City of Dover, New Hampshire's Comments on Proposed General Permit for Great Bay Estuary Communities in New Hampshire

Prefatory Statement

The City of Dover, New Hampshire presents the following comments on the Great Bay Total Nitrogen General Permit, NPDES Permit No. NHG58A000, 2020 Draft General Permit ("Draft General Permit" or "Draft Permit" or "General Permit").[1]

The City of Dover strongly supports the Clean Water Act and the progress that has been achieved by way of the Clean Water Act. The City appreciates the innovative structure of Draft General Permit and agrees that it has the potential, if needed and if modified in accordance with these comments, to represent an important step forward in the continued efforts to protect Great Bay, which is an invaluable natural resource. At the same time, the City of Dover harbors significant concerns over certain aspects of the Draft General Permit. These concerns are outlined below, together with a renewed request for independent peer review.

As currently drafted, the Draft General Permit would result in substantial, unnecessary expenditures and harm to local economies (including inability to grow) without corresponding improvements in eel grass or water quality. As discussed at the public hearing, Dover feels its resources would be better expended on addressing other, more pressing infrastructure improvements such as infiltration and inflow of water. In any event, given the gravity of the EPA's Draft General Permit, the City of Dover urges EPA to reconsider its Draft General Permit, as well as undertake an external, independent peer review before finalizing and issuing any permit.

Executive Summary and Preliminary Observations/Comments

[1] EPA denied an extension of the comment period deadline (expiring May 8, 2020). New Hampshire remains in a State of Emergency and subject to a general Stay-At-Home order through the current deadline. The City of Dover has done its best under the circumstances to provide fulsome comments based on the information currently available to Dover.

EPA's General Permit is premised upon the establishment of a watershed loading limitation (*i.e.*, total maximum daily load) of 100 kg TN/hectare-year (annual average), indexed to an "average" year rainfall of approximately 45 inches. DES and EPA have asserted that this watershed load limitation is necessary to comply with the state's narrative criteria for nutrients (Fact Sheet at 24). Based on this new watershed-wide load limitation, EPA has concluded that both point (POTW and MS4) and non-point sources must be significantly reduced throughout the system. Fact Sheet at 26-27. EPA has indicated that the point source load limitations for the larger facilities were set to trigger Clean Water Act antibacksliding restrictions and freeze existing Total Nitrogen ("TN") POTW loads to the system to existing discharge levels (excepting possibly for Rochester which will require a major upgrade to achieve the annual average TN limitation of 8 mg/l TN at existing flows). The General Permit's "load freeze" approach will preclude local growth to the currently approved "design flow" unless additional facility improvements are constructed to ensure TN loadings do not increase over time as communities grow.

EPA has also indicated its intent to modify the existing Small MS4 General Permit for New Hampshire communities that are tributary to Great Bay. Fact Sheet at 28-29. These permittees may anticipate imposition of a 40-60% TN reduction requirement under average rainfall conditions. This provision is significantly more restrictive than the existing MS4 General Permit issued by USEPA in 2015. While the proposed permit discusses "adaptive management," the ability to utilize that approach to reduce TN reduction compliance costs will, in general, not be possible for any community already meeting its designated effluent limitation. Moreover, to get offsets under EPA trading protocols, communities would need to fund efforts outside of their political boundaries. Under EPA Nutrient Trading Policies, a permittee cannot avoid a point sources reduction requirement by offsetting loads at another "non-point" location that would also need to reduce loads to comply with an applicable TMDL (watershed load restriction) (2019 USEPA Trading Policy). Moreover, EPA has indicated that the watershed load restriction of 100 kg/ha-yr is the "minimum" restriction that would be applied and that future assessments could require even more restrictive TN load reductions if eelgrass acreage does not increase to a non-impairment level (Fact Sheet at 23). Thus, there is no guarantee that non-point expenditures

made by any MS4 permittee outside of its political boundary would actually result in a reduced regulatory burden.

The following conclusions are applicable to compliance with the load reduction requirements mandated by this proposed General Permit:

- The proposed permit is far more restrictive than the regulatory approach EPA used in 2012-2016 in issuing nutrient reduction mandates to the Towns of Exeter and Newmarket, based on achieving a long-term ambient TN concentration of 0.3 mg/l TN (growing season average) in the Great Bay system.
- All point sources with design flow above 2.0 MGD (plus Newmarket) must institute "limits of technology" during the "growing season" to achieve the specified annual average load reduction requirements, as higher TN effluent concentrations occurring during the winter must be offset by much lower "growing season" performance. All major facilities must also offset any future growth with POTW improvements to lower TN levels.
- Non-point sources must be reduced to pristine forest conditions to achieve the 100 kg TN/ha-yr watershed load objective. This is discussed and analyze in detail below beginning at page 114.
- All point sources less than 2 MGD must implement substantial upgrades to be allowed to reach their approved design flow.
- Future growth will not be permissible under the current MS4 permit as MS4 TN reductions of 40-60% are not economically viable and the system will remain in excess of the 100 kg/ha-yr limitation in perpetuity.
- The estimated cost of compliance, watershed wide, would be in excess of $800 million, assuming extensive non-point source controls are even viable for reducing TN contributions that are refractory (*e.g.*, CDOM, watershed particulate N from decaying plant matter). Dover's costs are estimated to exceed $200 million to comply with EPA's 45% MS4 reduction target from existing TN loads. *See* Dover's Economic Impact Statement.
- Additional funding of watershed wide sampling of a broad range of nutrient and non-nutrient parameters is mandated.

- The new restrictions imposed potentially expose the communities to citizen suits under the existing MS4 permit for any new developments and facility operation beyond their reasonable control due to low temperatures and wet weather conditions.

To support these new regulatory mandates and impose a 100 kg TN/ha-yr watershed load limitation, EPA relied upon a series of documents, published 10-20 years ago, that have no direct relevance to Great Bay Estuary (*e.g.*, Latimer and Rego (2010); Valiela and Cole (2002), Hauxwell et al. (2003)). EPA presented no analysis explaining why these dated publications reasonably reflect conditions in the Great Bay Estuary or otherwise demonstrate that TN is adversely impacting eelgrass health in the Great Bay system. EPA failed to discuss or note that the methodology and conclusions presented in these reports were presented by EPA scientists (including Dr. Latimer, author of the 2010 paper) to the Great Bay Estuary PREP- Technical Advisory Committee in December 2007, which specifically concluded that such analyses were *not applicable* to the Great Bay system (*see*, Technical Advisory Committee meeting notes dated December 7, 2007 (Ex. 37, F1-F5)). All of these studies were reviewed as part of the 2014 Independent Peer Review and were not considered to be a credible basis for assessing TN effects in the Great Bay system. Moreover, EPA also nowhere addressed that the approach it has recommended as scientifically defensible for regulating TN for eelgrass protection in Great Bay was:

(1) nowhere identified as an acceptable methodology in EPA's Section 304(a) Guidance on scientifically defensible methods for narrative criteria interpretation (*e.g.*, 2010 Stressor Response Nutrient Criteria Development) and regulation of nutrients in estuarine waters (*e.g.*, Nutrients in Estuaries 2011) (*See* Ex. 1-6);

(2) specifically rejected by EPA Region I for such use in regulating TN for eelgrass protection in Long Island Sound embayments as not scientifically defensible and contrary to the approach recommended by the Long Island Sound peer review panel (Ex. 54 – Peer Review Request);

(3) directly at odds with (and failed to consider) the 2014 Independent Peer Review for the Great Bay system which reviewed all of the system data, including these studies and concluded that the available data and literature do not show that the system is impaired

by nitrogen or that TN is in any way responsible for the eelgrass decline occurring after 2006 (Ex. 47);

(4) was determined to be not scientifically defensible by Dr. Steven Chapra (an internationally renowned expert on nutrient impact assessment) and Dr. Brian Howes – SMAST (the leading expert on TN control for eelgrass protection in New England waters) (Ex. 70, 72);

(5) was rejected as appropriate for Great Bay estuary by EPA's own expert – Dr. James Latimer – who co-authored the 2010 paper EPA's General Permit relies upon (Ex. 37, 70, 71, F1-F4);

(6) is contrary to the methodology EPA proposed and defended in issuing the permits to both Newmarket and Exeter a mere six years earlier;

(7) produces an instream TN concentration of approximately 0.24 mg/l TN (Ex. 31-34) that is well below the TN concentrations that EPA concluded were sufficient to protect eelgrass resources in New England waters (0.35-0.45 mg/l as a growing season average) (Ex. 67-76); and,

(8) Only applies to inorganic nitrogen levels occurring in small/medium size shallow costal embayments that are poorly flushed (Ex. 71, F1-F4, Latimer and Rego (2010), Latimer and Charpentier (2010)). Latimer and Rego (2010) noted that false positive results occur for deeper, more well-flushed systems with his analysis. The equivalent "protective" TN loading condition for the Great Bay system would be at least three times higher, accounting for the forms of nitrogen present and the system hydrodynamics that transport nutrients out of the system rapidly.

Thus, EPA's "Fact Sheet" is based on a misapplied assessment, frozen in time, referencing materials that are decades out of date and were already found to be unreliable by EPA's own expert (Dr. Latimer), PREP experts (Jones and Langan (Ex. 42)), and the peer review experts selected by DES as a basis for establishing TN reduction requirements to protect eelgrasses in the Great Bay system and elsewhere. In fact, every assessment of TN impacts in the Great Bay system has concluded that there is no demonstrable impact from historical or existing TN loads or concentrations. Ex. 35-53. Even the latest DES Section 303(d) report failed to identify adverse

impacts from TN for Great Bay, Little Bay or the Piscataqua River. Ex. 77. The failure to address these basic inconsistencies in EPA's present action, and the well-known contrary scientific information confirming that this action is not scientifically defensible, confirms that this is a misguided action that should be withdrawn and subject to further objective analysis.

Beyond these oversights, EPA's analysis also failed to address any of the basic components applicable to the proper interpretation or application of a state narrative criteria under 40 C.F.R. §131.11 and 122.44(d) in establishing a numeric water quality objective or water quality-based effluent limitation. *See, e.g.,* Section 304(a) nutrient guidance applicable to estuaries (Ex. 1, 5); EPA 1994 Water Quality Standards Handbook; 2010 Stressor Response Method for Nutrient Criteria Derivation (Ex. 4); 1991 Technical Support Document for Water Quality-based Toxics Control. These steps were explained by EPA in detail in issuing the Newmarket and Exeter permits that regulated TN to protect eelgrass propagation in Great Bay. *See also* Taunton EAB decision. A narrative criterion is only violated if one has documentation for the system in question that the parameter of concern is, in fact, currently (or predicted to be) causing or contributing to a narrative criteria exceedance. WQS Handbook at 3-24; Ex. 35 (Currier). For nutrient/narrative criteria assessments, this requires a demonstration that nutrients, along a gradient, are causing demonstrable adverse impacts. Moreover, to calculate the required water quality-based limitation, the narrative criteria must be "translated" into a numeric water quality objective that is documented to be "necessary" to meet the narrative criteria. *Id.* Although EPA is required by the NPDES rules to ensure that effluent limitations are properly calculated and necessary to meet the applicable, numeric water quality objective (narrative translator), the Fact Sheet is devoid of such analyses. Moreover, there was no consideration of dilution, ambient concentration, or the relationship of the acceptable ambient concentration to those levels previously found protective of eelgrass resources by EPA in over 70 New England TMDL actions was presented or undertaken by EPA. *See* Ex. 75 (H&A), 76 (Howes). It is clear upon review of EPA's prior actions, this proposed set of nutrient limitations are not only arbitrary and capricious, but also dramatically more restrictive, with no apparent legal or technical basis stated for such inconsistent regulatory decisions. That is a basic Administrative Procedures Act violation. *Physicians for Social Responsibility, et al v. Wheeler (D.C. Cir. 2020)*

The selection and application of the 100 kg TN/ha-year watershed mass load limitation as applicable to the entire Great Bay watershed was also devoid of the procedural prerequisites and analyses required under CWA Section 303(d) and 40 C.F.R. Part 130 to establish scientifically defensible watershed load limits (*i.e.* TMDLs) for any waters of the US. Prior to assuming that the 100 kg TN/ha-year would be used to impose limitations under the General Permit, EPA failed to undergo any public notice and adoption process that applies to the establishment of such TMDLs, violating the due process rights of all in this watershed. Nor did EPA explain how the selection of a watershed "load" is consistent with the state narrative criteria for nutrients, which necessarily requires the selection of the protective *ambient* TN concentration. 40 C.F.R. Part 131. To the degree EPA is claiming that a watershed areal load is the same as a water quality criterion, that would be a fundamental change in state law and violate applicable federal regulations. 40 CFR Parts 130, 131 and 40 CFR 122.44(d).

Finally, Dover reluctantly feels compelled to observe that EPA's TN load reduction assessment and permit administrative record was pervasively biased and skewed to reach a conclusion that the system is impaired by nitrogen and major reductions are needed to protect eelgrass resources with the arbitrary and capricious 100 kg/ha-yr load limit as the fundamental basis for the new regulations. Ex. 58-61, 71, F1-F5. EPA's administrative record contained no evaluation of the extensive records in its possession, developed since 2013, that addressed whether TN is causing any form of adverse impact on eelgrass populations in the Great Bay system. Ex. 35-53. EPA eliminated all references that have confirmed excessive plant growth adversely impacting eelgrass repopulation is not occurring in the Great Bay system. The record is devoid of any analysis by Dr. Latimer (EPA's own employee) that is specific to Great Bay (or in any way endorsing the permitting approach).[2] (Ex F1-F5, 57, 59, 60). Likewise, EPA has not even discussed or mentioned the conclusions of the most detailed and comprehensive assessment devoted to analyzing whether TN is causing adverse impacts on eelgrass populations or DO in Great Bay - the 2014 Independent Peer Review - objectively demonstrating that EPA conducted a skewed analysis with a predetermined objective. Such pervasively biased actions are prohibited by federal APA norms of Agency behavior, EPA's Science Integrity Policy and substantive due process mandates.

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[2] Unfortunately, Dr. Latimer was also prevented from providing further explanation to the public regarding the proper use and application of his publication. (ExF1-F6) Ex. 57, 59, 60.

Over the past 14 months DES coordinated its regulatory positions with EPA. Ex. 57-60, F1-F5. Discussions with NHDES prior to the issuance of this draft permit confirmed that EPA had pre-determined that a major reduction in TN would be mandated for this system, regardless of any information confirming that such reductions were not necessary. *Id.* DES repeatedly informed the impacted municipalities – well before the Draft General Permit was even finalized or released to the public for comment - that it was "too late" to discuss the need for 100 kg TN/ha-yr loading threshold, and the regulatory agencies were not interested or willing to discuss the scientific validity of their position. *Id.* The EPA's denial of a peer review confirms as much, given EPA was informed that Dr. Latimer's methods had no application to the Great Bay system. Ex. 65, 71, F1-F5. EPA's action is inconsistent with federal Peer review and Science Integrity Policies applicable to agency scientific decision making. EPA's Scientific Integrity Policy at 4 expressly "[p]rohibits all EPA employees…from suppressing, altering, or otherwise impeding the timely release of scientific findings or conclusions." EPA's Scientific Integrity Policy at 4 states that "[t]o enhance transparency within Agency scientific processes, this policy…strengthens the actual and perceived credibility of Agency science by…ensuring that scientific studies used to support regulatory and other policy decisions undergo appropriate levels of independent peer review." (https://www.epa.gov /sites/production/files/2014-02/documents/scientific_integrity_policy_2012.pdf).

Based on this series of actions, Dover feels compelled to reluctantly observe that EPA Region I appears to have prejudged this matter and Dover's concern is that EPA will not objectively review the information that confirms the proposed TN reductions and more restrictive permit limitations are unfounded and misguided. Under these circumstances the matter must be transferred to a neutral party for objective consideration.

EPA undertook this action apparently in reliance on a State action that sought to unilaterally amend the Section 303(d) impairment listing without public notice or comments to conclude that eelgrasses in the Great Bay system are impaired due to nitrogen. *See* October 21, 2019 letter from DES to EPA – Fact Sheet at 20. DES's action was inconsistent with the 2014 Peer Review, the applicable adopted-EPA approved narrative criteria, applicable procedures for impairment designation, settlement agreement between DES and the Great Bay Municipal Coalition and multiple TN DES delisting submissions pending before EPA for the Great Bay system. DES's

action also violated state administrative law procedures that are designed to preclude unilateral regulatory decisions that will adversely impact public or private interests.[3] Neither EPA nor DES provided any notice, opportunity for public comment, or explanation for how this latest, diametrically opposed action was justified based on the data and the State's published narrative criteria interpretation procedures (2018 CALM) for the system. Ex. 77 – 2020 303(d) Report.

In summary, this proposed General Permit is an arbitrary and capricious action[4] that (1) violates statutory and regulatory authority, (2) violates the due process rights of the affected parties, (3) is devoid of the site-specific analyses needed to justify such action, and (4) is directly refuted by records in EPA's possession that it did not consider (or arbitrarily chose to ignore) in proposing systemwide TN reductions.

The following provides the specific procedural, regulatory and technical objections to this proposed General Permit.

Reservation of Rights

EPA has withheld critical documents and analyses from the permit administrative record and Fact Sheet. (Ex. F1-F6). EPA and DES have prevented the release of critical scientific information that addresses whether the proposed application of the underlying science is misplaced. To the extent withholding records and information has prevented the timely and complete submission of comments and, therefore, supplemental submissions are allowable under applicable NPDES rules and will be provided if and when the requested information is released.[5]

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[3] DES's actions fall squarely within the definition of an administrative rule requiring a variety of procedural measures. *See* N.H. Rev. Stat. § 541-A:1, XV (defining an administrative "rule" to mean any generally applicable policy); see also N.H. Rev. Stat. § 541-A:3 (required process for adoption of rules, none of which DES followed). DES did not follow state law in that regard, meaning DES's October 21, 2019 letter and other such unilateral actions related to the de-listing lack any effect or meaning. To rely on the defective state actions would violate the federal APA, which proscribes actions "not in accordance with law," 5 U.S.C. § 706(2)(A), as well as an action "without observance of procedure required by law," 5 U.S.C. § 706(2)(D). *See also*, 40 CFR 131.20, 131.21, 40 CFR Parts 130 and 25.

[4] The City of Rochester is submitting an overview of the arbitrary and capricious standard.

[5] EPA's partial release of FOIA records has, for the first time, on May 3, 2020, provided some insight on why EPA has rejected detailed technical analyses submitted by Dover over the past two years. (Ex. 92). The released document "rebuts" certain of Dover's technical claims using

Request for Peer Review

As detailed in these comments EPA and DES have utilized an unprecedented modeling methodology and narrative criteria interpretation related to nutrients. The theory that areal loading based on the surface of the waterbody alone dictates the ecological response of an estuarine system is unprecedented and not accepted scientific theory. The cost impact of this methodology is well in excess of $500 million and will have a long-term impact on the economy of the watershed. These methods and criteria interpretations are required to be peer reviewed prior to their use per federal Peer Review Policy and longstanding EPA procedures. Such action is requested.

I. Procedural Objections to General Permit Requirements and Issuance

1. The Application of General Permit Requirements to Communities with an Existing Individual Permit Violates NPDES Rules

The Draft General Permit applies the selected nitrogen reduction requirements on all 13 facilities identified in Part I.C. of the Fact Sheet regardless of whether the discharger has an existing individual NPDES permit that covers the discharge of nitrogen.[6] *See* Fact Sheet at 48 ("The nitrogen requirements in this General Permit, once effective, will supersede the nitrogen requirements in each Permittee's individual NPDES permit."). The EPA regulations regarding the coverage and administration of General Permits issued by EPA directly address the effect an existing individual NPDES permit has on the ability to issue a General Permit to the individual permittee. The regulation ensures that only a *single* permit is applicable to a specific form of

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conclusory statements but lacks independent basis for assessing the factual accuracy of EPA's responses. Limited marginal comments on this late-released, new document are provided. It would be improper under administrative law for EPA to rely on technical claims and analyses it has withheld from the public in responding to these comments. EPA has yet to provide records, which prevents Dover from understanding the full basis of EPA's decision to not discuss key technical analyses and independent expert analyses in its possession that were submitted by the communities over the past two years.

[6] The discharges with an existing individual NPDES permit include Exeter, Durham, and Newmarket.

discharge (e.g., POTW), not that different forms of permits may be issued based on pollutant type:

> (iv) When an individual NPDES permit is issued to an owner or operator otherwise subject to a general NPDES permit, the applicability of the general permit to the individual NPDES permittee is *automatically terminated* on the effective date of the individual permit.
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> (v) A source excluded from a general permit solely because it already has an individual permit may request that the individual permit be revoked, and that it be covered by the general permit. Upon revocation of the individual permit, the general permit shall apply to the source.

40 C.F.R. §122.28(b)(3)(iv)-(v) (emphasis supplied).

While the relevant EPA regulations discuss the ability to terminate the applicability of a general permit to a permittee upon the issuance of a subsequently issued individual permit that covers the same discharge, the regulations do not allow for the termination of an individual permit unless the permittee expressly requests that the individual permit be revoked. The provision is not parameter-based.

Thus, it is apparent that a permittee is not authorized to possess both an individual and general permit and, absent a request for revocation of an individual permit, EPA may not unilaterally impose a general permit on a permittee with an existing individual permit. EPA may not simply state that the general permit requirements supersede any existing individual NPDES permit for a specific pollutant without citation to any authority allowing that action and in the face of applicable regulations holding the opposite. EPA is acting in excess of its authority.

a. EPA action is proscribed by rule

The NPDES regulations provide only three options regarding the intersection of individual and general permits, (1) the director may require a discharger authorized under a general permit to apply for and obtain an individual permit that will terminate the application of the general permit (40 C.F.R. §122.28(b)(3)(i)-(ii)), (2) the operator authorized by a general permit may request an individual permit that will terminate the application of the general permit (*Id.*, at (iii)-(iv)), or (3) a source that is excluded from a general permit because it already has an individual permit may request to revoke the individual permit and the general permit will apply to that source (*Id.*, at (v)). EPA's application of the general permit to facilities with existing individual NPDES permits does not fall within one of the three enumerated options and therefore, violates the NPDES rules. To the degree EPA is claiming that General Permits may supersede individual permits on a parameter specific basis at EPA's choosing, that is not a rational interpretation of the adopted rule and constitutes an illegal NPDES rule amendment.

b. EPA lacks authority to issue a general permit to Dover

The City of Dover is one of the facilities covered by the Draft Permit that has an existing NPDES permit. In 2011, EPA proposed a TN limit for the City of Dover and that proposed permit action was never withdrawn,[7] while Dover's existing permit remains in effect. Nonetheless, the Draft Permit, as written, applies the more restrictive nitrogen reduction requirements on the City of Dover without any request from the permittee to revoke the existing permit or EPA's withdrawal of the still pending draft permit to which EPA has yet to respond to public comments.

As the NPDES regulations clearly do not allow for a general permit to supersede an individual permit without a request for revocation by the individual permit holder, the general permit may not apply to the City of Dover or any other facilities with an existing NPDES permit without being in violation of the NPDES rules. Consequently, this permit must remove the language in the Fact Sheet at 48 that states the requirements within this general permit will supersede any individual permits. Moreover, Dover should be withdrawn from coverage in this permit in toto given the pending individual permit action for TN regulation EPA has yet to act upon. Dover is also inclined to reject the permit as drafted.

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[7] The draft proposed TN limit may be found at http://storage.googleapis.com/ns697-merdr/EPA_Region1_NPDES_permits/nh/final/NH0101311_finalnh0101311permit.pdf.

c. Unlawful permit modification

EPA's assertion that the general permit reduction requirements supersede the communities' existing NPDES individual permit is an unlawful modification of the individual permit and the recently issued Small MS4 permit. As the supporting information for the general permit is decades old, the proposed modification is based entirely on information that was in the possession of the agency when the individual permits for various Great Bay communities were issued. In fact, this entire approach was rejected as applicable to Great Bay in 2007 (Ex. 37) and again in 2014 (Ex. 47). Moreover, Dr. Latimer himself acknowledged that his method was not applicable to river-dominated estuarine systems, such as the Great Bay system. (Ex. 71, 76, F1-F5). Failure to utilize existing studies is not a valid reason to modify an existing NPDES permit. 40 C.F.R. §122.62. Additionally, EPA has not presented any Great Bay-specific information or scientific basis to conclude that a more restrictive limit than the existing (or proposed) individual permit limitation is necessary to be protective of eelgrass in this system. Because it is clear that EPA has not presented sufficient information to justify modifying an existing individual NPDES permit, the more restrictive limits found within this draft general permit may not be unilaterally imposed on the communities with existing or pending individual permits.

2. The Issuance of Different Limits for Different Dischargers in a General Permit is Not Authorized

EPA has indicated that it intends to only regulate a specific parameter and use a general permit to impose different water quality-based nutrient limitations on the various POTW dischargers into the Great Bay system. Fact Sheet at 5. The imposition of different water-quality based effluent limitations ("WQBELs") via general permit is also a violation of the preconditions necessary for an NPDES permitting agency's use of a general permit. The general permit regulations specifically provide:

> (a) *Coverage.* The Director may issue a general permit in accordance with the following:
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> . . . .
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> (2) *Sources.* The general permit may be written to regulate *one or more categories or subcategories of discharges* . . . where the sources within a covered subcategory of discharges are either:

> (i) Storm water point sources; or (ii) One or more categories or subcategories of point sources other than storm water point sources,. . . if the sources . . . all:
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> . . . .
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> (C) *Require the same effluent limitations*, operating conditions, or standards for sewage sludge use or disposal;

40 C.F.R. § 122.28(a)(2)(ii)(C) (emphasis supplied). Thus, the regulations are very clear that non-storm water point sources can only be issued a general permit if the same effluent limitations apply to the entire category or subcategory. Moreover, the entire category of effluent requirements is to be regulated, not one individual pollutant via general permit and the rest by individual permit.

Similarly, § 122.28(a)(3) addresses the need for there to be common WQBELs:

> (3) *Water quality-based limits.* Where sources within a specific category or subcategory of dischargers are subject to water quality-based limits imposed pursuant to §122.44, *the sources in that specific category or subcategory shall be subject to the same water quality-based effluent limitations.*

40 C.F.R. § 122.28(a)(3) (Emphasis added). As such, the imposition of different TN WQBELs as established in the draft General Permit (as well as imposing only one individual WQBEL and regulating the rest via individual permit) is antithetical to the concept of a general permit and is not permissible under that form of NPDES permit. EPA may only implement this approach via issuance of individual permits.

3. EPA Improperly Substituted an Areal Load Reduction for a Protective Ambient Pollutant Concentration in Violation of NPDES Regulations (40 C.F.R. § 122.44(d))

In order to select the protective effluent limit necessary to protect the designated use and meet the applicable state narrative standards, this permit selected a 100 kg TN / ha-yr loading limit as applicable to the entire Great Bay watershed. Fact Sheet at 24. EPA's NPDES regulations specifically detail the proper procedures that a permit writer must follow to convert a narrative standard into a numeric criterion, to allow one to calculate the water quality-based limitation (e.g., load limitation), as detailed below. The utilization of an aerial loading limit without first identifying an acceptable ambient concentration as the basis for calculating such watershed or

effluent limitation is not in accord with those procedures and may not be relied upon for this permit. *See, e.g.*, Protocol for Developing Nutrient TMDLs, First Edition USEPA, 1999. 40 CFR 122.44(d). *Amer. Paper Inst. Inc. v. EPA*, 996 F 2d. 346, 31 (D.C. Cir. 1993); *see also* Newmarket and Exeter Fact Sheets and EAB appeal filings that explain the applicable procedures in detail. "EPA in issuing an NPDES permit must, by necessity, translate existing narrative criteria into instream numeric concentrations when developing water quality-based limitations."

In all NPDES permits, dischargers are issued water quality-based limitations ("WQBELs") only to the degree the limitations are "necessary" to attain applicable water quality standards ("WQS"). *See* 33 U.S.C. § 1311(b)(1)(C); 40 C.F.R. § 122.44(d). Moreover, the applicable WQSs[8] (and any numeric translator from a narrative criteria) are to reflect the adopted, EPA-approved narrative or numeric criteria that represents the threshold level at which a pollutant is having a documented significant adverse impact and that, when attained, will prevent such impairment. *See generally* 33 U.S.C § 1313(c)(2)(A); 40 C.F.R. § 131.2; 40 C.F.R. § 131.3(b); *see also Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, USEPA 1985, at 15, 16, 21.[9]

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[8] WQSs include, *inter alia*, the designated uses of a waterbody and the numeric or narrative criteria adopted to protect the uses. 40 C.F.R. § 130.3; 33 U.S.C. § 1313(c)(2)(A); *Anacostia Riverkeeper, Inc. v. Jackson*, 798 F. Supp. 2d 210, 227-228 (D.D.C. 2011).

[9] Water quality-based effluent limitations, like the underlying water quality criteria, whether narrative or numeric, are set at a level that is necessary to protect the designated use of a waterbody (*i.e.*, a threshold). *See, e.g.*, 40 C.F.R. § 131.3(b) ("When criteria are met, water quality will generally protect the designated use."); 80 Fed. Reg. 51020, 51021 (Aug. 21, 2015) ("[W]ater quality criteria define the minimum conditions necessary to achieve those environmental objectives."); *Natural Resources Defense Council v. EPA*, 915 F.2d 1314, 1317 (9th Cir. 1990) (water quality criteria represent "*the maximum concentrations of pollutants that could occur without jeopardizing the use*.") (emphasis added); *see also Thomas v. Jackson*, 581 F.3d 658, 661 (8th Cir. 2009) (stating same); *accord Leather Indus. of Am. v. EPA*, 40 F.3d 392, 401 (D.C. Cir. 1994) (vacating chromium standards not based on a demonstrated impairment threshold); *see also* Nutrients in Estuaries, at ix ("Water quality criteria, a component of water quality standards, are set to protect designated uses and must be based on sound scientific rationale [...] Nutrient criteria are benchmarks that help to establish the level of nutrient pollution below which waterbodies can maintain their designated uses – primarily aquatic life and recreation.").

Under the plain language of 40 C.F.R. § 122.44(d) and 33 U.S.C. § 1311(b)(1)(C), WQBELs implementing narrative standards must be "demonstrated" "necessary" by the "permitting authority" based on site-specific data/analyses using "reliable [] procedures."[10] The required analyses include (1) "demonstrate[ing]" the pollutant of concern from "the discharge," (2) "will cause" or is projected to "cause," (3) "an *in-stream excursion* above a narrative or numeric criteria," (4) considering "existing controls," and (5) the permit writer "demonstrates" and "ensure[s]" that the "calculated numeric water quality criterion" (*e.g.*, 0.45 mg/l TN for the Taunton Estuary[11]) "will attain and maintain applicable narrative water quality criteria and will fully protect the designated uses." 40 C.F.R. § 122.44(d)(passim).[12] Accordingly, EPA's Fact Sheet should have contained the analyses, evaluations, and data "demonstrating" that the TN limit was "necessary" to attain the "calculated numeric criterion" would "ensure" use attainment. However, EPA's analysis did not provide such analysis or assessment. A watershed load divided by a surface area is not an ambient pollutant concentration. On that basis alone this General Permit is in conflict with applicable NPDES effluent derivation rules.

The term "necessary" requires EPA to evaluate the factors and existing pollutant controls influencing the condition of concern to confirm the need for further reductions by Dover. *White Stallion Energy v. EPA*, 748 F.3d 1222, 1231 (D.C. Cir. 2014); *Michigan v. EPA*, 135 S. Ct. 2699, 2705 (2015). Moreover, WQBELs for narrative criteria are "*used only where ... a state has data showing* that the pollutant is present in the effluent *at a concentration* that causes ... or contributes to an excursion above an applicable narrative .... criterion." 54 Fed. Reg. 23, 868-77 (June 2, 1989) (emphasis added). Consequently, to impose a specific WQBEL on a specific discharge, the rule requires EPA to "demonstrate" by specific, not "generalized", analysis, using

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[10] *See, e.g.,* 54 Fed. Reg. 23,873 (June 2, 1989) "To determine whether a discharge causes, has a reasonable potential to cause, or contributes to an excursion above a water quality criterion, and thus requires a water quality-based effluent limit, the permitting authority must use reliable and consistent procedures."

[11] *See*, Taunton NPDES permit Fact Sheet issued by EPA Region I.

[12] *United States v. Knott*, 256 F.3d 20, 28 (1st Cir. 2001) (using Oxford and Webster's to interpret statutory terms). Based on Oxford and Webster's definitions, "Demonstrate" means to "clearly show the existence or truth of (something) by giving proof or evidence." "Ensure" means to "make certain something will occur or be the case." "Cause" means a "thing that gives rise to an action, phenomenon or condition." And "Necessary" means "needed to be done."

reliable data and methods from the system in question, that the pollutants from this source are actually a material part of a verified problem, above a specified ambient concentration and necessary for its solution. *Seacoast Anti-Pollution League v. Costle*, 572 F.2d 872, 876-877 (1st Cir. 1978) (rejecting generalized analyses as basis for regulatory decision); *MacClarence v. EPA*, 596 F.3d 1123, 1131 (9th Cir. 2010) (same); *see also Nat'l Mining Ass'n v. Jackson,* 880 F. Supp. 2d 119, 141 (D.D.C. 2012) *(reversed on other grounds)* (40 C.F.R. § 122.44(d) does not authorize EPA to presume impairment); *Ohio Valley Envtl. Coalition, Inc. v. Fola Coal Co., LLC,* 82 F. Supp. 3d 673, 687 (S.D. W. Va., 2015) (to find a pollutant-specific narrative violation EPA "first considered any confounding factors that may be causing the impairment and ruled them out."); *NRDC v. Metro. Water Reclamation Dist. of Greater Chi.,* 175 F. Supp. 3d 1041 (N.D. Ill. Mar. 31, 2016) (requiring proof algal growth was reason for the low DO condition present).

EPA's Fact Sheet at 21 states that EPA followed the procedures in 40 CFR 122.44(d)(1)(vi)(A) in deriving the proper effluent limitations based on the state's narrative criteria. However, this statement is incorrect and unsupported. Both state and federal rules require the identification of the protective ambient concentration – which nowhere appears in the Fact Sheet. Moreover, EPA has promulgated WQS regulations and an NPDES Permit Writer's Guide to aid permit writers in establishing effluent limitations designed to meet narrative standards, and any review of the issue must begin there. Found at 40 C.F.R. § 122.44(d)(1)(vi) and 40 CFR Part 131, these regulations mandate that EPA must identify the numeric criteria (*i.e.*, ambient level of water quality – a concentration of the pollutant) that will ensure narrative criteria compliance:

> (vi) Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a *concentration* that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:
>
> (A) Establish effluent limits *using a calculated numeric water quality criterion* for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such a criterion may be derived using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality

criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents; or

(B) Establish effluent limits on a *case-by-case basis*, using *EPA's water quality criteria*, published under section 304(a) of the CWA, supplemented where necessary by other relevant information; or

(C) Establish effluent limitations on an indicator parameter for the pollutant of concern.

(emphasis supplied). In summary, the regulation, cited by EPA, states that a permit writer must (1) demonstrate that the narrative criteria is being violated, (2) then create a threshold numeric concentration target ("translator") to assure attainment of the narrative criteria, and (3) calculate the "necessary" effluent limitations based on that ambient water quality objective. *Id.* As noted herein, state law requires the same approach, and therefore EPA has failed to apply the "applicable" WQS, also a violation of 40 CFR 122, 130, 131 and Section 301(b)(1)(c) of the Act. EPA's failure to identify and apply the protective ambient concentration renders this permit misguided as it is missing this critical component necessary to establish a WQBEL. *State Farm* – failure to assess a necessary part of the regulatory analysis renders an agency decision arbitrary and capricious.[13]

a. Applicable Standard was Not Applied

In addition, EPA has misapplied 40 C.F.R. § 122.44(d)(1)(vi)(A) ("Option A") in translating New Hampshire's narrative criteria. Fact Sheet at 21. EPA's Fact Sheet discussion relied solely on literature (not specific to Great Bay or New Hampshire) and identified no "proposed State criterion" nor any "explicit State policy or regulation interpreting its narrative water quality criterion."[14] The State's published CALM (an explicit state policy), which EPA approved, specifies how narrative nutrient criteria are applied in NH, but EPA failed to follow that state

[13] The misguided effort to translate numeric criteria in this matter at some level resembles DES's misguided attempt with respect to the 2008 criteria. To Dover's knowledge, no effort has been made by regulators to correct the analysis by DES or address the deficiencies.

[14] NHDES's October 21, 2019 letter was not cited in this section of the Fact Sheet and, in any event, cannot be relied on because, as discussed, the letter is an unlawful administrative rule prohibited by New Hampshire law.

guidance in violation of 40 CFR 122.44(d). While the regulation does allow EPA to use general literature in Option (A), such literature may only be supplementary to consideration of established standards (concentrations) elsewhere,[15] but the Fact Sheet contains no discussion of protective TN concentrations (in Great Bay or elsewhere). State law does not authorize the use of information from other, out of state, estuaries to declare New Hampshire waters impaired. And the other literature and information used to translate narrative criteria must also be "relevant." In this instance, EPA has acted arbitrarily, capriciously, and contrary to the regulation by (i) relying solely on literature without considering established standards (concentrations) found to be protective, and (ii) relying on literature or information with no relevance, as discussed elsewhere in these comments. As noted by Dr. Latimer himself, none of the published papers deal with river dominated estuarine systems. (Ex. F1-F5). Moreover, it is apparent that the physical settings of the other shallow embayments have no objective relationship to the Great Bay system. Nor did EPA present information showing that Great Bay should be expected to respond like these other systems. To the contrary, this system has "low" susceptibility to TN impairment, which Latimer and Rego (2010) confirm will result in a false-positive indication of impairment under their simplified approach. EPA's analysis recognized this difference, but failed to fully review its significance.

Option A also stresses the primacy of State regulations when interpreting narrative criteria. However, EPA also acted arbitrarily and capriciously by failing to take account or give due weight to New Hampshire regulations shedding light on how to translate narrative criteria (i.e.., into a concentration). *See N.H. Code of Admin. Rules*, Env-Wq 1703.14(b) ("Class B waters shall contain no phosphorus or nitrogen in such *concentrations* that would impair any existing or designated uses, unless naturally occurring.") (emphasis added); *N.H. Code of Admin. Rules*, Env-Wq 1702.14 (defining "Criterion" as either "[a] designated concentration of a pollutant" or a narrative statement or "[a] numeric value or narrative statement related to other characteristics of the surface waters"; nothing in the rule contemplates expression of a load). EPA likewise failed to consider prior state interpretations translating the narrative criteria, namely the 2009 "Numeric Nutrient Criteria for the Great Bay Estuary," which set a .30 mg/L

[15] *See Prairie Rivers Network v. Illinois Pollution Control Board*, 50 N.E.3d 680 (Ill. App. 2016) (observing "IEPA here set a numeric phosphorus effluent limit of 1.0 mg/L, but there is no evidence that such a limit was derived from any state or federal standards.").

concentration limit for TN.[16] As such, EPA's failure to set a protective TN concentration constitutes a mistake of law in interpreting the narrative criteria, as well as arbitrary and capricious agency action contrary to the applicable NPDES rules and CWA framework.

b. EPA unlawfully adopted a loading threshold without first determining the ambient concentration

EPA's Fact Sheet concluded that all of the Great Bay dischargers have a "reasonable potential" to violate the state narrative criteria for nutrients based on the conclusion that the watershed, as a whole, exceeded the assumed protective areal loading of 100 kg TN/ha-yr. The rule cited by EPA (40 CFR 122.44(d)) does not allow for such truncated assessments. The Federal Register notice preamble for the 40 C.F.R. § 122.44(d) final rule in 1989 sets forth the "principles for developing water quality-based effluent limits" from state narrative water quality criteria versus the use of a watershed load (i.e., TMDL) in developing wasteload allocations.

> Deriving water quality-based effluent limits from water quality standards is the only reliable method for developing water quality-based effluent limits that protect aquatic-life and human health. Pursuant to section 303(c) of the CWA, the states adopt water quality standards, *and then*, under section 303(d), develop total maximum daily loads (TMDL's), for water quality-limited segments, to attain and maintain the water quality standards. The TMDLs are used to derive a wasteload allocation for individual pollutants discharged from a points source. This process results in effluent limits that protect aquatic life and human health *because the limits are derived from water quality standards*. (Emphasis supplied)

The recently proposed Newport, NH NPDES Permit[17] explained how reasonable potential must be evaluated when implementing a New Hampshire criterion, by accounting for the available dilution at the point of discharge and other relevant ambient factors:[18]

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[16] *See* Ex. 47 - February 2014 Independent Peer Review accepted by DES. As an aside, though the peer review was critical of the 2009 DES document, and though City of Dover challenged that NHDES publication on procedural grounds, the fact remains that the document illustrates methodologically the State translated its narrative criteria into a numeric TN concentration. EPA's later permits for Newmarket and Exeter followed suit.

[17] https://www.epa.gov/npdes-permits/new-hampshire-draft-individual-npdes-permits

[18] *See also*, EPA's Fact Sheet for Taunton Massachusetts, issued in 2015.

> In determining whether the discharge presents the reasonable potential to cause or contribute to excursions above the instream water quality criteria for ammonia, the following mass balance equation is used to project the instream ammonia concentrations downstream from the discharge under 7Q10 conditions during both warm and cold weather.
>
> $$Q_dC_d + Q_sC_s = Q_rC_r$$
>
> Reasonable potential is then determined by comparing the resultant in-stream concentration with the relevant ammonia criteria multiplied by the factor of 0.9 to reserve 10% of the assimilative capacity of the receiving water in accordance with the requirements of Env-WQ 1705.01. The discharge is determined to have reasonable potential to cause or contribute to a violation of water quality standards if both the effluent concentration (C_d) and the downstream concentration (C_r) exceed the criteria. In EPA's Technical Support Document for Water Quality Based Toxics Control, EPA/505/2-90-001, March 1991, commonly known as the "TSD", box 3-2 describes the statistical approach in determining if there is a reasonable potential for an excursion above the maximum allowable concentration.

2019 Newport NH Fact Sheet issued by EPA Region I.

As discussed in the Newport Fact Sheet, consistent with the plain language of 40 CFR 122.44(d) to apply this procedure to the state's narrative criteria for nutrients, EPA first identified the protective instream nutrient ambient concentration to allow such calculation to proceed:

> In the absence of numeric criteria for phosphorus, EPA uses nationally recommended criteria and other technical guidance to develop effluent limitations for the discharge of phosphorus. EPA has published national guidance documents that contain recommended total phosphorus criteria and other indicators of eutrophication. EPA's 1986 *Quality Criteria for Water* (the "Gold Book") recommends that in-stream phosphorus concentrations not exceed 0.05 mg/L in any stream entering a lake or reservoir, 0.1 mg/L for any stream not discharging directly to lakes or impoundments, and 0.025 mg/L within a lake or reservoir. For this segment of the Sugar River, the 0.1 mg/L would apply downstream of the discharge.

Thus, the NPDES regulations, EAB decisions and the explanation contained in EPA's Newport Fact Sheet confirm that the proper procedures that must be followed to develop water quality-based effluent limits from state narrative standards require that an ambient concentration be selected that is protective of the designated uses. The acceptable watershed load and related WLAs are then derived from and based upon the acceptable ambient concentration. See, e.g.,

Protocol for Developing Nutrient TMDLs, First Edition USEPA 1991 at 1-5 and Chapter 4. One cannot simply select a watershed load (areal or otherwise) without undertaking the requisite analysis of compliance with an ambient concentration designed to meet the narrative objective:

> **Identification of Water Quality Indicators and Target Values**
>
> In some cases, however, TMDLs must be developed for parameters that do not have numeric water quality standards. When numeric water quality standards do not exist, impairment is determined by narrative water quality standards or identifiable impairment of designed uses (e.g., no fish). The narrative standard is then interpreted to develop a quantifiable target value to measure attainment or maintenance of the water quality standards.
>
> At 1-5; the process is displayed schematically below:

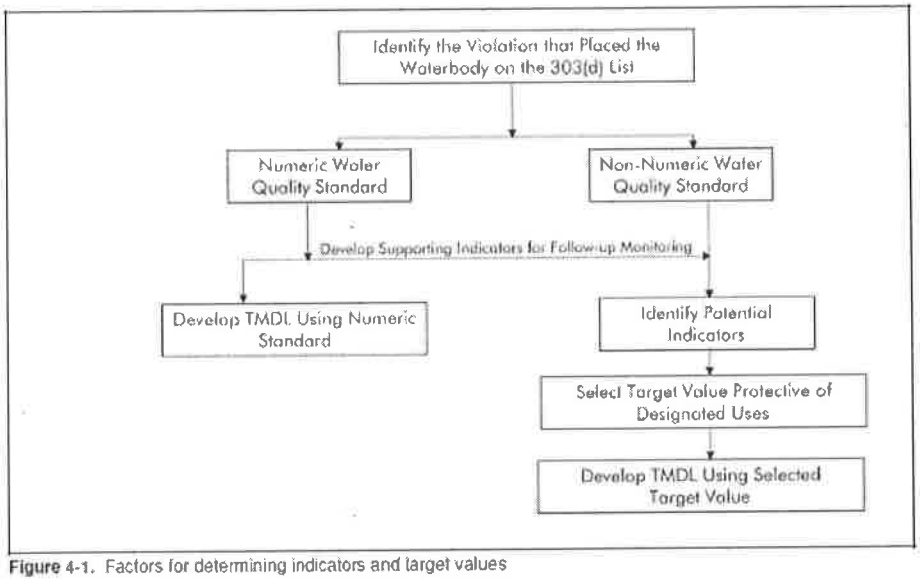

Figure 4-1. Factors for determining indicators and target values

The TMDLs/WLAs can only be used to derive wasteload allocations for the individual pollutant discharges at that time. EPA's General Permit Fact Sheet analysis skipped to the last step in the analysis by merely selecting an allowable watershed load (*i.e.,* TMDL) without first determining the "necessary" protective ambient concentration and then calculating the load limitation needed to comply with the ambient objective. EPA's action contravenes applicable federal rules and the structure of the CWA as it (1) fails to properly apply the state's narrative criteria and selects a load, not ambient concentration to represent the narrative criteria and (2) imposes a TMDL, without conducting any of the required technical activities for its development (assuming EPA is authorized under federal law to undertake this action). Moreover, with this approach, the effluent

limit selected cannot reliably be proven to be protective of aquatic-life and human health as required by 40 C.F.R. §122.44(d), violating that NPDES rule as well.

c. EPA Failed to Implement the Adopted and Applicable Narrative Standard

Further proof that translating a narrative criterion requires that the permit writer must first determine a protective ambient concentration may be found within the language of the State's narrative water quality standard itself. *See N.H. Code of Admin. Rules*, Env-Wq 1703.14(b) ("Class B waters shall contain no phosphorus or nitrogen in such *concentrations* that would impair any existing or designated uses, unless naturally occurring.") (emphasis added).[19] Likewise, the definition of "criteria" within the NPDES regulations at 40 C.F.R. 131(3)(b) explicitly states that all criteria are to be expressed as "constituent concentrations." There is no question that in order to develop a numeric objective from the EPA-approved narrative water quality standard and subsequent WLA, the permit writer must first identify an acceptable ambient concentration (numeric translator) that would be protective. That identification did not occur in developing this permit. EPA's entire "reasonable potential" analysis is deficient and misguided. As discussed later, a properly derived endpoint protective of eelgrasses and meeting the state's adopted narrative standard would range 0.36-0.40 mg/l TN (growing season average). Ex. 67-76. Had the proper analysis been conducted, the conclusion would be that there is no reasonable potential demonstrated for regulating TN in this system.

d. Recent EPA Narrative Criteria Action Confirm Error in Great Bay General Permit Derivation

The technical, independent peer review of the Long Island Sound (LIS) TMDL program addressed the proper narrative criteria derivation of nitrogen endpoints for eelgrass protection and the protective watershed load to meet that endpoint. Ex. 54, 55. That assessment provides an example of what should have been done here. In that independent peer review of the approach used in LIS to protect eelgrasses, Dr. Victor J. Bierman stated the following:

> TN concentration is the primary causal variable, chlorophyll a, k_d, and DO are the primary response variables, and eelgrass and aquatic life are the assessment endpoints. If

[19] The 40 CFR 122.44(d) final rule preamble "clarifies that an applicable state narrative water quality criterion provides the legal basis for establishing effluent limits under this paragraph." At 23875. Therefore, EPA may not establish an effluent limit (or watershed load restriction) contrary to the state's narrative water quality criteria.

> appropriate analyses are conducted with all of the relevant site-specific data, then TN concentration targets can be developed that will protect the assessment endpoints. In turn, an appropriate site-specific, load-response model can be then used to determine TN loads from the watershed that can meet the in-water TN concentration targets. This is the approach currently being used with the linked watershed-embayment model in the 89 MEP embayments (Howes et al., 2006).

Similarly, after employing the proper procedures, the EPA-issued Fact Sheet for the 2012 Exeter permit issued stated that 0.3-035 mg/l TN (growing season) *concentration* would be fully protective of eelgrasses in the Great Bay system. All wasteload allocations were based upon attaining that value, instream after mixing. However, this General Permit did not follow the procedures that EPA had confirmed are proper (and required to meet the applicable narrative standard) for this system, even though EPA is regulating the same pollutant (TN) and ecological impact of concern (eelgrass propagation).[20] Additionally, EPA has presented no data or basis in the General Permit Fact Sheet to conclude any other ambient TN concentration is necessary to be protective of eelgrasses within this system. Such inconsistencies demonstrate arbitrary and capricious decision-making.

Instead of following the long standing, established procedures for converting narrative standards into a numeric target by first identifying a protective ambient concentration, EPA merely identified a watershed load reduction with no relationship to the ambient TN concentration or the factors that affect whether such concentration will adversely impact eelgrass resources (hydrodynamics and freshwater dilution). This action is in direct violation of the required procedures laid out in EPA's NPDES regulations, Section 304(a) guidance, the state's narrative standards and the 100's of EPA approved TMDL's and NPDES permits that all used the proper procedures described above. Consequently, this permit must be withdrawn or modified to conform to applicable law. EPA has not fulfilled its obligation to justify why the more restrictive (and inconsistently derived) requirements that it now seeks to impose in the General Permit are necessary to meet the applicable narrative criteria. Therefore, EPA's action is arbitrary and capricious.

e. EPA Cannot Rely on Unlawful Actions by NHDES

[20] *In Re Town of Newmarket, New Hampshire*, NPDES Appeal No. 12-05, Order Denying Review, December 2, 2013.

The Fact Sheet relies heavily on (i) an October 21, 2019 letter from NHDES reaching a variety of conclusions, and (ii) New Hampshire's 303(d) list. However, neither of those state actions were lawful. Both actions by DES fall squarely within the definition of an administrative rule and rulemaking requiring a variety of procedural measures, including notice and the opportunity for public comment.[21] *See* N.H. Rev. Stat. § 541-A:1, XV (defining an administrative "rule" to mean any generally applicable policy); *see also* N.H. Rev. Stat. § 541-A:3 (required process for adoption of rules); N.H. Rev. Stat. § 541-A:6 (notice of rulemaking required); N.H. Rev. Stat. § 541-A:13 (review by JLCAR); S. Johnson, *Article: Administrative Agencies: A Comparison of New Hampshire and Federal Agencies' History, Structure, and Rulemaking Requirements*, 4 Pierce L. Rev. 435, 470 (Fall 2006) (explaining differences between state and federal requirements). But those requirements have not been observed or met.

The October 21, 2019 letter purports to reach significant, generally applicable policies concerning asserted nitrogen impairment of Great Bay and the perceived need for the current nitrogen loading methodology proposed in the Draft Permit. Likewise, DES's actions in relation to the 303(d) list likewise constitute generally applicable policymaking. And, DES acknowledged as much having solicited public comment and thereafter responded to public comment in the past. *See, e.g.*, *State of New Hampshire Response to Public Comment on the Draft 2018 Section 303(d) List of Impaired Waters and the Draft Consolidated Assessment and Listing Methodology* (NHDES August 8, 2019).[22] Yet, by letter dated February 25, 2020,[23] the

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[21] DES is responsible for adopting rules pursuant to N.H. Rev. Stat. § 485-A:6.

[22] *Available at* https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2018/documents/r-wd-19-26.pdf (and within related documents being submitted)

[23] *Available at* https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2018/documents/2018-epa-approval-20200225.pdf (and within related documents being submitted)

EPA purported to approve an after-the-fact amendment to the 303(d) list by DES letter dated January 17, 2020.[24]

DES did not follow state law and did not provide notice or opportunity to comment on either DES's October 21, 2019 letter[25] or the January 17, 2020 letter from DES purporting to reverse DES's earlier determinations to de-list Great Bay for nitrogen impairment.[26] As such, those actions "are . . . not valid or effective." *Bel Air Assocs. v. N.H. Dept. of Health and Human Servs.*, 154 N.H. 228, 235 (2006); *Petition of Pelletier*, 125 N.H. 565, 571 (1984); *see also* N.H. Rev. Stat. § 541-A:22, I. To rely in any way on these unlawful state actions would be arbitrary and capricious, action "not in accordance with law," 5 U.S.C. § 706(2)(A), as well as an action "without observance of procedure required by law," 5 U.S.C. § 706(2)(D). *See also*, 40 CFR 131.20, 131.21, 40 CFR Parts 130 and 25.[27]

4. The 100 kg TN / Ha-yr Loading Limit is an Unlawful Adoption of a TMDL

The Draft Permit imposes a watershed wide loading threshold limit of 100 kg TN / ha-yr on the Great Bay Estuary "to protect water quality standards" and as the basis for defining the TN reduction requirements in the general permit. Fact Sheet at 24. By definition, "[t]he sum of the individual [waste load allocations] for point sources and [load allocations] for non-point sources

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[24] *Available at* https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2018/documents/20200117-withdrawal-of-gbe-assessment-units.pdf (and within related documents being submitted)

[25] Dover did not learn about this October 2019 letter until seeing it referenced in the EPA's Draft Permit released in January 2020.

[26] The 2012 303(d) list cited in the Fact Sheet has been superseded by other de-listing actions by DES (noted in the Fact Sheet and attachments), which remain the most recent DES pronouncements on the 303(d) list.

[27] For the reasons discussed elsewhere in the substantive objections, these same actions by DES (to the extent they mirror EPA's substantive actions and conclusions) also fall short of other requirements of New Hampshire law directed towards the substance of state rules, including adequately reasoned decisions and consideration of all relevant factors (scientific and cost/economic). *See Appeal of Concord Natural Gas Corp.*, 121 N.H. 685, 692-93 (1981); N.H. Rev. Stat. § 485-A:4, III & V; N.H. Rev. Stat. § 541-A:5 (fiscal impact statement); N.H. Rev. Stat. § 541-A:25 (prohibiting unfunded state mandates). DES has acknowledged it conducted no real cost study.

and natural background" in a receiving water, is a total maximum daily load (TMDL) applicable to an entire watershed. 40 C.F.R. §130.2(i). Thus, the watershed load limit imposed in this permit is, in fact, a TMDL and not an ambient pollutant concentration or individual WLA as required to be derived pursuant to 40 C.F.R. §122.44(d). As discussed in the comments above, it is not proper to substitute an aerial or watershed load reduction for a protective ambient pollutant concentration when converting narrative criteria into numeric standards. Moreover, the development of the TMDL in this permit through the use of a watershed load limit was not only an improper application of the narrative criteria but also an unlawful TMDL as the watershed load limitation was not even done in accordance with the procedures laid out in 40 C.F.R. §130.7 or was subject to appropriate public notice. As the General Permit is based upon an illegal and unauthorized TMDL, it is void *ab initio.*

a. Part 130 TMDL procedures applicable to EPA's action

The Clean Water Act grants each state primary authority to identify and list those waters within its boundaries which exceed applicable water quality standards. *See* 33 U.S.C. § 1313(d)(1). Each state is required to submit a "Section 303(d) list" that identifies which waters are impaired biennially to EPA for approval. 33 U.S.C. § 1313(d)(2). In developing this list, each state is required to "assemble and evaluate all existing and readily available water quality-related data and information." 40 C.F.R. § 130.7(b)(5). Moreover, the state is required to use procedures/simplified models that consider dilution and known wastewater loadings to project whether a criteria exceedance may exist. *See* 40 C.F.R. § 130.7(b)(5)(2). The public then is given the opportunity to provide input on this process by commenting on the under- and over-inclusion of waterbodies on the draft lists and the need for a watershed load restriction. 40 C.F.R. §130.7(d)(2); *see generally* 40 C.F.R. Part 25. Where TMDL adoption occurs subsequent to such impairment designation, even more detailed public and technical procedures apply. (Ex. 1-6)

b. EPA exceeded its statutory authority by imposing a TMDL watershed load via a general permit

As described above, EPA's use of a watershed load limit within this permit is plainly the establishment of a TMDL for the Great Bay system. However, in the first instance, it is the exclusive nondiscretionary duty of the state to submit to EPA a TMDL for the waters identified

on its §303(d) list. 33 U.S.C. §1313 (d)(2). DES has not done this. Therefore, EPA's action of developing the TMDL for New Hampshire is outside of the agency's statutory authority because EPA is not authorized to develop a TMDL (1) unless the appropriate state fails to do so, (2) for waters identified as nutrient impaired. 40 C.F.R. §130.7(c). Even in the instance where a state is required to develop a TMDL and fails to do so, EPA is required to give notice to the state of that failure and allow the state the opportunity to develop the TMDL. *Id.*; 40 C.F.R. § 130.10.

The Courts have adopted a doctrine known as "constructive submission" in which the state has failed to submit a proposed TMDL for a long period of time, that prolonged failure may amount to the constructive submission of a "no TMDL" decision, triggering EPA's duty to act and develop a TMDL for the state. *Columbia Riverkeeper v. Wheeler*, 944 F.3d 1204, 1208-9 (9th Cir. 2019); *Scott v. City of Hammond*, 741 F.2d 992, 996 (7th Cir. 1984); *Hayes v. Whitman*, 264 F.3d 1017, 1024 (10th Cir. 2001). However, that precedent consistently holds that in order to trigger a constructive submission, it must be actually shown that the state has "clearly and unambiguously" decided to not submit a TMDL for an impaired water. *Id.* EPA has not claimed that a constructive submission of no TMDL nor could it. Moreover, DES has repeatedly determined that the system should not be designated TN impaired, confirming that a TMDL is not required. In issuing a General Permit that usurps the TMDL/Section 303(d) process, EPA is acting in excess of statutory authority.

c. EPA did not follow public notice procedure

EPA's action acknowledged that the state already determined in multiple Section 303(d) submissions that this system is not nitrogen impaired. Fact Sheet at 19. The 2018 Section 303(d) report also nowhere concludes that TN is causing adverse impacts on light transmission, phytoplankton growth or eelgrass propagation (Ex. 77). EPA erroneously concluded that such submissions have no effect on EPA's ability to adopt a watershed limitation (i.e., TMDL). Fact Sheet at 19. Pursuant to Section 303(d), EPA had 60 days to review these submissions and, if necessary, inform the state they are misplaced. This also never occurred. Under any set of circumstances, if EPA intended to develop a TMDL for an entire watershed within the state of New Hampshire and use that decision to control all NPDES discharges (WLAs) in that system, then public notice procedures must be followed. 40 C.F.R. §§ 130.7(c), (d)(2). The public notice on this draft permit is defective regarding this specific issue as the permit does not seek

comments on the TMDL or watershed load determination. It calls the watershed limit a "narrative criteria" or nitrogen threshold. Fact Sheet at 23. Watershed load limitations are not narrative criteria nitrogen thresholds. As the required public comment procedures are inadequate for this permit, the general permit as drafted must be withdrawn and submitted to public comment on the proposed TMDL and watershed load determination before they may be utilized.

d. EPA's claim that the outstanding proposal to delist the system has no effect on the general permit is incorrect

The Fact Sheet at 19 states that the outstanding proposals from NHDES to delist the Great Bay Estuary with respect to total nitrogen and any decision to "ultimately delist for total nitrogen would have no bearing on the terms of this General Permit." This statement is incorrect. DES has not identified the Great Bay system as nutrient impaired or requiring a watershed load reduction for TN (TMDL). EPA may not issue an NPDES permit "which is in conflict with an approved water quality management plan…" 40 C.F.R. § 130.12. If the system were to be delisted for total nitrogen as requested by NHDES, then a TMDL may not be developed for those waters. See, generally CWA § 303(d); 40 C.F.R. § 130. If the state that has the TMDL development authority is not even permitted to develop a TMDL for a system after it is delisted, then EPA certainly does not have the authority to issue a TMDL that requires load reductions on a delisted water. Therefore, if the ultimate decision to delist these assessment zones for total nitrogen would prohibit EPA from imposing nitrogen load reductions on these facilities, neither an individual nor the General Permit could require TN reduction.

5. Unlawful Modification of the Approved State Narrative Standard Without Public Notice and Proper Procedures

The permit limitations and instream numeric objectives are derived via application of Section 122.44(d)(1)(vi)(A). That provision does not constitute a basis for amending a narrative criterion but, as with other water quality standards, it is intended to strictly apply the standard as adopted, regardless of whether it is narrative or numeric. 40 C.F.R. § 122.44(d)(vi)(A). As noted previously, the EPA-approved state narrative standard expressly states that it must be translated into a nutrient concentration.[28] Here, EPA is seeking to illegally amend the applicable criteria,

[28] *See*, *In Re City of Taunton Department of Public Works*, NPDES Appeal No. 15-08, Order Denying Review, May 3, 2016 at 64-65.

violating applicable Federal law, in deciding that a specific *watershed load* is the same as an *ambient numeric criterion (or translator)* that must be met throughout the Great Bay Estuary to protect eelgrass. Fact Sheet at 22-24. EPA's intended application of a watershed-based loading limit, as opposed to an ambient TN concentration (as currently required by the state narrative standard[29]), is prohibited by 40 C.F.R. §§ 131.30, 131.21, also known as the "Alaska rule." The Alaska rule requires that any amendment of a state narrative standard must include specific procedures including public notice and comment.[30] Clearly, EPA has not undertaken such action as part of this General Permit, nor is it authorized to do so.

EPA did not engage in any of the proper notice and comment procedures to amend the State narrative standards to allow for a load limit in place of a nutrient concentration. Therefore, EPA's claim that a TN loading limit is equivalent to the narrative criteria is an unlawful modification of the applicable standard that is not permitted without going through the proper

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[29] New Hampshire's State narrative standard for Class B waters states: "Class B waters shall contain no phosphorus or nitrogen in such *concentrations* that would impair any existing or designated uses, unless naturally occurring." Env-Wq 1703.14 (emphasis supplied).

[30] EPA's "Alaska Rule" governing adoption and modification of state water quality standards – 40 C.F.R. § 131.21, 65 Fed. Reg. 24641, 24647 (April 27, 2000) ("During the adoption of the detailed procedures, all stakeholders and EPA have an opportunity to make sure that important technical issues or concerns are adequately addressed in the procedures. *** This approach is particularly useful for criteria which are heavily influenced by site-specific factors such as nutrient criteria or sediment guidelines. Such procedures must include a public participation step to provide all stake-holders and the public an opportunity to review the data and calculations supporting the site-specific application of the implementation procedures."); U.S. Environmental Protection Agency, Water Quality Standards Handbook, Second Edition, EPA 823-9-94-005a (August 1994), available at http://water.epa.gov/scitech/swguidance/standards/handbook/index.cf, at 3-22 ("Where a State elects to supplement its narrative criterion with an accompanying implementing procedure, it *must formally* adopt such a procedure as a part of its water quality standards. The procedure *must* be used by the State to calculate derived numeric criteria that will be used as the basis for all standards' purposes, including the following: *developing TMDLs*, WLAs, and limits in NPDES permits . . . .") (emphasis added); *id.* at 3-22 ("To be consistent with the requirements of the Act, the State's procedures to be applied to the narrative criterion *must* be submitted to EPA for review and approval, and will become a part of the State's water quality standards. (*See* 40 C.F.R. § 131.21 for further discussion.)") (emphasis added); *id.* at 3-24 ("Where a State plans to adopt a procedure to be applied to the narrative criterion, it *must* provide full opportunity for public participation in the development and adoption of the procedure as part of the State's water quality standards.") (emphasis added).

notice and comment procedures to amend the narrative standard for nutrients itself. As the permit is based on an unlawful modification of the "applicable standards," it must be withdrawn.

6. The General Permit Seeks to Unlawfully Modify the MS4 General Permit

The Fact Sheet for this permit states that "EPA anticipates that the next reissuance of the MS4 GP will contain updated nitrogen control requirements for all communities covered under the MS4 GP" that are more restrictive than the current MS4 general permit. Fact Sheet at 28-29. While the draft General Permit indicates that it "does not supersede any permit requirements contained in the MS4 GP" at this time, the expressed intention that the Agency *will* incorporate the TN reduction load requirements on the MS4 general permit essentially seeks to illegally modify the existing MS4 general permit, contrary to the federal regulations regarding permit modification.

EPA announced this intention to modify the MS4 general permit to require a nitrogen reduction of approximately 45% to achieve the chosen 100 kg TN / ha-yr loading threshold that is based upon data and information that is 10-18 years old. *Id.* EPA has been aware of these studies for over a decade. Ex. 37, 47. Therefore, the information being relied upon to modify and significantly reduce the nitrogen requirements in the MS4 general permit was in the possession of EPA when the MS4 general permit was developed and issued. It was also in EPA's possession when it adopted the Newmarket and Exeter permits and proposed the reissuance of the Dover permit. The NPDES regulations do not allow for the amendment of a permit based on information that was in the Agency's possession when the permit was developed and finalized. 40 C.F.R. §122.62 (allowing for the modification of a permit "only if the information was not available at the time of permit issuance").

Moreover, the information and analysis that is relied upon to determine the TN nitrogen requirements in this Draft permit were previously rejected as applicable to this system by EPA staff that were present at a 2007 PREP technical advisory meeting, a 2014 Peer Review, the Long Island Sound Peer Review and the author of the report himself. Ex. 47, 54, 55, 57. Dr. Latimer, in May 2018, emailed several colleagues (including Dr. Short – UNH) attempting to find a study relevant to the Great Bay system explaining: "My studies (published in 2010) purposely excluded river dominated estuaries." (Ex. F1 – F5)) Via this inquiry, Dr. Latimer was informed that such studies do not exist because "river dominated systems tend to be turbid and

with highly variable salinity, and thus have little seagrass in the first place." Thus, these communications expressly state that his published papers do not apply in the Great Bay system. Application of an expert evaluation contrary to the method in which such analyses were created is arbitrary and capricious.

The NPDES regulations do not permit the modification of a permit with information that was in the possession of the Agency or where the agency has been informed are not applicable to a particular system. See, USEPA Permit Writers Guide. EPA certainly may not use old information and reports that have been previously rejected as suitable for regulating nutrients in the very system the permit seeks to regulate without a detailed justification for now finding such reports sufficient to regulate TN. *See* 40 C.F.R. § 122.44(d) (Requiring EPA to consider "other information" in interpreting narrative criteria to set a numeric requirement). Such "other information" would certainly include statements by the very author EPA is seeking to rely upon confirming his research is, in fact, not applicable to the system in question. EPA's contrary action is clearly arbitrary and capricious.

As the NPDES regulations are clear on their face that the modification of a permit may not be allowed based upon information that was available at the time of permit issuance, EPA may not utilize the information relied upon to develop the nitrogen limits in this permit to modify and impose a more restrictive nitrogen limit on those covered by the MS4 general permit or to impose this General Permit. If EPA is to rely on these dated records, there must be a review of the information in the record which concluded that the use of the studies cited by EPA is not defensible for Great Bay. It is arbitrary and capricious for EPA to have ignored such key information confirming this proposed action is misplaced. *State Farm.*

7. Mandating Extensive Watershed Monitoring is Beyond EPA's Statutory Authority

This permit "stresses the importance of achieving this watershed nitrogen threshold while implementing a robust monitoring program to assess the health of the estuary in response to nitrogen load reductions." Fact Sheet at 23. EPA did not cite any authority for imposing this unprecedented watershed-wide monitoring mandate as none exists. EPA does not have the authority under the Clean Water Act to mandate the implementation of a watershed monitoring program by an NPDES permit holder and the General Permit rules provide no such basis.

NPDES permittees are required to monitor their effluent quality, given the effluent limitation derived by the regulatory authority responsible for permit issuance. *See generally*, 40 C.F.R. § 122. The responsibility to monitor state waters or develop a watershed monitoring program falls to the state in assessing criteria attainment under Section 303(d) and implementing a TMDL for the system, as necessary to ensure water quality standards compliance. Consequently, EPA's attempt to impose an extensive watershed monitoring program through this General Permit is beyond EPA's statutory authority and must be withdrawn.

It is also arbitrary and capricious to impose the entire cost of the ambient monitoring program on 13 municipal treatment facilities. According to the Great Bay Nitrogen Non-Point Source Study (2014), it was estimated that sixty-eight percent (68%) of the nitrogen that enters the Great Bay Estuary originated from sources other than municipal wastewater treatment facilities (Pg. 1, citing DES, 2010; PREP, 2013) and 25% of the loading originates from Maine. Other sources included atmospheric deposition, fertilizers, septic systems and animal wastes. As EPA cites no authority as the basis for imposing this program, it should be deleted from the permit. EPA also claimed that the permit implemented "adaptive management" but nowhere explains how the mandated program accomplishes this objective or what system response targets will confirm that further management (TN reduction) is unnecessary. Consequently, the monitoring program is untethered to a defined regulatory purpose and poses irrational costs on the regulatory community.

Even assuming *arguendo* monitoring could be imposed, the imposition of costs related to non-nitrogen factors should not be borne by Dover. While Dover believes such other factors should be monitored and studied, the cost of doing cannot and should not be imposed on Dover.

II. Substantive Objections to General Permit Effluent Limitations

1. Data do not indicate existing TN load or TN concentrations are adversely impacting eelgrass growth or in violation of narrative criteria

a. EPA's Fact Sheet is missing an analysis of basic mechanism for impacting eelgrass in GB system via nitrogen

Nitrogen, like all other nutrients, is not toxic. The parameter has no direct effect on eelgrass health or propagation. As stated in EPA's Protocol for Developing Nutrient TMDLs at 1-5, an essential step in developing a defensible watershed load limitation is to confirm the linkage

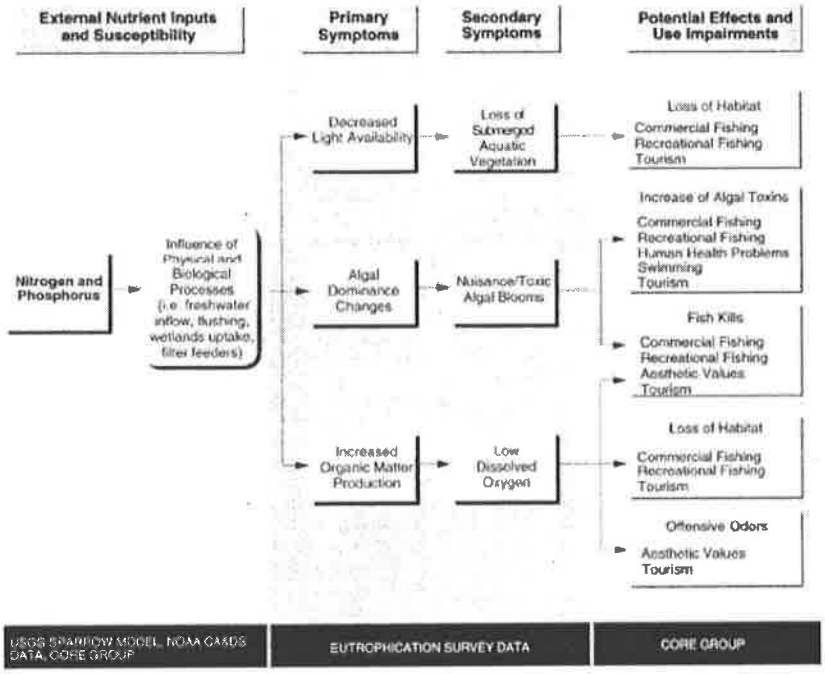
between the parameter of concern (in this case nitrogen) and the impairment endpoint intended for restoration (eelgrass acreage):

> **Linkage Between Water Quality Targets and Sources**
>
> To develop a TMDL, a linkage must be defined between the selected indicator(s) or target(s) and the identified sources. This linkage establishes the cause-and-effect relationship between the pollutant of concern and the pollutant sources. The relationship can vary seasonally, particularly for nonpoint sources, with factors such as precipitation. Once defined, the linkage yields the estimate of total loading capacity.

All of the documentation (e.g., published studies) cited by EPA relies on a conceptual model which reflects the following chain of events: TN loads cause increased TN concentrations in the system (accounting for system physical and chemical processes); increased TN concentration causes increased plant growth such as significantly higher (eutrophic) levels of phytoplankton, epiphytes (which attach to eelgrasses) and/or macroalgae which smothers areas where eelgrasses can grow or prevents the ability of seeds to germinate. (*See e.g.*, Latimer and Rego (2010); Vailela (2002) and Hauxwell (2003); Ex. 7-17)). As EPA stated in issuing the Exeter permit in 2010 regarding the justification for mandating TN controls to protect eelgrass propagation (Exeter Fact Sheet at 6-7):

> Increased nutrient inputs promote a progression of symptoms beginning with excessive growth of phytoplankton and macroalgae to the point where grazers cannot control growth (NOAA, 2007). Phytoplankton is microscopic algae growing in the water column and is measured by chlorophyll a. Macroalgae are large algae, commonly referred to as "seaweed." The primary symptoms of nutrient overenrichment include an increase in the rate of organic matter supply, changes in algal dominance, and loss of water clarity and are followed by one or more secondary symptoms such as loss of submerged aquatic vegetation, nuisance/toxic algal blooms and low dissolved oxygen. (EPA, 2001).

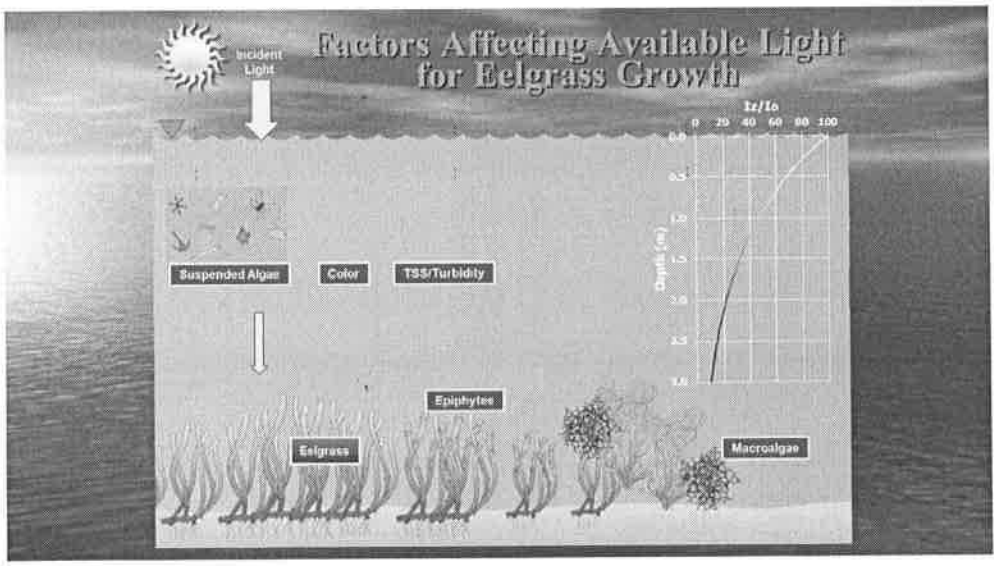
Figure 1



Source: EPA, 2001

Ex.2

The graphic below is a visual depiction of the chain of events where excessive nutrients cause eutrophic conditions, impairing other forms of aquatic life that must be documented in a system to conclude TN is adversely impacting eelgrass propagation:



The forms of excessive plant growth due to excess nutrients all have the same effect – it cuts the amount of light available for eelgrasses to grow. This was the same concern referenced by NOAA (2007), Latimer, Valiela and Cole, and Hauxwell in the papers EPA referenced as the basis for its proposed General Permit. (Fact Sheet at 22). Other papers considered by EPA, but excluded from the record, confirmed that specific forms of adverse plant growth (e,g, excessive macroalgal growth) were documented to conclude TN reduction was required. (Deegan - Ex 89). However, the record does not contain any assessment of existing data from the Great Bay system showing that the existing TN load/concentration has caused any form of excessive phytoplankton, epiphyte, or macroalgal growth or that such growth is documented to be causing adverse impacts on eelgrasses or, in any way, preventing the ability of seeds to germinate anywhere in this system. (See also Fact Sheet at 24, claiming TN reduction will reduce chlorophyll a, increase light transmission and DO levels, with no supporting analysis). The EPA Fact Sheet and Administrative Record does not contain any assessment of the TN concentration that will exist at the 100 kg TN / ha-yr condition as a result of the system's physical characteristics, how this concentration would be expected to cause any "excessive" plant growth, or the ambient TN concentration that is protective of eelgrass resources. EPA's Fact Sheet has not presented any of the required "linkage" between the selected watershed load restriction and the endpoints of concern, nor any intermediary condition needed to cause an adverse impact on eelgrass. *Supra*, Protocol at 1-5.

Such information, was however, available to EPA. EPA ignored that detailed studies of the Great Bay system confirmed that eelgrass growth is not light limited (Morrison 2008). EPA's conclusion that major TN reductions are required to protect eelgrass is directly refuted by the available detailed assessments of the Great Bay system which concluded there is no data showing that TN has caused adverse impacts to eelgrasses in this system. (See, e.g., 2014 Independent Peer Review accepted by DES).

In short, other than EPA's conclusory statement that " the system is beyond its assimilative capacity for nitrogen" (Fact Sheet at 17-19) there is no analysis of relevant data from Great Bay showing that the TN loads or concentrations (past or present) are causing any form of adverse impacts on eelgrasses in this system via growth of nuisance or other forms of competing plant

growth that would or could be preventing eelgrass recovery. This missing analysis is required to implement a narrative criterion. EPA WQS Handbook at 3-24; Ex. 35 – Trowbridge and Currier Deposition Excerpts. The Fact Sheet citations provided by EPA verify that information was available to confirm that (1) excessive phytoplankton growth has not occurred in response to TN loadings, (2) excessive epiphyte growth has not occurred, (3) nor has any research for this system confirmed TN is causing excessive macroalgal growth or that such growth is impairing eelgrass propagation in this system. Fact Sheet at 18-20; *see also*, Deposition excerpts of DES officials which verify such impacts are not documented in the Great Bay system discussed *infra*.[31] Ex. 35. EPA's decision to rely on dated and misplaced contrary reports and speculation is not a reliable basis to conclude otherwise. (Fact Sheet at 14-16 citing to pre-2014 Peer Review statements in PREP and other documents.) The subsequent, far more detailed assessments and depositions confirmed the earlier claims were unfounded.

The state's narrative criteria require that one demonstrate (from reliable, site-specific scientific information) that eutrophication conditions, in fact exist, or are projected to exist, to find that TN is "causing or contributing" to narrative criteria violations. See, 2018 NHDES CALM. Absent this analysis there is no basis to claim that a "reasonable potential" for violation of narrative criteria presently exists or is projected to exist at some time in the future, unless TN loadings to the system are reduced. As existing loads are not documented to be causing such adverse effects, it is illogical and unsupported to claim a reduction in loads is needed to prevent such impacts. EPA's conclusions to the contrary are speculative, unsupported and contrary to the current, available information for this system. This is out of step and contrary to the CWA and Administrative Procedures Act. *See Leather Indus. of Am. v. EPA*, 40 F.3d 392, 408 (D.C. Cir. 1994) (EPA decision may not be based on "sheer guess work"); *Columbia Falls Aluminum Co. v. EPA*, 139 F.3d 914 (D.C. Cir. 1998) (agency is not authorized to make regulatory decisions on "generalizations" when the case specific facts indicate that the generalized approach is inappropriate).

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[31] *See also* 2018 Section 303(d) report finding algal and DO levels present in Great Bay and Piscataqua System are in compliance with objectives to maintain uses. There is no evidence that excessive plant growth adversely impacting eelgrasses is occurring in this system or is preventing eelgrass regrowth.

Moreover, the most current eelgrass survey (also ignored by EPA), 2019 (Ex. 23) confirmed that eelgrass growth in the system increased by 8% over 2017. EPA was informed by Dr. Short that eelgrasses were looking "very healthy", yet EPA sought to claim otherwise. Ex. F1-F5. It is apparent that existing TN concentration or loads are not preventing eelgrass propagation in this system or causing further eelgrass losses. Dr. Kenworthy, an eelgrass expert, identified a series of reasons, unrelated to nitrogen, that could be precluding eelgrass regrowth. Ex. 24. Dr. Latimer's paper, heavily cited by EPA, also noted that significant eelgrass reductions had occurred in the neighboring Narragansett Bay system that had nothing to do with elevated TN. (Latimer at 236.) Numerous other assessments have been developed which all concluded TN is not the concern. Ex. 16-17, 35, 39-51. EPA's Fact Sheet evaluated none of these documents in issuing its General Permit, as further documented by their absence from the permit administrative record. EPA may not "cherry pick" records that support a conclusion while ignoring the vast majority of detailed analyses confirming that conclusion is unsupported. That violates APA norms and EPA's Science Integrity Policy, as discussed. *See also Overton Park.*

40 CFR 122.44(d) (and the applicable state narrative criteria) requires the use of the relevant site-specific information and studies when rendering a reasonable potential determination.[32] Absent an analysis of the available system data confirming the existence (present or projected) of a narrative criteria violation under existing load conditions, caused by nutrients, there is no rational basis for claiming that nutrient loads must be dramatically reduced to meet narrative criteria requirements.

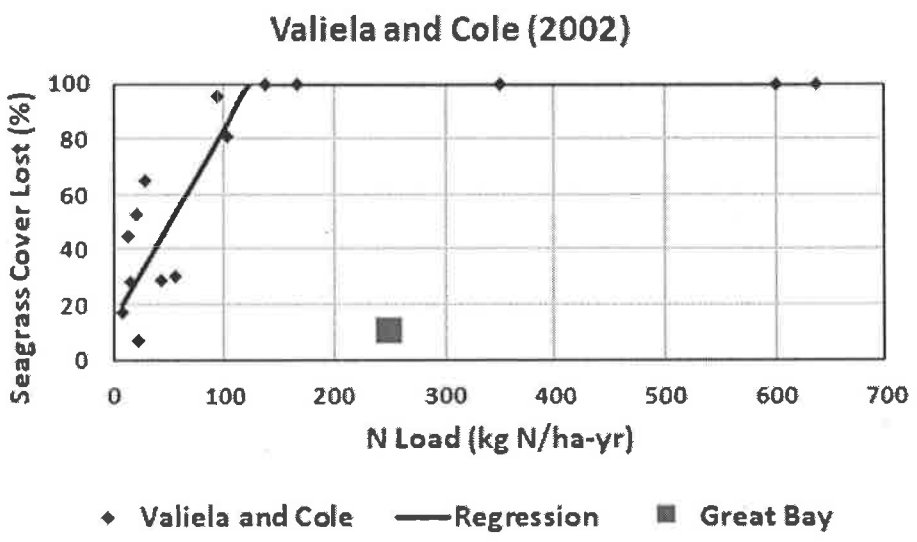
2. Peer review and related experts confirmed use of Latimer, Valiela and Hauxwell approaches are not valid for this system

EPA is required to use scientifically defensible methodologies in developing and applying water quality criteria, including the interpretation of narrative criteria. 40 CFR 131.11(b); EPA WQS Handbook; 40 C.F.R. § 122.44(d). To create a watershed TN load limitation of 100 kg TN/ha-yr, EPA's Fact Sheet relied upon a series of papers for other estuarine systems which evaluated the

[32] EPA itself emphasized at the inception of the rule used to derive the loading limit "that scientifically valid procedures must be used to develop criteria that protect aquatic life and human health." 54 Fed. Reg. 23868, 23876 (June 2, 1989).

possible connection between increased TN and eelgrass losses in small, shallow coastal embayments. (*See, e.g.*, Latimer and Rego (2010) Valiela and Cole (2002) and Hauxwell (2003)). Each of these papers were published over a decade ago and none of these papers addressed physical, biological or chemical conditions occurring in Great Bay. None of these papers address hydrodynamic conditions relevant to Great Bay. Ex. 57, 64, 68-73. Dr. Latimer expressly informed EPA that his paper (and these others) did not address conditions occurring in river-dominated estuarine environments. EPA was informed that there were no relevant papers addressing TN impacts on eelgrasses in such systems. (Ex. F1-F5) EPA's decision to ignore that information and claim the results of small coastal embayments, with confirmed TN impairments, applies to the Great Bay system, is a quintessential arbitrary and capricious decision. EPA's rationales for relying upon Latimer, Valiela and Hauxwell does not bear even moderate scrutiny.

While EPA noted that Valiela and Cole (2002) included a TN loading data entry for Great Bay (252 kg/ha-yr during the 1990s), that paper contained no subsequent information or analysis of how that loading affected eelgrass acreage in that system. During the mid-1990's *eelgrasses were thriving in Great Bay and a zero loss of eelgrass resources was occurring. (See, PREP Reports 2003, 2006, 2018)* (Fact Sheet at 22). The data point for Great Bay (large TN load, no adverse impact on or loss of eelgrass growth) was not included in the data analysis prepared by Latimer or Valiela that EPA relied upon, but is presented below:



As demonstrated above, the loading data contained in Valiela and Cole (2002) and Latimer and Rego (2010), when matched to the actual eelgrass conditions then occurring in Great Bay at that time, verify that a TN load of 252 kg/ha-yr is fully protective of Great Bay eelgrass resources. EPA's conclusion that Valiela demonstrates that a 100 kg TN/ha-yr is also appropriate for the Great Bay system (Fact Sheet at 22) is inaccurate.[33]

Hauxwell's assessment of a small coastal embayment was also clearly not relevant to the Great Bay system. His paper focused on eelgrass losses in Waquoit Bay, that were specifically caused by extensive macroalgal growth, which was documented to be smothering eelgrasses and precluding seed germination. That condition has no demonstrable relevance to the Great Bay system as there is no location in the entire Great Bay system where macroalgal growth is documented to be precluding eelgrass growth and eelgrasses grow extensively within Great Bay.[34] It was also documented in a related paper (Ex. 88 - Deegan) that the system studies by Hauxwell had thick, anoxic sediments that would, by themselves, preclude eelgrass growth. "Macroalgal biomass was positively related to nitrogen loading and was highest in Hamblin Pond (171 dry gm_2). Hamblin Pond also had a thick (70 cm deep) layer of black, anoxic mud, while Timms Pond had a thinner (5 cm) layer of organic matter overlying the sand layer." (Ex.89) Thus, the conditions occurring in Waquiot Bay are not relevant to Great Bay as eelgrass growth there is neither limited by macroalgae or anoxic sediments. Moreover, the timing of macroalgal growth in the Great Bay system is well documented. Such growth begins to occur in the shallows (generally unsuitable for eelgrass habitation) in late June, *after eelgrasses have sprouted from seeds. See*, Nettleton (2012); Short (Seagrass Net Reports 2012-2018). Thus, macroalgal growth cannot be preventing eelgrass from sprouting in the Great Bay system. Consequently, Hauxwell's paper clearly has no relevance to the Great Bay system. Moreover,

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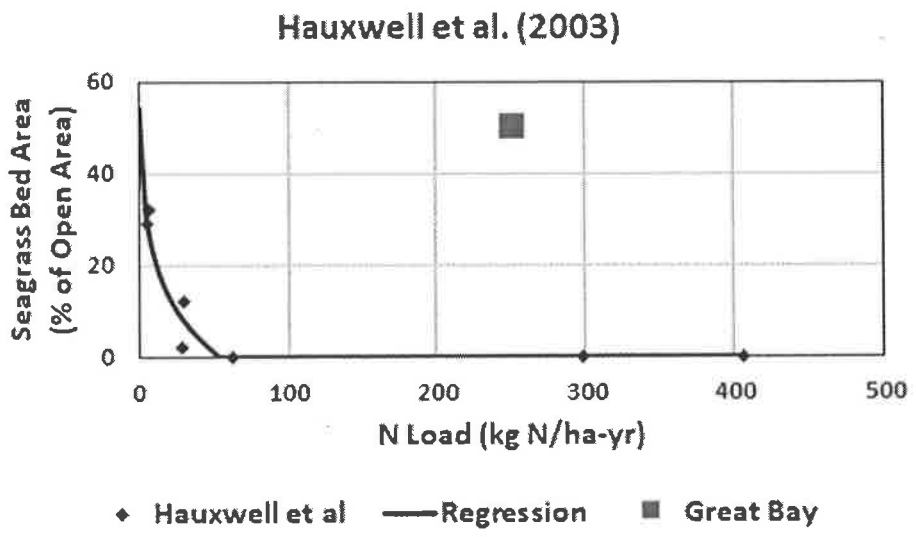
[33] EPA's assertion (F1-F5) that eelgrass have been is steady decline since 1996 is a false premise. First, 1996 was the highest recorded level of eelgrasses for Great Bay and necessarily, all other years would be less. Second, eelgrass beds naturally fluctuate and the system is not considered impaired for eelgrass acreage ranging 1750- 2150 acres. For that reason the system was not considered impaired prior to 2006. Basing a decision on ensuring that the 1996 eelgrass levels return is an improper implementation of the state narrative standard.

[34] *See*, Testimony of Philip Trowbridge and Dr. Fred Short which confirmed that macroalgae are not preventing eelgrass regrowth in the system. Ex. 35.

when Great Bay data are plotted in the chart developed by Hauxwell to estimate TN effect on the amount of area covered in eelgrass, it is apparent that his graphic also has no relevance whatsoever to the Great Bay system:



The specific study of Great Bay, conducted by Morrison (2008) and funded by PREP (i.e., EPA) confirmed that the system was not light-limited. (Ex. 17) Light limitation was the focus and concern of all the research papers cited in the Fact Sheet and it simply is not applicable to the Great Bay system – as EPA was well-aware when it issued this General Permit. As the referenced studies have no apparent or objective relevance to nutrient-related conditions in Great Bay, and consideration of contemporaneous Great Bay data demonstrate a much higher TN load is acceptable for eelgrass protection, EPA's analysis that relies on these objectively inapplicable studies is arbitrary and capricious.

a. Unique Characteristics of Estuaries Must Be Assessed under Applicable Section 304(a) Criteria

The permitting procedures specify that where a numeric criterion is not available and a narrative criterion is being implemented, the applicable Section 304(a) criteria document, modified by site-specific information should be employed. 40 C.F.R. § 122.44(d). EPA's published Section 304(a) guidance on estuarine system analyses of nutrient impacts expressly states that all such systems are "unique" and that analyses from one system cannot simply be transferred to another.

Ex. 1-6. Nonetheless, EPA has sought to presume that the assessments created by Latimer, Valiela, Cole and Hauxwell, were applicable to Great Bay without confirming that the system characteristics of Great Bay are similar to those smaller systems evaluated in the other papers. That critical missing assessment renders this entire permit arbitrary and capricious, as nothing in the administrative record indicates that the Great Bay system is similar to the small embayments evaluated in the publications EPA relied on. It is understandable why EPA did not conduct this key assessment – Dr. Latimer, EPA's lead expert on the matter informed EPA that the prior research was not applicable. "My studies (published in 2010) purposely excluded river dominated estuaries." (Ex. F1-F5) In any event, this oversight violates the Administrative Procedures Act. *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

b. EPA May Not Ignore Available Site-Specific Studies

Numerous records available to EPA contained analyses of this TN/eelgrass dynamics in Great Bay confirming the information cited by EPA is not applicable to this system. (Ex. 15-28, 35-37, 39-42, 45-51, 54-57, 62-64, 67-77; F1-F5) However, EPA simply chose to ignore those assessments and available system data confirmed that TN has had no demonstrable impact on any plant growth in this system and light conditions are ample to support eelgrass propagation. That decision was also arbitrary and capricious. *Environmental Defense Fund v. Blum,* 458 F. Supp. 650, 661 (D.D.C. 1978) (finding the agency "may not, however, skew the 'record' for review in its favor by excluding from that 'record' information in its own files which has great pertinence to the proceeding in question."). Ignoring the receipt of multiple expert opinions that verified the simplified analysis was misguided is a "head in the sand" approach that no court has ever countenanced. *See United States v. Charles George Trucking Co.*, 823 F.2d 685, 690-691 (1st Cir. 1987) ("A party who is aware of, and chooses to ignore, an available avenue for redress cannot later be allowed to characterize his refusal to travel the road as tantamount to the road being closed -- or to no road being in existence."). The 2014 Peer Review concluded that simply claiming that a different system is similar and allows the use of conclusions on nutrient control for that system to Great Bay is not defensible or reasonable. This is precisely the error identified by the 2014 Peer Review experts when they reviewed the 2009 Numeric Nutrient Criteria document:

> The 2009 Report *failed to acknowledge the relevance of some very important differences between the MEP* [Massachusetts Estuary Program] *program's approach and the DES approach. Also, important differences in some the physical characteristics of Great Bay and the embayments of Massachusetts were not acknowledged, implying that DES did not consider the relevance of the differences and how they could affect interpretation of water quality monitoring data. Furthermore, by making a simple comparison to the MEP program without a comprehensive evaluation of the status of that program, DES was irresponsible in making the comparison and implying that it supports total nitrogen criteria proposed for the Great Bay* (Kenworthy, 50).

Ex. 47.

Expert opinions were also provided by the PREP Technical Advisory Committee, Dr. Steven Jones, Dr. Richard Langan, Dr. Steven Chapra, Dr. Brian Howes, and Dr. Latimer, who all acknowledged that it was inappropriate for EPA to apply these simplified procedures to create TN limitations for Great Bay because the system characteristics were so radically different than those in the publications cited by EPA. Ex. 37, 41-42, 47, 55, 72, 76, F1-F5. EPA apparently went as far as to direct Dr. Latimer not to clarify the proper use of his study. Ex. F1-F5. Thus, EPA's failure to conduct its own "similar waters" assessment was compounded by the fact that the Agency methodically ignored every expert technical assessment that confirmed their approach was not defensible. Nor was the approach based on consideration of the "weight of evidence" as EPA simply ignored all evidence which confirmed there is no demonstrable impact of TN on the light regime in this system.

This "bury your head in the sand" approach extended to ignoring the very agency expert that EPA was purporting to rely upon – Dr. Richard Latimer. Dr. Latimer informed EPA that his paper (and that of the other scientists) was not based on conditions occurring in "river dominated systems". Ex. F1-F5. Dr. Howes verified with Dr. Latimer that he had informed EPA Region I staff that it was improper to utilize his paper to create a stringent TN reduction requirement for the Great Bay system. Ex.57, 71, 76. Moreover, as part of the Long Island Sound TMDL review regarding the need for eelgrass protections, EPA Region I itself determined that Dr. Latimer's areal loading methodology should not be applied to any system with major riverine inputs (such as occur with the Piscataqua River and Great Bay tributaries). Ex. 54-55, 67.

Ignoring the advice of the very experts an agency is claiming to rely upon to impose a regulatory requirement is *per se* arbitrary and capricious. *See Texas Oil & Gas Ass'n v. EPA*, 161 F.3d 923, 935 (5th Cir. 1998) (regulatory action that is "based on a study [that is] not designed for the purpose and is limited or criticized by its authors on points essential to the use sought to be made of it the administrative action is arbitrary and capricious and a clear error in judgment."); *Humana of Aurora, Inc. v. Heckler*, 753 F.2d 1579, 1583 (10th Cir. 1985) ("When an agency adopts a regulation based on a study not designed for the purpose and which is limited and criticized by its authors on points essential to the use sought to be made of it, the administrative action is arbitrary and capricious and a clear error in judgment."). Ignoring the existence of one's own prior conclusion that a method is not valid in specific physical settings (estuaries with major riverine inputs) is also *per se* arbitrary and capricious.

EPA's proposed permitting action, by their own admission and actions, have no scientific validity in the Great Bay estuary. Purposely ignoring the relevant scientific assessments available to reach a predetermined conclusion (Ex. F1-F5) in an administrative permit process is bad faith implementation of regulatory authority. Directing Dr. Latimer to not answer key questions presented by the affected communities that would have further clarified whether his method was applicable to the Great Bay system was inappropriate and inconsistent with EPA's Scientific Integrity Policy, as discussed. Consequently, EPA must withdraw the current draft permit, address the contrary information that confirm the TN reduction requirements are not justified, and open the updated analysis and full administrative record for public notice and comment.

3. Relative impact of Piscataqua system discharge over estimated based on available hydrodynamic model

Contrary to the assessments relied upon to justify the General Permit, EPA included the Piscataqua River as part of the estuarine embayment. This decision is arbitrary and capricious. The Piscataqua River is a river system, not an embayment and physical/chemical and biological conditions occurring in that segment have no resemblance to shallow small coastal embayment studies by Latimer, Valiella and Hauxwell. Ex. F1-F5, Howes and Chapra Expert analyses. As Dr. Latimer was informed "river dominated systems tend to be turbid and with highly variable salinity, and thus have little seagrass in the first place." Thus, it is expected that little to no

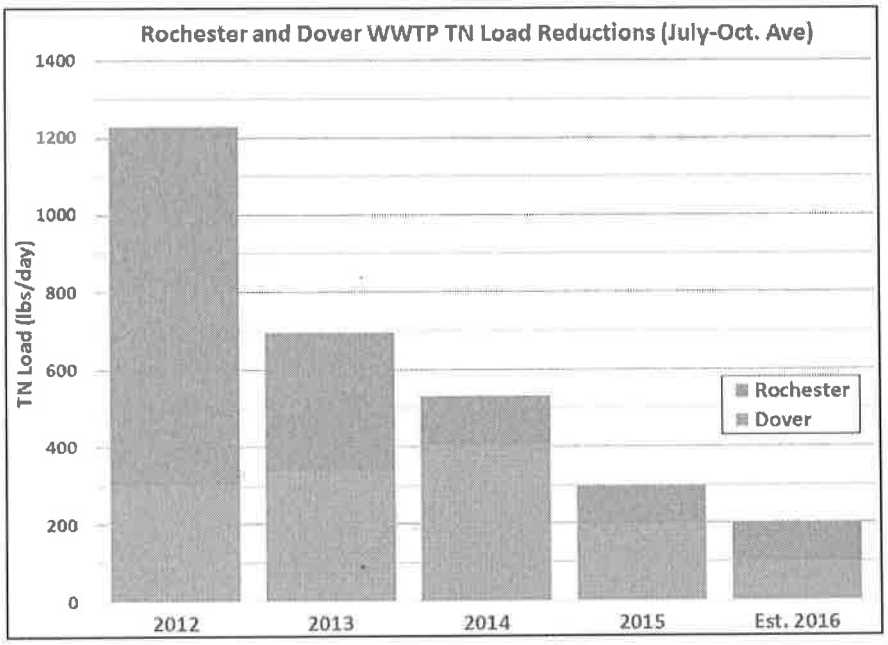
eelgrass would be present in this segment of the system and EPA's claim that the lack of eelgrass is TN induced is speculation. Ex. F1-F5.

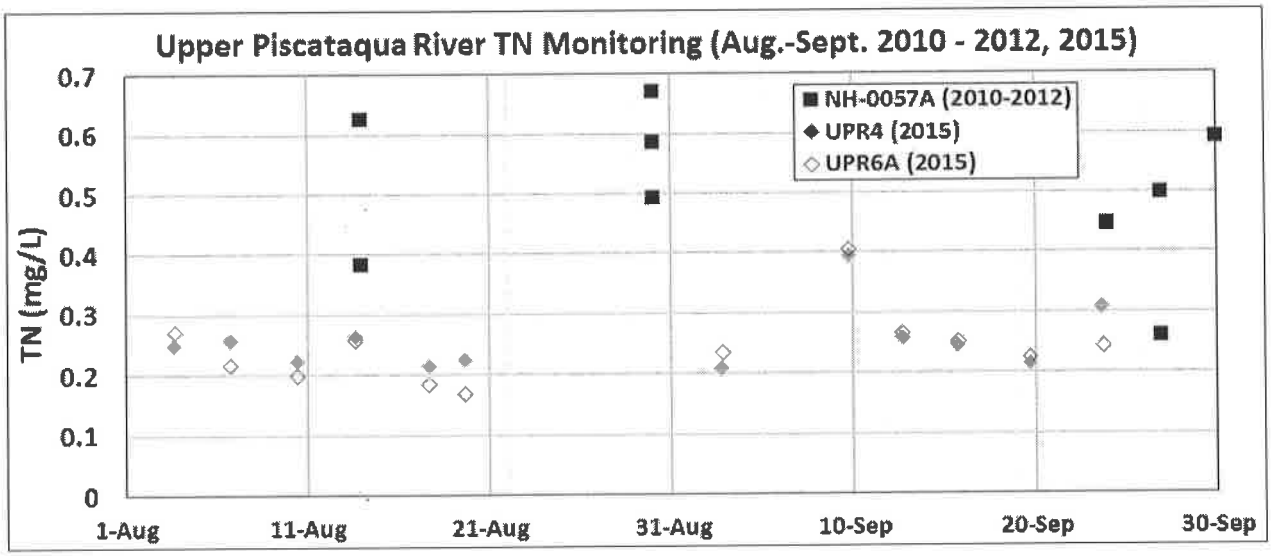
EPA guidance on the assessment of nutrient impacts in estuarine systems expressly states that system hydrodynamics must be considered in establishing nutrient objectives and reduction requirements. Ex. 1-6. Dover discharges to the Piscataqua River, not Great Bay, where eelgrasses presently do not exist for reasons completely unrelated to nutrient levels. The Piscataqua River has the greatest transparency and lowest algal growth in the system. The physical setting is not conducive to macroalgal growth and very limited macroalgal growth exists. Eelgrasses were lost on the Piscataqua decades ago due to wasting disease and they never fully recovered despite an acceptable light regime. Ex. 16, 17, 35, 46, 47. The recolonization of eelgrass beds in the Great Bay system is heavily dependent on reseeding from existing beds. *Id.* This is the same type of condition that Dr. Latimer noted at 235, 236 that is not nutrient related in Narragansett Bay and Block Island, but is a function of the physical setting and the inability of the area to reseed once eelgrasses are lost.

Macroalgae are not present in significant amounts in the Piscataqua due to the rapid current and therefore present no obstacle to eelgrass regrowth. Ex. 29-34, 36. Moreover, the short system detention time (about 1 day) preclude the build-up and growth of algae (phytoplankton), ensuring that this form of plant growth cannot adversely impact eelgrass recovery. Ex. 77. Thus, the issue of eelgrass recovery on the Piscataqua River has nothing to do with TN load or concentration in this area of the system. Therefore, the application of the 100 kg TN/ha-yr to protect eelgrasses from adverse effects of TN associated with embayments is completely lacking in applicability with regard to the Piscataqua River and the Dover discharge.

a. Site specific Studies Verified the Piscataqua Is Insensitive to Nutrient Loading

In 2014-2016 the communities on the Piscataqua River implemented voluntary measures to reduce nitrogen. This was known locally as the "Grand Experiment." The 2014 Peer Reviewers recommended this effort to determine if there was any beneficial effect of TN reduction. Ex. 49. The chart below indicated the degree of TN load reduction that was achieved and the dramatic TN response occurring in the Piscataqua River.





The analysis of the system response confirmed that the dramatic TN reduction (50-75%) had no effect on algal growth or the DO regime. Ex. 49. This further verified the conclusions of the 2014 Independent Peer review which found: "There is *no basis for a scientifically defensible linkage* between nitrogen impairment and eelgrass impairment … ." Ex. 47 at 19.

The latest PREP study on eelgrass acreage confirmed that an 8.5% increase in acreage in Great Bay occurred since 2017 (Ex. 77) with TN averaging about 0.37 mg/l (far higher than TN levels

occurring in the Piscataqua River). Moreover, Dr. Short informed EPA that eelgrasses in Great Bay are looking healthier than ever. Ex. F1-F5. If TN was precluding eelgrass recovery as EPA claims, this should not have happened. Moreover, eelgrasses are growing (or not growing) all throughout Great Bay in adjacent areas, where TN concentrations and light transmission are identical. Id. Once again, this reality cannot occur under EPA's theory that TN is precluding eelgrass regrowth and assumption that eelgrass growth and survival is only possible if TN loads are less than 100 kg/ha-yr. The actual growth of eelgrasses throughout Great Bay is proof positive that EPA's assumption is demonstrably incorrect.

EPA's failure to account for and address the numerous studies of the Great Bay system that documented a complete lack of impact (beneficial or detrimental) associated with major changes in TN loadings (including the major point source reductions already implemented), confirms that the assumption TN is significantly impacting plant growth and eelgrass propagation is not a credible scientific conclusion and unsupported premise. EPA must explain precisely what the earlier analyses failed to understand or evaluate to support its claim that eelgrasses in the Great Bay system are being adversely impacted by existing TN loading and major reductions are required to allow this resource to recover. *EPA must explain precisely how existing TN levels are causing eelgrass populations to remain low.* Without such information and analyses in the record, EPA's contrary determinations are simply conclusory and defective.

b. General Permit Rules are Not Followed

The General Permit rules only allow for the regulation of similarly situated facilities. *Supra.* To the degree some of the load from Dover discharged to the Piscataqua River may enter Great Bay, the hydrodynamic model that EPA reviewed and concluded was adequately calibrated, confirms that Dover's loading does not have the same effect as discharges that must pass through Great Bay to flow to the Atlantic Ocean. Ex. 29-34, 36. EPA's analysis completely failed to account for the prevalent (>60%) loss of nitrogen discharged by Dover down the Piscataqua River in setting a load reduction requirement for Dover to protect eelgrasses in Great Bay. Rather, EPA's analysis assumed that 100 percent of the load from Dover posed a threat to eelgrass recovery when this assumption is incorrect.

As the load impacts from Dover are dramatically different from those POTWs that discharge to tributaries that lead directly into Great Bay (Squamscott and Lamprey Rivers), it is arbitrary and capricious to consider that facilities in the various locations outside of Great Bay proper have the same loading effect on eelgrass survival as facilities inside the Great Bay watershed. The Piscataqua River exhibits dramatically greater initial dilution and more rapid transport out of the system than is exhibited in Great Bay proper where eelgrass growth is the major concern. *Id.* The applicable NPDES rules (40 C.F.R. §122.44(d)) expressly state that the dilution available at the point of discharge and other factors impacting the effect of the pollutant discharge on the environment must be considered in deriving effluent limitations "necessary to ensure standards compliance." 40 C.F.R. §122.44(d). In issuing the Exeter permit and regulating TN, EPA acknowledged that the following assessments applied:

> In determining whether a discharge causes or has the reasonable potential to cause or contribute to an excursion above a narrative or numeric criterion within a State water quality standard, EPA considers: (1) existing controls on point and non-point sources of pollution; (2) the variability of the pollutant or pollutant parameter in the effluent; (3) the sensitivity of the species to toxicity testing; (4) where appropriate, the dilution of the effluent in the receiving water; and (5) the statistical approach outlines in the *Technical Support Document for Water Quality-based Toxics Control, Section 3* (USEPA, March 1991 [EPA/505/2-90-001]) (see also 40 CFR §122.44(d)(1)(ii)). In accordance with New Hampshire's Water Quality Standards (RSA 485-A:8 VI, Env-WQ 1705.02(c)), available dilution for tidal waters is equivalent to the conditions that result in a dilution that is exceeded 99% of the time.

As EPA's Fact Sheet analysis is missing every component of this assessment, and, most importantly, how the location of the discharge effects the degree to which TN can possibly influence eelgrass growth in the system, the proposed limitation EPA stated was applicable to Dover is arbitrary and capricious.[35]

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[35] EPA's internal correspondence noted that lack of recruitment (i.e., seeds) is the reason eelgrasses are not growing back. Ex. F1-F5. There is no demonstration that TN is what is precluding reseeding of the Piscataqua River or Little Bay. Thus, EPA's TN-impairment assumption has no relevance to this area, where high currents and massive tidal exchange limit the ability to be reseeded.

4. Existing TN Concentrations in the Great Bay System are Fully Protective of Eelgrass Growth, survival and propagation

EPA's proposed permit action failed to evaluate the TN concentrations present in the Great Bay system and determine whether that level of TN is considered protective of eelgrass resources based on similar evaluations conducted for other New England estuarine systems. EPA was aware that this was a critical analysis for any program to protect eelgrasses, as well as the evaluation that were recently undertaken by EPA in issuing prior permits for Great Bay facilities (Newmarket and Exeter) in 2011- 2012 and in 2016 for Long Island Sound in developing a program to protect eelgrass resources in those embayments. Ex. 54-56, 67. As noted by Dr. Latimer the key assessment to perform is the "expression of the effects along the gradient of nitrogen inputs." Internal EPA records stated that EPA could not identify a protective TN concentration (F1-F4). This is inaccurate, as extensive information was available to EPA to select a protective TN concentration for this system.[36] EPA's failure to review the available data and information in its possession, renders this decision arbitrary and capricious.

In the Exeter permit Fact Sheet (2011), for example, EPA expressly stated that the proper approach to narrative criteria implementation is to identify the acceptable nutrient concentration:

> Class B waters are subject to class-specific narrative and/or numeric water quality criteria. Env-Wq 1703.01 and 1703.04. With respect to nutrients, Env-Ws 1703.14(b) sets forth a class-specific criterion that prohibits *in-stream concentrations* of phosphorus or nitrogen in waters that would impair any existing or designated uses.

Fact Sheet at 9 (emphasis supplied).

Further underscoring that a numeric concentration must be identified to properly calculate a water quality-based effluent limitation, the Exeter Fact Sheet states:

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[36] *See* Benson, Schlezinger, and Howes, *Relationship between nitrogen concentration, light, and Zostera marina habitat quality and survival in southeastern Massachusetts estuaries*, J. Env. Manag. at p. 135 (2013) (long-term summer seasonal average of .39 +/- .3 mg/L); Wazniak et al., *Linking Water Quality To Living Resources in a Mid-Atlantic Lagoon System*, USA Ecol. App. 17(5) Supplement, at p. S67 (2007) (monthly annual averages of .55 mg/L); Howes, Samimy, and Dudley, *Massachusetts Estuaries Project Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators Interim Report* at p. 22 (July 21, 2003) (summer seasonal average of .39 to .50 mg/L).

> Numeric total nitrogen criteria have not yet been adopted into the State of New Hampshire Water Quality Standards. EPA relies therefore on existing narrative criteria to establish effluent permit limitations. When developing an effluent limitation to implement a narrative water quality standard, EPA regulations direct the Agency (in relevant part) to use one or more of the following methodologies:
>
> > A. Establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use.
> >
> > ...
>
> 40 C.F.R. §§ 122.44(d)(1)(vi)(A), (B). EPA is authorized to base its permitting decision on a wide range of relevant material, including EPA technical guidance, state policies applicable to the narrative water quality criterion, and site-specific studies.

Exeter Fact Sheet at 20

In all cases, the first step is to identify the protective numeric criteria, which, by definition, is the ambient pollutant concentration that is protective of the use in question. 40 C.F.R. §131. Consideration of site-specific studies and data are essential to this action. Ex. 35 (Currier Deposition). EPA's Exeter Fact Sheet also described the protective TN concentrations that support eelgrass propagation:

> EPA's Nutrient Criteria Technical Guidance Manual – Estuarine and Coastal Marine Waters (EPA, 2001) indicates that dissolved inorganic nitrogen should be less than 0.15 mg/l in order to protect submerged aquatic vegetation. The guidance also explains that because of the recycling of nutrients in the environment it is best to limit total concentrations (i.e. total nitrogen) as opposed to fractions of the total.
>
> For selected waterbodies, the State of Delaware has adopted dissolved inorganic nitrogen criteria of 0.14 mg/l as N. This criterion is for the protection of submerged aquatic vegetation and is applicable from March 1 through October 31 (State of Delaware, 2004).
>
> The Massachusetts Department of Environmental Protection (MADEP) has identified total nitrogen levels believed to be protective of eelgrass habitats as less than 0.39 mg/l and ideally less than 0.3 mg/l and chlorophyll *a* levels as 3-5 ug/l and ideally less than 3.

Exeter Fact Sheet at 20-21

EPA (through Tetra Tech) prepared a literature review memo summarizing its technical approach for establishing nitrogen thresholds to protect eelgrass resources in Long Island Sound.[37] Ex. 67. The literature review memo is organized by watershed groupings including separate evaluations for smaller embayments and those affected by large riverine systems. For each of these groupings, EPA nitrogen thresholds were identified to translate the narrative water quality standard into a numeric target concentration (as done in the MEP TMDLs summarized in the table) and identifying where nitrogen watershed loading results in exceedances of the identified threshold. Based on the literature review of median *growing season* TN concentration necessary to protect eelgrass, page F-3 of the Report stated the following:

> *For embayments, Tetra Tech selected a median value of 0.40 mg/L TN to protect the seagrasses in embayments. This value is the rounded value of the median TN protective of seagrasses (0.39 mg/L; range: 0.30 to 0.49 mg/L). Values above the literature review maximum TN concentration of 0.49 mg/L were not considered protective of eelgrass (see Table F-1).*

Once a TN endpoint was identified, the load necessary to meet the endpoint was calculated considering the system hydrodynamics. (See, *Establishing Nitrogen Endpoints for Three Long Island Sound Watershed Groupings. Subtasks F and G. Summary of Empirical Modeling and Nitrogen Endpoints*. April 13, 2018). For Great Bay, the TN load associated with a 0.40 mg/l TN is >250 kg/ha-yr (as an areal loading). Ex. 33. An independent peer review of the proposed LIS approach was completed in January 29, 2019 by EPA Region 1. The independent peer review Technical Review Team, funded by EPA, included Dr. Victor J. Bierman. Dr. Bierman was also on the peer review team that evaluated the 2009 Draft Nutrient Criteria for Great Bay. In that analysis, Dr. Bierman stated the following:

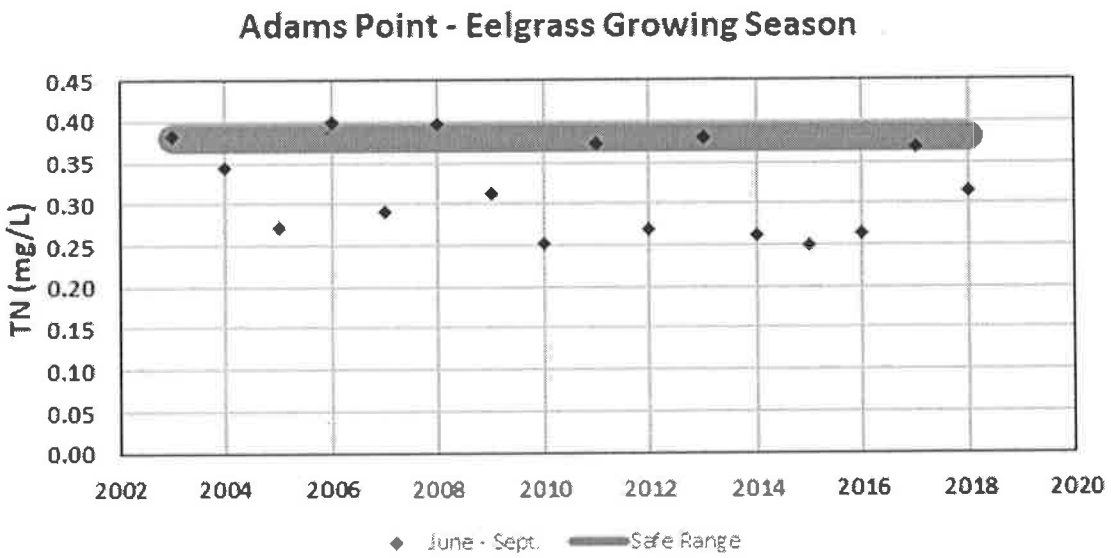
> *[E]elgrass and aquatic life are the assessment endpoints. If appropriate analyses are conducted with all of the relevant site-specific data, then TN concentration*

[37] Literature Review Memo. March 27, 2018. Long Island Sound (LIS): Application of Technical Approach for Establishing Nitrogen Thresholds and Allowable Loads for Three LIS Watershed Groupings: Embayments, Large Riverine Systems and Western LIS Point Source Discharges to Open Waters.

targets can be developed that will protect the assessment endpoints. In turn, an appropriate site-specific, load-response model can then be used to determine TN loads from the watershed that can meet the in-water TN concentration targets. This is the approach currently being used with the linked watershed-embayment model in the 89 MEP embayments (Howes et al., 2006).

Exhibits 74-76 provide a summary of TN concentrations that EPA previously approved as specifically protective of eelgrass propagation in TMDLs for New England estuarine systems. Consistent with EPA's own findings and approaches in LIS, the range of growing season average TN endpoints (0.35-0.45 mg/l) would be expected to be protective of eelgrass resources in the Great Bay system. The current growing season TN concentrations in Great Bay are all below the range that is expected to adversely impact eelgrass propagation. Ex.33

From 2012 to present, the maximum TN has not exceeded 0.38 mg/l and the multi-year average is about 0.32 mg/l. For the past 5 years, the growing season average TN has averaged less than 0.30 mg/l.



EPA has previously concluded that TN ranging 0.30-0.35 mg/l (growing season average) represents "excellent" water quality for protecting eelgrass. *See* Newmarket and Exeter Permit Fact Sheets. The water quality at Adams Point for 2018 further confirms that existing TN concentrations are fully protective of eelgrass resources:

Month	TN (mg/L)	DIN (mg/L)	Chl-a (µg/L)
Apr-18	0.33	0.03	6.7
May-18	0.36	0.16	-
Jun-18	0.25	0.06	3.0
Jul-18	0.28	0.07	4.0
Aug-18	0.43	0.15	4.1
Sep-18	0.30	0.04	8.4
Oct-18	0.36	0.04	13.3
Nov-18	0.46	0.16	0.9
Dec-18	0.47	0.20	1.4
May-Sept	0.32	0.10	4.9
June-Sept	0.31	0.08	4.9
Annual	0.36	0.10	5.2

Results are tidal averages. Monitoring results that did not include measurements near high and low tide were excluded from the summary.

Both DIN and TN values during the growing season reflect excellent water quality for eelgrass propagation and growing season chlorophyll-a remained low – also reflecting excellent water quality (as it has done for decades).

Dr. Howes' site-specific MEP-style review for the Great Bay system (considering the relevant studies and site-specific information ignored in EPA's analysis) concluded that, at a minimum a 0.36 mg/l growing season TN concentration would be protective of Great Bay eelgrass resources, and that the protective value could be as high as 0.40 mg/l TN. Ex. 76. No information or explanation is provided in this General Permit that demonstrates the prior narrative criteria determinations made in these other studies was in any way flawed or that the recommendations derived for Long Island Sound are not protective of eelgrass resources in Great Bay. As such, there is no rational basis to claim that existing TN conditions in Great Bay have the "reasonable potential" to adversely impact eelgrass resources.

Moreover, the inorganic nitrogen levels are now routinely below 0.1 mg/l DIN, which EPA has stated is fully protective of eelgrass growth in estuarine systems. PREP's 2018 State of the Estuaries Report confirms that current DIN levels are now equivalent to those occurring in the late-1970s.

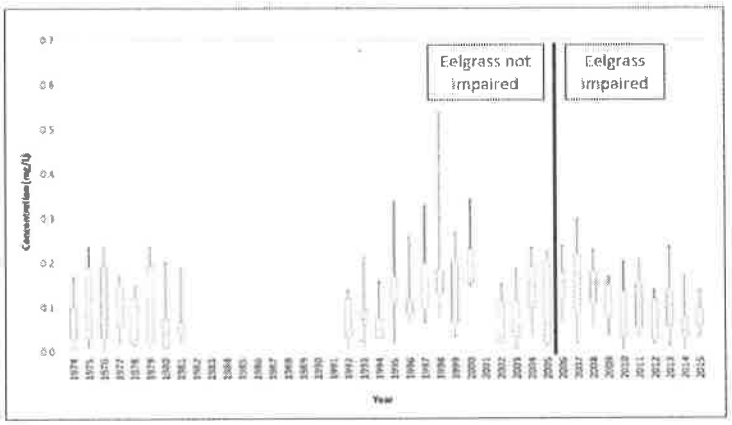


Figure 4.2 Dissolved inorganic nitrogen (DIN) at Adams Point. Box and whisker plots of dissolved inorganic nitrogen (DIN) concentrations (collected monthly, April through December, at low tide) between 1974 and 2015. The horizontal line in each box is the median. Boxes encompass the middle 50% of the data points. Upper and lower vertical lines show the complete range of data values. Some years omitted due to missing data.

Data Source: Great Bay National Estuarine Research Reserve and the UNH Jackson Estuarine Laboratory

[38]

The range of protective growing season average TN levels have been documented to include, at a minimum, the following:

- Long Island Sound (USEPA) .....0.40 mg/l
- Critical Indicators Report (SMAST) .....0.35-0.45 mg/l
- Various Authors/2014 GB Peer Review.....0.40-0.60 mg/l
- Dr. Brian Howes (site-specific GB).....0.36 mg/l
- USEPA NE TMDL (Eelgrass protection) .....0.32-0.49 mg/l
- Maine DEP (Casco Bay).....0.32 mg/l
- DENREC (All Estuaries).....0.15 mg/l DIN

None of these target concentrations would result in needing to achieve a 100 kg/ha-yr surface water loading level. Given the EPA-approved and case specific TN and DIN endpoints found

[38] This image has been modified slight--the date of the DES eelgrass impairment listing is added.

protective of eelgrass resources are already achieved in this system, there is no rational basis to claim that further TN reductions are required to ensure protection of eelgrass resources in the Great Bay system. At a minimum, EPA would need to explain to the public why these other EPA-approved growing season TN concentration endpoints found to fully protect eelgrass resources in various embayments evaluated by Dr. Latimer and others are not going to be protective for the Great Bay system. This would necessarily include an analysis of the Great Bay system characteristics that make it more or less susceptible to nutrient effects than the systems with the higher, EPA-approved TN values. It is expected that EPA did not undertake that assessment because the available analysis of system susceptibility confirms that, compared to the other systems, Great Bay has *lower* susceptibility to adverse effects of TN. Ex. 70. Thus, EPA's failure to utilize or consider the TN levels that were determined by EPA to be protective of eelgrass resources in other nearby systems is clearly arbitrary and capricious.

a. Site-specific analysis confirms, at a minimum, 0.36 mg/l TN is protective in Great Bay System

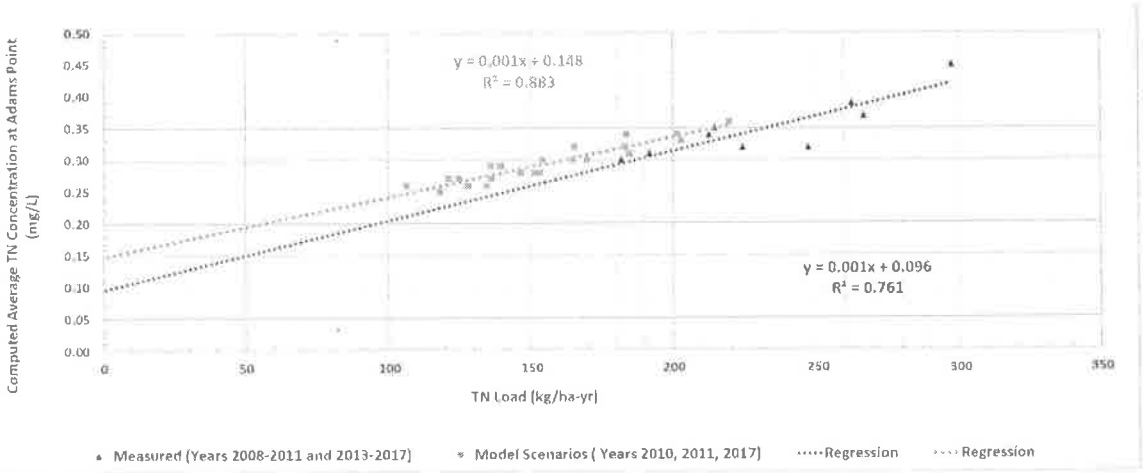
Using the methodology employed in developing over 70 EPA-approved TMDLs and verified as applicable to Long Island Sound in the EPA-funded peer review (MEP program analysis), Dr. Brian Howes has assessed the physical conditions in the Great Bay system that control whether and how TN may impact eelgrass growth. He has also assessed how plant growth in the system has responded to various levels of TN to determine whether TN is presently having any demonstrable impacts on eelgrass health. He has concluded that the ambient TN level of 0.36 mg/l (growing season average) is sufficient to protect eelgrasses in the Great Bay system. Ex. 76. He notes that it is likely that an even higher TN concentration would fully protect the resource. This TN concentration is estimated to be equivalent to a watershed loading of 200 kg TN/ha-yr – essentially double the amount EPA has claimed is necessary to protect eelgrass resources. Based on Dr. Howes' site-specific assessment, EPA's assumption-based conclusion that a 100 kg/ha-yr limitation is required to protect eelgrass resources is not rational or scientifically defensible.

Contrary to decades of EPA actions, the 100 kg/ha-yr target was chosen without considering the system hydrodynamics (salt and freshwater flushing), residence time, tidal variation forms of nitrogen present, and other critical factors that affect whether a given nutrient load will produce an adverse effect in a given water body. *See*, EPA Guidance on Nutrient TMDLs and Nutrient

Criteria Development – Ex. 1 and 6. See also Latimer and Charpentier (2010) ("Estuaries are dynamic environments that can assimilate nutrients depending upon their geomorphic and hydrodynamic properties which affect the ability to dilute and flush nutrient loads.") Based on the more comprehensive analysis, considering the relevant factors, there is no "reasonable potential" to adversely impact eelgrass resources, minimally, at a 200 kg TN/ha-yr watershed loading (when that proper ambient TN concentration and system hydrodynamics are used to evaluate compliance with the state narrative criteria). Under this condition the applicable water quality objective is met (TN concentration protective of eelgrass resources) and further TN reductions are not required for this system. At a minimum, setting any loading before identifying a protective TN endpoint concentration puts the cart before the horse. Such information was available to EPA and should have been used as the basis of any loading reductions imposed.

b. EPA's 100 kg TN/ha-Yr load limitation is arbitrary and capricious

As noted above, EPA's assessment completely failed to evaluate the ambient TN concentration protective of eelgrass resources, as required by (1) the applicable state standard and (2) the implementing NPDES rules/Section 304(a) guidance applicable to narrative criteria implementation. Moreover, EPA failed to evaluate the resulting instream TN concentration that would result from the proposed watershed TN load limit it has proposed. That TN concentration is estimated via the HDR model and the system nomograph to be 0.24 mg/l TN on an annual average basis. Ex. 33 and 34.



As noted above, no scientific assessment or published literature indicates that a 0.24 mg/l TN (annual average) is necessary to protect eelgrass growth in New England waters. EPA previously noted that 0.32-0.40 mg/l TN (multi-year growing season average) was fully protective and routinely approved even higher TN concentrations to protect eelgrass resources as part of the TMDL program for Massachusetts, where site-specific analyses were performed (such as that conducted by Dr. Howes – Ex. 54, 56, 70, 76). For LIS EPA's literature search concluded that a 0.4 mg/l TN was typically protective of eelgrass growth for embayments. The protective watershed load at 0.4 mg/l TN is in excess of 250 kg/ha-yr. That loading is consistent with historical TN loadings that supported robust eelgrass growth from 1990-2005. EPA has presented no analysis, based on relevant information for this system, that a loading of 250 kg/ha-yr would not be protective.

Given the available site-specific technical assessments that have been performed to date and were available to EPA, all indicating that the system is not showing any indication of adverse effects from varying TN concentrations and loads far above the level EPA now seeks to regulate, EPA's insistence on compliance with a 0.24 mg/l TN concentration is not scientifically defensible and should be withdrawn. *Leather Industries; Physicians for Social Responsibility, et al v. Wheeler (2020),* Analyses confirm that EPA's proposed watershed limitation is equivalent to meeting pristine forest conditions in the watershed, as well as "limits of technology" at the wastewater treatment facilities. EPA's analysis provided no credible basis for believing such extreme reductions are needed to a system that presently has more extensive eelgrass beds than the systems regulated in a less restrictive manner. Moreover, EPA has provided no explanation for why it completely altered the approach it followed for setting the eelgrass-protective permit requirements for Newmarket and Exeter and has proposed an approach divorced of any ambient TN assessments.[39] These inexplicable changes in EPA's rule interpretations and scientific approaches require a full technical justification – which is presently lacking in the administrative

[39] City of Taunton followed this approach also. *In Re City of Taunton Department of Public Works*, NPDES Appeal No. 15-08, Order Denying Review, May 3, 2016 at 64-65 ("To arrive at the limit for the City's Permit, the Region first determined a threshold nitrogen concentration in the receiving waters that would be consistent with unimpaired conditions. Fact Sheet at 29. From there, the Region determined the allowable load from watershed sources generally, and from the City's Plant in particular, that would result in receiving water concentrations at or below that allowable threshold.").

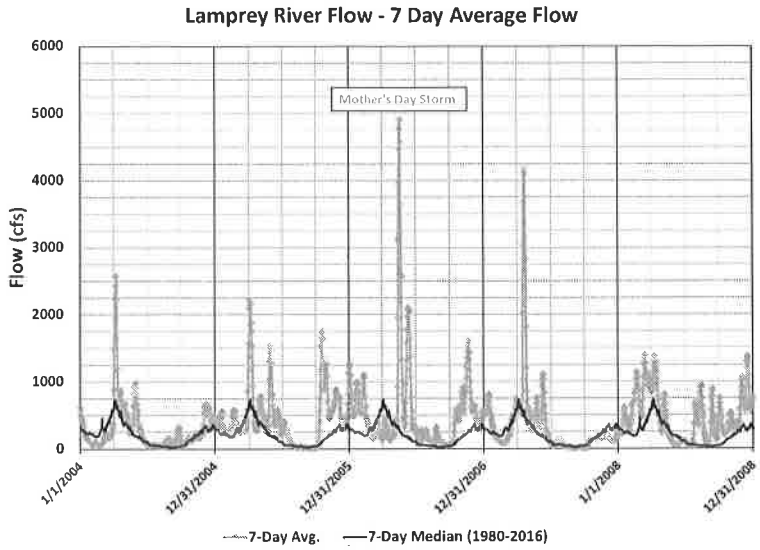
record. Assuming such assessment is prepared, it should be presented to the public for review as it will constitute a new basis for imposing stringent TN regulation on this system. Pending such assessments, the permit should be withdrawn, the oversights and omissions addressed, and later resubmitted for public comment.

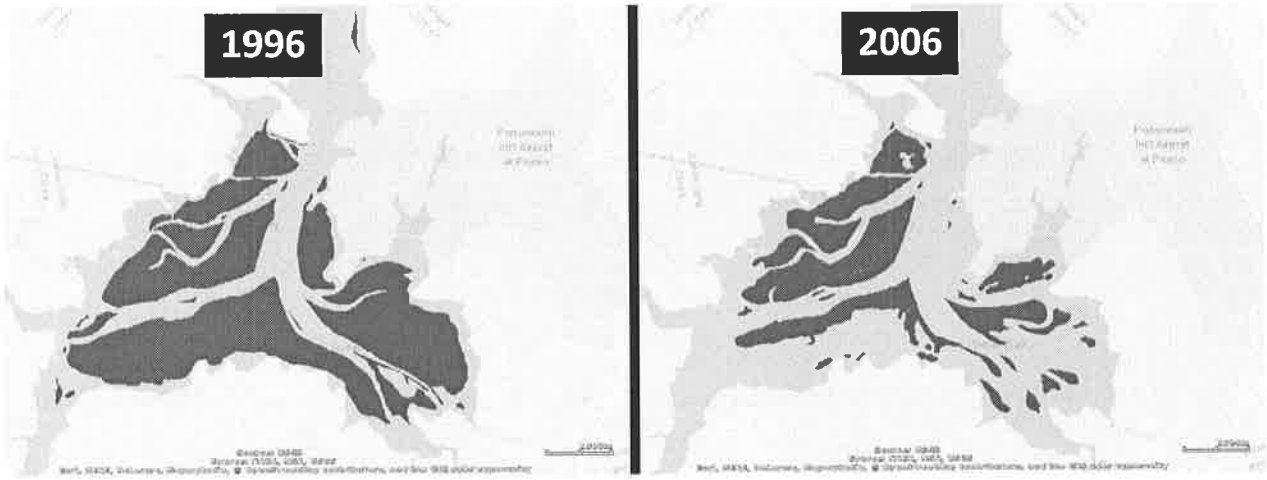
5. Failure to consider factors known to affect whether or how TN impacts an estuarine system and the reason eelgrasses declined in 2006

EPA's Fact Sheet references a series of documents indicating that TN, in certain cases, may cause adverse impacts on eelgrass propagation. (Fact Sheet at 14-24). EPA referenced specific PREP findings from "State of the Estuaries Reports" noting that up through 2005, the system was, (1) not responding to changing levels of TN, and (2) eelgrass resources were not considered impaired by TN. Fact Sheet at 15. During this period, the TN/DIN concentrations and loadings to Great Bay where eelgrasses thrived were significantly *higher* than they are today. *See*, Ex. 77; PREP 2018 State of the Estuaries Report (identifying historical TN loadings and concentrations exceeding 250 kg TN/ha-yr). This is precisely the type of information EPA has routinely used and supported for developing protective TN concentrations and loadings for estuaries throughout New England. (Ex. 57, 76). This long-term record of healthy eelgrass growth occurring with TN loadings from 175-250 kg/ha-yr, that EPA failed to address, objectively confirms that the existing and historical system TN loading was not adversely impacting eelgrass propagation. EPA's analysis arbitrarily ignored this information when concluding, based on assumptions, not data analysis, that the system was beyond its assimilative capacity for nitrogen.

a. A Natural Condition Caused the Eelgrass Losses

Federal law does not regulate natural conditions under the Clean Water Act. When eelgrasses declined in 2006, that condition was directly caused by a series of major storms that were 50-100 year events – not eutrophication effects from ambient TN concentrations. Ex. 25-27, 39; PREP 2018 State of the Estuaries Report and Figures below. This storm in early May and the follow-up storm in June degraded water quality for over 6 weeks during the critical early growing season when light is needed for eelgrass to sprout.





This impact was also confirmed by the 2014 Independent Peer Review and related scientific assessments which concluded that there was no evidence supporting the proposition that nitrogen was, in any way, responsible for the eelgrass decline in this system. Ex. 47. Rather, various assessments confirmed that the eelgrass impacts were not caused by excessive plant growth, they were caused by increased CDOM and particulate matter in the watershed runoff that dramatically cut the light transmission through the water column for over a month during the early eelgrass growing season in 2006. Ex. 25-27; 63. The higher CDOM condition is also a natural condition. *Id.*; Ex. 35. High turbidity occurring under a flood condition is also a natural event.

8.1.2 Turbidity, river discharge, and wind resuspension

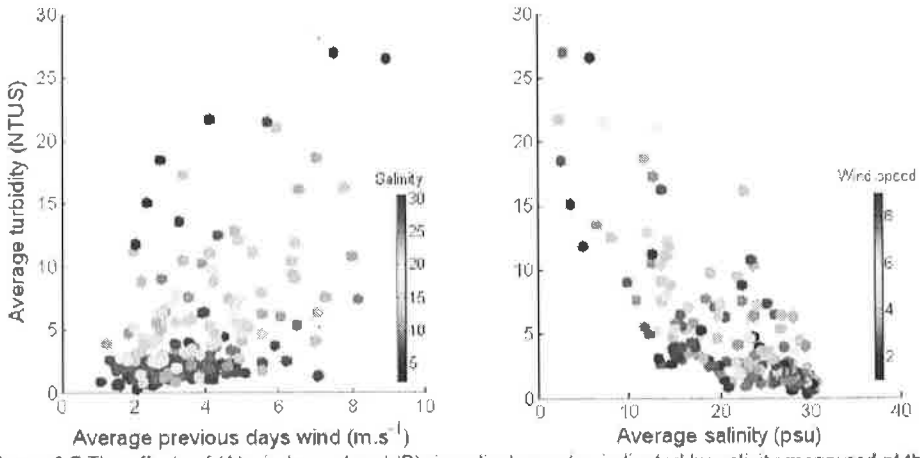


Figure 8.7 The effects of (A) windspeed and (B) river discharge (as indicated by salinity measured at the buoy) on turbidity.

High turbidity levels appeared to have occurred after high wind events (Figure 8.1) and were also associated increased river flow. A simple model for turbidity levels was that the mean daily turbidity was dependent on the mean daily wind speed for the previous day and the current daily river discharge (Figure 8.7). Salinity at the buoy was used as a proxy for the effect of discharge. 70 percent of the variability of the log transformed turbidity (NTU) was explained by the previous day's windspeed (U_w) and the current day salinity (Sal, Equation 8.2).

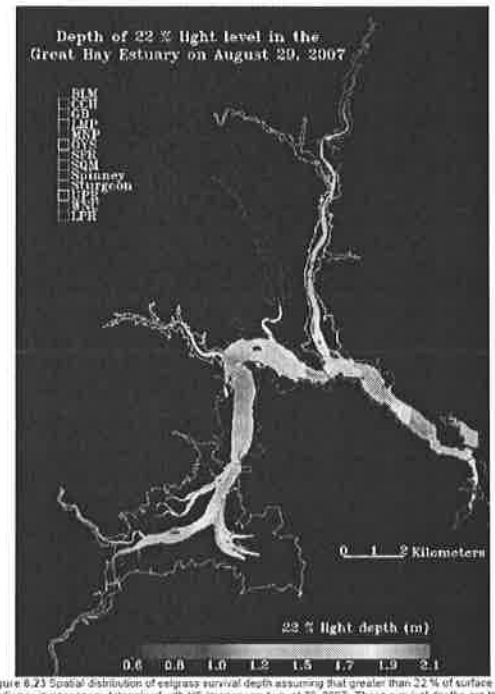
Morrison at 28

Due to the extreme floods, salinity in the system also plummeted and was near zero for weeks. PREP 2018, noted that this alone could have caused extensive loss of the systems eelgrasses which require a mostly saline environment to survive.

All of these conditions (low salinity, high CDOM, high turbidity) were exacerbated near where the major rivers enter the system (Squamscott, Lamprey and Winnicut). That is precisely where the greatest losses in eelgrasses occurred – as demonstrated in the eelgrass maps for 2006. In short, no assessment of this system's data and plant growth responses has ever concluded that nutrients had anything to do with the present eelgrass decline or failure to recover occurring after the Mother's Day storm event. The Great Bay eelgrass decline was broad and pervasive, regardless of the depth of the area – confirming a eutrophic condition could not possibly have caused this dramatic downturn. See, Fact Sheet at 21, Figure 3, which confirms eelgrasses declined significantly at all system depths.

b. Little Bay Losses are not Related to Nutrients

The eelgrass losses in Little Bay occurred from the late-1980s wasting disease and never recovered. Over 250 acres of eelgrass were lost permanently in Little Bay. When Great Bay recovered in the early 1990's Little Bay never did, despite better water quality and clarity than Great Bay as confirmed by Morrison (2008) and a light regime that is sufficient to support unlimited eelgrass growth.



ure 8.23 Spatial distribution of eelgrass survival depth assuming that greater than 22 % of surface
ndance is necessary determined with HS imagery on August 29, 2007. These survival depths are the
pth below the mean water level and depths less than one meter effectively indicating no eelgrass
sible as they would be associated with intertidal areas.

e 8.17 Remotely sensed effective PAR diffuse attenuation coefficient, K_d(PAR), for optically deep
s from the HS imagery collected on August 29, 2007. Outlines of the NHEP estuarine assessment
s are given as is the transect of the along-track measurements in red.

Light levels are plainly far better in Little Bay than in Great Bay, but this condition did not result in regrowth of the eelgrass beds after the 1988/89 wasting disease event or after the 2006 Mother's Day storm. As with the Piscataqua River, the hydrodynamics of the system have apparently prevented significant reseeding of eelgrass beds in Little Bay. EPA's claim that eelgrasses losses in Little Bay are part of a TN related problem is unsupported by rational analysis.

As a series of natural events caused the system eelgrass losses in 2006 and prior to that time, and at no time did TN levels preclude eelgrass regrowth, EPA may not regulate TN based on the

claim that eelgrass populations have decreased in the system since natural events not pollutants or eutrophication effects caused this condition to exist. Authority to mandate more restrictive nutrient regulation does not exist under these circumstances.

c. Regulating on Presumption is not Authorized under the Act

EPA's proposed permit assessment regarding TN effects should be withdrawn because it is based only on assumptions of TN effects with no analysis of the available system data (or detailed system studies) to verify whether the assumptions are rational or supported for this system.[40] EPA's published Section 304(a) guidance for estuaries and WQS Handbook notes that it is essential to evaluate the specific physical and chemical conditions present in an estuary to properly evaluate the need for nutrient limitations and establish necessary requirements.:

> In the case of nutrients, it is understood that there is a great deal of variability in inherent nutrient levels and the biotic responses to nutrients. This natural variability is due to differences in geology, climate and waterbody type. Because of that variation, EPA has accepted that various types of waterbodies need to be evaluated differently and that recommended nutrient concentration levels need to reflect such a variation. Thus, nutrient criteria are not typically transferable from [...] one type of estuary to another.
>
> ...the extent to which various symptoms are expressed depends on the rate of nutrient loading, its composition, seasonality of the loads relative to the growth state of the resident organisms, status of higher trophic levels, residence time, stratification and many other abiotic factors, such as suspended sediment load (e.g., Figure 2.2). One of the important factors determining the expression of eutrophication symptoms is the composition of the nutrient pool. Nutrients can be delivered to an ecosystem from riverine sources, groundwater, atmospheric, marine and other sources. Each source can vary in the amount of specific nutrients they contribute (N, P or Silicon [Si]), as well as their proportional ratio to other nutrients in that source. They can also vary in the chemical form of those nutrients, inorganic or organic, or, in the case of N, oxidized (NO3– or NO2-) or reduced (NH4+) forms.

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[40] *See* Taunton EAB appeal decision at 65-68 discussing how EPA reviewed the system specific data to set the appropriate ambient TN threshold to meet narrative and numeric criteria. *In Re City of Taunton Department of Public Works*, NPDES Appeal No. 15-08, Order Denying Review, May 3, 2016 at 65-68.

> ... Estuaries can respond to similar levels of nutrient loading in very different ways. As described throughout this report, this disparity can be ascribed to fundamental differences in the way the respective waterbodies receive and process inputs.

Nutrients in Estuaries, USEPA 2010, at 3, 12 and 27.

As EPA did not account for any of the well-known factors that control TN effects in an estuarine system or the available studies for the Great Bay system that assessed those factors (Ex. 16 to 77), the analysis is arbitrary and capricious. *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (An administrative action will be set aside if the agency "has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise."). At a minimum, the critical factors that EPA must assess include system transport, dilution, detention time, form of nitrogen, and timing of the loads to the system.

EPA's reliance on the Latimer and related studies is inappropriate. EPA claiming that Latimer's study (and others) is based on *total* nitrogen loads when the paper expressly stated it *only* considered *dissolved* N (i.e., inorganic N) and the loading model not verified by any system data. Total nitrogen loads in a riverine setting are completely different from the form of nitrogen occurring in ground water influenced coastal embayments. As EPA Guidance notes:

> ...the extent to which various symptoms are expressed depends on the rate of nutrient loading, its composition, seasonality of the loads relative to the growth state of the resident organisms, status of higher trophic levels, residence time, stratification and many other abiotic factors, such as suspended sediment load (e.g., Figure 2.2). One of the important factors determining the expression of eutrophication symptoms is the composition of the nutrient pool. Nutrients can be delivered to an ecosystem from riverine sources, groundwater, atmospheric, marine and other sources. Each source can vary in the amount of specific nutrients they contribute (N, P or

Silicon [Si]), as well as their proportional ratio to other nutrients in that source. They can also vary in the chemical form of those nutrients, inorganic or organic, or, in the case of N, oxidized (NO_3^- or NO_2^-) or reduced (NH_4^+) forms.

Nutrients in Estuaries at 12.

The failure of EPA to properly evaluate this single issue (the difference between dissolved versus Total N) caused EPA to underpredict the allowable Great Bay system load by a factor of 2.5 (assuming the cited papers are applicable to the Great Bay system in the first instance). This is apparent when TN loads for this system are plotted on the graphics EPA has relied upon from the various authors. Moreover, Dr. Latimer confirmed that his paper was based on assumed, not documented impacts of TN on eelgrass growth – rendering it nothing more than speculation – not a biological fact of TN loads versus eelgrass demise. (Ex. 71) In fact, the entire paper was based on undocumented estimates of TN loads, eelgrass growth or nutrient impacts, as Dr. Latimer readily acknowledged in his response to questions posed by the community experts:

Latimer confirmed the TN load eelgrass assessment is completely based on assumed, not documented TN loads and eelgrass impacts

Question: Our understanding of your paper is that it presumed eelgrass should exist in various New England locations in bays, tidal ponds and tidal rivers (based on a chosen depth), compared that calculation to the amount of eelgrass presently there to calculate "eelgrass loss" and then plotted that value against the amount of TN loading occurring in those areas, but did not confirm that
(1) eelgrass actually could thrive in the calculated areas
(2) if historical beds did exist, their loss was not caused by other non-nutrient factors (e.g., wasting disease, storms, boat traffic, invasive species, etc.) or
(3) TN related impairments were documented for the systems in question where major losses were calculated to have occurred.
Is this an accurate understanding of information presented in the paper?
Response: Yes

Latimer confirmed that TN eutrophication impacts were not confirmed as occurring in these systems, they were assumed to be occurring

Please identify those systems where significant TN impairment (light limitation caused by excessive epiphytes, excessive macroalgae or excessive phytoplankton growth) was documented as the reason for the change in eelgrass population).
Response: Unknown

What level of phytoplankton biomass (as chlorophyll-a, μg/L – average and maximum) was present in the 2010 study sites for the year characterized in the study?
Response: We did not consider phytoplankton biomass (chl-a) in our analysis.

Latimer confirmed his loads were all based on dissolved nitrogen (TDN) predicted loads

How did you calculate TN loading rates used to populate the graphs – were these measured loads or estimated loads? Did you account for tidal transport within the system or only "upstream" sources?
Response: TDN was calculated using the NLOAD (NLM) watershed model; see Latimer and Charpentier 2010 paper for details. Upstream (watershed) sources were considered as well as atmospheric deposition to estuarine surface.

Latimer Confirmed his method did not address TN effects in river dominated systems

Question: Did the study include any analysis that separated water bodies into tidal rivers, versus ponds and harbors due to the well-known differences in hydrodynamics and non-nutrient factors affecting light transmission, sediment quality, and the ability of eelgrass repatriation to occur?
Response: Only non-river dominated systems were studied.

Latimer confirmed eelgrass losses in charts were assumed, not confirmed losses

Question: Did this study assume that eelgrass can grow at all areas with average depth < 3 meters? Was any confirmation undertaken to document the assumption was appropriate for the various waterbodies included in this paper – in particular waters with naturally elevated CDOM levels?
Response: Yes; we used general conclusions from the Vaudrey 2008 report. We had no data on CDOM levels for the estuaries.

Question: What were the adverse TN impacts on eelgrass in the study's references?
Response: We did not document TN impairments to the estuaries (except for anomalous estuaries)

Latimer confirmed that wasting disease, a widely known cause of eelgrass decline for the embayments evaluated was not considered

Question: How did this study account for wasting disease? (Note: The data for Massachusetts estuaries were obtained for 2001. The Atlantic coast experienced a significant outbreak of wasting disease in 1988-1989 and in the late 1990s/early 2000s)
Response: We did not account for wasting disease; although, in general, southern New England system wide losses from wasting disease has been documented to be before the imagery was collected for this study.

Latimer confirmed that the TN Loads were estimated, not measured

Question: How did you calculate TN loading rates used to populate the graphs – were these measured loads or estimated loads? Did you account for tidal transport within the system or only "upstream" sources?
Response: TDN was calculated using the NLOAD (NLM) watershed model; see Latimer and Charpentier 2010 paper for details. Upstream (watershed) sources were considered as well as atmospheric deposition to estuarine surface.

Latimer confirmed the use of annual versus seasonal loads were simply an artifact of the assessment method, not ecologically required

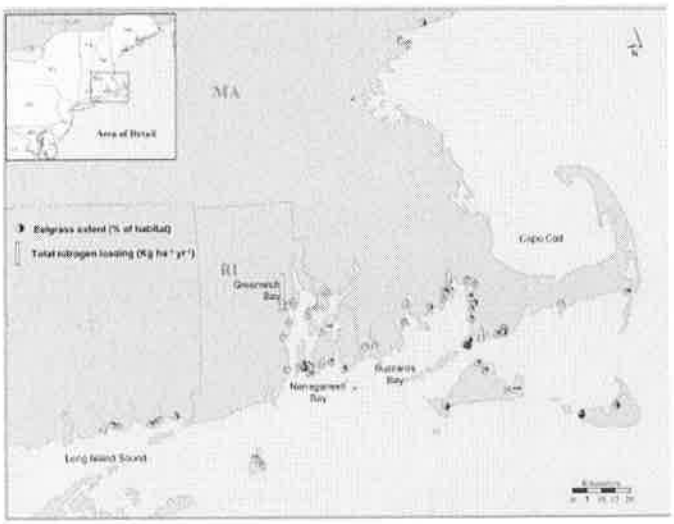
Question: Why was annual TN loading used when nutrient loads and their impacts on eelgrass are seasonal (see below from PREP, S. Jones, 2000)?

Response: Annual loading rate was used because the model used to estimate loading is based on land use and thus integrates over time (average loading).

In summary, the entire paper was simply a theoretical analysis and was never intended to be taken as presenting a scientifically defensible determination of the degree of TN loading that must occur to protect eelgrass resources. One cannot rationally review his publication, peer reviewed or not, and conclude that it verifies a 100 kg/ha-yr TN load limitation is necessary to protect eelgrass populations in every estuarine system or in any river dominated system. On its face, his paper states the opposite. Latimer and Rego at 234, 238 – ("The ecological response to nitrogen to an estuary will be modulated by its physical characteristics .. However, ecological effects are not simply derived from the magnitude of nitrogen that comes from the watershed, but rather include the mitigating or magnifying effects such as flushing and dilution.") Moreover, by his admission, this paper does not apply to "river dominated" systems – which is the Great Bay system. For Great Bay, virtually all nutrient loads enter via river inputs and the system salinity is dramatically affected by the amount and timing of freshwater entering Great Bay. Excluding the one-time drop related to the Mother's Day Flood in 2006, Great Bay has historically had stable eelgrass acreage at a time when TN loads were well in excess of 100 kg/ha-yr.[41] None of the systems within Dr. Latimer's paper (or the other authors) were "river dominated" because of the dramatic impact major watersheds have on a host of conditions that affect the ability of eelgrasses to exist and thrive. The forms of nitrogen, as discussed in detail later, are also dramatically different in river dominated systems, versus small embayments Latimer evaluated. EPA's analysis completely ignored all of these critical facts

[41] Figure 2 of the Fact Sheet shows the one-time drop (2006). During the period 2012-2016, EPA has calculated a total load of 189.3 kg/ha-yr, yet eelgrass again remained stable.

and Dr. Latimer's specific admonition that the paper has no relevance to river dominated systems (nor do the other papers cited by EPA). Ex. F1-F5 All of the embayments evaluated by Latimer, Hauxwell and Valiela were small, coastal embayments, which are not similar to the Great Bay system, as evidenced in the map below:



These systems are documented to be highly susceptible to nutrient impairment, while the Great Bay system is documented to have low susceptibility (See Latimer and Rego supplement and Ex.70) Latimer stated that this difference would lead to false positive indications of impairment if not addressed. EPA's lack of analysis is directly contrary to published Section 304(a) methods on nutrient impact evaluation (which apply to this matter via 40 C.F.R. § 122.44(d)(1)(vi) in the development of the numeric target value from a narrative criterion[42]). In particular, a marked difference between the systems/papers EPA referenced as the basis for its decision and the Great Bay system is the form of nitrogen (mostly labile and particulate) and the system transport that ensures such forms of TN are not available to stimulate excessive plant growth. Ex. 26-28, 57, 72, 76. Dr. Howes and Dr. Latimer confirmed that the form of nitrogen used to create the graphs in his paper was DIN, *not* TN. Ex. 57. Dr. Latimer's paper expressly stated that the loads only reflected the dissolved nitrogen loading to the system. Latimer and Rego at 233. Thus, EPA's

[42] 40 C.F.R. §122.44(d) requires that the permitting authority *shall* account for the dilution of the effluent in the receiving water when determining if a discharge causes an excursion above a narrative criterion and use Section 304(a) documents when interpreting narrative standards. EPA's Section 304(a) criteria for nutrients required consideration of the form of nitrogen occurring in the system.

100 kg/Ha-yr target is not a TN load it is equivalent to a dissolved inorganic (DIN) load. The Great Bay system is already well below that load, as DIN only accounts for about 35% of the TN watershed load. Ex. 26-28. This "apples and oranges" comparison confirmed EPA's assessment is misguided and does not accurately reflect the documents it purports to be relying upon.

Finally, EPA also failed to recognize that the majority of the non-point source loadings to this system occur during the non-growing season and, given the systems relatively short detention time (7-10 days), have no relevance to eelgrass propagation or stimulation of any forms of "excessive" plant growth (see, seasonal load variation to Great Bay system). Given these fundamental deficiencies in EPA's Fact Sheet and supporting analyses that directly affect whether and how any adverse impacts from a given TN load may be manifested, this proposed General Permit must be amended to reflect the actual conditions occurring in the system versus those analyses by the referenced authors. *State Farm*

6. **Failure to address information available to EPA to confirm whether use of 100 kg/ha-yr limit to mandate load reductions is scientifically defensible**

In addition to the lack of data and system analysis to support a conclusion that existing TN concentrations or loads have a reasonable potential to adversely impact eelgrass resources or to support a conclusion for imposing a watershed load limitation of 100 kg TN/ha-yr, EPA Fact Sheet did not evaluate or consider the extensive records in its possession confirming that the proposed General Permit was not reasonable or appropriate. EPA possessed scores of technical assessments that evaluated the system data and concluded that TN was not causing any form of demonstrable harm to eelgrass recovers. *See* Exhibit List of reports evaluating aspects of TN impacts on Great Bay system and eelgrasses in particular. EPA did not (1) include any of these documents in the administrative record, or (2) evaluate the relevant information or findings presented in these analyses that are based on the site-specific information. EPA also reviewed but ignored studies that confirmed higher TN loads (150 kg/ha-yr – 175 kg/ha-yr) were protective of eelgrass (Mumford Cove Ex. 86; Steward Ex.87).[43]

[43] Steward and Green (2007) (Ex. 87) evaluated nutrient loading limits to protect seagrass resources in several estuaries in Florida that were adversely affected by increases in light attenuation. They developed regressions to relate departures from seagrass depth-limit targets to watershed TN loading rates (similar to the approach used in Waquoit Bay, MA) and used a 10% reduction from the targeted depth limits as a threshold for impairment based on Florida's water quality standards. The regressions showed a significant correlation between the areal loading rate and percent departure from the seagrass depth-limit targets. The regression model provided a loading target of 2.4 –

EPA also possessed the deposition excerpts from various systems "experts" who had claimed to EPA that TN was adversely impacting eelgrass resources. Ex. 35. These individuals (Dr. Short, Philip Trowbridge, Ted Diers) admitted, under oath, that they lacked any objective information or analyses in support of their prior claims and that, in fact, the available information supported the opposite conclusion (no apparent adverse effects from TN on this system). The relevant deposition excerpts are listed below.

No Material Change in Phytoplankton Levels

> **Q.** [F]or the data available, does it support the hypothesis that nitrogen is causing phytoplankton blooms which are reducing water clarity to a great degree? Do the data show that? **A.** The data – the trend analysis, which doesn't show any kind of increased trend, does not support that hypothesis.

Trowbridge Deposition Vol. 1 at 127 ln 15-22 (Ex. 35).

No Narrative Criteria Violation Through 2005

> **Q.** So up through 2005 there's no narrative criteria violation for what – I guess what you call ecological impacts for Great Bay or Portsmouth Harbor; right? **A.** Correct.

Id., at Vol 2 at 354 ln 2-4.

No Change in Transparency Through 2005

> **Q.** And as far as we know, there was no change in transparency throughout this time frame of 1990 to 2005, to the degree we have data or information available on that; right? **A.** Right.

Id., at Vol 2 at 355 ln 12-14.

Reason for 2006 Eelgrass Decline Unknown

3.2 kg TN/ha-year. Translating this loading target to the Great Bay Estuary, with a watershed area of 1,023 square miles and an estuarine area of 21 square miles, the resulting loading target would be 117 – 156 kg TN/ha-year. These targets are well above the adaptive management target proposed by EPA. The Great Bay system has far greater water transfer and lower algal growth potential than the systems evaluated by Steward, thus, significantly higher TN loads would be required to cause a >10% reduction in transparency from algal growth.

Q. There was a major decrease in eelgrass populations in Great Bay; right? **A.** You mean in 2006, 2007, 2008? **Q.** Yeah. Big drop-off? **A.** Yes. … **Q.** That major decline you don't know what caused that in 2006, '7 and '8; right? **A.** Uhm-hmm. Yes. We do not know.

Id., at Vol. 2 at 371 ln 16-17, 371 ln 16-17.

No Light Limitation

Q. You've got emails form Dr. Short, Phil Colarusso, Jim Latimer, I don't know what he's an expert on, all saying the same thing, the system is not a light-limited system, Great Bay. What information did you have that demonstrated that expert advice was incorrect? **A.** None.

Id., at Vol 1 at 211 ln 18- 212 ln 3.

Great Bay Eelgrasses Receive Enough Light

Q. "Great Bay is dominated by extensive eelgrass meadows that are intertidal that receive enough light at low tide to satisfy their light requirements." Do you have any reason to disagree with that observation made by Dr. Short? **A.** No

Id., at Vol. 1 at 177 ln 8-18.

Tidal Rivers Have Naturally Low Transparency

Q. Based on the Morrison report you know CDOM is originating from the tidal rivers; right? **A.** Yes. **Q.** Okay. Are the CDOM concentrations much higher in the tidal rivers than they are in the bay? **A.** Yes. … Correct; that's a natural condition.

Id., at Vol. 2 at 427 ln 6-9.

Proper Narrative Criteria Implementation

A. [T]his rule basically applies to cultural eutrophication, and the end point is the excessive plant growth. **Q.** … Suppose I had nitrogen or phosphorus discharge into the water body and it didn't cause a change in plant growth. Would that nitrogen or phosphorus be considered in violation of this provision in any event? **A.** No.

Currier Deposition at 19 ln 4-13.

Q. Is it your understanding that a narrative criteria violation for nutrients only occurs if the nutrients are causing some demonstrated adverse effect? **A.** Yes.

Trowbridge Deposition Vol. 2 at 326 ln 4-8.

No Documented Macroalgae Impacts

Q. Do you know if in this system the growth of macroalgae is what caused the eelgrass loss? **A.** No. **Q.** Okay. And whatever macroalgae were growing, they apparently did not prevent 500 acres of eelgrass from recovering, did it? **A.** No.

Id., at Vol. 1 at 156 ln 21- 157 ln 5.

Q. Have any of the indicator reports ever addressed the extent of macroalgae growth in the system and whether or not it's causing an impairment? **A.** No.

Id., at Vol. 1 at 152 ln 13-16.

EPA's failure to address or even consider these relevant documents in their possession confirms that the proposed TN reductions in the General Permit are not necessary to protect eelgrass resources. EPA's failure to address this reliable (sworn testimony) information relevant to claiming TN impairment, indicates a biased and results-oriented assessment was completed. This assessment must be withdrawn pending the completion of an assessment that addresses all of the relevant studies and analyses addressing whether TN reductions are needed to protect eelgrass resources in this system. *Environmental Defense Fund v. Blum*, 458 F. Supp. 650, 661 (D.D.C. 1978).

7. **New System modeling and loading data analysis confirms TN limit of 100 kg/ha-yr produces unnecessarily restrictive ambient TN concentration**

As noted earlier, EPA's Fact Sheet and administrative record lack any analysis evaluating the TN concentration that will result from the proposed watershed load limitation of 100 kg TN/ha-yr. This is directly at odds with EPA's published procedures for waste load allocation development, as evidenced by the permits issued to Exeter, Newmarket, Newport, and Taunton, which contained such analyses based on the modeling methods that are available. Those prior EPA analyses assumed all TN loads were conservative and accounted for the system hydrodynamics that governed assimilative capacity and ambient nutrient concentrations.

As EPA is aware, Dover, in conjunction with the City of Rochester, funded the development and calibration of a hydrodynamic model. An EPA expert, Mr. Hagy, reviewed that model's transport calibration and did not find any substantive concerns with the hydrodynamic calibration. That model was also recently calibrated for predicting the systems TN for various loading scenarios, assuming TN was conservative once it reached the system. Like EPA's assessments, TN was assumed to respond in a conservative manner once in the Great Bay system. Ex. 30-33. Dr. Howes, an expert on estuarine modeling for nutrients, reviewed the model calibration and has concluded that it is scientifically defensible and capable of predicting the system's TN response to various loading scenarios. Ex. 34. He has indicated that further consideration of nitrogen cycling, or sediment interaction is not required given the physical attributes of the Great Bay system.

Based on that model, a TN load of 100 kg/ha-yr produces a TN concentration of 0.24 mg/l at Adams Point. A 200 kg/ha-yr load produces a 0.36 mg/l TN concentration at this location. Ex. 31-33. This model (and the nomograph of system loading versus response) demonstrate that the proposed General Permit watershed load is unduly restrictive. At a minimum, Dr. Howes concluded that a 200 kg/ha-yr loading is sufficient to protect eelgrass resources and, in all likelihood, a value of 250 kg/ha-yr would be also. Ex. 76 (EPA Tetra Tech A TN Endpoint Analysis for Long Island Sound). Based on this assessment not available when EPA released the General Permit, the allowable system TN loading should be increased to 250 kg/ha-yr and the related point source limitations adjusted accordingly.

8. Use of annual average limitation not necessary to avoid harmful plant growth and contrary to EPA guidance

EPA has proposed to limit nitrogen on an annual average basis from the wastewater facilities. EPA's only explanation in support of this decision is that the Latimer paper and that of Valiela and Hauxwell also reported TN loadings on an annual average assessment. As explained by Latimer, that was simply a function of the analysis framework, not an ecological requirement. (Ex.71) That is not an appropriate rational for imposing a year-round TN limitation. Federal guidance on development of water quality-based limitations for nutrients states that seasonal limitations should be used, except where the specific characteristics of the water body justify

year-round limitations. (Ex. 1-6) The nutrient impacts of concern can only occur in the growing season and the pollutant conditions influencing such conditions (water column inorganic nutrients) are transient. The application of the state narrative criteria does not require communities to meet nutrient objectives on a year-round basis for this system or other short detention time systems. *See*, Exeter, Newmarket, Newport, and Taunton NPDES Permit Fact Sheets.

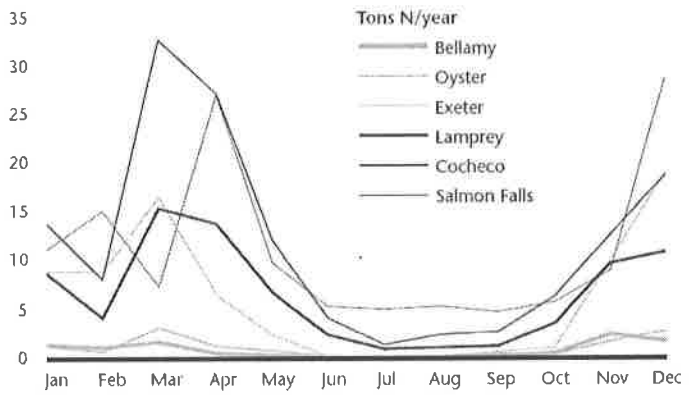
Consistent with this understanding, EPA Region I has issued scores of permits and approved easily 100 nutrient TMDLs, implementing state narrative criteria that only impose specific nutrient limitations during the growing season. (*See also* 70 Nutrient TMDLs approved by USEPA Region I for eelgrass protection that establish limitations only on a growing season average basis and related permits). *See*, https://www.epa.gov/tmdl/region-1-approved-tmdls-state EPA's decision to impose a more restrictive approach in this context is not supported by a valid regulatory analysis or demonstration of ecological need. Ex. 75, 76.

First, effluent limitations are only imposed to the degree that they are "necessary" to ensure compliance with an "applicable water quality standard." *See*, 40 C.F.R. § 301(b)(1)(c); 40 C.F.R. 122.44(d), and 40 C.F.R. § 130. Excessive plant growth that could adversely impact eelgrass resources is only a concern during the plant "growing season" and nutrients do not stimulate excessive plant growth outside of this time frame. Consequently, EPA's standard procedure and recommended approach to nutrient regulation in estuarine waters is to establish only **growing season** average nutrient limitations. The permits previously issued for Exeter and Newmarket to protect the Great Bay system (as well as the draft Dover permit) also utilized this approach.

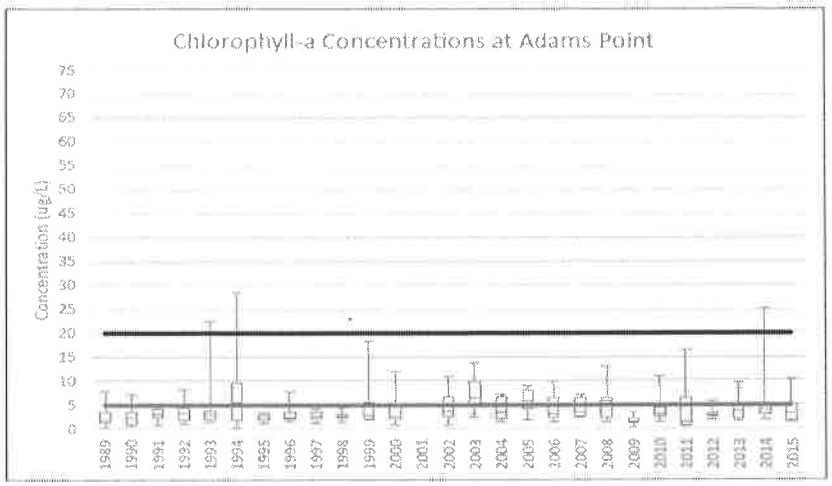
Second, the only reason the papers cited by EPA as the basis for the 100 kg/ha-yr limitation used "annual average" analyses was due to the fact that they only addressed groundwater nutrient inputs and such loading assessments are typically conducted on an annual basis because they do not vary significantly as a function of season. Ex. 71 (Latimer responses) None of the cited papers determined that these embayments required year-round TN reduction to ensure excessive plant growth did not occur.

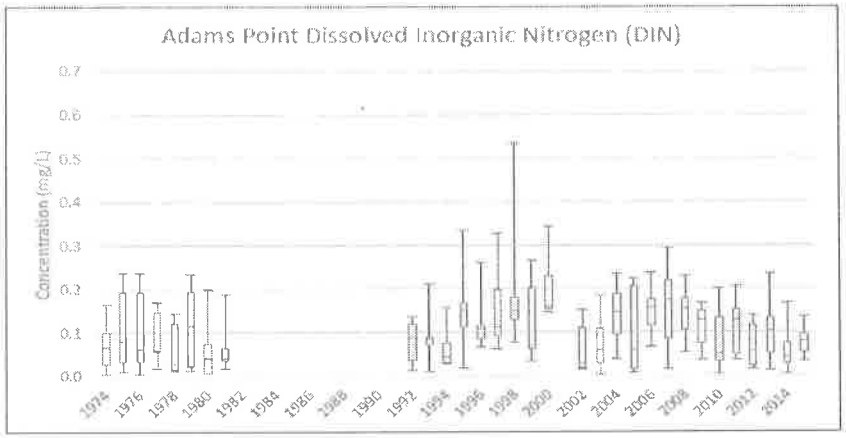
Third, the Great Bay system, however, is not dominated by ground water nutrient inputs, rather, the dominant nutrient sources are tributary and POTW driven, as EPA documented. Ex. 65. Unlike groundwater inputs evaluated by Latimer and others, these inputs do vary dramatically on a seasonal basis and the cost of TN reduction is much more expensive and difficult to maintain during the non-growing season. The chart below demonstrates when tributary loads occur and their magnitude in the Great Bay system. The vast majority of the loads occur outside of the growing season (November – April) when impacts to eelgrasses are not a concern.

Annual loading of nitrogen from fluvial (riverine) sources to the Great Bay Estuary. FIGURE 2.34

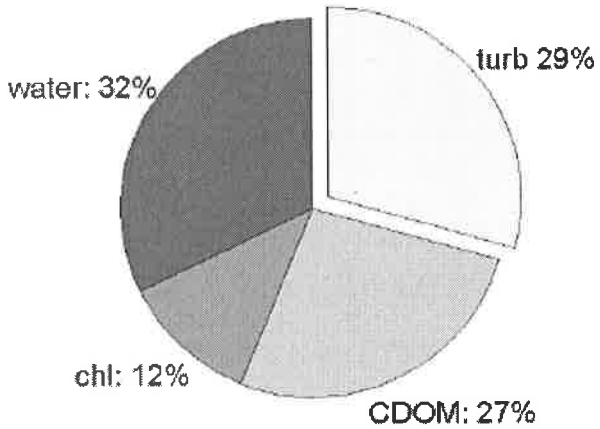


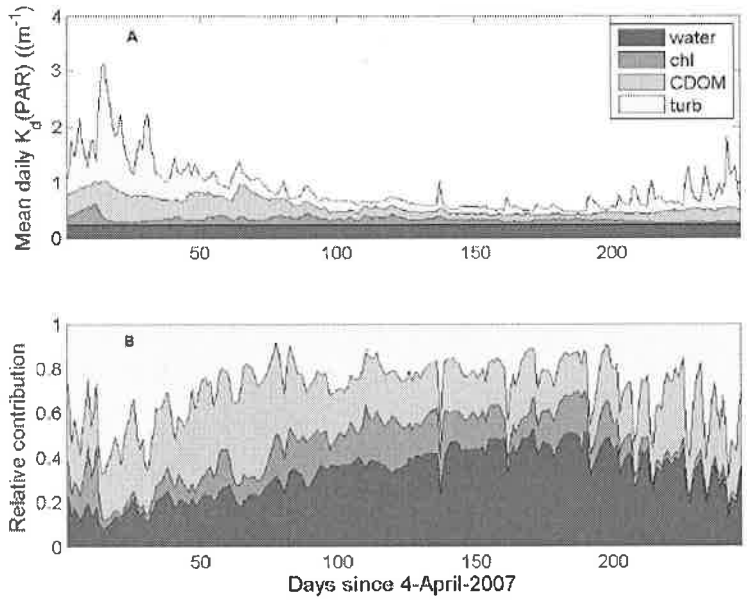
Fourth, it is clear that non-growing season nutrient loads are irrelevant to eelgrass protection in this system. Such loads, which pass through the system, do not stimulate any form of adverse plant growth in the non-growing season that would serve to prevent eelgrass propagation that starts in late April and early May when ice clears and seeds begin to germinate. The data for the system (figures below) confirm that excessive phytoplankton stimulation has not occurred for over 30 years, regardless of the load or concentration of total or inorganic nitrogen present in the system. PREP State of Estuaries Report (2018); Fact Sheet at 18; Ex. 35 (Trowbridge Deposition Excerpts).





Finally, as noted by Dr. Howes (Ex. 57-76), the available inorganic nitrogen is not limiting plant growth. Plant growth is controlled by other physical factors of the system (detention time and light transmission due to CDOM). Morrison (2008) also confirmed that CDOM and non-algal turbidity were the dominant factors controlling light transmission through the water column. Ex. 17. The effect of riverine sources of these components was confirmed by his analyses.





Likewise, epiphyte growth has never been documented as a concern impairing eelgrass propagation in this system. Ex. 35 (Short and Trowbridge Deposition). This is not surprising as this system is subject to reduced light transmission due to CDOM. The reduced light will also limit the ability of epiphytes to grow on the eelgrass leaves. Macroalgae, the only potential form of competing plant growth does not appear in the system until June, after eelgrass beds have started growing. *See*, Nettleton 2012 and Burdick 2018. Thus, the only tributary loads that have any potential for adverse effect on eelgrass growth are those occurring June- October, that could stimulate some level of increased macroalgae growth during that period. Thus, EPA's decision to regulate TN on an annual average basis will overregulate about 80% of the system loads that have no apparent effect on plant growth based on 30 years of system monitoring.

In conclusion, EPA has presented no valid or scientifically defensible analysis demonstrating that it is necessary to limit nutrient loadings during the non-growing season in this system. There is no basis to conclude non-growing season nutrient loadings "causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard." 40 C.F.R. § 122.44(d)(1)(vi). Considering the specific characteristics of Great Bay, the timing of the potential plant growth of concern and the longstanding EPA procedure to set only growing season limitations, the annual average nutrient

reduction requirement should be stricken and replaced with the appropriate growing season (June-October) limitation (derived from a protective ambient concentration, as discussed above), as needed to protect eelgrass resources from, at most, possible adverse impacts from macroalgae.[44]

9. Lack of peer review to confirm that the watershed loading method as applied is appropriate for setting nutrient limits for this system

Impacted communities have requested, and Dover hereby renews and restates its request, for an independent peer review of EPA's intended approach to be conducted prior to the issuance of any final permit. Ex. 54-56. EPA responded to the City of Dover's earlier request stating that the need for peer review would be dependent on the comments received. This response was in error and a peer review must occur before the "Latimer" nutrient loading model may be used in a regulatory setting. The "peer reviewed" article by Latimer nowhere stated that it was submitted to scientifically establish that estuarine nutrient load restrictions for eelgrass protection should be based on the surface area of the waterbody, regardless of the other physical characteristics of the system (e.g., depth, dilution from freshwater and the ocean, system hydrodynamics and other factors influencing the ability of aquatic plants to grow - CDOM, turbidity, sediment characteristics, depth, etc.). In fact, that theory, now presented by EPA, was expressly rejected in the companion article published by Latimer and Charpentier in 2010 "*Nitrogen inputs to seventy-four southern New England estuaries: Application of a watershed nitrogen loading model*" which states:

> *The results of the application of the NLM to the 74 watershed estuary systems provide an understanding of the magnitude of nitrogen loading to estuaries in southern New England, but alone are insufficient to determine how much nitrogen is too much. What is lacking is the associated expression of the effects along the gradient of nitrogen inputs. According to common understanding of how nutrients affect estuaries, at levels below some critical loading, nutrients provide benefits to the healthy structure and function of estuaries. Estuaries are dynamic*

[44] Internal EPA records focused on the claim that macroalgae were the cause of the eelgrass decline and present lower acreage. While this is pure speculation, if true, only loads from June - September would need to be regulated. Ex. F1-F5.

> *environments that can assimilate nutrients depending upon their geomorphic and hydrodynamic properties which affect the ability to dilute and flush nutrient loads. Knowledge of estuarine susceptibility to nutrients and the associated expressions of effects is important (NRC, 2000). The NLM provides one essential component in the development of quantitative empirical pressure-state relationships suitable to determine how much nitrogen is too much. The other essential components are data on effects or symptoms of eutrophication, such as, for example, water clarity, chlorophyll-a magnitude as well as indicators tied directly to designated uses, such as extent of hypoxia and extent of ecologically important resources such as seagrasses.*

Dr. Latimer's publications (as well as dozens of EPA's published, peer reviewed Guidance documents) all recognize that the need to control TN must be demonstrated after considering system flushing and hydrodynamics and be confirmed by data showing elevated TN caused adverse impacts in the system in question. Such analyses ("effects along a gradient of nitrogen input") are a fundamental part of estuarine assessments that are nowhere presented in EPA's draft General Permit Fact Sheet. EPA's use of the Latimer, Valiela and Hauxwell papers to establish that areal load (based on the surface area of an estuary) alone dictates the allowable nutrient load for any system is unprecedented, has never been stated in any peer reviewed scientific publication and is, on its face, indefensible. It violates basic laws of physics, environmental engineering, plant growth and estuarine dynamics that have been the foundations for nutrient impact assessment for decades. EPA is applying the cited paper in a manner that is not even consistent with the finding reached in those publications – which stand for the unremarkable premise that excessive inorganic nitrogen loads to small, shallow coastal embayments may be expected to adversely impact eelgrass growth due to reduced light transmission caused by excessive plant growth. That conclusion does not establish the premise that all estuarine systems, no matter how different from the small coastal embayments studied are expected to respond similarly. Dr. Latimer's publication itself stated this would not be the case.

Separately, Dover's Economic Impact Memorandum being submitted with these comments outlines and underscores the significant cost implications of the regulatory decision. From Dover's perspective, the highest priority spending and use of resources would be addressing

infiltration and inflow. Dover has current average baseline flows between 2.7 and 2.8 mgd. During a period of heavy rain, the flow may go up significantly to over 15 mgd. Operationally, Dover often has to anticipate shutting the air off to its MLE process before the flow spike hits. This essentially maximizes our solids settling by using the MLE for primary settlement, which takes a load off the secondary clarifiers. So TN treatment is basically halted in lieu of maximizing solids capture.[45] In short, using resources at the WWTP would be on the lowest end of the priority list, yet the Draft Permit significantly disturbs local planning and needs.

USEPA's *Peer Review Handbook*[46] ("Handbook") provides guidance for the use of peer reviews in policy and regulatory decision-making. According to the Handbook, influential scientific information (ISI) should be peer reviewed prior to the issuance of the proposed regulation as "[p]eer review is intended to identify any technical problems or unresolved issues in a preliminary (or draft) work product through the use of independent experts [...] so that the final work product will reflect sound technical information and analyses."[47] Influential scientific information is defined as meeting at least one of the following criteria:

a) Establishes a significant precedent, model, or methodology;

b) Likely to have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, Tribal, or Local governments or communities;

c) Addresses significant controversial issues;

d) Focuses on significant emerging issues;

e) Has significant cross-Agency/interagency implications;

f) Involves a significant investment of Agency resources;

g) Considers an innovative approach for a previously defined problem/process/methodology;

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[45] Secondarily, given the varying topography of Dover, and thus sewer collection system, Dover has to maintain 24 pump stations, including one large one that transports flow from our old WWTP site, to the new WWTP. The holistic management of our sanitary sewer system could or would be adversely affected via mandated improvements at the WWTP.

[46] USEPA. October 2015. Peer Review Handbook, 4th Ed.

[47] *Handbook* § 1.2.2.

h) Satisfies a statutory or other legal mandate for peer review.

Handbook at 41-42.

Moreover, "if a site-specific decision is supported by ISI or a HISA [highly influential scientific assessment] generated for that site-specific decision, then that work product should be peer reviewed." Handbook at 48. Highly influential scientific assessment is defined as either having "the potential impact of more than $500 million in any year, or [being] novel, controversial, or precedent-setting or has significant interagency interest." *Id.*, at 43. As discussed in detail in the correspondence to EPA and reiterated below, all of these criteria are met with respect to the need for a peer review and there should be no presumption that EPA is properly interpreting the referenced materials.

EPA's prior TN endpoints protective of eelgrass in every other estuary are significantly higher than the endpoint implied by 100 kg/ha/yr, as discussed elsewhere in these comments. The Draft Permit also asserts conclusively that "there is a clear maximum threshold of 100 kg ha^{-1} yr^{1}, above which eelgrass is unable to thrive and significant or complete loss is inevitable." Fact Sheet at 22. Yet, other data set forth in the Fact Sheet casts significant doubt on that statement. The Fact Sheet (Figure 2) itself illustrates actual conditions do not reflect "significant or complete loss" of eelgrass during periods of high nitrogen loads, which EPA calculates as 189.3 kg/ha-yr (Fact Sheet at 26). Intrinsically, then, the Fact Sheet relies on a syllogism with false premises, underscoring the need for independent review. That is all the more case in view of the analyses being submitted with these comments by Dr. Chapra and Dr. Howes, which sharply call into question the validity, necessity, and efficacy of the 100 kg/ha-yr loading limit (and the failure to consider ambient concentrations), among other things.[48]

The economic costs of the permit are hard to overstate, as illustrated by the City of Rochester's

[48] The novelty of the Draft Permit's approach is underscored by the fact that EPA's Fact Sheet identifies no prior example of the methodology used in this permit. This is a brand new approach to regulation.

and the Town of Exeter's cost studies separately indicate.[49] As discussed, EPA itself recognizes that "[t]o achieve acceptable nitrogen loads consistent with the established nutrient threshold, significant point source and non-point reductions are necessary." Fact Sheet at 26 (emphasis added). The undersigned communities lack any practical means of achieving meaningful non-point reductions. Dover, for example, has analyzed the land area within its borders and has concluded that Dover only controls 8.4% of land within Dover,[50] meaning the large majority of non-point reductions will have to be taken on private land. Yet, there are few or no currently established legal means, much less technological advances, to feasibly accomplish such outcomes on private land. Dover undertook watershed renewal in Berry Brook at a cost in excess of $1,500,000, which eliminated only 2.27 pounds per day of nitrogen—undertaking 40 such projects at today's construction cost would easily fall in the $100,000,000 to $150,000,000 range. What is more, the Draft Permit's requirements would effectively halt development in many or all of the affected communities, including the City of Dover. It is also easy to foresee how substantial increases in local tax burdens and water consumption costs would result in loss of existing commercial businesses, future business decisions against locating any business in the affected communities, and ultimate downstream impacts on local economies.

These significant economic impacts alone warrant peer review, and all the more so when considered with the novelty and deep scientific doubt surrounding the Draft Permit.

As also noted in the Handbook, "new applications or modifications of existing, adequately peer-reviewed methodologies or models that significantly depart from the situations for which they were originally designed may require additional peer review." … "The extent to which additional peer review is needed for an article that has been peer reviewed by a credible refereed scientific journal depends upon EPA's use of the article. For example, EPA may determine that an

[49] The City of Dover incorporates by reference all of those cost studies (by Rochester and Exeter), including update memoranda to same. This includes the Geosyntec memorandum submitted by Rochester, the Brown & Caldwell memorandum submitted by Rochester, and any update memoranda to either.

[50] Dover land area is approximately 27.5 square miles. There are 25.1 square miles of actual land. 2.1 square miles is City-owned/controlled. *See also* Dover Economic Impact Memorandum.

additional and more rigorous or transparent review process is needed if a particular journal review process did not address questions that EPA determines should be addressed before using or disseminating the information." Handbook at 42 and 48. None of the authors cited by EPA indicated that their analyses of small shallow coastal embayments had any direct relevance to the Great Bay system. Dr. Latimer confirmed this independently with another outside expert. Ex. F1-F5. Again, each of these guidelines for requiring peer review, are met in this case as previously discussed in correspondence to EPA and re-verified by the information presented in these comments. Therefore, this "novel" method may not be used in a regulatory setting until peer review confirms that it is appropriate.

EPA's proposed Strengthening Transparency in Regulatory Science rule (April 30, 2018, 83 FR 18768) further supports a peer review of this new scientific approach (emphasis added):

> Today, EPA is proposing to establish a clear policy for the transparency of the scientific information used for significant regulations: Specifically, the dose response data *and models* that underlie what we are calling "pivotal regulatory science." "Pivotal regulatory science" is the studies, *models*, and analyses that drive the magnitude of the benefit-cost calculation, *the level of a standard*, or point-of-departure from which a reference value is calculated. In other words, *they are critical to the calculation of a final regulatory standard or level, or to the quantified costs, benefits, risks and other impacts on which a final regulation is based.* [...] *EPA shall conduct independent peer review on all pivotal regulatory science used to justify regulatory decisions, consistent with the requirements of the OMB Final Information Quality Bulletin for Peer Review* (70 FR 2664) and the exemptions described therein.

As the untested methodology applied by EPA is controlling the regulatory requirement being imposed on this entire watershed, it certainly qualifies as "pivotal regulatory science" and must therefore be peer reviewed. Relevant to this peer review request are also the conclusions of both Dr. Chapra and Howes. Ex. 57, 72, 76. Upon a detailed analysis of system data, applicable literature and the hydrodynamic model developed by HDR for the Great Bay coalition, Dr. Howes has concluded that:

- The use of the "Latimer" nutrient loading model is not scientifically defensible for Great Bay because of numerous underlying technical deficiencies with that

methodology;

- Dr. Latimer agreed with his assessment and that the simplified method described in his publication should not be employed to impose TN limitations in Great Bay nor was it based on eelgrass responses to nutrient loads in river-dominated systems, such as the Great Bay system;
- Dr. Latimer was informed by experts that he contacted that publications regarding nutrient impacts on eelgrass in river dominated systems did not exist;
- Existing studies and data for the Great Bay system (and nearby new England embayments) confirm that a total nitrogen 100 kg/ha-yr load limitation is not defensible for this system.

Dr. Chapra, an internationally recognized expert on nutrient modeling, also review the proposed approach EPA employed for establishing a watershed wide nutrient load restriction of 100 kg/ha-yr, based on the work of Latimer, Valiela, Cole and Hauxwell. Dr. Chapra provided the following answers, that were in EPA's possession (Ex. 72):

1. *Is the Latimer and Rego, 2010 approach consistent with accepted scientific methods for assessing TN impacts on estuarine systems?*

No. This simplified analysis does not address the numerous physical, chemical, or biological factors that need to be considered to produce a scientifically defensible conclusion that nitrogen is impairing a specific estuarine system. There is no EPA-approved or "generally accepted by the scientific community" method for TN loading/eelgrass response that is applicable to estuarine systems, as there can be for lakes assuming sufficient observed response data (not unverified data points) are available to relate nutrient loading to a form of excessive plant growth that may be detrimental to the system.

2. *Is the Latimer and Rego, 2010 approach applicable to Great Bay Estuary and does the approach provide reasonable confirmation that TN has impaired eelgrass growth in Great Bay or is preventing its recovery?*

No. For the reasons expressed by Dr. Latimer himself, this approach has no apparent applicability to the Great Bay system. In fact, the data for the Great Bay system confirm it is inapplicable as TN loadings have greatly exceeded the upper TN loading Latimer and Rego indicate will eradicate all eelgrass growth (100 kg/ha-yr) while robust eelgrass growth was maintained in the 1990s through 2005. These data for the Great Bay system are a direct, unambiguous empirical indicator of the "safe"

systemwide TN loading at this time, particularly as excessive macrophyte or phytoplankton growth did not occur with those loadings. The more recent data for Great Bay suggest an eelgrass loss of about 30% from historical levels, not the 100% loss expected if the Latimer model was applicable. That would place Great Bay among the least impacted systems assessed by Latimer. Moreover, the factors that would suggest a linkage to TN are not reflected in present measurements. In comparison with the earlier period, phytoplankton levels are essentially unchanged, and epiphytes are not reported to be excessive. Macrophytes are present, but apparently are not preventing eelgrass regrowth each year.

3. *Is the Latimer and Rego, 2010 method contrary to the 2014 Peer Review and EPA's 2010 Stressor Response peer review?*

Yes to both aspects of this question. The 2014 Peer Review determined that the available system data did not confirm that TN was the cause of eelgrass decline or periodic low dissolved oxygen readings. The Latimer and Rego, 2010 analysis is not "new" nor is it "data" for this system nor is it reflective of the conditions controlling nutrient dynamics in the Great Bay Estuary. Thus, it cannot be used to demonstrate that the prior peer review conclusions are, in any way, in error.
EPA's 2010 Stressor-Response methodology specifically requires consideration of the relevant factors (sometimes called "confounding factors") affecting an ecological response of concern when developing system wide nutrient criteria. This analysis fails to consider any of those relevant physical, chemical, or biological factors.

To avoid peer review, EPA must provide evidence that these various factual and scientific conclusions are in error – which is doubtful given that Dr. Latimer himself stated the method does not apply to river dominated estuarine systems and that his methodology addressed dissolved, not total forms of nitrogen.

In addition to these independent expert reviews, a 2016 peer review, conducted by EPA Region I for Long Island Sound confirmed that the loading method created by Dr. Latimer should not be used to establish nutrient limitations for any embayments in that system. Ex. 54. The LIS peer reviewers expressly concluded that the first step is to identify the protective TN concentration and then to derive the protective load considering the system's hydrodynamic characteristics. Dr. Latimer was also part of that process too. EPA Region I itself concluded that the method should not be applied to any system with significant riverine inputs. Ex. 54. Therefore, it is apparent that the method is being misapplied and is not defensible to use these papers to establish the

"presumed applicable" watershed aerial load for eelgrass protection.

Based on these detailed expert analyses and opinions, as well as EPA's own analyses of the utility of this methodology, that the "Latimer nutrient loading model" is untested, deviates dramatically from EPA's published, peer reviewed methods which all require consideration of system hydrodynamics, and physical/chemical processes influencing the ability of nitrogen to stimulate excessive plant growth. Minimally for this application, the Latimer NLM is inapplicable to the Great Bay system and is providing a clearly inappropriate nutrient load reduction requirement. Moreover, on their face, the papers cited were not published for the purpose of setting TMDL load reductions for any waters that contain eelgrasses, regardless of the characteristics of that water body or the forms of nitrogen being discharged. (Howes 2019, 2020, Chapra 2019). Furthermore, EPA seems aware that it is using the method in a manner not intended by any of the authors or previously found acceptable by EPA itself. *Id.* Given these facts that confirm the federal criteria for peer review are met, the cost implications (several hundred million in additional local expenditures) and the major adverse impacts on future growth (further development is prohibited as it will add loads to an already overloaded (in EPA's opinion) system, a peer review of EPA's intended application of this scientific method is mandated by EPA's guidance.

As a matter of equal protection and fundamental fairness EPA may not deny the request for peer review, in that it has routinely employed such procedures in similar circumstances to ensure that the recommended regulatory approach is scientifically supported and defensible. (*See*, Peer reviews for Great Bay (2011), Cape Cod (2016), Long Island Sound (2016) and Chesapeake Bay.). Thus, this new and untested method for creating nutrient watershed load limitations, regardless of the physical characteristics of the system, may not be employed to impose regulatory requirements unless such independent peer review is completed and confirms that the methodology is scientifically defensible for its intended use.

10. Action is contrary to prior peer reviews which determined Latimer/Valiela method not appropriate for setting nutrient limitations for this and other systems

As noted above, EPA Region I itself concluded in 2015-6 that the methodology it chose to utilize for the entire Great Bay system should not be used for any system with significant riverine sources of nitrogen or for any Long Island Sound embayments. Ex. 54-56. When issuing this General Permit, EPA chose not to address this critical fact or to explain why the method is properly applied in the Great Bay system. An agency is arbitrary and capricious when it chooses to regulate similar situations in diametrically opposed manners. *Transactive Corp. v. United States*, 91 F.3d 232, 237 (D.C. Cir. 1996) ("Agency action is also arbitrary and capricious if it 'offered insufficient reasons for treating similar situations differently.'"). Likewise, EPA also chose to ignore the advice of Dr. Latimer that his paper did not address systems such as Great Bay and stopped further contact with Dr. Latimer on the outstanding scientific issues of concern. Ex. 57, 59-61, F1-F5. Such actions do not adequately respect, and in fact violate, the due process rights of the affected communities.

Internal EPA documents confirm that the methodology being employed (areal loading to predict eelgrass loss) was known by EPA to not be applicable to the Great Bay system. For example, Dr. Latimer, in May 2018, emailed several colleagues (including Dr. Short – UNH) attempting to find a study relevant to the Great Bay system explaining: "My studies (published in 2010) purposely excluded river dominated estuaries." Ex. F1-F5. Via this inquiry, Dr. Latimer was informed that such studies do not exist because "river dominated systems tend to be turbid and with highly variable salinity, and thus have little seagrass in the first place." Thus, these communications expressly state that his published papers do not apply in the Great Bay system. Moreover, Dr. Howes, the director of the SMAST estuary program and well-known expert on TN and eelgrass loss in New England systems, met with Dr. Latimer in January 2020. At that meeting, Dr. Latimer acknowledged to Dr. Howes that he had informed Region I that his paper should not be used to set nutrient reduction requirements for Great Bay. Ex.57, 76, F1-F5. That statement was reflected in Dr. Howes independent evaluation, which EPA possesses. EPA, however, did not address this critical scientific information in the administrative record. EPA also undertook steps to block Dr. Latimer from responding to key questions that would have revealed EPA was misapplying his publication. Ex. F1-F5.

EPA is not allowed to skew an administrative record so that the public is not able to receive critical information on the need for and reasonableness of an agency's regulatory activities. *Environmental Defense Fund v. Blum,* 458 F. Supp. 650, 661 (D.D.C. 1978) (finding the agency "may not, however, skew the 'record' for review in its favor by excluding from that 'record' information in its own files which has great pertinence to the proceeding in question."). EPA must withdraw this permit and allow the communities access to the information that confirms whether or not the methodology employed by EPA to derive the system permit limitations is valid for this system and scientifically defensible, based on the opinions of the author of the method.

a. Loading Model is Acknowledged to be unverified and faulty

The method EPA has applied is based upon calculated, not verified dissolved nutrient loadings to the systems evaluated by Latimer and others. The loading model employed only estimates the dissolved nitrogen entering the system through the groundwater. (See, Latimer and Rego (2010); Latimer question responses (Ex. 71) and Ex. 57, 76 Howes evaluations). Dr. Howes reviewed the source material for the loading model EPA relied upon, which was not evaluated by EPA in the Fact Sheet. The authors and subsequent studies determined that a wide range of erroneous estimates are produced by the groundwater model. (Ex. 57, 76) Moreover, the loads presented in the papers did not consider sources entering the system besides areal deposition and groundwater from inorganic N sources. Internal transport, plant decay and surface sources were not addressed. Thus, the actual loadings to all of these systems were simply partial estimates that failed to represent the actual nutrient loads received.

In this case, EPA compared those incomplete estimates to actual total nitrogen measured loads, regardless of source, occurring anywhere in the Great Bay system. EPA assumed riverine segments of the system (the Piscataqua River) should be assessed as an estuarine embayment. This is at odds with the methods utilized by the authors cited by EPA. (Ex 71, Latimer answers). None of the Piscataqua River system loads should have been considered under the methodology employed by Latimer and the other authors. These were the majority of the loads EPA considered in its assessment. As EPA's loading assessment bore no resemblance to that employed by the papers cited, their determination that the Great Bay system is exceeding the

loads needed to support eelgrass growth based on Latimer, Valiela and Hauxwell is misplaced and clearly erroneous as is the conclusion that the system is beyond its assimilative capacity. Evidently, it is not because eelgrasses are growing robustly, at loading EPA claims cannot support eelgrass growth. EPA's conclusions bear no resemblance to reality and therefore must be withdrawn and revised.

11. Form of nitrogen assessed by Latimer, Valiela, Cole and Hauxwell is not the same as form of nitrogen present in GB system

Well in advance of EPA's publication of the draft General Permit, the communities informed EPA that the form of nitrogen assessed in those studies was not "Total Nitrogen" but only comprised the dissolved (primarily inorganic) nitrogen component. Ex. 64, 69, 71, 73. The form of nitrogen was verified by Drs. Chapra, Latimer, and Howes as dissolved, inorganic. Ex. 57, 71, 72. EPA's Fact Sheet failed to address this critical issue, although the communities had raised it expressly. Ex. F1-F5. EPA was aware of this issue, as the Region directed Dr. Latimer to not respond to the requests for further clarification on this issue submitted by Dover's consultant. Ex. F1-F5. Ex. 57-60 confirmed that the Latimer, and related papers, were all evaluating the level of dissolved inorganic nitrogen entering the system via groundwater. Dr. Latimer, in response to questions presented, admitted this fact. Ex. 71. When the communities attempted to obtain final confirmation of this point from Dr. Latimer (Ex. 59), all further communications with Dr. Latimer were cut off by EPA Region I. Ex. F1-F5. Such action by EPA is inconsistent with the Agency's Science Integrity Policy, as discussed.

Inorganic nitrogen is only about 1/3 of the total nitrogen delivered to the Great Bay system (Ex. 26-28). The other forms of nitrogen are not available in this system to stimulate plant growth. Ex. 1, 2, 5, 57, 76. Thus, EPA's use of Latimer, et al. to directly set a total nitrogen watershed limit was clearly improper. A proper comparison on system loads contained in the materials relied upon by EPA would have revealed that the existing annual average inorganic Nitrogen load is 1/3 less, between 50-70 kg/ha-yr. That is within the range that EPA acknowledged was not a threat to eelgrass resources. Because EPA conducted an "apples and oranges" evaluation, they misapplied the papers that they were relying upon. Such contradictory analyses are "arbitrary and capricious. *Columbia Falls Aluminum Co. v. EPA*, 139 F.3d 914 (D.C. Cir. 1998). Had EPA properly applied the method, the conclusion should have been that existing TN loads

do not present any threat to eelgrass resources, which is precisely what every valid system analysis has confirmed to date. Ex. 35-56.

This permit must be withdrawn to correct this error. Moreover, EPA's decision to preclude public access to Dr. Latimer to verify the proper interpretation of his scientific work was out of step with the regulatory process – which requires that this matter be withdrawn.

12. EPA is regulating forms of nitrogen that cannot be causing adverse impacts on eelgrasses in the GB system

As noted in EPA's guidance a scientifically defensible analysis of nutrient effects must reasonably account for the forms of nitrogen present and how the physical/chemical characteristics of a system control the ability of the nutrient to stimulate plant growth. Ex. 1-6. The only form of nitrogen that can stimulate phytoplankton, epiphyte or macroalgal growth is inorganic nitrogen. The documents available to EPA confirm that the forms of nitrogen present from the watershed loading are dominated (>65%) by (1) dissolved organic nitrogen (CDOM) that is not available for plant growth and (2) particulate nitrogen that can only be available if it is converted to an inorganic nitrogen form. Ex. 1-6, 54, 57, 72, 76. Moreover, about 40% of the TN in the water column nitrogen is from the ocean. *Id.* That "total" nitrogen is decades "old" and labile (*i.e.*, has a very low capability to stimulate plant growth as verified in the Piscataqua system). *Id.*

The Great Bay system has a short detention time, as confirmed by DES analysis and the calibrated and verified hydrodynamic model. Ex. 30-33, 36. The detention time, which ranges from 1-7 days, is insufficient to allow any significant conversion of particulate or dissolved organic nitrogen to inorganic nitrogen. Given the systems hydrodynamics, no more than 5% of the particulate N would convert to inorganic nitrogen (assuming temperature is at least 25□ - which only occurs for 3 months in the year). EPA was certainly aware of this fact, yet chose not to address it, in assuming, contrary to the available data, that all forms of nitrogen posed a threat to eelgrass resources in Great Bay – an incorrect assumption. Despite this reality, and knowing that the system has shown basically no response to significantly increasing or decreasing TN loads (which have ranged from >250 kg/ha-yr in the 1990s to 130 kg/ha-yr in 2014-2016), EPA assumed that all of the nitrogen being contributed to the system from the watershed, including

labile and particulate forms, required regulation. EPA did this by setting a total nitrogen watershed load limitation that failed to consider whether the majority of the terrestrial nitrogen in the system has a demonstrable effect on the stimulation of excessive plant growth. Ex. 26-28. In contrast, Latimer, Valiela and Hauxwell only considered the dissolved nitrogen entering the system in evaluating eelgrass responses in shallow embayments, which is known to be the component that may stimulate excessive macroalgal growth in some systems. EPA's Fact Sheet provides no explanation for this inconsistency.

All water quality-based limitations must be set at the level "necessary" to protect aquatic life and achieve the applicable water quality criteria. 40 C.F.R. § 122.44(d). In many settings EPA has established procedures to ensure that only the "toxic fraction" of a pollution is regulated (*see*, National Toxics Rule; 40 C.F.R. § 131). EPA Section 304(a) guidance on proper regulation of nutrients specifically requires such an assessment of the forms of nitrogen that are present – where appropriate for the system under review. Ex. 1-6. EPA's decision to regulate based on Total Nitrogen is arbitrary, capricious, and falls short of a scientifically defensible approach for the Great Bay system, particularly given that the watershed loading considered by Latimer and others was based only on dissolved and predominantly on the inorganic fraction. If nitrogen control is needed, it must be based on the percentage of the watershed load that is capable of stimulating excessive plant growth, considering the specific characteristics of the Great Bay system. Ex. 1-6. EPA may not claim, based on papers that reached no such conclusion, that the form of nitrogen to regulate is total nitrogen, regardless of (1) the underlying data used in that prior research or (2) the information from the system in question that confirms such a decision will greatly overregulate nutrient inputs to that system. Ex. 57, 72, 76. EPA presents no justification for regulating TN rather than dissolved inorganic nitrogen in this system. EPA must reassess the need for the proposed limitations based upon the relevant physical and chemical characteristics of the Great Bay system as required by applicable rules and published procedures.

13. Data and system analysis confirm nitrogen is not adversely causing increased plant growth adverse to eelgrasses or causing decline of eelgrass in this system

EPA, like all regulatory agencies, is not authorized to regulate based on mere speculation or guesses. Only reliably scientific information may be used. As noted earlier, the data and analyses (Ex. 16-77) for this system confirms the following facts:

- There are no data or analyses showing that existing (or previously higher TN loadings/concentrations occurring in the 1990s) caused excessive plant growth that harmed eelgrass propagation or survival;
- It appears every expert that has evaluated the system data since 2014 has reached the conclusion that the system data do not show nitrogen has caused impairment to eelgrass;
- When eelgrasses declined dramatically in the late 1980s due to wasting disease, they fully recovered, despite TN levels higher than they are today, confirming that the existing TN levels do not preclude eelgrass recovery;
- The only places in the Great Bay system that eelgrasses did not regrow after the wasting disease events were areas where reseeding was difficult to occur due to system hydrodynamics (Little Bay and Piscataqua River – which have lower TN levels than occur in Great Bay, where full eelgrass recovery did occur);
- In 2006, eelgrasses declined immediately after a series of major storms (known as the Mother's Day flood) impacting Great Bay and nitrogen played no role in that occurrence;
- Since the 2006 downturn, eelgrasses have not repopulated various areas in Great Bay, despite water quality better than that which existed when eelgrasses thrived in the system;
- The system is not light limited and eelgrasses in Great Bay receive sufficient light over the tidal cycle;
- The system has exhibited no beneficial plant growth response to major TN reduction, and such conditions are now far better than when eelgrasses thrived in the 1990s;
- Eelgrass publications recognize that numerous factors other than nutrients control whether and where eelgrasses can propagate, yet EPA's analyses have assessed none of these other confounding factors;

- The Great Bay system is not TN-limited and unrelated physical factors control the ability of eelgrasses to thrive and propagate in this system.

EPA's conclusion that further TN reduction is required to address the "reasonable potential" for TN to adversely impact eelgrass resources and allow for eelgrass restoration is unsupported speculation and directly at odds with the system data confirming that TN is having no effect on eelgrass survival and propagation. EPA's Fact Sheet nowhere evaluates the degree to which TN is causing an adverse impact, because the data show no such eutrophication effects. EPA has provided no assessment showing that eelgrass have declined along a gradient of TN in this system, as the data plainly show this is not occurring. Without that assessment, as well as consideration of the factors known to limit eelgrass propagation in this system (hydrodynamics, CDOM, salinity, wasting disease, reseeding), EPA's claim that TN reduction is needed to ensure greater eelgrass growth is unsupported speculation and directly at odds with EPA's rules and published guidance. Ex. 1-6; 40 C.F.R. § 122.44(d); 40 C.F.R. §130. EPA's assessment is refuted by the information that EPA has not addressed, confirming that this entire regulatory effort is a misconceived, arbitrary and capricious regulatory assessment that does not apply to the reality of the Great Bay system. *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

14. Activities undertaken by EPA and DES actively biased the analyses and violated fundamental due process rights and APA prerequisites

It is a fundamental right of the regulated community to be managed by an unbiased, objective regulatory program. *Am. Bankers Ass'n v. NCUA*, 513 F. Supp. 2d 190, 201 (M.D. Pa. 2007) ("When improper bias permeates an agency's decision making, no presumption of 'integrity and independence' can exist."). Where systematic bias is demonstrated that decisionmaker must be removed from the process. EPA permit writing guidance specifically states that where bias is demonstrated or even suspected, the agency is required to remedy the situation to ensure fair decision making. *NPDES Permit Writer's Manual,* 2010, at 11-17.

EPA has committed a series of acts that indicate its analysis was not objective and its intent to impose stringent TN reduction requirements was done without reasoned consideration of the extensive information confirming such requirements were unnecessary. The actions that provide evidence of a Regional Office bias and a violation of permittee due process rights include:

1. Informing NHDES that it would not accept a permit that did not require stringent TN reduction (Ex. 58, 61, F1-F5);[51]
2. Informing NHDES that any changes to the permit must be acceptable to an environmental organization (Ex. 58);
3. EPA prevented its expert from providing accurate information to the affected regulated public regarding the applicability of the method EPA used to set the nutrient limitations (Ex. 59, 60, F1-F5).
4. EPA withheld from the public documents addressing the prior PREP conclusion that Dr. Latimer's eelgrass/nutrient load model was not applicable to the Great Bay system (F1-F6).
5. EPA disregarded the conclusions of the study author that it was an improper application of his method and that the method did not apply to the Great Bay system (Ex. 57, 60, 76, F1-F5).[52]
6. EPA established a total nitrogen load restriction despite confirmation from Dr. Latimer that his method only accounted for dissolved nitrogen loadings (Ex.71)
7. EPA's assessment excluded every expert analysis that concluded EPA's regulatory proposal was not defensible from its Fact Sheet and administrative record.
8. EPA overlooked all of the system data that confirmed further TN reduction was not required to protect eelgrass resources in Great Bay, including PREP documentation that excessive plant growth never occurred in the system despite

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[51] This position confirms that the staff had already decided to not objectively analyze the site-specific factors to develop the proper limit. This action is equivalent to requesting post-promulgation comments that have been repeatedly found to be clearly improper under the APA notice and comment requirements because the agency had already "pre-committed" to a specific finding and will not genuinely consider any public comments submitted that do not support that finding. *See United States v. Gould*, 568 F.3d 459, 479 (4th Cir. 2009) ("[R]equesting post-promulgation comments makes a sham of the APA's rulemaking procedures.").

[52] When an agency relies upon a report that is criticized by its author, that action is *per se* arbitrary and capricious. *Humana of Aurora, Inc. v. Heckler*, 753 F.2d 1579, 1583 (10th Cir. 1985) ("When an agency adopts a regulation based on a study not designed for the purpose and which is limited and criticized by its authors on points essential to the use sought to be made of it, the administrative action is arbitrary and capricious and a clear error in judgment.").

loadings greater than EPA's target for the past 40 years and the 2012, 2014 and 2016 DES delisting decisions.

9. EPA disregarded its own prior peer review conclusions that that the watershed loading method it chose to employ was not a valid basis for setting TN limitations to protect eelgrasses. (Ex. 67).
10. EPA overlooked its prior TMDL and permitting conclusions regarding the level of TN concentration that would protect eelgrass resources in New England waters (over 70 such decisions) which confirmed further TN reduction was not necessary in the Great Bay system. (Ex. 74-76).
11. EPA has, to date, declined to submit the 100 kg/ha-yr (or any portion of the Draft Permit) to independent peer review, although similar estuarine matters have undergone such review.
12. EPA has, to date, not considered the information submitted by Dr. Howes and Dr. Chapra.
13. EPA has, without explanation, deviated from the method of translating narrative criteria effectively prescribed by New Hampshire's regulations and followed by EPA in the Exeter and Newmarket NPDES permits.
14. EPA did not disclose documents sought by the affected communities that would seemingly have explained the basis for EPA claiming that Dover's various technical submissions from the past two years were scientifically flawed or inadequate, effectively preventing the communities, all other stakeholders, and the general public from an opportunity to review and rebut EPA's conclusions. (F1-F6; Ex. 92)
15. In summary, these actions collectively suggest an effort to drive toward a specific outcome without scientific analysis or method as the guide. The administrative record reflects this, as does the Fact Sheet and documents being submitted with these comments. To the extent EPA does not address the problems set forth in these comments, EPA will confirm that it has prejudged this matter and acted with bias.

In summary, these actions collectively suggest an effort to drive toward a specific outcome without scientific analysis or method as the guide. The administrative record reflects this, as

does the Fact Sheet and documents being submitted with these comments. To the extent EPA does not address the problems set forth in these comments, EPA will confirm that it has prejudged this matter and acted with bias. *See Valley v. Rapides Parish Sch. Bd.*, 118 F.3d 1047, 1052-53 (5th Cir. 1997) ("The problem of a procedural defect arises when the decision maker has prejudged the facts to such an extent that their minds are 'irrevocably closed' before actual adjudication."). This entire permit process should be withdrawn, the errors identified herein addressed, and then resumed and resubmitted for public comment.

15. The General Permit is not adaptive management

The Draft General Permit does not employ "adaptive management." Previously, the EPA has generally defined adaptive management ("AM") as follows:

> Adaptive management is a formal and systematic site or project management approach centered on rigorous site planning and a firm understanding of site conditions and uncertainties. This technique, rooted in the sound use of science and technology, encourages continuous re-evaluation and management prioritization of site activities to account for new information and changing site conditions. A structured and continuous planning, implementation and assessment process allows EPA, states, other federal agencies (OFAs), or responsible parties (PRPs) to target management and resource decisions with the goal of incrementally reducing site uncertainties while supporting continued site progress.

EPA Memorandum from J. Woolford, *Superfund Task Force Recommendation #3: Broaden the Use of Adaptive Management* (July 3, 2018) (emphases added), *available at* https://semspub.epa.gov/work/HQ/100001630.pdf.

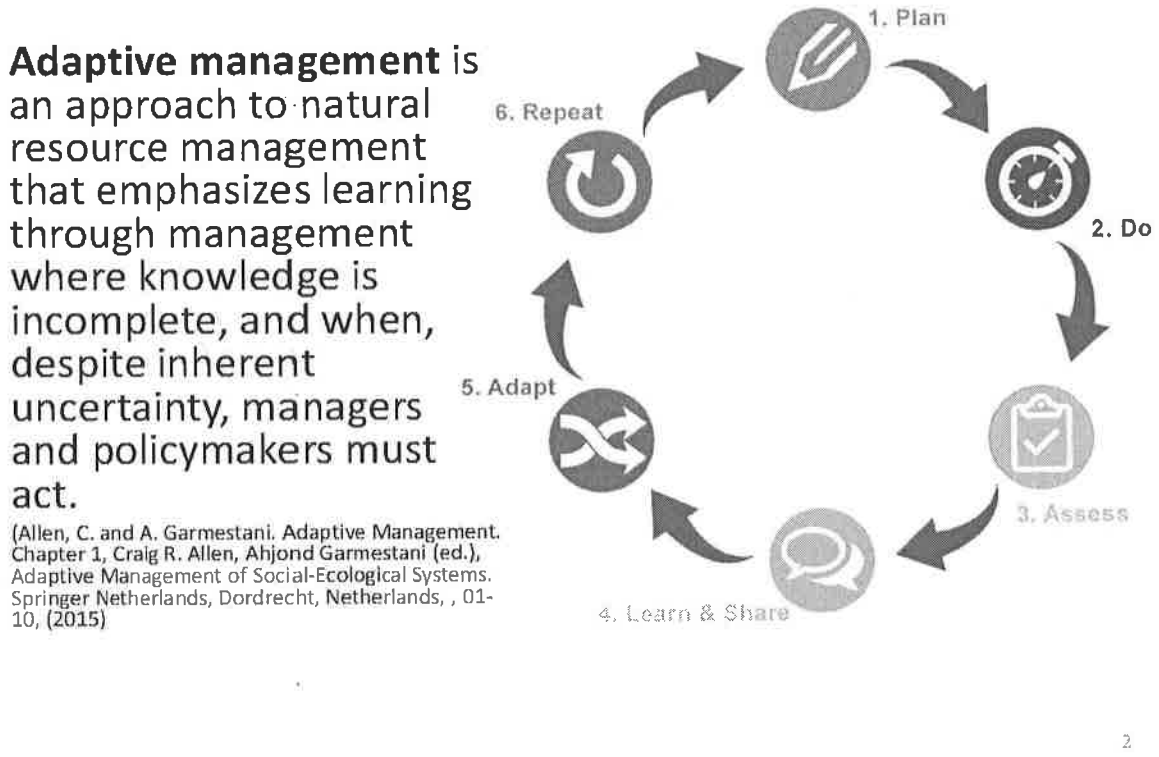
Contrary to this definition, for reasons already discussed, (i) the Draft Permit does not set an initial loading threshold based on "rigorous" planning and understanding of the site conditions, (ii) the 100 kg/ha-yr is not "rooted in the sound use of science;" and, (iii) by setting the initial target of 100 kg/ha-yr, which sound science indicates is an extremely low threshold, the Draft Permit does not "incrementally reduce site uncertainties."

Perhaps most remarkably, the Draft Permit does not provide for notice and comment on any definition of successful outcomes. That is EPA's burden as regulator. To the extent EPA intends to address that later as part of issuing a final permit in this matter, the EPA will deprive the communities, including Dover, from their right to review and comment on the goals and

sought-after outcomes of the permit. The absence of the permitting goals also underscores that the proposed permit is only adaptive management in name, not in substance or function.

Similarly, the Draft Permit's lack of specification over the implementation and cost allocation of the monitoring program does not provide communities, including Dover, the opportunity to review and comment on the EPA's proposal. If the intent is to truly engage in adaptive management, the Draft Permit presented lacks both the goals and the means of assessing whether the goals are met. EPA should itself articulate the goals and the proposed monitoring plan and then allow for notice and comment.

It is also worth noting that EPA and DES previously presented the following slide on adaptive management:



True adaptive management should also take account of the fact that the regulated communities are already in the midst of that process and have made substantial reductions in nitrogen in recent

years. The collective improvements of Rochester, Portsmouth, Exeter, Newmarket, and Dover have planned and done significant upgrades. The communities have made substantial reductions beyond treatment plants in a holistic fashion by also instituting BMPs to improve water quality, including considerable investment in monitoring and analysis of resulting system changes. These are all key parts of adaptive management undertaken voluntarily and regulators have not pursued these since the concept was first presented by communities in 2012. This all underscores that we are in an assessment phase, dovetailing with PREP's Draft Integrated Research & Monitoring Plan (released April 2020). Likewise, it is not adaptive management to force communities to initiate their own sampling programs, rather than embodying a collaborative program bringing municipalities, regulators, and other interested parties together to embrace an adaptive and constructive program.

The hold-the-load provision in the Draft Permit is another example of a feature that is not adaptive management. The Draft Permit is overly rigid and could, and should, be drafted in a way that does not (incorrectly) assume a drastic intervention a priori, rather than incrementally moving forward. Dover would respectfully assert that the Draft Permit should at least have the following features:

- Allow Dover to hold-the-load at design flows. The purpose of designing and building a plant is to meet a certain capacity and performance. Alternatively, EPA could make an allowance to current day average flows.
- Use growing season averages, as discussed elsewhere in these comments.

16. General Observations Regarding EPA's Narragansett Bay Claims and Comparisons

In an effort to support the proposed threshold loading rate obtained from the three literature studies to protect eelgrass resources in Great Bay Estuary, EPA points to Narragansett Bay as an example, suggesting that water quality improvements in Narragansett Bay are relevant to the Great Bay Estuary and verify that the 100 kg/ha-yr TN load is necessary to protect eelgrass resources (See, Fact Sheet at 23-24). These claims and comparisons are misplaced and unsupported by any rational assessment. Moreover, EPA's conclusory assertion that Narragansett Bay analyses and TN controls prove that the 100 kg TN/ha-yr limitation is reasonable lack any rational support and is misplaced based on the data from both systems.

The TN aerial loading limits proposed for Great Bay Estuary are based on the recommendations in Latimer and Rego (2010) for the protection of eelgrass in shallow, non-river dominated estuarine systems – where the habitat is amenable to support eelgrass (<2.5 meters deep). In contrast to this, the nitrogen targets specified for Narragansett Bay are based on the mitigation of hypoxic/anoxic conditions, as discussed in the Fact Sheet with the 2018 draft NPDES Permit for the Warwick WWTF. (Discussed below) Eelgrass restoration is not a focus of this program as eelgrasses cannot grow in over 99% of the Bay due to depth and water clarity. Consequently, the observation that the nitrogen load entering Narragansett Bay divided by the massive area of Narragansett Bay yields a load less than 100 kg/ha-yr proves no relevant information with respect to its applicability for Great Bay or its need to protect eelgrass resources.

On inspection of Narragansett Bay data and studies, it is apparent that the EPA's claim that TN loading per area of open water in that system is controlling eelgrass growth is unfounded. The coverage of eelgrasses present in the entire Narragansett Bay is about 500 acres (about 1/3 of that present in Great Bay) even though Narragansett Bay is nearly ten times larger than the Great Bay system. Thus, TN areal loadings 150-250 kg/ha-yr in the Great Bay system (well above current Narraganset Bay areal loads), supports 30 times more eelgrass growth per acre. The Narragansett system lacks extensive eelgrass beds because most of the system is simply too deep to support eelgrasses. Dividing the watershed load by areas that have no ability to support eelgrass propagation is an irrelevant and arbitrary exercise that proves nothing with respect to eelgrass protection in Great Bay. If anything, EPA should have observed that Great Bay system has triple the eelgrass cover at double the TN aerial load *in the areas where eelgrass growth may occur*. This indicates that the existing TN load is protective, not excessive and that the Narragansett Bay areal load has no relevance to eelgrass growth in Great Bay.

Based on an evaluation of nitrogen impacts on excessive algal growth and hypoxia, the Rhode Island Department of Environmental Management has determined that it would be appropriate to establish seasonal (May -October) limits for total nitrogen of 8.0 mg/L for the Warwick WWTF and many other WWTPs discharging to Narragansett Bay. EPA has approved this approach, repeatedly as protective of estuarine resources from nutrient effects. These limits, in combination with the reductions being assigned to the other WWTFs, will achieve a 50% reduction from the 1995-1996 Rhode Island WWTF loading, consistent with the recommendations from The

Governor's Narragansett Bay and Watershed Planning Commission. Consequently, it is not apparent how EPA could claim that the seasonal TN reduction requirements for this system somehow justifies year-round TN reduction to the same or a lower TN level. The fact that the current loading rate is 80.1 kg TN/ha on an annual loading basis is mere coincidence and says nothing about the applicability of the Latimer and Rego (2010) approach to Great Bay Estuary or the efficacy of that loading rate to support eelgrass growth in the Great Bay system.

a. Narragansett Bay has radically different morphology from Great Bay

With respect to physical characteristics, the estuarine embayments that served as the basis for Latimer and Rego's proposed loading targets are described as small (average surface area – 2.41 km^2), very shallow (mean depth – 2.53 meters), and vertically mixed. *See*, Latimer and Rego (2010) (at 233,234). By comparison, Narragansett Bay has a surface area of 507.5 km^2, is much deeper (average depth – 7.92 meters), and is subject to thermal stratification, causing hypoxic events to occur in the hypolimnion of the bay. (See, The State of Narragansett Bay and Its Waters. Technical Report, 2017. Appendix A provides the estuary geometries). Eelgrasses in Narragansett Bay were noted to have declined for multiple reasons – wasting disease, physical disturbance, and excessive phytoplankton growth cutting light to the plants. The nutrient issue in Narragansett Bay was excessive plant (phytoplankton) growth which has no relevance to Great Bay.[53] In contrast, numerous reports for the Great Bay system confirm that excessive phytoplankton growth is not occurring and the tidal variation ensure that viable eelgrass beds areas receive sufficient light over the tidal cycle.

As noted earlier by Dr. Kenworthy, claiming estuarine systems are similar without specifically assessing the physical differences between the systems (or documentation confirming that TN induced plant growth changes were causing eelgrass bed reductions) is "irresponsible." Ex. 47. It is noted that eelgrass losses have occurred throughout Narragansett Bay – from the coastal embayments to northern embayments – regardless of the TN level present. EPA's assessment failed to demonstrate that any changes in eelgrass acreage at any location was related to nutrients occurring in these specific areas. (See 2017 NBEP Report.) EPA also did not assess eelgrass losses along a "gradient" of TN concentration as recommended by Dr. Latimer and required by

[53] See 2018 Section 303(d) report which concluded that phytoplankton growth is not causing impairment in the system. Ex. 47.

applicable Section 304(a) nutrient guidance for estuarine systems. Consequently, it is arbitrary and capricious to compare the nutrient control program occurring in Narragansett Bay to either the assessment by Latimer and Rego (2010) or the conditions occurring Great Bay. Narragansett Bay is a very different system, with very different nutrient dynamics. These oversights render this entire comparison of systems arbitrary and capricious (*State Farm*)

On review, no data are presented by EPA to support the various claims and the arguments presented in the Fact Sheet are either vague, irrelevant, or so general that it could apply to any waterbody. The EPA claims presented in the Fact Sheet are listed below in their entirety with an assessment provided after each unsupported statement.

b. Specific EPA Claims Not Supported or Refuted by Available Scientific Information

EPA: For comparison, this threshold of 100 kg ha-1 yr-1 is empirically consistent with recent water quality improvements that have been observed in a much larger estuary, Narragansett Bay.

COMMENT: This statement is not supported by any form of "empirical" evidence (e.g., analyses showing a relationship between eelgrass propagation and TN exposure in Narragansett Bay). As noted above, whether the TN loading to Narragansett Bay is less than the 100 kg/ha-yr loading threshold has no objective relevance to Great Bay where radically different morphology and plant growth responses to higher TN areal loadings are well-documented.

EPA: Like Great Bay, Narragansett Bay is an estuary with significant tidal and riverine inputs and exhibits complex flow patterns and mixing dynamics.

COMMENT: This statement is insignificant. EPA implies that significant tidal and riverine inputs are the necessary characteristics for comparison to assess whether the two estuaries respond similarly to nutrients. EPA provides no scientific justification for this statement and it is plainly erroneous based on EPA's published Section 304(a) nutrient criteria and impact evaluation documents. (Ex 1-6) Moreover, other well-known characteristics, such as water depth, tidal range, tidal transport, detention time and concurrent nutrient response, were not considered.

EPA: In recent years, EPA, MassDEP and the Rhode Island Department of Environmental Management (RIDEM) have undertaken extensive efforts to address significant nutrient-related

water quality impacts by reducing nitrogen loads to the system. While the surface area of the estuary is much larger than that of Great Bay (197.5 sq mi compared to 21 sq mi), the area-normalized nitrogen loading rate is quite comparable.

COMMENT: EPA is implying that the two estuaries should be considered similar if the normalized nitrogen loading rates are comparable. That statement is incorrect based on EPA's published guidance on proper evaluation of nutrient effects in estuarine systems. (Ex. 1-6) Comparability is based on whether the two estuaries respond in a similar matter to the normalized loading rate, based on the system hydrodynamics and morphology. No data or analyses are presented to show that Narragansett Bay and Great Bay respond similarly to normalized nitrogen loads. In fact, the data confirm that they do not, as Narragansett Bay is subject to excessive phytoplankton growth and hypoxia. Great Bay, at higher areal loading, is not.

EPA: In 2000-2004, the loading rate to Narragansett Bay was 157.6 kg ha-1 yr-1. This loading rate corresponded to significant DO and chlorophyll impairments and contributed to eelgrass loss throughout the estuary (NBEP 2017).

COMMENT: This statement confirms that the systems do not respond in a similar fashion. Great Bay experienced loadings of 250 kg/ha-yr (Valiela 2002) without manifesting these adverse conditions. . The primary adverse eutrophic impacts experienced only by Narragansett Bay are elevated phytoplantkton chlorophyll-a and hypoxia. The elevated chlorophyll-a is related to the nitrogen loading rate and occurred because the system detention time of Narragansett Bay is far greater than Great Bay, allowing algal levels to build up. Hypoxia is primarily associated with stratification caused by wet weather conditions/high freshwater flow. This condition also does not exist in Great Bay which is shallower and well- mixed. Recent reductions in nitrogen loading rate have not reduced the occurrence of hypoxia when Narragansett Bay waters become stratified – confirming that the specific morphology of Narragansett Bay allows it to be susceptible to these conditions. "Eelgrass loss throughout the estuary" is added as an adverse effect in an attempt to link the origin of the proposed loading threshold to Narragansett Bay. No data are presented showing that eelgrass losses have occurred in response to elevated nitrogen loads or how excessive phytoplankton growth in Narragansett Bay (also not occurring in Great Bay) caused eelgrass beds to decline.

EPA: "The decline [of seagrass] was caused by stressors such as nutrient enrichment and physical disturbances (*e.g.*, dredging, removal through boating or other activities, and storms), as well as by a seagrass disease outbreak in the 1930s that caused extensive losses along the Atlantic coast (Costa 1988, Short et al. 1993, Doherty 1995, Kopp et al. 1995)." (NBEP 2017, at 224)

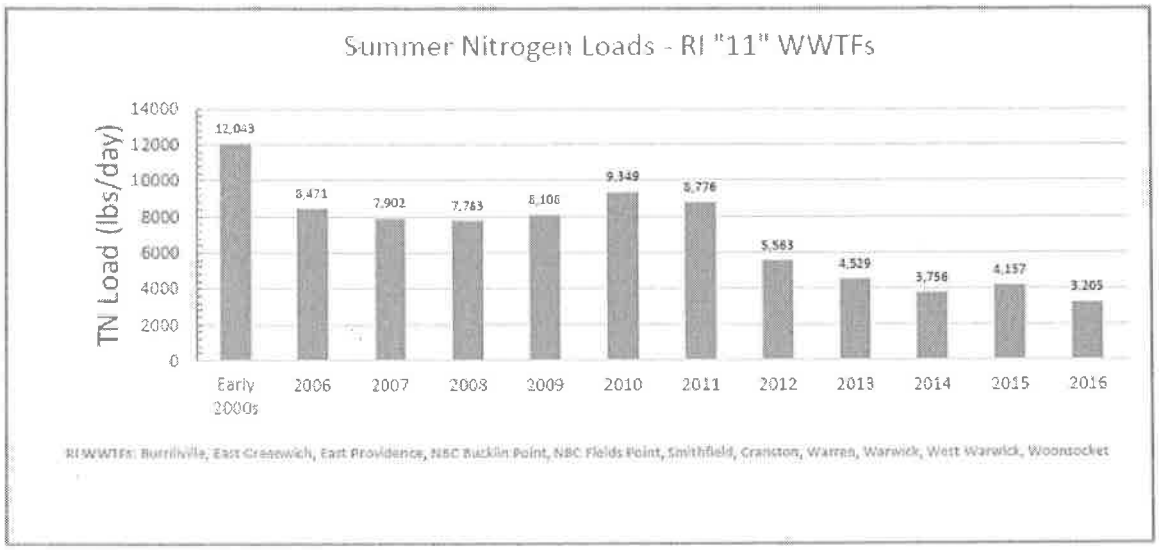
COMMENT: Other than the decline due to wasting disease, this statement has no documented relevance to Great Bay. EPA presents a general list of stressors that potentially affect eelgrass. Nutrients are lumped in with a host of non-nutrient related factors. No information is presented to show that nutrients have caused or contributed to any losses of eelgrass that may have occurred in Narragansett Bay or if that occurred, where it occurred.

EPA: Based on effective nutrient management throughout the estuary in recent years, the nitrogen loading rate in 2013-2015 dropped to 80.1 kg ha-1 yr-1, a 49% reduction from 2000-2004 levels. Corresponding with the loading rate dropping below 100 kg ha-1 yr-1, water quality improvements have been observed in dissolved oxygen and chlorophyll-a levels and seagrass levels have generally rebounded (NBEP 2017; Oviatt et al. 2017).

COMMENT: This statement is inaccurate and, in any event, has no objective relevance to the Great Bay system. Significant nutrient load reductions have been documented between 2000-2004 and 2013 – 2015 due to increased treatment at area POTWs, but not before 2012. Improvements in chlorophyll-a and dissolved oxygen have occurred in Narragansett Bay apparently because of a significant decline in excessive algal growth. By comparison, Great Bay does not have any chlorophyll-a or dissolved oxygen impairments even though the TN load is much greater, confirming that the systems are not comparable. Peak algal levels in the Great Bay system are 5-10 times lower than those occurring in Narragansett Bay. Thus, Great Bay water quality is already far better than that occurring in Narragansett Bay.

Eelgrass levels in Narragansett Bay did apparently improve in the period from 2006 to 2012. However, the implication is that nutrient load reductions caused the rebound in eelgrass cover is incorrect based upon the available data, which do not support this implication/speculation. Significant nitrogen load reductions in Narragansett Bay did not occur until 2012. (See, RIDEM loading chart). At this time (2012), there were no improvements in chlorophyll-a or dissolved oxygen. (See, NBEP 2017 Report at 325) Consequently, as the rebound in eelgrass cover

occurred prior to the significant load reductions, this rebound was clearly unrelated to the nutrient load or system transparency improvements.

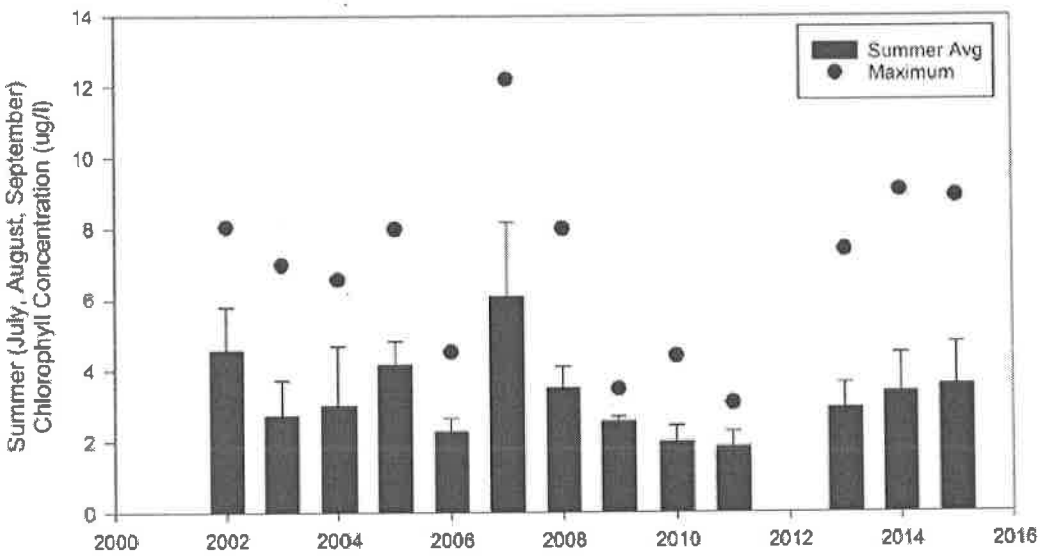


EPA: Between 2006 and 2012 seagrass acreage increased by 37 percent in areas of Narragansett Bay that were mapped both years….(NBEP 2017, at 231) The recent gains in seagrass acreage in Narragansett Bay likely stemmed from improved water quality. A reduction in nutrient loading from local wastewater treatment facilities (see 'Nutrient Loading' chapter) likely reduced epiphyte coverage on seagrass leaves, phytoplankton blooms, and macroalgae growth, improving water clarity (see 'Water Clarity' chapter). Improved water clarity allows light to penetrate to greater depths, allowing seagrass beds to flourish and expand into deeper waters. (NBEP 2017, at 229). (Emphasis added)

COMMENT: This statement is unsupported by any data analysis and, as noted above, is inaccurate given the data and reports available to EPA. In particular improving water clarity did not occur. With respect to macroalgae growth, the email from C. Oviatt to J. Latimer. (August 17, 2018) states a study of macroalgae in Narragansett Bay "seems not to show any change in drift macroalgae in the Bay". Data presented in the Narragansett Bay State of the Bay Report (2017) confirm that chlorophyll-a levels and water clarity did not improve over this period.

Summer chlorophyll-a concentrations at the Fox Island (GSO) sampling station in the lower bay, where all the eelgrass beds are found, did not show any statistically significant trend over time.

Data for the period from 2004 to 2014 are illustrated in the figure below from the NBEP 2017 Report (Figure 7 at 309). These data show that chlorophyll-a levels are relatively low over the entire period, spanning 2002 – 2015, when the POTW load reductions occurred. Phytoplankton blooms occurring after the load reductions (2013 – 2015) were just as high as they were prior to any load reductions,



EPA implies that the recent gains in eelgrass cover observed in 2012 (in comparison with 2006 eelgrass cover) was due to improvements in water clarity. This could be true if water clarity had been documented to improve. However, as noted in the State of the Bay Report (2017), there was no improvement in water clarity between the period before POTW load reductions were implemented (2004) and the period after load reductions were implemented (2012 – 2014).

From 1972 to 1997, water clarity improved steadily at Fox Island in the Lower Bay, especially in the summer months, but data from 2004 to 2014 did not show any improvement. (NBEP 2017 at 329) (Emphasis added)

EPA: EPA notes that in the case of the Narragansett Bay estuary, further nitrogen reductions are still required to address nutrient-related water quality impairments that continue to exist in certain sections of the estuary (*e.g.*, Mount Hope Bay and the Taunton River estuary).

COMMENT: This statement is irrelevant. This statement is presented to support EPA's proposed adaptive management approach – If reducing the load to 100 kg TN/ha/yr does not alleviate the observed impairments, further reductions would be required. Mount Hope Bay and the Taunton

River estuary are in the upper portion of Narragansett Bay and do not support eelgrass. Consequently, these areas are unrelated to any requirements to support eelgrass. The nutrient-related water quality impairment that exists in this area is hypoxia caused when stratification prevents reoxygenation of hypolimnic waters. No data are presented to show that further nitrogen reductions will correct this natural condition.

EPA: Furthermore, rising water temperatures in southern New England pose additional stress on the continued recovery of eelgrass in Narragansett Bay, and may be responsible for the 7 percent decline in seagrass acreage between 2012 and 2016. Although seagrass acreage is still well above 2006 levels, further nitrogen reductions may be necessary to off-set the negative effects of rising temperatures.

COMMENT: This statement is inaccurate and unsupported by any relevant data analysis. Data presented in the State of the Bay (2017) report show that, for the three years where there are eelgrass cover data, the highest reported summer average temperature occurred in 2012, when eelgrass cover was reported at its maximum extent.

Year	*Summer Average Temp.*	*Eelgrass Acreage*
2006	*20.8°C*	*357*
2012	*22.0°C*	*513*
2016	*21.4°C*	*479*

Data from NBEP 2017, Figure 1 at 230

In 2016, the summer average temperature was lower than that reported for 2012. EPA's supposition that rising water temperatures may be responsible for the decline in eelgrass acreage between 2012 and 2016 is a red herring presented to distract from the fact that eelgrass cover declined even as nitrogen loading to the bay declined.

EPA: While Narragansett Bay and Great Bay have some obvious distinctions, the comparison supports the conclusion that a loading threshold of 100 kg ha-1 yr-1 in larger estuaries with riverine inputs and complex flow patterns and mixing dynamics is a reasonable goal as part of an adaptive management approach.

COMMENT: This statement is based on speculation and inaccurate assumptions. As discussed above, EPA speculates that TN load reductions in Narragansett Bay resulted in water quality improvements (improved water clarity, reduce algal growth, reduced macrophytes, changing temperature regime) that caused an increase in eelgrass acreage without providing any data or analysis to support its position, even though extensive data were available to confirm the validity (or not) of this claim. Where data are available (trends in chlorophyll-a, water clarity, temperature), it shows that chlorophyll-a and water clarity did not improve and that when improvements occurred, eelgrass acreage, in fact, declined. EPA's contrary speculative conclusions are unfounded. And, as discussed, the Draft Permit is not adaptive management.

EPA: In summary, the three scientific studies described above, the comparison to Narragansett Bay, and site-specific reports, analyses and conclusions which confirm the applicability to the Great Bay estuary constitute a consistent and reasonable basis for the 100 kg ha-1 yr-1 nitrogen loading threshold to protect water quality standards.

COMMENT: No relevant data were presented to justify the use of Narragansett Bay as a surrogate for TN effects on eelgrass in the Great Bay Estuary. The eutrophication issues identified for Narragansett Bay (phytoplankton chlorophyll-a, hypoxia) are not experienced by Great Bay Estuary. Moreover, the TN load reductions achieved for Narragansett Bay did not improve chlorophyll-a levels, hypoxia, or water clarity between 2004 and 2015, and are unrelated to changes in eelgrass coverage. Even with TN areal loads significantly higher in the Great Bay these adverse impacts are not manifested, verifying that Narragansett Bay responses are not representative of conditions occurring in the Great Bay system.

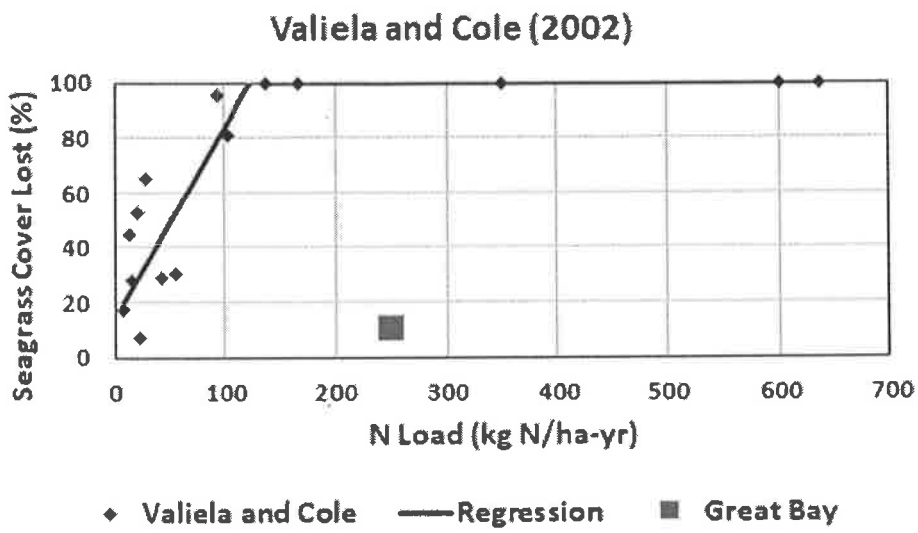
EPA: EPA's analysis does not rely on any single study or comparison as the sole basis for this approach but relies on a broad understanding of available literature and site-specific data in Great Bay as well as comparable estuaries.

COMMENT: No relevant data are presented to justify imposition of the 100 kg TN/ha/yr load limit in the Great Bay Estuary. Narragansett Bay is not a comparable estuary. It has an area that is approximately ten times the area of Great Bay (21 mi^2 vs 198 mi^2) but less than one third of the eelgrass cover (~1,600 acres to 479 acres). Great Bay is shallow, with most of its area available for eelgrass habitat and supports extensive eelgrass growth. Narragansett Bay is relatively deep, with only 0.5% of its area available for eelgrass habitat. The primary eelgrass

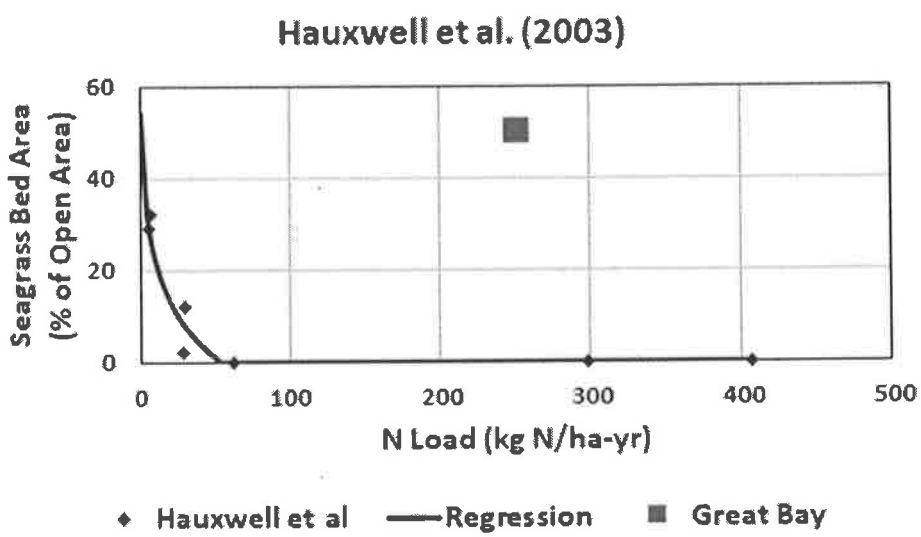
beds in Great Bay are located high in the estuary where the TN loads have the greatest impact. The primary eelgrass beds in Narragansett Bay are located in the lower estuary, far removed from the major loading sources. Eutrophication effects in Narragansett Bay are expressed as phytoplankton blooms and hypoxia. Great Bay does not suffer from excessive phytoplankton chlorophyll-a or hypoxia. Narragansett Bay becomes stratified, leading to hypoxia. Great Bay is well mixed. Tidal variation allows eelgrasses to receive sufficient sunlight over the tidal range, where such conditions do not occur in Narragansett Bay where its eelgrasses are located. The systems could not be more different regarding the key factors controlling nutrient dynamics and their ability to impact eelgrass growth.

EPA: More specifically, the first two scientific studies (i.e., Valiela & Cole, 2002 and Hauxwell et al., 2003) provide a threshold of area-normalized nitrogen loads for entire estuaries. This threshold is clearly applicable to the Great Bay Estuary based on Great Bay's specific inclusion in the study.

COMMENT: This comment is addressed in more detail elsewhere in these comments. We note that EPA appears to stake its claim on applicability based on data for Great Bay being included in the study by Valiela & Cole (2002). EPA did not claim that the data for Great Bay fall within the confidence interval of the regressions presented by Valiela & Cole, which would be the relevant fact, if it existed, but does not. On closer inspection of Valiela & Cole (2002), the data for Great Bay were not used in Figure 4B (at 99) (which relied on the data presented in Table 2) to derive the threshold area-normalized nitrogen load. Consistent with EPA's own analysis, the data for Great Bay were not used in the study to develop the target nitrogen load. Therefore, the study is objectively inapplicable to the Great Bay system. By inserting the relevant Great Bay data into the Valiela and Cole figure associated with eelgrass cover occurring in the early 1990s, it is apparent that paper has no relevance, whatsoever, TN/eelgrass dynamics in the Great Bay system. A much higher areal loading occurs with essentially no loss of eelgrass cover.



The same conclusion is also reached with respect to Hauxwell's assessment of Waquiot Bay, as eelgrasses covered a high percentage of the area where such growth is possible in the Great Bay system even with much higher areal TN loads.



Finally, in support of the loading threshold, Latimer and Rego (2010) presented Figure 2, which presents eelgrass cover as a percentage of total estuarine area less than 3 meters deep versus the nitrogen loading rate. Using the information presented in Short and Mathieson (1992), the pre-Mother's Day storm data for Great Bay was added to this regression and is presented below. As

illustrated, the site-specific data for Great Bay does not fit the analysis presented by Latimer and Rego (2010).

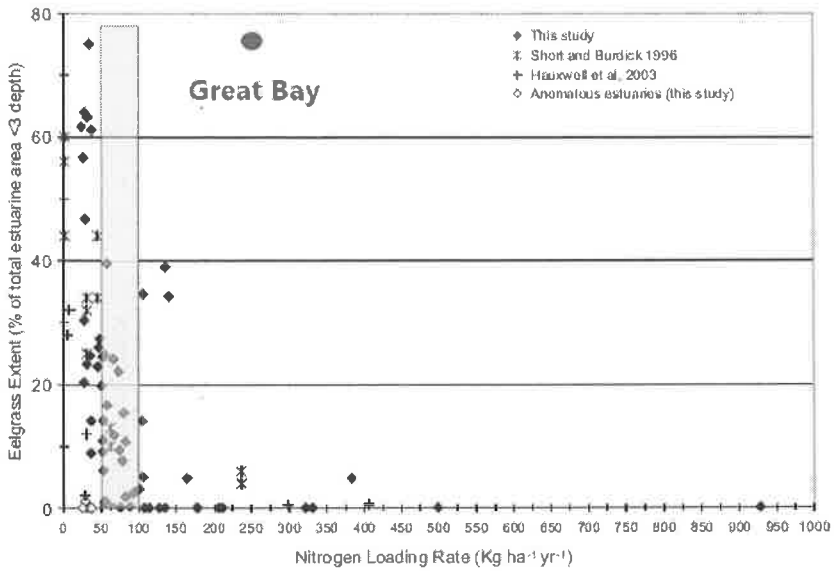


Fig. 2. Plot of eelgrass extent (percent of available habitat) vs. nitrogen loading rate (Kg N ha^{-1} yr^{-1}) (including other published values); gray bar is the nitrogen loading threshold range from the literature 50 – 100 Kg ha^{-1} yr^{-1}).

As illustrated clearly in the graphics presented above, the eelgrass response in Great Bay Estuary does not resemble the data used to derive the loading thresholds by Valiela and Cole (2002), Hauxwell et al. (2003), or Latimer and Rego (2010). These studies do not reflect the assimilative capacity exhibited by Great Bay and the lower loading threshold cited by EPA has no relevance to this estuary.

EPA: The third scientific study (*i.e.*, Latimer & Rego, 2010), provides a smaller scale analysis by evaluating estuarine embayments and concludes that area-normalized nitrogen loading to such embayments must also not exceed the same upper threshold.

COMMENT: This statement is inaccurate. Nowhere did Latimer and Rego's publication claim that all embayments may not exceed 100 kg/ha-yr of TN to protect eelgrass resources nor did they claim that the analyses presented in that paper had any relevance, whatsoever, to the Great Bay system. As acknowledged by Dr. Latimer, the entire paper was based on a series of presumptions, not even actual data. Dr. Latimer specifically confirmed that (1) the paper does not apply to river dominated systems (like the Great Bay system), (2) only dissolved forms of TN

were considered in the loading calculations and (3) the use of an annual loading threshold was an artifact of the loading model employed.

EPA: Finally, the comparison to Narragansett Bay acts to provide a direct comparison on a larger scale that actual area-normalized nitrogen load reductions similar to those proposed in this permit have been effective towards achieving water quality standards. This comparison confirms that such an approach is justified and that it is reasonable to expect a similar result in the Great Bay estuary.

COMMENT: The statement is inaccurate based upon the evaluations presented and available data for both systems. EPA is claiming that one area-normalized nitrogen loading rate is sufficient to assess eelgrass impacts to all estuaries and no site-specific evaluation is necessary. On its face, this conclusion is not scientifically defensible as Great Bay has three times more eelgrass in about one tenth the area of Narragansett Bay while areal nutrient loads are 2-3 times higher. Narragansett Bay is fundamentally different from Great Bay and cannot be used to infer any information on the needs for Great Bay. The table below illustrates the significant physical and nutrient response differences between the two estuaries.

Parameter	*Great Bay*	*Narragansett Bay*
Surface Area	*21 mi2*	*197.5 mi2*
Average Depth	*<2 meters*	*7.5 meters*
TN Load (kg/ha/yr)	*252-150*	*80.1*
Eelgrass Acreage	*>1,600 ac*	*497 ac*
Phytoplankton	*Does not respond to TN loads*	*Responds to TN Loads*
Water Clarity	*Does not responds to TN loads*	*Responds to Phytoplankton level*

Another paper, by Latimer and Charpentier (2010)[54], discusses additional considerations necessary for assessing protective nitrogen loading rates for individual estuaries. They expressly note that the magnitude of nitrogen loading is insufficient to determine how much nitrogen is too much. "Estuaries are dynamic environments that can assimilate nutrients depending upon their geomorphic and hydrodynamic properties which affect the ability to dilute and flush nutrient loads." ... "The other essential components are data on effects or symptoms of eutrophication, such as, for example, water clarity, chlorophyll-a magnitude as well as indicators tied directly to designated uses, such as extent of hypoxia and extent of ecologically important resources such as seagrasses." (Latimer and Charpentier (2010) at 134) (Emphasis added) EPA's analysis lacks consideration of any of these factors and is therefore not a credible analysis.

Likewise, EPA's published Estuarine Nutrient Criteria document states one must conduct separate nutrient impact assessments based on the specific characteristics of the estuary in question:

...the extent to which various symptoms are expressed depends on the rate of nutrient loading, its composition, seasonality of the loads relative to the growth state of the resident organisms, status of higher trophic levels, residence time, stratification and many other abiotic factors, such as suspended sediment load (e.g., Figure 2.2). One of the important factors determining the expression of eutrophication symptoms is the composition of the nutrient pool. Nutrients can be delivered to an ecosystem from riverine sources, groundwater, atmospheric, marine and other sources. Each source can vary in the amount of specific nutrients they contribute (N, P or Silicon [Si]), as well as their proportional ratio to other nutrients in that source. They can also vary in the chemical form of those nutrients, inorganic or organic, or, in the case of N, oxidized (NO_3^- or NO_2^-) or reduced (NH_4^+) forms.

... Estuaries can respond to similar levels of nutrient loading in very different ways. As described throughout this report, this disparity can be ascribed to fundamental differences in the way the respective waterbodies receive and process inputs.

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[54] Latimer, James S., and Michael A. Charpertier. 2010. Nitrogen inputs to seventy-four southern New England estuaries: Application of a watershed nitrogen loading model. Estuarine, Coastal and Shelf Science 89 (2010) 125 – 136.

Nutrients in Estuaries, USEPA 2010, at 12 and 27

EPA: This is particularly true given that the 2007 NOAA report discussed above characterizes both Great Bay and Narragansett Bay with the same degree of susceptibility to nitrogen-induced eutrophication (*i.e.*, "moderately susceptible").

COMMENT: This 13-year-old statement is unsupported by actual data for the Great Bay system, and is vague and misleading. The systems clearly do not exhibit equal "susceptibility" based on the actual ecological impacts documented to be caused by TN loads. Narragansett Bay is a much larger and deeper estuary, with far greater detention time in comparison to Great Bay. The eutrophication concerns in Narragansett Bay are primarily related to phytoplankton and dissolved oxygen. Great Bay does not experience these problems where eelgrasses are growing. In fact, phytoplankton chlorophyll-a levels in Great Bay are very low and do not respond to reductions in TN load as well documented by PREP and the 2014 Independent Peer Review.

EPA: While any one of these lines of support may be sufficient to establish the threshold of 100 kg ha-1 yr-1 as a reasonable target, the fact that they each independently reinforce the same threshold gives EPA confidence that this threshold, as part of an adaptive management approach, is an effective means to protect eelgrass and achieve water quality standards throughout the Great Bay Estuary.

COMMENT: This is an indefensible and unsupported conclusory statement, that is refuted by the system data and documents EPA references and contravenes other information being submitted herewith concerning protective TN endpoints for other systems compared to the one implied by the 100 kg/ha-yr threshold. At a minimum, EPA should peer review the 100 kg/ha-yr to investigate the significant discrepancy and novelty of this permit. The proposed lines of support are not applicable to Great Bay and provide no information relevant to the Great Bay system. To the contrary, Dr. Latimer noted that his published study (and the related studies) are not applicable to conditions in Great Bay. Ample information has already been provided to confirm that none of the studies and information cited by EPA are applicable to Great Bay.

EPA: Finally, given the impacts of overall water quality on eelgrass health, EPA expects that nutrient reductions necessary to effectively restore and protect eelgrass will also bring the Great Bay estuary into attainment of water quality standards for all other nutrient-related impairments

(*i.e.*, chlorophyll-a, dissolved oxygen and light attenuation). Accordingly, the GBTN GP is requiring a robust ambient monitoring for eelgrass and each of these water quality parameters as part of this adaptive management approach. *See* discussion of the Adaptive Management Ambient Monitoring Program in Part IV of this Fact Sheet. EPA notes that once water quality standards are met consistently for all nutrient-related parameters throughout the Great Bay estuary, no further nitrogen loading reductions will be necessary (assuming that nitrogen loads do not increase from that level because of significant changes in land use, weather, atmospheric deposition or other reasons that can affect water quality).

COMMENT: This final comment lacks supporting data analysis in the permit administrative record. EPA has provided no information showing that nutrient reductions in Great Bay are necessary to restore and protect eelgrass or that they have adversely impacted the ability of eelgrass to propagate. EPA is also aware that chlorophyll-a levels in Great Bay are low and do not respond to reductions in TN load. No one has documented the existence of excessive macrophytes or epiphytes in the Great Bay system, the only other way TN could inhibit regrowth of eelgrasses. Similarly, water clarity/light attenuation does not respond to TN load reductions as this parameter is governed by CDOM and non-algal particles in the estuary. Great Bay, Little Bay and the Piscataqua River do not have a dissolved oxygen problem. Unlike Narragansett Bay, the loss in eelgrass cover in Great Bay occurred at all depths after the Mother's Day storm, not just along the deep-water edge of the beds. (See, Fact Sheet Figure 3 at 21). This loss has persisted even after ambient water quality returned to pre-Mother's Day storm conditions, which were determined, based on detailed 2007 system monitoring, to be sufficient to support eelgrass growth throughout Great Bay (Morrison 2008) Unlike Narragansett Bay, phytoplankton growth in Great Bay is controlled by residence time and water clarity in Great Bay is primarily controlled by naturally occurring colored dissolved organic matter (CDOM) and non-algal particulates (NAP). Consequently, this comparison to Narragansett Bay is incongruous as it ignores the critical controlling factors that distinguish these estuaries and the factors controlling eelgrass health.

17. Proposed Watershed Load Reduction Is Not Rational or Attainable

Comment: *Using the USEPA load allocation and information developed by NHDES on NPS TN loads reaching the estuary, it is impossible to achieve the loading target, even if the entire*

watershed is converted to pristine forestland and the point sources install "limits of technology" treatment. Thus, EPA's proposed approach is not "adaptive management," it is instead absolute management. This analysis also verifies that EPA's proposed reductions are not rational, as no other New England or East Coast systems with eelgrass controlled TMDL decisions have required pristine forest conditions to ensure eelgrass propagation.[55] *This is further confirmation that EPA has misapplied the methodology it employed to derive effluent reduction requirements for this system and reconsideration of that approach should occur.*[56]

Background

USEPA identified an initial adaptive management loading target of 100 kg TN per year per hectare of estuary surface area as an initial target in its draft General NPDES Permit for the Great Bay Estuary watershed. This target concentration is purportedly based on scientific papers by several researchers, primarily Latimer and Rego (2010). USEPA used this initial loading target to prepare a preliminary load allocation between municipal wastewater treatment facilities (point sources) and non-point sources (NPS). This allocation, and the ability of the watershed to achieve the proposed allocation, are evaluated below.

Based on the documentation cited by EPA for determining the existing point and nonpoint source loads to Great Bay Estuary (2018 State of Our Estuaries Report and 2014 NHDES Great Bay Non-Point Source Study; Fact Sheet at 25/26) the following "normalized" 2012-2016 load allocation was determined for the estuary:

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[55] See, Maine DEP TN requirements for protection of Casco Bay which allow much greater areal loads to achieve an instream far field objective of 0.32 mg/l TN – during the growing season.

[56] The City of Rochester has performed a similar analysis of a forested estuary and independently reached similar conclusions.

Table 1 - Total Nitrogen NPS Load Delivered to Great Bay Estuary (2012 – 2016)

Year	GBE NPS Loading (tons/year)	GBE NPS Loading (kg/ha-year)	Load Normalized to Average Rainfall (kg/ha-year)
2012	645.2	107.6	119.8
2013	642.0	107.1	110.1
2014	760.8	126.9	129.8
2015	498.5	83.1	99.4
2016	451.6	75.3	89.3
Average	599.6	100.0	109.7
LPR Contribution	39.6	6.6	7.3
Total Load	639.2	106.6	117.0

Note: Average rainfall for 2012 – 2016 was 36.6 inches/year. Average rainfall is 42.5 inches/year. NPS contributions to the Lower Piscataqua River (LPR) are not included in the NPS loading estimates provided by PREP in the 2018 SOE Report. USEPA adjusted the head-of-tide loading estimates by 6.6% to account or this part of the watershed.

Table 2 – Total Nitrogen Load Delivered to Great Bay Estuary (2012 – 2016 Average)

Source	TN Contribution (tons)	Area Load (kg/ha-year)
Point Sources	487.1	81.2
Non-Point Sources*	639.2	117.0
Total	1,116.3	198.2

* Includes 6.6% adjustment for loads to the Lower Piscataqua River.

EPA proposed four "adaptive management" scenarios for compliance with the Estuary target load of 100 kg/ha-yr: These scenarios (Table 3) were based on various loading targets for the Point Sources that varied from 8.0 mg/L TN for the largest facilities (Scenario A) to 3.0 mg/L TN for all facilities (Scenario D – WWTPs operating at the limits of technology). Compliance with the overall Estuary target load of 100 kg/ha-year was achieved by adjusting the allowable NPS loads. Thus, the minimum target NPS load of 66.6 kg/ha-year corresponds with the most relaxed Point Source limits (Scenario A) and increases to a maximum of 78.2 kg/ha-year when all WWTPs are at the limits of technology (Scenario D).

Table 3 – TN Allocation to Achieve 100 kg/ha-year Loading Target

Scenario	WWTF Load (kg TN/ha-yr)	NPS Load Target (kg TN/ha-yr)	NPS % Reduction Required (from 2012-2016 levels)*
2012-2016 baseline	81.2	117.0	-
A	33.4	66.6	43%
B	24.4	75.6	35%
C	25.1	74.9	36%
D	21.8	78.2	33%

* Normalized to average rainfall of 42.5 inches/year

Evaluation of NPS Reduction Target Attainability

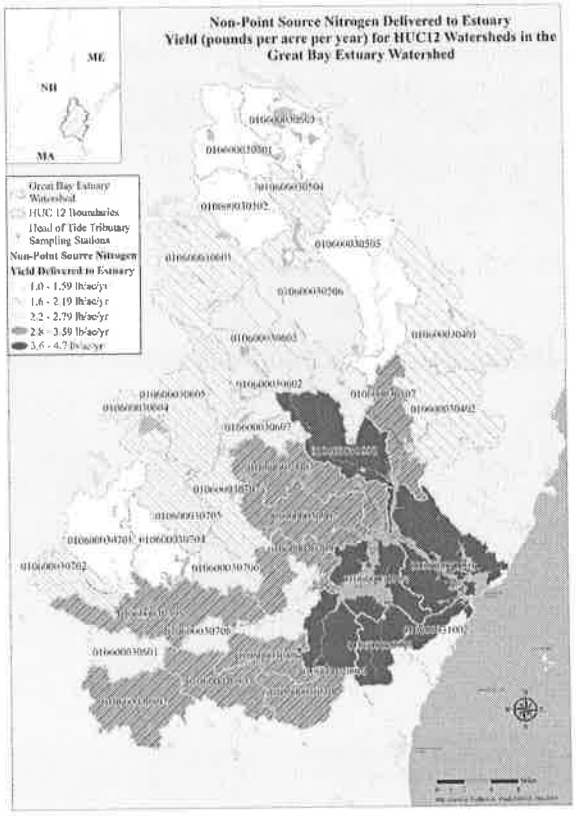
Under EPA's load reductions, assuming all the communities are at "limits of technology" (Scenario D), the allowable watershed load under a "normal" rainfall year must be less than or equal to 78.2 kg TN/ha-year. The maximum NPS load allocation of 78.2 kg/ha-year represents a 33% decrease in NPS loads from the "normalized" 2012 – 2016 average condition – which were much dryer than average. This is equivalent to a total delivered NPS load of 468.9 tons TN/year. Compliance with this total nitrogen load target is contingent upon the ability to reduce NPS loads from anthropogenic sources caused by land use alteration such that the combination of anthropogenic and natural background NPS loads do not exceed 468.9 tons/year delivered to the

estuary. The only such sources that may be controlled via "adaptive management" are septic systems, animal/fertilizer inputs and impervious surfaces in urban areas. Nutrient loads from forests and wetlands and surface waters cannot be controlled. The following assessment confirms that EPA's watershed load and NPS reduction targets are not attainable – even if the entire watershed were forested.[57]

a. Forested Watershed Loads Exceed EPA's

To reach EPA's load reduction target, the following maps illustrate where the reductions would need to occur - in the areas with the greatest impervious surface and relatively higher NPS loads. These are, in general, the developed lands in closest proximity to the estuary (PREP 2018 and NHDES 2014):

Figure 1.2 Percent impervious cover by town as of 2015.



To assess whether EPA's projected NPS load reduction is feasible, it is necessary to first determine the minimum load expected for the watershed if locally controllable anthropogenic

[57] It would be unlawful to regulate beyond a natural condition. *See* 40 C.F.R. § 131.10(g); N.H. Rev. Stat. § 485-A:8; *N.H. Code of Admin. Rules*, Env-Wq Chapter 1702 generally (defining "naturally occurring conditions" and containing numerous references to same).

influences were eliminated. EPA's Fact Sheet referenced the NHDES (2014) study evaluated non-point sources of nitrogen delivered to the Great Bay Estuary. In this study, NHDES estimated that, if the entire watershed was pristine forest, the anticipated TN loading would be approximately 408 tons/year based on a NH Forest study:

Another comparison can be made with the nitrogen loads from the Hubbard Brook Experimental Forest in North Woodstock, NH. Nitrogen yields of 1.2 lb/ac/yr from this forest (Bernal et al., 2012) reflect current atmospheric deposition rates but not human development on the ground because the watershed is pristine. For the Great Bay Estuary watershed, a yield of 1.2 lb/ac/yr would amount to nitrogen load of 408 tons/yr.

(NHDES (2014) at 20) (Emphasis added)

As discussed later, the Bernal paper *only addressed dissolved inorganic N* originating from a forested system. However, assuming Bernal actually represented the total nitrogen (i.e., included particulate, and dissolved organic N (e.g., CDOM)) from a forested watershed, the remaining load for all other non-point source loads would be 60.9 tons per year (i.e., 468.9 tons – 408 tons). *Thus, under all circumstances, WWTP would need to install upgrades to achieve 3 mg/l TN on an annual average basis (limits of technology – LOT) since the residual load available for other human-induced NPS loads is clearly below EPA's allowable target even with LOT.*

Moreover, the excess NPS TN load of 231.2 tons (i.e., 639.2 tons – 408 tons) will need to be reduced by, at a minimum, 74% on average, to meet the 78.2 kg/ha-year loading target. This reduction would need to come from entirely the existing loads attributed to septic systems, agriculture, animals, urbanization and fertilizer. Such a reduction cannot be achieved. EPA's allowable load translates into 1.38 lbs. TN/ac-yr. The urbanized areas with the most impervious surface average up to 4.7 lbs/ac-yr. Even the furthest and least populated areas of the watershed fail to meet this target (NHDES 2014 at 24, Figure 8 above).

In reality NPS load reduction required to meet the 100 kg/ha-year loading target will actually be far greater than 74% under most years. NHDES estimated the NPS load from septic systems, animals, and fertilizer was 490 tons/year delivered to the estuary for the 2009 – 2011 period that was only moderately wet. (NHDES (2014), Figure ES at 3) based on information from the 2013 State of Our Estuaries report. Consequently, the excess load would require a reduction of 85% to

allow the long-term average to be met. It would be impossible to achieve these load reductions without completely eliminating farming and other human habitation and converting the area to forest. However, such NPS load reductions are not feasible even with a pristine, forested watershed, as discussed in detail below, because the EAP and DES NPS load evaluations significantly underestimated the "natural" NPS load delivered to the system under current conditions.

b. Review and Evaluation of NPS Load Calculations Confirms EPA Mandated Pristine Forest Conditions

The evaluation presented above uses the baseline load of 408 tons/year that was presented in the Non-Point Source Study prepared by NHDES. The delivered baseline load for a forested watershed of 1.2 lb/acre-year was based on the study by Bernal et al. (2012) focusing on DIN. Bernal et al. (2012) also acknowledged that dissolved organic nitrogen (DON) is a significant component of the outflow from the forest, but they did not quantify the amount of DON that was discharged. A separate report prepared by Campbell et al. (2000)[58] of NH forests demonstrated that DON made up the majority of TDN in stream exports. Campbell et al. (2000) measured DON at four stations in the Hubbard Brook Experimental Forest and reported that the DON component ranged from 48 – 80% of the TDN in the stream flow leaving the forest. (Campbell et al. (2000), Table 3 at 135). For a median percentage of 61% DON in the stream flow, the load of TDN exiting the forest would be 156% greater than the estimate provided in Bernal et al. (2012) to account for the DON present. While some DON will be lost in transport and some converted to DIN, it is clear that the TN load delivered to the estuary from a pristine forest is considerably higher than estimated by NHDES 2014. The water quality data for the system confirms DON as additional 39% of the system TN (Exhibit 27). This DON would originate from the watershed due to decaying plant matter.

[58] Campbell, J., Hornbeck, J., McDowell, W., Buso, D, Shanley, J. and Likens, G. 2000. Dissolved organic nitrogen budgets for upland, forested ecosystems in New England. Biogeochemistry 49: 123 – 142.

GRBAP - Great Bay

N=48

Fraction	Species	Median (mg N/L)	Percent of Total
Dissolved	Ammonia	0.048	13%
	Nitrate+Nitrite	0.092	24%
	In Organic Matter	0.148	39%
Particulate	In Phytoplankton	0.005	1%
	In Organic Matter	0.084	22%
Total		0.375	100%

Properly accounting for the organic N load to the system that reaches Great Bay increases the TN (DIN-based) loading from a forested system by 39% (263 tons/yr) and the resulting forest TN load of 665 tons/year or 111 kg TN/ha-yr. This load matches other system data and TN loading analyses.

The 2018 State of Our Estuaries report also indicates that a significant amount of DON originates from forests, wetlands, and marshes. PREP 2018 reports that the entire Gulf of Maine is experiencing increases in colored dissolved organic matter (CDOM) from rivers, associated with increase precipitation and is composed of decaying plant matter from the watershed. CDOM contains organic nitrogen and is a significant source of DON entering the estuary. Monitoring data presented in the 2018 PREP Report shows that NPS loads contributed 606.1 tons/year of TN to the estuary as measured at the head-of-tide stations. (See Figure 3-2 at 17) and only 253.3 tons/year of DIN at that location (Figure 3-3 at). *Thus, up to 352.8 tons/year of DON and particulate organic nitrogen originated from the watershed.* This load does not originate from septic, animal and fertilizer sources, which are primarily DIN and enter via groundwaters.

NHDES (2014) reported that the remaining anthropogenic source of nitrogen, animals, only contributed 115 tons/year in the 2009 – 2011 monitoring period, when rainfall rates were higher. Assuming that all of this load was nitrogen other than DIN, the forest/wetland load would contribute an additional 237.8 tons/year of DON that Bernal failed to consider. Thus, based on PREPs assessment of the form of nitrogen entering the system, the actual total nitrogen loading from forests and wetlands in an average year is far higher than 408 tons per year, it is on the order of 630 tons/year or 105 kg TN/ha-yr.

Under either evaluation, using the relevant studies for this watershed, the loads from a forested watershed alone would meet or exceed EPA's allowable "maximum" watershed loading, even with all wastewater facilities at limits of technology and all other forms of human habitation eliminated. Measurements made in the Chesapeake Bay watershed also demonstrated a delivered total nitrogen forest load of 1.8 lbs/acre-year, a delivery rate that is 50% greater than the estimate contained in the NHDES (2014) Great Bay Nitrogen Non-Point Source Study. The Chesapeake Bay value was a true "TN" load from forests delivered to that watershed, not a DIN load. If this delivery rate was applied to Great Bay as a lower bound estimate of the pristine forest delivered load, the resulting TN loading rate would be about 600 tons/year (100 kg TN/ha-yr). Thus, all of the estimates indicate a forest load of at least 600 tons per year, if the watershed were returned to pristine forest conditions.

c. Conclusions Regarding Ability to Achieve NPS TN Loading Target

The monitoring data from the PREP 2018 State of Our Estuaries report as well as monitoring in the Hubbard Brook Experimental Forest show that the NPS loads for pristine forest watershed will meet or exceed EPA's watershed loading target, even with all WWTPs at LOT. Consequently, the target loading rates specified in the permit as part of an "adaptive management" approach are not achievable, even if virtually all traces of human habitation are removed. Such load reduction mandates are not rational.

18. EPA's Evaluation of Normalized NPS Load Underpredicted NPS Reduction Requirements

Beyond these apparent errors, the evaluation presented by USEPA to support its loading determination and load reduction decisions was based on normalizing the 2012 – 2016 average NPS load to average rainfall conditions. As shown in Table 1, USEPA normalized the 2012 – 2016 NPS load using an adjustment factor of 9.7% (i.e., the loading rate increased from 100 kg/ha-year to 109.7 kg/ha-year). The rainfall for the period 2012 – 2016 averaged 36.6 inches/year and two years 2015-2016 were drought conditions (~31.5 inches of rainfall). With an average rainfall of 45.2 inches/year, the scale-up for rainfall alone is 23% over the 4-year average. It is not apparent how EPA could have selected the factor it used to "normalize" the 2012-2016 system NPS loads. Using data contained in the PREP 2018 State of Our Estuaries report to determine the relationship between rainfall and NPS load, it is apparent that EPA's NPS

load estimate is in error and should be increased significantly. This means EPA significantly underpredicted the degree of NPS load reduction needed to meet its intended watershed target. It also means EPA dramatically underpredicted the amount of uncontrollable TN loading to the system by at least 30%. Once again, the conclusion is that the 100 kg/ha-yr load limitation is simply impossible to obtain and irrational to impose.

The 2018 State of Our Estuaries report provided information on rainfall and NPS loads to the estuary. Annual rainfall data were summarized in Figure 1 from the report (PREP 2018 at 7). The annual precipitation totals from this chart were translated into a table of annual rainfall data.

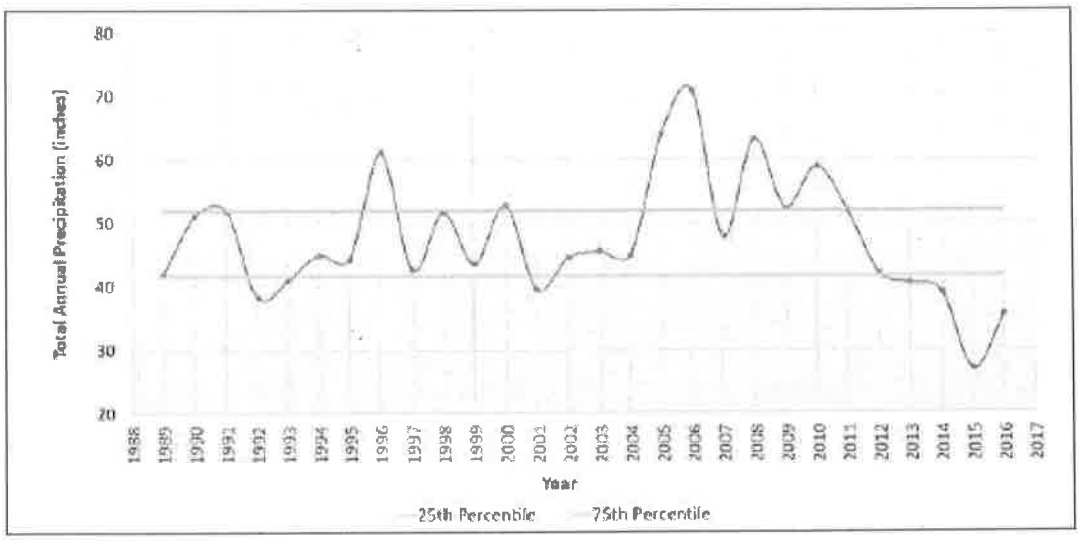


Figure 1 Precipitation in total inches from Greenland/Portsmouth Station. Data are averaged between Portsmouth (Pease) and Greenland weather stations.

Data Source: NOAA National Centers for Environmental Information

Table 4 – Annual Rainfall Reported by PREP (2018)

Year	Rainfall	Year	Rainfall	Year	Rainfall
1989	43	1999	44	2009	52
1990	52	2000	53	2010	59
1991	53	2001	39	2011	52

1992	37	2002	44	2012	42
1993	41	2003	45	2013	41
1994	45	2004	44	2014	38
1995	44	2005	65	2015	27
1996	62	2006	71	2016	35
1997	43	2007	47	-	-
1998	52	2008	63	-	-

Figure 3.1 from the report (PREP 2018 at 17) provides NPS nitrogen loading data that are grouped into five periods. These periods include 2003 – 2004, 2005 – 2006, 2007 – 2008, 2009 – 2011, and 2012 – 2016. In addition, annual loading estimates are provided for the five years in the 2012 – 2016 period.

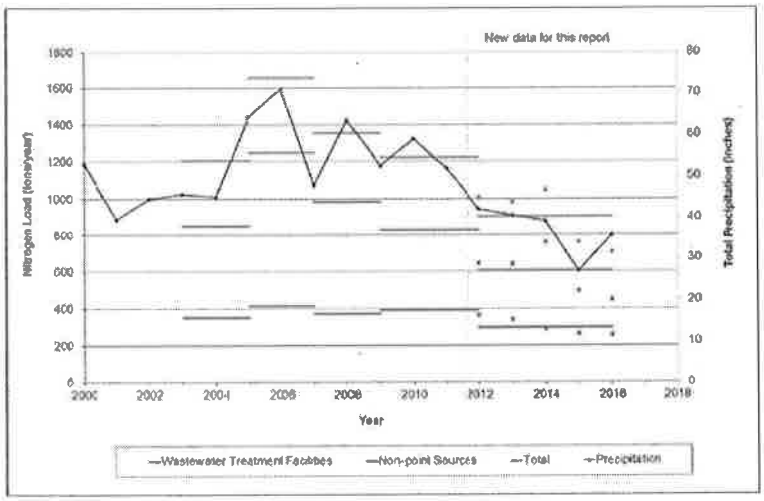


Figure 3.1 Nitrogen loads to the Great Bay Estuary, shown separated by source as well as the total nitrogen load. Precipitation data are averaged between Portsmouth (Pease) and Greenland weather stations. Colored circles indicate annualized loads for 2012 through 2016.

Data Source: NH Water Resources Research Center. Load estimates from 2003–2011 from NHDES (2016)

Based on a review of the annual loading estimates, this five-year period was divided into two averaging periods. The period from 2012 – 2014 consisted of annual rainfall between 38 and 42

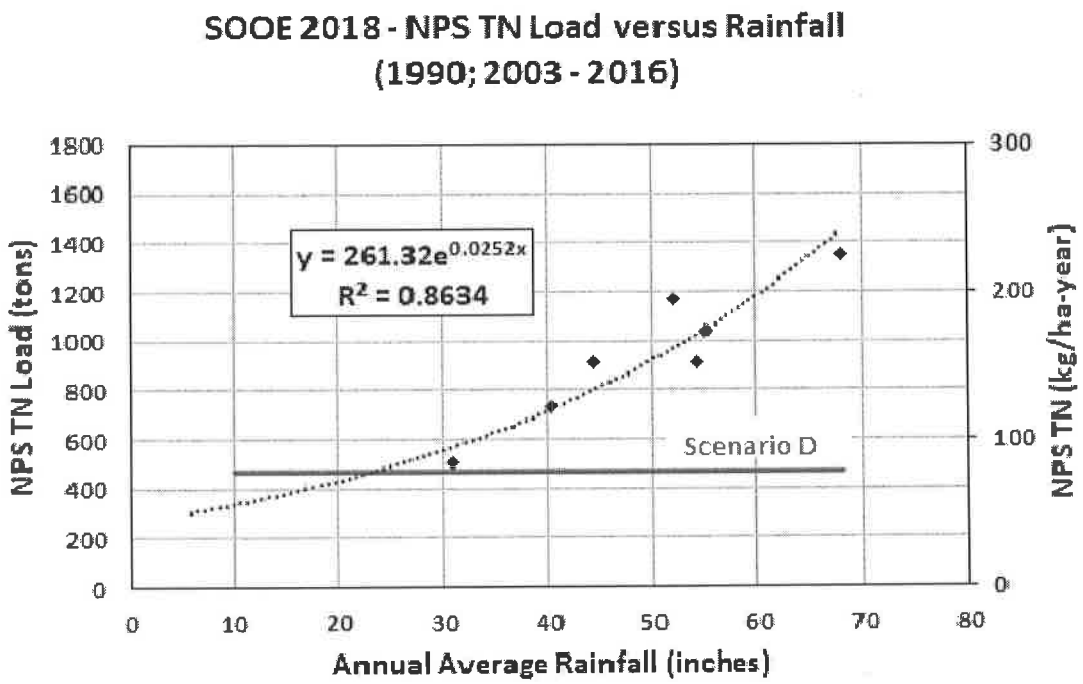
inches/year with NPS loads greater than 640 tons/year. The period from 2015 – 2016 consisted of significantly lower rainfall (27 and 35 inches/year, respectively), and the NPS loads were less than 500 tons/year. These data were supplemented with one additional data point. As part of USEPA's determination that Valiela and Cole (2002) was directly applicable to the Great Bay Estuary, it noted that data for the estuary were included in the report. Valiela and Cole (2002) reported a nitrogen load to the upper estuary of 252 kg/ha-year. These data were referenced to Short and Mathieson (1992). A review of the referenced report indicates that the loading rate was for 1990 (53 in. rain). The NPS portion of this load was estimated by proportioning the point source load based on the population data provided in PREP (2018) (Figure 2 at 7). The loading data along with annual precipitation are summarized in Table 5.

Table 5 – NPS Nitrogen Loads and Annual Precipitation from PREP 2018

Period	Rainfall (in)	WWTF (tons)	NPS (tons)	NPS with LPR Load (tons)	NPS (kg/ha-yr)
1990	52.0	343.2	1167.9	1167.9	194.8
2003-2004	44.5	350	850	906.1	151.1
2005-2006	68.0	400	1262.4	1345.7	224.4
2007-2008	55.0	375	975	1039.4	173.3
2009-2011	54.3	390	850	906.1	151.1
2012-2014	40.3	320.5	682.7	727.7	121.4
2015-2016	31.0	260.3	475.05	506.4	84.4

The data in Table 5 for NPS load with the Lower Piscataqua River included were plotted to examine the relationship between rainfall and NPS nitrogen loading. (Figure 1) The regression shows a very strong correlation ($R^2 = 0.86$).

Figure 1 – Relationship between NPS Load and Rainfall



Using this correlation to normalize the NPS load for the average rainfall of 45.2 inches/year, the resulting NPS load is 816.3 tons, not 639 tons/year as estimated by EPA. *Consequently, all of EPA's load reduction projections are misstated and low by about factor of 2. The actual controllable NPS loads must be reduced by ~85% to achieve a 100 kg/ha-yr target- which is not physically achievable without eliminating virtually all human habitation in this watershed*

Summary

The data used by USEPA to support the General Permit and the adaptive management approach for limiting total nitrogen load to the Great Bay Estuary were evaluated to assess the requirements and ability to comply with the permit. These data indicate that compliance would require all point source dischargers to upgrade their facilities to the limits of technology. In addition, the entire watershed would need to respond like a pristine forest. All remaining non-point source loads (septic systems, fertilizer application, animals) would need to be eliminated to achieve the loading target of 100 kg/ha-year. Such NPS load reductions are not attainable or rational. EPA has presented no information explaining how this watershed and estuarine system could possibly be required to implement such draconian reductions, when no other New England

watershed has had such requirements imposed to protect eelgrass resources. EPA's proposed action is facially irrational.

Finally, this analysis further confirms that the 100 kg/ha-yr target is not rational. Even if the watershed were forested, this limit could not be achieved. No other systems have been required to achieve pristine forest conditions to protect eelgrass resources underscoring earlier comments that the entire technical basis for imposing the selected level of TN reduction was misplaced.

19. Miscellaneous Comments:

Scientific literature and reports (Fact Sheet 13-17)

EPA notes Great Bay water quality is influenced by six watersheds covering >500 sq. miles and 17 POTWs. (Fact Sheet 11-13). EPA nowhere addresses whether this watershed's nutrient sources are similar to those evaluated in the papers used to set the watershed load limitation. The loading characteristics and forms of nitrogen are clearly different from the publications EPA has relied upon to set the General Permit effluent limitations.

EPA notes that the GB estuary is "tidally dominated" with tidal range of "8.9 feet at the mouth and 6.6 feet at Dover Point." (Fact sheet at 13). EPA nowhere assesses the effect of this large change in tidal flow has on the ability of nitrogen to cause excessive plant growth in this system or for sufficient light to reach system eelgrass populations.

EPA notes that "unlike free flowing rivers which tend to flush out sediments and pollutants relatively quickly, estuaries will often have a lengthy retention period… ." EPA nowhere assesses that Great Bay estuary, unlike other estuaries (Narragansett Bay, Chesapeake Bay, Long Island Sound) does not have a "lengthy retention period" and that tributary nutrient loads from the Squamscott and Lamprey Rivers pass out of the system in a matter of days. Ex. 36, 29-32, 34. Thus, the generalities stated by EPA have no relevance to the Great Bay system. The dominant load sources to the Piscataqua (from the Cocheco and Salmon Falls Rivers) pass out to the ocean in one day. *Id.* EPA's failure to assess this critical characteristic of the system, in comparison to the ones used to set the watershed load limit renders this assessment completely arbitrary and misplaced. Ex. 1-6.

EPA says that the reports for Great Bay document an "estuary in decline." (Fact Sheet at 14) This is incorrect with respect to TN loadings, TN concentration and phytoplankton growth, light transmission, macroalgae growth and epiphytes, the only factors that matter in implementing nutrient criteria. *See e.g.,* 2018 State of the Estuaries Report; Ex. 17-24, 35, 47, 63, 77.

EPA cites to a 1997 NOAA document (Fact Sheet at 14). That document contains no specific assessment showing TN is causing adverse impacts on the Great Bay system. At the time it was published, eelgrass levels were thriving and there was no information showing TN levels (higher than today) were adversely impacting eelgrass viability or propagation. EPA fails to note this in their analysis which completely undercuts any claim that this document supports that TN caused or contributed to the decline in eelgrasses.

EPA references a 2007 NOAA report which does not support any contention that TN cause or contributed to eelgrass declines in Great Bay. Fact Sheet at 14. A finding that a system is only "moderately susceptible" to adverse impacts from TN confirms that the system has a greater assimilative capacity for nutrient loadings than other systems, such as those evaluated by the cited papers. *See also*, Ex. 57, 70, 76. EPA completely failed to recognize this fact in completing its assessment. The claim that chlorophyll a data showed significant impairment has no relevance in areas where eelgrasses were growing. The NOAA statement indicating chlorophyll a changed due to DIN increases is inaccurate as verified by the OPPOSITE statement found in the Fact Sheet at 15 ("Negative effects of excessive nitrogen, such as algae blooms and low dissolved oxygen levels are not evident."). *See also*, Ex. 77. PREP (which contained several EPA representatives) repeatedly found that Chlorophyll a has never changed significantly in this system for the past 30 years despite a major increase then decrease in TN and inorganic N concentrations. PREP 2003, 2006, 2009, 2013, 2015, 2018 – State of the Estuaries Reports.

EPA's claim that "five State of the Estuaries Reports … detail a trend of increasing nitrogen related impairments in the Great Bay estuary" is inaccurate. Fact Sheet at 15. PREP repeatedly found changes in TN had no apparent effect on the primary indicators that could adversely impact eelgrasses. Moreover, the reports documented a decreasing, not increasing trend of TN and DIN from 2003 to the present. 2018 State of Estuaries Reports; Ex. 77.

EPA's reference to findings in the 2009 and 2013 PREP Reports are misguided. ("Great Bay Estuary exhibits many of the classic symptoms of too much nitrogen…." Fact Sheet at 15-16.

The primary author of those negative statements, Philip Trowbridge, admitted under oath that the claims were not supported by the system data. *See*, Ex. 35 – deposition excerpts which EPA had in its possession; Ex. 47 – 2014 Peer Review. DES also admitted that it declared the system TN impaired at EPA's request to appease CLF, a local environmental group. Ex. 35. DES subsequently withdrew the 2009 Nutrient Criteria document that it used to claim TN was causing impairment, after a detailed independent peer review confirmed that none of the statements and conclusions regarding TN impairment to eelgrasses or DO were scientifically defensible. Ex. 47. DES subsequently informed EPA that the system should be delisted as impaired for TN.

EPA's reference to TN impacts on other estuaries (Fact Sheet at 17) does not provide evidence that TN is causing adverse impact in this system. Ex. 1-6. EPA's speculation that macroalgae may be causing adverse effects is completely undocumented for this system and has no basis in scientific fact nor does EPA cite documentation for this system. Macroalgae surveys in Great Bay have occurred where eelgrasses do not inhabit (above the median low water line). *See*, Nettleton, Burdick. These macroalgae are primarily invasive species (*see* PREP 2018), have never been related to the amount of TN occurring in the system and have never documented adverse impacts on eelgrasses. Ex. 35 (Trowbridge Deposition).

EPA cites the state's definition of "cultural eutrophication" (Env-Wq 1702.15) which governs whether and where one may find a "reasonable potential" for nutrient impairment. (Fact Sheet at 17). Although EPA claims the system is currently exceeding assimilative capacity, EPA nowhere provides data showing that such "cultural eutrophication" exists in the Great Bay system or that it is causing adverse impacts on eelgrass survival and propagation. Fact Sheet at 18, Table 2, verifies that the state has not classified Great Bay, Little Bay, the Piscataqua River or Portsmouth Harbor as nutrient impaired, despite 30 years of detailed monitoring under the National Estuaries Program, verifying that the system is not presently violating applicable narrative water quality criteria for nutrients. Moreover, the discharges to the impaired riverine systems (Squamscott and Lamprey) are already directed to reduce nutrients. Only the Cocheco system, impacted by Rochester, has yet to have a nutrient requirement imposed. That system is not yet regulated because an update in DO criteria, mandated by the state legislature, is expected to eliminate the concern noted for that system.

EPA's Fact Sheet at 19 confuses that applicable narrative state WQS for regulating nutrients with the threshold for making a decision to regulate a pollutant in an individual NPDES permit (40 CFR 122.44d). The applicable NPDES rule does not alter the stringency of the applicable standard. DES concluded that TN is not causing use impairment, in whole or in part, based on its Section 303(d) de-listing determinations cited by EPA. Federal Rules require consistency between NPDES and Section 303(d) decisions. *See* 40 C.F.R. § 130.12. These determinations were made based on an expert report (2014) which concluded no information indicated that TN is a cause of eelgrass decline in the GB system. Ex. 47, 51. Finally, whether a discharge may need a limitation does not determine what that limitation must be or whether a load reduction is needed. Load reductions are only mandated when the system is impaired (indicating that assimilative capacity is exceeded. There is no data showing TN assimilative capacity is presently exceeded in Great Bay, Little Bay, Piscataqua River, or Portsmouth Harbor.

EPA's assertion that eelgrasses have declined primarily at deeper locations due to nutrient effects on light attenuation is (1) inaccurate and (2) does not prove TN is the cause or even contributing to this condition. (Fact Sheet at 20-21). Eelgrasses declined in shallow and deep waters fairly uniformly in the Bay after the Mother's Day storm. It is also inaccurate that TN is causing a decline in system transparency, which this statement assumes. (Fact Sheet at 21). Morrison specifically reviewed this issue in detail in 2008 and concluded that the amount of light reaching eelgrass was acceptable. Ex. 17. DES admitted this also under deposition. Ex. 35. Moreover, this is precisely the claim that the 2014 Independent Peer Review determined was unsupported and contrary to. System transparency has not changed over time, nor has the phytoplankton component of that condition. An EPA official acknowledged TN had not caused any change in system transparency adversely impacting eelgrass resources.[59] The fact that eelgrasses have declined in shallow as well as deeper waters to approximately the same degree (30%) proves beyond any speculation that TN-induced light transmission is not the factor controlling eelgrass decline or restoration in this system. Ex. 19-24, 26-28, 45. Finally, the sharp decline in 2006 was documented to be caused by the Mother's Day Storm and occurred primarily in proximity to the river inputs. Ex. 26-28, 39, 47, 51, 63, 76. Eelgrass resources have remained constant before and

[59] *See* the attached Declaration of Dean Peschel.

after this event, confirming that a decline in transparency due to eutrophication or excessive algal growth had nothing to do with the major eelgrass decline occurring in this system.

EPA's claim that TN reduction will bring the system into compliance for DO, chlorophyll a and light attenuation (Fact Sheet at 24) is unsupported speculation. First, there is no "light attenuation" violation in the system related to eelgrass propagation. Light attenuation has remained unchanged for decades as eelgrasses increased and decreased and has repeatedly been determined sufficient to support eelgrass growth. Second, EPA presented no analysis of system data to support the claim. The analyses in EPA's possession (Morrison 2008) proves to a scientific certainty that the statements are inaccurate. Third, EPA presents no linkage between low DO (occurring in the Cocheco River) and algal growth. The elevated chlorophyll-a readings occur due to runoff at low tide, and this has no relationship whatsoever to a periodic low DO condition that occurs in that river. Finally, there is no chlorophyll a "violation" occurring in Great Bay, Little Bay, Piscataqua River, or Portsmouth Harbor. Chlorophyll *a* levels are considered "good to excellent" in those waters and EPA has presented no data or analysis to the contrary. Ex. 77. Unsupported speculation is not a basis for regulation of any discharge under the Clean Water Act.