

STATE OF NEW HAMPSHIRE

**Response to Public Comment on the Draft
2020 Section 303(d) List of Impaired Waters
and the Draft Consolidated Assessment and Listing
Methodology**

February 18, 2022



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**Response to Public Comment on the Draft
2020 Section 303(d) List of Impaired Waters
and the Draft Consolidated Assessment and Listing
Methodology (CALM)**

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A. INTRODUCTION

On October 16, 2020, the New Hampshire Department of Environmental Services (NHDES) released the Draft 2020 303(d) List of impaired waters and the Draft Consolidated Assessment and Listing Methodology (CALM) for public comments. Downloadable copies of the draft 303(d) list and CALM were made available on the NHDES website for review. Public comments were accepted through the close of business on November 23, 2020. In addition to posting the notice of comment opportunity at multiple locations on the NHDES website, direct notification by email was sent to nearly 2,000 stakeholders including but not limited to:

- Federal agencies
- State agencies in New Hampshire and abutting states
- Municipal officials
- DPW Directors of the MS4 Communities
- County Conservation Districts
- Regional Planning Commissions
- Nonprofit interest groups
- Volunteer monitoring groups
- New England Interstate Water Pollution Control Commission
- University of New Hampshire

EPA issued a [memo and milestone template](#) on January 25, 2021 to facilitate timely submission of the 2022 Section 303(d) and 305(b) integrated report. The intent of the memo and template were to facilitate nationwide reporting of water quality data, successes, and challenges to the public for the Clean Water Act (CWA) 50th anniversary. If states determined that meeting the deadline was particularly challenging or potentially unachievable they were asked to identify potential actions to address the challenges, which included the option of submitting a combined cycle. After careful review of our assessment process and key milestones, NHDES concluded that the only way to guarantee submittal of our integrated report by April 1, 2022 would be to submit a combined 2020/2022 Section 303(d) and 305(b) Integrated Report. On April 12, 2021 NHDES sent a [letter to EPA](#) to request consideration on the submittal of a combined 2020/2022 Integrated Report.

EPA accepted NHDES' request for submittal of a combined 2020/2022 Integrated Report in a [letter](#) dated April 29, 2021. As a result of this decision future references to the 2020 assessments and accompanying documents will now be denoted as the 2020/2022 assessments.

The following sections contain the comments received, NHDES' responses to comments and supporting information. The sections are organized as follows:

- A. Introduction.
- B. Response to Public Comment. (Note: This section contains NHDES' responses to all of the comments received. The responses are organized by reference number. A reference number refers to a specific section of a comment letter in Section D.)
- C. References used in Section A & B.
- D. Public Comment on the Draft 2020/2022 303(d) List of Impaired Waters. (Note: This section contains the full text of all comments received. Each individual comment in the letters has been assigned a reference number. The reference number corresponds to the responses in Section B.)

While the bulk of the comments text is provided in this document, the full original comments and attachments received on the October 16, 2020, draft are on the department's [FTP site](#):

1. Go to this address using a web browser:
ftp://pubftp.nh.gov/DES/wmb/WaterQuality/SWQA/2020-2022/Draft_CALM_303d_Comments
2. At the login window, click on the box in the lower left hand corner labeled "Login Anonymously."
3. The user name will then be automatically filled in with the word "Anonymous."
4. Type in your email address in the "Email Address" block.
5. Then click on the "Log On" button.

Table 1: Comment Letters Received by NHDES and the Designated Comment Letter Number.

COMMENTS	RECEIVED	COMMENT #
Amy Prouty Gill, City of Nashua, Division of Public Works	10/19/2020	#1
Russell Dean, Town of Exeter and Steve Fournier, Town of Newmarket	11/16/2020	#2
Gene Porter, Lower Merrimack River Local Advisory Committee	11/17/2020	#3
Blaine M. Cox, City of Rochester	11/20/2020	#4
Daniel Hammond, Stacy Villanueva and Clifton Bell, Brown and Caldwell	11/20/2020	#4a
Heidi Trimarco, Conservation Law Foundation (CLF)	11/23/2020	#5
Joshua M Wyatt, City of Dover	11/23/2020	#6
Daniel Hudson, City of Nashua	11/23/2020	#7
Suzanne M. Woodland, City of Portsmouth	11/23/2020	#8

B. RESPONSE TO PUBLIC COMMENT ON THE JANUARY 24, 2019 DRAFT

RESPONSE TO COMMENT #1: Amy Prouty Gill, City of Nashua, Division of Public Works

NHDES RESPONSE to 1- 1

The commenter is concerned that NHDES identified Second Brook (NHRIV700061206-10) as being within the towns of Hudson and Nashua. They feel that Second Brook is entirely within the Town of Hudson. After careful review of the waterbody, NHDES is in agreement with the assessment of the commenter. Towns were originally assigned to all of the assessment units in the State based on a GIS analysis that overlaid the town polygons with the assessment units. Assessment units are based off of the National Hydrography Dataset (NHD), and as such many of the rivers in the State are depicted as stream centerlines, not as actual polygons that depict the bank to bank width of the stream. Due to this artifact of how streams are drawn, at the confluence of Second Brook with the Merrimack River, the AUID representing Second River extends

into the space where one visually “sees” the Merrimack River and a small portion crosses the town boundary into Nashua as depicted in Figure 1. NHDES will correct this GIS artifact by revising the Second River AUID so that it ends at the banks of the Merrimack River. In order to retain the ability to do upstream and downstream tracing of the AUID network, the small section of what the NHD draws as Second Brook that was within the Merrimack River will be re-associated to the Merrimack River (NHRIV700061206-24), Figure 2, and all necessary changes will be made to the AUID attributes in NHDES’ Environmental Monitoring Database (EMD).

Figure 1: Original Confluence of Second Brook with the Merrimack River

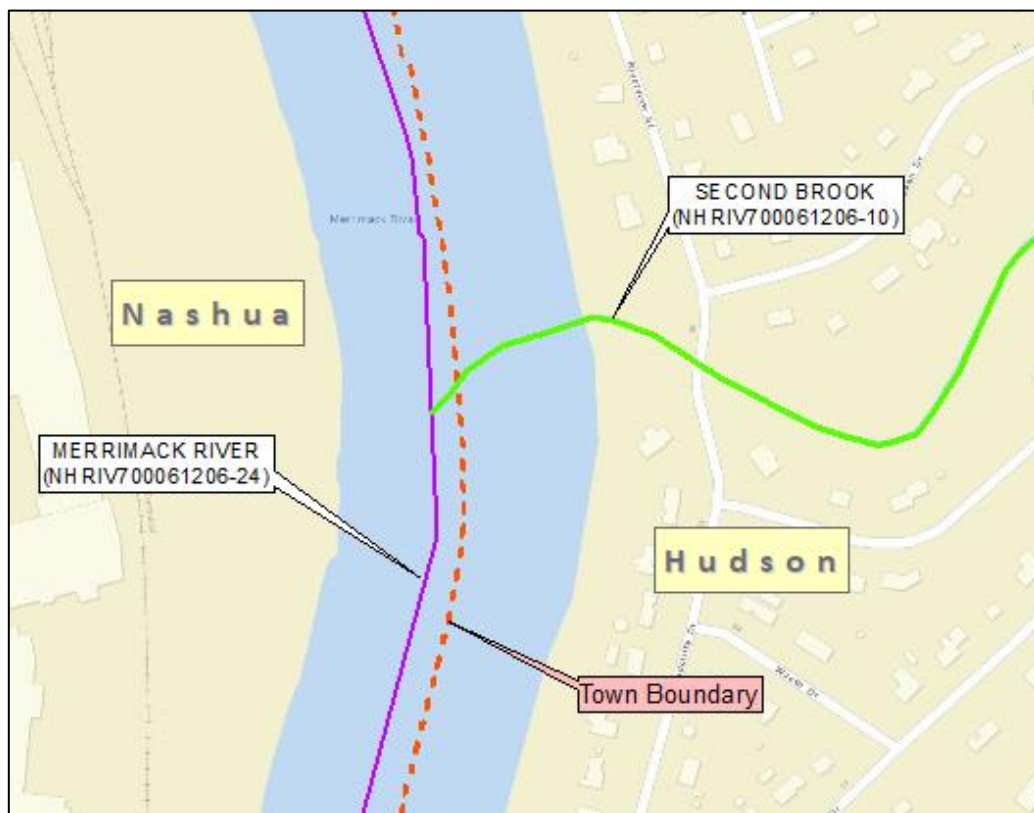
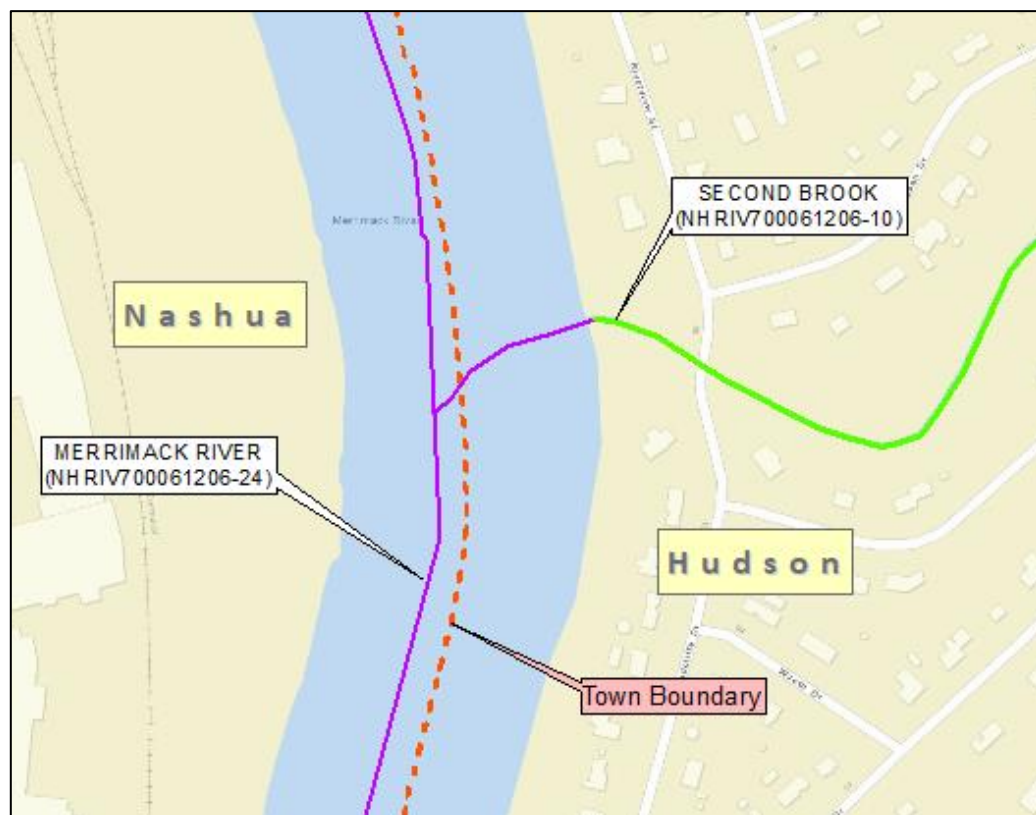


Figure 2: Revised Confluence of Second Brook with the Merrimack River

RESPONSE TO COMMENT #2: Russell Dean, Town of Exeter and Steve Fournier, Town of Newmarket

NHDES RESPONSE to 2- 1

The commenters feel that the Total Maximum Daily Load (TMDL) priority for all total nitrogen impaired assessment units within the Great Bay estuary should be elevated from “Low” priority to “High” priority. Although NHDES agrees with the Towns that total nitrogen impaired waterbodies should be a high priority for NHDES, there are several factors that preclude us from implementing this change. First and foremost is simply time and resources. As part of the draft 2020/2022 assessments released for public comment on October 16, 2020, there were 2,720 waterbody/parameters combinations listed as impaired and requiring a TMDL (category 5). As much as it would please NHDES to develop TMDLs for all of these waterbodies our TMDL program consists of a single individual, therefore, the number of TMDLs developed in a given year is limited by the resources available to develop them and the varying complexity of TMDL projects. Unfortunately, this means that the vast majority of the waterbodies with category 5 impairments must remain as “Low” priority.

To aid in the process of determining which impaired waterbodies will receive a TMDL and ranked as “High” priority the TMDL Program has developed “[New Hampshire's Long-term Vision for Implementing CWA 303\(d\) Program Responsibilities and Opportunity to Comment on NHDES List of Waterbodies Selected for Development of a TMDL, Alternative Plan or Protection Plan by 9/30/2022.](#)” This document was included for public comment on October 16, 2020 as Appendix B to the DRAFT 2020/2022 Section 303(d) Surface Water Quality List. Unfortunately, no comments were received under this solicitation in 2020.

As part of NHDES' long term vision for TMDLs, NHDES has chosen to focus TMDL development on surface waters listed on the State's 303(d) list that are impaired for two parameters: 1) bacteria in all waterbody types; and 2) lakes that are impaired due to excess nutrients (i.e. phosphorus). NHDES utilizes EPA's Recovery Potential Screening Tool ([RPST](#)) to further prioritize the order waterbodies will have TMDLs developed. There are several key factors that go into determining prioritizations including; severity of impairment, amount of additional data needed, a numeric target and stakeholder involvement that could lead to restoration plan implementation efforts. It is partially due to these aforementioned reasons that NHDES has not prioritized estuaries that are impaired for excess nutrients (i.e. total nitrogen).

As the commenters may recall, in 2009 NHDES released its Numeric Nutrient Criteria for the Great Bay Estuary, (NHDES, 2009). Following litigation with the Great Bay Municipal Coalition, NHDES agreed to discontinue its use of the numeric criteria and instead revert to its narrative criteria. The unforeseen consequence of this decision has resulted in the inability for NHDES to have an agreed upon target value for nitrogen and it makes it extremely difficult to develop a TMDL if there is no agreed upon end point. Furthermore, as evident from the comments submitted for the draft 2020/2022 303(d) list (Comments 4, 5, 6, and 8), there is still much debate over the nitrogen impairment status of the assessment units within the Great Bay estuary. NHDES, EPA and the local communities around the Great Bay estuary have been debating the science, impairment status of the estuary and reduction levels needed to improve the health of the estuary for over 10 years. NHDES feels that the time and resources that would potentially be spent on litigation could be better utilized on the implementation of TMDLs that have the full support of affected communities. Furthermore, EPA issued their [Great Bay Total Nitrogen General Permit](#) on November 24, 2020, which will become effective on February 1, 2021. Eligible facilities may submit a Notice of Intent to be covered by this General Permit to EPA until the deadline of April 1, 2021. Although not a traditional TMDL it serves much the same purpose and includes similar load allocations and reductions levels needed to improve the health of the estuary.

On July 27, 2020, NHDES sent a letter to EPA Region 1 outlining the state's commitments to assist the communities in their implementation of the Nitrogen General Permit. Amongst other commitments, NHDES stated the following about nitrogen targets and TMDLs.

"Toward this end, NHDES is committing itself to work with PREP, EPA, stakeholders and the municipalities to create a consensus-based approach to a target nitrogen goal and ecological endpoints for the estuary. The goal setting process is also a participatory one. Great work has already been done on this subject by NHDES and the communities themselves. And, the NGP is a good start toward setting a load reduction goal. This approach can and should be refined with additional modeling, data and strong participation by many stakeholders. However, the initial reductions in the permit are necessary and timely. NHDES has pointed out many times that nitrogen removed today is better than nitrogen removed tomorrow. These short-term reductions should commence at the same time that the target for its future reissuance is refined by utilizing the permit's adaptive management approach.

NHDES will consider the feasibility of using that goal to create a Total Maximum Daily Load (TMDL) that can be approved by EPA. An approved TMDL could provide the basis for both waste load and load allocations by sector and set up an adaptive management approach based on those allocations and ecosystem endpoints, and, if created, would become the basis for future permitting. In all likelihood, even if a different target is selected and achieves some level of consensus, the first phase reductions in the NGP are going to be necessary to meet water quality goals. It's highly unlikely that a target would require less than the total reduction required by the combination of the WWTP effluent limits and the first 11% reduction in nonpoint source nitrogen inputs as described in the NGP."

The commenters are encouraged to contact NHDES' [TMDL Program](#) to gain a better understanding of the TMDL prioritization process and discuss what might be needed to further their goal of shifting priority to the development of a total nitrogen TMDL for the Great Bay estuary.

RESPONSE TO COMMENT #3: Gene Porter, Lower Merrimack River Local Advisory Committee

NHDES RESPONSE to 3- 1

The commenter feels that the Merrimack River in Nashua and Hudson is no longer contaminated with creosote. Although the commenter did not provide a specific assessment unit for which their comment applies, NHDES assumes that they are referencing the Merrimack River (NHRIV700061002-14) below the Merrimack WWTF outfall to the Nashua River. Because the commenter did not provide any supporting documentation to justify their opinion, the project manager within NHDES' Hazardous Remediation Bureau was contacted to get a summary of the status of the remediation project at the Beazer East (former Koppers Company) site in Nashua (EPA ID No. NHD001084979, DES Site #198708017), which was the cause of the impairment.

The project manager summarized that NHDES entered into a Consent Decree with Beazer East, Inc. on August 29, 2007. The Consent Decree requires Beazer East to: 1) evaluate the performance of previously implemented remedial actions and current site conditions; 2) prepare a modified Remedial Action Plan (RAP); and 3) design, construct, operate, implement and maintain the modified RAP. The Final Remedial Design Report for the site was approved by NHDES on June 16, 2016. The modified remedy consists of: 1) construction of a subsurface barrier wall upgradient of the existing sheet pile barrier system; 2) NAPL recovery; 3) in-situ stabilization/treatment of potentially mobile NAPL; 4) sediment removal from the adjacent Merrimack River and construction of a residual NAPL barrier system; and 5) capping of the former lagoon area. Construction of the remedy was initiated in July 2016. All of the remedial actions have been completed as of the fall of 2018 with the exception of capping the former lagoon area and restoration of plantings on the riverbank. This work was originally scheduled to be completed during the 2020 construction season, but due to delays as of the issuance of this response the work has not been completed. Beazer East, Inc. continues to monitor the effects of past discharges at the site pursuant to expired Groundwater Management Permit GWP-198708017-N-001. Renewal of the Groundwater Management Permit is in progress.

NHDES appreciates the commenter for bringing this to our attention. However, upon discussion with the project manager it is the feeling of NHDES that the creosote impairment of the Merrimack River (NHRIV700061002-14) for the primary contact recreation designated use should not be removed until the project has been fully completed. NHDES will make sure to keep track of the status of this project and anticipates that the impairment will be removed as part of the 2022 assessment process.

NHDES RESPONSE to 3- 2

The commenter feels that the Merrimack River in Nashua, Hudson, Merrimack and Litchfield is no longer impaired for pH as a result of a report they read issued by the Pennichuck Waterworks, that described their intake sampling. Although the commenter did not provide a specific assessment unit for which their comment applies, NHDES assumes that they are referencing the Merrimack River (NHRIV700061002-14) below the Merrimack WWTF outfall to the Nashua River.

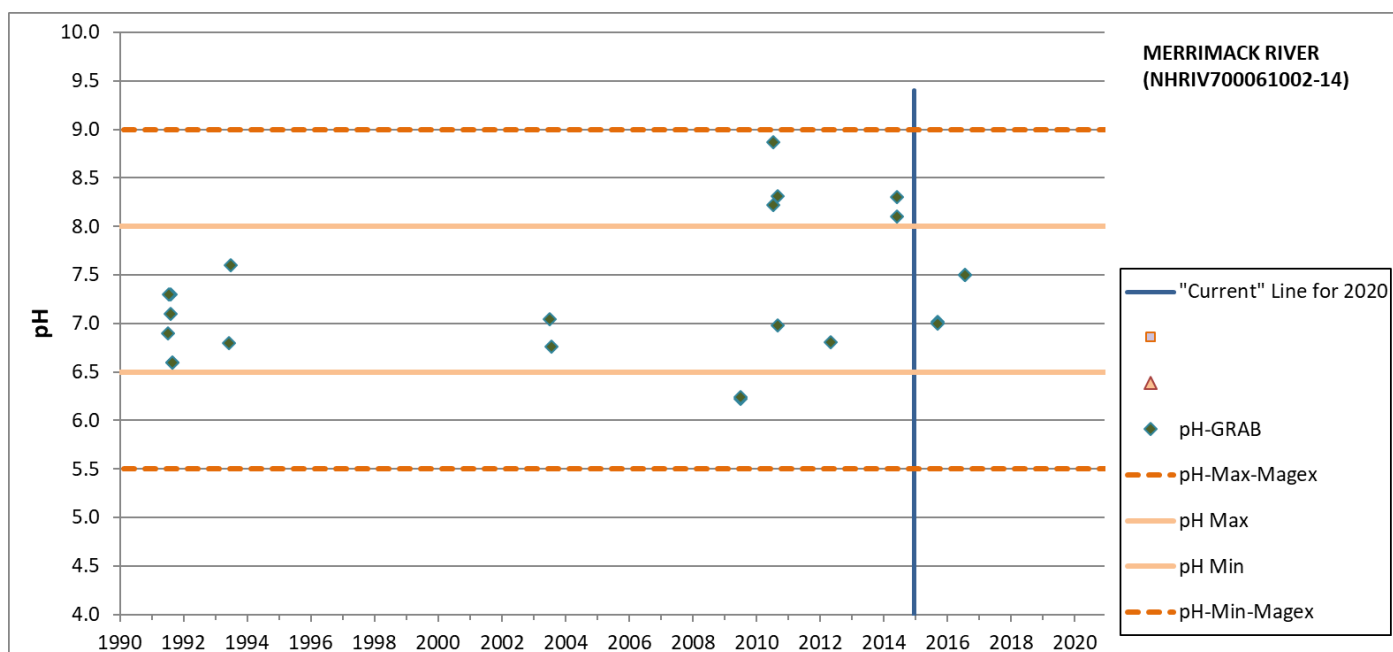
To begin the assessment process NHDES distributes a request of data that is sent to nearly 2,000 recipients. The request for data for the 2020/2022 assessments was sent out on September 12, 2019, with a due date for submittal by November 15, 2019, which included NHDES' [Guidance for Submittal of Surface Water Data/Information](#). It does not appear that NHDES received any data from Pennichuck Waterworks per that

solicitation. The most recent sample that NHDES has for Merrimack River (NHRIV700061002-14) were collected in 2016 by the United States Army Corps of Engineers (Figure 3). If Pennichuck Waterworks does in fact have more recent samples, NHDES encourages the commenter to reach out to them and ask for the data to be submitted to NHDES so that it might be included in the next round of assessments. The aforementioned data submittal guidance provides instructions as to how to submit data to NHDES.

In the absence of this data, NHDES must make assessment determinations based on the samples collected within the last 5-years (current period, 2015-2020). Additionally, if there are sufficient data ($n \geq 10$) in the current period that indicate a change in water quality, the data must be collected at stations and under hydrological and meteorological conditions similar to those that drove the initial impairment determination. For additional information on what is needed to remove an impairment, NHDES recommends the commenter reviews [Removal of Water Quality Impairments: Data and Documentation Considerations](#). Considerations must also be given to where and how samples were taken by Pennichuck Waterworks. If collected at the end of a long pipe under altered pressure, it is not clear that those samples would be considered representative of the ambient Merrimack River pH. As an example, if samples were collected under suction, the lowered pressure could cause CO₂ outgassing and pH increases.

As shown in Figure 3, seven of 23 (30%) pH samples collected in the Merrimack River (NHRIV700061002-14) were outside of the minimum and maximum pH thresholds. Although, the most recent samples collected in 2016 do indicate acceptable water quality, additional data is needed prior to making a delisting determination. Until further data is collected for evaluation, the Merrimack River (NHRIV700061002-14) will remain impaired for pH for the aquatic life integrity designated use.

Figure 3: pH Samples Taken in the Merrimack River (NHRIV700061002-14)



NHDES RESPONSE to 3- 3

The commenter feels that the Nashua River above the Mine Falls Dam is no longer impaired for dissolved oxygen as evident by healthy fish and angler populations. Although the commenter did not provide a specific assessment unit for which their comment applies, NHDES assumes that they are referencing the Nashua River - Mine Falls Dam Pond (NHIMP700040402-02), which is impaired for dissolved oxygen saturation for the aquatic life integrity designated use in the draft 2020/2022 assessments. The goal for the

dissolved oxygen criteria is to have a healthy, balanced community of aquatic life, not a decimated fish community. Anglers may still fish in, and catch fish in waterbodies that are impaired due to low dissolved oxygen. As such NHDES cannot make assessment determination based off of anecdotal evidence such as anglers fishing in the area. Assessments must be based off defensible science, and in this instance actual dissolved oxygen data. As no additional dissolved oxygen data was submitted to NHDES for consideration as part of these comments, the Nashua River - Mine Falls Dam Pond (NHIMP700040402-02) will remain impaired (5-P) for dissolved oxygen saturation for the aquatic life integrity designated use for the 2020/2022 cycle.

NHDES RESPONSE to 3- 4

The commenter is inquiring as to how many years after the last sample is taken can a waterbody remain on the 303(d) list. NHDES would like to direct the commenter to Section 3.1.10 Data Age of the [2020/2022 CALM](#), which provides an overview of how NHDES uses data age to make assessment decisions (NHDES, 2021a, p. 20). In short, NHDES does not remove waters from a threatened or impaired category based solely on data age in keeping with 40 CFR 130.7(b)(6)(iv).

RESPONSE TO COMMENT #4: Blaine M. Cox, City of Rochester

NHDES RESPONSE to 4- 1

This section contains opening remarks by the City of Rochester, including a summary of their disagreement with the Cocheco River (NHEST600030608-01) being impaired for chlorophyll-a, dissolved oxygen concentration and total nitrogen for the aquatic life integrity designated use. The City further expresses their disagreement with NHDES' use of the CALM, stating that the NHDES does not have legal authority to implement the CALM as a guidance. NHDES' response to these comments are address below.

NHDES RESPONSE to 4- 2

In this section the commenter states that the draft 2020/2022 303(d) List is unchanged from the 2018 303(d) List with respect to the Cocheco River (NHEST600030608-01). As such, the commenter reaffirms their position that their comments in whole provided on the 2016 and 2018 303(d) Lists and CALMs remain relevant and asks that they be considered for the draft 2020/2022 303(d) List and CALM. NHDES feels that they have adequately addressed the concerns raised by the commenter in both the [2016 Response to Comments on the Draft 303\(d\) and CALM](#) (NHDES, 2017b) and [2018 Response to Comments on the Draft 303\(d\) and CALM](#) (NHDES, 2019d). NHDES encourages the commenter to review the applicable sections of the responses as provided by NHDES on 11/30/2017 and 8/8/2019, respectively. No additional response necessary. Responses to the Brown & Caldwell's November 23, 2020 comments are provided in sections below.

NHDES RESPONSE to 4- 3

The commenter feels that NHDES has not addressed their concerns, first raised with comments made on the 2016 CALM (NHDES, 2017d) and later with the 2018 CALM (NHDES, 2019a), that NHDES failed to incorporate recommendations of the 2014 peer review (Bierman, Diaz, Kenworthy, & Reckhow, 2014) into the CALM. NHDES' position on this matter has not changed since first addressed in the 2016 Response To Comments (NHDES, 2017b, p. 53) and again in the 2018 Response to Comments (NHDES, 2019d, p. 38). Changes were made to the 2014 CALM in response to the peer review, those changes were carried into the 2016 and 2018 CALMs, and later the draft 2020/2022 CALM. In response to the peer review NHDES discontinued use of the numeric nutrient criteria (NHDES, 2009) and transitioned to the use of a multi-indicator evaluation to assess compliance with the narrative criteria (Env-Wq 1703.14) for the Great Bay Estuary. Additionally, while NHDES does not itself perform sampling, we have continued to fund studies through UNH and the Piscataqua Region Estuaries Partnership (PREP) and have worked with the legislature

to gather additional funding to maintain and enhance ongoing science through the purchase of datasondes, probes and sapling supplies. Nevertheless, some of the studies suggested are beyond the funding and resource capacities of NHDES.

NHDES RESPONSE to 4- 4

The commenter feels that NHDES should delay finalization of the 2020/2022 303(d) list until new dissolved oxygen regulations are enacted. As previously addressed in the 2018 Response to Comments (NHDES, 2019d, p. 39), until such time that new standards are developed, adopted by NHDES, and approved by EPA, NHDES is required to make assessment determinations based on the current NH Code of Administrative Rules, Chapter Env-Wq 1700 Surface Water Quality Standards.

NHDES RESPONSE to 4- 6

The commenter feels that NHDES is in violation of its rulemaking obligations under RSA 541-A, and that until NHDES completes the rulemaking process and properly promulgates the CALM, NHDES should suspend the 2020/2022 303(d) list. As previously addressed in the 2016 Response to Comments (NHDES, 2017b, p. 53), and the 2018 Response to Comments (NHDES, 2019d, p. 40), the CALM is not a rule. RSA 541-A:1, XV, defines “rule” as “each regulation, standard, form as defined in paragraph VII-a, or other statement of general applicability adopted by an agency to (a) implement, interpret, or make specific a statute enforced or administered by such agency or (b) prescribe or interpret an agency policy, procedure or practice requirement binding on persons outside the agency, whether members of the general public or personnel in other agencies.” The CALM is used to fulfill a federal obligation, not to “implement, interpret, or make specific” a state statute. The CALM creates no “policy, procedure or practice requirement [that is] binding on persons outside the agency.” The CALM is used in preparing the 305(b) Report and 303(d) list, and that list may be used by the federal or state government to make decisions in regulatory programs, but each such decision is made under its own administrative process that includes opportunities for public input and appeal.

NHDES RESPONSE to 4- 7

This section states that the City is incorporating in full Brown & Caldwell’s technical analysis of the 2020/2022 draft CALM and draft 303(d) List. Responses to these comments are addressed below, in RESPONSE TO COMMENT #4a: .

NHDES RESPONSE to 4- 8

The commenter requests NHDES to suspend its use of the CALM until such time as it has gone through the rulemaking process. NHDES addressed this request above under *NHDES RESPONSE to 4- 6*.

NHDES RESPONSE to 4- 9

The commenter requests that all references to standards based upon chlorophyll-a be removed from the CALM as a result of the arguments raised by Brown & Caldwell. At this time NHDES does not agree with the commenter that all references to standards based upon chlorophyll-a be removed from the CALM. NHDES has addressed this topic under *NHDES RESPONSE to 4a- 5* and *4a- 6*, below.

NHDES RESPONSE to 4- 10

The commenter requests that NHDES stop the use of chlorophyll-a thresholds to conclude total nitrogen is causing dissolved oxygen impairments as a result of the arguments raised by Brown & Caldwell. At this time NHDES does not agree with the commenter that it is necessary to stop using chlorophyll-a in its weight of evidence approach to assessing total nitrogen. NHDES has addressed Brown & Caldwell’s claims under *NHDES RESPONSE to 4a- 6*, below.

NHDES RESPONSE to 4- 11

The commenter requests NHDES to discontinue the practice of making Potential Not Supporting (3-PNS) and Potential Attaining Standards (3-PAS) decision relative to dissolved oxygen saturation, as outlined in the CALM. This comment is not applicable as it relates to the practices outlined in the draft 2018 CALM. The final 2018 CALM (NHDES, 2019a, p. 53) does not make screening level assessments with respect to dissolved oxygen saturation. Similarly, the 2020/2022 CALM (NHDES, 2021a, p. 56) makes full assessment decision based off of dissolved oxygen saturation data.

NHDES RESPONSE to 4- 12

The commenter feels that NHDES should discontinue the use of Indicator 4: Nitrogen in Estuarine Waters for the primary contact recreation designated use, as described in the technical memorandum submitted by Brown and Caldwell. As no further evidence as to the commenters positions was provided for this request, it will be addressed in NHDES' responses to Brown & Caldwell's technical memorandum under *NHDES RESPONSE to 4a- 1 through 4a- 15*, below.

NHDES RESPONSE to 4- 13

The commenter feels that Indicator 10: Total Nitrogen Concentrations (TN) and Associated Eutrophication Impacts in the Great Bay Estuary, in the 2020/2022 CALM, should be revised to acknowledge that other variables beyond nitrogen might affect the response variables examined as part of the preponderance of evidence approach used by NHDES. While NHDES agrees with the commenter there are multiple influencing variables that can contribute to the observed effects seen in the response variables beyond nitrogen, NHDES does not feel that revisions are necessary at this point in time to make that clearer to the reader. The CALM states that "Each individual indicator has varying degrees of linkage to total nitrogen and those linkages are likely to differ by assessment zone. This variability of linkages, coupled with the lack of data about some of the indicators, is such that not all indicators can individually be used to make full-support/non-support determinations. Inherent in this evaluation is a consideration of the quality, currentness, representativeness, completeness, applicability, frequency, magnitude and duration of each indicator" (NHDES, 2021a, p. 73). NHDES feels that the aforementioned statement is sufficient to relay to the reader that there are confounding variables at work in this complex estuary and that those variables are taken into consideration in NHDES' assessment process.

The commenter further requests that NHDES not use chlorophyll-a as an indicator of dissolved oxygen impairments, but instead use dissolved oxygen data. As presented in Indicator 10a: Dissolved Oxygen Assessment (NHDES, 2021a, p. 73), dissolved oxygen data is the only data used for the assessment of dissolved oxygen. The commenter may be confusing Indicator 10b: Chlorophyll-a Concentration (Chl-a) Threshold to Protect Dissolved Oxygen (NHDES, 2021a, p. 74), which evaluates chlorophyll-a, recognizing that it represents a potential draw on available dissolved oxygen that is spurred by increased nitrogen in the system. However, Indicator 10b is an evaluation of chlorophyll-a and is separate from Indicator 10a. Both of these subheadings under Indicator 10 are part of the 9-indicators factored into the final assessment for total nitrogen.

NHDES RESPONSE to 4- 14

The commenter requests that the Cocheco River (NHEST600030608-01) be revised from category 5-M to category 3-PAS as an interim listing until more high quality data can be collected and assessed. Although the commenter fails to identify to which parameter they are referring, NHDES assumes the commenter is referring to dissolved oxygen concentration and total nitrogen, as those are the only parameters listed as category 5-M in the draft 2020/2022 303(d) List. As addressed in the Technical Support Document for the Great Bay Estuary (NHDES, 2021b, pp. 78-84) and in the various responses to the comments made by the City of Rochester and Brown & Caldwell, NHDES does not agree with the arguments as they have been presented. NHDES feels that sufficient high quality data has been collected to make accurate assessment

decisions for both dissolved oxygen concentration and total nitrogen. Therefore, the Cocheco River (NHST600030608-01) will remain impaired (5-M) for dissolved oxygen concentration and total nitrogen for the aquatic life integrity designated use for the 2020/2022 assessment cycle.

NHDES RESPONSE to 4- 15

The commenter states that NHDES has not provided evidence or analysis to suggest the Cocheco River (NHST600030608-01) is not achieving any designated use or that total nitrogen is impairing said designated use. NHDES disagrees with this statement. NHDES has provided evidence in the Technical Support Document for the Great Bay Estuary (NHDES, 2021b, pp. 78-84) showing that the Cocheco River (NHST600030608-01) is impaired for chlorophyll-a, dissolved oxygen saturation and total nitrogen for the aquatic life integrity designated use as defined in [Env-Wq 1700](#). NHDES followed methodologies outlined in their Consolidated and Assessment Listing Mythology guidance document (NHDES, 2021a), which is subject to public review and comment biennially along with the 303(d) List. These impairments are unchanged from those of the 2018 303(d) List, which was [approved by EPA](#) on February 25, 2020. Although reductions in nitrogen inputs to the estuary have been made by local municipalities, it may take an extended period of time before these efforts are seen in the estuary due to the decades of high loading. Other estuaries have demonstrated that the benefits resulting from reduced nitrogen inputs often lag behind the actual reductions in the system, sometimes by a decade or more.

The commenter further requests that NHDES conduct a statistical evaluation to identify if changes in nitrogen loading as a result of recent facility improvements have had any measurable impact on water quality in the Cocheco River. The commenter claims that without identifying such linkages, NHDES lacks the technical basis for listing the Cocheco River as impaired. Although NHDES agrees with the commenter that such an analysis would be academically interesting, and possibly provide context into some improvements that have been identified in the Technical Support Document for the Great Bay Estuary (NHDES, 2021b, pp. 78-84), such a study is not required in the assessment process as governed by the Federal Water Pollution Control Act [PL92-500, commonly called the Clean Water Act (CWA)] and New Hampshire Statutes Chapter 485-A:4.XIV. See the Piscataqua River Estuaries Partnership's Environmental Data Report for additional information and analysis on loading to the Great Bay Estuary (PREP, 2017, pp. 26-45).

NHDES RESPONSE to 4- 16

The commenter requests that NHDES develop a water quality management strategy for the tidal Cocheco River and the Great Bay Estuary that focuses on collaboration between regulatory agencies and affected stakeholders in the watershed. The comment is duly noted, however, as this comment does not directly relate to the CALM or the 303(d) List, no additional response necessary.

NHDES RESPONSE to 4- 16

This section includes a summary of the City's comments and reiterates its request for NHDES to amend its 2020/2022 CALM and 2020/2022 303(d) list. NHDES directs the commenter to sections 4- 1 through 4- 15 of RESPONSE TO COMMENT #4: Blaine M. Cox, City of Rochester and sections 4a- 1 through 4a- 15 of RESPONSE TO COMMENT #4a: for a complete explanation of NHDES' positions on the requested changes.

RESPONSE TO COMMENT #4a: Technical Memorandum prepared for the City of Rochester, Comments on New Hampshire Draft 2020 CALM and 303(d) Listings, Brown and Caldwell

NHDES RESPONSE to 4a- 1

In this section the commenter explains that on behalf of the City of Rochester they have developed technical comments on the Cocheco River (NHST600030608-01). They continue on to explain that they also provided technical comments for the City for the 2016 and 2018 assessments and that the draft

2020/2022 303(d) List is unchanged from the 2018 303(d) List with respect to the tidal Cocheco River (NHES600030608-01). As such, the commenter reaffirms their position that their comments in whole provided on the 2016 and 2018 303(d) Lists and CALMs remain relevant and asks that they be considered for the draft 2020/2022 303(d) List and CALM. As stated previously under *NHDES RESPONSE* to 4- 2, NHDES addressed the concerns raised by the commenter in both the [2016 Response to Comments on the Draft 303\(d\) and CALM](#) (NHDES, 2017b) and [2018 Response to Comments on the Draft 303\(d\) and CALM](#) (NHDES, 2019d) and most recently considered by EPA as part of their [approval of the 2018 assessments](#) on February 25, 2020. NHDES encourages the commenter to review the applicable sections of the responses as provided by NHDES on 11/30/2017 and 8/8/2019, respectively.

NHDES RESPONSE to 4a- 2

This section summarizes previous comments submitted on previous assessment cycles. NHDES addressed the concerns raised by the commenter in both the [2016 Response to Comments on the Draft 303\(d\) and CALM](#) (NHDES, 2017b) and [2018 Response to Comments on the Draft 303\(d\) and CALM](#) (NHDES, 2019d) and most recently considered by EPA as part of their [approval of the 2018 assessments](#) on February 25, 2020. NHDES encourages the commenter to review the applicable sections of the responses as provided by NHDES on 11/30/2017 and 8/8/2019, respectively. No additional response necessary.

NHDES RESPONSE to 4a- 3

The commenter feels that the dissolved oxygen saturation criterion lacks a linkage to designated use protection. They raised this issue in their comments to the 2018 assessments and have since been working with the NHDES and EPA through the NH Water Quality Standards Advisory Committee (WQSAC). As previously addressed in the 2018 Response to Comments (NHDES, 2019d, p. 39), until such time that new standards are developed, adopted by NHDES, and approved by EPA, NHDES is required to make assessment determinations based on the current NH Code of Administrative Rules, Chapter Env-Wq 1700 Surface Water Quality Standards. NHDES encourages the commenter to continue to work with the WQSAC on this issue until such time as it has been fully resolved.

NHDES RESPONSE to 4a- 4

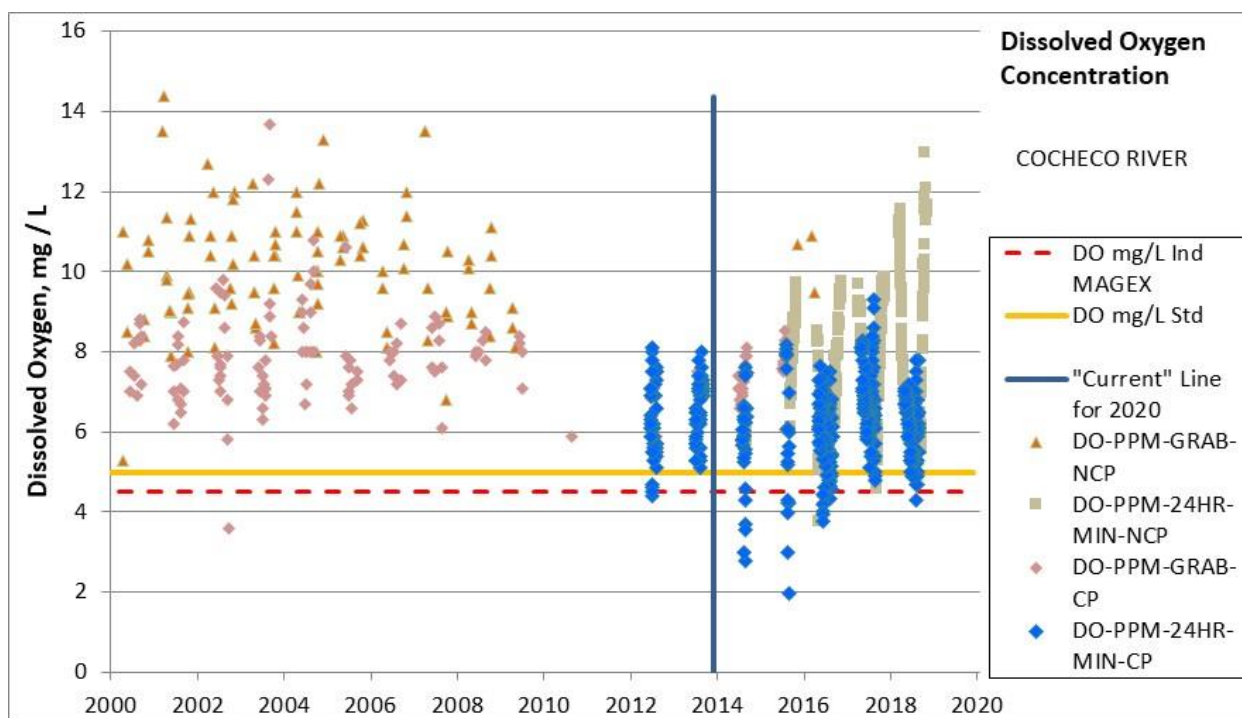
The commenter feels that the 10% exceedance threshold triggering a dissolved oxygen concentration impairment of the Cocheco River (NHES600030608-01) is subjective based on measurement and equipment precision. They feel that because some of the values were so close to the 5.0 mg/L threshold (4.9 mg/L) they should not be included in the count. The commenter contends that they were within the meter's accuracy range of "0.1 mg/L or 1%, whichever is greater," and therefore should not be counted towards the total. The commenter requests NHDES to present further justification for their impairment decision of the Cocheco River.

NHDES does not feel that further justification is warranted at this time. As explained in the Technical Support Document for the Great Bay Estuary, "[p]art of the concept behind the 10% rule was to address random errors within the meter measurement accuracy thereby limiting accidental impairments. The magnitude of exceedance indicator threshold (< 4.5 mg/L) was layered into the assessment process to address major exceedances and exceedances beyond all normal measurement errors. Of the overall current dataset (2014-2018), there were 42 days on which DO fell below 5 mg/L; there were 9 days on which DO fell below 4 mg/L; there were 3 days on which DO fell below 3 mg/L; and there was 1 day on which DO fell below 2 mg/L" (NHDES, 2021b, p. 78).

As explained in the Technical Support Document, NHDES is in agreement with the commenter that using the 10% rule of thumb as outlined in the CALM (NHDES, 2021a, p. 27) on its own in this instance might not be appropriate in making an impairment determination. However, as explained in the Technical Support Document and shown in Figure 4, there were multiple occasions in which the daily minimum dissolved

oxygen concentration fell below 4 mg/L and in one instance dropped below 2 mg/L. It is due to these major exceedances below the magnitude of exceedance threshold (< 4.5 mg/L) in conjunction with the exceedance of the 10% rule that NHDES concluded that an impairment was justified.

Figure 4: Dissolved Oxygen Concentration of the Cocheco River



NHDES RESPONSE to 4a- 5

The commenter claims that using the worst case scenario approach for chlorophyll-a data skews assessment towards impairment without an accurate understanding of indicator pathways to effects on designated uses. The commenter further declares that this approach is understandable for use on many parameters, but should not be utilized for nutrients as it prevents a thorough understanding of interactions between variables and confounds the ability to make accurate assessments.

As stated in the CALM (NHDES, 2021a, p. 73), assessments to determine compliance with Env-Wq 1703.14 consider both direct measure of nutrients and indicators of nutrient-related impairments (i.e. eutrophication). NHDES utilizes a “preponderance of evidence” approach that looks at a stressor-response relationship between total nitrogen and various indicators. The CALM articulates under Section 3.2.4.1, Indicator 10b: Chlorophyll-a Concentration (Chl-a) Threshold to Protect Dissolved Oxygen (NHDES, 2021a, p. 74), that chlorophyll-a represents a potential draw on available dissolved oxygen in two principal 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. Indicator Part 10b is a response threshold that will be used to assess if there are excess nutrients per Env-Wq 1703.14 to maintain an adequate dissolved oxygen concentration per Env-Wq 1703.07.

The commenter implies that by using the highest chlorophyll-a value from a particular day in the evaluation, it may miss the optimal conditions identified by NHDES for sustaining large phytoplankton blooms and unnecessarily show cause for impairment. While NHDES has pointed out that optimal conditions for the Cocheco River to sustain large phytoplankton blooms occur when low tide occurs at

midday, with low freshwater inputs (NHDES, 2021b, p. 78), this does not mean that these are the only conditions in which large phytoplankton blooms can occur. Using the peak chlorophyll-a in a day helps to identify the potential for overall productivity and future dissolved oxygen consumption as well as the peak potential for chlorophyll-a to block light for eelgrass. Furthermore, it is important to note that in the evaluation process, NHDES aggregates all the peak daily chlorophyll-a values in the last five-year period so that a single day's peak was a lesser influence.

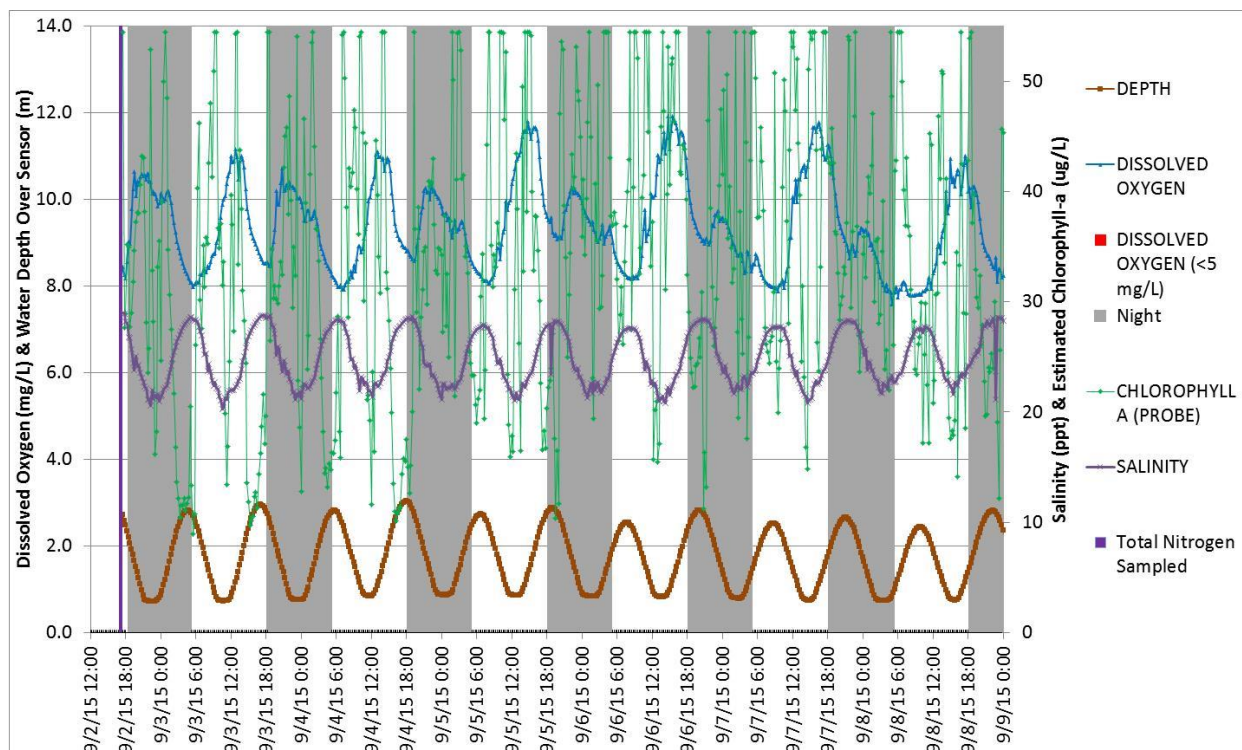
The Technical Support Document for the Great Bay Estuary (NHDES, 2021b, p. 78) states that the calculated 90th percentile of chlorophyll-a in the Cocheco River assessment zone is 16.1 µg/L (n = 71), which is above the 10 µg/L threshold. It is for this reason that the Cocheco River (NHEST600030608-01) was impaired for chlorophyll-a in the draft 303(d) List. As articulated above, NHDES does not feel that a change to the methodology is warranted at this time. The Cocheco River (NHEST600030608-01) will remain impaired for chlorophyll-a on the final 2020/2022 303(d) List.

NHDES RESPONSE to 4a- 6

In this section the commenter states that NHDES has not provided sufficient analyses to demonstrate a linkage between chlorophyll-a data and dissolved oxygen data. The commenter further states that without such a statistical relationship that the current data are insufficient to characterize the conditions in the Cocheco River (NHEST600030608-01). The commenter attempted to correlate dissolved oxygen data to grab-sample chlorophyll-a data, but found that there were insufficient data “occurring on the same day” to make a meaningful correlation. Without such a correlation the commenter feels NHDES cannot impair the Cocheco River for chlorophyll-a.

While NHDES can understand the commenter's desire to show a discrete linkage between paired dissolved oxygen and chlorophyll-a samples, however, it is well documented in the body of scientific literature that chlorophyll-a can be a draw on available dissolved oxygen in estuarine systems. As described in the CALM, chlorophyll-a represents a potential draw on available dissolved oxygen in two principal 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 (NHDES, 2021a, p. 74). It is this second way, after death, that chlorophyll-a typically has the greatest impact and for that reason we would expect difficulty in finding a relationship in the daily paired dataset. As discussed in the Great Bay Technical Support Document (TSD), the calculated 90th percentile for chlorophyll-a was 16.1 µg/L, which is well above the 10 µg/L threshold. It is because of this exceedance of the threshold and the low dissolved oxygen readings that the waterbody has been categorized as impaired for chlorophyll-a for the aquatic life integrity designated use.

As part of the 2016 TSD, NHDES presented a detailed evaluation of the datalogger installation at station CR7 (Cocheco River) in 2015 (NHDES, 2017c, pp. 58-64). The current period for the 2020/2022 assessments includes all data collected within the last five years (2015-2020), therefore this dataset is still relevant to this assessment period. As part of this evaluation NHDES presented detailed information on the interactions between chlorophyll-a and dissolved oxygen measurements recorded. As shown in Figure 5, chlorophyll concentrations are elevated regardless of tide and diel cycles. Photosynthesis by the water column algae drives dissolved oxygen up to 160% saturation, so high in fact that even the 3-4 mg/L drawdown during the dark period is often not enough to draw dissolved oxygen down to 100% saturation (NHDES, 2017c).

Figure 5: Datalogger Data from CR7 as Presented in the 2016 Technical Support Document – Period 1

This evaluation further shows in Figure 6 that the chlorophyll levels cycle along with the tides. Low tide brings the highest chlorophyll concentrations down river to the datalogger, and high tide brings low chlorophyll water up river from the Piscataqua River. As a result, there is less super-saturation of dissolved oxygen as compared the first period, and when low tide occurs at night or during the early morning, the dissolved oxygen levels dip below 5 mg/L and as low as 3 mg/L due to total system respiration (the death and decomposition of the high level of algae which consume oxygen, continued respiration by the surviving chlorophyll, and other dissolved oxygen consuming sources), (NHDES, 2017c).

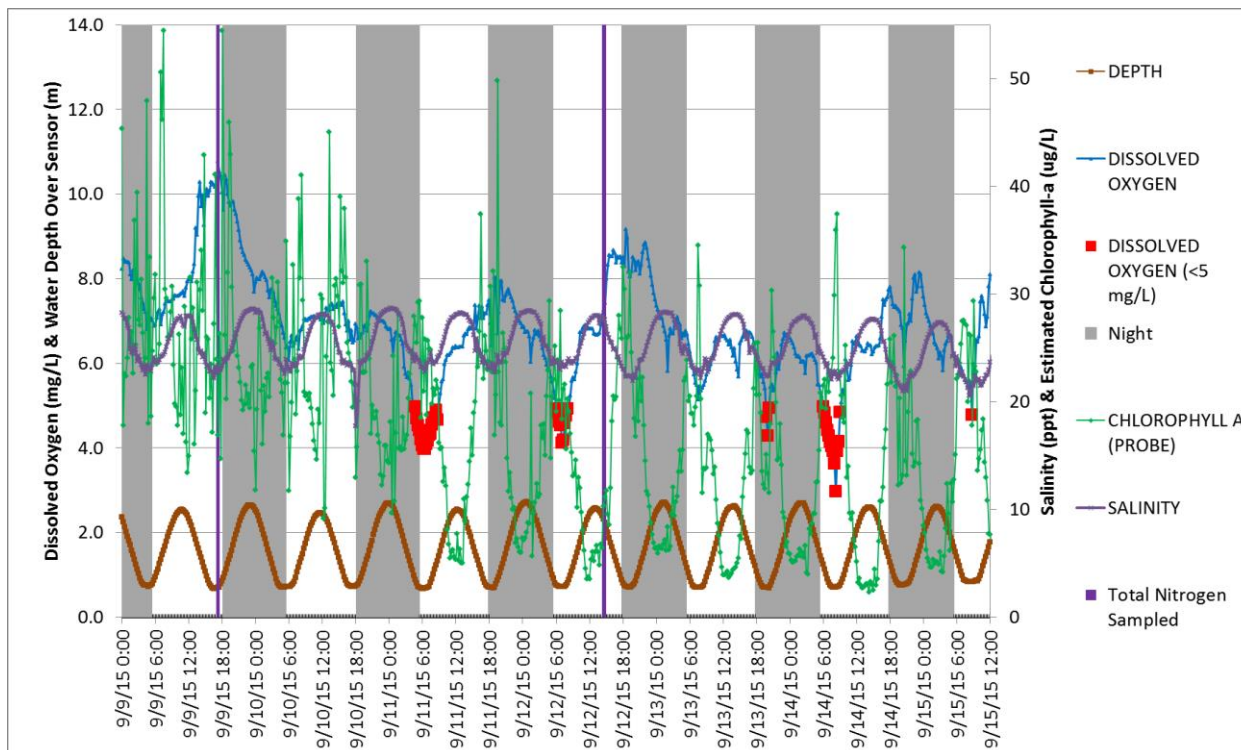
Figure 6: Datalogger Data from CR7 as Presented in the 2016 Technical Support Document – Period 2

Figure 5 and Figure 6 along with the full analysis conducted by NHDES as part of the 2016 TSD clearly illustrate that chlorophyll-a and dissolved oxygen are highly interactive. It is for these specific reasons along with the body of scientific literature that NHDES feels it is appropriate to assess chlorophyll-a concentrations to protect dissolved oxygen as outlined in the CALM (NHDES, 2021a, p. 74).

NHDES RESPONSE to 4a- 7

In this section the commenter contends that improvements seen in dissolved oxygen data are a result of improvements in data quality not improvements in water quality. Further the commenter implies that NHDES believes the water quality has already improved. As such the commenter feels that the Cocheco River (NHST600030608-01) should not be impaired for dissolved oxygen concentration as first raised in their comments submitted for the 2016 303(d) List and again in the 2018 303(d) List.

Note that NHDES did not state that conditions have improved but that we expect that they **will** improve in the coming years.

“Given the concerted effort by the municipalities to reduce nutrient loading through infrastructure investments, nonpoint source controls and stormwater ordinances, NHDES **anticipates that the condition will continue** to improve in the coming years.” (draft 2020/2022 TSD pg. 78)

“While there has been a rapid decrease in nutrient loading and improved conditions **expected in the coming years**, the response datasets still warrant nitrogen impairment under New Hampshire’s narrative standard.” (draft 2020/2022 TSD pg. 78)

NHDES does not agree with the commenter’s statement and feels that the data used in this and past assessments is scientifically defensible. As previously stated, NHDES demonstrated through their analysis of the data that the trends for which the commenters objects were also observed within the Upper Piscataqua River and the Oyster River. NHDES explained in their response that the amplitude of these

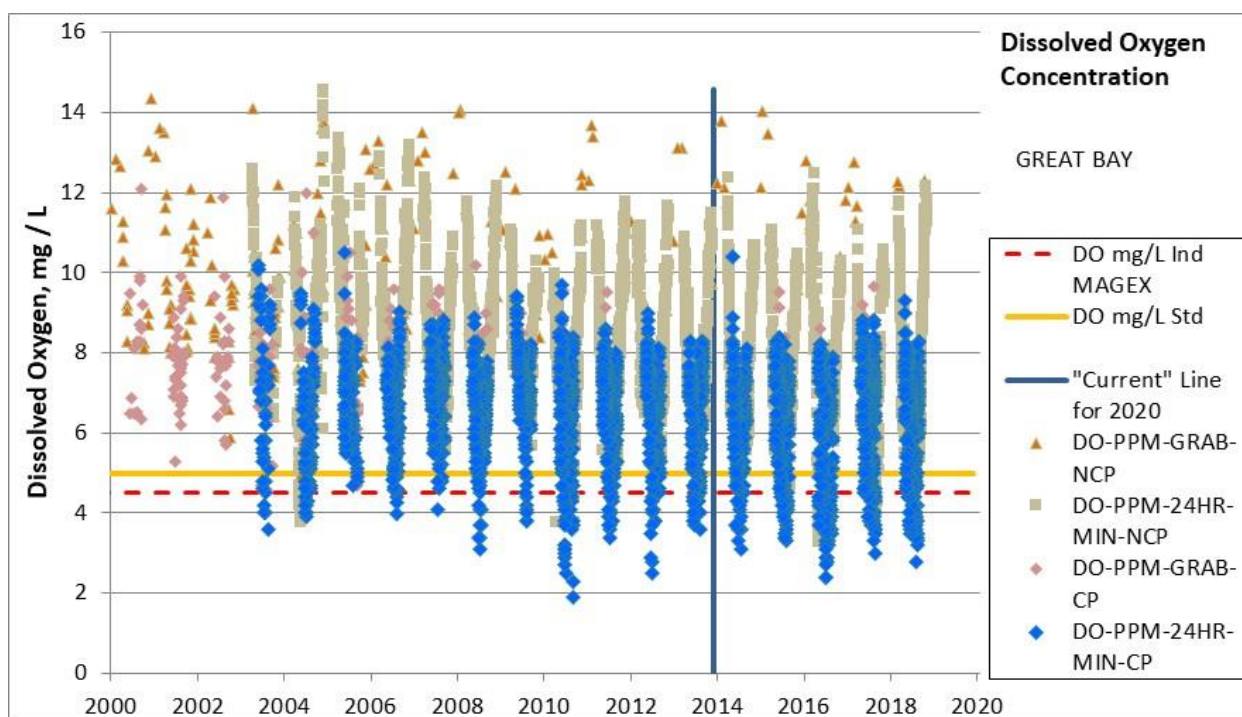
trends were different at each station due in part to differences in freshwater inputs, nutrient loading, and tidal flushing. However, the fact that the same patterns were observed at three separate locations, at relatively the same times, directly contradicts the commenters assertion that the data was due in part to interference and should be deemed unreliable (NHDES, 2019d, p. 44). NHDES directs the commenter to the original comments, which were provided in their response to comments on the 2016 assessment material (NHDES, 2017b, pp. 60-68).

NHDES RESPONSE to 4a- 8

In this section the commenter argues that the Great Bay Technical Support Document (NHDES, 2021b) uses low dissolved oxygen in its weight of evidence assessment to list Great Bay (NHEST600030904-02, NHEST600030904-03, NHEST600030904-04-02, NHEST600030904-04-03, NHEST600030904-04-04, NHEST600030904-04-05, NHEST600030904-04-06) as impaired for total nitrogen for the aquatic life integrity designated use, despite Great Bay not being categorized as impaired for dissolved oxygen.

NHDES would first like the commenter to understand that Great Bay was categorized as fully meeting water quality standards for dissolved oxygen saturation (2-M), but not for dissolved oxygen concentration. Great Bay was categorized as potentially not supporting (3-PNS) for dissolved oxygen concentration due to mixed results from sampling stations. As stated in the Technical Support Document, “[t]he very low readings from GRBSQ are a cause for concern. While GRBSQ more accurately represents the conditions in the Squamscott River than the entirety of Great Bay proper, it indicates that low DO issues are likely to extend into portions of Great Bay” (NHDES, 2021b, p. 44). As seen in Figure 7, which is also presented in the Technical Support Document, dissolved oxygen concentrations routinely drop below 4 mg/L. Further, regarding the newly established Great Bay (GRBGBE), the TSD states, “...in 2018 an additional new rotational site was established on the east side of Great Bay (GRBGBE) which recorded a minimum DO below 5 mg/L on 4-dates (9/5 to 9/8).” Therefore, the commenters claim that “[n]o evidence or analysis was provided to support the assumption of low DO in Great Bay when data indicate full support in these segments” is unfounded.

Figure 7: Dissolved Oxygen Concentration in Great Bay 2000-2018 Including GRBSQ and GRBAP



NHDES RESPONSE to 4a- 9

In this section the commenter asserts that NHDES uses chlorophyll-a greater than the 10 µg/L 90th percentile threshold as evidence to suggest eelgrass was not protected in Great Bay. They continue, that no quantifiable evidence was presented to show that a threshold of 10 µg/L is necessary to protect eelgrass. NHDES is puzzled by this statement as the estuarine bioassessment (eelgrass) indicator is not assessed using a chlorophyll-a threshold. As outlined in the CALM, NHDES does not use chlorophyll-a to assess eelgrass. Rather, eelgrass impairment decisions are based on historical loss > 20% or a decreasing trend that shows a loss of 20% of the resource (NHDES, 2021a, pp. 70-71). Furthermore, the explanation given in the Great Bay Technical Support Document for the impairment of eelgrass clearly states “The historical extent of eelgrass in this assessment zone was 2,130.7 acres from the 1948, 1962, 1980, and 1981 datasets. The median current extent of eelgrass in 2016-2019 is 1,450 acres, which is a 31.9% decrease. Since 1990, the trend in eelgrass cover in this assessment zone is a loss of 30.4%. The thresholds for impairment are either a loss of more than 20% of the historic extent of eelgrass or a recent trend of greater than 20% loss” (NHDES, 2021b, p. 45).

NHDES RESPONSE to 4a- 10

In this section the commenter selectively quotes portions of the CALM, specifically Indicator 10j: Final Total Nitrogen Concentration (TN) Assessment (NHDES, 2021a, p. 79). The commenter attempts to justify that Great Bay is not impaired for total nitrogen because the average growing season (May-Sept.) concentration was reports as being 409 µg/L. Selectively quoting a line from the CALM that states “Dr. Howes and the Massachusetts Estuary Project generally use 500 µg/L as the break between “Good to Fair” and “Moderate Impairment”[.]” (NHDES, 2021a, p. 79). However, the commenter fails to present that quote in its entirety, leaving out the final part of that sentence that states “[...] except is some systems where they use 400 µg/L.” The CALM also follows up by indicating that for NHDES’ assessment purposes “the frequency of samples over 500 µg/L has been considered as “high”” (NHDES, 2021a, p. 79).

The commenter also fails to acknowledge that the Great Bay Technical Support Document clearly identified that “[t]he long-term Great Bay site (GRBGB) recorded 6-measurments over 500 µg/L in 2018 (6/19=518 µg/L, 8/14=542 µg/L, 9/25=501 µg/L, 10/15=864 µg/L, 11/12=569 µg/L, & 12/3=643 µg/L). The new GRBGBE site documented 3-measurments over 500 µg/L in 2018 (8/17=908 µg/L, 9/24= 502 µg/L, 10/16=1,610 µg/L, 11/19=501 µg/L)” (NHDES, 2021b, p. 45). The CALM clearly states that, “...the frequency of samples over 500 µg/L has been considered as “high” and that Dr. Howe’s, “...indicated a growing season (May-Sept) average of 320-350 µg/L should be protective of that eelgrass resource in the Great Bay system (Howes, 2019).” In order to assess compliance with Env-Wq 1703.14 for the Great Bay estuary, NHDES utilizes a “preponderance of evidence” approach that looks at a stressor-response relationship between total nitrogen and various indicators. There were many samples (22%) in excess of 500 µg/L, some well over, and the growing season average of 409 µg/L well exceeds the “320-350 µg/L” that should be protective of that eelgrass resource in the Great Bay system (Howes, 2019). As presented in the Great Bay Technical Support Document, “[g]iven the number of eutrophication indicators that are above the levels identified in CALM as needed to support aquatic life use, and the preponderance of evidence indicating the impacts of eutrophication, this assessment zone has been moved to nonsupporting for total nitrogen” (NHDES, 2021b, pp. 44-57). As presented in the Great Bay Technical Support Document (NHDES, 2021b), NHDES feels there is sufficient evidence to support the impairment of Great Bay for total nitrogen for the aquatic life integrity designated use at this time.

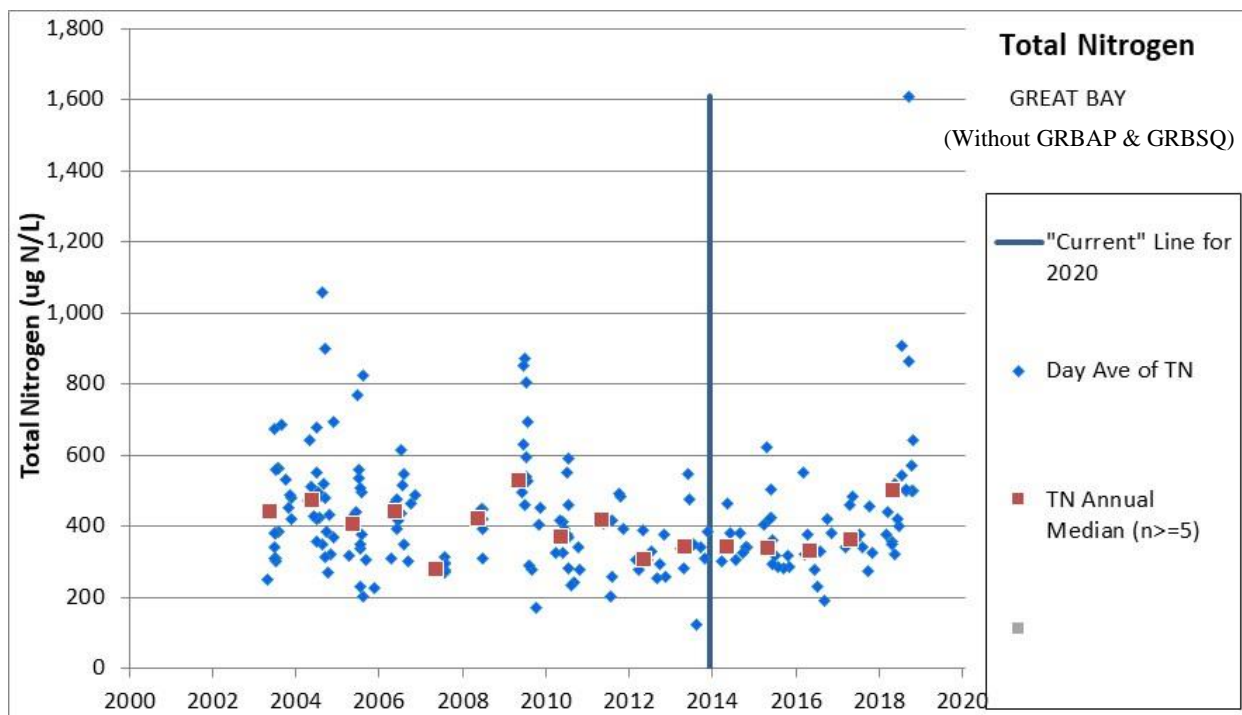
NHDES RESPONSE to 4a- 11

The commenter expresses concern that although the CALM states that frequency of total nitrogen over 500 µg/L is considered to be “high”, NHDES fails to establish a frequency in the determination. The commenter further states that NHDES fails to provide scientifically defensible evaluations linking total nitrogen

measurements over 500 µg/L to any adverse responses that would lead to non-attainment of designated uses. NHDES would like the commenter to understand that this is an interpretation of the narrative criteria in Env-Wq 1703.14 which in and of itself does not specify a frequency. Env-Wq 1703.14 simply states that class B waters shall not contain nitrogen in such concentrations that would impair the designated use.

NHDES uses best professional judgement in their evaluation process while following the guidelines set forth in the CALM. NHDES has utilized peer reviewed scientific literature in establishing the 500 µg/L threshold and a communication from Dr. Howes sent to the City of Rochester for the growing season average of 320-350 µg/L (Howes, 2019). As acknowledged by the commenter, NHDES identified that 22% (13 of 58) of samples collected in the center of Great Bay were over 500 µg/L. It is also important to understand that these concentrations were not just slightly over 500 µg/L, but in some instances were over 600 µg/L, with one exceeding 1,600 µg/L, Figure 8. It is NHDES' opinion that the frequency and magnitude of total nitrogen concentrations over 500 µg/L in combination with the number of other eutrophication indicators that are above the levels identified in CALM as needed to support the aquatic life integrity designated use is adequate to demonstrate a preponderance of evidence indicating the impacts of eutrophication in Great Bay.

Figure 8: Daily Average Total Nitrogen Concentration in Great Bay



NHDES RESPONSE to 4a- 12

This section summarizes and repeats the comments previously submitted to NHDES concerning their belief that NHDES is required to show stressor-response relationships between nutrients and nutrient response variable prior to making assessments. NHDES uses peer reviewed scientific literature in the development of their CALM and in setting thresholds for particular parameters and an evaluation of the available data per the existing narrative criteria.

The commenter further asks that NHDES delay any “regulatory action such as a TMDL” until such time as stressor-response relationships can be established. While the 303(d) List and TMDLs are required by the Clean Water Act (CWA), their intent is to be utilized as planning tools. As such, they are subject to use by

federal or state governmental agencies to make decision in regulatory programs, but each such decision is made under its own administrative process that includes opportunity for public input and appeal. While both the assessment process and the effluent permitting process rely on surface water quality standards, the development of permit limits is a completely separate activity. Situations can and do arise wherein the 303(d) List does not find a waterbody to be currently impaired, but based on the reasonable potential analysis (the basis for permit development), effluent limits are imposed to prevent impairments.

NHDES RESPONSE to 4a- 13

This section includes a summary of the Brown and Caldwell's comments and reiterates its request for NHDES to amend its 2020/2022 CALM and 2020/2022 303(d) list. NHDES directs the commenter to sections 4a- 1 through 4a- 13 of RESPONSE TO COMMENT #4a: for a complete explanation of NHDES' positions on their requested changes.

NHDES RESPONSE to 4a- 14

This section contains a copy of the technical comments on NHDES' 2016 CALM and 303(d) List. [Responses to those comments](#) can be found online (NHDES, 2017b). No additional response necessary.

NHDES RESPONSE to 4a- 15

This section contains a copy of the technical comments on NHDES' 2018 CALM and 303(d) List. [Responses to those comments](#) can be found online (NHDES, 2019d). No additional response necessary.

RESPONSE TO COMMENT #5: Heidi Trimarco, Conservation Law Foundation (CLF)

NHDES RESPONSE to 5- 1

This section contains opening remarks by the commenter thanking NHDES for their efforts in developing the draft 2020/2022 303(d) List, and for the opportunity to comment on said list. The commenter re-asserts and incorporates by reference their past comments on the draft 2012, draft 2014, draft 2016 and draft 2018 303(d) Lists, including but not limited to concerns about proposed de-listings and potential impacts to threatened or endangers species such as the Atlantic and short-nose sturgeon. As these comments are not directly related to the draft 2020/2022 303(d) List, and NHDES' position on those comments have already been stated in the applicable responses to comments on the 2012 through 2018 303(d) Lists, no additional response is necessary. NHDES directs the commenter to the following response to comments, which are available through our [Water Quality Assessment and TMDLs](#) website:

1. [NHDES' Response to Comments on the Draft 2018 303\(d\) List and CALM](#), (NHDES, 2019d, pp. 21-24).
2. [NHDES' Response to Comments on the Draft 2016 303\(d\) List and CALM](#), (NHDES, 2017b, pp. 71-72)
3. [NHDES' Response to Comments on the 2014 Draft 303\(d\) List](#), (NHDES, 2017a, pp. 36-38)
4. [NHDES' Response to Comments on the 2012 Draft 303\(d\) List](#), (NHDES, 2013, p. 5)

NHDES RESPONSE to 5- 2

In this section the commenter reaffirms their opposition to delistings of total nitrogen in the Great Bay estuary first raised in the draft 2014 303(d) List and reiterates a past comment that there is no requirement that a single pollutant must on its own cause an impairment before that pollutant can be listed on the 303(d). The commenter also reiterates their support for listing the Cocheco River (NHST600030608-01) as impaired for total nitrogen for the aquatic life integrity designated use, as stated in their comments to the 2016 303(d) List. To the extent that particular assessment zones previously commented upon by CLF remain not listed as impaired by total nitrogen NHDES directs the reader to the past assessment cycle comment responses (see *NHDES RESPONSE to 5- 1*) and the current TSD for data evaluations. Regarding the single

pollutant, we refer the commenter to the current CALM. Regarding the listing of the tidal Cocheco River, NHDES agrees.

NHDES RESPONSE to 5- 3

In this section the commenter expresses their support for NHDES' decision to impair Great Bay for chlorophyll-a and total nitrogen, and to impair the Bellamy River for chlorophyll-a, dissolved oxygen concentration, water clarity and total nitrogen as part of the 2020/2022 303(d) List. NHDES appreciates the support.

NHDES RESPONSE to 5- 4

In this section the commenter objects to NHDES' decision to not impair Little Bay, the Upper Piscataqua River, Portsmouth Harbor, and Little Harbor/Back Channel for total nitrogen. As expressed in previous comments, the commenter feels that NHDES should impair waterbodies where nitrogen is contributing to eutrophic conditions, it is not necessary to show that nitrogen is the primary cause for those conditions.

As described in the CALM, the acceptable levels of nutrients in surface waters are governed by Administrative Rule EnvWq 1703.14 which requires that there be a natural level of nutrients in Class A waters and no nutrients in such quantities as to impair any designated uses in Class B waters. In order to assess compliance with Env-Wq 1703.14, for the Great Bay estuary, NHDES utilizes a "preponderance of evidence" approach that looks at a stressor-response relationship between total nitrogen and various indicators. In that approach, a collection of water quality criteria, assessment thresholds and measures collectively act as the indicators of nutrient-related impacts. (NHDES, 2021a, p. 73).

As described in the Technical Support Document for the Great Bay Estuary (NHDES, 2021b), for each of the aforementioned assessment zones the data suggests that the status of the indicators of nutrients and nutrient-related impacts do not present a preponderance of evidence that eutrophication effects are occurring at this time. These decisions were made with the understanding that nitrogen does not need to be the primary cause of the conditions, which is why response indicators such as dissolved oxygen, chlorophyll-a, macroalgae, epiphytes, water clarity, and eelgrass extent are evaluated independently of total nitrogen concentrations. The class B threshold does not specify that a set amount of eutrophication has occurred, but that the eutrophication has **contributed** to the impairment.

NHDES RESPONSE to 5- 5

In this section the commenter expresses their support for NHDES' decision to impair the Oyster River for chlorophyll-a, and to impair Sagamore Creek (NHEST600031001-03, NHEST600031001-04) for chlorophyll-a and total nitrogen as part of the 2020/2022 303(d) List. NHDES appreciates the support.

NHDES RESPONSE to 5- 6

This section contains closing remarks by the commenter, urging NHDES to amend its 2020/2022 303(d) List to include impairment listings for total nitrogen for the Little Bay, Upper Piscataqua River, Portsmouth Harbor and Little Harbor/Back Channel assessment zones. See NHDES' Response to 5- 4, above.

RESPONSE TO COMMENT #6: Joshua M Wyatt, City of Dover

NHDES RESPONSE to 6- 1

This section contains opening remarks by the commenter thanking NHDES for their efforts in developing the draft 2020/2022 CALM and 303(d) List. No response necessary.

NHDES RESPONSE to 6- 2

The commenter does not feel that NHDES can promulgate the CALM of the 303(d) list outside of administrative rulemaking requirements set forth in RSA chapter 541-A. Until NHDES completes the rulemaking process and properly promulgates the CALM and 303(d) List the commenter feels that NHDES should suspend the 2020/2022 303(d) list. This same comment was raised by the City of Rochester and is addressed under *NHDES' RESPONSE to 4- 6*, above. No further response necessary.

NHDES RESPONSE to 6- 3

In this section the commenter concurs with comments raised by the City of Rochester and incorporates by references the comments submitted by Brown and Caldwell on the 2016, 2018 and 2020/2022 CALMs and 303(d) Lists. As stated earlier, NHDES' position on past comments has not changed and refers the commenter to NHDES' [Response to Comments on the Draft 2016 303\(d\) List and CALM](#) (NHDES, 2017b) and [Response to Comments on the Draft 2018 303\(d\) List and CALM](#) (NHDES, 2019d). NHDES directs the commenter to RESPONSE TO COMMENT #4a: Technical Memorandum prepared for the City of Rochester, Brown and Caldwell, above, for responses to comments submitted on the draft 2020/2022 303(d) List and CALM.

NHDES RESPONSE to 6- 4

The commenter feels that the Total Maximum Daily Load (TMDL) priority for all total nitrogen impaired assessment units within the Great Bay estuary should be elevated from 'Low' priority to 'High' priority. A similar comment was submitted by the Towns of Exeter and Newmarket. Therefore, NHDES directs the commenter to NHDES' RESPONSE to 2- 1, above. The one big difference between this comment and that raised in 2- 1, is that in this case the commenter believes there is a need for significant scientific investigations and technical work prior to elevating the priority. As stated in NHDES' RESPONSE to 2- 1, above, NHDES agrees with the commenter in this regard.

RESPONSE TO COMMENT #7: Daniel Hudson, City of Nashua

NHDES RESPONSE to 7- 1

This section contains opening remarks by the City of Nashua and thanks NHDES for their opportunity to review and comment on the draft 2020/2022 303(d) List, in particular the Nashua River – Nashua Canal Dike (NHIMP700040402-03). No response necessary.

NHDES RESPONSE to 7- 2

This section contains a background summary of how and why the Nashua River – Nashua Canal Dike (NHIMP700040402-03) received its impairment status for chloride, for the aquatic life integrity designated use and aligns with what NHDES understands regarding the dataset. No response necessary.

NHDES RESPONSE to 7- 3

This section contains a summary of the data that NHDES used in their draft 2020/2022 assessment process for chloride. It describes the commenters process of taking the available specific conductance samples and using NH's state wide specific conductance to chloride relationship to approximate chloride concentrations. The commenter summarizes that within the current assessment period (2010 through 2020) there were 57 specific conductance samples collected at station 04A-NSH, which had an average calculated chloride concentration of 68 mg/L and a maximum of 149 mg/L. NHDES agrees with the commenter's summation, however as a point of clarification, the commenter should understand that in NHDES' approach to chloride assessments instead of converting each of the specific conductance measurements we typically just convert the chloride thresholds. Therefore, the specific conductance thresholds that represent the chronic (230 mg/L) and acute (860 mg/L) chloride criteria for the state-wide relationship would be 835.5 µS/cm for

chronic and 3,013.1 5 $\mu\text{S}/\text{cm}$ for acute (NHDES, 2021a, p. 87). Either approach is acceptable and should result in the same relationship of samples to meeting or exceeding the thresholds.

NHDES RESPONSE to 7- 4

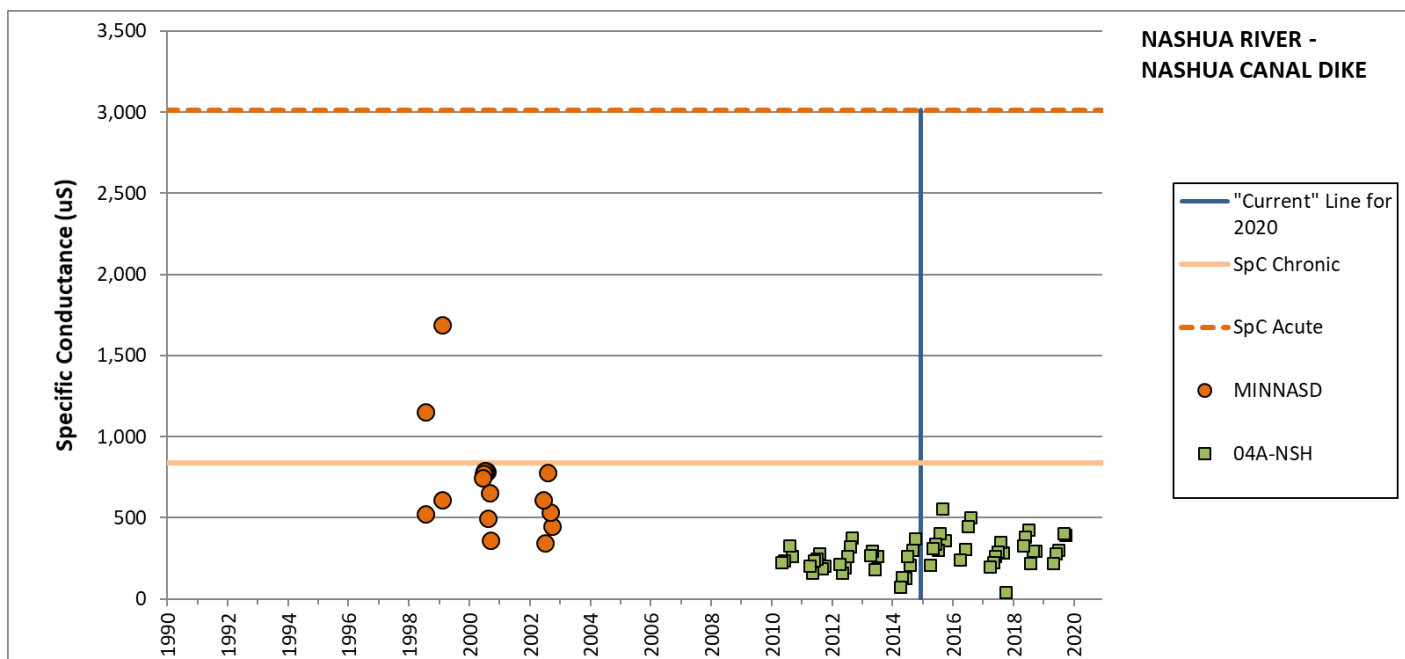
In this section the commenter argues that because assessment units were created to be relatively homogenous, it follows that any independent sample taken from an assessment unit is representative of conditions in the assessment unit (NHDES, 2021a, p. 25). They continue that due to this understanding it stands to reason that the 57 samples collected as station 04A-NSH, even when considered in conjunction with the two samples collected at station MINNASD in 1998 & 1999, should provide enough evidence to show that conditions in the Nashua River – Nashua Canal Dike (NHIMP700040402-03) have improved and it should no longer be listed as impaired for chloride for the aquatic life integrity designated use.

Although fundamentally NHDES agrees that samples collected within a waterbody represent the conditions of that waterbody as a whole, we also recognize that each sampling station is unique and may have contributing factors that could make the results differ from those of another station. It is for these reasons that NHDES aggregates all of the sampling data collected in a particular waterbody together during the assessment process. When we examine the chloride data collected at station MINNASD (**Table 2**) one of the obvious factors that sticks out is that both of the samples over the chronic threshold of 230 mg/L were collected near the bottom, in the hypolimnion (i.e. ≥ 5 meters). In contrast, samples collected closer to the surface on the same day demonstrate concentrations that were below the chronic threshold. We also know that waterbodies have a tendency to stratify both thermally due the temperature based density differences and by density itself due to dissolved substances. It stands to reason as two of the samples were collected in February, that the waterbody is showing evidence of a non-thermal density stratification, with the denser saltier water sinking to the bottom.

Table 2: Summary of Chloride Data at Station MINNASD

Station ID	Station Name	Parameter Name	Start Date	Result	Unit	Depth
MINNASD	MINE FALLS POND-DEEP SPOT	CHLORIDE	2/10/1999	160	MG/L	2.5 M
			2/10/1999	488	MG/L	5.5 M
			7/21/1998	136	MG/L	2.5 M
			7/21/1998	350	MG/L	5 M

A review of the specific conductance data collected at stations MINNASD and 04A-NSH indicates that all of the samples, with the exception of those collected in 1998 and 1999, were collected from the surface. NHDES agrees with the commenter that the samples collected in the current period (2015-2020, Figure 9) shows specific conductance concentrations below the water quality threshold. However, the data collected at station 04A-NSH does not indicate a change in water quality as they were not collected at the same depth as those that drove the initial impairment. As described in [Removal of Water Quality Impairments: Data and Documentation Considerations](#), the data collected to show an improvement must be comparable to the original data in as many ways as possible. That is, it must be collected under the same (or more limiting) conditions as the original data that showed problems. In this instance to demonstrate a change in water quality, samples should be collected in the hypolimnion and preferably at station MINNASD.

Figure 9: Specific Conductance Samples Collected at Stations MINNASD vs 04A-NSH

In addition to collecting samples that are representative of those that drove the initial impairment, other considerations are needed for a full support determination. As outlined in the [CALM](#), for a full support determination at least 50% of the minimum number of independent chloride samples needed (i.e. $n > 5$) for FS, shall be taken between June 1 and September 30 when base flow has the greatest likelihood of showing impacts due to long term groundwater loading and from ion exchange water softeners that rely on chloride for recharge. Additionally, at least 50% of the minimum number of independent samples needed (i.e. $n > 5$) for full support, shall be taken during melt events (i.e., between December 1 and March 15), when the melt of “managed snow” in paved area is likely to contain the highest chloride levels (NHDES, 2021a, p. 82). With the exception of the two samples collected at station MINNASD in 1999, there have been no samples collected during the melt period (i.e. between December 1 and March 15). It is for these reasons that NHDES must keep the Nashua River – Nashua Canal Dike (NHIMP700040402-03) impaired for chloride for the aquatic life integrity designated use for the 2020/2022 cycle.

NHDES RESPONSE to 7- 5

In this section the commenter remarks that sampling in portions of the Nashua River and the Nashua Canal will be completed as part of the FERC license renewal of the Mine Falls Dam, which will be completed in 2021. NHDES looks forward to having this new sampling information for use in its 2022 assessment cycle. NHDES further encourages the commenter to review the comments provided in NHDES RESPONSE to 7-4, above, as well as NHDES’ [Removal of Water Quality Impairments: Data and Documentation Considerations](#) to ensure that the data being collected will meet the desire of the commenter in demonstrating a change in water quality and be useful in reevaluating the Nashua River – Nashua Canal Dike (NHIMP700040402-03) for a potential delisting.

NHDES RESPONSE to 7- 6

In this section the commenter summarizes their assertion that the Nashua River – Nashua Canal Dike (NHIMP700040402-03) should not be impaired for chloride for the aquatic life integrity designated use for the 2020/2022 cycle. This comment is addressed directly in NHDES RESPONSE to 7-4, above, no additional response necessary.

RESPONSE TO COMMENT #8: Suzanne M. Woodland, City of Portsmouth

NHDES RESPONSE to 8- 1

This section contains opening remarks by the commenter thanking NHDES for their efforts in developing the draft 2020/2022 CALM and 303(d) List. The commenter further states that in recognition of the detailed comments submitted by the Cities of Rochester and Dover, their comments will be brief. No response necessary.

NHDES RESPONSE to 8- 2

The commenter concurs with the Cities of Rochester and Dover "...that the required statutory promulgation procedure for the development of the CALM has been neglected." This comment has been previously addressed under *NHDES' RESPONSE* to 4- 6, above. No further response necessary.

NHDES RESPONSE to 8- 3

The commenter concurs with the Cities of Rochester and Dover that the Total Maximum Daily Load (TMDL) priority for all total nitrogen impaired assessment units within the Great Bay estuary should be elevated from 'Low' priority to 'High' priority. Similar to the comment 6- 4 submitted by the City of Dover, the commenter believes there is a need for significant scientific investigations and technical work prior to elevating the priority. This comment has been previously addressed under *NHDES' RESPONSE* to 2- 1 and 6- 4, above. No further response necessary.

NHDES RESPONSE to 8- 4

The commenter echoes the City of Rochester's comments that NHDES has failed to adopt new dissolved oxygen regulations in spite of a Legislative call to do so. This comment has been previously addressed under *NHDES' RESPONSE* to 4- 4, above. No further response necessary.

NHDES RESPONSE to 8- 5

In this section the commenter incorporates by references the comments submitted the Cities of Rochester and Dover as they relate to the draft 2020/2022 303(d) List and CALM. NHDES directs the commenter to the following sections, above:

1. RESPONSE TO COMMENT #4: Blaine M. Cox, City of Rochester
2. RESPONSE TO COMMENT #4a: Technical Memorandum prepared for the City of Rochester, Brown and Caldwell
3. RESPONSE TO COMMENT #6: Joshua M Wyatt, City of Dover

C. REFERENCES

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D. PUBLIC COMMENT ON THE DRAFT, 2020/2022 SECTION 303(D) LIST

Below are public comments on the Draft 2020/2022 303(d) List of Impaired Waters. This section contains the comments received presented as screen shots taken from the original documents. Each individual comment in the letters has been assigned a reference number. The reference number corresponds to the responses in Section B. While the bulk of the comment text is provided in this document, the full original comments and attachments received on the October 16, 2020, draft are on the department's [FTP site](#). If any accommodations are required with this section, please contact the NHDES [Water Quality Assessment Program Coordinator](#).

COMMENT #1: Amy Prouty Gill, City of Nashua, Division of Public Works

Hello,

I am writing this email in response for the NHDES request for comments.

In review of Appendix A – Draft 2020 303(d) list, please note that Second Brook listed below is entirely within the watershed of Hudson. As with First Brook just north of Second Brook, Nashua does not contribute runoff to the Second Brook watershed. Please remove Nashua from the town list.

2020	NHRIV700061206-10	SECOND BROOK	HUDSON, NASHUA	Yes	2.318	MILES	Aquatic Life Integrity	pH	5-M	LOW	N	2000	2000
2020	NHRIV700061206-05	FIRST BROOK	HUDSON	Yes	0.149	MILES	Aquatic Life Integrity	pH	5-M	LOW	N	2019	2016

The location of Second Brook is shown on the attached map from UNH GranitView.

Thank you.

Amy Prouty Gill
Sr. Staff Engineer
Engineering Department
Division of Public Works
9 Riverside Street
Nashua, NH 03062

1-1

COMMENT #2: Russell Dean, Town of Exeter and Steve Fournier, Town of Newmarket

Dear Mr. Wood:

The Towns of Newmarket and Exeter, New Hampshire (collectively the "Towns") respectfully submit the following comments on the 2020 New Hampshire Department of Environmental Services ("DES") Draft 303(d) List of Impaired Surface Waters ("Draft 303(d) List"). For the reasons set forth below, the Towns request that NHDES amend the Draft 303(d) List by elevating the priority of the Great Bay and its tributaries from Low to High.

Section 303(d) of the Clean Water Act requires the State to identify all impaired waters and directs the State to develop a Total Maximum Daily Load ("TMDL") for each pollutant to ensure compliance with and implementation of the applicable water quality standards.¹ Great Bay does not have a TMDL for Nitrogen.

The Draft 303(d) List currently designates the TMDL priority for Great Bay and its tributaries² as "Low" throughout the various assessment units. Such rankings are inconsistent with DES' position on the importance of protecting and enhancing the Great Bay Estuary as only one of the 28 estuaries of national significance in the United States, as well as recent action taken by US EPA in issuing its Draft NPDES Permit (the "Draft Permit"), which specifically targets

Total Nitrogen in the Great Bay watershed.³ As noted in comments submitted to US EPA on the Draft Permit, the Towns are committed to working with DES to address the Total Nitrogen levels in the Great Bay watershed. Setting a TMDL for the Great Bay would be an important step in promoting the ecological health of the watershed and would greatly assist the communities in protecting this critical resource.⁴

Indeed, one of the most valuable tools available to the State to reduce Total Nitrogen, and ultimately improve the ecological health of the Great Bay watershed, is to elevate the priority of the development of a TMDL. For these reasons, we respectfully request that DES prioritize the development of a TMDL for Great Bay and its tributaries. Thank you for your consideration of this request.

Respectfully submitted,



Russell Dean
Town Manager
Town of Exeter, NH



Steve Fournier
Town Manager
Town of Newmarket, NH

¹ 33 U.S.C. § 1313(d)(3).

² For purposes of these comments the Great Bay tributaries include: Bellamy River (NHES600030903-01-01, NHES600030903-01-03, NHES600030903-01-04); Oyster River (NHES600030902-01-03, NHES600030902-01-04, NHES600030904-06-17); Lamprey River (NHES600030709-01-01, NHES600030709-01-02); Squamscott River (NHES600030806-01-01, NHES600030806-01-02); and the Winnicut River (NHES600030904-01).

³ The Draft Permit can be found here: <https://www.epa.gov/npdes-permits/draft-great-bay-total-nitrogen-general-permit>

⁴ While the Towns recognize that ranking alone does not always correlate directly with expedience of a TMDL schedule, as described in the 2020 Consolidated Assessment and Listing Methodology, it is a factor in prioritizing certain resources and the Towns request that NHDES modify this ranking to address the high priority that should be given to Great Bay. Moreover, to the extent NHDES has other means of prioritizing the TMDL schedule for Great Bay, the Towns request that NHDES also take such additional steps.

2- 1

COMMENT #3: Gene Porter, Lower Merrimack River Local Advisory Committee

The Merrimack River in Nashua, Hudson, is no longer contaminated with creosote as a result of the DES-Overseen HazMat remediation project completed in 2019 - 3 years after the last reported creosote report. NHDES Site #:198708017	3- 1
The Merrimack River in Nashua, Hudson Merrimack and Litchfield is no longer impaired by pH as shown in the sampling reported by Pennichuck Waterworks Merrimack River intake samples	3- 2
The Nashua River above the Mine Falls Dam is no longer impaired by low O2 as evidenced by the healthy fish and angler population.	3- 3
More generally, how many years after the last sample can a water body remain on the 303d list? Gene Porter Chair, LMRLAC	3- 4

COMMENT #4: Blaine M. Cox, City of Rochester

<p>Dear Mr. Wood:</p> <p>Thank you for providing us with the opportunity to comment on the draft 2020 Consolidated Assessment and Listing Methodology (“CALM”) and 303(d) List. As we have stated in our comments to the 2016 and 2018 draft CALM and 303(d) List comments, the City of Rochester (the “City”) continues to have significant concerns about the Department of Environmental Services’ (“DES”) lack of scientific evidence to place the tidal Cocheco River (Assessment Unit NHEST600030608-01) into Category 5 for chlorophyll-a, dissolved oxygen (“DO”) and total nitrogen (“TN”). The City also has concerns about the legal authority to implement the CALM as a guideline rather than through rulemaking. Even if the CALM is legally authorized as a guideline instead of through rulemaking, DES has no legal authority to determine that a waterway is impaired, in whole or in part, based upon chlorophyll-a which has no regulatory limits under the Env-Wq 1700 rules. At a minimum, the CALM as it relates to chlorophyll-a is an invalid promulgation of a water quality standard.</p>	4- 1
<p>The 2020 303(d) List is unchanged from the 2018 List as it relates to the tidal Cocheco River. As such, the City’s prior and current comments and the comments of Brown & Caldwell are relevant to the 2020 List. With this letter, the City has attached and incorporates in full the following:</p> <ul style="list-style-type: none"> • Brown & Caldwell’s November 23, 2020 “Comments on New Hampshire Draft 2020 CALM and 303(d) Listings;” • The City’s March 15, 2019 letter with comments on DES’s draft 2018 CALM and 303(d) List; • Brown & Caldwell’s March 15, 2019 “Comments on New Hampshire Draft 2018 CALM and 303(d) Listings,” included as Attachment B to Brown & Caldwell’s November 23, 2020 Comments listed above; • The City’s June 23, 2017 letter with comments on DES’s draft 2016 CALM and 303(d) List; and • Brown & Caldwell’s June 22, 2017 “Comments on NHDES Draft 2016 CALM and Tidal Cocheco River 303(d) Listing,” included as Attachment A to Brown & Caldwell’s November 23, 2020 Comments listed above. <p>Because these comments from the 2018 and 2016 CALM and 303(d) Lists remain equally relevant to the draft 2020 CALM and 303(d) List, the City respectfully requests that DES consider them along with the comments to the draft 2020 CALM and 303(d) List.</p>	4- 2

The 2020 CALM Fails to Incorporate the 2014 Peer Review Findings

In 2017 and 2019, the City commented on DES's draft 2016 and 2018 CALM, respectively. In its comments, the City raised its concern regarding "the lack of *any* reference to the 2014 Joint Report of Peer Review Panel or application of the recommendations contained in the peer review panel's report" as one of the most glaring deficiencies of the draft 2016 and 2018 CALM.

The draft CALM describes the relationship between DO and TN in part as follows:

Low dissolved oxygen is a well-established indicator of elevated nutrients in estuaries.... Fish and other species require sufficient concentrations of dissolved oxygen in the water to survive. In nitrogen-limited systems, such as estuaries ..., 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.... Effects on species include death, compressed habitats, and shifts in species composition to opportunistic benthic species with short life spans and smaller body sizes....

4- 3

2020 draft CALM at 73-74 (citations omitted).¹ In the 2014 Joint Report, the scientists concluded that "[t]o assess if nitrogen reductions will improve DO conditions, data on the origin, quantity, and quality of organic matter in the various assessment regions of Great Bay are needed. [...] In particular, relating DO to nitrogen concentration as in figures 28 and 29 of the DES 2009 Report without accounting for the co-varying influence of these factors is too simple." 2014 Joint Report at 33. The peer review scientists were asked "[d]o you have any recommendations for the long-term (10-year) monitoring and evaluation of the estuary to assess changes in conditions over time?" Dr. Bierman responded: "Long-term monitoring and evaluation of the estuary should be conducted within the larger context of an overall decision support system. An adaptive management framework should be used for this decision support system, and should be a framework for integrating continued monitoring, data analysis and process-based mass balance model to improve scientific understanding and reduce uncertainties. A relevant example would be the recommendations in the Massachusetts Estuary Project (MEP) Linked Watershed Embayment Model Peer Review (Scientific Peer Review Panel 2011)." 2014

Peer Review Report at 67.² Dr. Diaz responded, in part: “Basically, there are no simple cause-effect relationships, it is all interactions. Therefore to focus limited resources on what is essential for setting nitrogen criteria within Great Bay, a detailed conceptual model of all sources of nitrogen entering Great Bay and interactions of ecosystem components with nitrogen would be needed. Evaluation of data gaps within this overall model framework combined with best professional judgment will guide both which linkages are most important, and which short-term and long-term datasets are needed.” *Id.*

DES has continually failed to perform any of the studies and modeling recommended by the peer review scientists, yet continues to contradict the peer review scientists by assuming nitrogen is the cause of impairments and eelgrass loss in Great Bay.

To this point, the peer review scientists were asked “Given the available data/studies, is nitrogen an important factor in the presence/absence of eelgrass in various segments of the estuary?” Dr. Bierman responded, in part, “The DES 2009 Report did not adequately demonstrate that nitrogen is the primary factor in the Great Bay Estuary because it did not explicitly consider any of the other important, confounding factors in developing relationships between nitrogen and the presence/health of eelgrass. These answers apply to the Estuary as a whole and to its various individual segments.” 2014 Peer Review Report at 18.³ Dr. Kenworthy concluded that “DES also included their assessments of chlorophyll-a in each of the zones and determined that there were four zones with nitrogen impairment and seven zones without nitrogen impairment; implicitly linking eelgrass impairment to nitrogen impairment. 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 the Great Bay Estuary are considered impaired for both, and more than half of the zones with eelgrass impairment were not declared nitrogen impaired. . . . There is no basis for a scientifically defensible linkage between nitrogen impairment and eelgrass impairment presented in the report.” *Id.*

Thus, the City reiterates its comment made regarding both the 2016 and the 2018 draft CALM that the lack of *any* reference to the 2014 Joint Report of Peer Review Panel. The City further states that the updated methodology in the draft 2020 CALM fails to incorporate the recommendations contained in the peer review panel’s report and is one of the most glaring deficiencies of the draft 2020 CALM. This is reflected in DES’s continued failure to adopt the report’s findings, perform the recommended studies, and reach conclusions consistent with the approach recommended by the peer review scientists. DES continues to imply potential nitrogen impairments using ambiguous, inappropriate, or unsubstantiated statements such as using the indicator/stressors collectively with the “preponderance of the evidence” approach to evaluate total nitrogen concentrations, while ignoring the 2014 Peer Review Report and its recommendations.⁴ The CALM should be revised to incorporate the findings of the 2014 Peer Review Report and report uncertainties as they currently exist. Where there is this level of uncertainty over the data, DES should not recommend impairment.

¹ The City notes, however, that all of the citations predate the 2014 Joint Report.

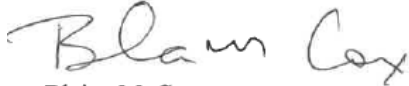
² The City notes here that the 2020 CALM does include reference to the discussions of the SMAST and the MEP thresholds (e.g. 320-350 ug/L) as protective of eelgrass, specifically on page 79 in Note 2 of Indicator 10j: Final Total Nitrogen Concentration Assessment in the context of the growing season (May – September) TN concentration that is factored into the assessments which is a reference to the 2014 Peer Review Report. However, the cited reference is to Dr. Howes from an October 7, 2019 letter to the EPA Region 1 Administrator by Dover and Rochester. See also 2014 Peer Review Report.

³ The City notes that DES includes no reference to the 2014 Peer Review Report within the 2020 CALM, but cites similar language in Section 1.5 of the draft 2020 303(d) list at page 3 in support of its evaluation that the 2020 CALM report is more robust than the 2009 assessment methodology.

⁴ See NH Draft 2020 303(d) list. Section 1.5 at 4.

<p><u>DES Should Delay Finalizing the 2020 303(d) Until New DO Regulations Are Enacted</u></p> <p>In 2017, the New Hampshire legislature instructed DES to “adopt rules, under RSA 541-A, relative to dissolved oxygen water quality standards for tidal and saline waters in a manner consistent with Environmental Protection Agency guidance on dissolved oxygen water criteria published pursuant to section 304(a) of the Clean Water Act, and other relevant scientific information.” Senate Bill 127 (2017). Nevertheless, DES has determined the tidal Cocheco River is DO impaired, but is using rules the legislature has specifically instructed DES to modify and update. Until such time as DES promulgates rules in accordance with its legislative mandate, it should suspend its 2020 303(d) listings.</p>	4- 4
<p><u>DES Has Not Properly Engaged In Rulemaking to Promulgate the CALM</u></p> <p>Under New Hampshire law, a “rule” is defined in relevant part to mean:</p> <p style="padding-left: 40px;">each regulation, standard ... or other statement of general applicability adopted by an agency to (a) implement, interpret, or make specific a statute enforced or administered by such agency or (b) prescribe or interpret an agency policy, procedure or practice requirement binding on persons outside the agency, whether members of the general public or personnel in other agencies.</p> <p>New Hampshire Administrative Procedures Act (“APA”), RSA 541-A:1. “Where an agency’s efforts ‘effect substantive changes binding on persons outside the agency, the agency’s policy constitutes a ‘rule’ that must be promulgated pursuant to the APA.” <i>Bel Air Assocs. v. DHHS</i>, 154 N.H. 228, 233, (2006).</p> <p>The City raised this issue regarding both the 2016 and 2018 draft CALM. Until such time as DES completes the rulemaking process and properly promulgates the CALM, DES should suspend the 2020 303(d) list process.</p>	4- 5
<p><u>Brown & Caldwell’s Technical Analysis</u></p> <p>The City incorporates in full Brown & Caldwell’s technical analysis of the 2020 draft CALM and draft 303(d) List, a copy of which is attached hereto.</p>	4- 6
<p><u>Requests and Recommendations</u></p> <p>The City respectfully requests the following actions relative to the draft CALM:</p> <ol style="list-style-type: none"> 1. Suspend its use of the CALM until such time as it has been fully evaluated and considered in a rulemaking process as required by the APA. 	4- 7
<ol style="list-style-type: none"> 2. For the reasons described by Brown & Caldwell, all references to standards based upon chlorophyll-a should be removed from the CALM. 	4- 8
<ol style="list-style-type: none"> 3. For the reasons described by Brown & Caldwell, DES should not use chlorophyll-a thresholds to conclude TN is causing DO impairment. 	4- 9
<ol style="list-style-type: none"> 4. Although the CALM has discontinued the use of DO percent saturation to make full-support or non-support decisions, the City requests that DO percent saturation not be used for PAS or PNS decisions for the reasons described by Brown & Caldwell. 	4- 10

5. For the reasons described by Brown & Caldwell, the City recommends that DES remove Indicator 4 (Nitrogen in Estuarine Waters) for primary contact recreation. This indicator is based on chlorophyll-a concentrations which is technically unsupported and results in the imposition of a rule that has not gone through the rulemaking process. DES should incorporate the specific recommendations described in the 2014 Joint Report of Peer Review Panel.	4- 11
6. Indicator 10 (Total Nitrogen Concentration) for aquatic life integrity should be revised to acknowledge that the response variables may be affected by a variety of environmental conditions other than nitrogen. Also, chlorophyll-a should not be used as an indicator of DO impairments. Rather, DO should be assessed using DO data.	4- 12
<p>The City respectfully requests that DES take the following actions relative to the 2020 draft 303(d) listing for the tidal Cocheco:</p> <p>1. Revise the draft 2020 303(d) listing for the tidal Cocheco River from category 5-M to category 3-PAS as an interim listing until such time as more high quality data can be collected and assessed.</p>	4- 13
2. DES has not provided evidence or analysis to suggest the tidal Cocheco River is not achieving any designated use or that total nitrogen has been demonstrated to be a causative pollutant for any impairment. DES states nitrogen remains elevated while acknowledging a rapid decrease in loading. Before designating any impairment, the City requests that DES conduct a thorough statistical evaluation using verifiable, high quality data to identify if changes in nitrogen loading as a result of recent facility improvements have any measurable impact on water quality in the Cocheco River. Without identification of such linkages, DES lacks the technical basis for listing the tidal Cocheco River as impaired	4- 14
3. Develop water quality management strategies for the tidal Cocheco River and the Great Bay Estuary that focus on collaboration between regulatory agencies and affected stakeholders in the watershed. In recent years, the Great Bay communities have significantly decreased TN loading into the Great Bay Estuary. Given the TN management strategies already implemented by Rochester and the significant reductions already observed, we strongly recommend that DES oversee a Great Bay-specific study and analysis to establish what factors have prevented eelgrass from fully rebounding and study the effect the existing nutrient loading reductions have had on the Great Bay Estuary over time. This, in turn, will give DES actionable data upon which it can properly determine the impairment status of waterbodies within the Great Bay Estuary.	4- 15

<p><u>Conclusion</u></p> <p>The City appreciates the substantial effort undertaken by DES to develop the 2020 draft CALM and 303(d) listings. The draft 2020 CALM and 303(d) list, however, have significant deficiencies that call into question the legal and technical conclusions reached by DES. For the reasons stated in this letter, as well as the attached report from Brown & Caldwell, and the comments submitted in response to the draft 2016 and 2018 CALM and 303(d) list, all of which are incorporated into this letter in full, the City respectfully requests that DES amend its CALM process and its impairment conclusions in accordance with the requests outlined in this letter and in the referenced documents.</p> <p>Sincerely,</p>  <p>Blaine M. Cox City Manager</p>	<p>4- 16</p>
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COMMENT #4a: Technical Memorandum prepared for the City of Rochester, Comments on New Hampshire Draft 2020 CALM and 303(d) Listings, Brown and Caldwell

<p>Section 1: Introduction</p> <p>The New Hampshire Department of Environmental Services (NHDES) currently lists the tidal Cocheco River (segment NHST600030608-01) as impaired for chlorophyll-a (5-P), dissolved oxygen (5-M), and total nitrogen (TN; 5-M) (NHDES 2020a). The listings were added during the 2016 303(d) assessment and maintained during the 2018 and the most recent 2020 303(d) assessments. The listings were based on grab sample and continuous recorder data collected within the assessment unit in accordance with the thresholds established in the 2020 Draft Consolidated Assessment and Listing Methodology (CALM) document (NHDES, 2020b).</p> <p>On behalf of the City of Rochester, Brown and Caldwell (BC) developed technical comments on the 2016 (BC 2017) and 2018 (BC 2019) listings for the tidal Cocheco River as well as the associated CALM documents and their applicability for identifying impairments for the larger Great Bay Estuary (GBE) for submittal to NHDES. The comments focused on data quality issues observed in the sonde data used for the assessment, as well as comments on how the data were used to generate the assessment results. These comments provided specific evidence that the tidal Cocheco River assessment and resulting impairment listing may be the result of data quality issues and did not reflect actual water quality conditions in the river. Given that the data presented in the previous assessments are still included in the 2020 assessment, BC asserts the previous comments on data quality are still relevant and are therefore incorporated into this memo (BC 2017 and BC 2019) and submitted as Attachments A and B. These comments are summarized below as they pertain to data used in the 2020 assessment and issues raised in those comment memos continue to affect the accurate and scientifically defensible characterization of the tidal Cocheco River and larger GBE.</p> <p>This memo builds on the previous submittals to present comments and recommendations regarding the draft 2020 assessment listings for the tidal Cocheco River and GBE segments. These comments are based on the data quality issues that likely led to the appearance of water quality issues (e.g. dissolved oxygen) and NHDES' acknowledgement of improving conditions resulting from nutrient reduction activities undertaken by local municipalities, including the City of Rochester.</p>	<p>4a- 1</p>
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Section 2: Summary of Previous Technical Comments on Tidal Cocheco River and Great Bay Estuary Assessments

2.1 Tidal Cocheco River

The 2020 303(d) list assessment for the tidal Cocheco River included data from the “current” period, which NHDES refers to as 2014–2018 (NHDES 2020a). The 2016 and 2018 assessments also included data from the 2014–2016 time period, which were the focus of technical comments previously submitted to NHDES regarding data quality (BC 2017 and BC 2019; see Attachments A and B). The manner in which the 2014–2016 data were included in the assessments skews the tidal Cocheco River toward impairment. Several data quality issues with the 2014–2016 dataset have been presented to NHDES during the 2016 and 2018 comment period including:

- Anomalous dissolved oxygen (DO) measurements indicating probe interference were not flagged and removed from the assessment dataset (BC 2017)
- NHDES conceptual model for impairment based on chlorophyll-a is not supported by the data (BC 2017)
- Chlorophyll-a assessment uses un-corrected chlorophyll-a measurements, which skews the data set (BC 2017)
- Lack of paired DO, total nitrogen (TN), and chlorophyll-a data prevent assessment of a cause and effect relationship warranting impairment for TN (BC 2017)
- DO measurements reflect equipment and interference issues in the 2016 dataset uncharacteristic of ecological responses (BC 2019)
- NHDES did not provide any assessment of algal biomass to explain DO measurements (BC 2019)

NHDES provided responses to the previous comment memos, but did not address the data quality issues during the 2020 assessment, specifically those related to the DO impairment listing. If the data quality issues present in the 2014–2016 dataset were rectified as discussed in the previous comment memos during the 2020 assessment, the tidal Cocheco River would not meet the threshold for impairment of DO.

In addition to commenting on specific technical issues with the data used in the assessment for the tidal Cocheco River, previous comment memos also provide comments and recommendations for improvements to the CALM employed by NHDES to determine thresholds for impairment (BC 2017 and BC 2019), including:

- DO saturation should not be used to indicate non-support of designated uses (BC 2017 & 2019)
- DO minimum concentration criterion lacks a scientifically defensible link to designated uses for tidal waters (BC 2017 & 2019)
- The MAGEX value has no scientific or ecological value and should be removed from the CALM (BC 2017)
- Chlorophyll-a 90th percentile threshold is not a defensible indicator of DO related impairments (BC 2017)
- Recreational chlorophyll-a threshold represents unpromulgated criteria and should not be used directly for impairment determinations (BC 2019)

The approach to assessment and the data used in the assessments are paramount to evaluations of water quality that determine whether a waterbody warrants a 303(d) listing. Given that the data used in the 2020 assessment include the 2014–2016 data, these comments are still relevant to the 2020 assessment of the tidal Cocheco River. These previously submitted comments along with the additional comments/recommendations provided in the following sections together warrant reconsideration of the impairment determination for the tidal Cocheco River by NHDES.

4a- 2

<h2>2.2 Great Bay Estuary</h2> <p>BC's previous assessment comment memos also discussed the applicability of indicators used by NHDES for the larger GBE (BC 2017 and BC 2019). The CALM identifies several indicators used to determine if individual GBE assessment units attain designated uses with respect to nutrients and nutrient response variables. Previous comments assert shortcomings in the data and methodologies used to assess the GBE, focusing on a lack of stressor/response relationships between variables necessary to make impairment determinations. The following is a brief list of those comments as they pertain to impairment determinations for GBE assessment units:</p> <ul style="list-style-type: none"> • The importance of stressor/response relationships as described in the 2014 peer review (Bierman et al. 2009) should be incorporated into assessments of the GBE. • The CALM uses problematic thresholds, such as an unpromulgated chlorophyll-a threshold as an indicator of DO impairment. • Assessments of impairment rely on general claims of relationships between nutrient and nutrient response variables without quantifiable evidence of linkages. <p>These comments are relevant to discussions concerning the 2020 assessment of the GBE because the CALM includes the same indicators and thresholds with similar results to those discussed during previous assessment cycles. The importance of identifying ecologically and statistically significant relationships between nutrient and nutrient response variables cannot be overstated for impairment assessments. This continues to be true for the 2020 assessment and the GBE (as discussed in Section 4 below).</p>	
<h2>Section 3: Technical Comments on 2020 Tidal Cocheco River 303(d) Assessment</h2> <p>This section builds on the previous comments, focusing on data used in the 2020 assessment. The City of Rochester respectfully requests NHDES consider these comments and analysis prior to finalizing the 2020 assessment listings for the tidal Cocheco River.</p> <ol style="list-style-type: none"> 1. <u>The dissolved oxygen percent saturation criterion continues to lack a linkage to designated use protection.</u> The City has commented on the DO saturation criteria in previous 303(d) listing cycles and has also participated in the related discussions with NHDES and the United States Environmental Protection Agency (EPA) through the NH Water Quality Standards Advisory Committee. The City continues to maintain that the percent DO saturation is neither a necessary nor preferred metric for expression of DO-related criteria. NH's existing DO concentration criteria are fully protective of aquatic life uses, including early life stages, and in fact are likely overprotective in tidal settings outside of spawning periods. The City has previously provided NHDES with detailed technical rationale for this position (Bell, 2019; Bell, 2020) which includes responses to EPA's objections to removal of percent DO saturation. We incorporate those documents into these comments by reference, and look forward to working with NHDES to refine NH's tidal DO criteria based on the best available scientific information. 	4a- 3
<ol style="list-style-type: none"> 2. <u>10 percent exceedance threshold triggering dissolved oxygen impairment is subjective based on measurement and equipment precision</u> The 2020 assessment listed DO based on a 10.3 percent exceedance rate (42 of 406 days) of daily minimum values between 2014 and 2018 (NHDES 2020a). This included some measurements very close to 5.0 mg/L (e.g. 4.9 mg/L). The data sondes used to collect DO data have an accuracy of 0.1 mg/L or 1% of reading, whichever is greater (Jones et al. 2019) and calibration requirements allow for a range of 0.5 mg/L in order to validate the data (Jones et al. 2019). Therefore, some values in the dataset are indistinguishable from the 5.0 threshold. For example, six of the 406 days of data that "fell below 5 mg/L" had low values that were between 4.9 mg/L and 5.0 mg/L. Given that these values are indistinguishable from the threshold, the exceedance rate could potentially be as low as 8.8 percent, which would not trigger an impairment listing. This evaluation is not presented as an attempt to use rounding as a way out of the impairment listing, but rather to illustrate the tenuous nature of the listing. With enough values falling within the range of equipment or calibration error, it raises concerns over the validity of the impairment listing. NHDES should include additional evaluation of the DO data in order to identify if an impairment is actually occurring, prior to finalizing the impairment listing for the tidal Cocheco River. 	4a- 4

3. "Worst-case scenario" approach for chlorophyll-a data skews assessment toward impairment without an accurate understanding of indicator pathway to effects on designated uses

According to the 2020 CALM, "Where there were multiple samples (including samples taken at different depths) taken on the same calendar day and located less than 500 feet horizontally from each other, the worst case value was used as the independent sample for that day and location unless otherwise noted in Section 3.2" (NHDES 2020b). In the 2020 assessment for the tidal Cocheco River, chlorophyll-a data were collected twice during each sampling event, during high tide

and again during low tide. In most cases, this approach resulted in two chlorophyll-a samples collected within approximately six hours of each other, many times with greatly varying results.

This "worst-case scenario" approach of utilizing the highest value from a day is understandable for assessments of many parameters, mainly toxics (e.g. heavy metals, pesticides, organic compounds). However, in the case of nutrients and nutrient response variables (which are not toxics), this methodology prevents a thorough understanding of interactions between variables and confounds the ability to make an accurate assessment. This is especially true in a dynamic system such as the tidal Cocheco River which experiences large hydrologic variations from freshwater inflows and tidal effects. The 2020 Technical Support Document (TSD) for the Great Bay Estuary (NHDES 2020a) describes the conceptual model explaining chlorophyll-a in the following manner:

[Large spikes in chlorophyll-a] "were most pronounced when low tide (maximum freshwater signal and maximum water temperature) occurred at midday to late afternoon (maximum photosynthesis duration period) and when freshwater inflow was at a minimum (0.23 – 0.10 cfs) (minimum dilution of upstream loading). Under those conditions, the high nutrient water in the Cocheco River had the optimum conditions to sustain a large phytoplankton biomass."

However, NHDES' "worst-case scenario" approach of using only the highest chlorophyll-a measurement from a day prevents the assessment from verifying if this conceptual model is true. The two highest chlorophyll-a values used in the 2020 assessment (79.0 µg/L on 10/16/2017 and 49.3 µg/L on 9/5/2018) were measured during high tides in the morning. In both of these instances, within six hours of the high measurement used in the assessment, a far lower measurement was recorded during low tide in the late afternoon when NHDES' conceptual model suggested the highest phytoplankton biomass was occurring. While these two measurements by themselves do not indicate any type of trend in the data, they do point to flaws in the use of the "worst-case scenario" approach for constituents like chlorophyll-a that experience widely varying effects based on time of day and hydrologic fluctuations. NHDES should present an evaluation of hydrologic effects (e.g. tides) on interactions between causal and response variables in order to determine if their conceptual model is supported. This should include the use of all available data and not be limited to the highest values of the day. This would allow for a more comprehensive understanding of the effects and interactions between parameters that will be useful not only for the impairment listings, but also future management options, where they are determined to be necessary.

Using only the "worst-case scenario" data for assessment of chlorophyll-a (along with other nutrient and nutrient response variables) prevents a complete understanding of the dynamic effects in waterbodies such as the tidal Cocheco River. This understanding of pathways and effects is necessary to develop an accurate assessment of these parameters and the tidal Cocheco River. The tidal Cocheco is a highly dynamic system and categorizing the system based only on the highest value for a day does not allow for an accurate characterization of the system and skews the assessment toward impairment without an understanding of the actual effects of confounding variables.

4a- 5

4. Chlorophyll-a assessment does not show a scientifically defensible linkage to low dissolved oxygen measurements and therefore, does not warrant listing.

Chlorophyll-a does not have promulgated water quality criterion, but is used as an indicator for attainment of the DO criterion. NHDES uses the 90th percentile chlorophyll-a threshold of 10 µg/L, above which phytoplankton biomass would be expected to cause DO to drop below 5.0 mg/L

(NHDES 2020b). NHDES' conceptual model states high chlorophyll-a measurements are the cause of the low DO observed in the dataset (NHDES 2020a). However, no causal evaluation is provided to determine if this is actually occurring. NHDES needs to provide an evaluation of the links between chlorophyll-a and DO in order to provide assurance the conceptual model is supported in this assessment. We attempted to develop a correlation between DO and grab-sample chlorophyll-a for the data used in the 2020 assessment, but lack of data prevented a meaningful correlation. The 2020 assessment dataset contains very few instances of valid DO and valid grab-sample chlorophyll-a measurements occurring on the same day, which prevented such an analysis. The few data points that were available do not show a link between chlorophyll-a and low DO. However, the lack of sufficient data to identify any relationship between these two parameters is an issue that prevents characterization of effects of chlorophyll-a and DO.

A linkage between chlorophyll-a measurements and DO is crucial for listing of chlorophyll-a. Without such a link, the 90th percentile chlorophyll-a calculation, even when above 10 µg/L, is not sufficient on its own to warrant listing. The CALM (NHDES 2020b) recognizes the need to interpret these data prior to making a final assessment decision stating with respect to chlorophyll-a:

"The final assessment decision for this indicator is dependent on the distribution of chlorophyll-a data, the distribution of the dissolved oxygen data and consideration of the quality, currentness, representativeness, completeness, applicability, frequency, magnitude and duration of each data component."

The inability to identify any relationship between DO and chlorophyll-a in the 2020 assessment demonstrates the current data are insufficient to characterize conditions in the tidal Cochemo River. We recommend the 5-P draft listing for chlorophyll-a be revised to 3-PAS (some insufficient data, but data may suggest meeting uses), which would allow time for additional data collection and analysis to further explore the relationships between nutrient and nutrient response variables in the tidal Cochemo River. In this case, the term "insufficient data" does not refer to a lack of measurements for the assessment, rather it refers to a lack of data and understanding necessary to establish the relationships between nutrients and nutrient response variables that inform the assessment.

4a- 6

<p>5. <u>Improvements in dissolved oxygen data coincide with improved data quality, not improvements in water quality, evidence that a revision to the impairment category is warranted.</u></p> <p>The 2020 assessment for DO is based on continuous recorder data collected from 2014–2018, focusing on the summer months when temperatures are expected to be the highest and lower DO levels are expected to be more pronounced and frequent. As discussed previously, the continuous recorder data from 2014–2016 exhibit data quality issues that likely confound the assessment of water quality in the tidal Cocheco River. The annual exceedance rate of the 5.0 mg/L threshold was between 18 and 30 percent in the 2014–2016 data. In 2017 and 2018, the rate of daily exceedances were 2 percent and 6 percent, respectively. NHDES attributes the improvement in DO to reductions in nutrient loading stating “Given the concerted effort by the municipalities to reduce nutrient loading through infrastructure investments, nonpoint source controls and stormwater ordinances, NHDES anticipates that the condition will continue to improve in the coming years” (NHDES 2020a). While Rochester agrees the investment in facility upgrades is important and will ultimately improve water quality in the long-term, the tidal Cocheco River data do not support that improved DO in the 2017-2018 data is the result of reductions in nutrients and again point to data quality issues in the 2014-2016 DO data used in the assessment of the waterbody.</p> <p>The TSD for the Great Bay Estuary presents nitrogen and chlorophyll-a data for the tidal Cocheco River that appears to conflict with the concept of lower nitrogen leading to improved DO conditions in the river (NHDES 2020a). Graphs depicting the nitrogen data (NHDES 2020a, pg. 83) and chlorophyll-a data (NHDES 2020a, pg. 80) show higher nitrogen medians and higher 90th percentile chlorophyll-a measurements in 2017 and 2018 compared to the 2014–2016 data. This conflicts with NHDES’ conceptual model of lower nitrogen leading to improved DO conditions as well the assertion that the data indicate a “preponderance of evidence” warranting listing for these parameters.</p> <p>If the low DO observed in the tidal Cocheco River were actually the result of nitrogen and related impacts in the 2014–2016 time frame, the current data would suggest even lower DO should have been observed in the 2017 and 2018 datasets. This did not occur, which begs the question “Why not?” The lack of a causal relationship between nutrients and nutrient response variables (chlorophyll-a and DO) indicates some other factor is leading to the apparent improvement in DO. With new data collection equipment deployed in the tidal Cocheco River in 2017 and the dramatic reduction in qualified and removed data from the datasets after 2017, it is far more likely the observed DO is the result of improved data quality and not improved water quality conditions in the river. This, coupled with the previous comments on data quality summarized above, lend additional evidence that the 2014–2016 data are suspect and do not reflect the actual conditions in the waterbody.</p> <p>We recommend additional data collection and analysis are necessary prior to making a final impairment decision with respect to DO in the tidal Cocheco River. Additional years of high quality data are necessary for identifying and interpreting the relationships that may exist between nutrients and nutrient response variables, as well as the hydrologic interactions that may confound these relationships.</p>	<p>4a- 7</p>
<p>Section 4: Comments on 2020 Assessment of Great Bay</p> <p>Similar to comments previously submitted to NHDES regarding impairment assessments and those presented here, we assert that quantifiable stressor-response relationships between variables are necessary prior to finalizing impairment listings. This will likely require additional time for data collection and analysis in order to establish such relationships. Evidence of the need for continued research and evaluation can be found in the assessment of Great Bay (NHEST600030904-02, NHEST600030904-03, NHEST600030904-04-02, NHEST600030904-04-03, NHEST600030904-04-04, NHEST600030904-04-05, NHEST600030904-04-06). Several issues are apparent in the assessment of Great Bay which raise concerns over the applicability of the thresholds for accurate determination of impairment. These issues include:</p> <ul style="list-style-type: none"> • The TSD (NHDES 2020a, pp. 45-46) states that DO may be low in portions of Great Bay even though assessment of DO did not identify exceedances that would trigger an impairment listing. The assumption of low DO was then used in discussion of a “preponderance of evidence” to list nitrogen as “not-supporting” for Great Bay. No evidence or analysis was provided to support the assumption of low DO in Great Bay when data indicate full support in these segments. 	<p>4a- 8</p>

<ul style="list-style-type: none"> Chlorophyll-a 90th percentile value above 10 µg/L was used as evidence to suggest eelgrass was not protected in Great Bay. However, no quantifiable evidence was provided to show how a threshold of 10 µg/L is necessary to protect eelgrass. Further, the CALM does not establish a threshold of 10 µg/L as necessary to protect eelgrass, rather it states in general terms “90th Percentile Chl-a concentrations are not elevated” for full support of designated uses (NHDES 2020b). 	4a- 9
<ul style="list-style-type: none"> Median total nitrogen concentrations for Great Bay were between 378 µg/L and 401 µg/L based on the sampling stations included in the assessment, with an average concentration of 409 µg/L during the growing season (NHDES 2020a, p. 45). The CALM states that growing season average TN concentrations between 320-350 µg/L are considered protective of eelgrass in GBE, along with a threshold of 500 µg/L to designate a breakpoint between “Good to Fair” and “Moderate Impairment” (NHDES 2020b, Section 3.2.4, Indicator 10j). The CALM references the work of Dr. Howes at University of Massachusetts Dartmouth, School for Marine Science and Technology (SMAST) and the Massachusetts Estuary Project for these thresholds and are discussed as valuable for the final assessment of TN concentrations in GBE (NHDES 2020b, Section 3.2.4, Indicator 10j). The average TN concentration calculated for GBE is within the range of these thresholds, which would indicate TN may not be elevated in GBE. The assessment of TN lacks an evaluation linking TN concentrations to response variables and ultimately eelgrass in GBE, which is necessary in order to make a final determination of nutrient impairment. 	4a- 10
<ul style="list-style-type: none"> The CALM states that frequency of TN measurements over 500 µg/L is considered to be “high” (NHDES 2020b, Section 3.2.4, Indicator 10j), as an additional threshold used in the final assessment of nitrogen in GBE. However, the CALM does not establish at what frequency the determination of “high” would be made. The TSD identifies 13 of 58 measurements (22 percent) above 500 µg/L is evidence of “high” nitrogen (NHDES 2020a) without any further assessment of conditions that may have led to these measurements such as tide and precipitation, nor how these values indicate the Great Bay is not supporting designated uses. In addition, NHDES has not provided any scientifically defensible evaluation linking a frequency of TN measurements above 500 µg/L to any adverse response (e.g. reduced water clarity, low DO, increased chlorophyll-a) that would lead to non-attainment of designated uses or reduced eelgrass coverage or biomass. Without such a linkage, the frequency of TN measurements above 500 µg/L is an indefensible threshold and should be removed from the CALM. 	4a- 11
<p>These comments reflect and repeat prior concerns previously submitted to NHDES over the applicability of the thresholds to identify impairments in the GBE. We urge NHDES to pursue quantifiable stressor-response relationships between nutrient and nutrient response variables prior to finalizing impairment listings for the GBE. Additional time and data collection are necessary to identify the linkages and pathways that lead to effects on eelgrass. We maintain that, in the meantime, regulatory action such as a TMDL should not be undertaken until such time as causal relationships can be established based on sound data to determine the best management approach to protecting the estuary.</p>	4a- 12
<p>Section 5: Conclusions</p> <p>Rochester respectfully requests NHDES consider the comments provided here prior to finalizing the 2020 assessments listings. Our review of the assessment data and interpretation of the data suggest revisions to the impairment listings are warranted, as follows:</p> <ul style="list-style-type: none"> <u>Tidal Cocheco River</u> – Revise listings for DO (5-M), chlorophyll-a (5-P), and nitrogen (5-M) to 3-PAS. This would allow time for additional data collection and evaluation to identify relationships between variables that would support understanding of their interactions and inform listing decisions. <u>Great Bay</u> – Withhold regulatory action until such time as linkages and pathways that lead to effects on eelgrass can be quantified. <p>Thank you for the opportunity to provide these comments and we look forward to working with you on the shared goal of cooperative, effective management for the Great Bay Estuary.</p>	4a- 13

<p>References</p> <p>Bell, C.F. 2019. Technical Justification for Removal of NH'S Percent DO Saturation Criteria. Electronic transmittal to Ted Diers (DES) 3 p.</p> <p>Bell, C.F. 2020. Responding to USEPA Concerns on Removal of Percent DO Saturation. Letter submitted to Ted Diers (DES) dated Mar 18, 2020. 2 p.</p> <p>Bierman, V.J., Diaz, R.J., Kenworthy, W.J., and Reckhow, K.H. 2014. Joint Report of Peer Review Panel for Numeric Nutrient Criteria for the Great Bay Estuary New Hampshire Department of Environmental Services, June, 2009.</p> <p>Brown and Caldwell, 2017, Comments on NHDES Draft 2016 CALM and Tidal Cocheco River 303(d) Listing. Technical memorandum submitted to NHDES on behalf of City of Rochester, June 22, 2017.</p> <p>Brown and Caldwell, 2019, Comments on New Hampshire Draft CALM and 303(d) Listings, Technical memorandum submitted to NHDES on behalf of City of Rochester, March 15, 2019.</p> <p>Jones, S., T. Gregory, L. Martin, 2019, Cocheco River Water Quality Monitoring. Final Report for 2018, Technical Report submitted to the Great Bay Municipal Coalition.</p> <p>New Hampshire Department of Environmental Services (NHDES), 2020a, Technical Support Document for the Great Bay Estuary Aquatic Life Integrity Designated Use Assessments, 2020 305(b) Report/303(d) List, R-WD-20-21.</p> <p>New Hampshire Department of Environmental Services (NHDES), 2020b, 2020 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology, Draft, R-WD-20-20.</p>	
<p>Attachment A: Technical Comments on NHDES 2016 CALM and 303(d) Listings</p> <hr/> <p>[This section contains a copy of the technical comments on NHDES' 2016 CALM and 303(d) List. Responses to those comments can be found online (NHDES, 2017b).]</p>	<p>4a- 14</p>
<p>Attachment B: Technical Comments on NHDES 2018 CALM and 303(d) Listings</p> <hr/> <p>[This section contains a copy of the technical comments on NHDES' 2018 CALM and 303(d) List. Responses to those comments can be found online (NHDES, 2019d).]</p>	<p>4a- 15</p>

COMMENT #5: Heidi Trimarco, Conservation Law Foundation (CLF)

<p>Re: CLF's Comments on N.H. Department of Environmental Services DRAFT 2020 Section 303(d) Surface Water Quality List</p> <p>Conservation Law Foundation (CLF) appreciates the opportunity to comment on the NH Department of Environmental Services (DES) Draft 2020 Section 303(d) Surface Water Quality List, published by DES on October 16, 2020, and revised by DES on November 10, 2020 (Draft 2020 303(d) List). CLF is a member-supported environmental advocacy group that works to solve environmental problems facing communities and our natural resources in New Hampshire and throughout New England. CLF and its members have a strong interest in protecting waterbodies around the state, with a particular emphasis on restoring and maintaining the health of the Great Bay estuary and the rivers that feed it. For more than 10 years, CLF has engaged in concerted, ongoing efforts to address and reduce threats to the health of the Great Bay estuary, which is recognized as an estuary of national significance under Section 320 of the Clean Water Act.</p> <p>Section 303(d) of the Clean Water Act requires the State of New Hampshire to identify surface waters that are impaired or threatened by a pollutant or pollutant(s) such that they cannot support their designated uses.¹ As a result, every two years DES proposes a draft 303(d) list to EPA for approval. CLF has provided detailed comments on these lists, and we re-assert and specifically incorporate by reference here CLF's comments on the Draft 2012, Draft 2014, Draft 2016, and Draft 2018 Section 303(d) lists, including but not limited to concerns about proposed de-listings potentially adversely affecting threatened or endangered species such as, but not limited to, the Atlantic and short-nose sturgeon.</p> <p>¹ Water quality assessments are made by assessment units. CLF provides the following assessment-unit-specific comments below, and these comments should not be construed as implicitly supporting any listing or delisting not specifically addressed herein.</p>	<p>5- 1</p>
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CLF Has Opposed Delisting Total Nitrogen Impairments in the Great Bay Since 2015

Since the Draft 2014 303(d) List was released, proposing the delisting of Great Bay assessment units for impairments related to total nitrogen, CLF has opposed the delisting and has submitted detailed comments explaining why the impairments approved by EPA in 2012 should remain. Those comments are incorporated here.²

CLF has urged DES to find that excessive nitrogen in the Great Bay is causing aquatic life use impairments in the estuary, even if nitrogen cannot be identified as the *sole cause* of impairments. Specifically, in 2015 CLF urged DES to maintain the 2012 finding of total nitrogen impairments where the conditions in the estuary clearly demonstrated excessive nitrogen to be at least a contributing cause to impairments. Citing EPA's approval of the 2012 total nitrogen impairments in the Great Bay, CLF explained that it was not necessary to prove that total nitrogen was the sole cause of the impairments.³ As CLF wrote:

Of particular importance, EPA, after reviewing all the available data and information, specifically concluded that even if it were to not rely on the numeric nitrogen criteria developed in the 2009 NHDES methodology, the waters that are the subject of NHDES's de-listing proposal are impaired relative to total nitrogen... 'Even if the specific numeric total nitrogen values for assessment and listing purposes contained in NH DES's 2009 report are set aside, there is substantial information in the record to support the listing of the Great Bay Estuary as not meeting applicable water quality standards and that excess nitrogen concentrations are at least a cause of the State's aquatic life use impairments in the estuary.' [Citing EPA's 2012 Approval of the 2012 Section 303(d) List.] Indeed, NHDES itself acknowledges that 'nutrient levels in the water body only have to 'encourage' or 'contribute to' cultural eutrophication to prompt action in Class B waters,' rendering its decision not to use the 2009 numeric nitrogen threshold not determinative of whether, based on the weight of the evidence, the ... Total Nitrogen impairments should be retained.⁴

5- 2

In 2017 CLF again wrote that "[w]hether nitrogen is the *primary* factor is irrelevant for purposes of determining nitrogen impairments and management decisions for the estuary." CLF further noted that "[l]isting water bodies as nitrogen-impaired where eutrophic conditions exist – including but not limited to eelgrass loss – also is essential in light of the impacts of climate change. It is well established that climate-related changes such as increased rainfall and warming water temperatures exacerbate the eutrophication impacts of nitrogen."⁵


CLF strongly supported re-listing the Cocheco River as impaired for total nitrogen in the Draft 2016 303(d) List, and applauded DES's "rationale for relisting with respect to Total Nitrogen...where elevated Nitrogen is associated with indicators of eutrophication even if it is not proven to be solely responsible."⁶ At the same time, CLF strongly objected to the proposed delisting of other assessment units in the Great Bay for total nitrogen because nitrogen could not conclusively be identified as the sole cause of the impairment. CLF's 2017 comment bears repeating here: "there is simply no basis in law for requiring that a single pollutant, *on its own*, cause the violation of a water quality standard in order to be listed as a cause of an impairment."⁷

² Tom Irwin, CLF, to Ken Edwardson, DES, Re: Draft 2014 Section 303(d) List of Impaired Surface Waters, December 11, 2015; Tom Irwin, CLF, to Ken Edwardson, DES, Re: Comments on DES DRAFT 2016 Section 305(b) and 303(d) Surface Water Quality Report List of Threatened or Impaired Waters, June 23, 2017; Meredith A. Hatfield and Melissa Paly, CLF, to Matt Wood, DES, Re: CLF's Comments on DES Draft 2018 Section 303(d) Surface Water Quality Report List of Threatened or Impaired Waters, March 15, 2019.

³ Irwin to Edwardson, 2015, citing EPA Region 1 Attachment A (EPA Technical Support Document) to EPA Approval of DES 2012 Section 303(d) List of Impaired Surface Waters.

⁴ Irwin to Edwardson, 2015, internal citations omitted.

<p>⁵ Irwin to Edwardson, 2017, internal citations omitted.</p> <p>⁶ <i>Id.</i></p> <p>⁷ <i>Id.</i></p>	
<p><u>Great Bay Estuary Impairments and Proposed De-Listings in the Draft 2020 303(d) List</u></p> <p>DES proposes re-listing the Great Bay and the Bellamy River as impaired for total nitrogen. CLF strongly supports the inclusion of these units as impaired for nitrogen but objects to the continued proposed delisting of other Great Bay estuary assessment units.</p> <p>DES describes its 2020 approach to nitrogen impairments in the Great Bay estuary as using a “preponderance of the evidence” to determine if nitrogen is causing the impairment, without tying the impairment decision to a “single TN number.” Draft 2020 303(d) List, at 5. As with the listing of the Cochecho River in 2016, CLF supports nitrogen-related impairment listings where nitrogen is found to be associated with other eutrophication indicators. However, CLF continues to maintain that a nitrogen impairment should be found where total nitrogen is contributing to eutrophic conditions, whether or not nitrogen is found to be the primary cause of those conditions.</p> <p>In proposing the Great Bay for a total nitrogen impairment in 2020, DES finds:</p> <p style="padding-left: 40px;">...not only has eelgrass been lost and light attenuation is unsuitable for its growth, but the chlorophyll-a indicator is elevated above the 90th percentile for the protection of eelgrass and is elevated as compared to previous assessment periods. The levels of TN in the assessment zone are higher than what would be considered protective levels (Howes, 2019) and are quite high (over 500 ug/L) on many occasions (13 of 58 samples or 22% of the time). Given the number of eutrophication indicators that are above the levels identified in CALM as needed to support aquatic life use, and the preponderance of evidence indicating the impacts of eutrophication, this assessment zone has been moved to nonsupporting for total nitrogen.</p> <p>Great Bay 2020 Technical Support Document, at 46. For the Bellamy River DES found impairments related to chlorophyll-a, dissolved oxygen, water clarity, and “a preponderance of evidence of eutrophication impacts. As such, this assessment zone has been assessed as not supporting aquatic life integrity due to total nitrogen.” Great Bay 2020 Technical Support Document, at 64 – 65. CLF strongly supports the listing of the Great Bay as impaired for chlorophyll-a and total nitrogen and the Bellamy River as impaired for chlorophyll-a, dissolved oxygen, water clarity, and total nitrogen.</p>	<p style="text-align: center;">5- 3</p>
<p>However, in the Draft 2020 303(d) List DES continues to propose delisting nitrogen impairments for Little Bay, Upper Piscataqua River, Portsmouth Harbor, and Little Harbor/Back Channel. As described in previous comments, CLF opposes the delisting of these assessment units. Where nitrogen is contributing to eutrophic conditions, it is not necessary to show that nitrogen is the primary cause of those conditions. For example, for Little Bay, DES concludes that there is insufficient information for a total nitrogen impairment while at the same time noting that “eelgrass beds are severely degraded” and light attenuation is poor. Great Bay 2020 Technical Support, at 72. DES reached a similar conclusion for the Upper Piscataqua, at 91, Portsmouth Harbor, at 123-24, and Little Harbor/Back Channel, at 137-38. As described above, eutrophic conditions in these waters, including eelgrass loss, is sufficient cause for listing these water bodies as nitrogen impaired, without requiring a demonstration that excessive nitrogen is the sole or primary cause of those conditions. CLF supports maintaining the nitrogen impairments for these water bodies that were approved by EPA in 2012 and strongly objects to delisting them.</p>	<p style="text-align: center;">5- 4</p>

<p>In addition to the impairments discussed above, DES proposes the following new impairments for assessment units in the Great Bay estuary: impairment for chlorophyll-a in the Oyster River, and impairments for chlorophyll-a and total nitrogen for Sagamore Creek. In making the Sagamore Creek recommendation, DES finds that “eelgrass beds are severely degraded” and “a preponderance of evidence that eutrophication effects are ongoing.” DES also notes “high median total nitrogen.” Great Bay 2020 Technical Support, at 130. CLF supports the inclusion of these units on the Draft 2020 303(d) List.</p>	5- 5
<p>Again, CLF appreciates the opportunity to provide these comments. We urge DES to amend its proposed 2020 303(d) list to include impairment listings for nitrogen impairments for Little Bay, Upper Piscataqua River, Portsmouth Harbor, and Little Harbor/Back Channel.</p> <p>Respectfully submitted,</p>  <p>Heidi Trimarco, Esq. Staff Attorney</p>	5- 6

COMMENT #6: Joshua M Wyatt, City of Dover

<p>Re: City of Dover’s Comments on 2020 Draft 303(d) List and CALM</p> <p>Dear Matthew:</p> <p>I write on behalf of the City of Dover (“Dover”) to offer comments on the draft 2020 Consolidated Assessment and Listing Methodology (“CALM”) and 303(d) list. Dover appreciates the work that the Department of Environmental Services (“DES”) is undertaking in an effort to protect water quality. I have organized Dover’s comments into three sections set forth below.</p>	6- 1
<p>I. CALM & 303(d) Promulgation Procedure</p> <p>Dover does not agree that DES can promulgate the CALM or the 303(d) list outside of administrative rulemaking requirements set forth in RSA chapter 541-A.</p> <p>New Hampshire statutes define an administrative “rule” broadly to mean any generally applicable policy. <i>See</i> RSA 541-A:1, XV (definitional section of APA, which states: “‘Rule’ means each regulation, standard, form as defined in paragraph VII-a, or other statement of general applicability adopted by an agency to (a) implement, interpret, or make specific a statute enforced or administered by such agency or (b) prescribe or interpret an agency policy, procedure or practice requirement binding on persons outside the agency, whether members of the general public or personnel in other agencies.”). “Where an agency’s efforts ‘effect substantive changes binding on persons outside the agency, the agency’s policy constitutes a ‘rule’ that must be promulgated pursuant to the APA.” <i>Bel Air Assocs. v. DHHS</i>, 154 N.H. 228, 233, (2006).</p> <p>Dover respectfully submits that the CALM and the 303(d) list should go through, and have not gone through, the statutorily required rulemaking process.</p>	6- 2

<p>II. Data Concerns and 2014 Peer Review</p> <p>As outlined in the comments submitted by the City of Rochester, including Rochester's supporting documentation, there are a number of scientific concerns about the accuracy and reliability of the data relied upon by DES. Moreover, Dover concurs with Rochester and believes DES should place more emphasis on the 2014 Peer Review, as outlined in Rochester's comments.</p> <p>Dover expressly incorporates by reference the following attachments to Rochester's comments on the draft 2020 CALM and 303(d) list:</p> <ul style="list-style-type: none"> • Brown & Caldwell's November 23, 2020 "Comments on New Hampshire Draft 2020 CALM and 303(d) Listings," • Brown & Caldwell's March 15, 2019 "Comments on New Hampshire Draft 2018 CALM and 303(d) Listings," included as Attachment B to Brown & Caldwell's November 23, 2020 Comments listed above; • Brown & Caldwell's June 22, 2017 "Comments on NHDES Draft 2016 CALM and Tidal Cocheco River 303(d) Listing," included as Attachment A to Brown & Caldwell's November 23, 2020 Comments listed above. 	<p>6- 3</p>
<p>III. Impaired Great Bay Waters/TMDL Priority</p> <p>As you know, 303(d) lists are required by statute to assign priorities to the impaired waters. <i>See</i> 33 U.S.C. § 1313(d)(1)(A); <i>see also</i> 40 C.F.R. § 130.7. As drafted, the current 2020 Draft 303(d) List assigns a "LOW" TMDL priority status for several water bodies related to Great Bay listed as impaired, including the Cocheco River and various Great Bay locations. In fact, the only TMDLs ranked as a "HIGH" priority are the Weare Reservoir in Weare and Haunted Lake in Franconia.</p> <p>Dover believes, respectfully, that all impaired waters related to Great Bay are not "low" priorities in any sense. While the need for significant additional scientific investigation and technical work precludes assigning a higher priority for TMDL development, Dover strongly supports prioritizing and proceeding with much-needed science-based investigation and analysis generally along the lines of that described in the above-referenced materials prepared by Brown and Caldwell. Commissioner Scott has authored two letters to EPA (one dated July 27, 2020 and another dated October 21, 2019) urging that EPA issue a general permit for the Great Bay watershed due to perceived need to have enforceable limits on total nitrogen. Any future general permit or other regulatory action should be guided by sound scientific study and analysis, but at present there are material gaps, flaws and inconsistencies in the available scientific information needed to make well-informed policy and regulatory decisions, particularly decisions that would have the effect of imposing extremely costly or restrictive requirements on our community. While Dover proudly continues to make smart water quality investments, we also appreciate the Commissioner's statement in his letter dated July 27, 2020 that DES "is committing itself to work with PREP, EPA, stakeholders and the municipalities to create a consensus-based approach to a target nitrogen goal and ecological endpoints for the estuary," as a more appropriate foundation for determining any necessary future regulation and also for adaptive management. Accordingly, it would seem DES itself recognizes the need for such study, meaning such a study should not be deemed a "low" priority even though a TMDL would be premature in the meantime. In summary, Dover recognizes that any future TMDL or pre-TMDL permitting processes would benefit from better data and analysis, and looks forward to collaborating with DES in the future on obtaining better, more recent water quality data and, ultimately, an appropriate study for any waters related to Great Bay and listed as impaired for nitrogen.</p>	<p>6- 4</p>

COMMENT #7: Daniel Hudson, City of Nashua

<p>Re: Comments to the Draft 2020, 303(d) List and CALM</p> <p>Dear Mr. Wood:</p> <p>The City of Nashua has reviewed the draft 2020 303(d) list and the water quality data used to assess waters within the City, in particular the Nashua River - Nashua Canal Dike assessment unit (AU) NHIMP700040402-03. We appreciate the opportunity to provide comments on the determination of this waterway as being impaired for chloride relative to the existing data set and how that data set was used in the assessment.</p>	<p>7- 1</p>
<p>Background</p> <p>As stated in the draft 2020 303(d) list, chloride data showing exceedances of the 230 mg/l chloride water quality criteria for fish and aquatic life protection were erroneously attributed to Nashua River - Mine Falls Dam Pond (NHIMP700040402-02) instead of Nashua River - Nashua Canal Dike (NHIMP700040402-03). The draft 2020 303(d) list notes that had the data been assigned to the correct waterbody, the Nashua River - Nashua Canal Dike (NHIMP700040402-03) would have received the impairment designation in 2006. The list goes on to say that the current data from the Nashua River - Nashua Canal Dike (NHIMP700040402-03) does not provide enough information to lift the impairment due to “different sampling stations and sampling depths.”</p>	<p>7- 2</p>
<p>Data Review</p> <p>The City of Nashua, with support from its consultant Hazen and Sawyer (Hazen), conducted a review of the waterbody data available for the Nashua River - Nashua Canal Dike (NHIMP700040402-03) from the NHDES 2020 Surface Water Quality Assessment Viewer. The sample collection timeframe ranged from 1998 to 2019 and included sample results from the following stations as shown in Figure 1¹. The viewer indicates that only data from the Mine Falls Park at Boat Launch (04A-NSH) were used for the 2020 assessment cycle.</p>	<p>7- 3</p>



Figure 1

No recent chloride samples have been collected at any of the sampling stations, instead specific conductance is measured as a surrogate. Hazen used New Hampshire's statewide specific conductance to chloride equation below to approximate chloride concentrations.

$$\text{Chloride (in mg/L)} = 0.2893 * \text{Specific Conductance (in } \mu\text{S/cm)} - 11.7$$

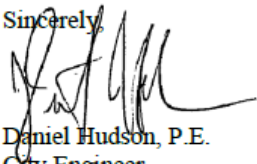
Hazen used chloride and specific conductance measurements from 1998 and 1999 as a check on the equation and found general agreement between the measured and calculated chloride concentrations as shown in Table 1.

Table 1

Date	Depth	Chloride (mg/l)	Specific Conductance (uS/cm)	Chloride, Calc. (mg/l)
7/21/1998	2.5	136	526	140
7/21/1998	5	350	1150	321
2/10/1999	2.5	160	608.4	164
2/10/1999	5.5	488	1689.1	477

From 2010 through 2019 (the assessment period), 57 specific conductance measurements were taken at Station 04A-NSH. Hazen used the specific conductance to chloride equation to calculate chloride concentrations for comparison with the chronic water quality standard. The average calculated chloride concentration was 68 mg/l and the maximum, 149 mg/l.

¹ The location shown on the assessment viewer for the Mine Falls Park Boat Launch Station is incorrect. An estimated location based on station description is shown in Figure 1.

<p>Analysis</p> <p>Both the 2018 CALM and the draft 2020 CALM set maximum data age of 10 years for assessing lakes and ponds. However, both require that any data used to make the original assessment be included in any reassessment decisions regardless of age. In this case, the samples collected at MINE FALLS POND-DEEP SPOT (MINNASD) in 1998 and 1999 that indicated impairment would be considered in reassessment decisions.</p> <p>As previously mentioned, the 303(d) list suggested that data from different sampling stations and sampling depths would make the current data invalid. However, both the 2018 CALM and the draft 2020 CALM advise that since assessment units were established to be homogenous, then any sample site within the AU would be representative of water quality conditions. Further, this means that an aggregation of samples would be allowed for assessment purposes.</p> <p>For these reasons, the data set used for the assessment should include the 57 samples collected at Mine Falls Park at Boat Launch (04A-NSH) along with those collected at MINE FALLS POND-DEEP SPOT (MINNASD) that were the basis for the previous impairment assessment (488 mg/l, collected on 2/10/1999 and 350 mg/l, collected on 7/21/1998).</p> <p>This would result in a data set of 59 samples and based upon Table 3-13 of the 2018 CALM and draft 2020 CALM, six exceedances would be required to assess a waterbody as impaired. In this case, only two samples exceeded the 230 mg/l chronic water quality criteria for chloride, thus the data do not indicate chloride impairment.</p>	7- 4
<p>Additional Sampling</p> <p>Sampling of the Nashua River and Nashua Canal are being completed as part of a FERC license renewal on the Mine Falls Dam, located immediately upstream of Nashua River - Nashua Canal DiKE (NHIMP700040402-03). Testing for chloride at two locations in the Nashua Canal DiKE is included in the study and the findings will be shared when the study is completed next year.</p>	7- 5
<p>Conclusion</p> <p>The City of Nashua respectfully requests that NHDES revise the assessment of the Nashua River - Nashua Canal DiKE (NHIMP700040402-03) for chloride to fully supporting. As a result, it should not be included in the final New Hampshire 303(d) list of impaired waters.</p> <p>Should you have any questions about our comments to the Draft 2020, 303(d) List and CALM, please feel free to contact me or our consultant, Saya Qualls-Hickey of Hazen and Sawyer at squalls@hazenandsawyer.com.</p> <p>Sincerely,</p>  <p>Daniel Hudson, P.E. City Engineer</p>	7- 6

COMMENT #8: Suzanne M. Woodland, City of Portsmouth

<p>RE: City of Portsmouth's comments on the CALM City of Portsmouth's comments on the 2020 Draft 303(d) List</p> <p>Dear Mr. Wood:</p> <p>I write on behalf of the City of Portsmouth ("Portsmouth") to offer comments on the draft 2020 Consolidated Assessment and Listing Methodology ("CALM") and 303(d) list. Portsmouth appreciates the effort the Department of Environmental Services ("DES") continues to make to protect and improve water quality. In recognition of the detailed comments submitted by the City of Rochester and City of Dover, Portsmouth comments will be brief.</p>	8- 1
<p>First, Portsmouth concurs with Rochester and Dover that the required statutory promulgation procedure for the development of the CALM has been neglected. Although Portsmouth may ultimately overlook this defect, it is a defect nonetheless. This defect opens up the CALM and the 303(d) list to legal challenge and undermines the regulatory process.</p>	8- 2
<p>Second, the City likewise concurs with Dover and Rochester that the DES regulatory effort would be better informed and have greater buy-in from the communities if there were a more robust basis for the nitrogen and eelgrass impairment determinations. Portsmouth has emphasized for years that good science is needed for important regulatory actions along with interim steps on the part of the communities to implement improvements as the science continues to evolve. Unless and until the scientific work is done to better understand the potential "confounding factors" for eelgrass and overall Estuary health, the question will remain as to whether the municipal funds dedicated to infrastructure upgrades and operational changes are well directed to our collective goal. With a more robust analysis in hand, a TMDL for the Estuary should have a high priority.</p>	8- 3
<p>The City of Rochester calls out in its comments that DES has not adopted new Dissolved Oxygen (DO) regulations in spite of a Legislative call to do so in order to bring the regulations into alignment with current Environmental Protection Agency guidance. This is of particular importance to the City of Portsmouth given that DES has identified Sagamore Creek as DO impaired based on the outdated regulations.</p>	8- 4
<p>Portsmouth incorporates into its comments the detailed comments submitted by the City of Rochester and the City of Dover as if restated in this document.</p> <p>Sincerely,</p> <p><i>/s/ Suzanne M. Woodland</i></p> <p>Suzanne M. Woodland Deputy City Attorney</p>	8- 5