RESPONSE TO COMMENTS
ISSUANCE OF NPDES PERMIT NO. NHG58A000
GREAT BAY TOTAL NITROGEN GENERAL PERMIT FOR
WASTEWATER TREATMENT FACILITIES IN
NEW HAMPSHIRE

On January 7, 2020, the U.S. Environmental Protection Agency (EPA) posted a notice of availability for public notice and comment in the Federal Register for the draft National Pollutant Discharge Elimination System (NPDES) Great Bay Total Nitrogen General Permit for Wastewater Treatment Facilities in New Hampshire (the "Draft General Permit"). The Draft General Permit was developed in close coordination over a period of several years with the State of New Hampshire and the New Hampshire Department of the Environmental Services (NHDES). Upon request from various parties, EPA twice extended the initial 60-day public notice and comment period, to May 8, 2020. Additionally, EPA held a public hearing on February 19, 2020. During the public notice and comment period on the Draft General Permit, EPA received the following written comments:

- Newington Sewer Commission, dated March 18, 2020
- Newfields, dated April 8, 2020
- Town of Epping, dated May 4, 2020
- City of Dover, dated May 6, 2020
- Berwick Sewer District, dated May 7, 2020
- City of Rochester, dated May 7, 2020
- City of Portsmouth, dated May 8, 2020
- City of Somersworth, dated May 8, 2020
- Rollinsford Water and Sewer District, dated May 8, 2020
- Town of Durham, dated May 8, 2020
- Town of Exeter and Town of Newmarket, dated May 8, 2020
- Town of Milton, dated May 8, 2020
- Town of Rollinsford, dated May 8, 2020
- Exeter-Squamscott River Local Advisory Committee ("ESRLAC"), dated March 17, 2020
- New Hampshire Department of Environmental Services ("NHDES"), dated April 21, 2020
- Piscataqua Region Estuaries Partnership ("PREP"), dated April 28, 2020
- Center for Regulatory Reasonableness, dated May 7, 2020
- Massachusetts Water Resources Authority ("MWRA"), dated May 7, 2020
- National Association of Clean Water Agencies ("NACWA"), dated May 7, 2020
- Southeast Watershed Alliance ("SWA"), dated May 7, 2020
- Conservation Law Foundation ("CLF"), dated May 8, 2020
- Friends of Casco Bay, dated May 8, 2020
- Hackensack Riverkeeper and NY/NJ Baykeeper, dated May 8, 2020
- Permit Committee of the New Hampshire Water Pollution Control Association ("NHWPCA"), dated May 8, 2020
- Senator David Watters, dated February 19, 2020
- Jim Howell, dated February 28, 2020
- Heidi Henninger, dated March 3, 2020

- Michael Letendre, dated March 5, 2020
- Ray Hebert, dated April 6, 2020
- Lisa Stanley, dated April 11, 2020
- John Michael Atherton, Ph.D., dated May 7, 2020
- William Baber, dated May 8, 2020
- Christopher Peter, dated May 8, 2020
- Cynthia Walter, Ph.D., dated May 8, 2020
- Lindsey Williams, dated May 8, 2020
- 182 nearly identical emails were received from concerned citizens as part of a mass mailer campaign concerning the General Permit
- 12 nearly identical emails were received from citizens requesting that the burden of nitrogen reduction be shared by all communities throughout the Great Bay Watershed

Additionally, the following people gave oral comments at the February 19, 2020 Public Hearing:

- Senator David Watters
- Senator James Gray
- Russell Dean, Exeter Town Manager
- Jennifer Perry, Exeter Public Works Director
- Caroline McCarley, Mayor of the City of Rochester
- Blaine Cox, City Manager of the City of Rochester
- Peter Nourse, Director of City Services Rochester
- Laura Hainey, Rochester City Councillor
- Robert Carrier, Mayor of the City of Dover
- John Storer, Director of Community Services for the City of Dover
- John O'Connor, Dover City Council
- Shawn Greig, Town of Newmarket
- Suzanne Woodland, Deputy City Attorney for the City of Portsmouth
- Caroline Kendall, Town Administrator for Rollinsford
- Fergus Cullen, City Councillor in the City of Dover
- Mark Allenwood, Brown and Caldwell
- Daniel Bordeau, Geosyntec Consultants
- Richard Spence
- Dean Peschel
- Cynthia Walter
- David Mercier, Underwood Engineers
- Heidi Trimarco, Conservation Law Foundation
- Melissa Paly, Conservation Law Foundation
- Rachel Rouillard, Director of the Piscataqua Region Estuaries Partnership
- Peter Drummond
- Dale Pike

Following a review of the comments received, EPA has made a final decision to issue the permit authorizing the discharge of nitrogen from the eligible facilities. While the information and

arguments presented did not raise any substantial new questions concerning the permit, EPA did make certain clarifications and other revisions to the final permit in response to comments. These improvements and changes are detailed in this document and reflected in the Final General Permit. In accordance with the provisions of 40 Code of Federal Regulations (CFR) § 124.17, the comments received and EPA's responses to those comments, including a description of any changes made to the permit as a result of those comments, as well as any clarifications EPA considers necessary, are described below.

A copy of the Final General Permit may be obtained by calling or writing Michael Cobb, United States Environmental Protection Agency, Region 1, 5 Post Office Square – Suite 100, Mail Code 06-1, Boston, Massachusetts 02109-3912, Telephone (617) 918-1369. Copies of the Final General Permit and the Response to Comments may also be obtained from the EPA Region 1 website at https://www.epa.gov/npdes-permits/new-hampshire-npdes-permits#fgp.

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SUMMARY OF CHANGES TO THE FINAL GENERAL PERMIT

Changes made to the Final General Permit as a result of public comments are summarized below with a reference to the Part of this Response to Comments that explains the rationale for each change:

1. A provision has been added to Part 3 of the Final General Permit to allow permittees to propose a process to establish approaches to ambient monitoring, pollution tracking, nutrient reduction planning, and to revise and iterate the chosen nitrogen target, in accordance with EPA's adaptive management approach. See Part II.C.1.
2. The Adaptive Management Ambient Monitoring Program has been removed. See Part II.D.
3. Appendix II has been removed. See Part II.E.
4. Effluent limitations in Part 2 of the Final General Permit have been changed to seasonal limits. See Part II.F.1.
5. Effluent limitations in Part 2 of the Final General Permit have been updated to be based on 2015-2019 growing season flows. See Part II.F.1.
6. The total nitrogen optimization requirement has been removed. See Part II.F.3.
7. A provision has been added to the Final General Permit (see Part 2.2) to allow increases in the effluent load limits in the next permit reissuance based on successful completion of septic system or private sewer system tie-in projects. See Part II.F.7.
8. The ammonia monitoring requirement has been removed. See Part II.F.11.
9. Sampling flexibility has been added in Part 2 of the Final General Permit (in Table 2, footnote 1), as follows: Occasional deviations from the routine sampling program are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report. See Part II.F.12.
10. Sample types for Milton and Newfields in Part 2 of the Final General Permit have been changed to Grab. See Part II.F.12.
11. Effluent limitation for Epping has been updated in Part 2 of the Final General Permit to be based on actual effluent data. See Part II.F.13.
12. Effluent limits for Milton and Rollinsford in Part 2 of the Final General Permit will be based on monitoring data from the first two growing seasons. For the first 24 months, these Permittees only have a reporting requirement and a provision to maintain normal operation of their POTWs, but no limit. See Part II.F.13.
13. Parts 1 and 4 of the Final General Permit have been adjusted such that obtaining coverage is only possible through voluntary submittal of a Notice of Intent, making coverage purely optional. The details of these submittals has also been clarified. See Part II.G.1.
14. Part 2.4 subpoint 2 of the Draft General Permit has been removed because this provision, which prohibits the discharge of waste that will "lower the legislated water quality classification or interfere with the uses assigned to said water by the New Hampshire

Legislature," is already contained in each potential Permittee's individual permit, all of which are administratively continued and in effect. This broad prohibition is more appropriately contained in individual permits, which cover a range of pollutants, whereas the General Permit covers only total nitrogen. Part 2.4 subpoint 1 has been moved to Part 6.3 of the Final General Permit.

RESPONSE TO COMMENTS ON DRAFT GREAT BAY TOTAL NITROGEN GENERAL PERMIT FOR WASTEWATER TREATMENT FACILITIES IN NEW HAMPSHIRE

EPA received numerous comments regarding various aspects of the Draft General Permit. This Response to Comments provides a comprehensive explanation of the overall permitting approach EPA has adopted and encompasses all significant comments received regarding the Draft General Permit, taking into account the CWA, implementing regulations, case law, varied technical considerations, available data for the Great Bay estuary, and relevant scientific literature. EPA's permitting approach is the conceptual underpinning of the total nitrogen (TN) effluent limits and other permit requirements in the Final General Permit. EPA reevaluated certain aspects of the permitting approach in light of public comment. This Response to Comments also explains any resulting changes that have been incorporated into the Final General Permit.

I. Introduction and Description of Permitting Approach

The Great Bay estuary is composed of a complex network of tidal rivers, inland bays, and coastal harbors. The estuary receives treated wastewater effluent containing nitrogen from 17 publicly owned treatment works (POTWs) located in New Hampshire and Maine. Additionally, the estuary receives a significant nitrogen load from a variety of nonpoint sources and stormwater point sources throughout the watershed. Upon an evaluation of years of ambient monitoring data and other relevant technical and scientific information, EPA has determined that the nitrogen load is exceeding the assimilative capacity of the estuary and is causing or contributing, or has the reasonable potential to cause or contribute, to pervasive nutrient-related impairments and violations of water quality standards. Fact Sheet at 14-26. EPA's conclusions are based on the weight of the evidence and draw on multiple lines of evidence. Although this is a simplified approach that does not attempt to quantify individual subprocesses involved in eutrophication, or to demonstrate cause and effect between each link in the eutrophic cycle, it is entirely appropriate for use in the context of NPDES permitting when assessing large scale nutrient load reductions over relatively long averaging periods. These factual determinations are largely uncontested.

EPA has developed this General Permit to address a difficult environmental regulatory problem with the goal of restoring the designated uses throughout the estuary. When confronting the challenge of controlling or accounting for discharges into a complex waterbody like the Great Bay estuary, EPA considered a variety of potential permitting approaches. Rather than addressing this permitting task on a permit-by-permit basis, EPA instead fashioned a general permit designed to comprehensively regulate nitrogen loading from 13 NH POTWs on a gross, watershed-wide scale, incorporating an innovative and adaptive approach to achieving water quality standards in the Great Bay estuary through a combination of mandatory point source and *voluntary* nonpoint source nitrogen reductions.

Beginning in early 2018, EPA initiated development of the Draft General Permit. Given the nature of nitrogen pollution, which emanates from an array of point and nonpoint sources and interacts with the environment in a complicated manner, EPA engaged with various regulators and stakeholders to determine the regulatory pathway that was most likely to expedite restoration of the waterbody. In these early discussions, NHDES and the municipalities in New Hampshire made it clear that an approach focused on investments in nonpoint source and stormwater point source was preferable to immediate upgrades at the POTWs to the limit of technology (*i.e.*, limits of 3.0 mg/L), which would be the outcome of individual permit issuances. Given that some significant reductions at many of the POTWs had already occurred in recent years and that most of the remaining nitrogen load is from nonpoint source and stormwater point sources, EPA agreed that this focus, which would provide municipal dischargers with a reasonable amount of flexibility in terms of source control while avoiding immediate, large scale investments in wastewater treatment infrastructure, would be appropriate if an acceptable permitting approach could be developed. With this said, EPA remains acutely aware of its jurisdictional limitations. The Clean Water Act does not authorize EPA to regulate nonpoint sources of pollution. That task falls to the State.

For the remainder of 2018 and through much of 2019, EPA participated in a series of meetings with permittees and other stakeholders to develop such an approach in a collaborative fashion. This collaboration included several in-person meetings with representatives of the various stakeholders to discuss the proposed permitting approach, including the underlying science behind the initial numeric loading target that would translate the state's narrative nutrient water quality criterion; the nonpoint source and stormwater point source expectations; the potential schedule to achieve such reductions; and other important aspects of the permitting approach.

EPA's long-standing permitting regulations *require* EPA to interpret narrative water quality standards by establishing a calculated instream numeric criterion for the pollutant in question—*i.e.*, an ambient wear quality target that will be fully protective of designated uses. In so doing, EPA uses the best information reasonably available at the time of permit reissuance. In other words, EPA must translate the narrative standard and implement it through the imposition of necessary effluent limitations even where EPA concludes there is not sufficient data to sustain a detailed scientific data assessment and modeling of all possible parameters influencing water quality conditions. To derive a water quality criterion that is protective of designated uses, EPA examined the entirety of system loading data and related peer-review literature in order to identify a protective loading threshold, which EPA provisionally determined to be 100 kg ha^{-1} yr^{-1}. EPA has always acknowledged that this is not a precise calculation but is intended to identify the *scale* of nutrient reductions required, subject to reevaluation under an adaptive management paradigm, or until the development of a TMDL. Throughout the process, NHDES and the municipalities expressed their commitment to the overall permitting approach set forth in the Draft General Permit, despite divergent opinions by some of the municipalities regarding some of the details, including the loading target. Other stakeholders, such as Conservation Law Foundation, expressed their support for necessary nitrogen reductions, while also evincing displeasure with certain aspects of the proposed approach.

For its part, New Hampshire consistently endorsed EPA's overall approach to implementing the state's water quality standards, specifically its narrative water quality criterion for nutrients. To document the state's support for both the structure of the permit and EPA's methodology for deriving an areal loading target, the Commissioner of NHDES sent a letter to EPA on October 21, 2019 regarding *An Adaptive Nutrient Management Strategy for the Great Bay Estuary*. In it, NHDES

acknowledges the existence of nitrogen-driven water quality impairments in Great Bay caused by a process called cultural eutrophication[1] and highlights the importance of restoring the Great Bay estuary through an adaptive management approach designed to address both point sources and nonpoint sources of nitrogen. NHDES specifically indicated that the 100 kg ha^{-1} yr^{-1} numeric loading threshold "is appropriate as an initial target that would meet state water quality standards." Upon evaluation, EPA determined that NHDES's interpretation of its own water quality standards was reasonable and, furthermore, credited its policy desire to address nitrogen pollution in Great Bay iteratively and on a watershed scale.

As a result of the collaboration described above, and in light of New Hampshire's interpretation of its own water quality standards, the Draft General Permit Fact Sheet identified the 100 kg ha^{-1} yr^{-1} numeric loading threshold as an appropriate target and articulated a set of governing principals, developed in consultation with the municipalities and other stakeholders, as the underlying legal, policy and environmental basis for this permit proceeding:

- A growing body of technical and scientific literature describes the Great Bay estuary as an estuary in environmental decline because of nutrient overloading (Fact Sheet pgs. 14-17);
- Excessive nitrogen pollution is resulting in pervasive water quality impairments (pgs. 17-21);
- Nitrogen loading to the Great Bay estuary is well above a broad range of nitrogen loading that available scientific literature suggests would result in attainment of water quality standards (pgs. 21-24);
- All 17 POTWs throughout the Great Bay watershed (*i.e.*, 13 in NH and 4 in ME) are contributing to these ongoing water quality impairments (pgs. 24-26); and
- Approximately two-thirds of the nitrogen load is from nonpoint sources and stormwater point sources, indicating that significant reductions from both POTWs and nonpoint sources and stormwater point sources are necessary to an achieve acceptable nitrogen loading (pgs. 26-29).

New Hampshire has not received authorization to administer the NPDES program. Accordingly, in the absence of a TMDL to address the nitrogen-driven impairments, the task of allocating nitrogen load reductions in a manner that ensures compliance with water quality standards, as required under Section 301 of the Clean Water Act, falls to EPA as the permitting authority in the state of New Hampshire.

One option EPA could have pursued at this point in the permitting process was to develop a water quality model for Great Bay to determine more precisely the exact level of required nitrogen reductions necessary to assure compliance with water quality standards and to then use the results of that model to develop effluent limitations and/or a TMDL to allocate the necessary reductions between all sources (*i.e.*, POTWs, stormwater point sources and nonpoint sources). While this approach has some advantages, it forestalls *any* point source nitrogen control requirements to some point several years into the future when these resource-intensive technical efforts and regulatory steps could be completed. Given that the eutrophic cycle is self-reinforcing and any delay could

[1] *See* Env-Wq 1702.15 (defining cultural eutrophication as "the human-induced addition of wastes containing nutrients to surface waters which results in excessive plant growth and/or a decrease in dissolved oxygen.")

mean the difference between potential recovery or collapse of the ecosystem, EPA opted for a precautionary, adaptive approach because it will allow for more expeditious application of nitrogen reductions. EPA concluded there is urgency to regulate nitrogen in order to prevent further degradation since total nitrogen load is population driven and the Great Bay estuary watershed population is and has been fast growing. *See* PREP 2018, Table 21.1 (connecting housing permit approvals to increases in nitrogen loading/concentration as well as other water quality stressors). EPA's views on this matter were informed by, and ultimately consistent with, NHDES's.

Another option that would resolve the concerns identified above would be a permit that requires immediate imposition of effluent limitations based on the limit of technology, or below. This approach, already followed by EPA when developing total nitrogen limits for two POTWs discharging to Great Bay, has the benefit of having been upheld by the Environmental Appeals Board following extensive administrative litigation. *In re Town of Newmarket*, 16 E.A.D. 182 (EAB 2013) (rejecting challenge to TN limit of 3 mg/L derived from the weight of the evidence, using multiple lines of evidence). EPA's overall approach to translating narrative nutrient water quality standards into effluent limitations has also been subjected to administrative and judicial review. *See e.g., Upper Blackstone Water Pollution Abatement Dist. v. U.S. Envtl. Prot. Agency*, 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013) (upholding total nitrogen limit of 5 mg/L and total phosphorus limit of 0.1 mg/L); *City of Taunton v. U.S. Envtl. Prot. Agency*, 895 F.3d 120 (1st Cir. 2018), *cert. denied*, 139 U.S. 1240 (2019) (upholding total nitrogen limit of 3 mg/L); *In re City of Attleboro Wastewater Treatment Plant*, 14 E.A.D. 398 (EAB 2009) (upholding total nitrogen limit of 8 mg/L and total phosphorus limit of 0.1 mg/L). This approach is the most defensible one to take from the standpoint of straightforward compliance with Section 301 of the Act, which commands that EPA establish effluent limitation that will ensure compliance with water quality standards, without reference to cost or technological feasibility. All things being equal, EPA employs this approach in the overwhelming majority of NPDES permitting actions.

While default to this regulatory pathway has always been a reasonable option in EPA's view, EPA has resisted it given the particular mix of point and nonpoint sources of pollution contributing to cultural eutrophication in Great Bay, arguably New Hampshire's most important natural water resource. Based on the record before it, EPA acknowledges that water quality standards will not be achieved in the Great Bay estuary by means of reductions at POTWs alone due to the large amount of load from nonpoint sources and stormwater point sources.[2] Therefore, EPA determined to undertake a more ambitious, adaptive approach which allows the municipalities in the Great Bay watershed to invest iteratively in both point and nonpoint source reductions over a reasonable period of time, as this appears to be the most expeditious path to achieving water quality standards. Critically, this approach is predicated on the support of NHDES and the municipalities to carry out nitrogen reductions from nonpoint sources voluntarily, because neither NHDES (nor, obviously, EPA) have sufficient regulatory basis to require such reductions at this time. Neither section 301 of the Act nor federal regulations governing the establishment of water quality-based effluent limitations dictate how EPA is to allocate point source and nonpoint sources of pollution when determining a "necessary" limit. *See* 40 CFR §§ 122.44(d)(1) and 122.44(d)(1)(vi). When assessing the protectiveness of a water quality-based effluent limitation, EPA accounts for controls on point and nonpoint sources of pollution that impact the receiving waters. It retains the discretion to exercise its technical judgment to make reasonable assumptions about the likelihood and magnitude

[2] EPA also recognizes that the permit is premised on adaptive management and EPA has included a provision in the General Permit to allow for review of the science relating to a protective threshold.

of future reductions, so long as those assumptions are grounded in the administrative record. Here, EPA is relying on written representations by the Governor of New Hampshire, NHDES and the municipalities, all expressing their support for an adaptive management permitting approach that includes concrete actions to reduce nonpoint source loads – some already underway – and allows dischargers to prioritize investments in nonpoint point source controls rather than POTW upgrades. The Environmental Appeals Board has denied review of another permit for Great Bay that was similarly predicated on assumptions relating to nonpoint source reductions that would occur outside the permit, finding EPA's approach to be reasonable under section 301 and 402 and adequately explained on the record. *In re Town of Newmarket, 16 E.A.D. 182, 226 (EAB 2013)*.

To this end, EPA established effluent limits for the POTWs in the Draft General Permit based on the achievement of the following overarching objectives:

- Current TN loads from each POTW must not increase pursuant to applicable antidegradation requirements, given that the estuary is already suffering from a variety of nutrient-related impairments and thus lacks assimilative capacity for nitrogen, *see* Env-WQ 1708 (prohibiting new or increased discharges of a pollutant to impaired waters for that pollutant);
- Effluent limits are reasonably expressed as annual average mass-based, to maintain consistency with the assumptions in the scientific literature and with nonpoint source and stormwater point source controls;
- All large POTWs above 2 MGD design flow (which account for approximately 85% of the POTW load) should be treated as a subcategory based on the relatively larger magnitude of their nutrient load and should receive effluent limitations derived using a common methodology for the subcategory;
- All small POTWs below 2 MGD design flow (which account for approximately 15% of the POTW load) should be treated as a subcategory based on the relatively smaller magnitude of their nutrient load and should receive effluent limitations derived using a common methodology for the subcategory;
- Most POTW load limits should be achievable through optimization alone under current flows, allowing investments in the short-term to be focused on nonpoint source and stormwater source reductions.

The Draft General Permit established load limits for all 13 POTWs in NH that met these objectives by establishing limits for the larger POTWs based on 8 mg/L[3] and average flows from 2012- 2016 and establishing limits for the smaller POTWs based on "hold the load" from 2012-2016 average loads.[4] Based on this allocation to the POTWs, the remaining reductions were allocated to nonpoint sources and stormwater point sources throughout the watershed and resulted in a necessary 45% reduction from such sources. ***These allocations were described in the Fact Sheet but were not***

[3] This level represented the concentration achievable by most of the existing large POTWs in the watershed by optimization alone.
[4] NHDES has indicated that it cannot issue a Section 401 Certification for a permit that increases loading of nitrogen from POTWs into Great Bay.

requirements of the Draft General Permit.[5] See Fact Sheet pages 26-31. Rather, they are assumptions of the General Permit and will be revisited through specific mechanisms outlined in the General Permit, as well as in future permit cycles.

One objective of the load limits established for the POTWs is that limited investments would be necessary for facility upgrades in the short-term, with potential investments only occurring in the long-term if flows increase (based on growth) and the facility must then treat nitrogen to a lower concentration in order to continue to meet the load limit at higher flows.[6] This trade off allows municipalities to plan for immediate and ongoing investments in nonpoint source and stormwater point source nitrogen reductions, while planning for and incorporating investments at the POTWs, if necessary, in the future.

At this stage of the permitting process, many of the municipalities continued to support this approach versus a standard permitting approach. The City of Portsmouth documented its support for this permitting approach in comments it submitted during the public comment period on May 8, 2020. That letter states:

> Portsmouth appreciates the innovative structure of the Draft Permit and the opportunities it presents." Portsmouth also submitted a subsequent letter to EPA on July 23, 2020 confirming their support for the "stormwater pathway" permitting approach expressed in the Draft General Permit, and stating further that "The City of Portsmouth has for over ten years signaled its interest in adaptive management and invested in the science we thought useful to that end. That interest continues.

On July 8, 2020, the Cities of Dover and Rochester sent a letter to EPA confirming their support for this permitting approach. In this letter they say, "Despite the concerns with the Draft Permit expressed by the communities in their public comments, which comments the communities fully stand by and do not waive, we wish to state and emphasize our support for true adaptive management and the flexibility that a truly integrated permit could provide, which would allow for nonpoint source (NPS) nitrogen reductions to offset point source nitrogen reductions that EPA has indicated it might otherwise impose."

NHDES sent EPA a letter on July 27, 2020 affirming their support for this permitting approach and presenting a variety of commitments they will undertake in the coming years in order to maximize the effectiveness of this approach. These commitments are discussed in more detail in the responses below. See Parts II.B.10, II.C.5 and II.E.3.

Because the potential permittees and other estuary stakeholders support this approach (notwithstanding reservations some expressed about other aspects of the permit), EPA determined this to be a viable, innovative, and expeditious pathway to water quality standard attainment. EPA

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[5] Similarly, the initial target of 100 kg ha^{-1} yr^{-1} as the basis for the nonpoint source and stormwater point source allocations is not a permit limit and is not included in the General Permit; it is instead a long-term goal subject to change based on adaptive management.

[6] EPA recognizes that one possible exception to this is Rochester, which currently provides less effective nitrogen removal than the other large POTWs and may need to invest in its POTW in the short-term to comply with its load limit. Although Rochester has stated in its comments that it will require a major POTW upgrade to comply with the load limit, the record is mixed on this question. Based on a 2018 study, Rochester's own consultants concluded that, with optimization, it "can achieve the target summer effluent TN discharges thus delaying large capital improvements." https://envirosim.com/references/2018/Esping_Don%20(FullScale_Testing_Postpones_Total_Nitrogen_Reduction_Expansion).pdf.

reiterates that the standard permitting approach of establishing nitrogen limits at the limit of technology (*i.e.*, 3.0 mg/L) where such a limit is needed to ensure that WQS are met is an approach that has been upheld by the Environmental Appeals Board, as well as the First Circuit, and that limitation will be implemented at the facilities eligible for coverage under the General Permit discharging in the Great Bay watershed should the approach in the General Permit not succeed.

Further, upon review of the comments received during the public notice period, EPA maintains its view that this permitting approach is reasonable (notwithstanding several adjustments to the Final General Permit based on public comments) and acknowledges that this approach will allow municipalities to direct resources immediately toward nonpoint sources while not allowing any increase in nitrogen from the POTWs.

While EPA remains committed in the near term to the overall permitting approach, all things being equal, there were some aspects and assumptions that were reevaluated based on comments received during the public comment period. EPA has summarized and responded to these below.

II. Principal Objections to EPA's Permitting Approach and Draft General Permit

Overall, most comments received by EPA can be categorized as pertaining to several broad aspects of the Draft General Permit. These are:

A. Administration;
B. The underlying scientific basis;
C. The role of adaptive management;
D. The ambient monitoring plan;
E. The optional nonpoint source and stormwater point source reduction pathway;
F. The total nitrogen effluent limits;
G. An assortment of regulatory issues; and
H. Overall policy considerations.

Each of these broad categories of comments has been summarized and responded to in the following sections of the Response to Comments. EPA has framed its response to encompass individual issues and arguments falling within each of these categories.

A. Administration

Based on number of comments requesting exclusion from coverage under the General Permit, EPA has revised the Draft General Permit to provide dischargers with the choice of: (1) obtaining coverage under the General Permit for their TN discharges; (2) continuing to operate under individual permits with existing effluent limits based on limit of technology (*i.e.*, Exeter and Newmarket); or (3) obtain coverage for their TN discharges through individual permit renewals, which EPA expects will be based on the limit of technology due to the amount of nitrogen reduction needed to meet water quality standards, as further described in Section H below. The effectiveness of the General Permit under the Act rests on the strength of EPA's assumption that nonpoint source and stormwater point source reductions will in fact be voluntarily undertaken by participating municipalities. For this reason, EPA has determined that the General Permit is more consistent with an opt-in rather than opt-out structure.

B. Scientific Basis

EPA received numerous comments regarding the scientific basis for the nitrogen loading target established by EPA under 40 C.F.R. § 122.44(d)(1)(vi)(A) to translate the state's narrative nutrient water quality criterion. This loading target—*i.e.*, 100 kg N ha^{-1} yr^{-1}—was premised on a widely-accepted conceptual model of eutrophication, and was derived from peer-reviewed literature that set forth loading thresholds determined to be protective of estuarine health, including eelgrass. Many commenters characterized EPA's permitting approach—an adaptive management permit based on holding the point source nitrogen load from the facilities at current levels, as required by New Hampshire's antidegradation requirements, combined with voluntary nonpoint source reductions—as arbitrary and capricious. These commenters objected to EPA's consideration of certain peer-reviewed literature to derive an initial load-based water quality criterion that is protective of designated uses. They advocated instead for a more precise, concentration-based methodology based on additional water quality modeling and analysis. Upon review and consideration of these comments, EPA has decided to maintain, with some adjustments, the effluent limitations in the General Permit, which are based mainly on antidegradation requirements, and to retain the nitrogen loading threshold to guide adaptive management until such information is provided to EPA that would warrant a revision. To be clear, EPA has not deemed the areal loading target to be the least stringent possible for this estuary, nor has it dismissed the viability of a concenration-based approach in the future. To the contrary, in response to comments EPA has added a permit provision that calls for the municipalities to submit to EPA a proposal to formalize a scientific review process to inform adaptative management responses to nutrient pollution in Great Bay, including the selection of an adjusted but still protective water quality criterion, whether based upon an areal loading approach or a concentration approach. In EPA's technical and scientific judgment, that information has not been provided in the comments, as explained below. On the other hand, the body of evidence submitted to EPA during the public comment period, including peer-reviewed literature submitted by the permittees, generally corroborates the view that the Great Bay estuary is suffering from the adverse water quality effects of cultural eutrophication, warranting the imposition of nitrogen effluent limitations on POTWs contributing to these impairments.

1. EPA's Conceptual Model

EPA's decision to rely on a conceptual model rather than a dynamic water quality model is not arbitrary and capricious. EPA's model, informed by peer-reviewed literature, effluent and ambient monitoring data, and other site-specific information, was rationally based in the record.

The point of departure for EPA's evaluation of excess nitrogen-driven water quality impairments in Great Bay is the widely-accepted conceptual model of cultural eutrophication, which establishes relationships between causal (*i.e.*, total nitrogen) and response (*i.e.*, algal growth, low and supersaturated dissolved oxygen) variables associated with this environmental problem. Cultural eutrophication is an ecosystem response to increases in nutrient (primarily nitrogen and phosphorus) inputs from human sources. Estuaries, bays and nearshore coastal waters in the Gulf of Maine receive nutrient inputs from land-based sources via rivers and streams; directly from human activities adjacent to and within marine environments; oceanic upwelling and circulation; and atmospheric deposition. These inputs result in predictable consequences once they enter the water body (Cloern, 2001; Bricker et al., 2007, Figure 1). First, nutrient concentrations in the water column increase, which then stimulates growth and production of both phytoplankton and larger algal

species such as floating mats of macroalgae, including *Ulva spp*. or sea lettuce. Although a certain amount of phytoplankton and macroalgae are needed to support upper trophic levels (*i.e.*, fish), excessive algal growth can lead to other more serious water quality impacts. For example, high concentrations of phytoplankton may cloud the water and cause die-off of seagrasses and other submerged aquatic vegetation. Seagrasses, such as eelgrass (*Zostera marina*), are essential to estuarine ecology because they filter nutrients and suspended particles from the water column; stabilize sediments; provide food for wintering waterfowl; provide habitat for juvenile fish and shellfish; and are the basis of an important estuarine food web. Piscataqua Region Estuaries Partnership ("PREP") 2009 State of the Estuaries Report (PREP 2009a) at 16. Macroalgae growth can smother and kill seagrasses and bottom-dwelling organisms such as clams. In addition, episodes of low bottom water dissolved oxygen (*i.e.*, hypoxia or anoxia) may occur if algae sink to the bottom and deplete oxygen levels during decomposition. The phytoplankton community may shift to favor more toxic and nuisance species, or harmful algal blooms (including red tides) that may also result in public health concerns.

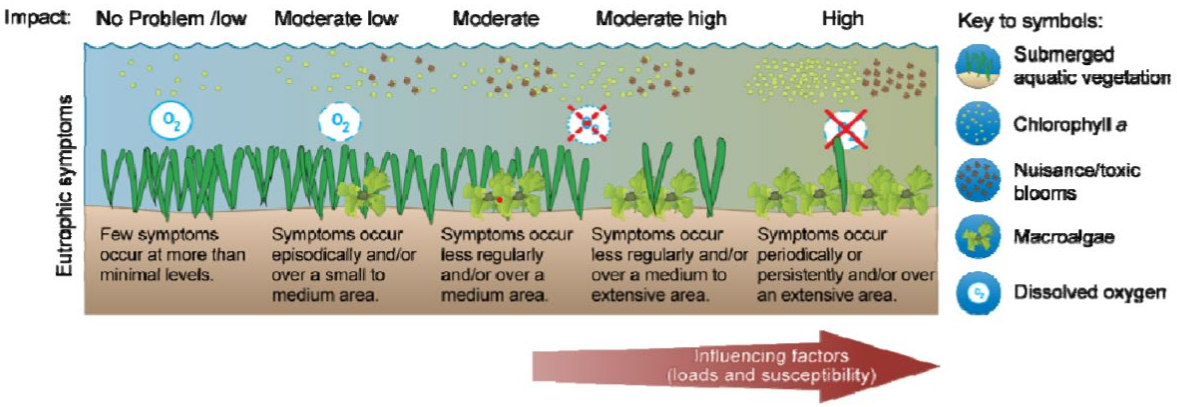

Figure 1: Conceptual diagram of the predictable consequences of increased nutrient discharges (low on left to higher on right) into coastal waterbodies. The response to nutrient loads within the waterbody is conditioned/modulated by the physical characteristics of the estuary such as the tidal exchange and the residence time (from Bricker et al., 2007).

This conceptual model of eutrophication is cited with approval in EPA's Nutrient Technical Guidance Manual: Estuarine and Coastal Marine Waters (EPA 2001). EPA notes that NHDES, in assessing attainment of designated uses and criteria in its water quality standards, also relies on this conceptual model. *See* CALM 70-71. According to peer-reviewed publications discussed in the Fact Sheet at 14-17, including a study applying the conceptual model to Great Bay (Bricker 2007), these waters have been experiencing ecosystem decline resulting from the impacts of cultural eutrophication for a significant period of time.

The First Circuit Court of Appeals has recognized the conceptual model of cultural eutrophication utilized by EPA in past permitting actions, which again identifies the relationship between causal (*e.g.*, TN) and response variables (*e.g.*, algal growth, DO, etc.). *Upper Blackstone Water Pollution Abatement Dist. v. U.S. Envtl. Prot. Agency*, 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013) (imposing concentration-based TN limit of 5 mg/L based on conceptual model); *City of Taunton v. U.S. Envtl. Prot. Agency*, 895 F.3d 120 (1st Cir. 2018), *cert. denied*, 139 U.S. 1240 (2019) (imposing mass-based TN limit based on LOT based on conceptual model). No party directly

contested the applicability of this conceptual model to Great Bay through the submission of any peer-reviewed literature during the public comment period.

Even though not directly contesting this model and predicted outcomes, several commenters, including the Cities of Dover and Rochester, denied that nitrogen was playing *any* role in causing water quality impairments such as eelgrass decline in the Great Bay estuary. In support of this claim, they submitted letters from nutrient water quality experts (See Dover Exhibits 34, 57 and 76) that endeavored to cast doubt on the linkage between total nitrogen and eelgrass health in the Great Bay system.

EPA disagrees with these comments and has responded to various details of the comments and letters in other relevant sections of the Response to Comments below, but briefly addresses these expert opinions here. With regard to one of the analyses (*i.e.*, Dover Exhibit 34), EPA notes that many of the conclusions are drawn from a document called *Joint Report of Peer Review Panel for Numeric Nutrient Criteria for the Great Bay Estuary New Hampshire Department of Environmental Services, June 2009*. That document was focused on the cause of eelgrass impairment and addressed whether the draft criteria analysis had demonstrated, with scientific certitude, cause and effect between nitrogen and the decline of eelgrass in Great Bay, and specifically whether nitrogen was the "primary factor" of that environmental despoilation. EPA acknowledges that other factors, in addition to total nitrogen, may impact eelgrass health and cause eelgrass decline in the Great Bay estuary (see Part II.B.3 below). However, EPA disagrees that total nitrogen is not a factor affecting the health of the Great Bay estuary. Importantly, this document indicates that total nitrogen is "one of the primary factors, not the sole primary factor." *See* 2009 Peer Review at 18.

Further, the comments rely on these letters to suggest that the Latimer & Rego 2010 study is not appropriate for establishing the impairment status for nitrogen or eelgrass in Great Bay. EPA is not relying on the Latimer & Rego 2010 study (or Valiela & Cole 2002 or Hauxwell et al. 2003) to alone establish the impairment status in Great Bay. Rather, EPA used Latimer & Rego 2010 as one source of information among others to evaluate receiving water conditions and to establish an initial TN loading target that will be protective of designated uses. Moreover, EPA observes that the 2009 Peer Review itself relies on Latimer & Rego 2010 in arriving at key conclusions, which is inconsistent with the broad claims made by Dover and Rochester that the paper is 'inapplicable' to Great Bay:

> [T]here is compelling scientific evidence that eutrophication of estuaries and coastal embayments and loss of eelgrass can be caused by either the loading or delivery of high concentrations of different forms of inorganic, organic, and total nitrogen (e.g., Taylor et al. 1995, Short et al. 1995, Short and Burdick 1996, Kemp et al. 2004, Burkholder et al. 2007, Krause-Jensen et al. 2008, Vaudry et al. 2010, Latimer and Rego 2010, Benson et al. 2013). Several of these studies also make a direct link between nitrogen concentrations, nitrogen loading and water transparency. Likewise, eliminating point source wastewater discharges and reducing nitrogen loading reversed eelgrass losses in a shallow coastal embayment on Long Island Sound, Ct (Vaudry et al. 2010). Lending credence to the argument that nitrogen management can improve water quality conditions (e.g., water transparency) for the protection and restoration (Dennison et al. 1993, Krause Jensen et al. 2008, Vaudry et al. 2010). None of these studies actually specify any threshold concentrations of total nitrogen,

and most either directly address concentrations of inorganic nitrogen (ammonium, nitrate/nitrite, phosphorous), or nitrogen loading.

See 2009 Peer Review at 54. The 2009 Peer Review also relies on Latimer & Rego 2010 for other scientific conclusions related to Great Bay. *Id*. at 11 and 58. More generally, aspects of the science underlying the Peer Review—such as reliance on the NOAA conceptual model, regulation of TN rather than other forms of nitrogen, etc.—are broadly consistent with EPA's conclusions in the General Permit.

Additionally, one of the expert analyses (see Dover Ex. 57) suggests that Latimer & Rego 2010 is not robust enough to develop and implement a nitrogen loading threshold for Great Bay but merely presents "fuzzy guidelines" for such a threshold. EPA agrees that this study, as well as Valiela & Cole 2002 and Hauxwell et al. 2003, do not present a precise loading threshold but rather present a range of potential thresholds. Therefore, EPA concluded that use of these peer-reviewed scientific studies is appropriate to develop an initial threshold as part of an adaptive managment approach, in combination with a variety of site-specific information.

That site-specific evidence suggests eutrophic process is underway in Great Bay, resulting in nitrogen-driven water quality impairments including but not limited to eelgrass declines. EPA evaluated receiving water conditions and found evidence of pervasive water quality-impairments, including but not limited to adverse impacts on eelgrass abundance, distribution and habitat. Fact Sheet at pp. 14-26 (discussing 1997 & 1999 NOAA report; PREP SOE reports from 2003, 2006, 2009, 2013, 2018; NHDES 303(d) list from 2012 (and 2014, 2016, 2018 not yet approved); GB eelgrass data from 1990s through 2017; comparison to Narragansett Bay data (loading and eelgrass trends 2000-2016); effluent data for each POTW [no TN data available for Epping, Rollinsford, Milton, North Berwick (ME)]; and a 2014 GBNNPSS (Great Bay Nitrogen Nonpoint Source Study by NHDES). Consistent with the conceptual model used by EPA in this proceeding, the Great Bay estuary exhibits primary and secondary indicators of eutrophication. As shown in Table 2 of the Fact Sheet, Great Bay, including its tributaries, have been included on the State of New Hampshire's 2012 Section 303(d) list for nutrient related impairments. The nutrient related impairment listings in Great Bay include dissolved oxygen, chlorophyll-a, estuarine bioassessments (eelgrass), water clarity and total nitrogen. As stated in the Fact Sheet, while each assessment zone is listed for a different combination of impairments "[g]iven that there are 50 individual impairments throughout the estuary listed in Table 2 [of the Fact Sheet], it is apparent that the entire estuary is suffering from significant and pervasive nutrient-related impacts which are not isolated to the most susceptible areas."

Additionally, in arriving at its determination that Great Bay has reached its assimilative capacity for nutrients, EPA conducted a literature review of loading-based nitrogen thresholds and identified a range of loading thresholds thought to be protective of eelgrass. (Because of its sensitivity to total nitrogen, eelgrass is considered a sentinel species, so a protective "water quality criterion" under section 122.44(d)(1)(vi)(A) that is protective of that species will likely also result in achievement of other nitrogen-related designated uses and water quality criteria.) EPA identified three peer-reviewed, published papers that provided a relevant spectrum of protective values:

- Valiela, I., Cole, M. Comparative Evidence that Salt Marshes and Mangroves May Protect Seagrass Meadows from Land-derived Nitrogen Loads. *Ecosystems* 5, 92–102 (2002).
- Hauxwell, J., et al., Eelgrass Zostera Marina Loss in Temperate Estuaries: Relationship to Land-derived Nitrogen Loads and Effect of Light Limitation Imposed by Algae, *Marine Ecology Progress Series*, 247: 59-73. (2003).
- Latimer, J., Rego, S., Empirical Relationship Between Eelgrass Extent and Predicted Watershed-derived Nitrogen Loading for Shallow New England Estuaries. *Estuarine, Coastal and Shelf Science*, Volume 90, Issue 4, p. 231-240. (2010).

The first study (*i.e.*, Valiela & Cole, 2002) confirmed the sensitivity of seagrass meadows to nitrogen loading in order to examine the possible role of coastal fringing wetlands to protect seagrass meadows from land-derived nitrogen loads. Data from over 30 diverse estuaries worldwide were evaluated, including the Great Bay estuary. This study observed a "50% - 100% reduction in seagrass production and habitat area as land-derived N loads exceed 100 kg N ha^{-1} yr^{-1}." The study further notes that nitrogen loading of 20-100 kg ha^{-1} yr^{-1} is the "critical range" where fringing wetlands may intercept and retain a sufficient portion of the land derived nitrogen load to protect seagrass meadows. However, above 100 kg ha^{-1} yr^{-1}, wetland retention of nitrogen is below 10% due to the fringing marshes being "overwhelmed" by high loads. (Valiela & Cole, 2002).

The second study (*i.e.*, Hauxwell, *et al.*, 2003) evaluated the role of nitrogen in eelgrass loss in temperate estuaries and the effect of light limitation imposed by algae. This study evaluated the specific role of opportunistic algae, including epiphytes and macroalgae, on light attenuation limiting recruitment of new eelgrass shoots. The study, referencing Valiela & Cole 2002, concludes with a management recommendation, as follows: "watersheds should be developed or managed such that land-derived [nitrogen] loads are kept low. The threshold value necessary for eelgrass preservation is difficult to establish accurately, since many factors may influence land-derived nitrogen loading and fate in estuaries (*i.e.*, retention by surrounding marsh, water residence time: Valiela et al., 2000a, 2001), but the present results and others (Valiela et al. 2000b, Valiela & Cole 2002) suggest that eelgrass is likely to decline substantially at values < 30 to 100 kg N ha^{-1} yr^{-1}." (Hauxwell et al., 2003)

The third study (*i.e.*, Latimer & Rego, 2010) evaluated the relationship between eelgrass extent and watershed-derived nitrogen loading for 62 estuarine embayments in New England. This study concluded that "area-normalized nitrogen inputs are proportional to eelgrass loss and that the data exhibit threshold behavior." More specifically, the estuaries could be grouped into three loading categories (*i.e.*, < 50 kg ha^{-1} yr^{-1}, 51-99 kg ha^{-1} yr^{-1}, and ≥ 100 kg ha^{-1} yr^{-1}) resulting in various levels of eelgrass loss. In the category between 51 and 99 kg ha^{-1} yr^{-1} the "ability of eelgrass to thrive diminishes markedly" and with loading rates above 100 kg ha^{-1} yr^{-1} "eelgrass is essentially absent." (Latimer & Rego, 2010). EPA recognizes that the Great Bay estuary is much larger than the embayments evaluated in this study, but notes that the Great Bay estuary is comprised of many smaller sections that are comparable to the embayments evaluated in this study.

The susceptibility and eutrophic characteristics of Great Bay described in the 2007 NOAA report, referenced above, as well as the inclusion of Great Bay itself in the Valiela & Cole 2002 study of comparable estuaries, confirm that the recommended nutrient thresholds presented in the scientific

literature are applicable to the Great Bay estuary. Although there is some variability of the "critical range" of nutrient loads presented in these studies (*e.g.*, 50-100, 20-100, 30-100 kg N ha^{-1} yr^{-1}), *based on the information before EPA at this time*, 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.

Of the available values in the scientific literature, EPA selected the least stringent value (*i.e.*, 100 kg N ha^{-1} yr^{-1}) and explained that it would refine the target in future permit cycles after any additional monitoring, studies and analysis if warranted by that information. As EPA explained in the Fact Sheet:

> Given the range of potential thresholds set forth in the literature, EPA has chosen to adopt the maximum loading rate as an initial threshold to protect the Great Bay estuary from "large deterioration" and to restore the estuary to a healthy condition. EPA notes that any threshold in the range presented in the scientific literature above (*i.e.*, 20/30/50 to 100 kg ha^{-1} yr^{-1}) would fall within a zone of relevant literature values. As the literature suggests, a threshold even lower than 100 kg ha^{-1} yr^{-1} may be necessary in the future if the system does not fully recover once brought into compliance with this initial threshold. EPA has chosen the least stringent threshold within the "critical range" as a reasonable next step in an adaptive management approach.

In allocating the load among the POTWs and nonpoint sources, EPA similarly selected the least stringent water quality-based effluent limit (WQBEL) legally permissible—that is, limits that hold the POTWs to their current loads,[7] as required by New Hampshire's antidegradation provisions—as it opted to consider nonpoint source and stormwater point source reductions, largely at the behest of NHDES and the municipalities themselves.

Several commenters stated for various reasons that more studies and modeling of the Great Bay estuary itself beyond the conceptual model are necessary before determining a nitrogen loading threshold. A number of courts have recognized that, in the course of implementing the CWA and other statutes involving complex scientific issues, EPA may need to act with imperfect information in order to accomplish Congress' goals in a timely fashion. The Supreme Court, addressing the contentious issue of greenhouse gas regulation, refused to let "EPA avoid its statutory obligation by noting the uncertainty surrounding various features of climate change and concluding that it would therefore be better not to regulate at this time." *Massachusetts v. EPA*, 549 U.S. 497, 534 (2007); *see also Miami-Dade County v. EPA*, 529 F.3d 1049, 1065 (11th Cir. 2008) ("EPA is compelled to exercise its judgment in the face of scientific uncertainty unless that uncertainty is so profound that it precludes any reasoned judgment."). In the specific context of the CWA, the D.C. Circuit has reprimanded EPA for refusing to impose permit conditions that would result in "a gross reduction in pollutant discharge" in favor of waiting for enough information to allow the Agency to issue "fine-tun[ed]" numerical effluent limitations, stating that "this ambitious statute [the CWA] is not

[7] The effluent limits for the subcategory of smaller POTWs was based on "hold the load" and the subcategory of larger POTWs was based on 8 mg/L at average flows. For the larger POTWs, this level was chosen as it represents the least stringent WQBEL legally permissible based on antidegradation provisions (*i.e.*, "hold the load") for most of the dischargers in this subcategory. This level was applied to all POTWs in this subcategory in order to require all large POTWs to achieve the same level of nitrogen treatment and to be consistent with the overall permitting goal of nitrogen reduction. This is particularly important for this subcategory given the magnitude of the load from these POTWs (*i.e.*, approximately 85% of the total POTW load).

hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all." *Natural Res. Def. Council, Inc. v. Costle*, 568 F.2d 1369, 1380 (D.C. Cir. 1977); *see also Am. Iron & Steel Inst. v. EPA*, 115 F.3d 979, 992 (D.C. Cir. 1997) (rejecting argument that EPA method for deriving numerical water pollution limits from narrative water quality standard was flawed simply because it would apply where a full set of data for case-by-case calculation of numeric limit was unavailable); *Am. Trucking Ass'ns, Inc. v. EPA*, 283 F.3d 355, 369-70 (D.C. Cir. 2002) (similar). Thus, where an agency may have "imperfect scientific information" and faces the "classic and difficult choice" of "whether to proceed on that basis or to invest the resources to conduct the perfect study," a court will generally defer to the agency's decision as to which course to take under the Administrative Procedure Act arbitrary-and-capricious standard. *Am. Iron & Steel*, 115 F.3d at 1004.

One of the reasons invoked by municipalities for delaying the permit included a desire for allowing the estuary time to show improvements that could come from recent upgrades at some of the POTWs that discharge to the estuary. While there will always be an amount of inherent uncertainty and new data that could be collected, EPA is nevertheless obligated to exercise its scientific expertise and apply its technical judgment based on the information it has at the time of permit issuance. *See Upper Blackstone*, 690 F.3d at 22 ("[N]either the CWA nor EPA regulations permit the EPA to delay issuance of a new permit indefinitely until better science can be developed, even where there is some uncertainty in the existing data."). EPA must proceed with identifying a loading threshold (or the assimilative capacity of the water body) to protect the Great Bay estuary based on all currently available data and information, while recognizing that this threshold (100 kg ha^{-1} yr^{-1}) may change in the future under the adaptive management framework. Although no commenters provided alternative, peer-reviewed scientific estimates of the assimilative capacity (either as a mass loading or ambient concentration) of the estuary, EPA anticipates additional studies on Great Bay will be conducted and agrees they may be used as support for future decisions under the General Permit's adaptive management approach. This additional information could include the studies and modeling conducted by the municipalities. And again, EPA has introduced a provision in the General Permit that encourages the permittees to establish a process to generate and review new scientific information relevant to Great Bay and that is designed to inform future permit requirements. Finally, against this backdrop of scientific uncertainty, what is certain is that large amounts of nitrogen contribute to water quality impairments throughout the Great Bay estuary, which is consistent with EPA's judgment that these waters have reached their assimilative capacity for nitrogen. In light of the foregoing, EPA must establish effluent limits to avoid further degradation of the Great Bay estuary from POTW discharges.

Another reason underlying many municipal commenters objections to EPA's approach is the unwarranted belief that EPA must be able to specifically determine the myriad factors influencing cultural eutrophication with a high level of certainty and detail in order to be "scientifically defensible" for the purpose of setting permit limits. This is not the case and is inconsistent with CWA requirements. As observed by the Environmental Appeals Board:

> The [petitioner] has cited no law, regulation, or Agency policy that would allow a permit application to remain pending for an indefinite, unlimited extension of time to allow additional scientific data or analysis to be developed to support the applicant's claim that its discharges will not violate the water quality standards of affected states. To the contrary, scientific uncertainty is not a basis for delay in issuing an NPDES permit. "In the face of

> unavoidable scientific uncertainty, EPA is authorized, if not required, to exercise reasonable discretion and judgment." *In re Dominion Energy Brayton Point, LLC*, 13 E.A.D. 407, 426 (EAB 2007). The federal courts in reviewing Agency decisions have similarly recognized that scientific uncertainty is not a bar to administrative decision making: "We do not demand certainty where there is none. There may be no strong reason for choosing [a particular numerical standard] rather than a somewhat higher or lower number. If so, we will uphold the agency's choice of a numerical standard if it is within a 'zone of reasonableness.'" *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 525 (D.C. Cir. 1983) (citation omitted); *see also Hercules, Inc. v. EPA*, 598 F.2d 91, 116-17 (D.C. Cir. 1978). More than three decades ago, the D.C. Circuit aptly described the CWA's balance when confronted with a difficult situation and the obligation to eliminate water quality impairments: "…EPA may issue permits with conditions designed to reduce the level of effluent discharges to acceptable levels. This may well mean opting for a gross reduction in pollutant discharge rather than the fine-tuning suggested by numerical limitations. But this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all." *Natural Resources Defense Council, Inc. v. Costle*, 568 F.2d 1369, 1380 (D.C. Cir. 1977) (emphasis added) (finding unlawful a rule that would have exempted certain discharges from permitting requirements based on the difficulty in setting limits). Here, the municipal commenters' "wait and see" approach would allow the permittees to continue discharging without any limit on total nitrogen discharges – effectively abdicating the responsibility to set permit limits when faced with difficulty establishing the limit. *UBWPAD*, 14 E.A.D. 577, 606.

It is well-established that the arbitrary-and-capricious review standard does not require that an agency utilize a model that provides perfect, complete certainty. The First Circuit has explained that EPA's "choice of a model will be sustained if it bears a 'rational relationship to the characteristics of the data to which it is applied.'" *Sur Contra La Contaminacion v. EPA*, 202 F.3d 443, 448 (1st Cir. 2000) (quoting *Appalachian Power Co. v. EPA*, 135 F.3d 791, 802 (D.C. Cir. 1998)); *see also Pan Am. Grain Mfg. Co. v. EPA*, 95 F.3d 101, 105 (1st Cir. 1996) (noting that in technical areas such as modeling, "EPA's expertise is heavily implicated, and we may not substitute our judgment for that of the Administrator" (citations and internal quotation marks omitted)). This standard leaves room for EPA to rely on a conceptual model, supplemented by peer-reviewed studies, to provide useful information, even if it is "somewhat simplistic" or it "make[s] assumptions that are not perfectly consistent with natural conditions." *Am. Iron & Steel Inst.*, 115 F.3d at 1004.

The D.C. Circuit has further explained the limited burden that an agency bears in showing that there is a rational connection between the data it is analyzing and the model chosen:

> [T]he agency must sufficiently explain the assumptions and methodology used in preparing the model; it must provide a "complete analytic defense of its model (and) respond to each objection with a reasoned presentation." The technical complexity of the analysis does not relieve the agency of the burden to consider all relevant factors and to identify the stepping stones to its final decision. There must be a rational connection between the factual inputs, modeling assumptions, modeling results and conclusions drawn from these results. *Sierra Club v. Costle*, 657 F.2d 298, 333 (D.C. Cir. 1981) (footnotes and citation omitted).

As the D.C. Circuit has recognized, "[a]ny model is an abstraction from and simplification of the real world." *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 535 (D.C. Cir. 1983). It is therefore not unusual for a model not to accurately capture every relevant variable, especially with respect to a complex, natural setting such as the Great Bay system. However, a court "can reverse [an agency decision] only if the model is so oversimplified that the agency's conclusions from it are unreasonable." *Small Refiner*, 705 F.3d at 535; *see also Appalachian Power*, 135 F.3d at 805 ("To invalidate a model simply because it does not perfectly fit every data point 'would be to defeat the purpose of using a model.'" (citation omitted)); *cf. Natural Res. Def. Council, Inc. v. Herrington*, 768 F.2d 1355, 1390-91 (D.C. Cir. 1985) (affirming the Department of Energy's reliance on an energy use model that it was unable to verify empirically where the agency had "attempted to solve the difficult predictive problem before it through use of an independently created econometric model which had received favorable notice in technical literature" and "responsibly addressed alleged defects in the model by changing the model or explaining why the defects were both extremely difficult to fix and of relatively minor moment to the rulemaking").

The highly detailed modeling many commenters appear to contemplate is generally associated with mechanistic modeling, an approach that represents ecological systems using equations that reflect ecological processes and parameters for these equations that can be calibrated empirically from site-specific data. These models can then be used to predict changes in the system, given changes in nitrogen concentrations. The mechanistic modeling approach requires sufficient data to identify the appropriate equations for characterizing a waterbody or group of waterbodies and sufficient data to calibrate parameters in these equations. While such complex models are sometimes preferable, they are still abstractions and simplifications of the real world, *Small Refiner*, 705 F.3d at 535. Furthermore, they are not without their own drawbacks; a danger in complex mathematical models is that error propagation is difficult to explicitly measure, and there is a tendency to use a more complex model than required, driving costs up substantially and unnecessarily. Another consideration that is gaining acceptance is that mathematical models need to be appropriately scaled to spatial and temporal processes, or they may suffer problems similar to empirical models when one extrapolates the results of scaled experiments to full-sized systems. Also, empirical coefficients introduced into equations often hide the degree of uncertainty concerning the fundamental nature of processes being represented. *See EPA, Nutrient Criteria Technical Guidance Manual – Estuarine and Coastal Waters* (2001) at 9-1 to 9-2. The commenters do not, and cannot, contend that there is an existing model available to represent this system at this level of complexity, or even that there is actually sufficient data available for development of such a model. Rather, the commenters seek to characterize any less complex analysis as insufficient, so that permit limits would be deferred until a complex model can be developed.

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While it may be within EPA's discretion to delay permit issuance to await the development of more sophisticated analysis or models when warranted, EPA has elected to move forward with the General Permit based on the best information reasonably available at the time of permit issuance. In this case, the conceptual model, as informed by site-specific data and peer-reviewed literature, was adequately suited to the task, given that EPA was approaching the problem on a gross, watershed scale. A concentration-based approach would have required an extensive commitment of limited agency resources and would have entailed protracted delay in the permitting process. While there is a possibility that such a modeling effort *could* have resulted in a more refined and accurate target,

there is no guarantee that the model when, and if, completed would yield defensible results. Furthermore, EPA's rational explanation of its decisions, unlike the approach of protracted delay advocated by the permittees, serves the goals of the CWA. EPA's specific rationale for issuing the General Permit in this case—that delay would be inconsistent with the goals of the CWA while offering little or no certain reward in terms of improved data or modeling that would result in a change in the permit's effluent limitations—rises well above the level of "a mechanical desire to reach a rapid conclusion without regard to whether the result is sound," as the First Circuit has described the decision to issue an NPDES permit without any explanation for such haste. *Puerto Rico Sun Oil*, 8 F.3d 73, 79 (1st Cir. 1993).

Still other considerations weighed against the setting aside an areal loading approach based on a conceptual model aside in favor of the more technically complex effort advocated by municipal commenters. First, EPA was cognizant that the cycle of cultural eutrophication was ongoing, demanding reasonably expeditious action, consistent with EPA's precautionary approach to controlling the effects of nutrient pollution.

Second, EPA observed that all but two of the permittees eligible for coverage under the General Permit lacked ***any*** TN limitations in their existing permits, which were all administratively continued after having long expired. This posture was inconsistent with the overarching objective of the Congress in establishing the Act to revisit permit requirements at regular intervals not to exceed five years.

Third, the need to precisely calibrate a water quality criterion was of less importance given the structure of the permit and the fact that effluent limitations could not be any less stringent than "hold the load." The Act generally does not allow new or increased discharges to impaired waters such as Great Bay.[8] The requirements in Env-Wq 1708.01(a) apply to Great Bay and require that existing uses be protected and maintained. This is known as "Tier 1" review. Existing uses are those uses that existed as of 1975 (see Env-Wq 1702.22). As presented in Figure 2 of the Fact Sheet, significant eelgrass coverage has been documented as present after 1975. Therefore, it is clear that eelgrass is an existing aquatic life use. Consistent with this view, NHDES has represented to EPA that it will not endorse any permit that does not, at a minimum, hold the load. (See subpoint 5 in Appendix C to the Response to Comments.) Because the TN limits only require the municipalities to hold the current load, these limits would not be impacted for this permit term based on incremental changes to the target water quality threshold. In other words, even if EPA's initial target is off the mark by a significant margin, and only a 10% reduction in nonpoint sources and stormwater point sources is necessary (rather than 45% as described in the Fact Sheet), the TN limits at the POTWs will not become less stringent.

Fourth, EPA also took into account that NHDES and the municipalities themselves had requested EPA to adopt the scheme embodied in the Draft General Permit, as the preferred path to meeting water quality standards.

[8] As there is no assimilative capacity remaining in Great Bay (*i.e.*, it is not a "High Quality" water), the provisions of NH Water Quality Standards at Env-Wq 1708.01(b) do not apply, and there is no option to do an antidegradation demonstration at this time.

Fifth, EPA reviewed the scientific studies and other water quality analysis submitted during the public comment period and observed that the commenters had not provided any peer-reviewed information demonstrating that the conceptual model used by EPA was inapplicable to Great Bay or a peer-reviewed alternative to the load-based nitrogen targets. Although commenters did propose a range of ambient concentration targets, the comments did not indicate whether or how these concentrations could be converted into a watershed load, how they compare with EPA's existing approach, nor how compliance with this value was to be measured through corresponding effluent limitations. More fundamentally, although portions of the estuary may be below the commenters' proposed concentration value, other parts are above it and even remain impaired for nitrogen and other nutrient-related parameters. This indicates that significant portions of the estuary are beyond the assimilative capacity for nitrogen and that each of the POTWs has the reasonable potential to cause or contribute to this exceedance of water quality standards. Put otherwise, it is not obvious to EPA that the use of a concentration-based target would obviate the need for nitrogen effluent limitations, and as described above, it would not in any event result in less stringent limits.

Specifically, commenters assert that the 100 kg ha^{-1} yr^{-1} loading threshold, when run through HDR's hydrodynamic model, results in a nitrogen concentration of 0.24 mg/L at Adam's Point. Commenters compare this concentration to a concentration goal proposed by the municipalities of 0.32 mg/L. This led commenters to assert that the 100 kg ha^{-1} yr^{-1} goal is too stringent. While the model may show a concentration below 0.32 mg/L at Adam's Point, this does not mean that the entire estuary would be below 0.32 mg/L at 100 kg ha^{-1} yr^{-1}. Adam's Point has greater dilution and a higher flushing rate than many other areas in the estuary. In order for these modeling results to be significant, other more conservative locations in the estuary (*e.g.*, within Great Bay proper or at the mouth of each tidal river) would need to be evaluated at the 100 kg ha^{-1} yr^{-1} load and shown to be below the municipality recommended concentration of 0.32 mg/L. For example, recent data collected by the University of New Hampshire, compiled by PREP and uploaded into NHDES's Environmental Monitoring Database (EMD) indicate seasonal average total nitrogen concentrations in Great Bay proper of 0.378 mg/L in 2017, 0.579 mg/L in 2018 and 0.369 mg/L in 2019. *See* Appendix A of the Response to Comments for these data. Based on these data, it is evident that current levels of nitrogen in large portions of the estuary continue to exceed both the acceptable loading threshold and the proposed concentration threshold even after most of the recent POTW upgrades and optimization efforts. This analysis indicates that significant nitrogen reductions are needed regardless of whether the target is loading-based or concentration-based. Additionally, in accordance with the adaptive management structure of EPA's permitting approach, the General Permit can be reissued with updated loading-based and/or concentration-based endpoints for these more conservative locations, if warranted.

Sixth, EPA took note that many commenters affirmed their commitment to restore designated uses in Great Bay and that several commenters, including certain municipalities, expressed dissatisfaction with the pace of regulatory action by EPA and NHDES to address ongoing nutrient pollution in Great Bay.

The decision to move forward with permit issuance based on the best information reasonably available at the time of permit issuance is consistent with caselaw interpreting the CWA and APA. The CWA disfavors unnecessary delay in progressing toward the achievement of applicable water quality standards. Under Section 402 of the Act, all NPDES permits are limited to terms of five

years, ensuring reevaluation and, if necessary, tightening of permit limitations at regular intervals. In enacting the CWA, Congress stated that its goal was to eliminate the discharge of pollutants by 1985, CWA § 101(a)(1), with limitations "necessary to meet water quality standards" to be achieved by July 1, 1977. CWA § 301(b)(1)(C). While these initial goals have not been entirely met, they must imbue EPA's regulatory efforts with a spirit of haste rather than hesitation. *Cf. Scott v. City of Hammond*, 741 F.2d 992, 998 (7th Cir. 1984) (criticizing continuing delay in implementing provision of the CWA designed to ensure achievement of water quality standards, given that "[t]he statutory time limits demonstrate that Congress anticipated that the entire process would take a relatively short time after the passage of the 1972 amendments"). While there will always be an irreducible amount of uncertainty given the varied sources of nitrogen loading into the Great Bay estuary and the size and complexity of that waterbody, EPA is nevertheless obligated to exercise its scientific expertise and apply its technical judgment based on the information it has at the time of permit reissuance, which under the Act is called for at regular intervals not to exceed five years. *See Upper Blackstone*, 690 F.3d at 22 ("[N]either the CWA nor EPA regulations permit the EPA to delay issuance of a new permit indefinitely until better science can be developed, even where there is some uncertainty in the existing data."); *Ethyl Corp. v. EPA,* 541 F.2d 1, 28 (D.C.Cir.1976) (en banc) ("[R]ecognizing ... the developing nature of [the field].... [t]he [EPA] Administrator may apply his expertise to draw conclusions from suspected, but not completely substantiated, relationships between facts, from trends among facts, from theoretical projections from imperfect data, from probative preliminary data not yet certifiable as 'fact,' and the like."). But here, once again, what remains clear on the record before EPA is the fact that large amounts of nitrogen contribute to water quality impairments throughout the Great Bay estuary. *Miami–Dade County v. EPA,* 529 F.3d 1049, 1065 (11th Cir.2008) (holding that the "EPA is compelled to exercise its judgment in the face of scientific uncertainty unless that uncertainty is so profound that it precludes any reasoned judgment"). In light of this fact and applicable case law construing the Act, EPA is more than justified to proceed with the imposition of reasonable permit effluent limits, designed to achieve gross reductions, for dischargers contributing to severe ongoing water quality impairments.

For all the reasons above, EPA rejects the views of some commenters that more data and modeling are necessary before determining what nitrogen limits are necessary.

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EPA has carefully assessed all the scientific and technical information submitted during the public comment period. In general, commenters objected to EPA's chosen approach as overly simplistic, and criticized EPA for moving forward in the absence of a concentration-based target, water quality model and consideration of the scientific studies submitted during the comment period. While the municipalities submitted voluminous scientific studies and analyses to EPA, no commenter presented peer-reviewed papers or other evidence to disturb the overall applicability of the conceptual model employed by EPA here. Nor did any commenter bring to the attention of EPA any peer-reviewed literature identifying less stringent areal loading targets that would still be protective of eelgrass. In addition, no commenter submitted peer-review literature establishing that the use of areal loading approach in lieu of concentration-based approach is technically or scientifically flawed.[9] Notably, the permittees do not contend that less stringent nitrogen limits would be

[9] See Appendix B of the Response to Comments (summarizing EPA's evaluation of all peer-reviewed studies and expert analyses submitted during the public comment period).

sufficient to satisfy the CWA's requirements to ensure compliance with water quality standards, including antidegradation. Instead, they argue that EPA had insufficient basis to establish *any* limit, and that it should have waited for more data and more certainty and left the POTWs nitrogen discharges unregulated in the meantime. At bottom, the commenters' allegations that EPA acted arbitrarily hinge on this assertion, which upon careful consideration EPA has determined to be unfounded. As explained below, in EPA's technical judgment the scientific studies, analyses and other information submitted during the public comment period are concordant with EPA's conclusion that: (1) the conceptual model obtains in Great Bay, (2) this water body is impaired for nitrogen and (3) some level of control over continuous point source discharges is necessitated by Sections 301 and 402 of the Act.

Over the course of almost two years, EPA has followed all the procedures – including extensive public engagement processes – requisite to making its permit decision. EPA thus utilized the central safety valves used by the courts to monitor an agency's use of technical methodology: "the requirement of public exposure of the assumptions and data incorporated into the analysis and the acceptance and consideration of public comment, the admission of uncertainties where they exist, and the insistence that ultimate responsibility for the policy decision remains with the agency rather than the [model]." *Sierra Club v. Costle*, 657 F.2d at 334. What is evident from the EPA's review of the comments is that no party to this proceeding professes to exactly know the correct areal loading (or concentration-based target) necessary to achieve and maintain the applicable narrative nutrient criteria and fully restore designated and existing uses. Furthermore, no commenter has presented any arguments or data that persuasively demonstrate that a less stringent nitrogen limit would be permissible under applicable antidegradation requirements or sufficient to address the severe eutrophication in the Great Bay system. Against this backdrop, in which EPA's core permitting determination remains undisturbed, EPA has no reason to delay a decision, especially when such a delay would allow significant water quality impairments to worsen or continue unabated. The record of the extensive process that the EPA went through in setting the total nitrogen limit demonstrates that it was "conscious [] of the limits of its model" and "invit[ed] and respon[ded] to public comment on all aspects of the model," thus EPA's reasoned decision is well within its discretion. *Id*. Even so, EPA has gone further and incorporated an optional submittal as a result of public comment for the permittees to propose a process to revise and iterate the chosen nitrogen target, in accordance with EPA's adaptive management approach. *See* Part II.B.5 below.

EPA has offered a detailed account of why the information available to it provided a reasonable basis for finalizing the General Permit. EPA's choice to go forward with new effluent limits designed to ensure compliance with the water quality standards applicable to the severely impaired waters affected by the POTWs' pollutant discharges is reasonable, fully explained and based on its technical judgment and ample scientific data. EPA has also explained that, given the adequate available scientific and technical information, it was unwilling to wait indefinitely for further modeling of uncertain usefulness, since it will not lead to relaxation of the permit limits given the existence of ongoing nitrogen-driven impairments in Great Bay.[10] This position is fully in accord

[10] Of course, effluent limits could potentially be relaxed in accordance with anti-backsliding and anti-degradation regulations in the future if water quality standards are attained.

with the State of New Hampshire. See letter from Governor Christopher T. Sununu to the Cities of Dover and Rochester, dated October 16, 2019.[11]

2. Cause-and Effect Methodologies Versus "Reasonable Potential" Analysis

Some commenters suggest that EPA is required to establish cause-and-effect relationships between the discharge of pollutants from the POTWs eligible for coverage under the General Permit and impacts on receiving water quality, including the elevated algal growth and eelgrass decline. Several municipal commenters cite to dictionary definitions of "necessary" and "demonstrate," and case law rejecting "generalized analyses as basis for regulatory decision" and "presumed impairments." They succeed only in reading the words "reasonable potential" out of 40 CFR § 122.44(d)(1), and along with them the underlying "precautionary approach" to protecting water quality intended by EPA in promulgating the regulation in the first place. EPA is unpersuaded by these types of argumentative and conclusory claims given that the record is replete with evidence suggesting that nitrogen is *a* causative driver of eutrophication in this system. EPA and NHDES, as well as PREP and other stakeholders, are in agreement on this point.

NPDES regulations do not require EPA to use any particular methodology or conduct any specific modeling to determine whether the "reasonable potential" standard is met, and EPA is not required to demonstrate that nitrogen is causing impairment before setting a nitrogen limit. *In re City of Taunton*, 17 E.A.D. 105, 147-158 (EAB 2016) *aff'd*, 895 F.3d 120 (1st Cir. 2018), *cert. denied,* 139 S. Ct. 1240 (Feb. 19, 2019). Under the 301(b)(1)(C) of the Act and implementing regulations at 40 CFR § 122.44(d)(1), a WQBEL is by definition "necessary" if there is a "reasonable potential" that that pollutant in the discharge causes or contributes to an excursion above water quality standards. *See* 40 CFR § 122.44(d)(1)(i), (ii). As EPA explained in the preamble to section 122.44(d)(1),

> Several commenters asked if it was necessary to show in-stream impact, or to show adverse effects on human health before invoking paragraph (vi) as a basis for establishing water quality-based limits on a pollutant of concern. It is not necessary to show adverse effects on aquatic life or human health to invoke this paragraph. The CWA does not require such a demonstration and it is EPA's position that it is not necessary to demonstrate such effects

[11] As the Governor explains:

> Unfortunately, time has run out for additional changes to the underlying model for this round of NPDES general permits. Tremendous work has been done to reach this end-point, and economic development throughout the GBE requires the certainty, and affordability, that the permit provides. This permit provides flexibility to municipalities and does not mandate the limits of technology or immediate TN reductions. The general permit has a twenty-year time horizon to reach restoration of the GBE and allows for changes every five years accounting for the most recent data and innovative scientific approach. Again, the state is committed to working on a hydrodynamic model, and developing protocols to account for seasonality in collaboration with municipalities and the EPA. These efforts will be informed by the additional data that will be collected from the new datasondes. The product of these efforts will be incorporated into the next phase of this NPDES permit.
>
> My administration has and will continue to ensure that this process takes a collaborative approach that incorporates stakeholder input at every tum. While, I cannot support a further delay to this NPDES permit, which would cause economic uncertainty in the region, I remain committed to working with municipalities to use the best available information to make informed changes thought out the 20-year span of this adaptive NPDES permit.

before establishing limits on a pollutant of concern.

National Pollutant Discharge Elimination System; Surface Water Toxics Control Program, 54 Fed.Reg. 23,868, 28,878. The Environmental Appeals Board has further explained:

> The requirement to impose a permit limit is not only premised on a finding that the pollutant discharges "are" at a level that "causes" violation of the applicable water quality standards, but the requirement is also triggered by a finding that the facility's pollutant discharges "may" be at a level that "contributes" to or has the "reasonable potential" to cause a violation. 40 CFR § 122.44(d)(1)(i). The juxtaposed contrasts between "are" and "may," and between "cause" and both "contribute" and "reasonable potential," indicate that the Region is not limited, as the District contends, to acting only where there is certainty of an existing causal link between a specific discharge and a particular violation of water quality standards. Instead, the regulation requires water quality-based effluent limits even when there is some degree of uncertainty regarding both the precise pollutant discharge levels and the potential causal effects of those discharges, so long as the record is sufficient to establish that there is a "reasonable potential" for that discharge to cause or contribute to a violation of water quality standards. Agency guidance and the Board's decisions have also stated that the reasonable potential analysis must be based on the "worst-case" effluent conditions. *In re Wash. Aqueduct Water Supply Syst.*, 11 E.A.D. 565, 584 (EAB 2004); *accord Am. Iron & Steel Inst. v. EPA*, 115 F.3d 979, 1001 (D.C. Cir. 1997) (discussing EPA's policy that the reasonable potential analysis be based on the worst case scenario). The regulations, thus, require a precautionary approach when determining whether the permit must contain a water quality-based effluent limit for a particular pollutant.

In re Upper Blackstone Water Pollution Abatement Dist., 14 E.A.D. 577, 599 n.29 (EAB 2010). Consistent with this view, "The EPA has interpreted 'reasonable potential' to mean 'some degree of certainty greater than a mere possibility.' *City of Taunton, Massachusetts v. United States Envtl. Prot. Agency*, 895 F.3d 120, 133 (1st Cir. 2018), *cert. denied sub nom. City of Taunton, Mass. v. E.P.A.*, 139 S. Ct. 1240, 203 L. Ed. 2d 256 (2019), *citing In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 599 n.29 (EAB 2010).

In this case, EPA's reasonable potential determination consisted of site-specific analysis of nitrogen-driven receiving water impairments, and the sources of point and nonpoint source loading. It also reflected the governing regulation's preventative orientation. EPA was, however, confronted with evidence that did not definitively dictate the precise level of nitrogen control necessary to meet New Hampshire's water quality standards, and therefore made a reasoned choice, taking into account the relevant uncertainties, among a few potential regulatory scenarios. In coming to its determination, EPA evaluated the following information:

- Available load-based TN targets from the peer-reviewed literature;
- Site-specific reports from NOAA and PREP on the Great Bay estuary;
- All available effluent data from the POTWs eligible for coverage under the General Permit;
- Site-specific ambient data from throughout the estuary for eelgrass, nitrogen, and other nutrient-related parameters; and,
- NHDES's regulatory determinations under Section 303(d) of the Act, in which the State determined the existence of nitrogen-driven water quality impairment.

From this body of information, EPA determined that a maximum load of 100 kg ha^{-1} yr^{-1} was a reasonable and protective "calculated water quality criterion" under section 122.44(d)(1)(vi)(A), as well as a reasonable point of departure under an adaptive management regime. *See* Fact Sheet at 14-26. EPA fully recognizes the need to further refine its target threshold and explicitly adopted an adaptive management regime, under which the necessary target would be further refined from permit cycle to permit cycle, and the effluent limitations adjusted accordingly.

Because EPA concluded that the receiving waters are substantially exceeding this load, and evidencing widespread effects of cultural eutrophication are ongoing as predicted by the conceptual model relied on in this proceeding, EPA's conclusion that the POTWs' loading of TN into Great Bay has the reasonable potential to cause or to contribute to a violation of water quality standards is also sound.

Finally, EPA's decision to "hold the load" from the POTWs, given that the receiving waters are already beyond their assimilative capacity for nitrogen is both supported by the record and necessitated by the New Hampshire's antidegradation policy.

While some commenters might prefer that EPA follow a different analytical process than it did, or consider or rely on other sources of information, nothing in the CWA, its implementing regulations, or Board precedent requires EPA to conduct the type of modeling, concentration-based or cause-and-effect analysis that the commenters state or imply is lacking in order to determine the existence of a reasonable potential under 40 CFR § 122.44(d)(1)(i). *See In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 599, 601 (EAB 2010), aff'd. 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013).[12] Although some parties dispute the extent of nitrogen-driven impairments in Great Bay and the effluent limitations necessary to control them, no party seriously disputes that the widely-accepted conceptual model of eutrophication establishing the relationship between causal variables (such as nitrogen) and response variables (such as chlorophyll-a and DO) is applicable here. *While the comments suggest that there are other contributing causes, like storm events, nonpoint source contributions from septic systems in the watershed and atmospheric deposition, this argument heightens rather than mitigates the need for nitrogen controls on controllable sources such as the continuous POTW dischargers that are eligible for coverage under*

[12] For reasons unclear to EPA, the commenters in significant part have simply decided to recycle causation claims that their representatives unsuccessfully attempted to advance in the *In re Town of Newmarket*, 16 E.A.D. 182 (EAB 2013), going so far as to cut and paste portions of the depositions and legal filings from that case. In that previous case, which has already been disposed of in EPA's favor, the Great Bay Municipal Coalition (including Rochester and Dover) attempted to equate "reasonable potential" with cause-and-effect demonstrations. These municipalities denied that nitrogen had *any* causal relationship to cultural eutrophication in Great Bay, despite a broadly-accepted, peer-reviewed conceptual model that holds to the contrary. Upon consideration of extensive briefing, the Board categorically rejected the commenters' arguments as inconsistent with the scientific record, as has the First Circuit, *see Upper Blackstone Water Pollution Abatement Dist. v. U.S. Envtl. Prot. Agency*, 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013), more than once, *see City of Taunton v. U.S. Envtl. Prot. Agency*, 895 F.3d 120 (1st Cir. 2018), *cert. denied*, 139 U.S. 1240 (2019). Rochester and Dover chose not to appeal the Environmental Appeals Board's decision. While permittees are free to expend their resources as they wish, EPA need not relitigate the issues from cases and decisions in which it has already prevailed and that have established legal precedent supporting EPA's approach in this permit (and, indeed, direct scientific relevance for the same receiving water body). Instead, EPA has added its legal briefs and the decisions themselves rejecting claims similar if not identical to the ones lodged in these comments to the administrative record, in order to efficiently address these issues without unnecessary waste of limited governmental resources.

the General Permit. Viewed in this light, EPA's choice is the rational product of its expert scientific judgment and not, as many commenters allege, arbitrary and capricious. *See Public Citizen Health Research Group v. Tyson*, 796 F.2d 1479, 1505 (D.C. Cir. 1986) ("[A]s long as Congress delegates power to an agency to regulate on the borders of the unknown, courts cannot interfere with reasonable interpretations of equivocal evidence.").

3. Nitrogen as "Sole Cause" Versus "Contributor" to Impairment

Relatedly, several commenters expressed the opinion that nitrogen has not been proven to be the sole cause of impairment in the estuary and that perhaps other approaches to improve water quality should be taken instead of limiting nitrogen loads to the estuary. EPA agrees that nitrogen may not be the "sole cause" of impairment to the estuary, given the complex nature of the waterbody. However, there is ample evidence that the overall nitrogen loading to the Great Bay estuary has exceeded the estuary's assimilative capacity and is therefore a cause of impairment to the estuary, as detailed in the Nitrogen Threshold and Reasonable Potential Analysis sections of the Fact Sheet pages 21-26.

A pollutant need not be the sole cause of an impairment before a NPDES permit limit may be imposed; an effluent limit may still be required, if the pollutant "contributes" to a violation. EPA regulations state that a permit limit *must* be established for any pollutant that "may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 CFR § 122.44(d)(1)(i).

In context of NPDES permitting, dischargers routinely argue against the imposition of necessary permit limits because there exist multiple stressors contributing to the impairment (*e.g.*, stressors cited in various comments, including the 2006 Mother's Day Storm and other climatic events, CDOM, etc.). For example, some municipal comments contend that floods, wasting disease, and other factors are the main causes of eelgrass loss – not excessive nitrogen loading. They use these other factors to argue that nitrogen limits will not lead to improvements in eelgrass health in the estuary. This argument is not persuasive. While EPA agrees that other factors can be contributing to eelgrass loss, these factors do not diminish the need for nitrogen limits. These "other factors" generally result in a waterbody being *more* sensitive to excessive nitrogen loads, and do not justify any move to weaken a necessary limit. In other words, it is most often the case that estuaries with low nitrogen loading (below the assimilative capacity of the ecosystem) can withstand stresses from floods, storms, droughts, or other disruptions. However, estuaries with excessive nitrogen loading (above the assimilative capacity) are less resilient to these stressors.

In rejecting a challenge to a permit limit by a Massachusetts POTW based on an argument similar to that being advanced by the dischargers here, the First Circuit explained:

> …[T]he District argues that any effluent limitation imposed upon it must cure (or nearly so) the water quality problem. The CWA quickly disposes of these arguments. The Act's TMDL and interim planning process both contemplate pollution control where multiple point sources cause or contribute to water quality standard violations. 33 U.S.C. § 1313(d), (e). Under earlier legislation, including the 1965 Federal Water Pollution Control Act, when a

> water body failed to meet its state-designated water quality standards, pollution limits could not be strengthened against any one polluter unless it could be shown that the polluter's discharge had caused the violation of quality standards. *See EPA v. California ex rel. State Water Res. Control Bd.,* 426 U.S. 200, 202–03, 96 S.Ct. 2022, 48 L.Ed.2d 578 (1976). This standard was ill-suited to the multifarious nature of modern water pollution and prevented the imposition of effective controls. *Id.* In 1972, Congress declared that the system was "inadequate in every vital aspect," and had left the country's waterways "severely polluted" and "unfit for most purposes." S.Rep. No. 92–414, at 3674 (1971), 1972 U.S.C.C.A.N. 3668, 3674. The CWA rejected the earlier approach and, among other things, introduced individual pollution discharge limits for all point sources. 33 U.S.C. 1311(b). To maintain state water quality standards, the Act establishes the TMDL and continuing planning processes, which target pollution from multiple sources. *Id.* § 1313(d), (e). EPA regulations require permitting authorities to include in NPDES permits conditions which "control all pollutants or pollutant parameters ... [that] are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 CFR § 122.44(d)(1)(i); *see also* 54 Fed.Reg. 23,868, 23,873 (June 2, 1989). We thus reject the notion that in order to strengthen the District's discharge limits, the EPA must show that the new limits, in and of themselves, will cure any water quality problems.

Upper Blackstone Water Pollution Abatement Dist. v. U.S. E.P.A., 690 F.3d 9, 32–33 (1st Cir. 2012); s*ee also In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 599-601 & n.29 (EAB 2010); *In re Town of Newmarket*, 16 E.A.D. 182, 224 n. 23 (EAB 2013). In this case, EPA has determined that the nitrogen load to Great Bay not only has the reasonable potential to cause but is actually causing an excursion of water quality standards based on pervasive nutrient-related water quality impairments, notwithstanding the fact that it may not be the "sole cause" of some of these impairments. It is clear that nitrogen is a major factor in large portions of the estuary and that all of the POTWs in the watershed are contributing to these impairments.[13] Therefore, EPA has a duty to act and has developed this General Permit to protect Great Bay from continued nutrient impairment.

Regarding these other factors, however, EPA notes that many of them are factors that cannot be regulated. Other stressors of eelgrass are discussed in detail in a recent report, *A Case for Restoration and Recovery of Zostera marina L. in the Great Bay Estuary*[14]. For example, some of the stressors listed in the report include bioturbation and wasting disease, which are not are able to be regulated by EPA or NHDES. Importantly, EPA reiterates that the impact of these "other factors" would generally result in a waterbody being *more* sensitive to excessive nitrogen loads and, therefore, would likely result in the need for EPA to require *more* nitrogen reductions in order to achieve water quality standards.

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[13] EPA recognizes that it is possible that there are certain areas within the estuary where nitrogen is not a major factor in the existing water quality problems, but this possibility does not alter EPA's conclusion that the POTW permit limits are necessary to protect water quality standards in other areas of the estuary. This conclusion should be understood in light of the methodology that EPA employed to analyze nitrogen impacts in Great Bay on an estuary-wide scale.

[14] Burdick, David M.; Edwardson, Kenneth J.; Gregory, Thomas; Matso, Kalle; Mattera, Trevor; Paly, Melissa; Peter, Christopher; Short, Frederick; and Torio, Dante D., "A Case for Restoration and Recovery of Zostera marina L. in the Great Bay Estuary" (2020). *PREP Reports & Publications*. 441.
https://scholars.unh.edu/prep/441

Relatedly, some commenters asserted that the 2006 drop in eelgrass coverage was caused by the Mother's Day flood and that prior to that storm event nitrogen levels were high and eelgrass populations were stable. Commenters further asserted that the eelgrass decline presented by EPA on Figure 2 of the Fact Sheet is skewed to look like a 20-year decline but that the level is steady after 2006. EPA cannot agree.

First, before 2006, eelgrass populations were not stable as the commenters suggest. Instead eelgrass coverage in the Great Bay estuary had been declining at least since 1996. PREP's 2006 State of Our Estuaries report, referenced in the Fact Sheet at page 15, states that eelgrass cover in the Great Bay had declined 17% between 1996 and 2004. This decline started with a retreat of the deep edge of eelgrass meadows in the Piscataqua River, followed by the expiration of eelgrass in that system. Further, the report stated the 2004 eelgrass biomass level for Great Bay was 948 metric tons, which was 41 percent lower than the biomass observed in 1996. Measurements of biomass provide a metric of eelgrass abundance and declines in abundance generally occur in advance of declines in acreage. These numbers demonstrate that eelgrass was declining before the 2006 storm, corresponding with a high level of nitrogen loading estimated to be up to 200 kg ha^{-1} yr^{-1} or higher in the years just prior to 2006.

As presented on Figure 2 of the Fact Sheet, eelgrass acreage in the Great Bay estuary measured in 1996 represents the highest eelgrass acreage on record[15]. Since that time, eelgrass has decreased and has never recovered to anywhere approaching the acreage present in 1996. Contrary to the comments that suggest eelgrass is stable, this figure shows a gradual decline before 2006, interrupted by a dramatic drop in 2006, with continued long-term decline through 2017.

Based on the misconception that eelgrass was stable prior to 2006, some comments suggest that the nitrogen load in 1996 would represent healthy conditions and they refer to Valiela & Cole 2002 (*See* Table 1 on page 94 of that study), which presents the load to Great Bay as 252 kg ha^{-1} yr^{-1}, citing a 1992 study titled "The Ecology of the Great Bay Estuary, New Hampshire and Maine: An Estuarine Profile and Bibliography" (Short and Mathieson, 1992). This comment suggests that the load of 252 kg ha^{-1} yr^{-1} would represent a nitrogen load that can support a healthy eelgrass population. However, EPA evaluated this loading and found it to be calculated inconsistently with EPA's methodology in the General Permit. In the General Permit, EPA evaluated the total nitrogen load to the entire 21 square mile surface area of the Great Bay estuary. In Short & Mathieson, 1992, however, the total nitrogen load is calculated based on a surface area of only Great Bay *proper* (*i.e.*, 8.9 square miles). While there is not sufficient data available to determine the precise load to the entire estuary in 1996, a relatively simple translation of the 252 kg ha^{-1} yr^{-1} to normalize the load across the entire estuary results in an estimated load of 106.8 kg ha^{-1} yr^{-1} (*i.e.*, 252 x 8.9 / 21 = 106.8). This rough loading estimate corresponds closely with EPA's initial target of 100 kg ha^{-1} yr^{-1}, which EPA maintains is reasonable and appropriate to restore a healthy eelgrass population. However, EPA cautions that this does not confirm that nitrogen levels from 1996 represent the correct target for eelgrass restoration. Rather, this loading corresponds to a time shortly before eelgrass acreage is documented to gradually decline. In order to restore eelgrass coverage, nitrogen levels may need to be reduced below levels that historically allowed them to persist. This uncertainty is incorporated into EPA's adaptive management permitting strategy.

[15] EPA notes that eelgrass monitoring throughout the estuary began in 1996 and prior data is not available for estuary-wide comparison.

EPA notes that this analysis also refutes the claim in the comments that total nitrogen levels were lower after the 2006 storm event than they were when eelgrass recovered from wasting disease in the 1980's. While there is some uncertainty regarding the precise nitrogen loads in the 1980's, it is not clear that they were significantly higher than in the years following the 2006 storm event. Rather, as nitrogen loads increased between 1996 and 2006, the eelgrass population became stressed to the point that it was unable to recover from the 2006 Mother's Day storm, as discussed in more detail below.

Second, while EPA agrees with the commenters that episodic stresses can cause eelgrass decline, EPA disagree that such stress leads to the conclusion that nitrogen limits are not needed in Great Bay. Large storm events, like the one that occurred in 2006, can cause extended periods of low salinity in the bay, uproot plants, deposit sediment that is easily resuspended, and increase the nutrient stormwater load to the estuary. After the 2006 Mother's Day storm event the eelgrass should have been able to fully recover but it was unable to do so due to a lack of resilience, caused, at least in part, by high levels of nitrogen loading. Eelgrass resilience is the measure of the ability of eelgrass to absorb repeated disturbances or shocks and still persist. Therefore, in this case it is plausible that the 2006 Mother's Day storm caused a decline in eelgrass but it is "equally plausible that chronic stressors, such as decreased water quality, have limited the resilience of eelgrass to episodic disturbances" (PREP, 2018 State of Our Estuaries). This is confirmed by the fact that eelgrass did not rebound to previous levels in the years following the 2006 storm. The 2018 PREP report further asserts that "there is broad scientific consensus that eelgrass in the Great Bay shows a consistent pattern of being less and less able to rebound from episodic stresses." For example, as the abundance of eelgrass falls, the potential reproductive output (*i.e.*, seeds) that could fuel a recovery also falls. Additionally, as overall water quality decreases, survival of seedlings are disproportionately impacted because they have a much higher light requirement than adult shoots (Oicheng *et al.*, 2010). These factors make a dramatic recovery less and less likely. Compounding these concerns, the frequency of extreme rainfall events is expected to continue to increase which has the potential to create more episodic stresses for eelgrass in Great Bay. Therefore, the expected impacts of changing climatic conditions further support the need to decrease nitrogen loads, to restore resilience to the system, so that eelgrass can recover from these episodic stresses in the future.

Finally, EPA disagrees that the data is skewed to look like a 20-year decline. On Figure 2 on page 20 of the Fact Sheet, EPA shows a statistically significant decreasing trend in eelgrass acreage from 1996 to 2016. Minor increases in eelgrass coverage in some years do not change the conclusion that eelgrass has been trending down for 20 years. Echoing statements from the Fact Sheet, EPA reaffirms that eelgrass has shown a decline from 1996 to 2016, with acreage dropping from 2,894 acres in 1996 to 1,493 acres in 2015. However, EPA also notes that recently a slight improvement in eelgrass coverage has been observed. As total nitrogen loading to Great Bay has started to decrease due to POTW upgrades, eelgrass acreage has shown some increases; from 2017 to 2019, the total area of eelgrass coverage increased by 131 acres.[16]

Another comment alleges that because recent voluntary reductions of total nitrogen loading from the POTWs did not result in eelgrass recovery, further nitrogen reductions are not warranted. EPA

[16] Barker, Seth, "Eelgrass Distribution in the Great Bay Estuary and Piscataqua River for 2019: Final Project Report submitted to the Piscataqua Region Estuaries Partnership" (2020). PREP Reports & Publications. 438.

agrees that POTWs have achieved significant total nitrogen reductions in recent years due to a combination of permit requirements and voluntary measures (actions which are collectively referred to in the comment as the "Grand Experiment"). However, EPA disagrees with the conclusion that these reductions did not result in any improvement in eelgrass; the agency also disagrees that further reductions would not benefit eelgrass health. Regarding improvements to eelgrass, the comment focuses too narrowly on eelgrass in the Upper Piscataqua River while ignoring recent increases in eelgrass in Great Bay proper. As the load reductions described in the comment resulted in less nitrogen to the entire estuary, including both the Upper Piscataqua River and Great Bay proper, it is not surprising that these reductions may have contributed to eelgrass recovery in Great Bay proper given that the hydrodynamics of this portion of the estuary are more conducive to eelgrass than in the river-dominated portions of the Upper Piscataqua River. Further, this assertion does not mean that eelgrass can never recover in the Upper Piscataqua River. Indeed, more nitrogen reductions likely need to be made before these more sensitive areas of the estuary would expect to see recovery.

Moreover, not all nitrogen reductions lead to observable, immediate responses in eelgrass populations. As we have seen in the restoration of other eutrophic systems (*e.g.*, Boston Harbor, Chesapeake Bay, Tampa Bay), there is a lag time between nitrogen reductions and ecosystem response. Due to decades of over-enrichment, the sediments throughout Great Bay now hold a large reservoir of nitrogen. As sources of nitrogen into the estuary are reduced, the flux of nitrogen from the water column into the sediments at some point will reverse direction. The large reservoir of nitrogen in the sediments will then become a source for the water column. Until that large reservoir is exhausted, no significant changes in water column parameters can be expected. (Taylor *et al.*, 2020). To simply claim that nitrogen reductions are fruitless because recent nitrogen reductions did not result in immediate improvement in the estuary is unreasonable and contradictory. Rather, EPA's adaptive management permitting approach is designed to allow for incremental load reductions to track and achieve the long-term environmental response with the goal of achieving water quality standards.

4. Comparative Ecology versus Great Bay-Specific Data

As explained above, EPA had a choice of methodologies to apply in Great Bay and, based on EPA's technical and environmental policy judgement, opted to apply a loading-based target using a combination of peer-reviewed scientific literature on comparative ecology along with substantial site-specific studies, reports and data verifying the need for nitrogen controls to protect water quality standards. EPA chose this methodology as part of an adaptive management permitting approach because it allowed EPA to expedite progress toward achieving water quality standards while allowing any scientific uncertainty associated with the precise level of nitrogen reduction needed to be addressed in the future.

Several commenters expressed the opinion that EPA's analysis is flawed because it did not include data specific to Great Bay. These comments claim that the studies used to set the loading threshold were not Great Bay specific and therefore should not be used for Great Bay. Additionally, some commenters expressed the opinion that Great Bay and Narragansett Bay are not comparable, so EPA's comparison of nitrogen loads and eelgrass health in these two estuaries was inappropriate.

First, EPA disagrees with the comments that the studies were not Great Bay specific. One of the three studies (*i.e.*, Valiela & Cole 2002) used to establish the loading target of 100 kg ha^{-1} yr^{-1}

expressly included Great Bay. EPA also evaluated a large number of scientific reports and studies specific to Great Bay that describe the historic and current impacts of nutrient loading on the estuary (and on eelgrass specifically). These reports, described in the Fact Sheet at 14-17, along with the evaluation of water quality impairments presented in the Fact Sheet at 17-21, present a clear and thorough review of site-specific "data on effects or symptoms of eutrophication." (*See* Latimer & Charpentier, 2010). Further, EPA has received and evaluated site-specific data after the close of the public comment period which further supports issuance of the Final General Permit based on all available information. For example, see concentration data presented in Part II.B.5 below. This analysis in the Fact Sheet (pgs. 14-21) contradicts the claim in some of the comments that EPA simply applied a loading threshold from the scientific literature inappropriately and without evaluating or understanding site-specific data.

Second, EPA disagrees that Great Bay and Narragansett Bay are not comparable. Specifically, some comments make the argument that Narragansett Bay and Great Bay are not comparable because Narragansett Bay has a greater average depth than Great Bay resulting in much less eelgrass coverage as a percentage of the surface area of the estuary. While EPA acknowledges this difference, EPA disagrees that this difference somehow refutes that the conceptual model obtains in both estuaries (*i.e.*, that excess nitrogen loading results in eutrophication and impacts eelgrass health in areas where it otherwise would thrive). Moreover, as noted on page 23 of the Fact Sheet, EPA acknowledges that while Narragansett Bay is significantly larger than Great Bay, both are complex estuaries in New England which share many similarities (*e.g.*, climate conditions, riverine input). Additionally, some comments argue that the nitrogen reductions that occurred in recent years in Narragansett Bay were addressing hypoxia rather than eelgrass restoration and, therefore, should not be compared to Great Bay. Again, EPA acknowledges that hypoxia may have been the driver of some of these reductions but notes that this does not diminish the conclusion that these nitrogen reductions did, in fact, improve both hypoxia and eelgrass health, as described in the Fact Sheet at 23-24. Therefore, EPA finds these comments unpersuasive and maintains its position that Narragansett Bay and Great Bay are comparable.[17]

Finally, and most importantly, EPA highlights the value of using comparative ecology in understanding nutrient impacts to a variety of estuaries. EPA acknowledges that the studies described in the Fact Sheet evaluated a large variety of estuaries all over the world. While some claim that the nutrient impacts observed in these diverse estuaries are unrelated to Great Bay, EPA disagrees with this assertion. Comparative ecology is the science of using natural variation and disparity to understand patterns of life in certain targeted ecosystems. The studies EPA relied on in the Fact Sheet to establish the initial loading target of 100 kg ha^{-1} yr^{-1} implemented comparative ecology to establish a range of nitrogen loads that were shown to support healthy eelgrass in a wide variety of estuarine environments. EPA determined, while acknowledging some inherent scientific uncertainty, that in order for Great Bay to support a healthy eelgrass population and ensure compliance with water quality standards, the nitrogen loading should be reduced to be within the

[17] EPA's decision to rely, in part, on other New England estuaries to derive a protective TN loading threshold was reasonable, as EPA outlined its rationale for doing so, solicited public comment on its decision, and considered those comments, finding them to be without merit. *Sierra Club v. Costle*, 657 F.2d 298, 333 (D.C. Cir. 1981). Many commenters, including those objecting to EPA's reference to Naragannsett Bay, have pointed to other New England estuaries to support their concentration-based approach without making the the type of comparability demonstration they allege EPA failed to conduct.

loading range presented in these peer-reviewed scientific studies. To disregard these studies because they are not focused solely on Great Bay would be to contradict the entire scientific purpose for which they were developed.

5. Load versus Concentration Target

Several commenters asked how the annual loading threshold approach compares to a seasonal concentration threshold approach. EPA recognizes that there are different approaches that could be taken to restore water quality to the Great Bay, including a seasonal concentration-based approach. When drafting this permit, EPA reviewed the relevant scientific literature for Great Bay and comparable estuaries. After reviewing the literature, EPA decided to apply an annual loading-based approach for the reasons described above and decided not to convert this load to an equivalent seasonal concentration in order to maintain consistency with the scientific literature and to apply the nitrogen reductions equitably throughout the watershed. While a conversion to a seasonal concentration-based target may have been feasible, EPA determined that this was unnecessary because EPA can regulate a loading reduction to meet a loading target directly. In fact, establishing a seasonal concentration-based target would have resulted in further complication from a permitting and compliance standpoint because of the variety of nitrogen sources contributing to the concentration at any given location in the estuary and the uncertainty regarding the scale of reductions necessary from each source to meet the target at each location. Rather than investing significant resources and causing delay at this stage of the permitting process to develop and calibrate a complex water quality model in order to apply a seasonal concentration-based target, EPA chose the much simpler approach of applying a watershed-wide loading-based target and incorporated an adaptive management approach to allow for adjustment of the target moving forward.

The above notwithstanding, recent concentration data in Great Bay proper confirm the need for significant nitrogen reductions below current levels. As mentioned above, recent data indicates seasonal average total nitrogen concentrations in Great Bay proper of 0.378 mg/L in 2017, 0.579 mg/L in 2018 and 0.369 mg/L in 2019. *See* Appendix A of this Response to Comments document for these data. EPA notes that these data (even after most of the recent POTW upgrades and optimization efforts) are well above the concentration of 0.32 mg/L suggested recently as a potential seasonal average target by some of the municipalities. *See* "Great Bay Estuary 5-Year Interim Permitting Framework For Establishing First-Cycle Nitrogen General Permit" dated September 25, 2020. In fact, considering that the background load from the ocean cannot be reduced, the total watershed load still needs to be significantly reduced in order to bring Great Bay proper into the range of the concentration target. This simple comparison of recent concentration data to the proposed concentration target confirms the need for nitrogen reductions on the scale contemplated in the Draft General Permit, especially in the initial permit term, regardless of whether the target is load-based or concentration-based.

In any case, EPA remains open to the potential adjustment of the long-term target as part of the adaptive management permitting approach. While EPA anticipates revisiting the long-term target each permit reissuance, as a result of public comment EPA has also incorporated into the Final General Permit an optional submittal for the permittees to propose, among other things, a process to revise and iterate the chosen nitrogen target, in accordance with EPA's adaptive management approach. *See* Part II.C.1 below.

In addition, in order to be compatible with a possible seasonal target at a later date and in acknowledgement that the environmental impact of nutrient enrichment occurs primarily in the warmer months, the TN limits in the Final General Permit have been changed from annual to seasonal rolling average loading limits. See Part II.F.1 below.

6. Applicability of the Load Target to Great Bay

Some comments suggest that the target of 100 kg ha^{-1} yr^{-1} does not apply to the Great Bay estuary because historic loads have been well above this level and eelgrass has not been completely eliminated from the estuary, as some of the scientific literature suggests may occur. While EPA agrees that total nitrogen loads in recent years have been well above 100 kg ha^{-1} yr^{-1}, EPA does not agree that this demonstrates that the loading target is inapplicable. Rather, EPA notes that during this time eelgrass has gradually declined from 1996 to 2006, was interrupted by a dramatic drop in 2006 due to a storm event, and then the long-term decline has continued after 2006. This gradual decline in eelgrass acreage by at least 50% from historic levels, which corresponds to total nitrogen loads that are mostly unregulated and are well above the proposed loading threshold, supports EPA's determination of the applicability of the scientific literature to Great Bay. EPA cautions that failing to regulate nitrogen at this time would result in continued eelgrass decline. Further, it is important to note that during low tide more than 50% of Great Bay proper is exposed mud or eelgrass flats (*See* Short & Mathieson, 1992 at 31), allowing some of the eelgrass to get most of its light requirements during low tide. This may explain why complete loss of eelgrass has not occurred in Great Bay proper as some of the scientific literature suggests may occur under current TN loads that are well above the chosen threshold. However, Great Bay proper has still lost a significant amount of its eelgrass acreage and eelgrass is completely gone or significantly reduced in other portions of the estuary.

Another comment asserts that the loading threshold presented in the Latimer & Rego 2010 study of 100 kg ha^{-1} yr^{-1} only applies to shallow, poorly flushed systems and should not be used for deep, well flushed systems like Great Bay. Regarding Latimer & Rego 2010, the Fact Sheet at 22 states, "EPA recognizes that the Great Bay estuary is much larger than the embayments evaluated in this study, but notes that the Great Bay estuary is comprised of many smaller sections that are comparable to the embayments evaluated in this study." EPA acknowledges that the estuary varies in depth and flushing rates, but confirms that the studies are comparable to much of the estuary. This is supported by the significant coverage of eelgrass historically throughout the estuary, which would not be the case in purely "deep, well flushed systems."

Similarly, a commenter notes that Dr. Latimer said his study does not apply to "river dominated systems." The commenter asserts that "river dominated systems tend to be turbid and with highly variable salinity, and thus have little seagrass in the first place." As discussed in the Fact Sheet at 14-21, much of Great Bay has historically had significant eelgrass coverage. Therefore, by the commenters own argument that "river dominated systems" would have "little eelgrass in the first place" they establish that many sections of Great Bay, historically having had eelgrass, do not conform to this definition of "river dominated systems" and thus Dr. Latimer's study is applicable to these sections. For example, much of Great Bay proper consists of a relatively shallow, non-turbid estuarine environment that EPA does not consider to be "river dominated" and has historically had

as much as 2,495 acres of eelgrass (*i.e.*, in 1996) but has lost almost half of this acreage since that time.

Finally, some commenters asserted that Dr. Latimer himself did not agree that his study was appropriate for use in establishing the nitrogen reduction target in the General Permit. These commenters cite personal communication with Dr. Latimer as the source for these claims. EPA disagrees with these claims. Foremost, EPA notes that the permitting approach is based on EPA's evaluation of peer-reviewed scientific literature along with Great Bay-specific studies, reports and data, and is not based on the personal view of any individual scientist. Additionally, contrary to the claims presented in the comments, Dr. Latimer is supportive of this use of his study and its applicability in development of the General Permit. EPA collaborated closely with Dr. Latimer during the development of the Draft General Permit. In Dr. Latimer's view, the peer-reviewed Latimer & Rego study, in combination with other sources described in the Fact Sheet of the Draft General Permit, provides a sufficient and reasonable basis to support the General Permit's total nitrogen loading endpoint.

7. Requests that the Initial Target Should be Lower or Should be Higher

Several commenters requested a lower nitrogen loading threshold to better protect the Great Bay estuary. Conversely, several commenters felt the nitrogen threshold was unnecessarily low and requested a higher nitrogen loading threshold. In the Fact Sheet, EPA discussed several scientific papers (*See* Fact Sheet pages 22-23) that presented a basis for a range of loading thresholds to protect the estuary from further deterioration and to restore the health of the estuary. From this range EPA chose to adopt the maximum loading threshold of 100 kg ha^{-1} yr^{-1}. As this threshold was the highest threshold presented within the relevant literature values, EPA determined that to start with a higher threshold above 100 kg ha^{-1} yr^{-1} would not ensure compliance with water quality standards throughout the Great Bay estuary. However, EPA wants to clarify that under the adaptive management approach this threshold can be changed over time, if needed, based on the recovery of the estuary in response to nitrogen load reductions. Therefore, if evidence shows that a higher threshold is protective of water quality standards in the estuary, a higher threshold may be adopted in a later reissuance of this General Permit. Conversely, if this initial threshold is reached and the estuary still has not attained water quality standards, a lower threshold may be adopted at that time.

8. Unattainability of the Long-Term Target

EPA received several comments expressing concern that the threshold of 100 kg ha^{-1} yr^{-1} is unattainable. EPA disagrees with these comments but would like to clarify that the 100 kg ha^{-1} yr^{-1} threshold is ***not*** a permit limit and is not required to be met under this issuance of the General Permit; it is instead a long-term goal subject to change based on adaptive management. EPA and NHDES recognize the complexity of addressing the broad range of nitrogen sources throughout the watershed and will collaborate with each other and with the municipalities to increase the attainability of nitrogen reductions in the coming years. While the concern regarding attainability seems to be focused on the long-term attainability of the overall target, EPA confirms that near-term reductions contemplated in the General Permit are attainable. This includes the effluent limits established for the POTWs and further EPA expects that each municipality, with the support of NHDES, will, if they choose to, be able to implement significant nonpoint source and stormwater

point source nitrogen reductions. Additional details concerning the feasibility of nonpoint source and stormwater point source nitrogen reductions are addressed in Part II.E.3 below.

Regarding the long-term target, some commenters asserted that 100 kg ha^{-1} yr^{-1} would only be attainable if the watershed were to be restored to pristine forest with no anthropogenic sources of nitrogen, suggesting that this would necessitate a reduction in the controllable load that is not possible. EPA disagrees with this conclusion for several reasons.

First, EPA reiterates that all reductions required in the General Permit are fully attainable and this contention is solely regarding the long-term target that is not required by the General Permit and this long-term target is able to be adjusted as part of the adaptive management permitting approach. For example, in subsequent permit terms the target may be adjusted upward if it is demonstrated scientifically that a higher target will ensure compliance with water quality standards.

Second, EPA does not agree with the conclusion that this target represents conditions with no anthropogenic sources of nitrogen. In support of this claim, the comment evaluated the nitrogen load from four small watersheds consisting of mostly vegetation within the Great Bay watershed (*i.e.*, Hubbard Brook and three within the Lamprey and Oyster River basins) and used that load data to extrapolate an expected load from the entire Great Bay watershed. EPA notes that this approach inappropriately equates the limited attenuation of a very small watershed with the attenuation of a much larger watershed. While the comment incorporated a "river delivery factor" of 0.87 (*i.e.*, 13% attenuation) based on the 2014 GBNNPSS report, EPA notes that this only accounts for nitrogen uptake within the rivers and does not account for the difference in attenuation that may occur in the Great Bay watershed before reaching the rivers.

Third, the comment improperly cites and therefore inappropriately relies upon an estimate of "pre-development" nitrogen loads from the 2014 GBNNPSS report. The comment points to an estimate on page 20 of the report estimating the "pre-development" nitrogen loads in the Great Bay watershed to be 408 tons/yr (*i.e.*, 68.1 kg ha^{-1} yr^{-1}). However, the comment fails to cite the entire paragraph from the report which includes two "pre-development" nitrogen load estimates and more context for understanding these estimates. The full paragraph from page 20 of the 2014 GBNNPSS report is reproduced below.

> The nitrogen yield from temperate zone ecosystems in North America prior to human disturbance has been estimated to be 0.7-1 lb/ac/yr (NRC, 2000 at 122, Howarth, 2008). For the Great Bay Estuary watershed, this 'pre-development' nitrogen load would amount to 227 to 315 tons/yr. In contrast, the total nitrogen load from the watershed from both nonpoint sources and wastewater treatment facilities was 1,225 tons/yr in 2009-2011 (PREP, 2013). Therefore, nitrogen loads to the Great Bay Estuary are currently 4 to 5 times above pre-development levels. 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. Current loads are 3 times higher. These estimates of 'background' or 'natural' nitrogen loads are approximate. The exact amount of nitrogen currently delivered to the estuary from natural

> processes is unknown given that the nitrogen cycle in the Piscataqua Region is now dominated by human sources. However, these comparisons provide useful reference points for understanding current nitrogen loads compared to what they might have been in the past or what would naturally occur with no development in the watershed.

See 2014 GBNNPSS at 20.

As shown, the report provided two estimates of "pre-development" nitrogen loads. One ranged from 227 to 315 tons/yr (*i.e.*, 37.9 to 52.5 kg ha^{-1} yr^{-1}) and the other was 408 tons/yr (*i.e.*, 68.1 kg ha^{-1} yr^{-1}). The report also points out that the current load from "background" or "natural" sources is unknown given that the load is dominated by human sources. This indicates that it is possible that the "natural" load that is currently being delivered to the estuary is even smaller than the estimates above because human development has removed natural sources in the watershed and replaced them with human sources, or altered the flow path of nitrogen through the expansion of impervious cover in the watershed, increasing direct untreated stormwater sources. Therefore, these estimates do not demonstrate, as the comment suggests, that EPA's proposed allocation of approximately 65 kg ha^{-1} yr^{-1} for the nonpoint source and stormwater point sources is unachievable. Rather, this simply provides a useful comparison indicating that EPA's target of 100 kg ha^{-1} yr^{-1} is approximately double this report's "pre-development" load estimate.

9. Forms of Nitrogen

Several comments questioned whether the form of nitrogen to be regulated should be total nitrogen (TN) or dissolved inorganic nitrogen (DIN). These comments stem from questions pertaining to the forms of nitrogen in the studies used in the lines of evidence to establish the loading target of 100 kg ha^{-1} yr^{-1} and the fact that DIN is more readily taken up within the estuary.

In response to these comments, EPA notes that in the *Joint Report of Peer Review Panel for Numeric Nutrient Criteria for the Great Bay Estuary New Hampshire Department of Environmental Services, June, 2009* (dated February 13, 2014) the peer reviewers were asked whether or not TN is the correct form of nitrogen on which to focus to address cultural eutrophication. Each of the peer reviewers agreed that focusing on TN was appropriate because of transformations of nitrogen that can take place in the estuary. Forms of nitrogen such as particulate organic nitrogen (PON) and dissolved organic nitrogen (DON) can be broken down into more readily bioavailable forms of DIN. Because of these transformations and the breakdown of organic forms of nitrogen into more readily bioavailable forms, TN is the most accurate way to measure nitrogen status in an estuary.

Given that TN is the appropriate form of nitrogen, EPA described four lines of evidence supporting the loading target of 100 kg ha^{-1} yr^{-1}, as described in the Fact Sheet at 22-24. These four lines consist of three scientific studies (*i.e.*, Valiela & Cole 2002, Hauxwell et al. 2003, and Latimer & Rego 2010) as well as an empirical comparison to Narragansett Bay.

Regarding the Valiela & Cole 2002 study, Great Bay was included in the estuaries evaluated. This study references Short & Mathieson 1992 report called "The ecology of the Great Bay Estuary, New Hampshire and Maine: an estuarine profile and bibliography" to obtain the nitrogen loading rate of 640 tons/year for Great Bay. The Short & Mathieson report obtained the loading rate from a July

1988 NOAA EPA report titled "Strategic Assessment of Near Coastal Waters – Northeast Case Study – Susceptibility and Status of Northeast Estuaries to Nutrient Discharges." Page 8 of this report states that nutrient estimates contain both organic and inorganic forms and are estimated as total nitrogen and total phosphorus. Therefore, this study used total nitrogen data and not any other form of nitrogen in evaluating Great Bay.

Regarding the Hauxwell et al. 2003, EPA notes that this study referenced the data used in Valiela & Cole 2002 in reaching its conclusions. Therefore, this study also focused on total nitrogen in Great Bay.

Regarding Latimer & Rego 2010, the comments are correct that this study did not evaluate TN data. Rather, this study looked at total dissolved nitrogen (TDN) which includes DON and DIN but does not include particulate nitrogen. Therefore, this study did not look only at DIN. Rather, it evaluated TDN which includes DON that can undergo transformations into more readily bioavailable forms for nitrogen in the estuary as mentioned above. Furthermore, for the embayments included in this study, TDN inputs are expected to be nearly equivalent to TN since the particulate fraction of nitrogen in groundwater is expected to be very low or negligible. *See* Dubrovsky, N. M. et al. 2010. The quality of our Nation's waters—Nutrients in the Nation's streams and groundwater, 1992–2004. US Geological Survey, Reston, VA.

Finally, when making comparisons between Great Bay and Narragansett Bay, EPA evaluated TN loadings to both of the estuaries, not DIN or other forms of nitrogen. Specifically, EPA reviewed the effects of decreased TN loadings on the health of eelgrass in Narragansett Bay and compared this to the target for TN reductions in Great Bay to restore eelgrass health.

Based on these four lines of evidence, EPA maintains that TN is the appropriate form of nitrogen to regulate and corresponds to EPA's analysis on the record. Therefore, no change is made to the loading target or to the Final General Permit based on these comments.

10. Peer Review

Some commenters requested that EPA conduct an independent peer review of the areal loading methodology and nitrogen loading threshold (100 kg ha^{-1} yr^{-1}) used by EPA for deriving water quality-based effluent limits for wastewater treatment plants in the Great Bay watershed. EPA earlier denied two requests for peer review. *See* Letter, dated December 19, 2019, from David Ross to the Cities of Dover and Rochester. Other peer review requests were submitted to EPA more recently. *See, e.g.*, email, dated April 10, 2020, from Hall & Associates to EPA Administrator Andrew Wheeler and Regional Administrator Dennis Deziel; letter, dated July 14, 2020, from the Center for Regulatory Reasonableness to EPA Administrator Andrew Wheeler. For the reasons explained below, EPA does not plan to subject the permitting approach to a separate peer review at this particular juncture of the permit proceedings. EPA, however, does not foreclose initiating a peer review as part of the adaptive management process, described below.

EPA appreciates the strong interest in the permitting approach used for the Great Bay. Throughout the development of this General Permit, EPA and NHDES made extraordinary efforts to engage the communities in the permit development process. The municipalities and other stakeholders were given ample opportunity to provide feedback and input regarding this permitting approach, including

on the underlying science. At one juncture, in November 2018, EPA solicited an alternate loading target from some of the municipalities if they could justify it based on sound science; by the time the Draft General Permit was ready for public notice in January 2020, EPA had still not received any such proposed loading target. Through these permit proceedings, including during the public comment period, municipalities and other stakeholders have submitted extensive analysis from water quality experts and other specialized consultants opining on EPA's decisioning making. EPA is aware of the objections lodged by the many experts already engaged in scrutinizing the General Permit. EPA carefully considered and, in some cases, incorporated this feedback into the General Permit. An additional peer review at this juncture may be cumulative and possibly duplicative of the analysis already provided to EPA.

EPA observes that the effluent limitations imposed on the POTWs are established mainly on the basis of antidegradation requirements of New Hampshire Water Quality Standards and not derived from the areal loading methodology or nitrogen loading threshold. *See* Env-WQ 1708 (prohibiting new or increased discharges of a pollutant to impaired waters for that pollutant for lack of assimilative capacity). Were they directly based on the nitrogen loading threshold, these limits would have been significantly more stringent (*e.g.*, limit of technology or lower). In short, the limits in this General Permit represent the least stringent limits EPA could justify under almost any loading scenario given the pervasive impairment status of the estuary. This counsels against a protracted peer review of either the methodology or threshold, as it would not impact the permit result. On this point, EPA again underscores that the 100 kg ha^{-1} yr^{-1} is not an enforceable permit limitation, but an initial target that is subject to refinement under an adaptive management scheme. Additionally, EPA observes that the areal loading methodology and nitrogen loading threshold have been fashioned on a site-specific basis and, like any permitting action, are not applicable beyond the proceedings here.

While EPA does not plan to conduct an independent peer review at this time, EPA notes that NHDES, in a letter dated July 27, 2020, has committed to further refining the nitrogen goal based on additional monitoring, studies and other information. NHDES will continue to work with municipalities, EPA, and other stakeholders while looking at the nitrogen goal. NHDES stated this approach should be further refined with additional modeling, data, and stakeholder participation. This refined nitrogen goal and the science presented to create it will be considered upon the next renewal of this General Permit and may result in an adjustment of the targeted load reduction in accordance with the adaptive management approach. To this end, EPA has incorporated an express provision allowing the permittees to propose a process for reviewing the nitrogen target under the adaptive management framework of the permit. Thus, the structure of the permit itself accommodates the concerns underlying the requests for peer review.

11. Cost and Technological Feasibility

Comments that rely on cost and technological feasibility as relevant factors in the derivation of WQBELs are misplaced.

EPA received comments from virtually all commenters objecting to EPA's WQBEL determination on the basis of cost or technological feasibility, including with respect to expenditures related to meeting the "hold the load" WQBELs and achievement of the areal threshold of 100 kg ha^{-1} yr^{-1}, which again EPA observes is not a requirement of the permit. These challenges are not persuasive, and EPA rejects them as relevant rationales for making less stringent or otherwise modulating any

technical or scientific judgments made in connection with its WQBEL determination. While striving to improve water quality, the Act "recognize[s], preserve[s], and protect[s] the primary responsibilities and rights of States" in reducing pollution and protecting their water resources. 33 U.S.C. § 1251(b). Consistently with this aim, water quality standards "are primarily the states' handiwork." *Am. Paper Inst.,* 996 F.2d at 349. Federal permits are required to meet state water quality standards. CWA § 301(b)(1)(C); CWA § 401(a)(2); 40 CFR § 122.44(d)(4)*; In re City of Fayetteville, Ark.*, 2 E.A.D. 594, 600-601 (CJO 1988) ("The meaning of [section 301(b)(1)(C)]…is plain and straightforward. It requires unequivocal compliance with applicable water quality standards, and does not make any exceptions for cost or technological feasibility."), *aff'd sub nom. Arkansas v. Oklahoma*, 503 U.S. 91 (1992). *See also In re City of Taunton*, 17 E.A.D. 105, 141 (EAB 2016) *aff'd*, 895 F.3d 120 (1st Cir. 2018), *cert. denied*, 139 S. Ct. 1240 (Feb. 19, 2019). "Congress self-consciously made the legislative determination that the health and safety gains that achievement of the Act's aspirations would bring to future generations will in some cases outweigh the economic dislocation it causes to the present generation." *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011, 1037 (D.C. Cir. 1978). As many courts have explained, states have also made similar policy judgments:

> The company also argues that the limitations on the six chemicals are impossible to achieve with present technology. Even if this is true, it does not follow that they are invalid. It is clear from ss 301 and 510 of the Act, and the legislative history, that the states are free to force technology. Although the Indiana Board considered technology in setting some of these limitations, it was not required to do so. Only the federal effluent limitations must be technology-based, and they represent the minimum level of pollution reduction required by the Act. See Leg. Hist., at 1468. If the states wish to achieve better water quality, they may, even at the cost of economic and social dislocations caused by plant closings. See Leg. Hist., at 231, 1282. Cf. *Union Electric Co. v. EPA*, 427 U.S. 246, 96 S.Ct. 2518, 49 L.Ed.2d 474 (1976). [footnotes omitted]

U. S. Steel Corp. v. Train, 556 F.2d 822, 838 (7th Cir. 1977). Here, New Hampshire long ago made a choice in adopting designated uses and narrative nutrient water quality standards for Great Bay, and that decision may *not* be undone by EPA via issuance of unduly lax NPDES permits, as many commenters imply.

12. Comparison to Other Permits

Comments that rely on differences in the methodologies used or requirements imposed in other permits as relevant factors in the derivation are misguided.

Several commenters based their objections to EPA's methodology on the fact that other permits utilized alternative technical approaches. The commenters cite, for example, Town of Newmarket and the City of Taunton, where EPA derived a concentration-based ambient target that will achieve designated uses under section 122.44(d)(1)(vi). None of these objections demonstrate any infirmity in EPA's decision making. EPA has a choice of methodologies when deriving WQBELs. "[A] disparity in requirements imposed on [publicly owned treatment works]" is "legally irrelevant" to a permit challenge because "permits are issued on an individual basis, taking into account individual differences where appropriate." *In re City of Port St. Joe*, 7 E.A.D. 275, 304 n.44 (EAB 1997). As described above, EPA has considered the use of concentration-based targets, but has deferred a final

decision on this matter pending further review and evaluation of such an approach in the adaptive management review process. *See* Part 3 of the Final General Permit.

13. Delay Based on Development of Numeric Criteria

Comments that urge delay in General Permit issuance or development of WQBELs to allow for development of numeric water quality criteria are unavailing.

Several comments argued, and others implied, that EPA should await the development of numeric water quality criteria for nitrogen prior to imposing WQBELs based on the existing narrative nutrient water quality criteria. State narrative water quality criteria are fully enforceable through NPDES permits. *See* 54 Fed.Reg. 23,868, 23,877 (1989); *see also id.* at 23,875 ("State narrative water quality criteria provide the legal basis for establishing effluent limits under paragraphs (d)(1)(v) and (d)(1)(vi) of today's regulations."). *Am. Paper Inst., Inc. v. U.S. E.P.A.*, 996 F.2d 346, 351 (D.C. Cir. 1993) ("The regulation thus seems to provide an eminently reasonable means of effectuating the intent of the previously adopted narrative criteria as well as Congress' own intent, made explicit in section 301 of the CWA, that *all* state water quality standards be enforced through meaningful limitations in individual NPDES permits.")

Numeric water quality criteria for nutrients are not currently under development in NHDES, and EPA is not aware that the state has any plans to develop such numeric criteria at this time. To predicate the imposition of necessary WQBELs on a regulatory process of uncertain duration, and indeed one that has not even commenced, would not be consistent with objectives of the Act, which requires EPA to make reasonable further progress toward the elimination of pollutant discharges to U.S. waters through permit limitations, to be reevaluated at intervals not to exceed five years. *See* 54 Fed.Reg. 23,868, 23,877 (1989) (noting that the EPA's legal obligation to assure that NPDES permits meet *all* applicable water quality standards could not be set aside until states promulgate numeric water quality criteria for all their standards). *See also Environmental Defense Fund, Inc. v. Costle*, 657 F.2d 275, 288 (D.C.Cir.1981) (approving the use of narrative criteria).

14. Numeric Criteria Development Under Section 303 of the Act Versus Translation of Narrative Criteria Under Section 402

Comments that conflate the numeric water quality criteria development process with the translation of existing narrative criteria lack merit.

Several comments assert that EPA is promulgating new water quality criteria through the General Permit and that EPA is therefore subject to the statutory and regulatory provisions pertaining to the that process, including section 304 of the Act. This concern is misplaced and was addressed by EPA at the time of the final regulation governing translation of narrative water quality standards into effluent limitations and amount to a challenge to the regulation. EPA explained:

> Many commenters also suggested that [the regulation] circumvents the state's traditional role in establishing water quality standards. The commenters argue that section 303(c) of the CWA reserves for the states the sole authority to establish water quality standards, and that option B would somehow prevent a state from exercising its authority under section 303(c). EPA disagrees that the use of [the regulation] in implementing the narrative criterion would prevent a state from adopting numeric water quality criteria. To the contrary, section

> 303(c)(2)(B) requires states to adopt water quality standards for certain toxic pollutants as soon as possible. States must adopt standards according to the provisions of section 303(c) and when the water quality standards are adopted, the NPDES permits must contain effluent limits necessary to meet each standard. [The regulation] applies only in the absence of state numeric water quality criteria. If a state has a numeric water quality criterion for the pollutant of concern, then paragraph (vi) does not apply. [The regulation] is not intended to substitute EPA's water quality criteria for state water quality standards. [The regulation] simply provides a mechanism for implementing narrative water quality criteria. Although states are required to adopt all necessary water quality standards under section 303, some states have not yet done so. Thus EPA is promulgating paragraph (vi) as an interim measure to control a pollutant of concern until the state promulgates a water quality criterion for the pollutant. However, EPA's legal obligation to ensure that NPDES permits meet all applicable water quality standards, including narrative criteria, cannot be set aside while a state develops water quality standards. This legal obligation applies to more than state adopted water quality standards. Section 301(b)(1)(C) requires that NPDES permits achieve "any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedule of compliance, established pursuant to any state law or regulations (under authority preserved by section 510) or any other Federal law" including international treaties or agreements that have force as domestic law.

National Pollutant Discharge Elimination System; Surface Water Toxics Control Program, 54 Fed.Reg. 23868, 23877 (June 6, 1989). EPA's view of the interaction between its regulations and the Act has been endorsed by the courts:

> As we understand it, the regulation does not supplant—either formally or functionally—the CWA's basic statutory framework for the creation of water quality standards; rather, it provides alternative mechanisms through which *previously adopted* water quality standards containing narrative criteria may be applied to create effective limitations on effluent emissions. As long as narrative criteria are permissible—and the petitioners do not contend that they are not—and must be enforced through limitations in particular permits, a permit writer will inevitably have some discretion in applying the criteria to a particular case.

Am. Paper Inst., Inc. v. U.S. E.P.A., 996 F.2d 346, 351 (D.C. Cir. 1993).

15. Other Clarifying Comments

Some commenters suggest that EPA is encouraging the Maine Department of Environmental Protection (DEP) to adopt permit limits that will not protect water quality. EPA disagrees and expects that, if Maine DEP implements an adaptive management approach for the communities in the Great Bay watershed similar to the one in this General Permit, EPA believes it will be protective of water quality standards. Alternatively, Maine DEP is at liberty to adopt more stringent POTW limits if they deem it necessary.

Some commenters quote the *Joint Report of Peer Review Panel for Numeric Nutrient Criteria for the Great Bay Estuary New Hampshire Department of Environmental Services, June 2009* stating that "four of the seven zones with eelgrass impairment were not declared nitrogen impaired. This is not very compelling evidence linking nitrogen impairment to eelgrass impairment if only 36% of the

zones in Great Bay Estuary are considered impaired for both and more than half of the zones with eelgrass impairment were not declared nitrogen impaired." While the commenter is correct in saying that not all of the zones discussed in this report were listed as impaired for both eelgrass and total nitrogen, it is important to note, nitrogen may be contributing to eelgrass impairment even in zones not impaired for nitrogen. Prior to 2009, more work needed to be done to translate the narrative criteria to an accepted numeric standard which created uncertainty regarding the impairment status for total nitrogen even if an assessment zone was demonstrating symptoms of eutrophication and eelgrass loss. On the other hand, listing an assessment zone as impaired for eelgrass was more straightforward, simply based on historic eelgrass coverage and eelgrass loss. Given the technical challenge at that time, and within 3 years of the drastic eelgrass losses that occurred in 2006, it is striking that the comment confirms that 36% of the zones in the Great Bay estuary were considered impaired for *both* eelgrass and total nitrogen. Clearly the need for reductions in total nitrogen was apparent. In any case, the standards used for listing impairments are not the same as the standard used to determine whether it is necessary to establish permit limits. Rather, 40 CFR § 122.44(d)(1)(i) states that a permit limit must be established for any pollutant that "may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." As detailed in the Nitrogen Threshold and Reasonable Potential Analysis sections of the Fact Sheet (pages 21-26), EPA has determined that the overall nitrogen loading to the Great Bay estuary has exceeded the estuary's assimilative capacity and permit limits are necessary.

Some commenters argue that this permit action is premature because the 2009 CWA section 303(d) list that added several areas of Great Bay as impaired was based on a draft water quality document that was withdrawn. The most recent EPA-approved 303(d) list is from 2012, which was summarized in Table 2 on page 18 of the Fact Sheet. NHDES amended the list to remove the total nitrogen impairment from some segments in the estuary and submitted it in 2014, 2016 and 2018, but EPA has not approved these subsequent submissions. As stated in the Fact Sheet (pg. 19), "NHDES's rationale for the proposed delisting of these assessment zones rests on NHDES's assumption that an assessment zone should be listed for total nitrogen only if it is clear that the eutrophication effects on designated uses can be attributed to total nitrogen alone. This is not the same standard used to determine whether it is necessary to establish permit limits." Therefore, whether Great Bay is on the 303(d) list for nitrogen impairment or not, EPA must establish permit limits based on reasonable potential. The Nitrogen Threshold and Reasonable Potential Analysis sections of the Fact Sheet (pages 21-26) have established that there are pervasive nutrient impairments in Great Bay, therefore, there is reasonable potential to cause or contribute to an excursion of water quality standards and EPA is obligated to include limits for the facilities specified in the General Permit. This permit action is not premature.

C. Adaptive Management

EPA received several comments regarding various aspects of the adaptive management approach described in the Fact Sheet. *See* Fact Sheet page 23. After a thorough review and consideration of these comments, EPA has decided to maintain the adaptive management approach in the Final General Permit.

1. Implementation

Several commenters expressed concern in a lack of clarity as to how EPA would implement the adaptive management permitting approach. As described in the Fact Sheet, page 23, "adaptive management has explicit structure, including a careful elucidation of goals, identification of alternative management objectives, and procedures for the collection of data followed by evaluation and reiteration. The process is iterative, and serves to reduce uncertainty, build knowledge and improve management over time in a goal-oriented and structured process." The water quality goal for Great Bay is to meet existing and designated uses, including the restoration of healthy eelgrass habitat. To achieve that goal, EPA has set an initial TN loading objective of 100 kg ha^{-1} yr^{-1}. A stepwise approach to reaching this objective was laid out through point source limits and a nonpoint source reduction pathway. Upon renewal of the General Permit, EPA will evaluate progress toward this objective, look at improvements in water quality, and make changes as needed.

Some commenters expressed further concern that by setting a nitrogen loading threshold the permit is not actually adaptable at all. EPA wants to clarify that the 100 kg ha^{-1} yr^{-1} is a loading threshold used as the basis for calculating necessary nonpoint source and stormwater point source nitrogen reductions; the threshold is not a permit limit. Under this adaptive management plan, total nitrogen loads to the estuary will be reduced gradually and water quality will improve over time. The level of improvement in water quality achieved will in the future be used to determine whether a more or less stringent nitrogen threshold is necessary. Adaptive management is implemented by using this flexibility in the threshold to achieve water quality standards. Additionally, EPA notes the permit's five-year term allows for frequent reassessments of progress and targets.

As a result of public comment, EPA has also incorporated into the Final General Permit an optional submittal for the permittees to propose approaches to the adaptive management framework (including ambient monitoring, pollution tracking, nutrient reduction planning, and a process to revise and iterate the chosen nitrogen target), in accordance with EPA's adaptive management approach. The additional provision, referred to as "Adaptive Management Framework Voluntary Submittal" is included as Part 3 of the Final General Permit as follows:

This General Permit is one aspect of the adaptive management framework. The other elements of the adaptive management framework include ambient monitoring, pollution tracking, reduction planning, and review. Implementation of adaptive management includes collaboration between EPA, the State of New Hampshire, and public, private, and commercial stakeholders. The following provision allows Permittees the option, at their election, to be involved in this collaboration, by submitting a detailed proposal, as specified below.

1. Within 180 days of the effective date of the permit, the permittees may, at their election, submit a proposal to EPA that outlines:
    a. The approach to monitor the ambient water quality in the Great Bay estuary to determine progress and trends.
    b. The method(s) to track reductions and additions of total nitrogen over the course of the permit.
    c. An outline/plan for overall source reductions of total nitrogen over the course of the permit.

d. An inclusive and transparent process for comprehensively evaluating any significant scientific and methodological issues relating to the permit, including the choice of a load-based threshold of 100 kg ha^{-1} yr^{-1} versus any other proposed threshold, including a concentration-based threshold of 0.32 mg/L. This submission shall include detailed milestones culminating in submission of a report to EPA for inclusion in the administrative record for permit renewal. That report shall be completed prior to expiration of the permit term and shall indicate whether NHDES concurs with the findings.
e. A proposed timeline for completing a Total Maximum Daily Load (TMDL) for Total Nitrogen in Great Bay and for submitting it to EPA for review and approval.

2. Permittees may, at their election, submit this proposal jointly or separately. EPA encourages permittees to consult with NHDES, PREP and other interested parties in advance of their proposed submission(s).

2. Flexibility

Some commenters expressed concerns that the adaptive management approach proposed in the General Permit lacked flexibility. EPA disagrees that the adaptive management approach lacks flexibility. This General Permit was designed to give the municipalities flexibility in achieving the necessary nitrogen reductions from whatever sources they find most feasible or economical. The usual permitting approach would have developed total nitrogen limits for each POTW at the limit of technology (*i.e.*, 3 mg/L). This would have resulted in an immediate need to upgrade most of the POTWs throughout the watershed. Instead, the General Permit allows for alternate sources of nitrogen reduction in the near-term. Additionally, as noted under Part II.C.1 above, EPA's adaptive management approach allows for a more or less stringent nitrogen threshold to be developed as necessary based on the level of water quality improvements demonstrated over time.

Specifically, some commenters further expressed concern that there is no flexibility to allow for nonpoint source and stormwater point source reductions to be credited toward POTW reductions. EPA would like to clarify that this could, hypothetically, be possible if a municipality were to reduce its nonpoint source and stormwater point source nitrogen loads below the optional 45% reduction target. These additional reductions could, hypothetically, be credited toward the municipalities required POTW reductions. However, that high level of reduction in nonpoint source and stormwater point source nitrogen loads will not happen in this short initial permit term. Therefore, EPA has not incorporated any such allowance into the General Permit. On the other hand, EPA clarifies that it is possible during this initial permit term for a municipality to achieve reductions from the POTW load beyond the permit limit and EPA will consider these POTW load reductions in determining whether more stringent effluent limits are necessary in future permit reissuances. Further, EPA will consider a municipality's contributions toward nitrogen reductions anywhere within the watershed in making these future determinations.

3. Trading

Some comments requested that EPA incorporate nitrogen trading into the General Permit. Pollutant trading is an approach to reduce pollution that has been used successfully to protect human health and the environment. Although not generally incorporated into the General Permit specifically, water

quality trading may be an option to provide additional adaptive management approaches to address excess nitrogen and EPA is committed to continue to evaluate options for flexibilities based on water quality trading opportunities. EPA's February 6, 2019 Memorandum on Water Quality Trading memorializes this commitment by the Agency, and provides additional guidance and policy options, including baseline flexibility concepts, for developing and implementing water quality trading.

On a related note, some comments objected to the provision in the Draft General Permit that allows the two POTWs operated by the City of Portsmouth (*i.e.*, Portsmouth and Pease) to effectively trade between each other because this allows nitrogen to be discharged at a location farther upstream in the Piscataqua River. EPA acknowledges that the Draft General Permit allows these two POTWs to achieve compliance with the permit by discharging below a cumulative load. This cumulative load is equivalent to the sum of the load allowed for each POTW individually, established equitably with the other POTWs covered by the General Permit. Given that these POTWs are operated by the same municipality, EPA determined that it was appropriate to provide the City of Portsmouth flexibility in balancing the overall POTW load reductions and expects this flexibility will allow the City to focus on nonpoint source and stormwater point source load reductions in the near-term. Further, EPA notes that both POTWs discharge directly into the estuary (*i.e.*, neither has an attenuation factor) so this provision does not allow for an increase in the nitrogen load delivered to the estuary no matter how the City decides to allocate the permitted load between the two facilities. Finally, EPA notes that the Portsmouth facility completed an upgrade in late 2019 resulting in a significantly reduced nitrogen load compared to loads from previous years. Based on this upgrade, the resulting combined load allowed by the General Permit from Portsmouth and Pease will be significantly lower than the combined load from these two facilities in recent years both in the upper portions of the estuary as well as in the vicinity of the discharges in the Lower Piscataqua River. In any case, EPA notes that this provision does not allow for an increased loading from the City of Portsmouth to an impaired water and is, therefore, in accordance with antidegradation regulations.

4. Anti-backsliding

Some commenters expressed concern that the loading threshold of 100 kg ha^{-1} yr^{-1} would need to comply with the anti-backsliding requirements of the CWA. See §§ 402(o) and 303(d)(4) of the CWA. Anti-backsliding provisions apply to effluent limits; the loading threshold is not an effluent limit and is not subject to the anti-backsliding provisions of the CWA. Therefore, in the future the loading threshold can be increased or decreased as needed based on all available scientific information and environmental indicators.

Other commenters suggested that anti-backsliding represented an absolute bar on relaxing effluent limitations. This legal analysis is not sound. Once an NPDES permit has been issued for a particular facility, the CWA also seeks to preserve improvements made to water quality by expressly prohibiting "backsliding" under CWA section 402(o). 33 U.S.C. § 1342(o). Backsliding "occurs when a renewed, reissued, or modified permit contains effluent limitations [that are] less stringent than those in the previous permit." *In re City of Tulsa*, 3 E.A.D. 505, 506 (CJO 1991) (citing CWA § 402(o), 33 U.S.C. § 1342(o)). The CWA's anti-backsliding provision in section 402(o) consists of three main parts: (1) a prohibition on specific forms of backsliding; (2) exceptions to the prohibition; and (3) a safety clause that provides an absolute limitation (also referred to as a "backstop") on backsliding if the revised effluent limit would result in a violation of water quality standards. 2010 Permit Writers' Manual § 7.2.1, at 7-2.

As to the first part of CWA section 402(o), the prohibition on backsliding, the statute generally provides that, except in certain specified circumstances, "a permit may not be renewed, reissued, or modified to contain effluent limitations [that] are less stringent than the comparable effluent limitations in the previous permit[.]" CWA § 402(o)(1), 33 U.S.C. § 1342(o)(1).

As to the second part of CWA section 402(o), which provides exceptions to the backsliding prohibition, one exception likely relevant to Great Bay is found under section 402(o)(1) and allows less stringent effluent limits if they comply with the provisions of CWA section 303(d)(4), which addresses the establishment and application of TMDLs. CWA § 402(o)(1), 33 U.S.C. § 1342(o)(1). Section 303(d)(4) provides, in relevant part, that "where the applicable water quality standard has not yet been attained, any effluent limitation based on a [TMDL]…may be revised" so long as attainment of water quality standards is assured. *See* CWA § 303(d)(4)(A)(i), 33 U.S.C. § 1313(d)(4)(A)(i). The other exception pertinent to the General Permit given its adaptive management orientation is 402(o)(2)(B)(i), which allows relaxation of a WQBEL where the following conditions are met:

- The information "was not available at the time of permit issuance."
- The information does not consist of "revised regulations, guidance or test methods."
- The new information "would have justified the application of a less stringent effluent limit at the time of permit issuance."

The third part of CWA section 402(o) – the safety clause – provides that "[i]n no event may…a permit…be renewed, reissued, or modified to contain a less stringent effluent limitation if the implementation of such limitation would result in a violation of a water quality standard under section 1313…." CWA § 402(o)(3), 33 U.S.C. § 1342(o)(3) (emphasis added). Therefore, even if one of the exceptions to the backsliding prohibition, such as that supplied by section 303(d)(4), is applicable and its conditions met, section 402(o)(3) acts as a floor on the extent to which effluent limits may be relaxed. Thus, under both CWA sections 303(d)(4) and 402(o)(3), a principal question when evaluating the permissibility of less stringent permit limits is whether the water quality standards will be met.

Relatedly, some commenters suggested that the General Permit violates anti-backsliding regulations for Exeter and Newmarket, allowing their total nitrogen limits to be relaxed inappropriately. EPA disagrees that the Draft General Permit violates anti-backsliding regulations by including these communities as eligible for coverage. Both Exeter and Newmarket were assigned TN effluent limitations based on the limit of technology in their respective individual permits. In contrast, the General Permit differs materially in both scale and methodology when compared to previous permitting actions in Great Bay. The General Permit establishes an overarching pollutant reduction regime that encompasses 13 dischargers across Great Bay and calculated appropriate WQBELs using a distinct analytical framework, with the effluent limitations calculated mainly to ensure compliance with New Hamsphire's antidegradation policy. In any case, both Exeter and Newmarket have categorically indicated in comments that they do not wish to be covered by the General Permit and desire to remain under their individual permits. Even if these these municipalities do seek coverage, they will not be able to immediately obtain coverage, but instead must wait until the conflicting TN limitations in their individual permits are removed, using appropriate Part 124

procedures. This process is subject to public comment and a final agency decision will be made at that time. Given this, EPA need not address the backsliding issue with respect to Exeter and Newmarket at this time, and will do so, if at all, in the event those municipalities submit NOIs.

5. Endpoints

Some commenters requested clarification on how, within the framework of adaptive management, EPA will decide when more or less stringent nitrogen targets need to be developed. To clarify, the nitrogen threshold will remain the same for the initial permit term but may be adjusted in the future. It may be increased if it can be demonstrated scientifically that a higher loading threshold would ensure compliance with water quality standards throughout the watershed or it may be decreased if compliance with water quality standards is still not achieved once the current target is met. EPA has incorporated an express provision allowing the permittees to propose, among other things, a process for reviewing the nitrogen target under the adaptive management framework of the permit. *See* Part II.B.5 above.

Additionally, in a letter dated July 27, 2020, NHDES has committed to working to create ecological endpoints for the estuary. These endpoints will be useful to help determine when the estuary attains water quality standards and whether the loading threshold needs to be adjusted.

6. Use Attainability Analysis

One commenter suggested that the framework designed for a Use Attainability Analysis (UAA) should be used now, by EPA, to analyze future attainability of a designated use based on eelgrass growth. While any party is free to pursue a UAA, EPA disagrees that the standard for a UAA is relevant to the derivation of WQBELs under Section 301 and 402 of the Act and implementing regulations. The effluent limitations are required to be based on the water quality standards as they exist, not on some hypothetical future standard or regulatory determination, the results of which cannot be known.

The commenter contends that eelgrass growth, in some areas of Great Bay, may be unachievable due to three factors: naturally occuring pollutant concentrations, physical conditions due to natural features of the waterbody (*e.g.,* poor substrate), and controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact. The commenter asserts that if this analysis were done now, knowing where eelgrass will not be able to grow even with reduced nitrogen loading to the estuary, could help avoid over expenditure.

EPA notes that eelgrass is being used as an environmental indicator to determine the need for reductions in nitrogen loading to the estuary. Eelgrass is not required, nor expected, to grow in every part of the estuary in order to achieve water quality standards. Rather, NHDES has developed a methodology in its Consolidated Assessment and Listing Methodology (CALM) for determining whether a particular assessment zone is impaired for eelgrass. This includes an assessment of historical eelgrass coverage and the extent of eelgrass loss. Presumably, this would only result in impairments where eelgrass was historically present and, therefore, where eelgrass restoration is presumed to be attainable. Further, impairments for nitrogen and other nutrient-related parameters throughout the estuary confirm that eelgrass restoration is still being precluded by nutrient impacts.

Hypothetically, if eelgrass remained impaired in a particular assessment zone despite all other nutrient-related impairments being resolved, initiation of a UAA may be justified.

7. Other Clarifying Comments

Some comments expressed concern about having 8, 13, 18, and 23-year nonpoint source and stormwater point source reduction targets in a five-year permit. These targets are presented in the Fact Sheet at page 29-31 to show a proposed, non-binding pathway to achieving water quality standards. These targets are not permit limits and are not required by the permit. Therefore, the five-year permit term is not a concern.[18] *More generally, EPA will ordinarily rely on NHDES's technical and policy judgments regarding the course and pace of nonpoint source implementation, and its assessment of whether reasonable further progress is being made toward achieving necessary reductions from permit cycle to cycle, because EPA lacks authority over these sources of pollution, and because EPA recognizes the technical, legal and political challenges associated with these types of reductions.* This posture with respect to progress on nonpoint source reductions does not of course mean that EPA, as permit issuer in New Hamsphire, will abdicate its independent obligations under sections 301 and 402 of the Act to ensure compliance with water quality standards. EPA intends to scrutinize the state's judgments. The states assessments of progress on nonpoint source reductions could lead EPA to reissue an adaptive permit if reasonable grounds exist to do so, or to abandon that approach in favor of a more traditional one insofar as insufficient progress is being made on necessary nonpoint source reductions.

Some commenters requested that the impacts of recent point source load reductions be evaluated, as part of adaptive management, before further reductions are required. EPA notes that the POTW limits in the draft permit were set to "lock in" recent reductions at some POTWs and to "hold the load" at the smaller facilities, only Rochester may require an upgrade to meet the permit limits set in the draft General Permit. Therefore, there is ample time for EPA to evaluate the impacts of these reductions before determining if more POTW reductions are needed in the next permit cycle. Additionally, voluntary nonpoint source and stormwater point source reductions, that are achieved during the 5-year permit term, will also be evaluated in the next permit cycle.

EPA also received comments inquiring how the response time between nitrogen reductions and environmental improvements would be accounted for to avoid over-expenditure. EPA expects total nitrogen loads to reduce gradually over many years and these gradual reductions will result in a gradual improvement in water quality. This gradual change will coincide with ongoing water quality monitoring by EPA, NHDES, PREP and other stakeholders to track progress over many years. Given the gradual nature of this process, as the Great Bay estuary approaches the restoration of water quality standards there will be ample opportunity to fine-tune the final target in a manner that avoids over-expenditure.

D. Ambient Monitoring Plan

EPA received numerous comments on various aspects of the Adaptive Management Ambient Monitoring Program contained in the Draft General Permit. *See* Draft General Permit pages 6-11 and

[18] Additionally, a future reissuance of the General Permit may have other requirements based on the progress achieved at that point.

Fact Sheet pages 31-37. After a thorough review and consideration of these comments, EPA has decided to remove the Adaptive Management Ambient Monitoring Program from the Final General Permit.

As described in the Fact Sheet (*see* page 11), the Great Bay estuary is one of only 28 "estuaries of national significance" under the National Estuary Program (NEP), which was established in 1987 by amendments to the Clean Water Act to identify, restore and protect estuaries along the coasts of the United States. For the Great Bay estuary, the Piscataqua Region Estuaries Partnership (PREP) is responsible for carrying out the goals of the NEP through its Comprehensive Conservation and Management Plan which guides local priorities and efforts.

Each five years, PREP publishes a "State of Our Estuaries" (SOE) report. The report is designed to provide an accurate understanding of environmental trends for the Great Bay and Hampton-Seabrook estuaries so that informed land use and resource management decisions can be made. The last SOE report was published in 2018. The 2018 SOE report included evaluations of 24 indicators of a healthy estuary, including social indicators for the first time. Of the 24 indicators, 14 were classified as having a cautionary or negative trend or status, while 6 showed a positive trend or status and 4 were too new to establish trends of any kind.

In addition to producing SOE reports, PREP is in the midst of a significant effort to develop the region's first Integrated Research and Monitoring Plan (IRMP). This plan is being developed through PREPs Technical Advisory Committee, with assistance from a diversity of technical experts from within and outside of the region and will be completed by June 2021. The IRMP will include conceptual models of the dynamics that link many stressors and habitats within the estuaries, prioritized research questions for all critical habitats, and detailed monitoring plans for each of those habitats.

Beyond the efforts of PREP, EPA also expects the municipalities to contribute to ambient monitoring during the life of the permit. Some of the municipalities indicated to EPA that the permittees are willing to allocate an annual commitment of between $200,000 and $500,000 toward monitoring "designed more comprehensively to understand the role of nitrogen, to include other factors affecting eelgrass such as sediment characteristics; suspended sediment concentrations and loads; bioturbation; epiphytic growth; and macroalgal community abundance." *See* "Great Bay Estuary 5-Year Interim Permitting Framework For Establishing First-Cycle Nitrogen General Permit," dated September 25, 2020. While this commitment is not incorporated into the General Permit as a requirement, EPA expects that the permittees will pursue significant ambient monitoring that will also be available to EPA and NHDES upon development of the reissuance of this General Permit. As a result of public comment, EPA has incorporated into the Final General Permit an optional submittal for the permittees to propose, among other things, an approach to monitor the ambient water quality in the Great Bay estuary, in accordance with EPA's adaptive management approach. *See* Part II.C.1 above. EPA will use all available ambient monitoring data in reevaluating the long-term target in future permit reissuances. If monitoring described by the permittees is not carried out, this lack of data may preclude EPA's ability to adjust the long-term target and may result in the need for more stringent effluent limits in the future to ensure water quality standards are achieved in the face of remaining uncertainty.

Based on these ongoing ambient monitoring efforts by PREP, the development of the IRMP, as well as numerous other monitoring efforts outside the scope of this General Permit by EPA, NHDES and other stakeholders, EPA has determined that the ambient monitoring plan in the Draft General Permit is unnecessary at this time. Furthermore, EPA agrees with some of the comments that the financial burden of this monitoring has the potential to detract from the resources available for nitrogen reduction efforts. Therefore, the ambient monitoring plan has been removed from the Final General Permit to allow for additional nitrogen reductions during the life of the permit.

EPA's decision to remove the ambient monitoring program from the General Permit is distinct from its authority to impose such a requirement, which in EPA's judgment is well within its authority under the Act. *See* CWA Section 308(a)(4)(A) ("the Administrator shall require the owner or operator of any point source to (i) establish and maintain such records, (ii) make such reports, (iii) install, use and maintain such monitoring equipment or methods (including, where appropriate, biological monitoring methods), (iv) sample such effluents (in accordance with such methods, at such locations, at such intervals, and in such manner as the Administrator shall prescribe), and (v) provide such other information as he may reasonably require[.]"); *In Re Alyeska Seafoods, Inc. Unalaska Seafood Facility*, 2004 WL 1059749 (upholding far field sediment survey and sea floor monitoring to verify the assumptions made in developing permit limits regarding receiving water conditions and the effectiveness of permit limits). EPA's decision did not turn on whether EPA has authority under Section 308 and 402 of the Act and implementing regulations to impose these requirements. EPA has broad authority to impose monitoring conditions in NPDES permits, included when necessary to measure receiving water response to WQBELs in order to evaluate their protectiveness.

E. Optional Nonpoint Source and Stormwater Point Source Reduction Pathway

EPA received several comments regarding various aspects of the optional Nonpoint Source and Stormwater Point Source Reduction Pathway described in the Draft General Permit. *See* Draft General Permit Appendix II and Fact Sheet pages 28-31. After consideration of these comments, EPA notes that this aspect of the permit was optional in the Draft General Permit and will remain optional and unchanged in the Final General Permit. To make this abundantly clear, EPA has removed Appendix II from the Final Permit.

Comments received on this topic fall in one of two categories, either relating to (1) details of the proposed optional pathway itself (*i.e.*, Appendix II of the Draft General Permit) or (2) how this proposed pathway fits into EPA's overall permitting approach. Regarding details of the proposed pathway itself, EPA has solicited NHDES's views given that this pathway is to be developed and implemented at the state level and not by operation of EPA's General Permit. See Appendix C for responses to these issues prepared by NHDES. Regarding how this proposed pathway fits into EPA's permitting approach, EPA has responded below. Given that this pathway is optional, EPA and NHDES have chosen to only respond to certain clarifying comments and questions.

1. Optional Nonpoint Source Pathway

Some commenters expressed concern that the nitrogen reductions contemplated for the nonpoint sources and stormwater point sources are not optional but are requirements of the General Permit. EPA confirms that these reductions are not required but are optional. As such, each Permittee may,

at their election, choose the extent to which they would develop and implement nonpoint source and stormwater point source plans. Failure to participate in these reductions will not result in a violation of the General Permit and will not result in any potential enforcement action taken by EPA.

However, EPA considers that nonpoint source and stormwater point source nitrogen reductions at the scale described in the Draft General Permit Appendix II to be necessary to achieve water quality standards. Therefore, if such reductions do not occur and water quality standards are not achieved, EPA will be forced to seek additional reductions in the future, likely resulting in more stringent load limits at the POTWs.

Finally, some commenters expressed that EPA cannot rely on optional reductions, which may never occur, to achieve water quality standards. EPA agrees that reliance on purely optional nitrogen reductions is not an effective permitting strategy toward achieving water quality standards. To account for this, EPA has structured the General Permit to incorporate an adaptive management strategy. As noted in the Fact Sheet at 31 and in Appendix II of the Draft General Permit, if these optional reductions do not occur EPA may lower, after all required administrative procedures, the allowable load from the POTWs. Additionally, EPA may include nitrogen reduction requirements in the next reissuance of the Municipal Separate Storm Sewer System (MS4) General Permit. Given this combination of incentives and potential requirements in the future along with the support of NHDES (*See* Part II.E.3 below), EPA expects that a significant reduction in nonpoint source and stormwater point source will occur. Given the inherent uncertainty in the precise level of nitrogen reductions necessary throughout the estuary, EPA has determined that this permitting strategy is appropriate at this time.

2. Cost and Affordability

Some commenters raised concerns that the overall scope of nonpoint source and stormwater point source reductions contemplated in the Draft General Permit are extremely costly and are not affordable by the municipalities, especially in light of the financial strain placed upon municipalities due to the COVID-19 pandemic. On the contrary, another expert commenter presented a detailed feasibility study indicating substantially lower cost estimates to achieve such reductions, especially regarding those to be carried out in the initial permit term. EPA recognizes that there is a disparity in the estimated cost to achieve nitrogen reductions throughout the watershed and that each municipality is unique in its ability to afford various nitrogen control measures. While EPA must act expeditiously to establish POTW effluent limits to achieve water quality standards regardless of cost, the Draft General Permit attempts to allow flexibility in achieving the necessary nitrogen reductions from whatever sources are the most achievable and economical for each municipality. A typical permitting approach would have developed total nitrogen limits for each POTW at the limit of technology (*i.e.*, 3 mg/L) as soon as possible. This type of approach would result in immediate capital cost to upgrade most of the POTWs throughout the watershed, with no flexibility to find alternate sources of nitrogen reduction in the near-term. While EPA recognizes that the municipalities under this permit may bear a financial burden to reduce nitrogen loads to the estuary, the permitting approach was developed specifically to allow the same municipalities the flexibility to choose their preferred approach to achieving such reductions.

Other comments related to cost and affordability request that EPA spread the burden to all 52 municipalities within the Great Bay watershed rather than only on the 12 included in the Draft General Permit.

First, EPA acknowledges that the Draft General Permit is limited in scope to simply authorize the discharge of nitrogen from the wastewater treatment facilities in New Hampshire that discharge into the Great Bay estuary; it is not a permit that regulates *all* sources of nitrogen throughout the watershed. In fact, EPA does not have the authority to regulate *all* sources of nitrogen throughout the watershed. However, it is this fact, combined with the fact that approximately two-thirds of the total load comes from sources other than the wastewater treatment plants, that set in motion a novel adaptive management general permitting approach in order to achieve the desired environmental goal through collaboration with NHDES and the municipalities.

Second, the permitting approach incorporated into the Draft General Permit is designed to provide the state of New Hampshire and municipalities an opportunity to spread the burden much more broadly than a standard permitting approach. Under a standard permitting approach, all the burden would be placed upon individual permittees to immediately upgrade their POTW to the limit of technology (*i.e.*, 3 mg/L). Under the Draft General Permit, however, EPA assumes the necessary nonpoint source and stormwater point source reductions will occur across all 52 municipalities, giving some flexibility to the POTWs. EPA reiterates that the Draft General Permit does not require these nonpoint source and stormwater point source reductions for any of the 52 municipalities (including those covered by the permit), but nevertheless EPA is basing the POTW limits on an assumption that these reductions will occur. To strengthen this assumption, EPA has worked closely with NHDES and with many of the municipalities to gain as much assurance as possible at this stage of the permitting process. Should this assumption prove faulty and water quality does not recover under this approach, EPA of course can revert to a more standard permitting approach in the future.

Finally, with regard to spreading the burden to all 52 municipalities, some comments also suggested that EPA apply residual designation authority (RDA) to broaden the scope of nitrogen sources that EPA can regulate throughout the watershed. EPA has authority under CWA § 402(p)(6)(E) and 40 CFR § 122.26(a)(9)(i)(D) to designate and permit stormwater dischargers that are contributing to a violation of a water quality standard or are significant contributors of pollutants to waters of the United States. This authority, referred to as "RDA," can be initiated by the permitting authority, or in response to a petition to use RDA in a specific instance (40 CFR § 122.26(f)(2)). EPA would carefully evaluate any such petition and make a determination on its merits. Currently, EPA has not received any such petition.

3. Feasibility

Some commenters expressed concerns that the nonpoint source and stormwater point source reductions are not feasible, indicating that only a small fraction of the sources are under direct control of the municipality and it is not possible for the municipalities to achieve the full scope of reductions described in the Draft General Permit. EPA recognizes that there are challenges when addressing the broad sources of nonpoint source and stormwater point source nitrogen and that there will be a variety of regulatory hurdles to overcome. However, EPA notes that NHDES is fully supportive of this permitting approach and is committed to working with the municipalities to overcome these hurdles and provide each municipality with the resources and authority needed to

implement significant nitrogen reductions. For example, in a letter from NHDES to EPA dated July 27, 2020, NHDES highlighted several commitments they are making in support of this permitting approach, such as:

- Commit up to $1,000,000 in State Revolving Fund loan forgiveness for nonpoint source control activities;
- Continue to maintain and update a Pollution Tracking and Accounting Program (PTAP) to track changes in nitrogen loading at least through the first phase of the permit;
- Continue to support ambient monitoring activities throughout the estuary to track the success of the permit;
- Seek to clarify the legislative authority of communities to implement fertilizer use restrictions and seek specific legislative authority to allow communities the flexibility to require onsite sewer nitrogen reduction technologies for septic systems or to tie into community sewer systems;
- Update the NHDES Stormwater Manual in a manner that can easily be utilized for required BMPs in future administrative rule changes; and
- Work with PREP, EPA, stakeholders and municipalities to create a consensus-based approach to a target nitrogen goal and ecological endpoints for the estuary that may be used to create a Total Maximum Daily Load (TMDL).

EPA is confident that these coordinated efforts will provide the municipalities with ample resources, authority and opportunity to significantly reduce nitrogen loads to the Great Bay estuary, especially to the extent contemplated within the initial permit term. EPA and NHDES will continue to monitor the feasibility of future reductions in subsequent permit terms and work with the municipalities to ensure that there is a reasonable pathway to achieve the contemplated reductions in each phase.

4. Enforceability

Some commenters raised the concern that the nonpoint source and stormwater point source reductions contemplated in the Draft General Permit are not enforceable and requested that EPA make them enforceable. EPA acknowledges that such reductions are optional and are not required nor enforceable. Given the extent to which nonpoint source and stormwater point source nitrogen loads must be reduced to achieve water quality standards, it is reasonable and in keeping with the overall objectives of the Act, *i.e.*, to make reasonable further progress toward the elimination of pollution into the Nation's waterways, to allow the municipalities the opportunity to invest in such reductions rather than directing their investments to immediate upgrades at the POTWs. However, as noted under Part II.E.1 above, if such reductions do not occur and water quality standards are not achieved, EPA will be forced to seek additional reductions in the future, likely resulting in more stringent load limits at the POTWs. Such reductions in POTW load limits would be enforceable. In either case, significant load reductions will occur until water quality standards are achieved.

Additionally, EPA notes that this General Permit is designed to require effluent limits for the 13 POTWs in NH that discharge into the Great Bay estuary. There is another general permit, the MS4 General Permit, that regulates stormwater discharges. As noted in the Fact Sheet at pages 28-29, the next reissuance of this MS4 General Permit will likely require additional actions to reduce the

nitrogen load in stormwater discharges. Any such reductions would be enforceable under the MS4 General Permit.

Related to the MS4 General Permit, some commenters requested that EPA specifically identify the stormwater sources to be regulated and objected that nitrogen reductions done in compliance with the MS4 General Permit would also count toward compliance with the Great Bay Total Nitrogen General Permit. The action being taken here is the issuance of the Great Bay Total Nitrogen General Permit, not the issuance of the MS4 General Permit. Any required MS4 reductions or required actions applicable to Great Bay communities will be developed during the issuance of the next MS4 General Permit. EPA reiterates that the Great Bay Total Nitrogen General Permit does not "require" any nonpoint source or stormwater point source nitrogen reductions. Therefore, such efforts would have no impact on compliance or enforceability related to the Great Bay Total Nitrogen General Permit. However, the overall load reduction of nitrogen, including from the entire array of nonpoint sources and point source stormwater, and any corresponding improvement in water quality in the estuary will certainly be taken into account in the next reissuance of the Great Bay Total Nitrogen General Permit.

Finally, related to enforceability, the Town of Rollinsford commented that the Town operates the POTW and the District handles potential decisions on nonpoint source and stormwater point source reductions and questioned whether the Town would be liable for inaction on the part of the District. EPA recognizes that this is a concern unique to the Town of Rollinsford and encourages the Town to take advantage of the financial, technical and regulatory support on offer by NHDES, as described in Part II.E.3 of this Response to Comments. The General Permit's adaptive management approach includes much flexibility in achieving additional nitrogen reductions through either the POTW or nonpoint sources and stormwater point sources. EPA will evaluate the level of overall reductions as well as challenges facing each municipality in any future permitting action. In any case, as the nonpoint source and stormwater point source reductions assumed by the General Permit are voluntary, there is no particular legal liability associated with inaction and EPA will not, and cannot, take any enforcement action under this General Permit based on such inaction.

5. Overall Load Reductions

Some commenters questioned whether both POTW load limits and nonpoint source and stormwater point source load reductions need to be achieved. EPA confirms that in order to achieve the initial target of load reductions necessary to attain water quality standards, *both* the POTW load limits proposed in the Draft General Permit *and* the long-term nonpoint source and stormwater point source reductions must occur. However, in order to provide each municipality with the most flexibility to achieve such overall reductions, EPA noted in the Fact Sheet that the municipalities may pursue the following, at their election:

- Reduce loads at the POTW in excess of the established load limit in order to meet the nonpoint source and stormwater point source reductions goals;
- Update the nonpoint source and stormwater point source baseline from 2011 to present in order to account for net load reductions that may have occurred during those years; and
- Contribute toward nitrogen reductions anywhere within the watershed toward their reduction goal.

Additionally, in the next permit reissuance EPA will evaluate and account for (if appropriate) future changes in atmospheric deposition of nitrogen to offset the load reductions goals throughout the watershed.

Given these flexibilities and the overall scope of reductions contemplated within the first permit term, EPA and NHDES expect each municipality to be able to achieve the POTW load limits as well as the optional nonpoint source and stormwater point source reductions, at their election, in a cost-effective manner.

6. Requests for Additional Specificity and Collaboration

Some commenters requested additional specificity in how to carry out the nonpoint source and stormwater point source reductions, and requested establishing procedures for collaboration between permitted municipalities, other non-permitted municipalities within the watershed, the state of New Hampshire and the state of Maine, other agencies or stakeholders, etc. While EPA and NHDES are fully supportive of the permitting approach and willing to engage in collaboration as described in these comments, EPA does not agree to be overly prescriptive by specifying such details here, especially given that this pathway is to be developed and implemented by NHDES and not within EPA's General Permit. Rather, EPA intentionally remains flexible to allow for all types of coordination and collaboration that may develop over the permit term.

7. Other Clarifying Questions

One question posed by commenters is whether the permit accounts for TN loading from combined sewer overflow (CSO) discharges. Nitrogen loads from CSO discharges were not explicitly accounted for in the Draft General Permit. However, EPA notes that only two municipalities in the watershed (*i.e.*, Portsmouth and Exeter) have active CSOs and they are only active intermittently under extreme weather conditions. Therefore, the nitrogen loading associated with these discharges is negligible compared to the overall scope of loadings and reductions described in the permit. Having said that, as a matter of policy, and as is detailed more fully in EPA's 1994 CSO Policy, EPA agrees that municipalities should always take every effort to eliminate CSO discharges for a variety of environmental and human health reasons.

Another question posed by commenters is whether the loading target accounts for TN loading from POTW discharges to the ground rather than to a surface water, such as the Farmington and Rockingham County POTWs. These loads are accounted for in EPA's approach. The 2014 GBNNPSS report used ambient nitrogen data to determine total nitrogen loads to the estuary from the watershed. Effluent data from the NPDES-regulated POTWs were then used to subtract NPDES-regulated POTW loads from the total load and the balance was determined to be from nonpoint sources, stormwater point sources, and non-NPDES regulated POTWs. This balance included any loads from any non-NPDES regulated discharges to the ground, such as the Farmington and Rockingham County POTWs. Therefore, the load from these POTWs was accounted for in EPA's approach and any nitrogen reductions from these POTWs, although not required by this General

Permit, would be taken into consideration when the EPA revisits the General Permit (and its loading assumptions) as described in the Fact Sheet at 28-31.[19]

[19] Comments related to Farmington and Rockingham County focused on whether this facility and other groundwater dischargers in the watershed are accounted for in the loading calculations. As explained above, they are and in EPA's view this disposes of the issue as framed in the comments. *See* Attachment 1 to the City of Rochester, New Hampshire's Comments at 9 ("If US EPA chooses not to regulate, or lacks the authority to regulate, these sources of nitrogen loading to the GBE, it should include them as components of the background nitrogen load that are beyond the purview of the municipalities regulated under the Draft GP.")

Insofar as the comments were couched in terms of the Supreme Court's decision in *Cty. of Maui, Hawaii v. Hawaii Wildlife Fund*, 140 S. Ct. 1462, 1469, 206 L. Ed. 2d 640 (2020), and assert that the Farmington and Rockingham County POTWs should be included in this General Permit, they are unpersuasive. In *Maui*, the Court held that the CWA requires a permit when there is a direct discharge of pollutants from a point source into navigable waters or when there is the functional equivalent of a direct discharge.

Neither the proposed permit nor the final permit authorizes a discharge from the Farmington or Rockingham County POTWs (or any other POTW discharging to groundwater) to a water of the United States, either as a direct surface water discharge or as a discharge through groundwater that is the "functional equivalent" of a direct surface water discharge to a water of the United States. EPA's record for this permitting action does not demonstrate that a discharge is occuring from either facility to groundwater that is the "functional equivalent" of a direct discharge to a water of the United States. The commenter states, "Given that Farmington discharges its municipal wastewater into groundwater through rapid infiltration basins in close proximity to the Cocheco River, Farmington must now operate under a NPDES permit," but does not provide any other data, studies or other material information that might establish the existence of a functionally equivalent discharge that is subject to the Act. The comment, for example, provides no information on the subsurface conditions at the site—soil type/porosity, depth to groundwater, flowpath, nutrient dynamics (*e.g.*, sorption, biological uptake, microbial processing), hydraulic conductivity—and no information or evidence that an actual discharge of pollutants occurs to a water of the United States. The comment provides no information at all regarding alleged discharges from the Rockingham County POTW. NPDES permits are only required for *actual* discharges; NPDES permits are not required for proposed discharges or *potential* discharges. *NPCC v EPA,* 635 F.3d 738 (2011).

The Supreme Court's decision in *County of Maui v. Hawaii Wildlife Fund*, 140 S.Ct. 1462 (2020), did not instruct NPDES permitting authorities to assume that discharges to the ground or to groundwater that occur in the vicinity of a surface water are the "functional equivalent" of direct discharges to surface water. Neither the "functional equivalent" test set out by the Supreme Court nor the CWA itself requires a facility owner or operator or a permitting authority to prove the *absence* of a discharge. And even if an actual discharge of pollutants occurs through groundwater and reaches a water of the United States, the *Maui* Court recognized not all discharges of pollutants through groundwater that reach a water of the United States are the "functional equivalent" of a direct surface water discharge and therefore not all such discharges require a NPDES permit. The permitting agency must in such instances apply the "functional equivalent" test, requiring consideration of "many potentially relevant factors." *Id.* at 1476-77.

To the extent that a facility is discharging a pollutant from a point source to a water of the United States without a permit, that discharge is prohibited by section 301(a) of the CWA. The obligation to obtain a permit lies with the facility owner or operator. The owners or operators of the Farmington and Rockingham County POTWs have not requested permit coverage for discharges to groundwater that are the functional equivalent of direct discharges and, as noted above, EPA's record for this permitting action does not demonstrate that such discharges are occuring. The Final Permit does not authorize such discharges and the CWA does not require EPA to analyze or provide permit coverage for discharges alleged by commenters that are not demonstrated in the permitting record.

As the NPDES permitting authority in New Hampshire, EPA has significant discretion regarding the scope of general permits. The exclusion of certain facilities or discharges from coverage under the General Permit does not alter the permit obligations of such facilities or indicate whether a permit is required for those discharges. Such facilities or discharges may be authorized apart from the General Permit through individual NPDES permits.

Related to atmospheric deposition, some comments questioned whether EPA is working outside the scope of this permit to protect air quality by limiting nitrogen emissions. EPA has taken action to reduce air emissions of nitrogen oxides (NOx). EPA has adopted four regional air emission transport regulations that have required reductions in NOx emissions from large industrial facilities such as power plants across most of the Eastern U.S. More information about these four air pollution transport regulations can be found in the following final rules: NOx State Implementation Plan (63 FR 57361; 10/27/1998); Clean Air Interstate Rule (70 FR 25170; 5/12/2005); Cross State Air Pollution Rule (76 FR 48208; 8/11/2011); and Cross State Air Pollution Rule Update (81 FR 74514; 10/26/2016).

F. Effluent Limits

EPA received numerous comments regarding various aspects of the total nitrogen effluent limits proposed in the Draft General Permit. These fell into two broad categories. In the first, commenters objected to the validity of the limitations themselves and questioned EPA's ability to impose them at this time based on the record before it. In this regard, commenters have three overarching objections to the effluent limitations in the Draft Permit. First, they argue that the conceptual model and information relied upon by EPA were too simplistic to support the permit limits, calling instead for development and reliance on a more sophisticated water quality model. They also contend that in order to make that showing, EPA regulations prescribe a specific methodology—concentration-based rather than the areal load-based approach—for deriving a protective water quality target. Finally, they assert that the floor established by Section 301(b)(1)(C) and 40 CFR § 122.44(d)(1) is cost and technological feasibility, and not whether the permit limitations will assure compliance with applicable water quality standards. These commenters are mistaken, for the reasons explained in Parts II.B and II.G of this Response to Comments document.

In addition to these more fundamental criticisms of the total nitrogen limit, commenters also requested adjustments to the effluent limitations should they remain in the permit. After a thorough review and consideration of these comments, EPA has decided to make a few adjustments to the effluent limits in the Final General Permit, as described in the sections below.

1. Seasonal Limits

Comments requesting EPA to adjust the duration of TN limits to the growing season have some merit.

Some comments requested that the limits be adjusted from annual to seasonal and apply only during the growing season because the winter load is environmentally less important and it is challenging to treat nitrogen in the winter months. Additionally, some comments proposed alternate long-term

targets that are seasonally based. EPA agrees that the loading during the summer months has a more significant environmental impact than the loading during the winter months.

EPA proposed annual average limits in the Draft General Permit for several reasons. First, to be consistent with the underlying scientific target of 100 kg ha^{-1} yr^{-1}, EPA determined that both the POTW effluent limits and the nonpoint source and stormwater point source loads should be expressed as annual averages. Second, EPA points out on page 27 of the Fact Sheet that in order to comply with these annual average limits, the POTWs will likely need to reduce the growing season load well below the annual average and that EPA expects this to further benefit the estuary during the growing season.

In light of the comments received, EPA has reevaluated this position. EPA recognizes that there is potential for the long-term target to be reevaluated and updated in a future permit reissuance, and that other potential targets may be based on seasonal averages rather than annual averages. Additionally, one primary objective of EPA's adaptive management permitting approach is to give the municipalities flexibility in achieving the most cost-effective nitrogen reductions that will maximize the benefit to water quality throughout Great Bay as expeditiously as possible. Given the large scope of nitrogen reductions and the limited resources available from the municipalities to achieve such reductions, EPA agrees that it is expedient to focus those resources on nitrogen reductions that will have the most benefit. For example, some commenters expressed that designing and constructing larger tanks would be necessary to optimize nitrogen removal in colder months. EPA agrees that this type of expense would not maximize the effectiveness of the municipalities limited resources. While reducing the winter load may have some benefit, EPA has determined that it would be more beneficial to the environment at this time to redirect resources from the winter months and apply them to achieving even more overall reductions during the growing season.

Therefore, EPA has changed the Final General Permit to include seasonal limits applied as a 7-month rolling average from April through October of each year. However, EPA will continue to require year-round monitoring. This monitoring will ensure EPA has sufficient data to evaluate seasonal and annual loads in comparison to all potential loading-based or concentration-based targets proposed in the future. See Part II.B.5 above.

To calculate these seasonal load limits while maintaining the overall objectives of the permitting approach, EPA has decided to base the limits on the same effluent concentrations used in the Draft General Permit while updating the effluent flow data to include data only from the growing season for the most recent 5-year period. Therefore, the limits in the Final Permit are based on average flows from April through October of 2015 through 2019. These updated seasonal limits are presented in the table below.

POTW	Average Flow during 2015-2019 growing seasons (MGD)	Concentration (mg/L)	Seasonal Load Limit (lb/day)
Rochester	2.96	8	198
Portsmouth	3.72	8	248
Dover	2.50	8	167
Exeter	1.59	8	106
Durham	0.88	8	59
Somersworth	1.38	8	92
Pease ITP	0.68	16.4	93
Newmarket	0.45	8	30
Epping	0.28	18.5[1]	43
Newington	0.10	17.6	15
Rollinsford	0.08	Report[2]	TBD[2]
Newfields	0.09	21.5	16
Milton	0.07	Report[2]	TBD[2]

[1] In their comments on the Draft General Permit, the Town of Epping submitted updated data from 2018 and 2019 indicating that the average effluent total nitrogen concentration was 18.5 mg/L. EPA has incorporated these data into the limit for Epping. See Part II.F.13 below.
[2] Limits for Milton and Rollinsford will be based on monitoring data during the first two years of the permit and will become effective at that time. See Part II.F.13 below.

2. Flow Data Not Representative

Comments requesting EPA to recalculate the WQBELs using more representative flow data have some merit.

Some comments pointed out that the effluent limits should be higher because the flows used to calculate them were from drought years and should be normalized to average rainfall. EPA agrees that the average 2012-2016 flows used to calculate the effluent limits were taken during years that had below average rainfall and that the Draft General Permit used this to normalize the necessary nonpoint source and stormwater point source loads to average rainfall. However, EPA notes that while nonpoint source and stormwater point source loads are highly dependent on rainfall, flows from POTWs are less so. Further, consistent with EPA's Permit Writer's Manual, it is EPA's ordinary practice to use the last 5 years of effluent data in establishing effluent limits. Based on this and other comments (See Part II.F.1 above), EPA has updated the flows used to derive the limits in the Final Permit to be 2015 to 2019 flows during the growing season.[20]

[20] *NPDES Permit Writer's Manual*, EPA-833-K-10-001, September 2010, page 5-30, recommends use of the most recent 3 to 5 years. https://www.epa.gov/sites/production/files/2015-09/documents/pwm_2010.pdf. EPA used the five year time frame to more fully capture a representative data set.

Therefore, EPA does not agree that it would be appropriate to adjust the limits in the Final General Permit based on average rainfall. Furthermore, EPA encourages municipalities to continue their efforts in reducing inflow and infiltration ("I/I") to allow for an increase in capacity of baseflow and corresponding population growth.

3. Optimization

Some comments argued that optimization is unnecessary, and that EPA is not authorized to require optimization so long as a facility is meeting its effluent limit.

EPA disagrees with the latter point. EPA is authorized to impose narrative conditions in permits to abate the discharge of pollutants when, for example, "The practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA." 40 CFR § 122.44(k)(4). Special conditions are defined in EPA's NPDES Permit Writer's Manual as those which

> "supplement numeric effluent limitations and require the permittee to undertake activities designed to reduce the overall quantity of pollutants being discharged to waters of the United States, to reduce the potential for discharges of pollutants, or to collect information that could be used in determining future permit requirements." (*NPDES Permit Writers' Manual, Chapter 9,* USEPA September 2010 [EPA833-K-10-001]).

As the optimization requirement supplements the TN load limit and is designed to reduce the overall quantity of nitrogen being discharged, it clearly fits within this definition. The requirement is not overly prescriptive, because it is intended to afford the permittees with the latitude to develop the optimization strategy that best meets the configuration and operation of the facility. EPA, in imposing the optimization requirement, is not dictating specific operational measures at the facility.

However, EPA has reconsidered whether the imposition of optimization requirements is necessary as part of the overall permitting approach. One overarching objective of EPA's permitting approach is to give municipalities the flexibility to achieve nitrogen reductions from their POTW or from nonpoint sources and stormwater point sources. In other words, so long as a POTW is able to achieve its load limit, EPA's intention is to allow flexibility to that municipality in achieving additional nitrogen reductions in whatever manner it chooses. Therefore, the optimization requirement has been removed from the Final General Permit but may be reintroduced in a subsequent permit reissuance if necessary. In arriving at this conclusion, EPA took account of the fact that, as a practical matter, POTWs will typically achieve significant nitrogen reduction during the non-growing season in order to maintain the biological process throughout the year to acheive compliance with the permit limits during the growing season. This will effectively reduce the nitrogen load in the non-growing season as well.

In contrast, EPA has required optimization in other permitting approaches, such as for permitting nitrogen in the Long Island Sound watershed. EPA distinguishes these two permitting scenarios in at least two ways. First, many of the permit limits set in the Long Island Sound permits, which were based on design flow, are at levels well above what is achievable by the existing POTWs, whereas the limits in Great Bay are designed to maximize most of the nitrogen reduction potential from the existing facilities. Second, in Great Bay, EPA is applying an adaptive management approach

designed to give municipalities flexibility in achieving additional nitrogen reductions, whereas the permits in the Long Island Sound do not incorporate this kind of approach.

4. Moratorium on Growth

Comments that presume the General Permit WQBELs amount to a moratorium on growth are misplaced.

Some comments suggested that the effluent limits proposed in the Draft General Permit would effectively implement a moratorium on growth within these municipalities. EPA disagrees with these comments and clarifies the relationship between effluent limits and the notion of growth. Any effluent load limit for any parameter, by definition, effectively prevents "growth" in the sense of preventing the discharge of that pollutant from increasing beyond the level set forth in the permit. This is a necessary implication of the need to cap or reduce the load of any pollutant to achieve water quality standards. However, this does not preclude the facility from improving the treatment process for that pollutant in order to allow for increases in flow due to population, commercial or industrial growth and still comply with the load limit. In this case, the load limits for total nitrogen are based either on 8 mg/L (for the larger POTWs) or "hold the load" (for the smaller facilities) and are designed to be achievable at current flows for most of the current treatment facilities through optimization alone. EPA's intention in setting limits at this level is to allow municipalities to divert near-term investments to nonpoint source and stormwater point source reductions while allowing POTWs to upgrade in the long-term to accommodate growth, if necessary. Importantly, the growth within a municipality will increase the number of users of the POTW and make a potential facility upgrade, if necessary, more affordable in the long-term. This type of investment is similar to other municipal infrastructure expenditures that accompany growth (schools, roads, trash removal capacity, etc.). Therefore, the permit limits are achievable in the short term and allow for growth in the long-term.

EPA notes that the POTWs are well below their respective design flows and are generally not expected to reach design flow for many years, allowing for further advances in nitrogen removal technologies. In any case, the limits in the Final General Permit are seasonal averages and are achievable under current flows and are generally within the current limits of technology even at design flow. See Part II.F.1 above.

EPA also point out that the typical permitting approach in this scenario would be to require POTWs to upgrade immediately to limit of technology effluent limits (*i.e.*, a concentration-based limit of 3 mg/L). Under this approach, municipalities would be forced to invest in facility upgrades immediately with significant costs to their current users. It seems that this typical approach would have a more drastic financial impact on the municipalities and that the approach in the Draft General Permit actually provides more opportunity to the municipalities to plan for growth and the facility upgrades that may be necessary to accommodate that growth.

EPA also reminds the commenters that antidegradation is a further justification for the limits set forth in the General Permit. While EPA acknowledges the limitations in the General Permit may lead to upgrades at some point in the future, the municipalities should be aware that there are other consequences associated with increased flows to the treatment plant resulting from population growth. From a water quality perspective, there is urgency to regulate nitrogen in order to prevent

further degradation since total nitrogen load is population driven and the Great Bay estuary watershed population is and has been fast growing. See PREP 2018 at 35 and Table 21.1. The Clean Water Act specifically protects "existing" and "designated" uses of navigable waters. *PUD No. 1 of Jefferson Cty. v. Washington Dep't of Ecology,* 511 U.S. 700, 704–05, 114 S.Ct. 1900, 128 L.Ed.2d 716 (1994) (citing CWA § 303(c)(2)(A) & (d)(4)(B); 40 CFR § 131.12). Thus, a state's water quality standards must identify existing and designated uses, such as drinking, recreation, wildlife support, and shellfish cultivation, and must establish " 'water quality criteria for such waters based upon such uses.' " *Id.* at 704, 114 S.Ct. 1900 (quoting CWA § 303(c)(2)(A)). Further, pursuant to the Clean Water Act's "antidegradation policy," a state's water quality standards must "be sufficient to maintain existing beneficial uses of navigable waters, preventing their further degradation." *Id.* at 705, 114 S.Ct. 1900 (citing CWA § 303(d)(4)(B)). The mandate's broad reach is reflected in 40 CFR § 131.12(a)(2), which provides that states "shall assure water quality adequate to protect existing uses fully." Thus, no activity that would "'partially or completely eliminate any existing use'" is permitted, even if it would leave the majority of a given body of water undisturbed. *PUD No. 1,* 511 U.S. at 718–19, 114 S.Ct. 1900 (quoting EPA, Questions and Answers on Antidegradation at 3 (Aug.1985)). *Cf.* Water Quality Standards Regulation, 47 Fed. Reg. 49234 (Oct. 29, 1982); Water Quality Standards Regulation, 48 Fed. Reg. 51400 (Nov. 8, 1983). Regarding antidegradation, page 7 of the Fact Sheet states:

> *Federal regulations found at 40 CFR § 131.12 require states to develop and adopt a statewide anti-degradation policy that maintains and protects existing in-stream water uses and the level of water quality necessary to protect these existing uses. In addition, the antidegradation policy ensures that high quality waters which exceed levels necessary to support propagation of fish, shellfish, and wildlife and support recreation in and on the water, are maintained unless the State finds that allowing degradation is necessary to accommodate important economic or social development in the area in which the waters are located.*
>
> *The New Hampshire Antidegradation Policy, found at Env-Wq 1708, applies to any new or increased activity that would lower water quality or affect existing or designated uses, including increased loadings to a water body from an existing activity. The antidegradation regulations focus on protecting high quality waters and maintaining water quality necessary to protect existing uses. Discharges that cause "significant degradation" are defined in NH WQS (Env-Wq 1708.09(a)) as those that use 20% or more of the remaining assimilative capacity for a water quality parameter in terms of either concentration or mass of pollutants or flow rate for water quantity. Where NHDES determined that a proposed increase would cause a significant increase, the applicant must provide documentation to demonstrate that the lowering of water quality is necessary, will provide net economic or social benefit in the area in which the water body is located, and that the benefits of the activity outweigh the environmental impact caused by the lower water quality. See Env-Wq 1708.10(b).*
>
> *This General Permit is being issued with effluent limitations sufficiently stringent to satisfy the State's antidegradation requirements, including the protection of the existing uses of the receiving water.*

As stated above, the *New Hampshire Antidegradation Policy* applies to "increased loading to a water body from an existing activity," which includes the 13 POTWs eligible for this General Permit, and is designed to prevent "significant degradation…in terms of either concentration or mass of pollutants." As demonstrated in the Fact Sheet at 24-26, the Great Bay estuary is exceeding its capacity for nitrogen load and has no assimilative capacity. Therefore, any increase in nitrogen load from these POTWs would not protect existing uses, would cause "significant degradation" and would be in violation of antidegradation regulations. Based on this, antidegradation becomes a "backstop" on potential limits that could be implemented in this General Permit, effectively prohibiting any increase from existing loads.

Among the 13 facilities, EPA established "hold the load" limits for the seven smaller POTWs which equates to the highest limit allowable based on antidegradation regulations. For the six larger POTWs, EPA established load limits based on 8 mg/L at average flows. Upon review of recent effluent data for these six POTWs, EPA has determined that these load limits are acheivable for five of them (*i.e.*, Portsmouth, Dover, Exeter, Durham, and Somersworth) and approximate the highest limit allowable based on antidegradation regulations. The limit for the sixth of these larger POTWs, Rochester, is 198 lb/day and is somewhat more stringent than the highest limit allowable based on antidegradation regulations (*i.e.*, approximately 250 lb/day). However, load limits based on 8 mg/L at average flows were applied to all six POTWs in this subcategory as it represents the least stringent WQBEL legally permissible based on antidegradation provisions (*i.e.*, "hold the load") for most of the dischargers in this subcategory and to be consistent with the overall permitting goal of nitrogen reduction. This is particularly important for this subcategory given the magnitude of the load from these POTWs (*i.e.*, approximately 85% of the total POTW load). Therefore, EPA has determined that these load limits represent the highest allowable load limits based on antidegradation regulations and these limits could not be made any less stringent no matter what initial loading target was chosen by EPA.

Finally, as described under Part II.E.3 above, NHDES has committed to work with PREP, EPA, stakeholders and municipalities to create a consensus-based approach to a target nitrogen goal and ecological endpoints for the estuary that may be used to create a Total Maximum Daily Load (TMDL). CWA 303(d)(4)(A) states "where the applicable water quality standard has not yet been attained, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section may be revised only if the cumulative effect of all such revised effluent limitations based on such total maximum daily load or waste load allocation will assure the attainment of such water quality standard." Therefore, if a TMDL is developed and approved in the future that justifies less stringent POTW effluent limits while ensuring attainment of water quality standards, the effluent limits may be revised. Presumably this would be possible if a significant amount of nonpoint source and stormwater point source nitrogen reductions occur and the waterbody responds positively to such reductions.

5. Limits Are Below Limit of Technology at Design Flow

Some commenters suggest that the "limit of technology" is approximately 5.5 mg/L as an annual average (*i.e.*, 3 mg/L in the growing season and 10 mg/L in the non-growing season) and that the limits for the larger POTWs will be below this limit of technology once flows increase to the respective design flow. The comments suggest that these initial limits do not allow for adaptive management. EPA agrees that the load limits proposed in the Draft General Permit resulted in limits

that were below 5.5 mg/L[21] at design flow for Rochester, Portsmouth, Dover, Exeter, Durham, Somersworth and Newmarket. However, for the reasons described above (*See* Part II.F.1 above), the limits in the Final Permit have been adjusted to apply only during the growing season. Based on this change, EPA does not agree that any of the limits are unachievable even at design flow. While EPA presumes that this change to seasonal limits, based on reasons described in other comments, resolves the concerns raised in these comments, EPA nevertheless provides the following responses.

First, EPA is not required to establish limits that are achievable under all future flow regimes. Rather, EPA must establish permits limits that ensure water quality standards are achieved under all reasonable permitting scenarios both at the time of permit issuance and under potential future flow regimes. *In re City of Fayetteville, Ark.*, 2 E.A.D. 594, 600-601 (CJO 1988) ("The meaning of [section 301(b)(1)(C)]…is plain and straightforward. It requires unequivocal compliance with applicable water quality standards, and does not make any exceptions for cost or technological feasibility."), *aff'd sub nom. Arkansas v. Oklahoma*, 503 U.S. 91 (1992). Under current conditions, EPA notes the following:

1) current POTW loads are contributing to pervasive water quality impairments and
2) current POTW loads for the POTWs listed above are below the hypothetical load based on 5.5 mg/L at design flow.

Based on this, EPA has determined that to establish annual average loads based on 5.5 mg/L and design flow would allow these POTWs to *increase* their load of nitrogen from current levels into an impaired waterbody. Clearly this would not be in accordance with the CWA or New Hampshire's Water Quality Standards. *See* CWA § 101(a) and 40 CFR § 131.12. *See also* Part II.F.4 above regarding antidegradation regulations.

Second, EPA disagrees that these initial limits do not allow for adaptive management. As noted in the Fact Sheet, if the municipalities elect to not participate in the nonpoint source and stormwater point source reduction pathway EPA may adjust the load limits to be more stringent. In such a case, EPA maintains the option of requiring a concentration-based effluent limit during the growing season of 3 mg/L under current flows. This would force the POTWs to undergo immediate upgrades to the limit of technology. At this point, EPA has determined that such a measure is not warranted based on NHDES's support of the proposed adaptive management approach. However, EPA still considers this a potential step in the future as part of an adaptive management permitting approach, if other less drastic measures fail.

Third, EPA notes that the "limit of technology" is not a static number but may decrease in the future as technology improves. Most of the POTWs only face the potential for upgrading their facility in the distant future as flows increase close to their design flow. EPA notes that by the time such potential upgrades would occur, the "limit of technology" may in fact be lower than it is today.

Finally, EPA also notes that the proposed load limits do have the potential to increase in the future. One possibility is through an allowance built into the Final General Permit to tie in septic systems or private sewer systems, as described in Part II.F.7 below. So long as each project results in an overall

[21] EPA does not acknowledge that 5.5 mg/L is the limit of technology for annual average total nitrogen control, but will use this number provided by the City of Portsmouth as an approximation of an achievable annual average concentration.

reduction of total nitrogen to the Great Bay estuary, this provision allows for future load increases beyond the proposed limits. Another possibility for a change in the limits is based on the development of a TMDL. As mentioned in Part II.E.3 above, NHDES is committed to a collaborative process to developing a target nitrogen goal and ecological endpoints for the estuary that may be used to create a TMDL. CWA § 303(d)(4)(A) states "where the applicable water quality standard has not yet been attained, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section may be revised only if the cumulative effect of all such revised effluent limitations based on such total maximum daily load or waste load allocation will assure the attainment of such water quality standard." Therefore, if a TMDL is developed and approved in the future that justifies less stringent POTW effluent limits while ensuring attainment of water quality standards, the effluent limits may be revised. Presumably this would be possible if a significant amount of nonpoint source and stormwater point source nitrogen reductions occur and the waterbody responds positively to such reductions.

6. Delivery Factors and Equitability

The City of Rochester commented that they were being treated inequitably because their proposed load limit does not take into account their delivery factor of 75.56%. EPA acknowledges that the Rochester discharge has a delivery factor of 75.56%, indicating that approximately 24.44% of the total nitrogen discharged is attenuated before reaching the Great Bay estuary. Among the large POTWs, the only other facility with any attenuation is Somersworth, which has a delivery factor of 94.94%. However, in allocating load limits for these large POTWs, EPA did not apply these delivery factors. Nitrogen attenuation refers to the loss of nitrogen that occurs during tributary river transport between the point of discharge and the point of impact. Attenuation is predicated on the idea that some degree of nitrogen removal due to permanent uptake or denitrification occurs in the river. Although not mentioned in the comment, insofar as commenters rely on 40 CFR § 122.44(d)(1)(ii) for the proposition that EPA is mandated to account for either dilution or attenuation, they are mistaken. That provision only requires EPA to consider dilution "as appropriate." Section 122.44(d)(1)(ii) does not speak of attenuation at all. Moreover, the provision does not apply to the calculation of effluent limits, only the determination of reasonable potential. A permit issuer does not have an obligation to impose higher effluent limits based on dilution or attenuation. *In re City of Attleboro Wastewater Treatment Plant*, 14 E.A.D. 398, 423-428 (EAB 2009). Whether to account for those factors is committed to EPA's discretion.

In this case, EPA determined that it would be more appropriate to allocate load limits based on an equitable level of treatment (*i.e.*, 8 mg/L). EPA's allocation ensures that all large POTWs are required to achieve the same level of nitrogen treatment, regardless of their location in the watershed. In other words, if EPA were to allow Rochester an increased load based on their delivery factor, this would allow them to only achieve a concentration of 10.6 mg/L when all other large POTWs must achieve 8.0 mg/L and the result would be an additional 48.2 lb/day of total nitrogen loading to the estuary. This increased amount of total nitrogen, if allowed, would be approximately the same as the entire delivered load from the four smallest POTWs combined (*i.e.*, South Berwick, Newington, Newfields, and Milton; see Fact Sheet at 27). Applying Rochester's delivery factor in this way would be inequitable under EPA's methodology for allocating the larger POTW loads and, more importantly, inconsistent with the overall permitting goal of nitrogen reduction to waters that are already suffering from the adverse water quality effects of cultural eutrophication.

7. Septic System or Private Sewer System Tie-Ins

Comments requesting EPA to account for septic system or private sewer system tie-ins have merit.

Some comments requested that a provision be added to the permit that allows for load increases at the POTWs if they were to tie in septic systems or private sewer systems, resulting in an overall decrease in nitrogen loading to the Great Bay estuary and that without this provision there would be a disincentive to tying in these loads even though the overall load would be reduced. EPA agrees with this comment and in order to incentivize projects of this nature that would benefit the estuary has decided to include a provision in the Final General Permit to allow increases in the permitted load limits based on future projects to tie in septic systems or private sewer systems that exist prior to the effective date of the General Permit. This provision does not allow tie-ins for septic systems or private sewer systems that did not exist before the effective date of the General Permit because such systems represent an increase in delivered TN load from current levels. In other words, that would allow a municipality to increase its load inhindered by iteratively installing new septic systems or private sewer systems and then tying those new systems into the POTW.

Accordingly, EPA has included a provision in the Final General Permit to allow increases in the permitted load limit based on these types of projects. The provision states that a Permittee may request an increase in its permitted load upon successful completion of septic system or private sewer system tie-in projects. EPA will review these requests and, if they meet the criteria set forth below, will increase the load limits as specified below in the next reissuance of this General Permit. These requests must include the following:

1. A description of the projects, confirming that the proposed septic system or private sewer system existed prior to the effective date of the General Permit;
2. An analysis of the expected decrease in delivered total nitrogen load to the Great Bay estuary (*i.e.*, the entire 21 square mile estuary) resulting from removal of the septic system or private sewer system. This analysis shall include a description of the methods used to estimate the decreased nitrogen load based on scientifically defensible values for:
    a. decrease in wastewater flow into septic system or private sewer system (based on per capita wastewater generation, average house occupancy, etc.),
    b. septic system or private sewer system effluent concentration, and
    c. decrease in delivered load from existing system after nitrogen attenuation expected in septic systems or private sewer system, leach fields, and downgradient groundwater and surface water travel;
3. An analysis of the expected increase in delivered total nitrogen load from the POTW to the Great Bay estuary (*i.e.*, the entire 21 square mile estuary) resulting from the tie-in of the septic system or private sewer system. This analysis shall include a description of the methods used to estimate the increased nitrogen load based on scientifically defensible values for:
    a. increase in POTW wastewater flow (based on per capita wastewater generation, average house occupancy, etc. and on a growing season average basis),

b. effluent total nitrogen concentration from POTW (*i.e.*, after treatment and on a growing season average basis),

c. increase in effluent total nitrogen load from POTW (*i.e.*, [the increased POTW flow, in MGD] x [the effluent concentration, in mg/L] x 8.345, on a growing season average basis)

d. increase in POTW delivered load (*i.e.*, after attenuation, if applicable)

4. The requested increase in the POTW's load limit (*i.e.*, in lb/day and on a growing season average basis) such that the overall total nitrogen load to the Great Bay estuary does not increase. This value shall be specified as either the value presented in subpoint 2.c or subpoint 3.c., whichever is smaller.

   For example, if removal of a septic system is expected to decrease the delivered load by 20 lb/day (subpart 2.c) and is expected to increase the POTW effluent load by 10 lb/day (subpart 3.c), the allowable increase in the load limit is 10 lb/day. On the other hand, if removal of a septic system is expected to decrease the delivered load by 10 lb/day (subpart 2.c) and is expected to increase the POTW effluent load by 20 lb/day (subpart 3.c), the allowable increase in the load limit is 10 lb/day.

EPA regards this provision as an extension of the load limits and it is intended to operate in conjunction with the load limits (*i.e.*, a mechanism to adjust the load limits within the framework of the General Permit).

The permittees should coordinate with EPA regarding the details of a potential project to ensure it will meet the criteria set forth in the General Permit.

8. Limits Should Be Set at Limit of Technology (3 mg/L)

Some comments suggest that the effluent limits should be set at the limit of technology (*i.e.*, 3 mg/L) because the existing limits will not ensure compliance with water quality standards. EPA acknowledges that POTW reductions alone, even reductions to 3 mg/L, will likely not ensure compliance with water quality standards. This is because approximately two-thirds of the load is from nonpoint sources and stormwater point sources of nitrogen that must also be addressed. In this scenario, EPA has chosen to allow some flexibility for the POTWs in order to allow resources in the near-term to be directed toward nitrogen reductions from other sources. Then in the long-term, if flows to the POTWs increase, resources may need to be directed toward POTW upgrades in order to continue to comply with the load limits. EPA also notes that the load limits proposed in the Draft General Permit for the larger POTWs are based on 8 mg/L (rather than 3 mg/L) but are based on current flows and are seasonal average limits. Therefore, as noted above, these limits will result in long-term nitrogen loads that are comparable to concentration-based limits of 3 to 5 mg/L during the growing season once flows increase close to design flow.

9. EPA's Position in Other Permits is that 8 mg/L is Not Protective

Some comments question EPA's use of 8 mg/L as the basis for permit limits when EPA has taken the position in other permits that 3 mg/L is necessary. EPA notes that a seasonal average load limit based on 8 mg/L and average flows is more stringent than the concentration-based limit of 8 mg/L as

described in these comments, especially as flows increase in the future. While the limits established in the Final General Permit are more stringent than mere concentration-based limits of 8 mg/L, they are less stringent (at current flows) than concentration-based limits of 3 mg/L and they are achievable, in most cases, without immediate upgrades. Therefore, the proposed load limits do not allow for any increase in nitrogen loads from current levels to an impaired waterbody while maintaining the opportunity for further reductions in permit limits through adaptive management, if necessary, should other sources of nitrogen not be addressed expeditiously.

10. Compliance Schedule

Some commenters requested clarification on compliance schedules to achieve the effluent TN limits in the General Permit. EPA notes that compliance schedules are only available to facilities that are expected to be out of compliance with the permit (*i.e.*, the effluent load limit) once the permit becomes effective. Based on this, EPA expects that only the City of Rochester may qualify for a compliance schedule. Therefore, EPA's Enforcement and Compliance Assurance Division (ECAD) has coordinated with the City of Rochester and would consider incorporating a compliance schedule for the Rochester WWTF through an administrative order, rather than through inclusion of a schedule directly in the Final General Permit. Should any of the other POTWs be unable to achieve the effluent limits, they may coordinate with EPA's ECAD to evaluate potential compliance options.

11. Ammonia Nitrogen Monitoring

Some comments requested that EPA remove the ammonia nitrogen monitoring requirement from the permit, noting that it is not necessary to determine the total nitrogen load and adds unnecessary costs to comply with the General Permit. EPA agrees that ammonia nitrogen monitoring is not necessary in order to determine the total nitrogen load. Further, EPA notes that ammonia nitrogen as a toxic pollutant will continue to be regulated through each permittee's individual NPDES permit. Therefore, EPA has removed ammonia monitoring from the Final General Permit.

12. Monitoring Flexibility

Some commenters requested flexibility in monitoring timing each day or week. EPA agrees that some flexibility is appropriate and has added the following language to the Final Permit: "Occasional deviations from the routine sampling program are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report."

Relatedly, the Milton POTW is a lagoon facility and the Town of Milton requested flexibility to sample only when discharging and that a grab sample, rather than a composite sample, is sufficiently representative. EPA agrees with these comments and has updated the Final General Permit for Milton accordingly. Further, EPA notes that Newfields is also a lagoon facility and their sample type has also been changed to a grab sample.

Some commenters requested flexibility in calculating monthly averages by using flow and concentration data from the same days as the TN sample to determine the daily load and averaging those daily loads within each month, suggesting that this is more representative of actual conditions. In the Draft General Permit, EPA specified "The total nitrogen monthly average mass loading

reported each month shall be calculated as follows: Total Nitrogen (lb/day) = average monthly total nitrogen concentration (mg/L) * average monthly flow (MGD) * 8.345." EPA acknowledges that there are various ways to calculate averages and that the calculation described by the commenter would likely produce a slightly different result than the calculation specified in the Draft General Permit. However, EPA does not agree that the proposed calculation would be more representative of actual conditions. In EPA's proposed calculation, all of the available flow and concentration data is used. In the commenter's calculation, the only data that is used is the data from the days on which total nitrogen is sampled. Therefore, EPA expects that using all available flow and concentration data would be more representative of average conditions throughout each month. Furthermore, EPA has been specifying this form of calculating monthly averages in other recently-issued permits and maintaining this consistency will allow EPA to compare results from other permits more appropriately. Therefore, the Final General Permit has not been changed.

Relatedly, some commenters requested flexibility in calculating compliance with the rolling average limit by using rolling weekly averages instead of rolling monthly averages, suggesting that this is more representative of actual conditions. EPA acknowledges that there are various ways to calculate rolling averages and that the method described by the commenter would likely produce a slightly different result than the calculation specified in the Draft General Permit. However, EPA does not agree that the commenter's proposed method would be more representative of actual conditions. Given that the average monthly mass loading data is based on all flow data throughout the entire month, it is representative of average conditions for that month regardless of whether that month includes four or five weeks (and therefore four or five TN samples). Furthermore, EPA has been specifying the use of rolling monthly averages (rather than rolling weekly averages) in other recently-issued permits and maintaining this consistency will allow EPA to compare results from other permits more appropriately. Therefore, the Final General Permit has not been changed.

13. Municipality-Specific Comments

The Town of Epping and the Town of Milton requested that their limits be based on actual data rather than an estimate. EPA acknowledges that the limits in the Draft General Permit for Epping, Milton and Rollinsford were based on estimates from the 2018 NHEP report. EPA agrees that it would be more appropriate for a "hold the load" limits to be based on actual data. The Town of Epping provided data from 2018 and 2019 indicating that the average effluent total nitrogen concentration from the facility was 18.5 mg/L. EPA has incorporated these data into the limit in the Final General Permit. For the Towns of Milton and Rollinsford, EPA has included a monitoring requirement in the Final General Permit for the first two growing seasons (*i.e.*, 24 months from the effective date of the authorization to discharge under the permit). The average load, in lb/day, from these two growing seasons will be submitted to EPA and then included as the effluent limits for these facilities to be effective after 24 months from the effective date of the authorization to discharge under the permit.

Additionally, during the first 24 months from the effective date of the authorization to discharge under the permit, the Towns of Milton and Rollinsford shall continue to implement normal operation of their existing wastewater treatment facilities, including, but not limited to, utilizing all available equipment for nitrogen removal and maintaining standard septage receiving practices. The facilities shall be operated without allowing for any significant increase in the nitrogen load. Each Town shall

submit a report 24 months from the effective date of the authorization to discharge under the permit, certifying that they have fulfilled this condition and describing their efforts.

The Town of Newfields commented that they did not know how EPA obtained total nitrogen concentration data from their effluent and requested that the limit be based on actual data. EPA confirms that it used 21.5 mg/L for the Newfields POTW based on the 2018 PREP State of the Estuary report. Table NL-2 of the Environmental Data Report shows Newfields' TN concentration as 21.5 mg/L, which is based on "2011 Town of Newfield Data." Therefore, the load limit is based on actual data and is not an estimate, like Epping, Milton and Rollinsford. EPA has maintained this as the basis for the limit in the Final General Permit and notes that this is the highest effluent concentration used to calculate any "hold the load" limit among all of the POTWs.

The Town of Durham commented that they are being penalized for I/I reductions and water conservation measures that caused their 2012 to 2016 flows to be lower, resulting in a lower proposed load limit in the Draft General Permit. EPA acknowledges that reduced flows result in more stringent limits but notes that all POTWs are required to implement I/I reductions based on proper operation and maintenance of the collection system and that this does not penalize Durham inequitably. Regarding water conservation measures, likewise EPA notes that many communities undertake these efforts to ensure water supply is adequate and to reduce water bills for users. Therefore, EPA views that these are equitably applied to all municipalities and the resulting limits based on these reduced flows will serve to further protect the estuary from excessive nitrogen loads. Further, based on other comments (See Part II.F.1 above), EPA notes that the limits in the Final General Permit have been adjusted and are based on flows during the growing season from 2015 through 2019.

The Town of Berwick commented that they are being penalized for optimizing total nitrogen removal from 2012 to 2016, resulting in a lower proposed load limit in the Draft General Permit. First, EPA notes that while a load limit was allocated to Berwick in the Fact Sheet, this was not included in the Draft General Permit which only covered POTWs in New Hampshire and not in Maine. Second, based on other comments (See Part II.F.1 above), EPA notes that the limits in the Final General Permit have been adjusted and are based on flows during the growing season from 2015 through 2019. While this recalculation was not done for POTWs in Maine, EPA expects that the Maine Department of Environmental Management will incorporate EPA's decision to adjust the limits in its derivation of limits for the Maine POTWs. Third, EPA based these limits and allocations on all available data and, as noted in the Part II.F.4 section above, the limits are not able to be increased due to antidegradation regulations which preclude increasing the discharge of a pollutant to an impaired water.

G. Regulatory Issues

1. The General Permit is Consistent with General Permit Regulations

Some commenters contend that the application of general permit requirements to entities with individual permits (*e.g.*, Exeter and Newmarket) violates 40 CFR § 122.28. The commenters argue that under that regulation EPA is foreclosed from regulating a facility's discharge through the combination of an individual and general permit and, moreover, that EPA is prohibited from limiting the scope of general permit coverage to a specific pollutant. It is the commenters' position that

NPDES regulations mandate a single permit, either individual or general, at any one time to cover the entire discharge.

For this proposition, the commenters rely on 40 CFR § 122.28(b)(3)(i)-(iv), which establishes rules for EPA to navigate several common permitting scenarios so that permittees are not governed by duplicative, overlapping and possibly conflicting requirements in separate individual and general permits. There is nothing in either the Act or the regulation relied on by the commenter that would diminish the flexibility afforded to EPA to frame permits in a manner designed to achieve the purposes of the Act. While the commenters claim that the four permitting configurations described in the regulation occupy the field of all possible interactions between individual and general permits and thus proscribe the action here, there is in fact nothing in the text of the regulation or its preamble to suggests these provisions were intended to limit EPA's authority to issue general permits on the facts here, where dischargers have individual permits but are seeking coverage under a general permit for the discharge of a specific pollutant. The concern underlying the comment—that the permittees will simultaneously be subject to two separate and dueling sets of requirements—does not obtain here, where there is no risk of conflicting permit requirements. This is because the General Permit has been crafted to work in conjunction with existing individual permits without overlap, as explained below.

The commenters misread EPA's statement in the Fact Sheet (p. 48) and in the Draft General Permit (p. 12) that, "The nitrogen requirements in this General Permit, once effective, will supersede the nitrogen requirements in each Permittee's individual NPDES permit." This is a statement of fact and it is not EPA's position that the General Permit, by operation of law or permit, would automatically supplant an existing individual permit. Permit termination, revocation and modification are governed by Part 122 and Part 124 requirements and procedures, and EPA will follow these procedures when effectuating any of these actions.

Some comments requested clarity from EPA regarding the criteria necessary to "opt out" of the General Permit and continue to operate solely under their individual permit. Other permittees have affirmatively requested to be excluded from coverage. In response to these comments, EPA has revised the permit to make the coverage under the General Permit only available through voluntary submittal of a Notice of Intent (NOI) within 60 days of the effective date of the permit. In other words, each Permittee must voluntarily "opt in" to the Final General Permit in order to obtain coverage. In the Draft General Permit, the requirement for all permittees to obtain coverage under the General Permit was driven in large measure by the ambient monitoring program (*i.e.*, to the extent that permittees dropped out, the proportional cost to be borne by the remaining entities would increase to unreasonable levels) and to have permittees operate collaboratively under a single overarching adaptive management framework. Based on other comments, described in Part II.D above, the ambient monitoring program has been removed from the Final General Permit. Therefore, a permittee may voluntarily obtain coverage under the General Permit or will receive a new total nitrogen limit in their renewed individual permit, which EPA intends to issue with dispatch. Under this scenario, EPA may, based on its discretion, apply a standard permitting approach rather than adaptive management based on that municipality's decision not to avail itself of the flexibilities provided through the common adaptive management framework of the General Permit. Put otherwise, effluent limits established under an individual permit will be more stringent than those proposed in the General Permit.

Should any municipality with an individual permit prefer to obtain coverage for its TN discharges under the General Permit, they may submit an NOI to EPA, and EPA will pursue appropriate partial revocation or permit renewal proceedings if their current individual permit contains nitrogen requirements (*i.e.*, for Exeter and Newmarket). Eleven of the thirteen POTWs eligible for coverage do not have existing effluent limitations or monitoring requirements for the nitrogen in their discharges, so no partial revocation proceedings would be necessary for those POTWs. For the other two POTWs (*i.e.*, Exeter and Newmarket), partial revocation or permit renewal proceedings would be necessary, but since seeking coverage under the General Permit would be voluntarily, these proceedings in the case of partial revocation would be on consent. *See* 40 CFR § 122.28(b)(3)(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."). Alternatively, dischargers holding individual permits may continue to remain under those existing instruments, and necessary nitrogen effluent limitations will be imposed at the time of permit reissuance. For this reason, and because permit termination and revocation proceedings will be carried out in the ordinary course under applicable regulations, EPA also rejects some commenter's claim that EPA is modifying an existing permit. It is instead regulating a constituent in the discharge under a separate general permit and the remainder under an existing individual permit. This, again, is a permitting configuration that a permittee may voluntarily opt into.

Several commenters contend that EPA is barred under the regulations from limiting the scope of a General Permit to a specific pollutant in the discharge. EPA disagrees, as there no such prohibition in plain text of 40 CFR § 122.28(a)(1), under which EPA is entitled to craft general permits "for categories or subcategories of discharges."[22] The matter turns on the definition of "discharge," and whether this term will accommodate some differentiation, as implied by the use of "subcategory." The limitation imagined by the commenters is inconsistent with the definition of "direct discharge" and "discharge of a pollutant," which EPA regulations define as, "Any addition of any 'pollutant' or combination of pollutants to 'waters of the United States' from any 'point source.'" 40 CFR § 122.2. Under its plain meaning, EPA regulations identify a distinction between the undifferentiated discharge of pollutants ("combination of pollutants") and a specific pollutant. Both may be regulated under a general permit scheme, and EPA is authorized to target permit coverage to particular constituents or types of waste in the effluent—whether subcategories of the discharges or a "pollutant"—in this case TN. This reading of the regulation is also consistent with EPA's intent to provide maximum flexibility under the general permit regulations to facilitate administration of the NPDES program, as detailed in the preamble to the rule. 61 Fed. Reg. 65268, 65272 (December 11, 1996) ("EPA's NPDES general permit program arose out of the broad grant of authority in section 402(a) of the CWA and the decision of *NRDC v. Train*, 396 F.Supp. 1393, 1402 (D.D.C. 1975), aff'd, *NRDC v. Costle*, 568 F.2d 1369 (D.C. Cir. 1977)), which recognized EPA's authority to employ administrative mechanisms, such as area (general) permits, to assist the Agency in the practical administration of the NPDES permit program."). This animating aspect of the rule is described more fully below.

[22] Clearly, the regulation did not conflate the source of the pollutant, *i.e.*, a POTW, with the discharge, which would suggest the discharge must be regulated as a whole. Instead, the regulation distinguishes between "categories and subcategories of sources" and "categories and subcategories of discharges," referring to pollutants in the effluent added to the U.S. waters. 40 CFR § 122.28(a)(2).

Some commenters assert that EPA erred by imposing differing water quality-based effluent limitations on the POTWs eligible for coverage under the General Permit, allegedly contrary to 40 CFR §122.28(a)(2), which provides:

> [t]he general permit may be written to regulate one or more categories or subcategories of discharges or sludge use or disposal practices or facilities, within the area described in paragraph (a)(1) of this section, 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, or one or more categories or subcategories of "treatment works treating domestic sewage", if the sources or "treatment works treating domestic sewage" within each category or subcategory all:
>
> > (A) Involve the same or substantially similar types of operations;
> >
> > (B) Discharge the same types of wastes or engage in the same types of sludge use or disposal practices;
> >
> > (C) Require the same effluent limitations, operating conditions, or standards for sewage sludge use or disposal;
> >
> > (D) Require the same or similar monitoring; and
> >
> > (E) In the opinion of the Director, are more appropriately controlled under a general permit than under individual permits

These commenters misunderstand the authority given to EPA under the regulation to categorize sources and discharges subject to a General Permit, and to impose "the same effluent limitations" on those subcategories. As EPA explained in the preamble to section 122.28:

> In today's notice, EPA seeks to revise §122.28(a)(1) and (2) to clarify that a general permit for non-storm water dischargers may cover more than one category or subcategory of sources or treatment works treating domestic sewage. This revision will enable greater permit drafting flexibility and would allow the Director to write a general permit covering (as separate categories) permittees whose discharges or sludge use or disposal practices differ substantially, for example, regarding flow or pollutant load, as well as for those permittees with similar discharges or sludge use or disposal practices (a single category). In another case, the Director might designate different monitoring requirements for different categories based on discharge flow or frequency and provide for this without having to promulgate separate general permits for each group of dischargers or treatment works treating domestic sewage in the general category.

61Fed. Reg. at 65272. The purpose behind the requirement to impose uniform WQBELs reflected, "EPA's position that general permits should not be used to provide permit coverage to loosely grouped categories of dissimilar discharges." *Id*. at 65273. It was not intended to curtail EPA's ability to identify a category of sources (POTWs) and to then further subcategorize that group based on attributes of the facility (large and small) and constituents in the discharge (TN). *Id.* ("To improve

administration and operation of the general permit program and to encourage more widespread use of general permits, the Agency is proposing to amend the general permit regulations to allow general permits to cover multiple categories of dischargers."). In so fashioning the regulation, EPA identified permitting flexibility and efficiency as one rationale for such an approach:

> The proposal would allow a permit drafted to cover a single category of dischargers or treatment works treating domestic sewage to cover different subcategories subject to different effluent limitations, standards, or conditions. This should reduce the burden on the permitting agency by decreasing the number of general permits issued.

Id. A contrary reading along the lines proposed by the commenter would render provisions relating to categorization and subcategorization superfluous. The preamble to the final rule confirms that the "same effluent limitations" language and the categorization provisions were intended to be applied in conjunction with one another. 65 Fed. Reg. 30866, 30890 (May 15, 2000) ("Within each identified category or subcategory, limitations would have to be identical for all covered dischargers or treatment works treating domestic sewage. EPA also proposed to revise the general permit regulations to clarify that where dischargers are subject to water quality-based effluent limitations (WQBELs), discharges within a specific category or subcategory shall be subject to the same WQBELs.").

Under 40 CFR § 122.28(a), a general permit may be issued to the same category or subcategory of facilities if the facilities require the same effluent limitations or operating conditions. EPA has crafted the permit consistent with 40 CFR § 122.28(a), because it has identified subcategories of POTWs and "required the same effluent limitations, operating conditions, or standards for sewage sludge use or disposal" for those subcategories of facilities. 40 CFR §122.28(a)(2)(i)(C). Of the 13 facilities considered under the general permit, EPA has identified two subcategories of facilities: large POTWs and small POTWs. EPA has identified these subcategories based on the operating conditions and existing discharges at each facility. All six large POTWs are limited by the same effluent limitations (*i.e.*, 8 mg/L at average flows), while the smaller POTWs are required to operate under similar conditions (*i.e.*, "hold the load"). EPA maintains the discretion under the regulation to employ general permitting vehicles to address individual pollutants in the discharge, which furthers the purpose of the general permitting regulations by encouraging their widespread coverage and enhancing permitting efficiency.

2. The General Permit is Consistent with EPA Regulations Governing Derivation of WQBELs and Does Not Revise State Water Quality Standards, Establish a TMDL or Modify the MS4 General Permit

Many commenters argued that EPA was required to implement 40 CFR § 122.44(d) through establishment of a dilution-based, concentration target, rather than an areal loading method. EPA has considered the varied objections to the areal loading method employed by EPA and is not persuaded by them. All are variations on a theme that rest on the fundamentally misguided premise that 40 CFR §122.44(d)(1) requires reasonable potential determinations and narrative criteria translations to be based on concentration-based targets. While EPA may have opted to utilize concentration-based approaches when calculating a protective instream TN target in other permits, it was *not* required to do so under applicable regulations. This is true for both the translation of the narrative into a numeric WQBEL under 40 CFR § 122.44(d)(1)(vi)(A) and the determination of reasonable potential under 40

CFR § 122.44(d)(1)(i)-(iii). Through their interpretation, the commenters effectively manufacture an additional, mandatory step in the WQBEL derivation process—and then accuses EPA of having missed it. But this reading departs from the plain language of the relevant standard, is inconsistent with the preamble and is accordingly without merit.

EPA's 1989 regulations lay out the process for the Agency to determine whether permit conditions are necessary to achieve state water quality standards and for the formulation of these conditions. *See* 40 CFR § 122.44(d). Permit writers are first required to determine whether pollutants "are or may be discharged [from a point source] at a level which will cause, have the reasonable potential to cause, or contribute to an excursion" of the narrative or numeric criteria set forth in state water quality standards. *See* 40 CFR § 122.44(d)(1)(i)-(iii). If a discharge is found to cause, have the reasonable potential to cause, or contribute to an excursion of a state water quality criterion, then a limit is "necessary," and EPA is obligated to include one in the permit. That WQBEL must be as stringent as necessary to achieve state water quality standards. *See* 40 CFR § 122.44(d)(1), (5) (providing in part that a permit must incorporate any more stringent limits required by CWA § 301(b)(1)(C)).

"EPA's legal obligation to ensure that NPDES permits meet all applicable water quality standards, including narrative criteria, cannot be set aside while a state develops [numeric] water quality standards." National Pollutant Discharge Elimination System; Surface Water Toxics Control Program; Final Rule, 54 Fed. Reg. 23,868, 23,877 (June 2, 1989). EPA, in issuing an NPDES permit, must, by necessity, translate existing narrative criteria into in-stream numeric concentrations when developing water quality-based effluent limitations, and for this reason, EPA regulations establish methods for the permit issuer to translate or interpret a State water quality standards into numeric effluent limitations. As explained by the District of Columbia Circuit:

> As long as narrative criteria are permissible…and must be enforced through limitations in particular permits, a permit writer will inevitably have some discretion in applying the criteria to a particular case. The general language of narrative criteria can only take the permit writer so far in her task. Of course, that does not mean that the language of a narrative criterion does not cabin the permit writer's authority at all; rather, it is an acknowledgement that the writer will have to engage in some kind of interpretation to determine what chemical-specific numeric criteria—and thus what effluent limitations—are most consistent with the state's intent as evinced in its generic standard.

Am. Paper Inst., Inc. v. EPA, 996 F.2d 346, 351 (D.C. Cir. 1993) (citations omitted). The process of translating a narrative criterion is specifically governed by 40 CFR § 122.44(d)(1)(vi), which implements Sections 301 and 402 of the Act. Subsection (A) of that provision mandates at the outset that in translating a state narrative criterion, EPA is to calculate a protective numeric concentration for the pollutant:

> 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* [emphasis added] 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[.]

See also Upper Blackstone, 690 F.3d at 23. The commenters contend that EPA was required to derive a concentration-based target that would be protective of eelgrass, rather than areal load reduction designed to achieve that *identical* objective. Contrary to the commenters' position, 40 CFR § 122.44(d), the regulation used to determine the need for and to establish water quality-based effluent limitations, is not at all predicated upon the derivation of a concentration-based target. Rather, that provision requires only "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 CFR § 122.44(d)(1)(vi) (EPA refers to this value as a "(d)(1)(vi) criterion").

These commenters wrongly contend that "concentration" is inherent in the notion of a "calculated water quality criterion." A criterion may in fact be expressed in many ways under the Clean Water Act, including as an ambient concentration or a mass load. In attempting to shoehorn the words "concentration-based" into the phrase "numeric water quality criterion," the commenters selectively quote from 40 CFR § 131.3(b), claiming that the definition of criteria "explicitly states that all criteria are to be expressed as "constituent concentrations." This a plain misreading of the definition, which says nothing of the sort:

(b) *Criteria* are elements of State water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.

The regulation specifically contemplates that a criterion may be "expressed as…levels, or narrative statements." EPA notes that a mass-based criterion would certainly fall within the ambit of a "level" that supports a particular use. The essential test is whether the WQBEL will implement the standard and achieve the designated use. In this case, that "calculated numeric criterion" was a mass-based, areal loading threshold. See Fact Sheet at 22-24. The commenters similarly elide the definition of "criterion" under New Hampshire's Water Quality Standards, claiming that "nothing in the rule contemplates expression of a load." This is plainly incorrect. *See* Env-Wq 1702.14(c) (defining criterion to include, "A numeric value or narrative statement related to other characteristics of the surface waters, such as flow and biological community integrity."). A numeric load, obviously, falls within the ambit of a "numeric value."

In addition to alleging that EPA departed from operative federal regulations, several commenters again rely on an overly-narrow understanding of WQBEL permitting by claiming that EPA failed to implement New Hampshire's narrative nutrient water quality criterion at Env-Wq 1703.14(b),

because it is expressed in terms of concentration. The fact that the State's narrative nutrient criteria happens to be expressed in that way does not preclude EPA from deriving a (d)(1)(vi) water quality criterion to meet it on a mass loading basis. What is material from the standpoint of section 301(b)(1)(C) of the Act, 40 CFR § 122.44(d)(1) and Env-Wq 1703.14(b) is whether the (d)(1)(vi) criterion will ensure compliance with applicable water standards, including attainment of designated uses, which is the final common pathway for all three provisions. If the (d)(1)(vi) criterion here is protective of designated uses, as EPA in its technical judgment has determined, then it will necessarily result in ambient concentrations that are stringent enough to meet the narrative water quality criterion. This view of the regulation, reflected in its plain language, is consistent with the intent behind the regulation. As EPA noted at the time of promulgation:

> Several commenters stated that option A should describe scientifically sound procedures that must be followed when deriving numeric criteria. EPA believes it is inappropriate for this regulation to provide detailed technical procedures for developing numeric criteria because option A is intended to provide flexibility to the states when developing water quality-based effluent limitations. EPA emphasizes however, that scientifically valid procedures must be used to develop criteria that protect aquatic life and human health. The regulation suggests the use of EPA's Water Quality Standards Handbook, but other procedures may be used provided the resulting numeric water quality criteria attain and maintain all applicable water quality standards. Because there is more than one procedure that can be used to develop water quality-based effluent limitations under option A, EPA is making no changes to this language in option A. EPA believes that option A offers a reasonable approach to developing water quality-based effluent limits in the absence of state numeric water quality standards, and EPA is not persuaded by the objections to option A.

National Pollutant Discharge Elimination System; Surface Water Toxics Control Program, 54 Fed. Reg. 23868, 28876. The interpretation advocated by the commenter, even if justified by the text of the regulation (which it is not, as demonstrated above), would needlessly constrain EPA's flexibility, and under the circumstances here, impede it from fully implementing state narrative water quality standards, an outcome inconsistent with 40 CFR § 122.44(d).[23]

Just as the commenters' claim that EPA was required to use a specific, concentration-based methodology in determining a (d)(1)(vi) criterion is mistaken, so too is the corollary that such an approach must be employed when EPA is determining the existence of reasonable potential pursuant to section 122.44(d)(1)(ii). The commenters' attempt to read a specific, concentration-based

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[23] The commenters cites to language from the preamble that it regards as supporting its theory:

> Like options A and B, option C is used only where a state has not adopted a water quality criterion for a pollutant for which the permitting authority has data showing that the pollutant is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above an applicable state narrative water quality criterion.

54 Fed. Reg. 23, 868-77 (June 2,1989). EPA does not discern any inconsistency in this language with its position. This statement makes reference to concentrations in the effluent, not ambient concentrations, and EPA utilized effluent concentration data to project the overall load from each contributing facility.

methodology into the regulation cannot be reconciled with its text. Again, section 122.44(d)(1)(ii) provides that "[w]hen determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for…*where appropriate* [emphasis added], the dilution of the effluent in the receiving water." 40 CFR § 122.44(d)(1)(ii). As the Environmental Appeals Board has held:

> [Section 122.44(d)(1)(ii)] does not mandate consideration of dilution at all times, it only requires that the permit issuer consider dilution "where appropriate." Moreover, this provision does not apply to the calculation of effluent limits. The provision only imposes an obligation to consider dilution, "where appropriate," when the permitting authority is determining "whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard." 40 CFR § 122.44(d)(1)(ii). The "cause or contribute" determination is different than the determination of an effluent limitation.

In re City of Attleboro Wastewater Treatment Plant, 14 E.A.D. 398 (EAB 2009). If EPA strictly mandated derivation of a concentration-based target, then accounting for dilution would not have been committed to the permit issuer's discretion but would have been mandated.

The commenters' interpretation runs aground not only upon the text of 40 CFR § 122.44(d)(1)(ii), but also contravenes EPA's contemporaneous interpretation of the regulation. A principal aim of 40 CFR § 122.44(d) is to provide flexibility to the permit writer in order to fully implement narrative water quality standards. For this reason, as the Board has held, NPDES regulations do not require the Region to use any particular methodology or conduct any specific modeling to determine whether the "reasonable potential" standard is met. *In re City of Taunton*, 17 E.A.D. 105, 144 (EAB 2016) *aff'd*, 895 F.3d 120 (1st Cir. 2018), *cert. denied*, 139 S. Ct. 1240 (Feb. 19, 2019). The permissive language in 40 CFR § 122.44(d)(1) is consistent with the "significant amount of flexibility [a permitting authority has] in determining whether a particular discharge has a reasonable potential to cause an excursion above a water quality criterion." 54 Fed. Reg. at 23,875-76, 23,878. Accordingly, neither the regulatory text, nor its preamble, nor Board or First Circuit precedent, oblige a permit issuer to account for dilution in establishing reasonable potential, or to impose lower effluent limits based on either dilution or attenuation under section 122.44(d)(1)(ii) or (vi).

In addition to their attempts to interpose additional hurdles that it claims EPA must overcome prior to establishing a (d)(1)(vi) criterion that will implement the State's narrative nutrient water quality standard, some commenters contend that EPA erred by considering certain sources of information, which it claims EPA was *prohibited* from doing under the regulations. Unsurprisingly, these commenters also postulate that EPA erred by failing to rely on other sources identified by it, which they claim EPA was *compelled* to do by regulation. Neither opinion stands up to much scrutiny. The only legally relevant test for determining the types of information that may be considered when deriving an appropriate numeric effluent limitation to implement a narrative criterion is plainly laid out in section 122.44(d)(1)(vi)(A). Under that provision, the permitting authority *must* establish effluent limits based on 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," and *may* derive this threshold value from "a proposed

State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information." *Id*. The preamble to the regulation states that "[u]nder [Option A] the permitting authority should use all available scientific information on the effect of a pollutant on human health and aquatic life," suggesting a broad construction of both "relevant information," so long as it is based on scientific information. 54 Fed. Reg. at 23,876. With respect to the scope of materials EPA is authorized to consider, the operative term of the regulation above is "relevant," which means, "Having a bearing on or connection with the matter at hand." *See The American Heritage Dictionary of the English Language, Fourth Edition (2004).* Nothing in the CWA or Part 124 limits or qualifies what can constitute "relevant information" under subsection (A) of § 122.44(d)(1)(vi), so long as EPA demonstrates that the target value will fully protect the designated use.

In any event, contrary to the commenters characterization, EPA did not "rely heavily" on the State's 303(d) determination relating to nutrient impairments or the letter outlining its concerns over ongoing nitrogen-driven cultural eutrophication in Great Bay, but evaluated them as two pieces among of the total mix of information. The 303(d) determinations are indicative of the State's position on the impairment status of the receiving waters and the pollution sources contributing to this water quality problem. These predicate regulatory determinations and underlying effluent and water quality information directly relates to the receiving waters and pollutant of concern at issue in this permit proceeding. Viewed in this light, both are clearly "relevant," albeit not dispositive, to the translation of the New Hampshire's narrative nutrient standard. As the court explained in *City of Dover v. United States Envtl. Prot. Agency*, 36 F. Supp. 3d 103, 113–16 (D.D.C. 2014)

> Simply put, the 303(d) listing determination and the section 122.44(d)(1)(i) determination are wholly separate. Hence, to make the 303(d) list determination, EPA asks whether a particular body of water is polluted; to make the section 122.44(d)(1)(i) reasonable potential determination, EPA asks whether a particular source is discharging too much of a pollutant.
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> *Id.* at 113.
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> Plaintiffs are correct that EPA can and does consider 303(d) listing when making its reasonable potential determination. Pls.' Opp'n at 6 (limits in proposed and "promised" permits "based on the 303(d) impairment determination"). While the 303(d) listing might therefore make it more likely that plaintiffs will receive a permit with restrictive nitrogen limits, it by no means guarantees it. As explained above, the reasonable potential determination is complex and involves many factors. In the permit issued to a non-plaintiff city that discharges into the Great Bay Estuary waters, EPA explains at length the many bases for its decision. *See* Defs.' Reply Ex. 6, *Newmarket Permit Fact Sheet,* at 25–31. It does mention the 303(d) listing, but careful review makes it clear that the listing was far from the only thing EPA considered. Although the 303(d) listing may influence the permitting decision, because it is something EPA considers, it does not—as plaintiffs imagine—conclusively establish the reasonable potential required under section 122.44(d).
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> *Id.* at 114-115.

> Even if the Great Bay Estuary waters were taken off the 303(d) list, nothing would require EPA to issue plaintiffs less restrictive permits. Indeed, because the limits in the permits to be received by plaintiffs are determined through a separate agency determination under section 122.44(d), those limits would be unaffected. Just as the 303(d) listing did not cause the proposed restrictive limits in plaintiffs' permits, reversing the listing will not ease those limits.

Id. at 116. While the commenters argue that these determinations must be set aside due to alleged procedural infirmities, these are merely conclusory, argumentative claims, as these listing decisions have not been challenged and remain valid.

Similarly, EPA rejects the commenters' position that it may not rely on NHDES statements, such as those contained in the October 21, 2019, letter endorsing the structure of the permit and EPA's interpretation of its narrative water quality standards. In contrast to the commenters' assertions, their relevance as sources of information to consider in the process of interpreting or translating an applicable narrative water quality criterion and deriving an effluent limitation to meet such a criterion do not turn on whether the (d)(1)(vi) target has been finalized, adopted as rules under N.H. Rev. Stat. Ann. § 541-A or submitted to EPA for approval as a revised water quality standard pursuant to section 303 of the Act. Nothing in the regulation or its preamble suggests that an "explicit state policy" (even assuming NHDES's statements constitute as much) or "relevant information" must have reached some specific point in the state legislative or administrative process prior to being employed in the derivation of a water quality-based effluent limitation under section 122.44(d)(1)(vi)(A). As the preamble to this regulation states:

> Paragraph (d)(1)(vi) is used only in the absence of a state numeric water quality criterion (including a criterion derived from an approved translator mechanism). The options in paragraph (d)(1)(vi) provide a regulatory basis for developing water quality-based effluent limitations as an interim measure until a numeric criterion for the pollutant of concern is available. *State policies or procedures, even procedures which calculate derived criteria but are not approved by EPA, may be used to develop effluent limits under option A of paragraph (d)(1)(vi).* 54 Fed. Reg. at 23,876 (emphasis added).

Barring the use of NHDES's technical and policy interpretations relating to implementation of its own water quality standards would cut against a rationale underlying subsection (A) of EPA's regulation, which is to pay appropriate heed to the State's reading of its own water quality standards. Whether these sources of information are "rules" for some reason procedurally infirm under New Hampshire's administrative statutes—conclusory allegations by the commenters—was not relevant to EPA's assessment, as EPA never regarded them as binding regulatory judgments.

Rather, in light of all the information in the administrative record, EPA determined that it was *obligated* to impose permit effluent limitations on the POTWs, because loading into the estuary far exceeds the assimilative capacity of the receiving waters, as evidenced by ongoing cultural eutrophication (*i.e.*, elevated chlorophyll-a, DO impacts and eelgrass declines). EPA rooted this judgment in effluent and water quality data and established the areal loading threshold on peer-reviewed literature evaluating estuarine impacts resulting from nitrogen loading. The State's characterization of the nutrient-impairment status of the receiving waters and reasonableness of the protective loading threshold selected by EPA bear on the interpretation of its own water quality

standards and are indisputably "relevant" to the question of nutrient loading into Great Bay and associated eelgrass impacts.

The commenters' assertion that EPA, when deriving a WQBEL to implement a narrative criterion, was required to utilize certain sources of information, such as the State's Consolidated Assessment and Listing Methodology (CALM), the Technical Support Document For Water Quality-Based Toxic Controls and the 2009 Numeric Nutrient Criteria for the Great Bay Estuary, falters for the same reasons outlined above. Section 122.44(d)(1)(vi) is fundamentally permissive in its operation, so as to afford the permit writer flexibility to fashion effluent limitations necessary to implement state water quality standards. With respect to the CALM, the Board has already addressed and refuted the argument:

> The NPDES regulations do not require the Region to follow the 303(d) listing methodology prescribed by a state. Nor does the CALM Guidance refer to or purport to apply to NPDES permitting determinations. As such, the City's Petition misapprehends the scope of the CALM Guidance.

In re City of Taunton, 17 E.A.D. 105, 141 (EAB 2016) *aff'd*, 895 F.3d 120 (1st Cir. 2018), *cert. denied*, 139 S. Ct. 1240 (Feb. 19, 2019). Still, EPA observes that this document is within the total mix of record information before EPA in making its determination and is broadly consistent with EPA's approach, which utilizes a conceptual model of eutrophication:

> Excessive algal growth (high biomass and high chlorophyll-a values) can impair the public safety and aesthetic enjoyment of surface waters. The General Water Quality Criteria (Env-Wq 1703.03) require that surface waters be free of substances which: produce color or turbidity making the water unsuitable for the designated use; or interfere with recreational activities (Env-Wq 1703.03 (c)(1) c & e). Further, Env-Wq 1703.14(b) states that, "Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring." The estuarine eutrophication model used by the National Oceanic and Atmospheric Administration relates external nutrient inputs to primary and secondary symptoms of eutrophication (Bricker, et al., 2007). Elevated chlorophyll-a concentrations and proliferation of macroalgae are primary symptoms of eutrophication.
>
> 1. The estuarine eutrophication model used by the National Oceanic and Atmospheric Administration relates external nutrient inputs to primary and secondary symptoms of eutrophication (Bricker, et al., 2007). Elevated chlorophyll-a concentrations and proliferation of macroalgae are primary symptoms of eutrophication, while low dissolved oxygen, loss of submerged aquatic vegetation (e.g., eelgrass), and harmful algal blooms are secondary symptoms. This approach is consistent with the conceptual model of coastal eutrophication presented by Cloern (Cloern, 2001). Therefore, the most direct link between nutrient inputs to an estuary and eutrophic effects is for chlorophyll-a concentrations in the water and macroalgae growth. 2018 New Hampshire Consolidated Assessment and Listing Methodology

2. The primary symptoms of eutrophication are useful as a means to detect eutrophication before secondary symptoms develop. Phytoplankton blooms (as measured by chlorophyll-a concentrations) can impair primary contact recreation.

See Consolidated Assessment and Listing Methodology at pp. 43-44. The CALM also outlines NHDES's views on the primary response variables to nitrogen loading in estuaries:

> Low dissolved oxygen is a well-established indicator of elevated nutrients in estuaries (NRC, 2000) (Cloern, 2001) (Bricker, et al., 2007) (USEPA, October 2001) (Diaz & Rosenberg, 2008). Fish and other species require sufficient concentrations of dissolved oxygen in the water to survive. In nitrogen-limited systems, such as estuaries (Howarth & Marino, 2006), increasing nitrogen inputs will increase primary productivity in the form of both pelagic phytoplankton and rooted or free-floating macroalgae. Respiration of the organic matter created by the primary productivity consumes oxygen from the water column and sediments. The resulting low oxygen conditions affect fish and benthic communities (Diaz & Rosenberg, 2008) (Cloern, 2001) (Bricker, et al., 2007). Effects on species include death, compressed habitats, and shifts in species composition to opportunistic benthic species with short life spans and smaller body sizes (Diaz & Rosenberg, 2008) (NRC, 2000).
>
> Chlorophyll-a growth is stimulated by eutrophication processes. Chlorophyll-a represents a potential draw on available dissolved oxygen in two principle ways. Initially, live phytoplankton must consume oxygen during the night to maintain biological functions. Once phytoplankton dies, the remaining organic matter is available to bacteria and additional oxygen consumption from the water column.
>
> Eelgrass is sensitive to water clarity among other factors (Short, Burdick, & Kaldy, 1995). Light attenuation in the water column by water, phytoplankton blooms, and non-algal particles, and colored dissolved organic matter (CDOM) reduce the light available to eelgrass for growth. Therefore, water clarity can be used as an indicator of suitable conditions for eelgrass survival. The assessment makes no assumptions regarding the relative weight of the various factors. General water quality criteria require that waterbodies be free of substances in kind or quantity, such as color and turbidity that affect water clarity, which would render it unsuitable for its designated uses (Env-Wq 1703.03(c)(1)c.).

CALM at 70-71. EPA observes that the record includes description of pervasive nutrient-related impairments throughout Great Bay consistent with those the conceptual model would predict.

The 1991 Technical Support Document (TSD) is published detailed technical guidance to assist permit writers in conducting reasonable potential analyses and ensuring variability is considered therein. In cases where effluent monitoring data are available, the guidance recommends that agencies use all such data to characterize pollutant concentrations in the effluent. Office of Water, U.S. EPA, EPA/505/2-90-001, *Technical Support Document for Water Quality-Based Toxics Control* § 3.3.2, at 52 (Mar. 1991). The TSD reflects EPA's long-established view that reasonable potential analyses incorporate worst-case estimates of effluent quality. *Am. Iron & Steel Inst. v. EPA*, 115 F.3d 979, 1001 (D.C. Cir. 1997). What the TSD does not do is supply a binding methodology for derivation of WQBELs under section 122.44(d)(1)(vi). Again, EPA could have employed a

concentration-based approach, and within that methodology could have looked to the specific procedures set out in the TSD, but it opted for a different path to achieve standards and explained its reasons for the choice.

Here, EPA implemented the "worst case" rationale underlying the TSD's statistical approach in assessing available effluent limitation data here, but to be clear, the TSD is not binding on permit writers; it is technical guidance, is not required to be used in all circumstance and does not dictate procedures for developing a water quality criterion under 122.44(d)(1)(vi). *In re Gov't of D.C. Mun. Separate Storm Sewer Sys.*, 10 E.A.D. 323, 336-37, 340 & n.18 (EAB 2002) (noting Region's decision that derivation of WQBELs using methods in Technical Support Document was not feasible due to insufficient information regarding magnitude, variation, and frequency of river and storm water discharge flow rates). Even if EPA had decided to pursue a concentration-based approach, it would not have been compelled to adhere to TSD procedures, so long as it met the substantive requirement of 40 CFR § 122.44(d)(1)(vi) (calculate a water quality criterion that will fully protect uses).

Some commenters contend that the 100 kg ha^{-1} yr^{-1} initial loading threshold is an unlawful adoption of a TMDL. For the reasons explained above, EPA was authorized to establish reasonable potential using an areal loading threshold rather than an ambient concentration and accordingly EPA's determination under section 122.44(d)(1)(vi)(A) does not magically convert this permitting action into a TMDL under Part 130. Although their reasoning is opaque, these commenters appears to argue that EPA's derivation of a WQBEL falls within the definition of a TMDL under 40 CFR § 130.2(i), because EPA accounted for point source loading and nonpoint source loading, among other things. The difficulty with this argument is that it would transfigure *any* WQBEL into a TMDL, because the EPA's reasonable potential regulations require EPA to consider "existing controls on point and nonpoint sources of pollution." This amounts to a prescription to await development of a TMDL prior to imposing a WQBEL on the discharge, a sequence of events that is inconsistent with EPA's regulations and one that both the Board and courts have definitively rejected.

Neither the CWA nor EPA regulations require a TMDL, or its equivalent, to be completed before a water quality-based limit may be included in an NPDES permit.[24] Rather, water quality-based effluent limitations in NPDES permits must be "consistent with the assumptions and requirements of any *available* [emphasis added] wasteload allocation." 40 CFR § 122.44(d)(1)(vii)(B). *Id*. Thus, an approved TMDL is not a precondition to the issuance of an NPDES permit for discharges to an impaired waterway. *Id*. This interpretation is consistent with the preamble to 40 CFR § 122.44(d)(1), which expressly outlines the relationship between subsections 122.44(d)(1)(vi) (*i.e.*, procedures for implementing narrative criteria), and (d)(1)(vii):

> The final point about paragraph (vi) is that in the majority of cases where paragraph (vi) applies waste load allocations and total maximum daily loads will not be available for the pollutant of concern. Nonetheless, any effluent limit derived under paragraph (vi) must satisfy the requirements of paragraph (vii). Paragraph (vii) requires that all water quality-

[24] *See*, *e.g.*, 43 FR 60662, 60664 (December 28, 1978) ("EPA does not consider the establishment of TMDL's as essential to setting of water quality based effluent limits. Development of TMDL's pursuant to section 303(d) is not a necessary prerequisite to adoption or enforcement of water quality standards, and therefore, will not determine the validity of existing, revised or new water quality standards.")

> based effluent limitations comply with "appropriate water quality standards," and be consistent with "available" waste load allocations. Thus for the purposes of complying with paragraph (vii), where a wasteload allocation is unavailable, effluent limits derived under paragraph (vi) must comply with narrative water quality criteria and other applicable water quality standards.

See 54 Fed. Reg. 23,868, 23,876 (June 2, 1989). If a TMDL is completed and approved by EPA, the effluent limitation in any subsequently issued NPDES permit must be consistent with the wasteload allocation assigned to the facility. In the meantime, relevant regulations require that EPA develop water quality based effluent limitations based on the existing applicable water quality standard in order to ensure that the permit complies with the EPA regulations requiring permits to include requirements "necessary to achieve water quality standards" (40 CFR § 122.44(d)(1)) and limits "derived from, and [that comply] with" water quality standards (§ 122.44(d)(1)(vii)). These requirements implement Clean Water Act section 301(b)(1)(C), which mandates inclusion of "any more stringent limitation, including those necessary to meet water quality standards" in NPDES permits. *See In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 604-05 (EAB 2010) (expressly rejecting the idea that the permitting authority cannot proceed to determine permit effluent limits where a TMDL has yet to be established), *aff'd*. 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013).

Several commenters claim that EPA, in deriving a WQBEL under 40 CFR § 122.44(d)(1)(vi) using an areal loading methodology has amended the applicable narrative nutrient water quality standards without following notice and comment procedures. As outlined above, the premise underlying this comment is erroneous. EPA has already demonstrated that a "calculated numeric criterion" under section 122.44(d)(1)(vi)(A) need not be concentration-based. EPA's decision to utilize an areal loading target was made pursuant to Section 402 and does not, and cannot, set off the cascade of regulatory consequences under Section 303 imagined by the commenters. A federal permit is not and cannot be a state water quality standard, because it is not enacted into state law. This is not the first time that the commenters have attempted to transfigure actions by NHDES and EPA as equivalent to putative water quality standards. In a dispute over the status and validity of the draft 2009 nitrogen criteria—which ironically commenters now press upon the agencies and urge them to consider—the court dismissed claims brought by three New Hampshire municipalities, explaining:

> EPA regulations define water quality standards as "provisions of State or Federal law." 40 CFR § 131.3(i) ("Water quality standards are provisions of State or Federal law which consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based upon such uses."); *see also* 40 CFR § 131.6(e) (requiring State to include in a water quality standard submitted for EPA review a "[c]ertification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law"). Promulgation into law is, hence, one of the prerequisites to deeming a document a new or revised water quality standard. Plaintiffs do not here challenge this regulatory definition—nor could they because the regulation was promulgated in 1983, *see* Water Quality Standards Regulation, 48 Fed.Reg. 51400, 51406 (Nov. 8, 1983), and the time to challenge it has long since expired, *see* 33 U.S.C. § 1369(b)(1).

City of Dover v. U.S. E.P.A., 956 F. Supp. 2d 272, 279 (D.D.C.), *on reconsideration in part sub nom. City of Dover v. United States Envtl. Prot. Agency*, 40 F. Supp. 3d 1 (D.D.C. 2013). Further:

> In any event, plaintiffs' fears about opportunities to circumvent the Clean Water Act procedures are misplaced. First, the Clean Water Act affirmatively requires adoption of initial water quality standards as well as periodic review (and, if needed, revision) of those standards. 33 U.S.C § 1313(a)(2), (a)(3), (b), (c)(1). Second, a document published by an agency operates differently from a water quality standard, which has been promulgated into law. Water quality standards carry binding consequences, automatically limiting the permits that may be issued. *See Am. Paper Inst.,* 996 F.2d at 350 (the Act "requires all NPDES permits for point sources to incorporate discharge limitations necessary to satisfy [the water quality] standard"). The 2009 Document may have effects detrimental to the Cities' interest, but it has these effects in the same way as a scientific report arguing for a lower cap on a pollutant or a higher requirement for a nutrient: it can influence subsequent regulatory action only by persuasion, and the Document's validity and persuasiveness can be challenged in the context of that decision.[3] The Cities' approach, by contrast, would require any document that a state agency may later consider in interpreting its water standards to be reviewed by the EPA. But there are countless such documents. *See, e.g.,* 40 CFR § 130.7(b)(5) (requiring States to "evaluate all existing and readily available water quality-related data and information" in creating impaired water lists). If EPA had to be aware of every one, and had to subject it to a review process—and, if it disagreed with its reasoning, promulgate its own alternative, *see* 33 U.S.C. § 1313(c)(4)—havoc would result.[4] The Clean Water Act and implementing regulations require no such thing, subjecting only provisions of state law to the review process. *See* 40 CFR § 131.3(i); *see also* 40 CFR § 131.21(a) (EPA's clock for acting on a State submission begins when "the State submits its *officially adopted* revisions" to water quality standards (emphasis added)). It is difficult to fathom how a contrary requirement would function, and it is hence entirely unsurprising—and dispositive here—that federal regulations interpreting the Act require a water quality standard to be a provision of law.

Id. at 280–81. The statutory and regulatory requirements, and applicable guidance, related to review and approval of revised WQS is not pertinent to this determination. Indeed, in upholding 40 CFR § 122.44(d)(1)(vi), the D.C. Circuit specifically considered and rejected an argument that the regulation violated the provisions governing promulgation of state water quality standards and criteria. The court explained:

> [T]he regulation does not supplant — either formally or functionally — the CWA's basic statutory framework for the creation of water quality standards; rather, it provides alternative mechanisms through which *previously adopted* water quality standards containing narrative criteria may be applied to create effective limitations on effluent emissions. As long as narrative criteria are permissible…and must be enforced through limitations in particular permits, a permit writer will inevitably have some discretion in applying the criteria to a particular case. The general language of narrative criteria can only take the permit writer so far in her task. Of course, that does not mean that the language of a narrative criterion does not cabin the permit writer's authority at all; rather, it is an acknowledgement that the writer will have to engage in some kind of interpretation to determine what chemical-specific

> numeric criteria — and thus what effluent limitations — are most consistent with the state's intent as evinced in its generic standard. The EPA's new regulation merely requires that permit writers engage in this task to create chemical-specific limitations on discharges of pollutants and gives those writers three tools with which to do this work in a fairly regularized fashion. The regulation thus seems to provide an eminently reasonable means of effectuating the intent of the previously adopted narrative criteria as well as Congress' own intent, made explicit in section 301 of the CWA, that *all* state water quality standards be enforced through meaningful limitations in individual NPDES permits.

American Paper Inst., Inc. v. EPA, 996 F.2d 346, 348, 351 (D.C. Cir. 1993) (citations omitted); *see also American Iron and Steel Inst. v. EPA*, 115 F.3d 979, 990-91 (D.C. Cir. 1997). While EPA supports both the adoption of a numeric nitrogen criteria and the development of a TMDL by the state, it is precisely because the threshold is not an approved WLA or a criterion, that it can be adjusted in future permitting actions.

Some commenters argue that the General Permit effects a modification of the MS4 General Permit. While conceding that the Draft General Permit indicates that it does *not* supersede any permit requirements contained in the MS4 General Permit, the commenters point to "the expressed intention that the Agency will incorporate the TN reduction load requirements on the MS4 general permit." EPA notes that the Great Bay Total Nitrogen General Permit and the MS4 General Permit are independent instruments with separate administrative records, and control different wastes streams (municipal wastewater effluent and stormwater). Aside from misconstruing the actual vehicle that would impose additional requirements in the MS4 General Permit—and which cannot be added through a permit writer's "intent"—the City has also mischaracterized the relationship between the Great Bay Total Nitrogen General Permit and the MS4 General Permit. Contrary to the City's assertion, EPA has never represented that it would impose a 45% TN reduction requirement in the MS4 General Permit. It merely stated that some load reductions would likely occur as a result of that permit—a outcome that runs to the benefit of the municipalities under the TN General Permit, because they can take credit for TN reductions, however achieved, and forestall the imposition of limit of technology controls on the POTWs.

3. Equitable Estoppel

The Towns of Exeter and Newmarket, two facilities with existing TN limits raised equitable estoppel arguments, arguing that because the Towns entered into administrative orders on consent that "are effective at least through 2022 and 2023 respectively…EPA should remove the Towns from any General Permit issued." The burden of proof in establishing this defense is on the party, seeking equitable sanctuary. *Heckler v. Community Health Services of Crawford,* 467 U.S. 51, 59–60, 104 S.Ct. 2218, 2224, 81 L.Ed.2d 42 (1984). A person must show the traditional elements of estoppel by proving the existence of a misrepresentation by the Government and that the claimant reasonably relied upon this misrepresentation to its detriment. *Id.* at 59*,* 104 S.Ct. at 2223. Additionally, since estoppel against the sovereign is recognized with "great reluctance," a claimant must prove a fourth element: affirmative misconduct by the Government in perpetrating its misrepresentation. *Miller v. United States Through Farmers Home Admin.,* 907 F.2d 80, 82 (8th Cir.1990); *Slagle v. United States,* 809 F.Supp. 704, 710 (D.Minn.1992). The commenters have made no such demonstrations. Although EPA disagrees that it is estopped from including these municipalities under the General Permit, EPA concurs that their individual permits, in conjunction with the enforceable orders, are

sufficient to assure compliance with applicable water quality standards. Exeter and Newmarket may continue to operate under their existing permits or alternatively may seek coverage under the General Permit. The issue of equitable estoppel is therefore moot.

4. Due Process and Equal Protection

Certain commenters lodged a series of due process and equal protection claims on the basis that EPA did not account for all sources of nitrogen pollution into Great Bay, including nonpoint sources, and only imposed controls on a subset of point source dischargers.

These commenters due process claims are misplaced. "[T]he quantum of process required before the government may deprive citizen-intervenors of [a protected] interest would depend on the three part analysis adumbrated in *Mathews v. Eldridge*, 424 U.S. 319, 335 (1976)." *Citizens Awareness Network, Inc. v. United States*, 391 F.3d 338, 354 (1st Cir. 2004); *see also Boston Redevelopment Auth. v. Nat'l Park Serv.*, 838 F.3d 42, 50 (1st Cir. 2016) ("The APA sets forth no strict procedural regime for informal agency decision-making, and a party's procedural due process rights are respected as long as the party is afforded adequate notice and an opportunity to be heard 'at a meaningful time and in a meaningful manner.'" (quoting *Mathews*, 424 U.S. at 333)). The commenters here do not allege any violation of Part 124 procedures and had ample opportunity for comment during an extended comment period as well as a public hearing. Because the commenters make "no effort to apply the *Mathews* rubric to the rules at issue," that is, balancing "the fairness and reliability of the existing . . . procedures, and the probable value, if any, of additional procedural safeguards," its due process claims are not persuasive.

Moreover, these comments are premised on the view that the permittees have some property interest in their existing individual permit or the General Permit, which they do not. (40 CFR § 122.5 "The issuance of a permit does not convey any property rights of any sort, or any exclusive privilege."). The permittees are not entitled to discharge pollutants into United States waters. They may be authorized to do so long as their discharge complies with the requirements of the Act.

At bottom, the commenters' objection turns on the following consideration:

> While Exeter and Newmarket do not dispute that regulation of nitrogen levels in the Estuary, within reason, serves an important government objective, the Draft Permit impermissibly targets only 12 of the 52 communities that contribute nitrogen.

EPA concurs that the regulation of nitrogen is an important government objective, but disagrees that the scope of coverage renders the General Permit irrational and discriminatory. The commenters fail to present the alternative to permitting scheme contemplated by the General Permit: that is, the application of limit of technology or below to ensure that these communities' individual discharges do not cause or contribute to a water quality standards violations. The General Permit forestalls or potentially obviates the need for those lower limits and its purpose is to provide flexibility to the communities that obtain coverage under it. That EPA did not include all sources of nitrogen—whether point or nonpoint source—in the permit does not render the permit arbitrary, but merely acquiesces to indisputable jurisdictional constraints: EPA does not have jurisdiction to alone impose nonpoint source reductions in an NPDES permit. There is nothing irrational about basing the permit structure on this jurisdictional reality. The logical conclusion of the commenters' argument is that

every imposition of a nitrogen limitation, even in an individual permit, would be Constitutionally prohibited in the absence of a permitting act that solved the entire in one fell swoop. This is contrary to the operation of the Clean Water Act.[25] The commenters have a choice of permitting options and may choose to be covered under an individual permit or General Permit.

The commenters claim that the permit violates the Equal Protection Clause of the Constitution is unconvincing. Any general permitting regime will by necessity only include a subset of persons contributing to any given water pollution problem, so it is unclear whether Equal Protection Clause is even applicable in this context. In any event, EPA had a rational basis for structuring the permit as it did and articulated this on permit's record. "[EPA], like other units of government, need not take on all phases of a problem at once; the Administrator may instead proceed incrementally, starting in one state before proceeding to others. *Cf. Beach Commc'ns, Inc.,* 508 U.S. at 316, 113 S.Ct. 2096; *Williamson,* 348 U.S. at 489, 75 S.Ct. 461." *Fla. Wildlife Fed'n, Inc. v. Jackson*, 853 F. Supp. 2d 1138, 1175 (N.D. Fla. 2012). More fundamentally, the commenters misapprehend the scope and operation of the Clean Water Act. Section 301(b)(1)(C) requires each point source to achieve effluent limitations necessary to meet water quality standards and does not make allowances for the failure of other sources to comply. *In the Matter of: National Pollutant Discharge Elimination System Permit for Blue Plains Sewage Treatment*, 1979 WL 22676, at *6. As the First Circuit has explained:

> Under earlier legislation, including the 1965 Federal Water Pollution Control Act, when a water body failed to meet its state-designated water quality standards, pollution limits could not be strengthened against any one polluter unless it could be shown that the polluter's discharge had caused the violation of quality standards. *See EPA v. California ex rel. State Water Res. Control Bd.,* 426 U.S. 200, 202–03, 96 S.Ct. 2022, 48 L.Ed.2d 578 (1976). This standard was ill-suited to the multifarious nature of modern water pollution and prevented the imposition of effective controls. *Id.* In 1972, Congress declared that the system was "inadequate in every vital aspect," and had left the country's waterways "severely polluted" and "unfit for most purposes." S.Rep. No. 92–414, at 3674 (1971), 1972 U.S.C.C.A.N. 3668, 3674. The CWA rejected the earlier approach and, among other things, introduced individual pollution discharge limits for all point sources. 33 U.S.C. 1311(b). To maintain state water quality standards, the Act establishes the TMDL and continuing planning processes, which target pollution from multiple sources. *Id.* § 1313(d), (e).
>
> EPA regulations require permitting authorities to include in NPDES permits conditions which "control all pollutants or pollutant parameters ... [that] are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 CFR § 122.44(d)(1)(i); *see also* 54 Fed.Reg. 23,868, 23,873 (June 2, 1989). We thus reject the notion that in order to strengthen the District's discharge limits, the EPA must show that the new limits, in and of themselves, will cure any water quality problems.

Upper Blackstone Water Pollution Abatement Dist. v. U.S. E.P.A., 690 F.3d 9, 32–33 (1st Cir. 2012).

[25] A TMDL prepared and implemented by the state is the vehicle envisioned by the CWA to address impairments, especially those driven by a combination of point sources and nonpoint sources. EPA encourages permittees and stakeholders to work with NHDES to achieve that objective, as NHDES has indicated they are willing to do.

Under Section 301(b)(1)(C) and 402 of the Clean Water Act, EPA may not issue a permit unless it contains effluent limitations as stringent as necessary to comply with, among other things, applicable state water quality standards. While these commenters advocate for expanding the permit to include 52 contributing municipalities, whether or not those municipalities have point source discharges of pollutants subject to regulation under the Act, EPA's chosen approach of including 13 POTWs from 12 municipalities that discharge directly into Great Bay or its tributaries does not present any Constitutional infirmity. The relevant inquiry is whether these discharges cause or contribute, or have the reasonable potential to cause or contribute, to a violation of water quality standards, and if so, EPA is obligated to impose necessary effluent limitations to order to authorize the discharge.

H. Overall Policy Considerations

In the event the General Permit is appealed[26], EPA may consider withdrawing it in favor of individual permit issuances based on LOT or below, for reasons independent of any litigation risk associated with any claims that might be brought. Protracted litigation over this novel General Permit is a highly disfavored outcome where EPA's overall approach to translating narrative nutrient water quality standards into limit of technology effluent limitations in individual permits has survived extensive administrative and judicial review, and where time is of the essence from the standpoint of controlling nitrogen discharges that contribute to cultural eutrophication in Great Bay. *See e.g., Upper Blackstone Water Pollution Abatement Dist. v. U.S. Envtl. Prot. Agency*, 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013) (imposing concentration-based TN limit of 5 mg/L); *City of Taunton v. U.S. Envtl. Prot. Agency*, 895 F.3d 120 (1st Cir. 2018), *cert. denied*, 139 U.S. 1240 (2019) (imposing mass-based TN limit based on LOT); *In re Town of Newmarket*, 16 E.A.D. 182 (EAB 2013) (imposing concentration-based limit of 3 mg/L).

EPA also remains cognizant of its obligations to write permits that *ensure* compliance with water quality standards and acknowledges that, in the absence of a certain baseline assumption regarding nonpoint source and stormwater point source reductions, this General Permit as written would *not* ensure compliance with water quality standards. After first advocating for the permitting framework as set forth in the Draft General Permit which allows the municipalities to prioritize nonpoint source reductions, comments made by the municipalities during the public comment period unsettled EPA's assumption. However, more recent collaborative interactions among EPA, NHDES and the municipalities (as described in Part I above) appear to reflect a shifting posture and have restored the basis for this assumption, at least sufficient to move forward with permit issuance.

Further, given the degree of impairment documented throughout the estuary and the scale of nonpoint sources and stormwater point sources of nitrogen throughout the watershed that continue to be unregulated, EPA notes that no permit regulating only these 13 POTWs, regardless of how stringent the effluent limits may be, could ensure compliance with water quality standards in the sense of eliminating all nutrient-related impairments throughout the estuary. In this scenario, the most any such permit could do is ensure that those particular discharges do not cause or contribute to an excursion of water quality standards while the receiving waters continue to be impaired. Even ensuring this much would be challenging given that such effluent limits would likely be well below the limits of technology. Given these regulatory challenges, EPA's permitting strategy allows

[26] Persons affected by an NPDES general permit may not file a petition for review with the Environmental Appeals Board but may challenge it by filing an action in court. 40 CFR § 124.19(p)(1)(i).

flexibility in directing municipal resources to address all sources of nitrogen with the goal that this will eliminate the underlying impairments rather than simply preventing the POTWs from contributing to those impairments. Such a strategy necessitates expeditious action in the face of uncertainty coupled with adaptive management to incorporate new information as it becomes available.

Appendix A – 2014-2019 Total Nitrogen Data for Great Bay Proper

Station ID	Date	Total Nitrogen [1, 2] (mg/L)
GRBGB	4/23/2014	0.301
GRBGB	5/12/2014	0.336
GRBGB	6/3/2014	0.464
GRBGB	7/7/2014	0.380
GRBGB	8/20/2014	0.306
GRBGB	9/25/2014	0.382
GRBGB	10/20/2014	0.327
2014 Seasonal Average		**0.357**
GRBGB	4/27/2015	0.405
GRBGB	5/13/2015	0.624
GRBGB	6/8/2015	0.422
GRBGB	7/7/2015	0.294
GRBGB	8/3/2015	0.317
GRBGB	9/1/2015	0.285
GRBGB	10/15/2015	0.283
2015 Seasonal Average		**0.376**
GRBGB	4/12/2016	0.323
GRBGB	5/9/2016	0.378
GRBGB	6/22/2016	0.329
GRBGB	7/13/2016	0.279
GRBGB	8/8/2016	0.231
GRBGB	9/6/2016	0.328
GRBGB	10/4/2016	0.190
2016 Season Average		**0.294**
GRBGB	4/17/2017	0.341
GRBGB	5/18/2017	0.460
GRBGB	6/12/2017	0.485
GRBGB	7/11/2017	0.362
GRBGB	8/8/2017	0.378
GRBGB	9/11/2017	0.343
GRBGB	10/23/2017	0.275
2017 Seasonal Average		**0.378**
GRBGB	4/10/2018	0.378
GRBGBE	4/23/2018	0.440
GRBGB	5/21/2018	0.349
GRBGBE	5/22/2018	0.356
GRBGB	6/19/2018	0.518
GRBGBE	6/20/2018	0.321
GRBGB	7/9/2018	0.422

GRBGBE	7/30/2018	0.401
GRBGB	8/14/2018	0.542
GRBGBE	8/17/2018	0.908
GRBGBE	9/24/2018	0.502
GRBGB	9/25/2018	0.501
GRBGB	10/15/2018	0.864
GRBGBE	10/16/2018	1.610
2018 Seasonal Average		**0.579**
GRBGB	04/23/2019	0.462
GRBGBE	04/25/2019	0.435
GRBGB	05/21/2019	0.271
GRBGBE	05/23/2019	0.406
GRBGB	06/18/2019	0.416
GRBGBE	06/28/2019	0.377
GRBGB	07/09/2019	0.334
GRBGBE	07/19/2019	0.282
GRBGB	08/06/2019	0.355
GRBGBE	08/26/2019	0.418
GRBGB	09/17/2019	0.376
GRBGBE	09/24/2019	0.515
GRBGB	10/14/2019	0.254
GRBGBE	10/22/2019	0.266
2019 Seasonal Average		**0.369**

[1] Total Nitrogen was calculated as the sum of Total Dissolved Nitrogen and Total Suspended Nitrogen
[2] Data collected by the University of New Hampshire, compiled by PREP and uploaded into NHDES's Environmental Monitoring Database (EMD). The 2019 data is not yet uploaded to NHDES's EMD.

Appendix B – EPA Review of Peer-Reviewed Literature and Expert Analyses Submitted During the Public Comment Period

Document	Author	EPA Assessment
Nutrients in Estuaries: A Summary Report of the National Estuarine Experts Workgroup 2005 - 2007.	National Estuarine Experts Workgroup	Reference document. Not a regulation or policy. This document describes some of the current science in estuarine nutrient criteria development. It does not set criteria, nor does it recommend a single methodology for doing so. Criteria can vary from site to site and from estuary type to estuary type, and the methods for setting criteria can vary depending on both the estuary type and availability of data. This document complements and does not supersede previously published EPA guidance such as the Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters (EPA-822-B-01-003).
Zostera marina (eelgrass) growth and survival along a gradient of nutrients and turbidity in the lower Chesapeake Bay. Mar. Ecol. Prog. Ser. Vol. 142: 247-259, 1996.	Moore, Neckles, and Orth	Confirms turbidity in impacts on eelgrass through increase Kd. Nutrient enrichment in fall and winter had no observable effect on epiphytic accumulations or macrophlite growth, presumably because of overriding control by other factors. Epiphytic growth on leaves during the spring may contribute to an initiation of seagrass decline.
Linking water quality to living resources in a mid-Atlantic Lagoon System, USA. Ecological Applications 17(5) Supplement, 2007, pp. S64-S78.	Wazniak et al.	Degrading conditions with increasing nutrients. Issues with DO, macroalgae, and chl 'a'. Supports the link of increase nutrient with water quality issues. Large areas of the bays exhibited nutrient enrichment above threshold levels needed to maintain biotic communities with degrading consitions.
Experimental analysis of the response and recovery of Zostera marina (L.) and Halodule wrightii (Ascher.) to repeated lightlimitation stress. J. Exp. Marine Biol. & Ecol. 369 (2009) 110-117.	Biber, Kenworthy, and Pearl	Chronic light-limitation interspersed with unpredictable acute attenuation events have had poorly understood effects on seagrass recovery dynamics. Only plants in treatments where light deprivation was followed by a recovery interval of at least the same duration showed signs of long-term survival. Study confirms importance of Kd and impact of acute reduce light events on eelgrass. Baseline Kd should be good enough to allow eelgrass to recover from acute events.
Relationship between nitrogen concentration, light, and Zostera marina habitat quality and survival in southeastern Massachusetts estuaries. J. Env. Management 131 (2013) 129-137.	Benson, Schlezinger, and Howes	Confirms impacts on estuarine water quality. Bottom light declines in proportion to increases in total nitrogen levels, phytoplankton biomass, and water column particulates determined from long-term water quality data. Healthy eelgrass existed where tidally-averaged total nitrogen was less than 0.34 mg/L.

Document	Author	EPA Assessment
Unexpected resurgence of a large submersed plant bed in Chesapeake Bay: Analysis of time series data. Limnol. Oceanogr. 59 (2), 2014, 482-494.	Gurbisz and Kemp	Reductions in nutrient loading led to long-term water clarity improvement and, thus, a long-term increase in light availability for plant photosynthesis. As plant density increased, positive feedback effects between the bed and ambient water quality facilitated the subsequent rapid SAV resurgence. Paper supports the importance of improved water quality to support eelgrass. Also notes the impact of tributary high and low flow years.
Massachusetts Estuaries Project - Site-specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators. Interim Report.	SMAST - Brian Howes	Proposes classifications for Class SA and SB waters. Classifications range from excellent to severely degraded. Supports the relationship of higher nitrogen levels with increased phytoplankton, macroalgae, lower light, and lower DO.
Seagrasses and eutrophication	Burkholder, Tomasko, and Touchette	Confirms adverse impact to seagrass from nutrient over-enrichment and eutrophication which can be exacerbated by other factors and is hard to recover once lost. "Concerted local and national actions, thus far mostly lacking, are needed worldwide to protect remaining seagrass meadows from accelerating cultural eutrophication in rapidly urbanizing coastal zones." pg. 47
Effect of grazing by Canada geese Branta canadensis on an intertidal eelgrass Zostera marina meadow. Mar. Ecol. Prog. Ser. Vol 333: 271-279, 2007.	Rivers and Short	Highlights that eelgrass loss can occur from grazing Canada geese. EPA notes this would impact shallow eelgrass, not deep eelgrass; whereas Great Bay is losing mostly deep eelgrass (See Fact Sheet at 21). Unlikely that geese are a significant factor in Great Bay.
Using Moored Arrays and Hyperspectral Aerial Imagery to Develop Nutrient Criteria for New Hampshire's Estuaries	Morrison et al.	Based on a single day of aerial imagery (August 29, 2007), the report concludes "The virtual absence of eelgrass from [Little Bay and the Lower Piscataqua River] suggests that other processes apart from light restricted growth are important for limiting eelgrass survival." (See page 51) EPA agrees that other factors may be important but notes that light attenuation varies and limited data in this report does not preclude eutrophic impacts adversely impacting eelgrass documented over the past 20 years.
Eelgrass Distribution in the Great Bay Estuary and Piscataqua River for 2017	PREP	Confirms 142 acre decrease in eelgrass (8.5%) from 2016 to 2017.
Eelgrass Distribution in the Great Bay Estuary and Piscataqua River for 2019: Final Project Report	PREP	Confirms 131 acre increase in eelgrass (8.5%) from 2017 to 2019. EPA notes recent increase in eelgrass acreage is likely due to recent TN reductions and further TN reductions are necessary to achieve further eelgrass recovery.

Document	Author	EPA Assessment
PowerPoint: Eelgrass Coverage in Great Bay	Jud Kenworthy	Lists the following factors that may be causing eelgrass declines: "N loading, substrate quality, shoreline charactersitics, sediment loading." EPA notes Dr Kenworthy includes "N loading" as the first possible factor based on his evalutaion of eelgrass in Great Bay.
Letter to D. Peschel on Review of HDR Hydrodynamic Model	SMAST - Brian Howes	Confirms calibration of hydrodynamic model developed by Dover and Rochester; calls into question the linkage between nitrogen and eelgrass and suggests further study on factors controlling eelgrass dynamics; suggests current TN loading (post Dover & Rochester WWTF reductions) is protective and recommends no further TN reductions should be implemented at this time. Based on review of monitoring data, PREP State of the Estuary reports, Section 303(d) lists from NHDES, and scientific literature regarding the impact of excess nitrogen in estuarine environmetns, EPA disagrees that total nitrogen is not related to eelgrass health in Great Bay.
Article: Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future	UNH	Impacts of climate change include rising temperatures and sea level rise, both of which exacerbate impacts of nitrogen pollution in Great Bay.
UNH Scholars' Repository: The Ecology of the Great Bay Estuary, New Hampshire and Maine: An Estuarine Profile and Bibliography.	F. Short	Chapter 7 of the document is provided. Information in this chapter refers to wasting disease becoming an issue affecting eelgrass beds on both sides of the Atlantic. EPA agrees that wasting disease has affected the eelgrass beds in the Great Bay estuary. In the late 1980's the estuary lost significant acreage due to wasting disease. However, the beds recovered. Wasting disease has not been noted as an issue in the estuary since 1996 which is the highest acreage year and after this year acreage started declining. Additionally, the beds were resilient and recovered after the wasting disease in the late 1980's but additional stressors, including excess nitrogen, make recovery more difficult today.
Piscataqua River-Portsmouth Harbor Water Transparency Field Study - Field Sampling & Monitoring Report	UNH - S. Jones and T. Gregory	Provides water quality data for the Piscataqua River and Portsmouth Harbor from August and September of 2013. The data included chlorophyll a, water column nitrogen, dissolved oxygen, Kd, and TSS.
Letter to D. Peschel on Review of Latimer and Rego (2010) applicability to Great Bay Estuary	SMAST - Brian Howes	Dr Howes reviews the Latimer & Rego 2010 paper and "conclude[s] that it is not sufficiently robust for determining eelgrass restoration targets in this estuary." Though he does note that the study has "merits by bringing forward the cautionary note that external N loading to estuaries can result in eelgrass loss and therefore source reductions are needed in some areas for eelgrass protection." EPA notes that many of the detailed critiques presented have been responded to in various sections of the Response to Comments document. EPA concludes that use of the peer-reviewed scientific studies in combination with a variety of site-specific information is appropriate to develop an initial threshold as part of an adaptive managment approach.

Document	Author	EPA Assessment
Letter to D. Peschel RE: Analysis of Technical Justification for Proposed Watershed TN Load Limitations for GBE	Stephen Chapra	Suggests Latimer & Rego 2010 paper not sufficient to demonstrate TN and eelgrass impairment in Great Bay. EPA is not using Latimer & Rego 2010 to demonstrate this impairment. Rather, EPA relied in NHDES 303(d) immpairment listings. EPA notes that an impairment is not necessary to establish effluent limitations. Rather, effluent limits are based on whether the discharge has reasonable potential to cause or contribute to an excurstion of water quality standards.
Letter to Dean Peschel on SMAST Endpoint and TMDL Development	SMAST (Brian Howes)	Based on TMDLs developed in Massachusetts, Dr. Howes suggests a "growing season average in the range of 0.32 - 0.35 mg/L should be protective" of eelgrass for the Great Bay system. EPA notes that this letter inherently relies on a relationship between TN and eelgrass in the Great Bay system, confirming EPA's conceptual model.
Exploring Estuarine Nutrient Susceptibility. Environ. Sci. Technol. 2009, 43, 3474 – 3479.	Scavia and Liu	Develops a model to determine estuarine nitrogen susceptibility; not specifically applied to Great Bay. EPA did not independently determine the degree of nitrogen susceptibility in Great Bay (i.e., moderately susceptible) but relied on the NOAA 2007 report referenced in the Fact Sheet.
Complex response of the forest nitrogen cycle to climate change. PNAS Vol. 109 No. 9: 3406 – 3411.	Bernal et al. 2012	Looks at the effects of climate change and other anthropogenic influences on ecosystem nutrient flux and cycling. In this case climate influence effects explained ~40% of the nitrate decline.
Dissolved Organic Nitrogen Budgets for Upland Forested Ecosystems in New England. Biogeochemistry 49: 123 – 142, 2000.	Campbell et al. 2000	Calculated DON and DIN budgets from 9 watersheds at 4 sites in New England. "DON made up the majority of TDN in stream exports, suggesting that inclusion of DON is critical to assessing N dynamics even in areas with large anthropogenic inputs of DIN."
Eelgrass recovery after nutrient enrichment reversal. Aquatic Botany 93 (2010) 237 – 243.	Vaudrey et al. 2010	Confirms adverse impact to eelgrass from nutrient over-enrichment and shows a case of recovery following the termination of a nutrient point source. "Fifteen years after termination of nutrient enrichment, this cove had recovered from 40 years of point source anthropogenic nutrient input, returning from an Ulva-dominated to a Zostera-dominated state."
Setting Load Limits for Nutrients and Suspended Solids Based upon Seagrass Depth-limit Targets. Estuaries and Coasts, Vol. 30, No. 4 (August 2007), pp. 657 – 670.	Steward and Green	Evaluated nutrient loading limits to protect seagrass resources in several Florida estuaries. Loadings were regressed against seagrass depth limits to back-predict the allocations (kg ha-' yr-') necessary to meet targeted seagrass depth limits in the lagoons. The study found TN loadings that should be protective of the several species of seagrass in the Florida estuaries. Though these TN loadings vary from the level applied in Great Bay the study supports EPA's overall loading target approach.

Document	Author	EPA Assessment
Nitrogen loading alters seagrass ecosystem structure and support of higher trophic levels. Aquatic. Conserv: Mar. Freshw. Ecosyst. 12: 193 – 212 (2002).	Deegan et al., 2002	Evaluated the effects of nitrogen loading on changes in macrophyte community structure and the associated fauna of a north temperate estuary. "As nitrogen load increased we found increased macroalgal biomass, decreased eelgrass shoot density and biomass, decreased fish and decapod abundance and biomass, and decreased fish diversity."
A Case for Restoration and Recovery of Zostera marina L. in the Great Bay Estuary	PREP	Describes the state of eelgrass science in the Great Bay Estuary. "While there is much more work to be done to improve water quality, there are indications that recent reductions in nitrogen loads are creating conditions more favorable for eelgrass growth in certain areas." Further assesses local eelgrass stressors and identifies where trials of eelgrass restoration activity might occur. Supports EPA's conclusion for, at a minimum, the application of hold the load nitrogen limits.

Appendix C – NHDES Responses to Certain Comments Related to Nonpoint Source and Stormwater Point Source Reduction Pathway and Statement Regarding "Hold the Load" Limits

The following has been prepared by NHDES in response to specific comments regarding the nonpoint source and stormwater point source reduction pathway and regarding the "hold the load" limits in the General Permit:

1. Optional

Some commenters questioned whether there are any alternative options. Based on the analysis presented in the Fact Sheet, significant nitrogen reductions are necessary to meet water quality thresholds throughout the Great Bay estuary. EPA and NHDES have determined that, based on the scale of reductions, they must come from a combination of the POTWs, nonpoint sources and stormwater point sources. The POTW effluent limits set forth in the General Permit establish a maximum load from the POTWs toward the overall reduction goal. The optional pathway is simply presented as one approach for achieving additional reductions to help meet water quality standards in the long-term, but the municipalities are welcome to pursue additional nitrogen reductions or other actions that may improve water quality in any way they choose and from any source throughout the watershed. The optional pathway has the advantage of addressing pollutants other than nitrogen, such as fecal bacteria, total suspended solids, phosphorus and other common urban runoff contaminants. Once compliance with water quality standards is demonstrated, no further nitrogen reductions would be necessary.

2. Feasibility

Some commenters expressed concerns that the smaller towns covered by this permit have limited resources to identify and implement nonpoint source and stormwater point source nitrogen reductions and requested that NHDES provide financial assistance and/or administrative guidance. The commitments by NHDES described in the October 21, 2019 letter sent to EPA include a significant amount of financial and administrative assistance to all municipalities. An example of this type of assistance is that which NHDES is already providing on the MS4 General Permit. To the extent any Town would like to request additional assistance from NHDES based on their unique needs, they may reach out to NHDES and initiate such discussions. NHDES also observes that EPA's nonpoint source program funds grants for nonpoint source reductions, outside of the MS4 area. Each year, NHDES has set aside millions of dollars from the State Revolving Fund for the purpose of stormwater management. EPA is already working with Great Bay communities to fund nonpoint source reduction projects, including with the City of Rochester.

3. Schedule

Some comments questioned the length of the schedule contemplated in the Draft General Permit to achieve nonpoint source and stormwater point source load reductions, suggesting that the schedule be changed from 23 years to 15 years or less and that more significant reductions should be front-loaded earlier in the schedule. While NHDES agrees that reductions should occur as soon as

possible, NHDES also acknowledges that implementing the scale of reductions throughout the watershed in a cost-effective manner takes time to properly plan and implement. It should be noted the that 23-year schedule in the permit is there for guidance alone, it is not a regulatory requirement. The schedule proposed in the Draft General Permit allows time for potential structural and non-structural BMPs to be understood, compared, planned, budgeted, implemented, tracked and maintained in a thoughtful and deliberate manner. The iterative implementation of 5-year phases overlapping with 5-year permit terms also allows EPA and NHDES to reassess progress each time the General Permit is up for reissuance and adjust as necessary based on the level of reductions achieved and the response demonstrated in the estuary. This time also allows for ambient monitoring and scientific analysis to be conducted to further guide and prioritize future action.

4. Other Clarifying Questions

Some commenters asked for clarity regarding specific details of the Optional Nonpoint Source and Stormwater Point Source Pathway laid out in the Draft General Permit and Fact Sheet. NHDES has responded to some of these requests briefly below.

One question is how to calculate or update the nonpoint source and stormwater point source baseline using "average rainfall." In determining average rainfall in the Fact Sheet at page 28, EPA used the average annual rainfall over the past 30-year period and then normalized the rainfall during specific years to normalize loads during those years to a normalized load. In order to be consistent with this approach, municipalities may adopt either of the following approaches to determine their municipality-specific baseline:

- Determine municipality-specific baseline using the nonpoint source and stormwater point source loads from 2009-2011 specified in the 2014 GBNNPSS report, normalized to the current time period; or
- Update municipality-specific baseline using documented changes in nonpoint source and stormwater point source loads for a set of years and normalize to the current time period.

In either case, the municipality may use average rainfall for the Great Bay watershed or average rainfall for that specific municipality, if better local data is available.

For example, the Towns of Exeter and Newmarket developed town-specific nonpoint source baseline loads in 2018 as part of their Nitrogen Control Plans, required by the respective Administrative Orders on Consent, and questioned in their comments whether they can use these updated baseline loads. Those updated loads estimates are more detailed than NHDES' and can be normalized to long term averages to determine loads over time.

Another question is whether EPA can provide a specific baseline for each municipality that is broken into major load categories and normalized to average rainfall. As described above, the 2014 GBNNPSS report includes municipality-specific loads broken into major load categories. See Table 5 of the GBNNPSS report which is available at the NHDES website. Using these loads, a municipality may simply normalize from 2009-2011 average rainfall to average rainfall over the past 30 years to establish a baseline and to understand the major load categories of that baseline.

Another question raised is why delivery factors are only applied to some POTWs. As specified on page 25 of the Fact Sheet, all POTWs discharging directly into the Great Bay estuary (including the Lower Piscataqua River) do not have a delivery factor because all of the nitrogen is reaching some portion of the estuary without attenuation. Other POTWs that discharge above the tidal dams have delivery factors because a portion of the nitrogen discharged is assumed to attenuate before reaching the Great Bay estuary.

Related to delivery factors, some comments questioned how to determine the reduction in "delivered load" to the Great Bay estuary based on natural attenuation between the implemented measure and the estuary. Municipalities should work within the Pollution Tracking and Accounting Program (PTAP) to develop specific delivery factors for the watershed and in the meantime can simply use the delivery factor from Table 3 on page 25 of the Fact Sheet.

Another question brought up was how municipalities will get credit for various reductions as performance curves are updated for best management practices (BMPs) that have been incorporated. The current MS4 General Permit contains TN reduction credits for variable sized and designed BMPs in Appendix F. These BMP performance credits have also been utilized by PTAP to credit stormwater BMPs. Municipalities should rely on these performance curves during the planning and tracking process for BMP crediting. NHDES notes that these TN removal credits do not account for delivery to Great Bay and urges municipalities to work with PTAP to refine delivery factors in the watershed and select appropriate BMPs to maximize pollution reduction. NHDES is aware that new BMPs may be designed and new TN credits may be developed over time. Any reissuance of the MS4 General Permit will contain the most up to date, validated TN reduction credits. To account for potentially changing reduction credits, NHDES expects municipalities to use actual reductions that have occurred based on the latest performance curves. In other words, if performance curves are updated after implementing the first phase of reductions resulting in a decline in overall performance (*e.g.*, previous credit calculation yielded a 12% TN reduction from installed BMPs and new removal curves indicate a 10% reduction only), then the second 5-year plan should be developed to account for an additional 2% reduction needed. NHDES notes that this scenario could also work in the reverse, reducing the required reduction for a municipality in phase 2 based on increased performance estimates.

Additionally, new data is now available to assist municipalities in selecting BMPs to maximize pollutant load reductions. In an effort to better understand water quality in the Great Bay estuary and its tributaries, the UNH Stormwater Center in cooperation with NH GRANIT and NHDES, conducted a pollutant loading analysis for thirty-six towns (for which digital tax parcel data were available) in New Hampshire's coastal watershed. To complete the analysis, the tax parcel data for each town was combined with impervious surface data, land use data, soil data, conservation lands data, and pollutant load export rates from the 2017 NH MS4 General Permit. Analyses were then performed to determine the pollutant load by parcel for three primary contributing pollutants: nitrogen, phosphorus, and TSS. The resulting data were then exported to community-based summary spreadsheets that identify impervious cover plus pollutant loading for nitrogen, phosphorus, and TSS at the parcel level for each community. To aid in nitrogen reduction efforts, municipalities could use the summary spreadsheet data to complete an inventory and priority ranking of parcels that could be managed with BMPs designed to reduce the frequency, volume, and nitrogen loads of stormwater

discharges through mitigation of impervious cover. The community-based summary spreadsheets and other project data are available here: https://granit.unh.edu/Projects/Details?project_id=464 .

NHDES also notes that an iterative approach should be taken with respect to estimates of nitrogen load due to atmospheric deposition. In the initial 5-year phase of nonpoint source and stormwater point source reductions, the permit contemplates municipalities would plan to achieve an 11% load reduction from their baseline. Each permit reissuance, EPA will reevaluate the nitrogen load estimated from a variety of sources including updated atmospheric deposition data. Based on this reevaluation EPA will incorporate any change in load in the overall reduction target for the municipalities within the watershed. For example, if after 5 years EPA is reissuing the General Permit and the updated atmospheric deposition data indicates that loads have decreased from the baseline estimated loads by an amount equivalent to 2% of the total nonpoint source and stormwater point source watershed load, EPA would update the load reduction target in the next phase to be 2% lower (*i.e.*, phase 2 would target a cumulative 20% reduction rather than a cumulative 22% reduction). Alternatively, or in addition, it may be possible to add atmospheric deposition into PTAP and allocate it by community.

Another question was how the public will be able to participate in the nonpoint source and stormwater point source plans. NHDES agrees that the scope of these plans should include public participation. While this pathway is not mandatory, NHDES encourages each municipality to incorporate a public process to engage its citizens in the development of these plans. Further, NHDES encourages each municipality to make these plans publicly available for those in the region to review and comment. Finally, NHDES will endeavor to make publicly available the tracking of nitrogen reductions through PTAP as such reductions are implemented in the coming years.

Another question was whether EPA can provide a table that indicates which municipalities are included in the following categories: NPDES Permit for POTW, NPDES MS4 Permit, NPDES MS4 Waiver and non-NPDES municipality. NHDES agrees that this may be helpful and has provided the table below.

Community	Town completely/partially in watershed?	MS4	NPDES Permit
Barrington	Complete	Waiver	N/A
Brentwood	Complete	Waiver	NH0100609
Brookfield	Partial	No	N/A
Candia	Partial	Waiver	N/A
Chester	Partial	Waiver	N/A
Danville	Partial	Yes	N/A
Deerfield	Complete	No	N/A
Dover	Complete	Yes	NH0101311
Durham	Complete	Yes	NH0100455
East Kingston	Partial	Waiver	N/A
Epping	Complete	Waiver	NH0100692
Exeter	Complete	Yes	NH0100871

Farmington	Complete	No	NH0100854
Fremont	Complete	Waiver	N/A
Greenland	Complete	Yes	N/A
Hampton	Complete	Yes	NH0022985
			NH0022055
			NH0100625
Hampton Falls	Complete	Waiver	N/A
Kensington	Complete	No	N/A
Kingston	Partial	Yes	N/A
Lee	Complete	Waiver	N/A
Madbury	Complete	Waiver	N/A
Middleton	Complete	No	N/A
Milton	Complete	Yes	NH0100676
New Castle	Complete	Yes	N/A
New Durham	Partial	No	N/A
Newfields	Complete	Waiver	NH0101192
Newington	Complete	Waiver	NH0020923
			NHG581141
Newmarket	Complete	Yes	NH0100196
North Hampton	Complete	Yes	N/A
Northwood	Partial	No	N/A
Nottingham	Complete	No	N/A
Portsmouth	Complete	Yes	NH0100234
			NH0090000
Raymond	Complete	Yes	N/A
Rochester	Complete	Yes	NH0100668
Rollinsford	Complete	Yes	NH0100251
Rye	Complete	Yes	N/A
Sandown	Partial	Yes	N/A
Seabrook	Complete	Yes	N/A
Somersworth	Complete	Yes	NH0100277
Strafford	Partial	No	N/A
Stratham	Complete	Yes	N/A
Wakefield	Partial	No	N/A
Alton	Negligible	No	N/A
Derry	Negligible	Yes	N/A
Hampstead	Negligible	Yes	N/A
Pittsfield	Negligible	No	N/A
Wolfeboro	Negligible	No	N/A

Related to this, some commenters noted that the New Hampshire Department of Transportation (NHDOT) owns many roadways throughout the watershed and the comments suggested that they also should be included in implementing total nitrogen reductions. EPA has confirmed to NHDES that stormwater discharges from the NHDOT stormwater system (that includes roadways within MS4 regulated area) are currently covered under the MS4 General Permit. That permit includes additional measures the NHDOT is responsible for implementing to reduce nitrogen in stormwater discharges to the Great Bay or its tributaries.

Another question raised in the comments was whether EPA can describe other advantages of managing nonpoint source pollution in addition to nitrogen removal. Specifically, some commenters requested examples of measures that may have additional benefits such as aesthetics, total suspended solids (TSS) removal, erosion control, etc. Further, some commenters questioned whether implementing BMPs that are designed to maximize nitrogen reduction would result in less potential for TSS or chromophoric dissolved organic matter (CDOM) reduction. There are many reasons a municipality may choose to implement BMPs throughout their jurisdiction, these reasons include stormwater system resiliency, flood mitigation, reduction of heat island effects, aesthetics, public safety and permitted pollutant reductions. The specific reason a municipality may choose one BMP over another, say tree planting over rain gardens, is a municipal decision based on local priorities. The pollution removal estimation tools provided by EPA Region 1 on https://www.epa.gov/npdes-permits/stormwater-tools-new-england#swbmp include information on nitrogen, phosphorus, TSS, metals and bacteria reduction based on the implementation of a variety of BMPs. This allows municipalities to use the best available information to define the pollution reduction realized by implementing different stormwater BMPs. Different BMP designs will optimize the reduction of one pollutant over another, but the agencies disagree that by prioritizing the removal of nitrogen in stormwater BMPs you would increase TSS or CDOM. Many BMPs rely on infiltration as a mechanism for pollution reduction, this will decrease the total volume of untreated stormwater reaching Great Bay and will reduce the overall loading of all constituents found in stormwater.

5. Expansion of nutrient loading to the estuary

As noted in the fact sheet and explained elsewhere in the Response to Comments, this draft General Permit will essentially "hold the load" at the wastewater treatment plants. Per Env-Wq 1708.08(f), "… if the department determines, based on the information submitted, that there is no remaining assimilative capacity for a specific parameter, no further degradation with regard to that parameter shall be allowed." Given that all of the WWTPs contribute nitrogen into nitrogen impaired waters, loads cannot be expanded.