

portion of the River and validated water quality models. Use of the models enables one to evaluate the fate and transport of all sources to the river.

The primary mechanism for nitrogen attenuation in the Blackstone River is alga uptake and retention of the algae in the water column or sediment. In 1997 MA, USEPA and DEM completed a WLA for ammonia and phosphorus to address excessive algae growth and dissolved oxygen conditions in the Blackstone River (USEPA et. al 1997). The response to comments submitted by MADEP also explains how the water quality models were used to evaluate the reduction in attenuation associated with the control of algae levels. It was determined that between 71 and 77 % of the individual MA WWTFs nitrogen loading is delivered to the mouth of the River (72% for UBWPAD) and 86% of the Woonsocket WWTF when the required WLA is met. Of the load predicted at the mouth of the River, WWTFs represent 98%: UBWPAD and Woonsocket represent 83 % of the load delivered (64 % and 19 %, respectively). This confirms the expectation that attenuation will be reduced as WWTFs meet current permit requirements, demonstrates that attenuation will be minimal and underscores the point that further study of attenuation factors prior to implementation of nitrogen controls is not appropriate.

DEM has also acknowledged that researchers agree that WWTFs represent the majority of the annual nitrogen loading to Narragansett Bay. The impact of WWTF is especially pronounced during critical dry weather periods. Also, non point source inputs are typically highest during high flow periods. While nitrogen loading throughout the year has the potential to contribute to the pool of nitrogen available during critical periods, the general consensus of participants in the technical advisory committee that DEM established to assist with efforts to develop a water quality model and TMDL for the Providence and Seekonk Rivers was that the winter contribution is not significant. This is also supported by work completed by Doering et. al. (1990) which concluded that their analysis and previous mesocosm experiment data showed that dissolved nitrogen concentrations in the Providence and Seekonk Rivers result from external sources, while lower portions of the bay are largely driven by internal recycling.

Besides wastewater treatment facilities, there are many other sources of nitrogen to the Upper Bay, including storm water, ISDS systems, and atmospheric deposition. The Plan underscores the importance of the several other pollution prevention and treatment measures that are being implemented by DEM, CRMC, and other agencies to reduce nutrients from these other sources.

Water quality restoration plans addressing nutrient impairments are underway for a number of coastal embayments and rivers discharging to the Bay, including Greenwich Bay, Kickemuit River and Reservoir, and Palmer River. These plans identify sources of nutrients and necessary actions to restore water quality, including both point source and non-point sources of pollution.

Also, many efforts are underway to prevent water quality impacts associated with storm water runoff in undeveloped areas, and to enhance the treatment and management of storm water from urban and agricultural areas. These include initiatives such as Grow Smart RI and the Governor's Growth Planning Council; watershed-based project to identify, protect and restore riparian buffers; and public education and municipal assistance efforts to encourage low impact development. The state Department of Transportation and 36 municipalities are working on a major effort to better manage urban storm water through the development and implementation of storm water management plans.

Comment:

DEM's analysis of the conditions of the Providence and Seekonk Rivers is based on data from May 31, 1995 through September 21 of 1995 and from May 2, 1996 through November 14, 1996. Although the period of DO problems is typically the summer, DEM has established total nitrogen limitations for the period of April 1 through October 31, without any specific justification as to these specific dates. This is an issue for wastewater treatment facilities (especially the early April time frame) because this is often a period of high flow and temperatures, which requires facilities to be constructed larger than otherwise needed to accommodate the biological kinetics of nitrification and de-nitrification processes.

Response:

While nitrogen loading throughout the year has the potential to contribute to the pool of nitrogen available during critical periods, the general consensus of participants in the technical advisory committee that DEM established to assist with efforts to develop a water quality model and TMDL for the Providence and Seekonk Rivers was that the winter contribution is not significant. This is also supported by work completed by Doering et. al. (1990) which stated that their analysis and previous mesocosm experiment data showed that dissolved nitrogen concentrations in the Providence and Seekonk Rivers result from external sources, while lower portions of the bay are largely driven by internal recycling.

Nevertheless, the DEM included a permit conditions, which requires that the facility continue to operate all available treatment equipment throughout the rest of the year in order to maximize the nitrogen removal benefits. Due to the heavy dependence of biological nutrient removal on temperature, the costs associated with year-round limits would significantly greater than the cost to achieve the seasonal limits and are not being imposed until information is available to indicate they are necessary. With the exception of the Woonsocket WWTF, the proposed permit modifications require that seasonal limits commence May 1st to mitigate water quality impacts associated with excessive algae growth. The draft modification for the Woonsocket WWTF required compliance with the nitrogen limits on April 1st, consistent with the ammonia and nitrogen limits in the existing permit. During the development of the current permit, it was determined that ammonia limits were necessary to ensure compliance with water quality impacts of ammonia (dissolved oxygen and ammonia toxicity) on the Blackstone River, and nitrogen limits were required at that time. The final permit modification has been changed to commence the modified nitrogen limit on May 1st consistent with the other WWTFs. The seasonal nitrogen limits proposed were established and the seasonal nutrient removal limits that are typically assigned in RIPDES permits.

Comment:

The proposed permit modification imposes limits of 667 pounds per day of total nitrogen, and a concentration limit of 5 mg/l. For the period from April through October of 2004, monthly data submitted to DEM by the City shows that the City discharged an average of only 364 pounds per day of Nitrogen, which is 55% of the mass allowed by the proposed modification. The average concentration was approximately 6.5 mg/l. Although slightly above the 5.0 mg/l limit of the permit, the City is well within the far more important mass emission rates. DEM appears not to have considered these facts at all in developing its approach for nitrogen control.

As noted earlier, MERL tank experiments suggest LOT treatment is required to meet water quality standards. However, based on a comparison of technology, costs and reductions in the nutrient loading factors for the Providence and Seekonk River Systems DEM has established a phased reduction strategy. The Report acknowledges that loadings will increase as WWTF flows increase to their design flows, but follow-up monitoring and possibly water quality modeling will be needed to determine whether additional reductions are required. Because LOT is presently indicated, it is DEM's position that it is appropriate to express WWTF permit requirements as a concentration limit, which will enhance the near-term environmental improvement, rather than a monthly load limit that would allow higher concentrations to be discharged during periods of lower WWTF flows. Rule 17.02(a) of the RIPDES Regulations specifies that "In the case of POTWs, permit limitations, standards or prohibitions shall be calculated based on design flow."

Comment:

DEM's permitting strategy establishes permit limits of 5 mg/l for the Woonsocket facility, as well as for those of the Narragansett Bay Commission. For four other plants, East Providence, Cranston, West Warwick and Warwick, the 2004 Evaluation sets limits at 8 mg/l. No rationale is presented for this difference, and none is readily apparent from the technical information presented.

Before DEM proceeds any further with the proposed nitrogen reduction limits and new discharge permit requirements, I would urge you to require the following:

1. First, that DEM should commission a scientific peer review of the studies and conclusions reached by DEM with respect to the appropriateness of the scientific/analytical techniques used by DEM and the appropriateness and necessity of creating new nitrogen discharge standards, as required by the new legislation, based upon the DEM analysis.
2. Second, the costs of achieving the standard at each of the wastewater treatment facilities in Rhode Island where the standard would be applied should be carefully estimated and should include both capital and operating cost impacts for the necessary facilities.
3. Third, completion of a comprehensive, scientific study of the impacts of implementation of the nitrogen standard utilizing currently relevant data of water quality of the Blackstone River, Seekonk River, Providence River and Narragansett Bay should be completed and subjected to the appropriate level of peer review.
4. Fourth, DEM should establish a Technical Advisory Committee ("TAC") with active City participation and should meet jointly with representatives of all the affected communities and authorities that operate wastewater treatment plants to discuss the cost and methods of financing the necessary improvements required to achieve the desired water quality in the Bay for the benefit of the State of Rhode Island.

Response:

DEM has developed a plan to achieve the 50% reduction goal when current loads (95-96) are compared to proposed treatment requirements at approved WWTF design flows. Although the WWTF modifications will initially achieve a greater percent nitrogen

reduction, it will drop to 50% at design flow. DEM has developed a plan that achieves an overall reduction of 50% from the WWTFs impacting the Providence and Seekonk Rivers and the Upper Bay. The treatment necessary varies with the relative environmental impact of each discharge. It is not clear why the City commented that: No rationale is presented for this difference, and none is readily apparent from the technical information presented. The report indicates that greater reductions are appropriate for those facilities located closer to the portion of the receiving water where impacts have been observed. The section "Consideration Regarding WWTF loading reductions" specifically identifies and accounts for attenuation during tributary river transport and from the edge of the Providence and Seekonk Rivers to the to the area of most significant degradation. Specific excerpts are presented in the response to comments received from MADEP.

Beginning in the 1980s various researchers have developed water quality models for the Providence and Seekonk Rivers; the Narragansett Bay Project funded many of these. Several meetings of academic, private consulting and government officials were held to discuss monitoring data and technical approaches most likely to result in a successful circulation and water quality model. In addition, two national modeling experts reviewed the status of modeling efforts and met with the committee to discuss recommendations for future monitoring and modeling techniques. In 1992, it was concluded that over a 50% reduction was needed to produce observable response (higher levels for significant response and that reliability in the screening level model was substantial and provides a good indication of the impact of reduced nitrogen loads on phytoplankton levels (Limno-Tech 1992).

Since the early to mid 1990s, DEM hired a consultant and has been working with a technical advisory committee (TAC), consisting primarily of scientists and engineers representing, academic, municipal, state and federal organizations, to calibrate a model and develop a water quality restoration plan, or TMDL. Based on previous recommendations, a data collection and modeling approach was developed. Meetings were held throughout the model development process and suggested modifications to the approach were implemented in the hopes of producing the best scientific tool for predicting the impact of various nitrogen reduction alternatives. Despite these efforts, it was concluded that the hydrodynamic model formulation could not adequately simulate conditions due to the relatively severe changes in the bathymetry in the Providence River.

The Governor's Narragansett Bay and Watershed Planning Commission included a Nutrient and Bacteria Pollution Panel with representation from private consulting firms, environmental groups, WWTFs and regulatory agencies. The primary recommendation of the Panel was to reduce nitrogen discharges from RI wastewater treatment facilities that discharge in the upper bay or its tributaries by 40 to 50%. The full commission also endorsed this recommendation.

DEM agrees that an assessment plan is needed to determine the need for future tighter restrictions. As noted in the DEM evaluation, an integral component of this phased implementation approach is adequate monitoring and assessment of water quality changes to determine if additional reductions are necessary to meet water quality standards. DEM, in partnership with Narragansett Bay National Estuarine Research Reserve, the Narragansett Bay Commission, University of Rhode Island, and Roger Williams University, will be increasing the number of continuous water quality monitoring stations to at least 13 by the summer of 2005. EPA is currently seeking a contractor to assist DEM with the development of methods to review continuous time series

measurements of dissolved oxygen for compliance with EPA's October 2000 recommended ambient water quality criteria.

Although not specifically documented in the permit modifications or the DEM report cited above, DEM agrees that a water quality model or other predictive tool may also be necessary to evaluate the need for additional nitrogen reductions. However, it is DEM's position that additional resources should not be devoted to development of such tools until input regarding the most promising approaches, based on consideration of past experience, has been received by a technical advisory committee.

Comment:

The Superior Court Consent Order entered on May 19, 2000, resolving the Superior Court suit provides within Section 8 that the City and DEM agreed to a permit limit of 10 mg/l of total nitrogen in the 2000 RIPDES permit with the proviso that "both parties understand that RIDEM reserves the right to modify the permit limit of 10 mg/l through RIDEM's administrative rules of practice and procedure". Part G.1 of the existing RIPDES permit also references that the permit may be re-opened or modified in accordance with rule 23 of the RIDEM Regulations for the Rhode Island Pollutant Discharge Elimination System (June 26, 1984, amended February 5, 2003, effective February 25, 2003 (RIPDES Regulations)).

Rule 23 allows the Department to modify a permit in circumstances where the Department has received new information (other than revised regulations, guidance, or test methods) which was not available at the time the permit was issued and would have justified the application of different permit conditions at the time of issuance. (Rule 23(b)(2)). In addition, Rule 23 allows a permit or a permit condition to be modified after promulgation of new or amended water quality standards, effluent limitation guidelines by EPA or judicial decisions where a permit or permit condition was based on a prior water quality standard or effluent limitation guidelines which have been altered or revoked (Rule 23(b)(3)(i)). The RIPDES Regulations also provide for modification of the RIPDES permit under Rule 36 at the initiation of the Department within 90 days of the adoption of new limitation guidelines and authorize the Department to provide a schedule for compliance in accordance with Rule 20 (rule 23(3)).

It is difficult to determine from either DEM's July 2, 2004 letter, or the subsequent December 23, 2004 Public Notice of the proposed permit modification whether the proposed modification is based on a waste load allocation (G.1. (b)) or modification of water quality standards for the receiving waters of the Providence and Seekonk Rivers (G.1(a)). It appears that the Department is not specifically proposing a total maximum daily load (TMDL) for the area, but rather is relying on DEM's extrapolation of experiments conducted at URI on Narragansett Bay to reach a conclusion that the existing water quality standards for the Seekonk and Providence Rivers (minimum 5.0 mg/l "except as naturally occurs") cannot be achieved without significant reductions in total nitrogen discharges from wastewater treatment facilities.

In all respects the proposed limit appears to be a water quality based effluent limit based on the new legislation, rather than based on a TMDL, as required by the 2000 Superior Court Consent Decree and RIPDES permit and the RIPDES Regulations (Rules 3 and 17) and without complying with TMDL regulations and guidance documents or obtaining EPA approval.

In effect, DEM has exceeded its authority under the 2000 Superior Court Consent Decree and RIPDES permit and applicable RIPDES regulations in proposing this permit modification.

For all the foregoing reasons DEM should withdraw the proposed permit modifications.

Response:

As noted by the commenter, the current Woonsocket WWTF RIPDES Permit, and the 2000 Superior Court Consent Decree both recognize the Department's authority under Rule 23 of the RIPDES Regulations to modify the current permit. By entering the Superior Court Consent Decree, the City explicitly stated their understanding that DEM reserved its rights to modify the current permit limit of 10 mg/l through RIDEM's administrative rules of practice and procedure. The current RIPDES permit also states that the permit may be modified in accordance with Rule 23 of the RIPDES regulations for reasons that include but are not limited to those specifically listed in the permit.

As provided in Rule 23(b)(2) of the RIPDES Regulations, the proposed permit modifications are based upon new information: namely the DEM evaluation and the amendments to Chapter 46-12-2-(f) signed into law in 2004. The promulgation of the proposed permit modifications is proceeding in accordance with RIDEM's administrative rules of practice and procedure. Therefore, in proposing this permit modification, DEM has not exceeded its authority under the 2000 Superior Court Consent Decree, RIPDES permit or the applicable RIPDES regulations.

Below is a summary of the more significant specific comments that were submitted in support of the proposed permit modifications.

Commenter:

The Blackstone River Coalition
Donna M. Williams, Conservation Advocacy Coordinator
414 Massasoit Road
Worcester, MA 01604

Comments:

The Blackstone River Coalition (BRC) commented that they applaud the DEM for its proposed limits for nitrogen on the four wastewater treatment plants under consideration (Bucklin Point, Field's Point, East Providence and Woonsocket), and urged immediate implementation of those limits. They also commented that of particular interest to the BRC is the limit for the Woonsocket wastewater treatment plant, which, based on the Blackstone River Initiative, is one of the overwhelming sources of nutrients to the Blackstone River. Specifically, the Upper Blackstone Water Pollution Abatement District in Millbury, Massachusetts and the Woonsocket plant have been identified as the major sources of nutrients to the Blackstone River. In setting limits for these plants, the BRC indicated that DEM is leading the way for Massachusetts to do the same. The BRC urged DEM to move forward with the proposed limits and stated that appeals and further study only push the goal of a fishable/swimmable Blackstone River by 2015 further from reach.

Commenter:

Blackstone River Watershed Council
Frank Matta, Chairman
P.O. Box 8068
Cumberland, RI 02864

Comment:

The Blackstone River Watershed Council (BRWC) commented that they are collectively convinced that the WWTFs are major contributors to certain water quality impairments that are experienced along the Blackstone River. Specifically, the WWTFs are significant contributors to water quality impairments (such as ammonia, induced predominantly from nutrient (nitrogen) enrichment from these discharge outfalls) and which contribute heavily to water quality violations in the river. The BRWC agreed with the DEM that nutrient (nitrogen) reductions must be established for these WWTFs now and that, by implementing these permit modifications in an expedited fashion, water quality improvements will be measurably observed in the short term. The BRWC also stressed the importance and need for bi-state actions to take place in an expedited fashion.

Commenter:

Jan H. Reitsma
58 Third Street
Barrington, RI 02806

Comment:

Mr. Reitsma commented that by focusing first on discharges from WWTFs to reduce nitrogen loading to the receiving waters, the DEM has set the appropriate priority, and strengthened its ability to require or advocate for nutrient loading reduction in other locations and from other sources. Mr. Reitsma commented that there is no disagreement that nutrient loading involves nonpoint as well as point sources, and that sources further upstream in the tributaries also contribute to the problems in the Bay, however, he indicates that it would be a terrible mistake to delay the proposed regulatory actions until more information has been developed on nonpoint source pollution or until the DEM and agencies in other jurisdictions are ready and able to address the other sources as decisively as is now being proposed for these WWTFs.

Mr. Reitsma commented that it would be inaccurate to suggest that the problems would occur regardless of nutrient loading, or that reducing the load won't do any good. He indicated that the DEM deserves credit for analyzing the cost issues carefully, and for its effort to strike the appropriate balance by not limiting the WWTFs at this time to what is technologically possible (3 mg/l) but taking the phased approach instead. Mr. Reitsma commented that further efforts, by the DEM and other state entities, are needed to help the facilities financially, but also to find ways to implement the new limits most cost-effectively.

Commenter:

Save The Bay
Marci L. Cole, Ph.D.
Coastal Ecologist
434 Smith Street
Providence, RI 02908

Comments:

Dr. Cole presented written comments on behalf of Save the Bay in which it was indicated that they strongly support the nitrogen limits proposed by DEM in the permit modifications. She cited the fact that, in June of 2004, the Rhode Island Legislature passed an act stating that "the (RIDEM) shall implement measures to achieve an overall goal of reducing nitrogen loadings from waste water treatment facilities (the dominant point sources of nitrogen to Narragansett Bay) by fifty percent (50%) by December 31, 2008".

The next step in this process is the implementation of nitrogen reduction at RI wastewater treatment facilities (WWTFs) to meet the mandated 50% reduction goal. The four permit modifications put forward by the RIDEM, along with ongoing and completed construction at other WWTFs, will reach this 50% reduction goal. Therefore, Save The Bay expressed their full support for the nitrogen limits presented in the four permit modifications.

Commenter:

Save The Bay
John Torgan
Narragansett BayKeeper
434 Smith Street
Providence, RI 02908

Comments:

Mr. Torgan presented oral comments on behalf of Save The Bay in which he indicated that Save the Bay has reviewed the draft permits and offers its full and unqualified support for the permits. He indicated that Save the Bay felt that the permit limits are necessary to comply with the Clean Water Act and the Rhode Island Water Quality Standards and that they are well founded and based on the best available science. A full-blown, total, maximum daily load study is not necessary to recognize that reductions are needed immediately to reduce the risk of further habitat degradation and the death of more fish and plants.

Mr. Torgan also indicated that, since the 70's, there have been dramatic water quality improvements in the Providence River and Narragansett Bay seen from the significant reductions in toxic metals that are discharged. These improvements have resulted in pollution sensitive marine life, such as oysters, winter flounder, blue crab, and striped bass, being found well up into downtown Providence. However, Mr. Torgan indicated that Save the Bay feels that the single greatest present threat to the health of the Providence River and Narragansett Bay is the discharge of excessive levels of nitrogen from wastewater. Mr. Torgan cited studies conducted in 2003 that documented low dissolved oxygen levels during the summer throughout the Upper Bay and the Providence River, which are important areas for spawning winter flounder and many other estuarine species. Mr. Torgan further cited fish kills and other adverse impacts caused by excessive nutrients, including the July and August 2003 fish kills.

Mr. Torgan indicated that Save the Bay agrees that the fish kills were caused by excessive nutrients discharged by the WWTFs in combination with other contributing environmental factors such as high temperatures, low tides, and light wind. However, since it is impossible to control the other factors, Save the Bay feels that it is appropriate

what is already known today. Mr. Torgan indicated that Save the Bay does not agree that, since nitrogen levels have remained constant over the past 30 years no change is required. If this is true, Save the Bay points out that the nutrient and DO levels were unacceptable in the 70's and they remain unacceptable today and do not meet the minimum standards established by the Clean Water Act. Mr. Torgan indicated that Save the Bay does not expect that there will be any adverse impacts caused by implementing these limits today, to the contrary, Save the Bay expects that the new limits would improve shellfish habitats and restore the nutrient balance in the Bay to a more natural and healthful state.

Mr. Torgan closed by indicated that Save the Bay feels that, by implementing these limits, Rhode Island is sending a strong message to Massachusetts that reductions in the nitrogen levels at the WWTFs that are located in Massachusetts but discharge to the Bay are required and delay in the form of additional studies, appeals, or other legal intervention will only serve to detract from the strong, urgent, and necessary improvements to be made at the WWTFs.

Commenter:

Steven Hamburg
Brown University
Box 1943
Providence, RI 02912

Comments:

Dr. Hamburg, a professor at Brown University, indicated that he is an ecosystem ecologist and that, for the past 3 or 4 years, he has been working on anthropogenic nutrient inputs into the Narragansett Bay. Based upon his research, Dr. Hamburg indicated that there is an unequivocal negative impact on the Bay due to anthropogenic nitrogen loads and that there is not an open scientific question about this. There is a preponderance of scientific evidence regarding serious ecosystem health issues regarding Nitrogen loading that we need to acknowledge. There has been, um, some question about the scientific basis for the proposed permit limits, and I would argue that that is an error. There is strong scientific consensus I said that has led to this comparable, action across the country. There is no evidence that Narragansett Bay is different from these ecosystems and thus, should not be subject to the same weight of scientific evidence that has been brought to bear elsewhere

In terms of the Upper Bay, Dr. Hamburg indicated that these nitrogen loads increase the risk of hypoxic events, invasion of non-native species, and the poor health of eelgrass. Dr. Hamburg also indicated that the increased nitrogen loading exacerbates the impacts of climate change. However, since we are unable to control the climate, Dr. Hamburg indicated that the future health of the Bay depends upon reducing the nitrogen discharged from WWTFs, since that is the variable for which we have the largest control over. Dr. Hamburg also indicated that nitrogen discharges are the most significant stress to the Bay and that a 50% reduction would have positive impacts on the Bay by making it more resilient and increasing DO levels. Dr. Hamburg indicated that he does not feel that there is any advantage to doing additional scientific studies and that we should be focusing on how to achieve the 50% reduction. In his opinion further reductions are warranted.

Commenter:

Warren L. Prell
Brown University
Providence, RI 02912

Comments:

Based on the available data, Dr. Prell concluded that the baseline loading of nutrients is too high in the upper bay and that the resulting productivity and oxygen depletion that causes low DO is primarily the result of excess nutrients. He expressed his position that everybody in attendance at the symposium on Block Island agrees that nutrient loading to the Upper Bay is extremely high. And that 60 to 70 percent of all the nutrients coming into the upper bay pass through wastewater treatment facilities, either directly, like Field Point, or indirectly coming through rivers. He indicated that the excessive amounts of nutrients being discharged into the bay are causing low DO levels in the Upper Bay and noted that these low DO levels are independent of particular environmental situations such as storms and winds. Environmental conditions may exacerbate, strengthen a hypoxic event, but the a base line of loading there which is supporting Chlorophyll levels in the upper bay are extremely high (five to 10 times higher than they are in the lower bay). Dissolved oxygen levels are really low, and I don't think people have appreciated just how low they are. He indicated that these reductions are fully warranted, and, we should look at even further reduction because clearly a 50 percent reduction will help the upper bay, but it will not solve it. He commented that he favors the proposal to reduce nutrient flux from the WWTF as the most practical means of reducing nutrients flowing into the Bay.

Commenter:

Donald Pryor
Brown University
Box 1943
Providence, RI 02912

Comments:

Mr. Pryor, Chairman of the Nutrient and Bacteria Panel of the Governor's Narragansett Bay and Watershed Planning Commission, commented on the fact that the Panel's primary recommendation was to reduce nitrogen discharges from RI WWTFs that discharge to the upper Bay or its tributaries by 40-50%. The full commission endorsed that recommendation. Subsequently, the RI General Assembly passed legislation that was enacted into law (46-12-2(f)) calling for reduction of nitrogen loading from WWTFs by 50% by December 31, 2008. Mr. Pryor commented that the proposed permits are essential for DEM to comply with this law.

Mr. Pryor also commented that voters approved a bond issue to assist in financing upgrades to WWTFs to achieve the required reductions and that timely action is necessary to ensure that those funds are used as intended.

Mr. Pryor commented that all of the studies and published literature agree that high nutrient loads drive low oxygen conditions in Narragansett Bay in the summer when mixing is low and that the panel reached its recommendation by consensus. He also

indicated that all of the analyses were consistent in identifying WWTFs as being responsible for 60 – 70 percent of the nitrogen load to the Upper Bay. He commented that Further study should parallel, not delay, action. A numerical process model might provide additional insight and is a worthwhile objective of ongoing work; however, no such model is likely to answer every question to match every aspect of the actual system or to be capable of predicting system behavior perfectly.

As nutrient reductions called for in the proposed permits are implemented, dissolved oxygen levels in the upper parts of the Bay will improve, particularly during conditions that now allow oxygen levels to fall below that needed to support most aquatic life. Dr. Pryor indicated that in other areas where nutrient reductions have been implemented, such as Tampa and Sarasota, no negative side effects were reported. Therefore, he indicated that the nutrient load reduction proposed in the draft permits should be implemented without further delay.

Commenter:

Emily Saarman
33 Power Street
Providence, RI 02903

Comments:

Ms. Saarman, a graduate student at Brown University, commented that, based on the dissolved oxygen data that she has been reviewing with Dr. Pell and Mr. Pryor, there is no question that the dissolved oxygen levels are extremely low during the summer. She indicated that, after reviewing the data from the summer of 2002, she found that the dissolved oxygen levels exceed the mortality rates for larvae in the Providence River by a factor of six (6). She also commented that the lowest dissolved oxygen levels are consistently seen just south of the Fields Point WWTF, a phenomenon that she attributes to the nitrogen discharges from the WWTF. She applauded DEM for drafting the proposed permit modifications and supported the modifications.

Commenter:

Senator Elizabeth Roberts
254 Norwood Avenue
Cranston, RI 02905

Comment:

Senator Roberts commented that the nutrient impact on Narragansett Bay is an issue that is very important to both people in her district and to the people of the State. She recognized that there would be significant costs associated with compliance but indicated that she felt that there are times when spending money is necessary. She indicated that she is pleased to see the DEM move so quickly with the drafting of these modifications and gave her full support.

Commenter:

City of Providence
Mayor David N. Cicilline
Providence City Hall

Providence, RI 02903

Comment:

Mayor Cicilline commented that, unquestionably greater restrictions upon wastewater treatment plants would help improve the quality of the receiving waters. Mayor Cicilline further commented that while he fully agrees that a clean Bay is critical to restoring Providence's waterfront and economy, and that he offers his support of the draft wastewater treatment plant permits for Woonsocket, East Providence and the Narragansett Bay Commission, he urges DEM to be mindful of how consumers will be able to shoulder this or any additional cost.

Commenter:

Curt Spalding
2 Norwood Avenue
Cranston, RI 02905

Comment:

Mr. Spalding, Executive Director of Save the Bay, indicated that he was providing comments as a resident of the Providence River and President of the Edgewood Sailing School. Based upon his personal experience, he feels that it is clear that the Upper Bay is impacted by excessive nitrogen discharges. People from all walks of life come to the Providence River to use it and should enjoy the same clean water column enjoyed by a person living in the middle and lower Bay. He specifically referenced, times during the summer season many people fish in the River but an overabundance of ulva algae compromises the ability to cast a bait through the water and that children at the Edgewood Sailing School must sail through inches of macro algae in the Providence River. Mr. Spalding stressed that poor water quality conditions should be viewed as an issue of equity, expressed his support for the DEM's proposed permit modifications and applauded DEM for moving so quickly in proposing the modifications.

Commenter:

City of Warwick
Mayor Scott Avedisian
3275 Post Road
Warwick, RI 02886

Comment:

Mayor Avedisian commented that he supports the permits proposed by DEM and that the proposed reductions in nitrogen loading in the Blackstone River, Providence River and the Upper Narragansett Bay are appropriate, necessary and consistent with the Governor's Narragansett Bay and Watershed Planning Commission's findings and recommendations.

Mayor Avedisian also commented that the City of Warwick is fully aware of the impacts that wastewater and other pollutants have on our sensitive environmental resources and that the City has made substantial commitments to improve water quality in Rhode Island as evidenced by the approval of a \$130 million general obligation bond by the voters of the City of Warwick, as well as the recent execution of authority for up to \$50

million in revenue bonds by the Warwick Sewer Authority. However, Mayor Avedisian commented that Warwick cannot address the pollution in Narragansett Bay alone and that the cities of East Providence and Woonsocket and the Narragansett Bay Commission must continue to invest in Rhode Island's future by upgrading their wastewater treatment facilities to further reduce nutrients.

Commenter:

City of Warwick
Councilman Steve Merolla
229 Castle Rocks Road
Warwick, RI 02886

Comment:

Councilman Merolla commented that he is in support of the new nitrogen limits proposed by the DEM for the City of Woonsocket and the City of East Providence municipal wastewater treatment plants, and the NBC's Bucklin Point and Fields Point wastewater treatment facilities and that these reductions in nitrogen loading in the Blackstone River, Seekonk River, Providence River and the Upper Narragansett Bay are critical steps in the effort to meet both existing USEPA water quality standards and the fifty percent nitrogen reduction goal set by the Rhode Island legislature last year.

Councilman Merolla also commented that, while there is significant cost to municipalities and the NBC to implement the proposed nitrogen limits, the mandated limits have been achieved by other Rhode Island communities who were dedicated to improve the water quality of the State's waters and he urged DEM and the facility operators to work cooperatively to put these new nitrogen limits in place as quickly as possible.

In addition to the specific comments mentioned above, the following organizations and individuals all submitted similar comments that supported the DEM's proposed permit modifications assigning total nitrogen permit limits to the WWTFs, in accordance with the recent legislation that was passed requiring that DEM implement the necessary measures to reduce nitrogen loadings to the Providence River by 50%. Several of these commenters also urged the DEM to work with the State of Massachusetts to implement similar nutrient reductions in the WWTFs that discharge to the Blackstone River but are located in Massachusetts.

Organizations:

1. *Brown Medical School*
Department of Psychiatry & Human Behavior
Michael A. Fiori, M.D.
Assistant Clinical Professor
345 Blackstone Boulevard
Providence, RI 02906
2. *Community Boating Center*
Peter Gengler
India Point Park
Providence, RI
3. *The Gordon School*
Megan Almeida

Zoe Bogus
Blinn Dorsy
Amanda Gaynor
Rachel Gibson
Elliot Green
Chris J
Neil D. Kelly
Christopher Kingdon
Anna Mack
Denyel Monroe
Jessie Parsons
Margaret Sawdy
Karan S. Takhar
Coby Unger
Susannah Wales
Nzingha Williams-Eugene
45 Maxfield Avenue
East Providence, RI 02914

4. *Greenwich Bay Watershed Group*
Richard Langseth
5. *The Rhode Island Rivers Council*
Meg Kerr
P.O. Box 1565
North Kingstown, RI 02852
6. *Rhode Island Shoreline Coalition*
Harry L. Staley, President
P.O. Box 1141
Westerly, RI 02891
7. *Saltwater Anglers Association*
Stephen J. Medeiros
6 Arnold Road
Coventry, RI 02816

Individuals:

1. Frohman C. Anderson
170 Adams Point Road
2. Samuel Fisher Babbitt
81 Benefit Street
Providence, RI 02904
3. Dana Bourque
4. Roger N. Carlsten, D.D.S.
433 Lloyd Avenue
Providence, RI 02906
5. Mike Darowski
61 Sagamore Street

Warwick, RI 02889

6. Ilana J. Goldstein
7. Arthur J. Latham, Jr.
and Doris S. Latham
8. Gidget Loomis
140 Duck Cove Road
North Kingstown, RI 02852
9. Raymond C. Martinelli
27 Sabra Street
Cranston, RI 02910
10. Liam Miner
50 Elton Street
Providence, RI 02906
11. Richard N. Morneau
8 Scott Street
Pawtucket, RI 02860
13. J. Schempp
47 Arbor Drive
Providence, RI 02908
14. Barbara M. Simone
6 Briarfield Road
Barrington, RI 02806
15. Marybeth Sulkowski
3 Brookfarm Road
North Providence, RI 02904
16. Robert Sumner-Mack, M.D.
643 East Avenue
Pawtucket, RI 02860
17. Carolyn R. Swift
50 Armstrong Avenue
Providence, RI 02903
18. Kim Ziegelmayer
206 Adelaide Avenue
Providence, RI 02907

HEARING REQUESTS

If you wish to contest any of the provisions of this permit, you may request a formal hearing within thirty (30) days of receipt of this letter. The request should be submitted to the Administrative Adjudication Division at the following address:

Bonnie Stewart, Clerk
Department of Environmental Management
Office of Administrative Adjudication
235 Promenade Street, 3rd Floor
Providence, Rhode Island 02908

Any request for a formal hearing must conform to the requirements of Rule 49 of the State Regulations.

STAYS OF RIPDES PERMITS

Should the Department receive and grant a request for a formal hearing, the contested conditions of the permit will not automatically be stayed. However, the permittee, in accordance with Rule 50, may request a temporary stay for the duration of adjudicatory hearing proceedings. Requests for stays of permit conditions should be submitted to the Office of Water Resources at the following address:

Angelo S. Liberti, P.E.
Chief of Surface Water Protection
Office of Water Resources
235 Promenade Street
Providence, Rhode Island 02908

All uncontested conditions of the permit will be effective and enforceable in accordance with the provisions of Rule 49.

Literature cited

Doering, P.H., C.A. Oviatt and M.E.Q. Pilson. December 1990. Control of Nutrient Concentrations in the Seekonk-Providence River Region of Narragansett Bay, Rhode Island. *Estuaries*13:4:418-430

Limno-Tech, Inc. August 6, 1992, Providence and Seekonk Rivers and Upper Narragansett Bay Eutrophication Screening Analysis.

Louis Berger and Associates, April 17, 1998 Narragansett Bay Commission Combined Sewer Overflow Control Facilities Program, Concept Design Report Amendment.

Michaelis, B. (2005). Dissolved oxygen dynamics in a shallow stream system. Dissertation in Civil and Environmental Engineering at the University of Rhode Island (URI).

Nixon, S., B. Buckley, S. Granger, L. Harris, A. Oczkowski, L. Cole and R. Fulweiler, 1995, Draft Report: Anthropogenic Nutrient Inputs to Narragansett Bay: A Twenty-five Year Perspective., A report to the Narragansett Bay Commission and Rhode Island Sea Grant.

Randall, C. W., J.L. Barnard, and H. D. Stensel. 1992. , Design and Retrofit of Wastewater Treatment Plants for Biological Nutrient Removal. Technomic Publishing Company, Lancaster, PA.

USEPA, MADEP and RIDEM, November 1997, Blackstone River Watershed Dissolved Oxygen Wasteload Allocation for Massachusetts and Rhode Island.

Walsh, T. 2005, Presentation entitled "Strategies from a Municipal Perspective" at the seminar "Maximizing Compliance Options: Strategies for Meeting Nutrient Limits in New England" held January 11, 2005