen loads. (Sea Grant)

**Response 33**: The TMDL Document does include the PEP commitment to tracking and reporting on the progress in implementing and achieving the TMDL at five year intervals (See Section VIII.D of the Final TMDL Document). Suffolk County Department of Health Services surface water and groundwater monitoring efforts will also assist in determining if nitrogen load reductions targets and state water quality standards are being achieved. The Peconic Estuary Program will also continue to periodically report on environmental indicators, as called for in the PEP CCMP.

**Comment 34**: The major sources of nitrogen entering the Peconic Estuary in order of magnitude are atmospheric deposition, sediment flux, groundwater underflow, stormwater runoff and point sources. All but the point sources have increased since 2001 since the Town of Riverhead's Advanced Wastewater Treatment Facility came on-line. The TMDL should address steps to reduce the major sources of nitrogen. (Town of Riverhead)

**Response 34**: The Implementation section of the TMDL document discusses how atmospheric deposition, groundwater underflow, stormwater runoff and point sources are addressed in order to achieve target loads. Sediment flux is addressed as an internal source principally responding to changes in loads. The TMDL Document does not discuss whether

loads have increased or decreased since 2001. Some programs are in place and load reductions may already be occurring.

**Comment 35**: The TMDL model should discuss the environmental benefits (if any) or impacts if the Riverhead STP outfall was relocated to an area of increased flushing within the estuary. (Town of Riverhead)

**Response 35:** Based on the analyses completed, the TMDL does not call for the relocation of the Riverhead STP outfall. The Final TMDL Document now states that "the relocation or extension of the Riverhead STP outfall to an area with more flushing might also be considered in the future. While this was previously determined not feasible, at some point, a re-evaluation may be appropriate."

**Comment 36**: The TMDL infers that "nitrogen removing on-site systems" was deemed cost prohibitive at $30,000 per system. Since cost is a consideration, then the TMDL report should investigate and prepare a cost effective analysis for increasing the number and/or horsepower of the proposed mechanical aerators in lieu of modifying the current SPDES permit as presented in the TMDL. (Town of Riverhead)

**Response 36**: As stated in the Implementation Section of the TMDL document, the primary focus with respect to on-site systems is to ensure existing systems work properly (which may perhaps include regular pumping/removal of solids), that there are no illegal or illicit interconnections, no discharges to surface waters and that new systems are properly sited and function correctly. Potential enhancements include ensuring systems operate properly upon property transfer and to investigate new OSDS nutrient removal technologies. The practical load scenario of the TMDL calls for reductions in nitrogen loadings from residential properties based on changes in turf and landscape management practices to decrease nitrogen loadings to groundwater. While the cost of nitrogen removing on-site systems was discussed at the public meeting, it is not discussed in the TMDL Document. The LAs and WLAs of the Final TMDL are based on reasonable load reductions from residential properties and STPs. It is not appropriate or necessary to consider increasing the amount of mechanical aeration in lieu of implementing the achievable load reductions from the STP.

**Comment 37**: Other documents (U.S. Environmental Protection Agency Water Quality Standards, Clean Water Act Section 101a and 303 Federal Water Pollution Control Act [As Amended Through P. L. 107-303, November 27, 2002], Peconic Estuary Program and US Environmental Protection Agency's proposed Peconic Estuary's Nitrogen TMDL, National Estuary Coastal Condition Report (Chapter 3: Northeast National Estuary Program Coast Condition, Peconic Bay Estuary Program) June 2007, U. S. Environmental Protection Agency, Region III, Chesapeake Bay Program, and the Upper Susquehanna Coalition, Using a network of local water quality professionals to develop, support and deliver watershed programs;) support an analysis of the economic and social impacts of meeting water quality standards according to the U.S. Environmental Protection Agency Clean Water Act Section 303. An economic impact analysis should be completed to determine the costs Suffolk County's agricultural industry would incur to meet the recommended 25% total nitrogen reduction from all protected agricultural parcels and 50% reduction in MC and PR-E zones. In addition please provide an analysis of the sources of funding (e.g., federal, state, county and cost share funds) to off-set costs incurred by the agricultural industry. (CCE – Ag Stewardship Program)

**Response 37**: While completing a cost analysis and evaluation might be desirable, it is not required as part of the TMDL process, and is not included in the Final TMDL Document. Information on funding sources is likewise not required, though some of this information is available in the PEP CCMP and other subsequent PEP reports and in "A Strategy to Develop and Implement the Suffolk County Agricultural Stewardship Program - A Report of the Agricultural Environmental Management Task Force for Nitrogen and Pesticide Load Reduction - Final Report" (May 26, 2004). The PEP and its partners are committed to seeking to fully implement the necessary programs to manage nitrogen and achieve water quality standards.

## E. SPDES Permitting and Related Topics

**Comment 38**: The wastewater reuse irrigation of the Indian Island Golf Course is an outfall that the Town of Riverhead neither owns nor controls by contract. It has always been understood that Suffolk County would control the irrigation reuse system based on the irrigation needs of the turf and if for any reason they decided not to use it then the reuse system would be taken off-line or not used at all at their sole discretion. How will the modified SPDES Permit address this issue? Will a modified SPDES permit require an alternate outfall when the golf course is not available? (Town of Riverhead)

**Response 38:** The current SPDES permit needs to be modified to reflect the proposed irrigation outfall at the Indian Island Golf Course. As the SPDES permit holder, the Town of Riverhead will need to submit an application for permit modification along with the Plans and Specifications for the proposed irrigation reuse project. The TMDL set the allocations to engage maximum use of existing facilities and the diversion capability under development.

The proposed SPDES permit will contain seasonal nitrogen loading limits. For the critical season (May to September), the nitrogen loading limit will be stated as a monthly average limit to allow some flexibility in the event that the irrigation system is taken off-line temporarily. It will be the Town of Riverhead's responsibility to assure through a combination of treatment and diversion that the discharged load to the Peconic River does not exceed the permit limit advanced by this TMDL.

**Comment 39**: The wastewater reuse treatment system was not planned to have equipment redundancy and emergency backup systems, since the plan was to revert to the Peconic outfall in case there was a treatment system malfunction or when routine maintenance was scheduled. Although the Ten State Standards do not have actual wastewater reuse guidelines, it implies that such systems would be required since reuse is now being mandated by the SPDES permit. The report should have considered the implications of changing the basis of the project and the Town must revisit the entire project to determine the costs associated with redundancy and emergency back-up systems. Will NYSDEC require compliance with the Ten State Standards as related to the wastewater reuse system? (Town of Riverhead)

**Response 39:** The issue of conformance with Ten State Standards is beyond the scope of this TMDL. Any significant upgrades or treatment addition to a wastewater treatment plant would be required to meet Ten State Standards. .

The Town of Riverhead should assure a definitive capacity to irrigate on the golf course or secure redundancy through combined treatment and irrigation either on the golf course or an alternative site.

**Comment 40**: The TMDL should analyze the use of a dissolved oxygen SPDES Permit parameter. This should be used instead of a total nitrogen limitation to improve water quality in the western portion of the estuary. (Town of Riverhead)

**Response 40:** A total nitrogen limit is needed because nitrogen is the pollutant that is causing dissolved oxygen depletion. The hypoxia resulting from night time respiration and the decay of phytoplankton is due to both long-term nitrogen loadings and daily or short-term nitrogen-oxygen dynamics. Excess nitrogen in the system from the Riverhead STP and other sources is what is causing and contributing to water quality impairments, not the level of dissolved oxygen in the STP, per se.

**Comment 41**: The unintended consequence of water conservation throughout the Town of Riverhead has been the increased CBOD and TKN load of the influent waste stream seen at the Riverhead Sewage Treatment Plant. The facility was designed to achieve a TN effluent concentration of 10 mg/L with significant less influent loading. Without the wastewater reuse project, the proposed effluent nitrogen limit would require another substantial upgrade to the Riverhead STP. (Town of Riverhead)

**Response 41**: A decrease in water use through conservation cannot result in an increase in load (the mass of a pollutant such as nitrogen), although an increase in concentration likely results. Modeling efforts have demonstrated that it is necessary to reduce the nitrogen load from the Riverhead STP due to the location of its outfall in the stressed Tidal Peconic River. Achieving the TMDL's wasteload allocation can be achieved through the beneficial reuse of a portion of the STP effluent to irrigate the Indian Island County Golf Course, initially, although a treatment upgrade will be needed if the influent load and or flow continues to increase. DEC previously provided grant funding in the amount of $2,095,250.00 to the Town of Riverhead to advance the full-scale effluent reuse project. Without the effluent reuse project, an upgrade to the Riverhead STP would be necessary to meet the proposed seasonal nitrogen limit.

## F. Consistency with Clean Water Act Requirements, including the Appropriateness of Mechanical Aeration

**Comment 42**: This draft TMDL is a start. It provides guidance and suggests what measures to consider that may achieve water quality standards. However, it is not in itself a blueprint on how to restore these impaired waters. It is insufficient as it stands. To be viable, this TMDL needs to ratchet up our technology and management controls, and/or specifically propose the same, to effect its purpose of restoring these impaired waters as required under the Clean Water Act. (Peconic BayKeeper)

**Response 42**: The TMDL and the underlying analyses are sound and appropriate and satisfy the requirements of the Clean Water Act and implementing regulations and guidance. TMDLs are not intended to serve as a management blueprints. The purpose and scope of a TMDL is to specify allowable pollutant loadings from all contributing sources at a level necessary to attain the applicable water quality standards. The Implementation section describes existing and new programs and initiatives which can achieve the target loads specified. The PEP Management Conference provides the framework for overseeing a long term adaptive implementation process.

**Comment 43**: The TMDL is inconsistent with the requirement of the Clean Water Act, that a TMDL "be established at a level necessary to implement the applicable water quality standards." Further, the TMDL needs to be established based upon the legal requirements, not based upon what can be "practically" achieved. The loads should be calculated from the amount of nitrogen entering these estuarine waters. While aeration may be a good idea, it cannot replace the mandate to reduce nitrogen inputs, nor may a Practical Load Reduction substitute for a TMDL. In principal, however, that which is "practical" should be done. However, the definition of "practical" is a matter of considerable subjectivity. There is no analysis or disclosure of the assumed practicalities. (Peconic BayKeeper)

**Response 43:** Although the term "practical" has been used with regard to the load reduction scenario, the reductions needed to achieve the water quality standard are, in fact, fairly aggressive. The load reductions required of the major discharge to the impaired waters does require limit of technology as it approaches permitted flow. In addition, the practical load reduction (PLR) scenario includes a cumulative full build-out scenario whereby 50% of the remaining farmland is preserved; 15% -30% of vacant lot is protected; and 15-30% of sub-dividable land is protected. In addition to these restrictions, some of the TMDL-based reductions include: 25-50% reduction in agriculture; 25 – 50% reduction in golf course parcels; 25-33% reduction from existing development; and a 37.5-50% reduction from the existing agricultural and vacant lands.

**Comment 44**: Mechanical aeration is an option for a permit writer when technology based standards fail to meet water quality standards, provided certain conditions are met. There is, however, no provision that would seem to allow the porting of a potential, though disfavored, permit condition to the establishment of a TMDL. (Peconic BayKeeper)

**Response 44:** Mechanical aeration involves the addition of oxygen to specific locations in the impaired waters. Mechanical aerators would be installed in those segments needing additional oxygen. The provision for additional oxygen is not a permit condition related to the TMDL, rather, it is part of the implementation plan to achieve dissolved oxygen standards in the impaired segments. The need for mechanical aeration will be evaluated as the TMDL-based reductions are implemented and progress towards meeting water quality standards is assessed. In addition, it is possible that as the TMDL is implemented and the new DO standard is adopted, there may not be need for mechanical aeration.

**Comment 45**: The TMDL has at least one significant shortcoming. Under the federal Clean Water Act, states must establish Total Maximum Daily Loads ("TMDLs") for impaired water bodies "at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality."[2] The "Total Maximum Daily Loads for Nitrogen in the Peconic Estuary Program Study Area, Including Waterbodies Currently Impaired Due to Low Dissolved Oxygen: the Lower Peconic River and Tidal Tributaries; Western Flanders Bay and Lower Sawmill Creek; and Meetinghouse Creek, Terrys Creek and Tributaries" (hereinafter "Peconic Nitrogen TMDL" or "TMDL"), by its own terms, does not establish nitrogen loads at a level that will attain the applicable dissolved oxygen standard for these water bodies. Instead, it calls for mechanical aeration to add oxygen to the system. (TNC)

[2] 33 U.S.C. § 1313(d)(1)(C).

**Response 45:** As described in responses 43-44, the TMDL includes fairly aggressive reductions to meet standards. The need for mechanical aeration is limited to only several small areas within the impaired waters and will be evaluated as nitrogen reductions are implemented, the proposed water quality standards is adopted, and more recent data are evaluated.

**Comment 46**: As a baseline, the actual TMDL needs to be calculated based upon the actual carrying capacity of the impaired waters. If, for example, the Riverhead STP could not meet its WLA through technology based limitations, then as to its permit, aeration might be considered. However, the TMDL states that implementing technology could reduce nitrogen output by 50%. Nitrogen TMDL at pp. 25-27. Indeed, the TMDL seems to presume in the implementation section that a reduction of nutrient concentrations in the effluent of all STPs discharging into the estuary will be obtained, see id. at p. 59, although they are not quantified. Nowhere are such reductions quantified in WLAs. Consequently, mechanical aeration is not applicable to this TMDL, nor are the threshold requirements for its use in an individual permit met. Indeed, the TMDL seems to concede that a 50% reduction in nitrogen concentration in the effluent is achievable through technology. The impact of such a reduction on dissolved oxygen should be discussed. (Peconic BayKeeper)

**Response 46**: The TMDL is calculated based on the assimilative (carrying) capacity of the waterbodies. The TMDL includes individual WLAs for four point source discharges (Riverhead, Atlantis Marine World, Shelter Island Heights and Sag Harbor). For example, the WLA for the Riverhead STP is 40 lbs TN/day, which is a 69.5% reduction from its current load. The WLA will be used by permit writers to modify the STP's permit limit for nitrogen.

**Comment 47**: The inadequacy of the TMDL to meet water quality standards may rest from the exclusion of certain sources and technologies from the WLAs and LAs. As discussed, no further de-nitrification from STPs are calculated. Indeed, the STP at BNL was not even considered. Perhaps most glaring is the apparent lack of a LA requiring a reduction from on-site wastewater treatment systems (OWTSs), a significant source of nitrogen loading on our coastal waters through groundwater. Again, the implementation plan acknowledges that more needs to be done with OWTSs, but all the reductions in homeowner nitrogen removal appear to come from reduced fertilizer use. See p. 38, not mentioning OWTSs as factoring in the nitrogen reduction model. (Peconic BayKeeper).

**Response 47:** The wasteload allocation for the Riverhead STP can be achieved through partial effluent diversion for beneficial reuse at the adjoining golf course, or through a treatment upgrade, as there exists technology to reduce nitrogen further. Based on the modeling work completed for the TMDL, additional nitrogen removal is not required at the other STPs discharging to the estuary. The BNL STP continues to be discussed and addressed under "Other Implementation Considerations" in the TMDL Report. Current and future nitrogen loads from on-site treatment systems have been taken into account in the TMDL and LAs. The TMDL Document does promote the continued investigation of new On-site Wastewater Disposal Systems (OSDS) technologies that remove nutrients and the possible need for micro-sewering and traditional sewering. Nitrogen load reductions from unsewered residential properties does focus on decreasing nitrogen loads associated from turf and landscape maintenance.

**Comment 48**: The environmental impact of the mechanical mixer concept was not addressed, especially in terms of the: releasing of bound nitrogen in re-suspended sediment, in

that turbulent mixing is needed to increase dissolved oxygen in water; entrapment of marine life within the mixer; and consequence that the re-suspended sediment could have by reducing light levels on submerged aquatic vegetation. The report should have provided case studies where this concept was used successfully without any adverse environmental impacts. (Town of Riverhead)

**Response 48:** The need for mechanical aeration will be evaluated as the TMDL is implemented and compliance with the dissolved oxygen water quality standard is assessed. DEC agrees that prior to implementing mechanical aeration, its environmental impact should be evaluated. Information from the "San Joaquin River Dissolved Oxygen Aeration Project Draft Engineering Feasibility Study" (prepared for The California Bay-Delta Authority, prepared by HDR Engineering, Inc., Folsom, CA, July 2004) and other studies will be considered.

## IV. Acronyms

BNL – Brookhaven National Laboratory
CBOD- carbonaceous biochemical oxygen demand
CCMP - Comprehensive Conservation and Management Plan
CCE- Cornell Cooperative Extension of Suffolk County
DEC - New York State Department of Environmental Conservation
DO - dissolved oxygen
EFDC - Environmental Fluid Dynamics Code
ENB- Environmental Notice Bulletin
EPA - U.S. Environmental Protection Agency
lb (or lbs.) - pounds
LA - load allocation
mg/L - milligrams per liter
MOS - margin of safety
MS4 – Municipal Separate Storm Sewer System
N - nitrogen
OSDS- on-site disposal system
OWTS- on-site wastewater treatment system
PEP - Peconic Estuary Program
PLR – practical load reduction
SCDHS - Suffolk County Department of Health Services
SPDES - State Pollutant Discharge Elimination System
STP - sewage treatment plant
TKN- total Kjehldahl nitrogen
TMDL – total maximum daily load
TN – total nitrogen
TNC- The Nature Conservancy
WLA – wasteload allocation