RESPONSE TO COMMENTS
REISSUANCE OF NPDES PERMIT NO. NH0100170
CITY OF NASHUA
WASTEWATER TREATMENT FACILITY
NASHUA, NEW HAMPSHIRE

From July 23, 2013 through November 18, 2013, the U.S. Environmental Protection Agency (EPA-Region 1) and the New Hampshire Department of Environmental Services, Water Division (NHDES-WD) solicited public comments on the draft National Pollutant Discharge Elimination System ("NPDES") permit developed pursuant to an application submitted by the City of Nashua, New Hampshire, for the reissuance of its permit to discharge to the designated receiving waters.

EPA and NHDES-WD received comments from the Nashua River Watershed Association ("NRWA"), dated November 18, 2013; the City of Nashua, NH (the "permittee" or the "City"), dated November 18, 2013; and the City of Manchester, NH, dated November 14, 2013. Following a review of the comments received, EPA has made a final decision to issue the permit authorizing this discharge. In accordance with the provisions of 40 C.F.R. § 124.17, the comments received and EPA's responses to those comments, including a description of any changes made to the permit as a result of those comments as well as any clarifications EPA considers necessary, are described below.

A copy of the Final Permit may be obtained by calling or writing Meridith Timony, United States Environmental Protection Agency, 5 Post Office Square-Suite 100, Mail Code OEP06-1, Boston, Massachusetts 02109-3912; Telephone: (617) 918-1533. Copies of the Final Permit and the Response to Comments may also be obtained from the EPA Region I website at http://www.epa.gov/region1/npdes/index.html.

A. Summary of Changes to the Final Permit:

1. Screening and Disinfection Facility

Since the release of the Draft Permit for public comment, the City provided notification to EPA and NHDES of the completion of construction of the Screening and Disinfection Facility ("SDF") and associated outfall, which will provide screening and disinfection to combined flows that had previously been discharged through CSO Outfalls No. #005 and 006 to the Nashua and Merrimack Rivers, respectively. Flows from this facility will be discharged to the Merrimack River through CSO Outfall No. 014. As discussed in the Fact Sheet, the operation of the SDF is among the ongoing CSO controls implemented by the City that will reduce discharges of untreated wastewater through CSOs in accordance with the Consent Decree that was lodged on December 26, 2005 (as amended on March 31, 2009 (Civil Action No. 05-376-PB).

The authorization to discharge from Outfall No. 014 and associated conditions which apply to the SDF go into effect upon the effective date of the Final Permit. The following changes have been made to the Final Permit with respect to the SDF and CSO Outfall No. 014:

- Front Page and Attachment A– CSO Outfall No. 014 has been added to the list of outfalls that discharge to the Merrimack River.

- Part I.B.1. – CSO Outfall No. 014 is identified as an authorized CSO discharge outfall.

- Part I.B.5.b. – CSO Outfall No. 014 is identified as an authorized CSO discharge outfall.

- Part I.B.5.b. – Footnote # 1 of the Draft Permit, which required the City to provide notification to EPA and NHDES prior to the commencement of operation of the SDF, has been removed from the Final Permit.

2. Part I.A.1.a. – Inclusion of total phosphorus limit of 0.8 mg/l, which shall be in effect from April 1st – October 31st. See Response C.2.

3. Part I.A.1.a. – Footnote # 12 has been removed from the Final Permit, as provisions for modifying, revoking and/or reissuing the permit are included in Part II , Standard Conditions, as well as in 40 C.F.R. §§ 122.62 and 122.63. See Response B.11.

4. EPA has modified the language which defines dry weather in Part I.A.4. and I.B.2.d. to read as follows:

   "*The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand during dry weather. Dry weather is defined as any calendar day on which there is less than 0.1 inch of rainfall, no snow melt (defined as a day in which the temperature is greater than 32^{o} F), and 24 hours after a storm event to allow the storm-related flow to pass through the collection system and treatment facilities (as recorded by a hydrograph). The percent removal shall be calculated as a monthly average using the influent and effluent BOD_5 and TSS values collected during dry weather days."* The change was made to remove any ambiguity regarding the time it would take for the flow to pass through the collection system. See Response No. B.14.

5. Part I.B.1.c. - The due date for submitting the certification and supporting documentation of the review and revisions to the NMC implementation program has been changed to "*Within twelve months of the effective date of the permit"*. See Response B.17

6. Part I.B.2.g. - The requirements to provide both oral (i.e., within 24-hours") and written (within 5 days) to NHDES that were in the Draft Permit have been removed from the Final Permit. See Response B.20.

7. Part I.B.3.c. has been modified to read as "*Precipitation data for each day of the previous calendar year, including total rainfall, peak intensity, and average intensity*". See Response B.21.

8. Part I.B.5.a. - Footnote # 3 to Part I.B.5.a. of the Draft Permit has been removed from the Final Permit. Additionally, the monthly average effluent limitation of 30 mg/l for total suspended solids (TSS) contained in Part I.B.5.a. of the Draft Permit has been changed to a monitor only requirement in the Final Permit. See Responses B.10. and B.22.

9. Part I.B.5.a. - Footnote #8 and Part I.B.5.b. – Footnote #11 allows for the submittal of precipitation data that is collected in accordance with the City's Long Term Control Plan (LTCP) provided that the intensity and duration of each rain event whenever there is flow into the Wet Weather Flow Treatment Facility (WWFWTF) and/or Screening and Disinfection Facility (SDF), respectively, is submitted. See Response B.24.

10. A special condition has been added to the Final Permit that requires the operation of the wastewater treatment facility and the wet weather flow treatment facility during periods of wet weather to be consistent with the City of Nashua's High Flow Management Plan (HFMP), dated 2010, or the most recently–approved version of the HFMP (see Part I.C. of the Final Permit). See Response B.15.

11. Part I.D.4. – A statement has been added to clarify that any mapping of the collection system that has already been performed may be used to fulfill the requirements of Part I.D.4.

12. The Parts of the Final Permit have been re-numbered.

B. The following comments were received from Lisa M. Fauteux, Director, Division of Public Works, City of Nashua, New Hampshire, by letter dated November 18, 2013.

7Q10 DETERMINATION

Comment B.1.

EPA Region I used the S.L. Dingman Method to calculate the 7Q10 in the Merrimack River. EPA estimated the 7Q10 of the Merrimack River to be 784.1 cubic feet per second (cfs) using USGS gage station data from the Merrimack River below Manchester (01092000), the Souhegan River at Merrimack (01094000), and the Nashua River at East Pepperell (01096500), the Concord River Below R Meadow Branch (01099500), and the Merrimack River at Lowell, MA (0100000). The S.L. Dingman Method uses ungaged drainage areas to estimate a 7Q10. In this case, the ungaged drainage area between Manchester and Nashua and between Lowell and Manchester was used. EPA Region I also adjusted the upstream 7Q10 by subtracting the NWTF design flow; however, a more appropriate methodology is to subtract the NWTF's long-term average flow.

After consultation with the United States Geological Survey (USGS) in Massachusetts, it was determined that the log Pearson Fit Method for calculating the 7Q10 was more appropriate than using the S.L. Dingman Method. Hazen and Sawyer obtained station statistics for USGS gages 01092000 and 01100000. Using this data, a 7Q10 of 791 cfs was derived at Nashua using the log Pearson Fit Method. The 7Q10 of 791 cfs should be used for all analyses related to the NWTF permit, including the Reasonable Potential Analysis (RPA).

Response B.1.

It is unclear why the commenter finds the methodology applied by EPA in calculating the 7Q10 flow in the receiving water at the point of discharge, which incorporates Log-Pearson Type III statistics, to be inappropriate.

As described in the Fact Sheet, in areas where gaging data *was* available, the 7Q10 flows at the USGS gaging station sites were calculated using Log-Pearson Type III statistics, not the S.L. Dingman Method. In areas where gaging station data *was not* available (and no data exist), the S.L. Dingman Method was used to calculate the 7Q10 in the Merrimack River, as there was no data to which statistics like the log Pearson Fit Method could be applied (see Attachment B to the Fact Sheet that accompanied the Draft Permit).

The commenter also notes that "EPA Region I also adjusted the upstream 7Q10 by subtracting the NWTF design flow; however, a more appropriate methodology is to subtract the NWTF's long-term average flow." EPA's approach to performing reasonable potential analyses as well as in establishing water quality-based effluent limitations in NPDES permits issued to POTWs in New Hampshire is to apply a mass balance equation that assumes critical (7Q10) flow conditions in the receiving water, both upstream and downstream from the discharge, and that assumes the POTW is operating at design flow, rather than the long-term average flow, in order to ensure adequate protection of the receiving water under the most severe flow conditions. This is a protective, preventative approach, which is appropriate for waters suffering water quality impairments. *See also* 40 C.F.R. § 122.45(b) (…In the case of POTWs, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow). Additionally, application of the facility's design flow is reasonable given that the effluent flow discharged from the facility from 2007-2012 had exceeded the design flow on several occasions, and that the median effluent flow discharged during this period approached the design flow[1]. In addition, this method of calculating 7Q10 flows is consistent with derivation of 7Q10 flows for other NPDES permits issued to POTWs in New Hampshire.

PART I.A.1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Comment B.2.

LANGUAGE CHANGE FOR MONITORING FREQUENCY
The previous permit required the measurement frequency for biochemical oxygen demand (BOD_5) and total suspended solids (TSS) to be weekdays whereas the Draft Permit requires the BOD_5 and TSS measurement frequency to be 5 days/week. We request that the measurement frequency for BOD_5 and TSS be changed to "*weekdays*" or to "*5 samples per calendar week*".

Response B.2.

[1] As shown in Attachment C to the Fact Sheet, the monthly average effluent flow discharged from the facility from March 2007 through March 2012 ranged from 8.1 mgd to 21.1 mgd, and the median flow was 11.4 mgd.

The monitoring frequency for BOD_5 and TSS in the Draft Permit is "5/Week", and is identical to the monitoring frequency in the permit that was issued to the City in 2000. In any case, the monitoring frequency of 5 days per week is broad enough to encompass the City's preferred sampling schedule (e.g., 5 samples per calendar week or weekdays) and shall remain in the Final Permit.

Comment B.3.

REDUCTION IN MONITORING REQUIREMENTS FOR TSS AND BOD

We request the permit to be modified to reduce the monitoring for BOD_5 and TSS. Effluent data from March 31, 2007 through March 31, 2012 was evaluated to determine the potential for reduced monitoring for these pollutants. The April 1996 EPA *Interim Guidance for Performance-Based Reductions of NPDES Monitoring Frequencies* method was used to determine the appropriate reductions. The long-term average BOD_5 was 46 percent of the permit limit. There was only one violation in 2010; however, a single violation that is more than two years old does not prohibit the reduction in monitoring frequency. According to EPA guidance, the BOD_5 monitoring frequency should be reduced from five samples per week to three samples per week. The long-term average TSS was 31 percent of the permit limit. There were no violations of the TSS limit during the period of record. As a result, the TSS monitoring frequency should be reduced from five samples per seek to two samples per week.

Response B.3.

EPA establishes, and grants reductions of, monitoring frequencies in NPDES permits on a case-by-case basis (*NPDES Permit Writers' Manual, Chapter. 8.1.3*, USEPA September 2010 [EPA-833-K-10-001]). *See* CWA §§ Sections 402(a)(2) and 301(b)(1)(C); 40 C.F.R. §§ 122.4(a) and (d); 122.43; 122.44(d); 122.44(i); 122.48(b). The *Interim Guidance for Performance-Based Reductions of NPDES Monitoring Frequencies*, referenced in the above comment, contains procedures for determining the appropriateness of reducing monitoring frequencies based on the performance of the facility in question. The Guidance suggests procedures to follow for determining reductions based on plant performance. It does not consider site-specific issues that may require more monitoring, even if the overall performance of the plant is satisfactory. As in many communities served by combined wastewater collection systems, the City's wastewater treatment facilities are affected by the intensity, duration and frequency of wet weather events. Since the issuance of the 2000 permit, the City has made significant investments in their wastewater collection system and treatment facilities to address the impacts of wet weather events. However, EPA lacks data at this time with respect to periods when the Wet Weather Flow Treatment Facility (WWFTF) is operated, which is a reason in EPA's judgment for keeping the monitoring requirements as written in the Draft Permit. In consideration of these site-specific factors, EPA has determined that the BOD_5 and TSS monitoring requirements in the Draft Permit are necessary to generate data to fully and adequately characterize the effluent quality and assess treatment efficiencies under varying flow conditions, including when the WWFTF is operated. Therefore, EPA finds that reducing the monitoring frequency for BOD_5 and TSS is not appropriate at this time, and the Final Permit remains unchanged from the Draft. The City is free to re-submit its request for a reduction in the monitoring requirements for TSS

and BOD_5 in the future in the form of a request for a permit modification once additional data have been collected, and EPA will consider the merits of that renewed request based on the larger data set that will then exist in the record.

Comment B.4.

Numeric Nutrient Criteria and Total Phosphorus Limit

EPA Region 1 has circumvented New Hampshire's narrative nutrient criteria by basing an effluent phosphorus limit on ecoregion reference conditions. In the Nashua NPDES permit, a phosphorus limit was imposed because the recreational chlorophyll *a* standard of 15 µg/l has been exceeded in the Merrimack River. The phosphorus limit was established using a mass-balance wasteload allocation procedure using the 7Q10 as the basis. The use of the wasteload allocation procedure is inappropriate and should not be used to establish nutrient limits. The effects of nutrients are long-term and affected by many external factors. Numeric nutrient criteria should be established with a site-specific study to establish the correlation between nutrients and a biological response. It does not appear that biological data has been collected in conjunction with chlorophyll *a* data to evaluate a biological response in the Merrimack River.

Irrespective of a site-specific numeric nutrient study, there does not appear to be any justification for the proposed phosphorus limit in the Nashua permit. We reviewed the *Upper Merrimack and Pemigewasset River Study Field Program 2009-2012 Monitoring Data Report*, U.S. Army Corps of Engineers dated December 2012. A review of this report indicates that the upstream and downstream data for chlorophyll *a* and total phosphorus appear to indicate that the NWTF discharge has no discernable impact on the receiving stream. For each sampling date, stream flow, along with upstream, downstream and NWTF effluent phosphorus concentrations were measured; however, a mass-balance relationship between effluent phosphorus concentration and instream phosphorus could not be inferred from the data. These findings suggest that "reasonable potential" does not exist for the Nashua discharge to cause or contribute to exceedances of the chlorophyll *a* recreation-based criterion. Furthermore, the data from the study also indicates that the Nashua discharge does not have reasonable potential to cause or contribute to violations of the narrative criteria for nutrients.

The total phosphorus limit should be removed from the permit. A site-specific study and modeling effort will determine the nutrient input versus biological response relationship in the Merrimack River watershed. The study should take into account both the point and non-point source contribution.

Response B.4.

EPA has addressed the specific comments in detail below, but as a preliminary matter, the EPA observes that most if not all of the legal/regulatory objections to the permit underlying the City's comments on the phosphorus limit have been squarely addressed in past decisions by the United States Environmental Appeals Board and by the United States Court of Appeals for the First Circuit. *See Upper Blackstone Water Pollution Abatement Dist. v. U.S. EPA*, 690 F.3d 9, 33 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2282 (2013) (upholding the Region's overall methodology for the imposing a phosphorus limit, including use of the Gold Book, among other information, to

establish a site-specific total phosphorus limit applicable to that particular discharge); *In re Upper Blackstone Water Pollution Abatement Dist.*, NPDES Appeal Nos. 08-11 to 08-18 & 09-06 (EAB May 28, 2010) (same); *see also, In re City of Attleboro*, NPDES Appeal No. 8-08 (EAB Sept. 15, 2009) (same). Most recently, the EAB comprehensively addressed the Region's approach to interpreting the State's narrative nutrient criterion to derive an effluent limitation in *In re Town of Newmarket Treatment Plant*, NPDES Appeal No. 12-05, 16 E.A.D. __ (EAB December 2, 2013). EPA encourages the City to consult these decisions in conjunction with reviewing the Region's responses below.

EPA did not circumvent the narrative criteria for nutrients contained in the New Hampshire Water Quality Standards, but translated that existing criteria into a numeric effluent limitation based on the information (including site-specific data related to the effluent discharge and receiving waters) reasonably available during the permit development and reissuance process. As described in the Fact Sheet, EPA based the phosphorus limit in the Draft Permit on the Gold Book criterion, which was derived from an effects-based approach, rather than the ecoregional criterion, which was derived from a reference condition-based approach. See Fact Sheet at 19-20. EPA's overall approach to interpreting the State's narrative nutrient criterion to derive an effluent limitation is consistent with the requirements of 40 C.F.R. § 122.44(d) and has been addressed and upheld by the Environmental Appeals Board (EAB) (See Response to comment 8).

The New Hampshire Water Quality Standards do not contain criteria for chlorophyll *a.* As described in the Fact Sheet, chlorophyll *a* is a response indicator whose quantity may be correlated with the amount of phytoplankton (suspended plant biomass) present within the system (USEPA 2000, Chapra 1997, Thomann & Mueller 1987). Therefore, elevated instream chlorophyll *a* concentrations are indicative of nutrient enrichment. As such, NHDES applies a chlorophyll *a c*oncentration of 15 µg/l as a threshold value when making determinations as to whether the primary contact designated use is supported in a fresh water body under CWA Section 303(d) (see *2012 NHDES Consolidated Assessment and Listing Methodology (CALM)* (NHDES 2012)). Sections 301 and 402 of the Act, and implementing regulations at 40 C.F.R. § 122.44(d), are the provisions that govern this permitting action, not Section 303(d) and associated non-binding listing guidance such as the CALM. Therefore, the chlorophyll *a* threshold value that is used in making use support determinations is not directly applicable to this permitting action and was not determinative in EPA's permitting decision. This value was, however, one piece of information EPA considered in arriving at its decision to impose a water quality-based effluent limitation for nutrients.

It is worth noting that the chlorophyll *a* concentration of 15 µg/l used by NHDES is a threshold value for the protection of recreational uses, not for the protection of aquatic life uses, and that chlorophyll *a* values less than 15 µg/l are correlated with mesotrophic conditions in the literature (see Table 1 and Table 2).

Table 1 Freshwater System Trophic Status Based on Mean Chlorophyll *a* Concentration[1]

Trophic Status	Wetzel (2001)	Ryding and Rast (1989)	Smith (1998)	Novotny and Olem (1994)
Eutrophic	> 10 µg/l	6.7-31 µg/l	----------	> 10 µg/l
Mesotrophic	2-15 µg/l	3-7.4 µg/l	3.5-9 µg/l	4-10 µg/l
Oligotrophic	0.3-3 µg/l	0.8-3.4 µg/l	----------	< 4 µg/l

1. Adapted from *Ambient Water Quality for Dissolved Oxygen, Water Clarity, and Chlorophyll a for Chesapeake Bay and its Tidal Tributaries* (USEPA 2003)

Table 2 Nutrient (µg/l) and algal biomass criteria limits recommended to prevent nuisance conditions and water quality degradation in streams based either on nutrient-chlorophyll *a* relationships or preventing risks to stream impairment as indicated[1]

PERIPHYTON Maximum in mg/m^2						
TN	TP	DIN	SRP	Chlorophyll *a*	Impairment Risk	Source
				100-200	nuisance growth	Welch et al. 1988, 1989
275-650	38-90			100-200	nuisance growth	Dodds et al. 1997
1500	75			200	eutrophy	Dodds et al. 1998
300	20			150	nuisance growth	Clark Fork River Tri-State Council, MT
	20				*Cladophora* nuisance growth	Chetelat et al. 1999
	10-20				*Cladophora* nuisance growth	Stevenson unpubl. data
		430	60		eutrophy	UK Environ. Agency 1988
		100[1]	10[1]	200	nuisance growth	Biggs 2000
		25	3	100	reduced invertebrate diversity	Nordin 1985
			15	100	nuisance growth	Quinn 1991
		1000	10[2]	~100	eutrophy	Sosiak pers. comm.
PLANKTON Mean in µg/L						
TN	TP	DIN	SRP	Chlorophyll *a*	Impairment Risk	Source
300[3]	42			8	eutrophy	Van Nieuwenhuyse and Jones 1996
	70			15	chlorophyll action level	OAR 2000
250[3]	35			8	eutrophy	OECD 1992 (for lakes)

[1]30-day biomass accrual time
[2]Total Dissolved P
[3]Based on Redfield ratio of 7.2N:1P (Smith et al. 1997)

[1]From *Nutrient Criteria Technical Guidance Manual* (USEPA July 2000, Ch. 7, p.101 [EPA-822-B-00-002]))

The regulatory requirement for the establishment of a water quality based effluent-limit is based upon a determination that the pollutant of concern is or may be discharged at a level that will "cause, has the reasonable potential to cause, or contributes to an excursion above a State water quality standard, including State narrative criteria for water quality" (S*ee* 40 C.F.R. § 122.44(d)(1)(i)). The absence of numeric nutrient criteria does not preclude EPA from

establishing a water quality-based effluent limit in a NPDES permit. CWA § 301(b)(1)(C) and its implementing regulations at 40 C.F.R. § 122.44(d)(1), impose requirements on EPA to include in NPDES permits "any requirements…necessary to: (1) Achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality." In the absence of site-specific numeric criteria for the Merrimack River, or the development and adoption of statewide numeric criteria, EPA is compelled to establish limits that ensure compliance with all existing applicable criteria, which, in this case, are the narrative criteria found at Env-Wq 1703.14 (also see Response C.8.).

In New Hampshire, NPDES permit limits for discharges to rivers and streams are calculated such that applicable criteria are achieved under the "7Q10" flow conditions, or the "lowest average flow which occurs for 7 consecutive days on an annual basis with a recurrence interval of once in 10 years on average." *See* Env-Wq 1705.02(a) and (d). Also see Env-Wq 1702.44. EPA has simply written the permit in a manner that complies with applicable water quality standards as required by the CWA. Use of the 7Q10 flow is reasonable from a water quality perspective, as it ensures that water quality standards are met even in periods of critical low flow when the flow of the receiving water provides relatively little dilution to buffer impacts of pollutant loadings from the facility. Use of critical low flows is also consistent with the reasonably conservative approach the Region has adopted in nutrient permitting in general and that it has determined is necessary in this case in particular to break the ongoing cycle of eutrophication in the receiving waters. Please also see *In re City of Attleboro, MA Wastewater Treatment Plant*, NPDES Appeal No. 08-08, 14 E.A.D. __ (EAB, September 15, 2009) (discussing use of 7Q10 flow regimes in permit that vary from other TMDLs approved by the state and upholding the Region's determination to use 7Q10 as opposed to seasonal or annual average flows).

Upon finding that reasonable potential exists for the discharge from the Nashua Wastewater Treatment Facility ("WWTF") to cause or contribute to violations of water quality standards, EPA was obligated to impose a phosphorus limit on the discharge in accordance with the requirements of 40 C.F.R. § 122.44(d)(1) , and calculated that limit in accordance with section 122.44(d)(1)(vi). A detailed explanation of the legal and technical basis for the establishment of the phosphorus limit of the Draft Permit may be found on pages 19-24 of the Fact Sheet, as well as in Responses C.2., C.7., C.8. and C.15.

The intent of including the data presented in the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* (United States Corps of Engineers ("USACE") December 2012) was to highlight the fact that the receiving water is exhibiting signs associated with eutrophication, and not to demonstrate a direct causal relationship between the discharge of phosphorus from the Nashua Wastewater Treatment Facility (WWTF) and the receiving water. These data were pieces of EPA's larger analysis of determining the need for a phosphorus effluent limitation under applicable regulations. The *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* does not replicate nor is it a substitute for the reasonable potential analysis performed by EPA in determining whether phosphorus is discharged at a level that will cause, or may cause or contribute to, violations of water quality standards.

The City contends that:

> "A review of this report indicates that the upstream and downstream data for chlorophyll *a* and total phosphorus appear to indicate that the NWTF discharge has no discernable impact on the receiving stream. For each sampling date, stream flow, along with upstream, downstream and NWTF effluent phosphorus concentrations were measured; however, a mass-balance relationship between effluent phosphorus concentration and instream phosphorus could not be inferred from the data."

EPA disagrees with the conclusory assertion that these data reveal "no discernable impact" of phosphorus on the receiving waters. While the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* does not in itself contain an analysis of the impact of the effluent discharged from the Nashua WWTF on the downstream receiving water, EPA applied the ambient and effluent phosphorus data presented in this report, as well as the receiving water 7Q10 flow and the design flow of the facility, to a mass balance equation, the result of which indicates that the discharge does in fact present reasonable potential to cause or contribute to excursions above the 0.1 mg/l total phosphorus target. Additionally, the receiving water data indicate chlorophyll *a* levels in excess of the threshold.

Based on the analysis presented in the Fact Sheet, which includes but is not limited to the information presented in the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report*), EPA has concluded that the phosphorus limit in the Final Permit is necessary to ensure compliance with water quality standards. Should additional information, including the results of a site-specific study and/or modeling effort, become available during the term of the Final Permit which changes EPA's conclusions with respect to the phosphorus limit, the permit may be modified in accordance with 40 C.F.R. § 122.62(a)(2).

Comment B.5.

Reasonable Potential Analysis for Metals

EPA Region 1 did not use the recommended method for the calculation of total recoverable permit limits from a dissolved criterion as outlined in EPA's *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, 1996). In this document, the EPA Office of Water advised that dissolved metal concentrations should be used for the application of aquatic life criteria for metals. With very few exceptions, the total recoverable-based criterion for each metal must be multiplied by a conversion factor to obtain a dissolved criterion that should not be exceeded in the water column. The wasteload allocation must be translated into a total recoverable metals permit limit. As such, the hardness-dependent Criteria Continuous Concentration (CCC) and Criteria Maximum Concentration (CMC) should be calculated using the following equations:

$$CCC = (\exp\{m_c[\ln(\text{stream hardness})] + b_c\}) \times (CCF)$$
$$CMC = (\exp\{_{ma[}\ln(\text{stream hardness})] + b_a\}) \times (CCF)$$

Where:

m_c, b_c, m_a, b_a = hardness-dependent coefficients
CCF = Chronic Conversion Factor

ACF = Acute Conversion Factor

The translator converts the value for dissolved metal at laboratory conditions to total recoverable metal at ambient conditions as follows:

$$f_d = C_{diss}/C_{total} = 1/[1 + \{[K_{po}] [ss^{(1+a)}] [10^{-6}]$$

Where:

ss = in-stream suspended solids concentration (mg/L)
K_{po}, a = partition coefficients (from guidance)

The instream allowable concentrations (IAC) are then calculated as follows:

Chronic IAC = CCC/f_d
Acute IAC = CMC/f_d

The calculated allowable effluent concentration is then:

$$C_W \leq (S_A) [C_m(Q_s+Q_w) - Q_sC_s]/Q_w$$

Where:

S_A = percent "Stream Allocation"
C_m = resultant in-stream concentration after mixing
C_w = concentration of pollutant in wastewater
C_s = stream background concentration
Q_w = wastewater flow
Q_s = stream low flow

Table 3 Summary of Revised Reasonable Potential Analysis for Copper and Lead

	Copper	Lead
Stream Background Concentration, µg/l	2.00	0.50
Fraction Dissolved (f_D)	0.35	0.18
Measured Effluent concentration, 95th percentile	30.20	2.58
CHRONIC		
Fish and Aquatic Life Water Quality Criteria	2.74	0.54
Instream Allowable Concentration	7.90	2.90
Maximum Allowable Effluent Concentration	172	71
Reasonable Potential (is Maximum Allowable < Effluent Concentration?)	NO	NO

ACUTE		
Fish and Aquatic Life Water Quality Criteria	3.63	14
Instream Allowable Concentration	11	76
Maximum Allowable Effluent Concentration	246	2,173
Reasonable Potential (is Maximum Allowable < Effluent Concentration?)	NO	NO

The facility effluent data is then compared with the allowable effluent concentrations to determine if reasonable potential exists for the discharge to result in a water quality exceedance. Typically, if the 95th percentile value exceeds the allowable concentration, then reasonable potential exists and a limit is applied. A revised Reasonable Potential Analysis was performed for copper and lead using the recalculated 7Q10, stream background data from upstream monitoring, a hardness of 25 mg/l, and a suspended solids concentration of 10 mg/L. Table 1 provides a summary of the revised RPA for copper and lead. Reasonable potential does not exist for either copper or lead to exceed water quality criteria as a result of the NWTF discharge. Limits for copper and lead should be removed from the permit.

Response B.5.

Contrary to the above comment, EPA's approach to developing the total recoverable copper and lead limits in the Draft Permit, which is described in detail below, is consistent with the recommended methodology found in *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA 1996 [EPA-823-B96-007]).

Although many inorganic components of domestic wastewater, including metals, are in the particulate form, differences in the chemical composition between effluent and receiving water affects the partitioning of metals between the particulate and dissolved fractions as the effluent mixes with the receiving water, often resulting in a transition from the particulate to dissolved form (*The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA 1996 [EPA-823-B96-007])[2]. Therefore, quantifying only the dissolved fraction of metals in the effluent prior to discharge may not accurately reflect the biologically-available portion of metals in the receiving water. Therefore, effluent limits for metals are expressed as total recoverable metals in accordance with the requirements of 40 C.F.R. § 122.45(c). The total recoverable concentration of a metal is a measure of both the dissolved and particulate fraction. In order to establish total recoverable limits that will ensure attainment of dissolved aquatic life criteria, conversion factors have been developed to reflect the

[2] *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA 1996 [EPA-823-B96-007]) was used as the basis for the use of the criteria conversion factor (CF). National Guidance requires that permits limits for metals are to be expressed in terms of total recoverable metal and not dissolved metal. As such, conversion factors are used to develop total recoverable limits from dissolved criteria. The conversion factor reflects how the discharge of a particular metal partitions between the particulate and dissolved form after mixing with the receiving water. In the absence of site-specific data describing how a particular discharge partitions in the receiving water, a default assumption equivalent to the criteria conversion factor is used in accordance with guidance.

partitioning of metals as the effluent mixes with the receiving water, allowing for the translation between a dissolved criterion and a total recoverable limit (and vice-versa). These conversion factors are the fraction of the total recoverable metal in the effluent that will be in the dissolved form in the receiving water (*The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA 1996 [EPA-823-B96-007]).

The New Hampshire Water Quality Standards contain water quality criteria for metals that are expressed in terms of dissolved metals. *See* Env-Wq 1703.21, Table 1703.1, Footnote i. Conversion factors for translating dissolved criteria into total recoverable limits are found in the New Hampshire Water Quality Standards at Env-Wq 1703.21, Table 1703.2 (also see *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA 1996 [EPA-823-B96-007]. In developing the Draft Permit, EPA applied these conversion factors to the metals criteria contained in the New Hampshire Water Quality Standards at Env-Wq 1703.21, Table 1, to translate between dissolved metals and total recoverable metals.

The equations used to derive the dissolved metals criteria contained within the state water quality standards as well as the conversion factors used to convert dissolved metals to total recoverable metals, are shown below in Table 2. *See* Env-Wq 1703.21, Table 1703.1.

Table 4 Water Quality Criteria for Metals

Metal	m_A*	b_A*	m_C**	b_C**	CF acute	CF chronic	Dissolved Criteria[1]		Total Recoverable Criteria	
							Acute Criteria (CMC) * (µg/L)	Chronic Criteria (CCC)** (µg/L)	Acute Criteria (CMC) (µg/L)	Chronic Criteria (CCC) (µg/L)
Cadmium	1.1280	-3.6867	0.7852	-2.7150	1.002	0.967	0.95	0.80	0.95	0.83
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860	183.07	23.81	579.32	27.69
Copper	0.9422	-1.7000	0.8545	-1.7020	0.960	0.960	3.64	2.74	3.79	2.85
Lead	1.2730	-1.4600	1.2730	-4.7050	0.993	0.993	13.88	0.54	13.98	0.54
Nickel	0.8460	2.2550	0.8460	0.0584	0.998	0.997	144.92	16.10	145.21	16.14
Zinc	0.8473	0.8840	0.8473	0.8840	0.978	0.986	36.20	36.50	37.02	37.02
Aluminum	---	---	---	---	---	---	---	---	750	87

[1]Dissolved Criteria

Acute Criteria (CMC) = exp{ma*ln(hardness)+ba} * CF_{Acute}

Chronic Criteria (CCC) = exp{mc*ln(hardness)+bc} * $CF_{Chronic}$

[2]Total Recoverable Criteria

Acute Criteria (CMC) = Dissolved Acute Criteria/CF_{Acute}

Chronic Criteria (CCC) = Dissolved Chronic Critera/$CF_{Chronic}$

The reasonable potential analysis performed by EPA in developing the Draft Permit is provided in pages 15-18 of the Fact Sheet. The findings of this evaluation indicate that reasonable potential exists for the discharge of lead and copper from the Nashua WWTF to cause or contribute to excursions above the applicable acute and chronic water quality criteria for in the receiving water. As such, in accordance with 40 C.F.R. § 122.44(d)(1) and § 122.45(c), effluent limitations for lead and copper are included in the Final Permit. The derivation of these limits are shown in pages 15-18 of the Fact Sheet.

Comment B.6.

Sample Type for Total Residual Chlorine
The sample type for total residual chlorine should be changed from a 24-hour composite to a grab sample.

Response B.6.

The Draft Permit requires total residual chlorine samples to be collected as grab samples, not 24-hour composite samples as the commenter suggests. The Final Permit remains unchanged from the draft with respect to the sample type required for total residual chlorine monitoring.

Comment B.7.

Modification of pH Permit Limit
On August 24, 2012, the City of Nashua requested a modification of the pH permit limit from 6.5 to 8.0 standard units to 6.0 to 8.0 standard units. The City completed the pH adjustment demonstration project, the results of which support the reduction of the lower range of the pH limit from 6.5 to 6.0 standard units. The permit should be revised to reflect this change.

Response B.7.

As described in the Fact Sheet which accompanied the Draft Permit, the provision contained in the 2000 permit which would allow for a relaxation of the pH limit to outside the range of 6.5-8.0 standard units (SU), which is the designated pH range for Class B waters in the New Hampshire Water Quality Standards (Env-Wq 1703.18(b)), is no longer applicable due to the listing of the aquatic life designated use for the segment of the Merrimack River in the vicinity of the discharge as impaired due to pH in the *State of New Hampshire 2010 List of Threatened or Impaired Waters that Require a TMDL ("303(d) list")* (NHDES 2010)) (See Fact Sheet page 13). NHDES does not allow for modifications to the pH limit outside of the range specified in the Water Quality Standards when the water body is impaired for pH, which it is at this time. Therefore, the pH limit in the Final Permit remains unchanged from the draft.

Comment B.8.

Whole Effluent Toxicity Limit
Based on the revised calculation for 7Q10 and the procedures outlined in EPA's Guidance Manual, the 95th percentile for *Ceriodaphnia dubia* and *Pimephales promelas* were calculated to

be 92.9 percent and 63.9 percent, respectively. These values are different from the current permit values of 100 percent. Antibacksliding does not apply in the case, as the 2000 permit was written incorrectly. The LC_{50} should 11.69 percent based on a dilution factor of 28.5 with an instream allowable value of 0.3 TUa. The permit should be modified to reflect the correct LC_{50} values.

The NWTF has passed 22 consecutive WET tests. Therefore, based on reasonable potential, WET monitoring should be changed from semi-annual monitoring to annual monitoring.

Response B.8.

Please see ResponseB.1. regarding the calculation of the 7Q10 flow. EPA rejects that conclusion that the 7Q10 was incorrectly derived.

It is unclear why the commenter believes that the 2000 permit was written incorrectly. Further, the commenter does not explain where the specific values it references above came from, or how they were derived.[3]

Acute WET limits are established at an LC50 of 100, as opposed to being calculated from the dilution factor, in order to minimize the size of the mixing zone that will be subjected to acutely toxic levels of effluent. This is consistent with EPA and State mixing zone policies which require minimally sized mixing zones and no acute toxicity within the mixing zone. While an LC_{50} of 100 does not equate to no acute toxicity (it equates to 50% of the test organisms being killed), minimizing the size of the mixing zone minimizes the exposure period to acutely toxic levels of effluent and therefore minimizes or eliminates lethal impacts.

The WET testing requirements in the Draft Permit represent a reduction from those in the 2000 permit. This reduction was granted at the request of the City (See Fact Sheet at 25), in accordance with a provision contained in the 2000 permit that would allow for a reduction in the frequency of WET testing if specific conditions are met. This decision is partly in recognition of the facility's past performance, referenced in the comment above. Even given the facility's past performance, EPA does not believe that a once per year monitoring requirement is sufficient, given the sensitivity of aquatic life in the receiving waters to effluent toxicity, and the need to address any exceedances proactively and expeditiously, without the potential for a long lapse in time before EPA becomes aware of a problem. Therefore, the WET testing frequency in the Final Permit remains unchanged from the Draft Permit.

Comment B.9.

Whole Effluent Toxicity Monitoring

EPA Region I should not require monitoring for ammonia, hardness, aluminum, cadmium, copper, lead, nickel or zinc as part of EPA-approved WET testing. Certified WET Laboratories

[3] The Region is unsure where the 92.9 and 63.9% values came from. Assuming they are referring to the TSD, the Region calculated the 95th percentile daily max estimate for WET test results from 2007-2012, which were the results evaluated during the development of the Draft Permit. The 95th percentile daily max estimates are 105.5 (for *C. dubia*) and 126 (for *P. promelas*).

are required to follow standard quality assurance and control procedures. Furthermore, the NWTF has not had any recent WET violations that would require additional monitoring data as part of a Toxicity Identification/Reduction Evaluation (TI/RE). As such, the additional monitoring requirements included on the Effluent Limitations page and Footnote #14 should be removed from the permit.

Response B.9.

The requirement in the Draft Permit for the concurrent analyses of ammonia nitrogen (as N); hardness; alkalinity; and total recoverable aluminum, cadmium, copper, lead, nickel, and zinc in conjunction with WET testing is a standard requirement that is included in NPDES permits issued to all POTWs in New England that include WET testing requirements and is also a component of the EPA Region I Freshwater Acute and Chronic WET testing protocols, due to the likelihood for these metals to be present in the effluent discharged from a POTW. EPA includes monitoring for the parameters referenced above due to the risk of toxicity associated with discharges from domestic and industrial sources, and the commenter does not identify any water quality-based rationale for removing them. This requirement is not a substitute for any of the quality assurance and control procedures followed by the laboratory conducting the testing. The requirement in the Final Permit for the analyses of these additional parameters in conjunction with WET testing remains unchanged from the Draft Permit.

Comment B.10.

Footnote #3

Footnote #3 should be deleted from the permit. Part I.B.5. of the permit outlines the requirements for Effluent Limitations and Monitoring Requirements for the Wet Weather Flow Treatment Facility (WWFTF) discharge. The permitted compliance point for the NWTF consists of wet weather discharge, blended effluent and secondary treated effluent. A separate monitoring requirement for the secondary treated effluent does not meet the intent of EPA's policy on wet weather discharges. The removal of this footnote is supported by the Eighth Circuit Decision Iowa League of Cities versus Environmental Protection Agency, filed March 25, 2013 (refer to Section 6 of this letter).

Response B.10.

The requirements of footnote # 3 to Part I.B.5.a. (page 14 of 28) of the Draft Permit, which requires the percent removal of TSS in the effluent discharged from the Wet Weather Flow Treatment Facility to be maintained at a minimum of 80 percent, pertains to an internal outfall which does not discharge to the receiving water, but rather discharges to another treatment process before being discharged to the Merrimack River through Outfall No. 001, where the discharge is subject to effluent limitations. EPA has concluded that the Draft Permit requirements as originally proposed are not necessary in this case. Therefore, footnote # 3 to Part I.B.5.a. of the Draft Permit has been removed from the Final Permit, as has the monthly average effluent limitation for TSS that was included in Part I.B.5.a. of the Draft Permit

Comment B.11.

Footnote #12
Footnote #12 should be deleted from the permit. Language for reopening the permit is contained in NPDES Part II.A.2., Standard Conditions. A reopener clause specific to the NWTF is not justified.

Response B.11.

Footnote #12 has been removed from the Final Permit since Part II.A.4. contains reopener provisions for the permit.

Comment B.12.

Footnote #15 (shown as Footnote #2 in Draft Permit on page 5/28)
Footnote #15 should be removed from the permit. The Effluent Limitations and Monitoring Requirements are intended specifically to protect water quality. An extra statement that *"The discharge shall not cause or contribute to a violation of the water quality standards of the receiving water"* is not warranted.

Response B.12.

The language contained in Part I.A.2. of the Draft Permit is included in all NPDES permits issued to POTWs in New Hampshire, and remains unchanged in the Final Permit. While it is true that the permit is written to include limitations and conditions to assure compliance with water quality standards, EPA cannot reasonably be expected to anticipate all the water quality issues arising from the discharge. The CWA does not proscribe permit conditions stated in terms of water quality standards. EPA sees merit in including a more general, narrative, preventative permit provision that restates the commands of Section 301 and the implementing regulations at 40 C.F.R. §§ 122.4 and .44 to "ensure" compliance with quality standards. Doing so allows EPA to address, as necessary, ongoing water quality impairments caused or contributed to by such circumstances as changes in effluent quality that might otherwise meet permit conditions or the discharge of pollutants not identified in the City's permit application

Comment B.13.

Footnote #16 (shown as Footnote #3 in Draft Permit on page 5/28)
This footnote should be revised to be consistent with the New Hampshire narrative criteria for foam, as follows:

> *The discharge shall not contain substances that would settle so as to form harmful deposits or float as foam, debris, scum or other visible substances. The discharge shall not contain substances that produce odor, color, taste or turbidity in the receiving waters which is not naturally occurring and would render it unsuitable for its designated uses.*

Response B.13.

The language contained in Part I.A.3. of the Draft Permit is from the General Water Quality Criteria contained within the New Hampshire Water Quality Standards at Env-Wq 1703.03, and remains unchanged in the Final Permit.

Comment B .14.

Part I.A.1. Footnote #17 (shown as Footnote #4 in Draft Permit on page 6/28)
The language as currently stated in this footnote regarding 85 percent removal of TSS and BOD during dry weather is not protective of our facility due to the wet weather flow issues. EPA's definition of dry weather should not be used as a surrogate for dry weather flow conditions. CSO policy and guidance refer to dry weather flow as containing only non-precipitation flow. The NWTF requires at least 24 hours for the hydrograph from a storm event to leave the collection system and treatment facility. In addition, stored volumes from the Storage Facility and the Screening and Disinfection Facility will also impact influent flow totals. During this period, the facility meets all Effluent Limitation requirements; however, the influent flow is still dilute enough to violate the 85 percent removal requirements. As such, the following language changes are requested to this footnote:

> *The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand during dry weather. Dry weather is defined as any calendar day on which there is less than 0.1 inch of rainfall, no snow melt, and at least 24-hours after a storm event to allow the storm-flow hydrograph to pass through the collection and treatment facilities. The percent removal shall be calculated as a monthly average using the influent and effluent BOD_5 and TSS values collected during dry weather days.*

Response B.14.

The footnote referred to in the above comment actually pertains to the language contained in Part I.A.4., which requires the minimum 30-day average percent removal of BOD_5 and TSS be no less than 85% during periods of dry weather[4]. Dry weather is defined in Part I.A.4. of the Draft Permit as "*any calendar day on which there is less than 0.1 inch of rainfall and no snow melt*".

EPA has modified the definition of dry weather found in Part I.A.4. and I.B.2.d. of the Final Permit in response to the commenter's concern regarding the length of time it may take for increased flows resulting from wet weather events to pass through the collection system (and treatment facilities). To remove any ambiguity associated with the time for the storm-related flow (as recorded by a hydrograph) to pass through the collection system, the suggested language

[4] The provisions of 40 CFR § 133.103(a) allows for the application of an exception to the 85% BOD_5 and TSS removal requirements of 40 CFR § 133.102(a)(4)(iii) and (b)(3) in the event that a treatment works receiving flows from combined sewers is not able to achieve this level of BOD_5 and TSS reduction during wet weather.

in the above comment of "*at least 24-hours*" was changed to "*24 hours*" in Part I.A.4. of the Final Permit, which has reads as follows (modified language is in bold):

> "*The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand during dry weather. Dry weather is defined as any calendar day on which there is less than 0.1 inch of rainfall, no snow melt (defined as a day in which the temperature is greater than 32º F), and* ***24 hours after a storm event to allow the storm-related flow to pass through the collection system and treatment facilities (as recorded by a hydrograph)****. The percent removal shall be calculated as a monthly average using the influent and effluent BOD_5 and TSS values collected during dry weather days*."

Comment B.15.

Request for New Footnote to Part I.A.1.

The operation of our secondary treatment facility is outlined in our High Flow Management Plan dated September 30, 2010 and approved by EPA Region 1. We request the following language be added as a footnote to Part I.A.1:

> *The secondary treatment facility will be operated in accordance with the EPA-approved City of Nashua High Flow Management Plan.*

Response B.15.

A special condition has been added to the Final Permit that requires the operation of the wastewater treatment facility and the wet weather flow treatment facility during periods of wet weather to be consistent with the City of Nashua's High Flow Management Plan (HFMP), dated 2010, or the most recently–approved version of the HFMP. See Part I.C. of the Final Permit.

Part I.B.1. Combined Sewer Overflows

Comment B.16.

Definition of Dry Weather

EPA's definition of dry weather should not be used as a surrogate for dry weather flow conditions. CSO policy and guidance refer to dry weather flow as containing only non-precipitation flow. For the purposes of determining the applicability of the 85 percent removal requirement and what constitutes a dry weather overflow, the EPA's definition is overly restrictive. Nashua should be allowed to determine on a case-by-case basis whether the system flows contain precipitation-derived flow. The language in the first paragraph of Part I.B.1. should be revised to read, *"…These discharges are authorized only during wet weather (i.e., any period in which there is greater than 0.1 inches of rain and/or snow melt and at least 24-hours after a storm event."* For permit consistency, please refer to our comment in Section 2 of this letter regarding Footnote #17.

Response B.16.

EPA disagrees that the City should be given the discretion to determine on its own accord whether the system flows contain precipitation-derived flow. EPA believes an objective benchmark should be utilized to prevent confusion and to set clear expectations.

As discussed in Response B.14., EPA has made changes to the definition of dry weather in Part I.A.4. and I.B.2.d. of the Final Permit to accommodate the City's concerns regarding the time it may take for flows resulting from wet weather events to pass through the collection system and treatment facilities.

Comment B.17.

Part I.B.1.c.
We request that the language for reviewing and updating the Nine Minimum Controls (NMC) be changed to read *"within twelve months of the effective date of the permit".*

Response B.17.

The language contained in Part I.B.1.c. of the Final Permit has been changed to read as

> "***Within twelve months of the effective date of the permit****, the permittee shall review and update (as necessary) its program for implementing the Nine Minimum Controls, and shall submit to EPA and NHDES updated documentation of this program, which shall include a certification that this review has been performed and a description of any resultant revisions made to the program. EPA and NHDES consider that approvable documentation must include the minimum requirements set forth in Part I.B.2. of this permit and additional activities the permittee can reasonably undertake."*

Comment B.18.

Part I.B.1.d.
The Long Term Monitoring Plan requirements are intended specifically to protect water quality. If the CSO discharge is in compliance with the Long Term Monitoring Plan and the Effluent Limitations, then the City is in compliance with water quality standards. An extra statement that "*The discharge shall not cause a violation of the water quality standards of the receiving stream*" is not warranted and leaves the City and EPA vulnerable to third party lawsuits.

Response B.18.

The requirement that "The discharge shall not cause a violation of the water quality standards of the receiving stream" is consistent with the national CSO Control Policy, which requires that permits issued to CSO communities require permittees to comply with applicable water quality standards no later than the date allowed under the State's water quality standards, which has lapsed. 59 FR 18688. This requirement is expressed in the form of a narrative limitation, again consistent with the Policy, and shall remain in the Final Permit. See also Response B.12.

PART I.B.2. NINE MINIMUM CONTROL IMPLEMENTATION LEVELS

Comment B.19.

The Nashua NPDES permit contains provisions for Nine Minimum Controls (NMCs) for CSOs. A side-by-side comparison was performed with the year 2000 permit. The comparison indicated that Part I.B.2.a. to Part I.B.2.f. are similar to the previous permit with the exception of paragraph d., which addresses dry weather overflows and paragraph f., which includes the requirement for signs at CSO outfalls. Part I.B.2.g. and Part I.B.2.h. are new paragraphs to the 2013 Draft Permit addressing public notification and annual reporting, respectively.

The bulk of these requirements were carried over from the previous permit. These requirements are not consistent with either the Combined Sewer Overflows Guidance for Nine Minimum Controls (EPA, May 1995, 832-B-95-003) or the Combined Sewer Overflows Guidance for Permit Writers (EPA, August 1995, 832-B-95-008). The permit requires that Nashua review and update, if needed, its program for implementing the NMCs and that the program incorporate the Nine Minimum Control Implementation Levels outlined in Part I.B.2. of the permit as a threshold for EPA approval. These requirements are very prescriptive and could hardly be considered minimal. Additionally, some of the requirements are not appropriate given the circumstances of Nashua's CSO discharges. Appendix A of the CSO permit writers' guide provides example permit conditions for Phase II CSO permits. In this guidance, EPA organizes the permit conditions by each NMC along with the documentation necessary to evaluate compliance.

Part I.B.2. Nine Minimum Control compliance language should be revised for consistency with federal guidance. The Part I.B.2. language should be streamlined and appropriate for Nashua's system and CSO discharges as follows:

a. The permittee shall implement the nine minimum controls in accordance with the documentation provided to EPA and NHDES under Part I.B.1. of this permit, or as subsequently modified to enhance the effectiveness of the controls. This implementation must include the item s listed below (Part I.B.2.) plus any other controls the permittee can feasibly implement as set forth in the documentation.

b. Properly Operate and Maintain the Collection System

    i. Adequate management, staffing and funding. The permittee's Nine Minimum Control Plan shall document the resources allocated (manpower, funding, equipment and training) to system operation and maintenance.

c. Inspection and Maintenance. The permittee shall inspect each CSO structure/regulator, and/or pumping station at a frequency necessary to ensure good working condition and compliance with the NMC. The permittee's Nine Minimum Control Plan shall document the inspection procedures to include: frequency of inspections, date/time, facility condition and any maintenance performed. The permittee shall maintain records of all inspections for a minimum of three years.

d. Maximize Use of the Collection System for Storage.

   i. The permittee shall maintain all dams, diversion structures or regulator settings to minimize discharge from the CSO outfalls and shall keep them free from obstructions.

   ii. The permittee shall evaluate measures that retard inflows and provide upstream detention.

   iii. The permittee's Nine Minimum Control Plan shall document alternatives considered for maximizing storage and the actions taken to do so.

e. Review and Modify Pretreatment Program

   i. The permittee shall evaluate the potential for non-domestic dischargers to impact CSO discharges and make necessary modifications to the pretreatment program.

   ii. The permittee's Nine Minimum Control Plan shall document evaluations and any modifications to the pretreatment program.

f. Maximize Flow to the NWTF

   i. The permittee shall operate the NWTF at the maximum level during wet weather flow conditions.

   ii. The permittee's Nine Minimum Control Plan shall document the actions taken to maximize flow and describe any changes to further maximize flow.

g. Prohibit Dry Weather CSOs.

   i. The permittee shall monitor the system for dry weather overflows (overflows that occur in the absence of wet weather flow conditions). Should a dry weather overflow occur, the permittee shall immediately begin corrective action.

   ii. The permittee's Nine Minimum Control Plan shall document and describe alternatives considered and actions taken to identify and correct dry weather overflows. The plan should also include procedures for notifying permitting authorities of dry weather overflows.

h. Control Solid and Floatable Materials

   i. The permittee shall implement measures that could include baffles, trash racks, static screens, catch basin controls, nets, booms, etc. to control solids and floatable materials in CSOs.

   ii. The permittee's Nine Minimum Control Plan shall document the procedures or technologies considered, a description of the controls implemented and plans for any future controls.

i. Implement a Pollution Prevention Program

   i. The permittee shall implement a pollution prevention program to reduce pollutants in CSO discharges. The program should include elements such as street cleaning, public education, product bans/use control and waste/refuse management.

   ii. The permittee's Nine Minimum Control Plan shall document the alternatives considered, the measures implemented and the expected benefit of the selected controls.

j. Notify the public of CSOs.

   i. The permittee shall implement a public notification plan to include adequate signage at CSO outfall points and other methods of notice including the use of media, mailers and the internet.

   ii. The permittee's Nine Minimum Control Plan shall list and describe the measures planned for implementation, the location where signs are posted along with the information provided on the signs and the procedures for issuing notices.

k. Monitor to Characterize CSO Impacts and the Efficacy of CSO Controls

   i. The permittee shall monitor CSO outfalls and determine any other information needed to properly characterize the system, CSO impacts and the effectiveness of control measures.

   ii. The permittee's Nine Minimum Control Plan shall include relevant information and data as well as any evaluation of that information in terms of CSO impacts and control efficacy.

Response B.19.

The commenter merely asserts that the permit is inconsistent with the *Combined Sewer Overflows Guidance for Nine Minimum Controls* (EPA, May 1995, 832-B-95-003) or the *Combined Sewer Overflows Guidance for Permit Writers* (EPA, August 1995, 832-B-95-008), which does not provide grounds to revise the Draft Permit provisions, and is mistaken in the belief that mini*mum* CSO controls must be mini*mal* and non-prescriptive. The requirements in Part I.B.2. of the Draft Permit contain elements of both a Phase I and Phase II NPDES permit, which, contrary to the above comment, are consistent with the 1994 CSO Control Policy as well as subsequent guidance developed for the implementation of this policy. While the expectation of the national CSO Control Policy is that the incorporation of CSO controls in NPDES permits will occur through a two-phased approach, it is oftentimes difficult to distinguish between Phase I and Phase II. The CSO Control Policy recognizes this and as such, is designed to accommodate variations in the design and implementation of CSO controls. As a result, NPDES permits issued to CSO communities often include requirements of both a Phase I and Phase II permits.

The above comment does not provide an explanation as to why some of the requirements in Part I.B.2. of the Draft Permit are not appropriate given the "circumstances of Nashua's CSO discharges". The permit conditions outlined in Appendix A of the *CSO Guidance for Permit Writers* (USEPA September 1995 [EPA 832-B-95-008]) and referenced extensively in the above comment, are, as the title implies, "Compilation of Example CSO Permit Conditions," and are not intended to be applied to each and every CSO permit without first giving due consideration to the specific details of each CSO community.

Most, if not all, of the items included in the commenter's suggested language for Part I.B.2., or their substantive equivalent, are found in the Draft Permit. These requirements (Part I.B.2. of the Draft Permit), were developed in accordance with the national CSO Control Policy and were established following an evaluation of the measures taken by the City to control discharges from CSOs as well as the impacts of wet weather-related flows on the combined collection system. CSOs are a very serious environmental and public concern, and the requirements in the permit are designed to address them in an effective manner, which many times includes prescriptive conditions so that EPA and the public can be assured that specific steps will be taken to prevent their occurrence and/or mitigate their impacts as expeditiously as possible. The requirements in Part I.B.2. of the Draft Permit remain unchanged in the Final Permit.

Comment B.20.

Part I.B.2.g.
The City requests the language for oral CSO discharge notification to NHDES-WD be changed from *"within 24 hours"* to *"the next business day"*.

Response B.20.

The requirements in Part I.B.2.g. of the Draft Permit, requiring the City to provide both oral (i.e., within 24-hours") and written (within 5 days) notification to NHDES of a CSO discharge have been removed from the Final Permit, as discharges from CSOs during wet weather events are authorized under the permit. However, the permittee is still required to notify EPA and NHDES within 24-hours of any CSO discharges that occur during dry weather conditions (see Part I.B.2.d. of the Final Permit). Expeditious notification of dry weather discharges is important given the public health and aquatic life impacts, and requiring notification on the next business day could introduce a significant delay if, for example, the discharge occurs on a Friday.

PART I.B.3. NINE MINIMUM CONTROLS ANNUAL REPORTING REQUIREMENT

Comment B.21.

The previous permit only required the submittal of a certification that CSO discharges were recorded and records maintained. The Draft Permit contains extensive annual report requirements. A few requirements are reasonable, such as records of activation frequencies and volumes of CSO discharged. Other reporting requirements are unclear, such as the requirement to report precipitation data for each day of the year as opposed to only days where a discharge actually occurred. Additionally, other parts of the permit require data collection at rainfall gages

at one-hour intervals while the annual report requires 15-minute intervals in order to calculate peak rainfall intensity. The proposed monitoring requirements appear to attempt to characterize the operation of the collection system prior to the implementation of any controls with the expectation that CSO discharges from this system would not be consistent with the CSO Control Policy. However, the proposed monitoring requirements are not consistent with the CSO Control Policy. CSO discharges are managed through use of the WWFTF at the wastewater plant and the SDF, which are part of Nashua's Long Term Control Plan.

New Hampshire rule Env-Wq 1703.03(c) requires that all CSOs meet an *E. coli* limit of 1,000 colonies per 100 mL at the end of the pipe. Additionally, the *New Hampshire Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters*, September 2010 states, *"Although meeting ambient bacteria standards at the point of discharge for all sources is the goal of this TMDL, compliance will be based on ambient water quality and not water quality at the point of discharge (i.e., end of pipe). In addition, per Env-Wq 1703.06(c), for non-tidal CSO discharges in Class B waters, a bacteria criteria of 1,000 E. coli/100 mL shall be applied at the end of pipe."* It is clear that the disinfected CSO, WWFTF and SDF discharges will be in compliance with the TMDL and protective of instream uses, including downstream water supply.

Any monitoring and reporting requirements should be established to verify compliance with the effluent limitations, the NMC, and the TMDL. The Part I.B.1. requirement for annual *E. coli* monitoring from CSOs #002-#009 for permit compliance serves this purpose. The annual Reporting requirements in Part I.B.3. should be revised in the Final Permit to only include:

- Duration
- Volume
- Precipitation data (daily including the day prior to a discharge event)
- *E. coli* concentration (when measured)

Response B.21.

The commenter's suggestion that the reporting requirements in Part I.B. of the Draft Permit are inconsistent with the CSO Control Policy are unsubstantiated. As discussed in the Fact Sheet, since issuance of the 2000 permit, the City has implemented several of the CSO controls that were evaluated and selected in their Long Term Control Plan, including partial separation of the combined system, increasing the capacity for the off-line storage of combined flows, screening and disinfection, system optimization measures, and the operation of the Wet Weather Flow Treatment Facility. Based on the information that was available during the development of the Draft Permit, EPA was unable to determine whether wet weather flows are managed in a manner that is consistent with the Nine Minimum Controls (specifically, greater use of the collection system for storage (NMC #2) and return of the flow to the POTW for treatment (NMC #4)), the procedures established in the High Flow Management Plan[5] and the underlying assumptions set

[5] The City of Nashua submitted documentation of its plan for implementing the Nine Minimum Controls, titled "High Flow Management Plan for the Nashua Wastewater Treatment Plant", in November 1999. This document has

forth in the Long Term Control Plan[6]. The data and information collected and submitted in accordance with the monitoring requirements found in Part I.B. of the Draft Permit will allow for a characterization of the collection system and the Wet Weather Flow Treatment Facility to be made, which will assist in evaluating consistency with the NMC, and in turn, to assure compliance with the CSO-related requirements of permit. (CSO control policy, Part II.C.1., p. 18691).

EPA disagrees with the commenter's assertion that Part I.B.1 fully stands in for the more extensive requirements of Part I.B.3. The *E. coli* data that is collected in accordance with Part I.B.I. of the Final Permit will be used to determine compliance with the water-quality based *E. coli* limit, whereas Part I.B.3. of the Draft Permit requires the submittal of an annual report, the elements of which are to include the CSO discharge and precipitation data that were collected in accordance with Part I.B.2. of the permit, which will be used to evaluate compliance with the technology-based limits (i.e., the Nine Minimum controls). As previously stated in this response, the CSO discharge and precipitation data will provide information that is necessary for understanding the operation of the collection system during wet weather and to evaluate compliance with the Nine Minimum Controls (specifically, NMC #2 (maximum use of the collection system for storage), #4 (maximization of flow to the POTW) and #9 (monitoring to effectively characterize CSO impacts and the efficacy of CSO controls)). The data will also provide localized information relative to the conditions that result in discharges from individual CSOs.

EPA agrees with the commenter's contention that the precipitation data collection requirements in Parts I.B.3.c. of the Draft Permit are somewhat unclear. Therefore, the language in Part I.B.3.c. of the Final Permit has been changed to read as "*Precipitation data for each day of the previous calendar year, including total rainfall, peak intensity, and average intensity*".

WET WEATHER FLOW TREATMENT FACILITY AND SCREENING AND DISINFECTION FACILITY

Comment B.22.

The NWTF utilizes Actiflo units as treatment for flows exceeding the hydraulic capacity of the biological treatment facilities. The Draft Permit includes a number of monitoring requirements for this facility prior to blending with the effluent from the biological portion. These requirements in their entirety should be deleted to be consistent with the recent case law pertaining to blending. In a March 25, 2013 decision, the Eighth Circuit United States Court of Appeals found that *"effluent limitations apply at the end of the pipe"* and *"There is no indication that the secondary treatment regulations established situations in which it would be impractical to apply effluent limitations at the end of the pipe…"* The Eighth Circuit Court ruled *that "The EPA may regulate the pollutant levels in a waste stream that is discharged directly to the*

since undergone several revisions, with the most recent revision occurring in April 2010 to include procedures for handling wet weather-related flows at the POTW and Wet Weather Flow Treatment Facility.

[6]The City's Long Term Control Plan (LTCP) was submitted in 2003 (and amended in 2004). Specifically, the Long Term Control Plan predicts that the operation of the WWFTF will result in no untreated overflows in the largest storm in the typical year, or in the 5-year "actual" design storm

navigable waters of the United States through a "point source"; it is not authorized to regulate the pollution levels in a facility's internal waste stream. Therefore, insofar as the blending rule imposes secondary treatment regulations on flows within facilities, we vacate it as exceeding the EPA's statutory authority.

The Draft Permit also includes biochemical oxygen demand (BOD_5) and total suspended solids (TSS) monitoring requirements for the Screening and Disinfection Facility (SDF). The facility was not designed for BOD_5 and TSS removal; therefore, technology-based monitoring requirements are not appropriate. Additionally, the receiving stream is not impaired for dissolved oxygen or suspended solids, so there is no water quality basis for the monitoring requirements. Furthermore, the only controlling criteria in the City's Long Term Control Plan is monitoring and reporting for *E. coli*. EPA Region 1 should not be imposing effluent limitations other than total residual chlorine and *E. coli* on wet weather discharges per the Eighth Circuit Decision Iowa League of Cities versus EPA. The BOD_5 and TSS monitoring requirements should be deleted from the permit.

Response B.22.

As noted in Response B.10, Footnote # 3 to Part I.B.5.a. of the Draft Permit has been removed from the Final Permit and the monthly average effluent limitation of 30 mg/l for total suspended solids ("TSS") found in Part I.B.5.a of the Draft Permit has been changed to a monitor only requirement in the Final Permit. Sampling frequency remains at once per month.

The commenter's assertion that EPA's inclusion of monitoring requirements for the WWFTF and SDF are inconsistent with the cited case law are without merit. The case, which was from the Eighth Circuit, is inapposite. First, the monitoring requirements in Part I.B.5.a. of the Draft Permit, which pertain to the WWFTF, are not effluent limitations, and are not being imposed pursuant to Section 301(b)(1)(B), but instead under Section 308, 402, and the implementing regulations at 40 C.F.R. Part 122, which confer broad authority on EPA to monitor and gather information from POTWs. These monitor-only requirements are necessary to ensure the collection of data that will allow for a determination to be made regarding whether the operation of the facilities are consistent with the objectives and assumptions underlying the LTCP[7]. In addition, this monitoring will provide information necessary for understanding the operation of the collection system during wet weather and will allow for determinations to be made with respect to the effectiveness of its operation consistent with the Nine Minimum Controls.

With respect to the effluent limits and monitoring conditions in Part I.B.5.b. of the Draft Permit, which pertain to the SDF, the *Iowa League of Cities* decision is not applicable. The SDF is a stand-alone facility that does not involve blending with other effluents from the POTW or the WWFTF. This facility has a dedicated outfall which discharges to the Merrimack River. As with the WWFTF, the effluent limitations and monitoring requirements for the SDF are

[7] The specific levels of CSO control for each outfall are described in the Long Term Control Plan (LTCP) submitted by the City in 2003, as amended in 2004. The LTCP predicts that the operation of the WWFTF will result in no untreated overflows in the largest storm in the typical year, or in the 5-year "actual" design storm and that the operation of the SDF will result in no untreated CSOs in response to the largest storm in the typical year or the 2-year or 5-year "actual" storms.

necessary to allow for a determination to be made regarding whether the operation of the facilities are consistent with the objectives and assumptions underlying the LTCP and to provide information necessary for understanding the operation of the collection system during wet weather and will allow for determinations to be made with respect to the effectiveness of its operation consistent with the Nine Minimum Controls.

The requirements in Part I.B.5.a. and b. of the Final Permit remain unchanged from the Draft Permit.

Comment B.23.

Total Residual Chlorine

EPA Region 1 used the Merrimack River 7Q10 for calculating the Water Quality Based Effluent Limit (WQBELs) for the CSO discharges. The CSOs will only discharge during wet weather. EPA's NPDES Permit Writers' Manual indicates that for most pollutants and criteria, the critical flow in rivers and streams is a measure of the low flow of that river or stream; however, the critical condition could be different under a different discharge situation (i.e., a high flow event where a CSO from wet weather event are a significant issue). It is more appropriate to use the 30Q10 flow for reasonable potential during wet weather events. The RPA for total residual chlorine should be revised to reflect the correct dilution.

Response B.23.

Although CSO discharges typically occur as a result of wet weather-related flows, water quality-based effluent limitations must be established using applicable water quality standards. New Hampshire's Water Quality Standards (RSA 485-A:8 VI, Env-Wq 1705.02), require the use of 7Q10 flows for the establishment of water quality based effluent limitations. EPA has explained the water quality-based rationale for employing the 7Q10 flow elsewhere in the RTC. The total residual chlorine limits in Part I.B.5. of the Final Permit, which were based upon the 7Q10 flow of the receiving water, remain unchanged from the Draft Permit.

Comment B.24.

Part I.B.5.a. Footnotes #1, #2, #3, #4, #7 and #8

The Effluent Limitations Table in Part I.B.5.a. should not contain reporting requirements for the flow discharged from the WWTF to the chlorine contact tank or flow drained back to the NWTF. These flows are internal process flows and are not flows discharged to the Merrimack River. Per the Eighth Circuit Court Decisions Iowa League of Cities versus EPA, the Court ruled that the EPA may not impose arbitrary monitoring requirements on internal treatment processes and only end of pipe may be considered. As such, Part I.B.5.a. Footnotes #1, #2, #3, #4, #7 and #8 should be removed from the permit. Additionally, Footnote #9 requiring the City to monitor and report rainfall precipitation should be removed from the permit. Rainfall monitoring is already required as part of the City's Long Term Control Plan.

Response B.24.

See Response B.22.

EPA classified the outfall from the Wet Weather Flow Treatment Facility ("WWFTF") as an "internal outfall," since the effluent from the WWFTF is discharged to the chlorine contact chamber, where it is combined with secondary effluent prior to discharge to the receiving water. EPA included the flow monitoring requirements to better understand whether the WWFTF and bypass are operating in a manner that is consistent with the assumptions in the LTCP.

While EPA acknowledges that the discharge from the WWFTF is not to the receiving water, but rather to the chlorine contact chamber where the effluent is combined with secondary and primary effluents prior to discharge to the receiving water through Outfall No. 001, the flow monitoring requirements contained in Part I.B.5.a. of the permit will ensure that the operation of the WWFTF is consistent with the underlying assumptions contained in the City's Long Term Control Plan (LTCP) that was submitted by the City in 2003, as amended in 2004. Specifically, the LTCP predicts that the operation of the WWFTF will result in no untreated overflows in the largest storm in the typical year, or in the 5-year "actual" design storm. The flow monitoring requirements in Part I.B.5.a. of the Final Permit remain unchanged from the Draft Permit.

With the exception of footnote # 3 to Part I.B.5.a. of the Draft Permit, which has been removed from the Final Permit for the reasons discussed in Response B.10., the requirements in Part I.B.5.a. of the Draft Permit remain in the Final Permit. Footnote #9 to Part I.B.5.a. of the Draft Permit, has been modified in the Final Permit to clarify that precipitation data that is collected in accordance with the LTCP may be submitted to satisfy the requirement in Part I.B.5.a. provided that intensity (inches/hour) and duration (total hours/event) are provided.

Comment B.25.

Part I.B.5.b. Footnotes #1, #2, #3, #4, #5, #9, #10 and #11
The Effluent Limitations Table in Part I.B.5.b. should not contain reporting requirements for flow discharged into the SDF, discharged from the SDF, or flow drained back to the collection system per the Eighth Circuit Decision Iowa League of Cities versus EPA. As such, Part I.B.5.b. Footnotes #1, #2, #3, #4, #5, #9, #10 and #11 should be removed from the permit.

Response B.25.

The effluent from the SDF is discharged to the Merrimack River. Given that the SDF is a stand-alone facility with its own outfall to the Merrimack River and the effluent is not blended, the premise of the comment is incorrect. See Response B.22.

Comment B.26.

Part I.B.5.b. Footnote #12
The requirement to monitor and rainfall precipitation should be removed from the permit, as rainfall monitoring is already required as part of the City's Long Term Control Plan.

Response B.26

The precipitation data that is collected in accordance the LTCP may be used to satisfy the requirement in Part I.B.5.b. of the Final Permit, which remains unchanged from the Draft Permit. See Response B.24.

Comment B.27.

Request for New Footnote in Part I.B.5.a.

The operation of our WWFTF facility is outlined in our High Flow Management Plan dated September 30, 2010 and approved by EPA Region 1. We request the following language be added as a footnote to Part I.B5.b.:

The Wet Weather Flow Treatment Facility will be operated in accordance with the EPA-approved City of Nashua High Flow Management Plan.

Response B.27.

The following language has been added as a Special Condition (Part I.C.) in the Final Permit: "*Operation of the Wet Weather Flow Treatment Facility shall be in accordance with the most current EPA-approved High Flow Management Plan."*

Comment B.28.

Request for New Footnote in Part I.B.5.b.
The operation of our SDF is outlined in our High Flow Management Plan dated September 30, 2010 and approved by EPA Region 1. We request the following language be added as a footnote in Part I.B.5.b.:

The Screening and Disinfection Facility will be operated in accordance with the EPA-approved City of Nashua High Flow Management Plan.

Response B.28.

The operation of the SDF is not described in the HFMP.

Part I.D.4. Collection System Mapping

Comment B.29.

Collection system mapping is a requirement of the Long Term Control Plan, and should not be included as part of the NPDES permit. Part I.D.4. should be removed from the permit.

Response B.29.

The requirements in Part I.D.4. of the Draft Permit are being included in all NPDES permits issued to New Hampshire POTWs, and remain in the Final Permit. EPA does not perceive any drawback from making the requirement enforceable through the NPDES permit, and the permittee does not identify any. A statement has been added to Part I.D.4. clarifying that any mapping of the collection system that has been performed in accordance with the LTCP may be used to fulfill the requirements in Part I.D.4. of the Final Permit.

COLLECTION SYSTEM OPERATION AND MAINTENANCE PLAN

Comment B.30.

Part I.D.5.a.
We request that the schedule for the Collection System Operation and Maintenance Plan be changed from 6 months to 30 months of the effective date of the permit.

Response B.30.

The permittee has up to 24 months from the effective date of the permit to submit the full Collection System Operation and Maintenance Plan. Within the first 6 months of the effective date of the permit, the permittee is required to submit: (1) description of the collection system management goals, staffing, information management, and legal authorities; (2) A description of the overall condition of the collection system including a list of recent studies and construction activities; and (3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in Part I.E.5.b.1. through b.7.

The comments do not provide any reasons or explanation of the need to extend the schedule for the initial submittal of the collection system operation and maintenance plan from 6 to 30 months, therefore Part I.D.5. of the Final Permit remains unchanged from the Draft Permit. If the City wishes to submit a request to extend the deadline along with a justification of the request, EPA will consider an extension of the schedule through a permit modification.

Comment B.31.

Part I.D.5.b.
We request that the schedule for the Collection System Operation and Maintenance Plan submittal to EPA and NHDES be changed from 24 months to 36 months of the effective date of the permit.

Response B.31.

The comments do not provide any reasons or explanation of the need to extend the initial submittal of the collection system operation and maintenance plan from 24 to 36 months, therefore Part I.D.5. of the Final Permit remains unchanged from the Draft Permit. If the City

wishes to submit a request to extend the deadline, along with justification of the request, EPA will consider an extension of the schedule through a permit modification.

The due date for the submittal of the full Collection System Operation and Maintenance Plan in the Final Permit shall remain 24 months from the effective date.

Part I.H. Monitoring and Reporting

Comment B.32.

Part I.H.1.a.
We request that the schedule for submitting Discharge Monitoring Reports (DMRs) electronically using NetDMR be changed from one year to two years of the effective date of the permit.

Response B.32.

Many permittees have not had any difficulty complying with the NetDMR electronic reporting requirements within one year. The City has not provided any justification as to why they would not be able to comply with the NetDMR reporting requirements within one year of the effective date of the permit, therefore, the date on which DMRs are to be submitted electronically using NetDMR has been maintained in the Final Permit. If the City believes that they cannot use NetDMR due to technical or administrative infeasibilities, or for other logistical reasons, and can demonstrate a reasonable basis that precludes the use of NetDMR, they may submit a request to opt out of the NetDMR reporting requirements (i.e., an "opt-out" request) following the procedure in Part I.I. of the Final Permit.

Part I.I. STATE PERMIT CONDITIONS

Comment B.33.

State Permit Condition #5 states that the final effluent pH must be maintained in the range of 6.5 to 8.0 standard units. Please refer to our comment in Section 2 regarding the pH adjustment demonstration project. We request that this note be revised to reflect the new pH effluent permit limit range of 6.0 to 8.0 standard units.

Response B.33.

Please see Response B.7. regarding the pH limit in the Final Permit.

C. COMMENTS FROM THE CITY OF MANCHESTER, NEW HAMPSHIRE

OPENING COMMENT

The City of Manchester is providing the following comments to the Nashua Draft Permit (NH0100170). Manchester's comments will demonstrate that;

1. The EPA & NHDES have an extensive "sound science" document at their disposal, yet deferred to "Reasonable Potential" in setting a phosphorus limit;

2. The NHDES calculated a "Reasonable Potential" loading for phosphorus that will never be attained due to process changes that ensure phosphorus loading reductions at Merrimack and Manchester's WWTPs along with a proposed MS4 Permit that will reduce upstream TP loading significantly;

3. Nashua is a bigger plant than permitted upstream discharges yet Concord was given 90 lbs/month average discharge at 16 mgd design flow. Merrimack was given 168 lbs average monthly discharge and they are a 5 mgd designed facility. Concord was given 204 lbs average monthly discharge and they are designed at 10.1 mgd. There is no continuity in how permits are currently being proposed by the EPA;

4. The NHDES did not follow their "2010 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology (CALM) in their "Reasonable Potential" calculation;

5. The most recent extensive Merrimack and Pemigewasset River Study demonstrates that there is no oxygen impairment within the entire length of the Merrimack River. This study indicates that there is no adverse impact from the present phosphorus loadings and subsequent chlorophyll *a* growth as measured and evidenced within the Merrimack River Study;

6. The Copper and Lead limits are within the contamination concentration assumptions as outlined with the CALM (Table 3-32) and therefore do not exhibit potential or "Reasonable Potential" to exceed the WQ criteria;

7. The EPA and NHDES are requiring an unfunded mandate to achieve nutrient and metals removals where scientific study has shown that none are currently required.

Response to Opening Comment

The issues and concerns raised in items one through seven in Manchester's opening comment appear throughout comments C.1. through C.21. and, as such, are addressed in EPA's responses to those comments.

As a threshold matter, the commenter should note that the permit is a federal permit that may be adopted by the state of New Hampshire, meaning that most, if not all, of the actions attributed above to NHDES should actually be attributed to EPA.

Additionally, the commenter should be aware that EPA imposes limits on a case-by-case basis, determined in large part by the size and location of the facility, as well as other site-specific factors. The Region's determination of the effluent limit for the Nashua WWTF is specific to the facility and the particular impacts on its receiving water. The statute and regulations require EPA to set permit effluent limits for each point source at the level that is necessary to ensure compliance with state water quality standards.

The issues and concerns raised in Manchester's opening comment are raised as individual comments and are addressed in EPA's response to those comments below.

Comment C.1.

The Nashua Draft Permit indicates on pg. 10 of 28, item H. that annual notification shall be noticed to the public. Manchester would like to see the method listed to which this must be accomplished as, "The permittee shall issue an annual notification to the public, *via the largest daily circulated newspaper*, which shall include…"

Response C.1

It is unclear why Manchester has requested that annual notification occur in the specific manner identified above, which will result in increased costs to be borne by Nashua with marginal added benefit. EPA does not believe that public notice has to occur via the largest daily circulated newspaper in order to accomplish the objective of notifying the public of the occurance of a CSO discharge. Utilizing the largest daily circulated newspaper to issue the annual notification required by Part I.B.2.g. of the Final Permit is, of course, one reasonable means the City may employ to satisfy the permit condition.

Comment C.2.

TOTAL PHOSPHORUS LIMIT

The permit pg 3 of 28 lists a monthly average for total phosphorus of 0.06 mg/l between April 1st and October 1st. There are a number of factors that play into this determination which will be discussed in sequence. Attachment B of the Draft Permit outlines how the 7Q10 is calculated with a resulting 7Q10 downstream flow of 784.1 cfs. The upstream 7Q10 is 759.4 cfs.

Table 4, on pg. 22 of 36, outlines two upstream sampling dates. The dates listed on table 4 are 10/5/2007 and 7/27/2010. The 10/5/2007 sample date has two short comings. It falls outside the proposed permit compliance dates of April 1st through October 1st. Second it is beyond the five-year data age requirement as outlined in the EPA approved NHDES CALM of five years (10/5/2012 five-year period end date and Nashua's Draft Permit was prepared in 2013). There is another sample available for 9/21/2010 which should have been calculated in Table 4 and the October 2007 data point should be removed from this subset. By following the criteria in the

NHDES CALM and including the data point from 9/21/2010, with a Chlor-a of 2.0 µg/l and a TP of 67 µg/l. Table 4 should read as follows:

Station	Date	Chlor-a µg/l	TP µg/l
02M-MER	7/27/2010	20.85	36
M070*	9/21/2010	2	67
MIN		2	67 [8]
MAX		20.85	67
AVG		11.425	51.5
Median		11.425	51.5

A map is included in Attachment 1 that demonstrates that M070 is synonymous with 02M-MER and the mentioned 03-MER of the 10/5/2007 sample.

Response C.2.

The monthly average total phosphorus limit contained in Part I.A.1. of the Draft Permit is 0.6 mg/l, not 0.06 mg/l as the stated in the above comment. With the exception of the first paragraph in the above comment, it is assumed that the commenter's references to the Draft Permit and the attachments to the Draft Permit are actually intended to reference the Fact Sheet and the attachments to the Fact Sheet which accompanied the Draft Permit.

Although the period in which the total phosphorus limit is effective was correctly identified as April 1st – October 31st in the Fact Sheet, it was incorrectly identified in Part I.A.1. of the Draft Permit as April 1st – October 1st. The Final Permit has been changed to reflect the correct period in which the total phosphorus limit is in effect as April 1st - October 31st.

While EPA agrees that the upstream total phosphorus data collected at station M070 (NHDES station 02M-MER) on 9/21/2010 should have been included in the reasonable potential analysis that was presented in the Fact Sheet, the commenter's argument that the phosphorus data collected on 10/5/2007 should be excluded from the analysis because it "falls outside of the permit compliance date" and is "beyond the five-year data age requirement as outlined in the EPA approved NHDES CALM of five years" is flawed. Sections 301 and 402 of the Act, and implementing regulations at 40 C.F.R. § 122.44(d), are the provisions that govern this permitting action, not Section 303(d) and associated non-binding listing guidance such as the CALM. Pursuant to those provisions, EPA is authorized to consider the best information reasonably available at the time of permit issuance, and is not bound by any definitive limitations regarding the age of data in making its permitting judgments. As described in the Fact Sheet, EPA reviewed data collected from March 2007 through March 2012 during the development of the Draft Permit. Therefore, EPA's inclusion of data collected on 10/5/2007 in its analysis is appropriate since this date falls within the selected data review period and is also within the season in which the proposed phosphorus limit would be in effect.

[8] [The minimum total phosphorus value in the comment was 67 – but it should be 36.]

The summary of the results of instream chlorophyll *a* and total phosphorus analyses conducted on samples collected within the segment of the receiving water into which the Nashua WWTF discharges (both upstream and downstream from the discharge) between 2005-2011 by NHDES as part of their Ambient River Monitoring Program (ARMP), and in 2010 by the Unites States Army Corps of Engineers (USACE) as part of the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* (USACE December 2012 (prepared by CDM))[9] that was presented in Table 4 of the Fact Sheet has been revised to include the data collected upstream from the discharge at station 02M-MER on 9/21/2010, and is shown below in Table 5. Inclusion of the 9/21/2010 data yields a median upstream phosphorus concentration of 67 µg/l (0.067 mg/l).

Table 5 Instream Chlorophyll *a* and Total Phosphorus Concentrations Upstream From the Nashua WWTF

Station[1]	Date	Chlorophyll *a* (µg/l)	Total Phosphorus (µg/l)
Upstream of Nashua WWTF			
03-MER	10/5/2007	0.2	110
02M-MER	7/27/2010	20.85	36
02M-MER	9/21/2010	2	67
Min.		**0.2**	**36**
Max.		**20.85**	**110**
Avg.		**7.68**	**71**
Median		**2**	**67.0**

[1]Sampling Stations: 03-MER -1.2 miles upstream of Nashua WWTF, Rt. 111 bridge, E. Hollis St., Nashua
02M-MER (M070) - approximately 100 feet upstream of Nashua WWTF;

Following the approach described in the Fact Sheet to determine whether or not reasonable potential exists for the discharge from the Nashua WWTF to cause or contribute to violations of water quality standards, the median of the upstream data (0.067 mg/l) and the maximum concentration of total phosphorus that was detected in samples of the effluent[10] (2.16 mg/l) were applied to a mass balance equation to project a downstream phosphorus concentration of 0.133 mg/l, as shown below.

[9]NHDES ARMP OneStop database
Upper Merrimack and Pemigewasset River Study Monitoring Data Report (U.S. Army Corps of Engineers December 2012) (prepared by CDM) ftp://ftp.usace.army.mil/pub/nae/UMRB-REPORTJAN2011/UMPRS_Year1%20Data%20Report%20Appendix_Jan2011.pdf

[10] The maximum concentration of total phosphorus detected in samples of the effluent that were analyzed in conjunction with the *Upper Merrimack and Pemigewasset River Study*, U.S. Army Corps of Engineers, January 2011. There was one inadvertent reference in the fact sheet to the maximum effluent concentration of total phosphorus being 2.55 mg/l. The maximum effluent concentration from the *Upper Merrimack and Pemigewasset River Study* was 2.16 mg/l.

$$Q_dC_d + Q_sC_s = Q_rC_r$$

Where:

C_r = resultant downstream phosphorus concentration (mg/l)
Q_d = effluent flow (design flow = 16 mgd = 24.75 cfs)
C_d= maximum effluent phosphorus concentration (2.16 mg/l)
Q_s = upstream 7Q10 flow (759.4 cfs)
C_s = median instream phosphorus concentration, upstream from the discharge (0.067 mg/l)
Q_r = 7Q10 flow just downstream from the discharge (784.1 cfs)

$$C_r = (Q_sC_s + Q_dC_d) / Q_r$$

$$C_r = [(759.4 \text{ cfs} * 0.067 \text{ mg/l}) + (24.75 \text{ cfs} * 2.16 \text{ mg/l})] / 784.1\text{cfs} = 0.133 \text{ mg/l}$$

The projected downstream concentration of 0.133 mg/l is greater than the instream target of 0.090 mg/l (the Gold Book Criterion of 0.100 mg/l multiplied by a factor of 0.9 to reserve 10% of the assimilative capacity of the receiving water in accordance with the New Hampshire Water Quality Standards, see Env-Wq 1705.02) determined by EPA to represent a protective instream target based on EPA guidance and other relevant information in the administrative record, indicating that reasonable potential exists for the discharge of phosphorus from the Nashua WWTF to cause or contribute to violations of water quality standards in the downstream receiving water.

The commenter implies that had EPA used an upstream phosphorus concentration of 51.5 µg/l, there would be no reasonable potential for the Nashua WWTF to cause or contribute to violations of water quality standards. This is simply not the case, as application of an upstream phosphorus concentration (C_s) of 51.5 µg/l to the mass balance equation shown above results in a projected downstream concentration of 0.12 mg/l, which is greater than the instream target of 0.09 mg/l, as shown below.

$$C_r = [(759.4 \text{ cfs} * 0.0515 \text{ mg/l}) + (24.75 \text{ cfs} * 2.16 \text{ mg/l})] / 784.1\text{cfs} = 0.12 \text{ mg/l}$$

Because there is reasonable potential for the concentration of phosphorus discharged from the Nashua WWTF to cause or contribute to violations of water quality standards, the Final Permit includes a seasonal monthly average total phosphorus limit, which EPA has determined to be 0.8 mg/l, in accordance with 40 C.F.R. § 122.44(d)(1)(vi). This limit was calculated (see equation below) by rearranging the mass balance equation shown above and solving for C_d, which is the maximum allowable concentration of phosphorus that may be discharged and still meet the instream concentration target derived by EPA under § 122.44(d)(1)(vi) to implement the narrative nutrient criteria. This is an average monthly limit, which is in effect from April 1st – October 31st.

$$C_d = (Q_r C_r - Q_s C_s)/Q_d$$

Where:

C_d= maximum effluent phosphorus concentration (limit) (mg/l)
C_r = resultant downstream phosphorus concentration, equal to Gold Book criterion * 0.9 (0.090 mg/l)
Q_d = effluent flow (design flow = 16 mgd = 24.75 cfs)
Q_s = upstream 7Q10 flow (759.4 cfs)
C_s = median instream phosphorus concentration, upstream from the discharge (0.067 mg/l)
Q_r = 7Q10 flow just downstream from the discharge (784.1 cfs)

$$C_d = [(784.1 \text{ cfs} * 0.090 \text{ mg/l}) - (759.4 \text{ cfs} * 0.067 \text{ mg/l})]/24.75 \text{ cfs} = 0.800 \text{ mg/l}$$

Comment C.3.

The Phosphorus section in the Fact Sheet says, *"nutrients can promote the growth of nuisance algae and rooted aquatic plants and that elevated levels of nutrients will cause excessive algal and/or plant growth resulting in reduced water clarity, poor aesthetic quality and impaired aquatic habitat which in turn reduces in-stream dissolved oxygen concentrations."*

The Nashua Draft Permit requires an average monthly total phosphorus limit of 60 pounds (16 mgd design flow and 0.6 mg/l monthly average discharge of TP). *The actual median in-stream phosphorus concentration is 51.5 µg/l. By adding the effluent concentration (after dilution) to the new background concentration, there is potential to be at 130 µg/l (corrected calculation, pg. 23 of 36 of the Fact Sheet). NHDES States, "This indicates that reasonable potential exists for the discharge of phosphorus from the Nashua WWTP to cause or contribute violations of the WQ standards in the downstream receiving water."* As attested within these comments, there is currently no impairment within the Merrimack River caused by TP. There is also an omission by the EPA in not reviewing the current and future nutrient reductions from the "Reasonable "Potential" calculations as permits and process changes are happening just upstream of the Nashua WWTP.

Response C.3.

The above comment includes several inaccurate statements. First, the Draft Permit does not contain a mass-based limit for total phosphorus, as implied in the above comment.

Secondly, as described in Response C.2., by applying a median upstream concentration of 67 µg/l (which includes the data collected on 9/21/2010) to the reasonable potential analysis, the projected concentration of total phosphorus that can be expected to occur downstream from the Nashua WWTF under critical flow conditions is 0.133 mg/l, which is greater than the in stream target of 0.090 mg/l (the Gold Book Criterion of 0.100 mg/l multiplied by a factor of 0.9 to reserve 10% of the assimilative capacity of the receiving water in accordance with the New Hampshire Water Quality Standards found at Env-Wq 1705.02). Therefore, reasonable potential exists for the discharge to cause or contribute to violations of water quality standards.

Lastly, the listing of the Merrimack River as impaired for chlorophyll *a* in the 303(d) listing (in conjunction with the water quality data and analysis underlying this finding) as well as the findings of the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* (USACE December 2012)) are indications that the River is being negatively impacted by nutrients.

A more detailed response regarding "current and future nutrient reductions" may be found in Responses C.4. and C.6.

Comment C.4.

The City of Nashua's permit indicated that they had a reasonable potential of discharging 340.3 lbs of TP to the Merrimack River on a peak design day (16 mgd at 2.55 mg/l TP). The Town of Merrimack is now using the Block and Hong process for removal of TP. They have been consistently able to reduce their loads over this summer's operating range by > 50% and that is without any chemical addition. In the Merrimack Permit the EPA stated that the reasonable potential for the Merrimack Discharge was 594 lbs TP (5 mgd at 14 mg/l TP) or an instream concentration of 0.212 mg/l. The Merrimack WWTP has experimented with biological nutrient removal over the summer period of 2013. The average discharge is 6 mg/l with a flow of 1.8 mgd. This is an actual discharge of 90 lbs TP. This is the expected future maximum as there is little to no growth foreseen within the community over the next couple of years. Their Draft Permit allowed a daily average of 168 lbs. of discharge per day as a permit limit. The monthly mas loading calculates to an average daily phosphorus discharge of 4mg/l at 5 mgd. Nashua's Draft Permit is for $1/6^{th}$ of the TP discharge that was allocated within Merrimack's discharge permit a few months prior. A question is why is there such a disparity between the TP allocation between two municipalities that are within 10 miles of each other along the same stretch of the river? The City of Concord was permitted for 2.42 mg/l of TP discharge at and design flow of 10.1 mgd. That is a loading of 203.8 lbs of TP that is > 2 times the allowable mass loading given to Nashua

The Town of Merrimack has proven that there can be a 500 lb reduction under their "Reasonable Potential" maximum TP load calculation as outlined in their Draft Permit. This proves that the "Reasonable Potential" condition is extremely conservative, has no basis in scientific fact, and can never transpire within Nashua's permit period.

Response C.4.

The contention that EPA may not establish a phosphorus limit that is inconsistent with the limitations in permits issued to upstream municipalities is without basis. The Region takes into account site-specific circumstances particular to each discharge before imposing an effluent limitation. In determining the need for a permit limit, EPA accounts for the concentration of a given pollutant in the effluent (discharge concentration); the percentage of effluent in the receiving water immediately downstream of the discharge under the critical low flow conditions identified in the state water quality standards (available dilution); and the concentration of pollutants upstream of the discharge (background) to determine how much the discharge can

contribute such that the resulting mix downstream does not exceed the criterion. *NPDES Permit Writers' Manual*, Chapter 6 ([EPA-833-K-10-001], USEPA September 2010).

The monthly average limit of 165 lbs/day that is contained within the permit that was recently issued to the Merrimack WWTF, which discharges to the Merrimack River upstream of Nashua, was established upon finding that there is reasonable potential for the discharge to exceed the Gold Book value based upon an analysis of site-specific parameters, including the receiving water 7Q10 flow, background total phosphorus levels, the design flow of the facility and the concentration of total phosphorus detected in the effluent. In making reasonable potential determinations, EPA models the effect of a discharge under critical conditions through the application of the maximum effluent concentration, median upstream concentration, and critical flow values (i.e., receiving water 7Q10 flow and effluent flow equal to the design flow) to its analysis. As such, EPA would not expect a substantial reduction in downstream total phosphorus concentrations unless the **average** discharge from an upstream point-source is reduced. Based on an average seasonal flow of 2.17 mgd and an average effluent total phosphorus concentration of 6.5 mg/l (based on data collected from April through October over the last five years), the current average phosphorus loading from the Merrimack WWTP is 118 lbs/day. Hence, although the limit does effectually prevent future increases in total phosphorus while limiting the upper extreme of current loadings, it is not expected to result in a significant reduction from current average loadings. As such, a substantial reduction in the instream phosphorus concentration upstream from the Nashua WWTF would not be expected as a result of the recently-issued Merrimack permit.

The conclusions drawn by the commenter regarding upstream reductions, which are based upon a comparison of the current average loading (from the summer of 2013) of 90 lbs/day (based on an **average** effluent concentration of 6 mg/l and an average effluent flow value of 1.8 mgd), to the **maximum** potential loading of 594 lbs/day (based upon a maximum effluent concentration of 14 mg/l and a maximum effluent flow value of 5 mgd), are not appropriate because the effluent values are based on different averaging periods.

In conclusion, the discharge of phosphorus from the Merrimack WWTF in quantities equal to the permitted load (165 lbs/day) will be well above their current average discharge load of 118 lbs/day, and is not likely to result in a substantial reduction in upstream phosphorus concentrations just upstream from the Nashua WWTF.

Comment C.5.

Manchester is in the process of installing a Modified Johannesburg Process for biological phosphorus removal. Manchester currently discharges 477 lbs of TP to the Merrimack on an average day (22 mgd at 2.6 mg/l TP). Bio-Win modeling has demonstrated that Manchester will consistently achieve a 1 mg/l or less TP effluent discharge with bio-P removal. That would mean a reduction to 183 lbs of TP to the Merrimack River on an average day (294 lb reduction from current loading levels). This reduction taken with the 500 lbs actualized reduction from "Reasonable Potential" expectation from Merrimack's discharge is almost 800 lbs TP removed from the future "Reasonable Potential" load into the Merrimack River daily.

Response C.5.

EPA agrees that the reduction in average total phosphorus loadings from the Manchester WWTF as described above could substantially improve downstream total phosphorus concentrations. However, at this time this reduction has not been realized, since the treatment technology described above is not yet active. Hence, EPA is required to make permitting decisions using information that is currently available.

Comment C.6.

An 800 lb "Reasonable Potential" actualized reduction with a 7Q10 flow rate of 789 cfs (509 mgd) downstream of Nashua provides for 0.188 mg/l removal of TP from the Merrimack River. This is greater than the 0.139 calculated "Reasonable Potential" limit outlined in the Nashua Draft Permit. It would leave an in stream loading of 0.024 mg/l from the Reasonable Potential discharge from the Town of Merrimack's Draft Permit (212 μg/l maximum facility discharge at 5 mgd with a concentration of 14 mg/l). This does not include the TP reductions that will be achieved by the pending MS4 permits that will require TP reductions from all communities south of Concord. The EPA is only looking at the potential additions to the Merrimack River, but has not factored in the real reductions that have transpired since the 2010 sampling and will transpire over this permit period. It is impossible to reach any of the in stream "Reasonable Potential" conditions as outlined in the Nashua or Merrimack Draft Permits.

Response C.6.

As described above, the 800 lb reduction referred to by the commenter does not represent an actual reduction in upstream loadings. The reduction attributed to the Merrimack WWTF is not based on average loadings and the reduction attributed to Manchester is based on an expected reduction resulting from a treatment plant upgrade that has not been implemented as of yet. Similarly, any pending MS4 permits which are not currently being implemented to reduce total phosphorus loadings in the proximity of the Nashua discharge would not be applied in this analysis. In summary, the Nashua permit limit was developed based on site-specific parameters which EPA believes have not been significantly affected by other recent permitting actions in the Merrimack River. Hence, the total phosphorus limit of 0.8 mg/l is established in the Final Permit.

Comment C.7.

As the Army Corps study has demonstrated that the Merrimack River has no current impacts from nutrient or algae impacts, it is safe to say that with the above mentioned TP removals, the Merrimack River quality will only get better (Note that the Phase II study indicates the Merrimack River is currently in compliance with WQ criteria as outlined in the NHDES CALM). There is no reasonable potential for the Merrimack River to be any more impacted from TP loads than what was measured in the Phase II Merrimack Study (prior to the installations of the Block and Hong process at Merrimack and the pending nutrient upgrade at Manchester). This is reason enough to include at a maximum a monitor only provision in the Nashua permit for TP with no concentration or mass based nutrient limit for phosphorus

In Nashua's Fact Sheet, the 303(d) list, primary contact recreational uses are impaired by chlorophyll *a* and E-coli bacteria and aquatic life uses are impaired by aluminum and pH. The Fact Sheet states, "*When a State has not established a numeric water quality criterion for a specific pollutant that is present in the effluent in a concentration that causes or has a reasonable to cause a violation of the narrative water quality standards, the permitting authority must establish effluent limits in one of three ways."* One is by calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use. The second determined on a case-by-case basis using SWA § 304(a) recommended water quality criteria, supplemented as necessary by other relevant information. Third, is based on an indicator parameter.

The EPA has not demonstrated that TP is causing a WQ violation and has not factored in reductions in their "Reasonable Potential" argument.

Response C.7.

Contrary to the above comment, the Merrimack River is in fact exhibiting the effects of eutrophication. Elevated concentrations of chlorophyll *a* is one of the clearest indicators of cultural eutrophication. As discussed in the Fact Sheet, and elaborated upon throughout this Response to Comments document, chlorophyll *a* is identified as causing impairment of the primary contact recreation designated use in the segment of the Merrimack River into which the Nashua WWTF discharges (requiring the development of a TMDL, which is scheduled for completion in 2019) in the *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (Assessment Unit ID: NHRIV700061206-24; see *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010)). Additionally, the data presented in Figures 1 and 3 (see Response C.8.), from the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* (December 2012), illustrate that both chlorophyll *a* and total phosphorus levels increase appreciably upstream to downstream, particularly in the vicinity of the Nashua WWTF, which suggests the receiving water is being negatively impacted by elevated nutrient levels, particularly in the lower reaches that were sampled. It is also worth noting that the flows recorded at the nearest USGS gaging station located upstream from the Nashua WWTF (USGS gaging station No. 01092000, Merrimack River near Goffs Falls, below Manchester) on the sampling dates for the data presented in the figures included in Response C.8. were an order of magnitude greater than the 7Q10 flow for that gage. Therefore, it is reasonable to expect that the observed effects would be greater under 7Q10 flow conditions.

In consideration of the numeric instream phosphorus target, the available effluent and receiving water data, the projected receiving water concentrations, and evidence of impairments in the receiving as evidenced by elevated instream quantities of chlorophyll *a* and total phosphorus, EPA has determined that the discharge of phosphorus from the Nashua WWTF has the reasonable potential to cause, or contribute to exceedances of New Hampshire's Water Quality Standards. As such, EPA is required to include a total phosphorus limit in the permit.[11]

[11] The Region takes into account site-specific circumstances particular to each discharge before imposing an effluent limitation. The commenter should note, however, that the Region's overall approach to calculating numeric

Comment C.8.

LOW DISSOLVED OXYGEN INDICATES NUTRIENT AND CHLORPHYLL-A PROBLEMS

The draft Nashua permit pg. 20 of 36 states at the start of paragraph 3, "**While phosphorus is a causal indicator of eutrophication, chlorophyll *a* and dissolved oxygen are response indicators** whose quantities may be correlated with…**elevated concentrations of chlorophyll *a*, excessive algal and macrophyte growth, and low levels of dissolved oxygen are all effects of nutrient enrichment."** As there were no oxygen violations, as noted in the below discovery, or instances of excessive algal and macrophyte growth, there is no evidence that phosphorus levels are causing degradation.

The most recent 'Upper Merrimack and Pemigewasset River Study Field Program' (MRP-Study) that was conducted between 2009 and 2012, as funded by the USACOE, contains numerous data. For brevity sake this document will be referred to as MPR-Study. The CALM states, "*Surface water quality assessments are intended to determine the current designated use support. Use of out-dated information can result in assessments that are not representative of actual conditions in the water body… Obviously the more current the data the more accurate the assessment…. The maximum data age requirement for lakes and ponds is 10 years versus five years for other water body types.*" (CALM – Section 3.1.11 Data Age).

One of the goals of the Section 305(b) of the CWA is to assess all surface waters. To assess a large population such as surface waters, there are two generally accepted data collection schemes. The first is a consensus which requires examination of every unit in the population. A more practical and economic approach is to conduct a sample survey which involves sampling a portion of the population through probability (or random) sampling…. Probabilistic assessments are most useful for 305(b) reporting purposes… which might otherwise be impossible to do using the census approach" (CALM – Section 3.1.27 Probabilistic Assessments).

The extensive MPR-Study is not only the most current data available, but in this rare instance includes an entire population of data for the largest river in the state, rare by any scientific standard as pointed out by both the EPA and NHDES. The CALM states, "*The number of samples needed to make a use support decision plays a large role in an assessments defensibility and believability…. The more data there is the more confident one can be that the data represents actual conditions. In statistical terms the entire collection of all measurements is called the population. Since it is impossible to sample the entire population, it is necessary to try to describe the population based on a subset of the measurement. By doing so, some error is always introduced*" (CALM Section 3.1.17). In this instance the entire population was not only sampled once, but twice during lower flow critical conditions.

One sampling event happened on July 27, 2010 when the flow was at 2.5 times the 7Q10. The measured upstream phosphorus was 36 µg/l. Upstream flow was 2.5 X the 7Q10 equaling 1,225

phosphorus limits to implement narrative water quality criteria has been upheld by the U.S. Environmental Appeals Board and the First Circuit Court of Appeals.

mgd that would give an upstream TP loading of 368 lbs. The other was on September 21, 2010 when the flow was at 1.5 times the 7Q10 at 67 µg/l giving an upstream TP concentration of 411 lbs. The newly calculated in stream median is 51.5 µg/l. This at the 7Q10 would give an instream load of 218 lbs at 7Q10 flows. This is 60% or less of the calculated "Reasonable Potential" loading when measured on these days with no adverse impact to the WQ of the Merrimack River. When you look at the reductions outlined above that are currently happening along the Merrimack River with Merrimack's nutrient treatment and the nutrient treatment proposed at the Manchester WWTP within two years, there will be no greater loading to the Merrimack River than what was measured during the summer 2010 sampling events. There is no potential for Nashua to grow to 16 mgd daily and no potential for the river concentration below Nashua to reach 130 µg/l for TP as Merrimack has significantly reduced its TP discharge and Manchester will be doing this as well in two years. The 0.6 mg/l limit is unnecessary when viewing the above actual conditions and result in an expensive unnecessary unfunded upgrade for Nashua.

Appendix C of the MPR-Study has 140 pages of data tables. Within these data tables is the most extensive sampling that has ever occurred on the entire Merrimack River within the boundaries of New Hampshire. Contained within these pages are 945 actual field sample events for dissolved oxygen (DO). In review of all the 945 DO data sets the lowest observed DO reading during the two critical events occurred at station M042 on July 27th. The DO was 5.5 mg/l with a saturation of 69%. A follow up DO was taken with a subsequent DO reading of 6.4 mg/l and a saturation of 77.8% (Attachment 1). It appears for whatever reason, the initial reading was compromised and should not be considered as the DO increased by 0.9 mg/l and the saturation by 8.8%.

Two other DO samples within the myriad of the critical low flow sampling period should be considered suspect. One of the DO samples was taken at station M049 during the September 21st critical low flow event at 3:30 PM (DO 5.7 mg/l with a saturation of 65.5%) with a follow up sample at 3:45 PM (DO 5.7 with a saturation of 65.3%). On first look these two samples are almost identical and one would think the samples are statistically correct. However, the Winkler DO test for 3:30 PM reads 8.0 mg/l which is 2.3 mg/l higher than the meter reading [Attachment 2 and 2(b)]. This adds doubt to the DO readings.

The other DO sample was done on September 21st. M047 had a DO of 6.1 mg/l and 72.4% saturation at 2:35 PM and retest DO of 6.8 mg/l with a saturation of 71.5% at 2:50 PM. The M047 test is questionable due to the fact the Winkler DO test for 2:35 PM had a reading of 7.9 mg/l for DO (Attachment 3).

There were no field samples of the 945 below the 5.0 mg/l limit for Class B waters. Two sampling stations on the Merrimack River had saturation limits below the 75% designation. These were Station M006 with a DO of 6.1 mg/l and a saturation of 71.6% on July 27th. Station M025 had a DO of 5.9 and saturation of 72.2% on July 27th (significantly upstream from the Nashua outfall).

Should oxygen saturation be assessed separately from the DO mg/l levels only two samples fall within the criteria as cited in the population samples. The CALM has a 10% rule for

impairment, "*For water quality assessments, there are basically two types of error Type I, the water body is assessed as impaired when it is really fully supporting and Type II, the water body is assessed as fully supporting when it is really impaired….DES employed the "binomial approach; in previous reporting cycles. The binomial approach, however, was criticized by some as being too lenient because the number of exceedances needed for a water body to be considered impaired increased with the total sample size, and at least 3 exceedances were needed for total sample sizes of 10 or less. The concern was that some water bodies were not being listed which were actually impaired. In response to these concerns DES decided to abandon the binomial approach starting with the 2006 cycle and adopt the slightly more stringent ten percent rule (i.e. 10% rule for determining use support"* (CALM-Section 3.1.17 Minimum Number of Samples – 10 Percent Rule). No field samples demonstrated a DO of less than 5 mg/l and only a couple of saturation levels fell below the 75%. Note: In 2006 NHDES dropped the assessment methodology from the binominal approach 30% to determine impairment to the 10% rule. This is a 66% reduction that is significantly more restrictive than the binominal approach.

The CALM states, "Any data submitted to the NHDES is first reviewed against the existing protocols in the CALM document. In the event the CALM does not include protocols to adequately assess a particular data set, DES staff review the data in the context of the NH water quality standards and prepare a written summary that includes a review of data, the applicable water quality standards, and a recommendation of attainment status. Nothing in the CALM shall be construed as a basis for not evaluating a submitted dataset" (CALM – Section 1.2.1 Assessment and Listing Methodology).

As referenced within the CALM and verified via sound-science through the MRP-Study, there is no DO impairment on in the Merrimack River. The NHDES is taking the unscientific approach by station that "Reasonable Potential" in the Nashua Draft Permit for TP discharge will cause future violations of the dissolved oxygen standard and excessive algal/macrophyte growth. Based on the two critical low-flow period sampling events, that comprise the most current data, it was demonstrated that there is no dissolved oxygen impairment within the Merrimack River and no excessive algal/macrophyte growth. This reasoning assures a Type I error for dissolved oxygen and phosphorus as outlined in the CALM.

Response C.8.

See Responses C.4 and C.5. regarding anticipated (but not yet existing) upstream reductions

EPA has addressed the specific comments in detail below, but as a preliminary matter, the Region observes that most if not all of the legal/regulatory objections to the permit underlying Manchester's comments on DO and other issues have been squarely addressed in past decisions by the United States Environmental Appeals Board and by the United States Court of Appeals for the First Circuit. *See Upper Blackstone Water Pollution Abatement Dist. v. U.S. EPA*, 690 F.3d 9, 33 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2282 (2013) (upholding the Region's overall methodology for imposing a phosphorus limit, including use of the Gold Book, among other information, to establish a site-specific total phosphorus limit applicable to that particular discharge); *In re Upper Blackstone Water Pollution Abatement Dist.*, NPDES Appeal Nos. 08-11

to 08-18 & 09-06 (EAB May 28, 2010) (same); *see also, In re City of Attleboro*, NPDES Appeal No. 8-08 (EAB Sept. 15, 2009) (same). Most recently, the EAB comprehensively addressed the Region's approach to interpreting the State's narrative nutrient criterion to derive an effluent limitation in *In re Town of Newmarket Treatment Plant*, NPDES Appeal No. 12-05, 16 E.A.D. __ (EAB December 2, 2013). EPA encourages the Town to consult the specific portions of these decisions noted below in conjunction with reviewing the Region's responses below. They are available at:

Upper Blackstone First Circuit Decision Affirming Imposition of Phosphorus and Nitrogen Limits

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/2D0D249E441A18F185257B6600725F04/$File/1st%20cir..pdf

Page	Issue
30, 33-34	Finding that the CWA and EPA regulations allow EPA to proceed with permit reissuance even where there is uncertainty in the existing data without waiting until better science can be developed or more data gathered
31	Discussing risk associated with waiting to address to nutrient-based cultural eutrophication
32	Addressing claim that EPA should have "relied on more recent data" where EPA has no reason to question the continuing validity of data on which it relied
36	Discussing MERL model's use of correlations between data sets, rather than cause-and-effect models, in development of nutrient permit limit
50-53	Upholding EPA's use of national and regional guidance criteria, including the Gold Book value of 0.1 mg/l, in conjunction with site-specific data in determining phosphorus limit

Upper Blackstone EAB Decision Affirming Imposition of Phosphorus and Nitrogen Limits

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/NPDES%20Permit%20Appeals%20(CWA)/34E841C87F346D94852577360068976F/$File/Denying%20Review....pdf

Page	Issue
31-32	Finding that affirmative reasonable potential determination requires neither demonstration of causation nor certainty ("greater than a mere possibility)
80-83	Finding EPA's approach of establishing a range of target ambient values for phosphorus from EPA nationally recommended criteria guidance to be a regulatorily-authorized method for determining a phosphorus limit
83	Rejecting request for delay in imposition of phosphorus limit pending additional data or causal demonstrations in light of, *inter alia*, Region's conservative approach to nutrient permitting and overall objectives of the CWA

Attleboro EAB Decision Affirming Imposition of Phosphorus and Nitrogen Limits

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/NPDES%20Permit%20Appeals%20(CWA)/D506EBEE22A1035E8525763300499A78/$File/Denying%20NPDES%2008...84.pdf

Page	Issue
63	Upholding EPA's use of recommended Gold Book values and low flow conditions in determining phosphorus limit
65	Finding that EPA need not demonstrate actual impacts to the receiving water prior to imposing a permit effluent limit
72-73	Finding that EPA may reasonably consider current background conditions despite any expected future reductions

Newmarket EAB Decision Affirming Implementation of the Narrative Nutrient Criterion

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/Recent~Additions/97CCD304C9B7E58585257C3500799108/$File/Order%20Denying%20Review.pdf

Page	Issue
49-51	Rejecting request for delay in imposition of nutrient limit pending additional data or causal demonstrations in light of, *inter alia*, Region's conservative approach to nutrient permitting and overall objectives of the CWA
54 n 23	Finding that "reasonable potential" determination does not require a conclusive demonstration of cause and effect

Overall, Manchester's comments reflect a flawed understanding of the legal framework for NPDES permitting, including the regulatory standard for imposing necessary effluent limitations in a permit. As established by the decisions cited above, and as evidenced by the plain language of the statute and regulations, a waterbody need not be listed as impaired for a pollutant in order for the Region to impose an effluent limitation for that pollutant in an NPDES permit. Sections 301 and 402 of the Act, and implementing regulations at 40 C.F.R. § 122.44(d), are the provisions that govern this permitting action, not Section 303(d) and associated non-binding listing guidance such as CALM.

Under CWA section 402, 33 U.S.C. § 1342, EPA may issue NPDES permits "for the discharge of any pollutant, or combination of pollutants" if the permit conditions assure that the discharge complies with certain requirements, including those of section 301 of the CWA, 33 U.S.C. § 1311. Section 301(b)(1)(C), 33 U.S.C. § 1311(b)(1)(C), of the Act requires that NPDES permits include effluent limits more stringent than technology-based limits whenever:

> necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations…or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to [the CWA].

NPDES permits must contain effluent limitations necessary to attain and maintain WQS, without consideration of the cost, availability or effectiveness of treatment technologies. *See Upper Blackstone Water Pollution Abatement Dist. v. U.S. EPA*, 690 F.3d 9, 33 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2282 (2013).

EPA has implemented its Sections 301(b)(1)(C) and 402 of the Act through numerous regulations, which specify when the Region must include permit conditions, water quality-based effluent limitations or other requirements in NPDES permits. Most trenchantly, 40 C.F.R. § 122.4(d) *prohibits* issuance of an NPDES permit "[w]hen the imposition of conditions cannot *ensure* [emphasis added] compliance with the applicable water quality requirements of all affected States." Section 122.44(d)(1) is similarly broad in scope and obligates the Region to include in NPDES permits "any requirements…necessary to: (1) Achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality."

EPA's regulations set out the process for the Region to determine whether permit limits are "necessary" to achieve WQS and for the formulation of these requirements. *See* 40 C.F.R. § 122.44(d). Permit writers are first required to determine whether pollutants "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion" of the narrative or numeric criteria set forth in the WQS. *Id.* § 122.44(d)(1)(i). EPA guidance directs that this "reasonable potential" analysis be based on "worst-case" conditions. *In re Washington Aqueduct Water Supply Sys*., 11 E.A.D. 565, 584 (EAB 2004). If a discharge is found to cause, have the reasonable potential to cause, or contribute to an excursion of a state water quality criterion, then a permit *must* contain effluent limits as stringent as necessary to achieve the WQS. 40 C.F.R. § 122.44(d)(1), (5).

Even assuming that there is no evidence of exceedances of water quality standards for DO —a conclusion with which the Region disagrees, as described below—it is well established under Board precedent and guidance that EPA does *not* need to wait for the water quality violations to occur prior to imposing a protective effluent limitation in an NPDES permit. The requirement to impose a permit limit is not only premised on a finding that the pollutant discharges "are" at a level that "causes" violation of the applicable water quality standards, but the requirement is also triggered by a finding that the facility's pollutant discharges "may" be at a level that "contributes" to or has the "reasonable potential" to cause a violation. 40 C.F.R. § 122.44(d)(1)(i). The regulation requires water quality-based effluent limits even when there is some degree of uncertainty regarding both the precise pollutant discharge levels and the potential causal effects of those discharges, so long as the record is sufficient to establish that there is a "reasonable potential" for that discharge to cause or contribute to a violation of water quality standards. EPA in the Final Rule Preamble for 40 C.F.R. § 122.44(d)(1) dispels any doubt over the necessity of proving an impairment and causation of that impairment prior to either deriving a numeric instream target to implement a narrative water quality criterion, or imposing a water quality-based effluent limitation to implement that criterion:

> "Several commenters asked if it was necessary to show in-stream impact, or to show adverse effects on human health before invoking [§ 122.44(d)(1)(vi)] as a basis for establishing water quality-based limits on a pollutant of concern. It is not necessary to show adverse effects on

> aquatic life or human health to invoke this paragraph []. The CWA does not require such a demonstration and it is EPA's position that it is not necessary to demonstrate such effects before establishing limits on a pollutant of concern." 54 Fed. Reg. 23,868, 23,878 (June 2, 1989).

"Reasonable potential" requires some degree of certainty greater than a mere possibility, but it leaves to the permit writer's scientific and technical judgment how much certainty is necessary. The regulations, thus, require a precautionary approach when determining whether the permit must contain a water quality-based effluent limit for a particular pollutant.

The contention that the Region should be limited to the CALM and the MRP-Study in making its reasonable potential determinations is unfounded, as is the vague allegation that the data and approaches the Region did consider are somehow scientifically or technically unsound. In determining whether a discharge has the reasonable potential to cause or contribute to a WQS violation, "the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent . . . and where appropriate, the dilution of the effluent in the receiving water." 40 C.F.R. § 122.44; *see also* 54 Fed. Reg. 23,868, 23,873 (June 2, 1989) ("[A] permitting authority has a significant amount of flexibility in determining whether a particular discharge has a reasonable potential to cause an excursion above a water quality criterion, taking the factors in subparagraph (ii) into account"). It is the Region's position that, in making reasonable potential determinations, no one source of information should necessarily be given definitive weight, nor should the absence of any particular information source necessarily preclude EPA from establishing an effluent limit. The approach of utilizing available technical materials generated by EPA and States, as supplemented by other information reasonably available at the time of permit reissuance, is also reasonable in light of federal regulations requiring EPA to include requirements that will achieve state water quality standards when reissuing a permit and prohibiting issuance of a permit when the imposition of conditions cannot ensure compliance with the applicable state water quality requirements of all affected States. *See* 40 C.F.R. §§ 122.4(d), 122.44(d)(1); *see also* CWA §§ 301(b)(1)(C) and 401(a)(2).

Responses to Specific Comments

As discussed above, whether or not a receiving water segment is listed on the State's 305(b) and 303(d) lists does not determine whether a limit should be included in an NPDES permit. The absence of such a listing is irrelevant from a regulatory standpoint in instances where the Region otherwise concludes that the discharge has the reasonable potential to cause or contribute to a water quality standards violation. While NPDES determinations may be informed by State water quality assessments and listings, such listings are not prerequisites for determining that NPDES permit limits are necessary. EPA's regulations do not require that determinations on water quality-based effluent limits necessarily be consistent with existing state 303(d) listing designations. Impairment designations are not made according to the same standard that governs NPDES permitting decisions; permitting regulations require the imposition of effluent limits whenever a pollutant discharge "causes, has the reasonable potential to cause, or contributes to" a water quality violation. In determining the existence of reasonable potential, the Region considered the Section 303(d) listing to be one relevant factor pointing toward imposition of a

limit but conducted additional analysis before concluding that a limit was necessary. EPA has used the available data and in the Fact Sheet articulated a rational approach allowable under the regulations to determine that the facility has the reasonable potential to cause or contribute to a water quality violation. This approach is not the same as that used in 303(d) listing procedures, nor is it required to be.[12] EPA's reasonable potential determination for phosphorus is provided on pages 19 – 24 of the Fact Sheet, with further analysis provided below.

The State of New Hampshire's 2010 *Final List of Threatened or Impaired Waters That Require a TMDL* designates the Merrimack River segment receiving the discharge from the Nashua WWTF (NHRIV700061206-24) as impaired for chlorophyll *a*. Such designation is cause for concern, and was taken into consideration during the development of the Draft Permit, as an impairment due to chlorophyll *a* is indicative of nutrient enrichment in the vicinity of the discharge

The Region has reviewed the MPR-Study cited by Manchester. Contrary to the commenter's view, the Region concludes that the MPR-Study does not undermine the Region's permitting decision in this case.

The Upper Merrimack and Pemigewasset River Study referenced in this comment includes the results of chlorophyll *a* and total phosphorus analyses that were conducted on samples collected upstream of the Nashua WWTF on July 27, 2010 and September 21, 2010. These results are depicted below in the Figures 1 and 2, and indicate an increase in instream chlorophyll *a* and total phosphorus concentrations in the vicinity of the Nashua WWTF. The conditions present in the receiving water on the sampling dates were observed when flows in the river were approximately 2.5 and 1.5 times (respectively) the 7Q10 flow, as measured at the nearest USGS gaging station located upstream from the Nashua WWTF (USGS gaging station No. 01092000, Merrimack River near Goffs Falls, below Manchester). One can reasonably expect that the observed conditions would be greater under 7Q10 flow conditions.

The MPR-study also includes the results of two types of DO analyses: field tests and Winkler tests. Put simply, field tests are instantaneous DO measurements taken in the field using portable DO meters, and Winkler tests are samples that were preserved and later analyzed in the lab. These samples were collected as single grab samples at each sampling location. This is not the preferred data/condition for assessing DO conditions described in the CALM. The CALM's preferred method is that such determinations be based on a series of measurements taken at the same location one hour apart over a 24 hour period. When preferred data is not available, assessments may be done for individual grab samples according to criteria found in Part 3.2.4, Indicator 1, Notes 5.c.2.a and 5.c.2.b. For DO concentration in a Class B water, any sample collected between 05:00 and 08:00 with less than 4.5 mg/l DO is an exceedance. For percent saturation, any sample collected between 05:00 and 10:00 with DO saturation less than 45

[12] While 40 CFR § 122.44 does require consistency with some state determinations, for example requiring that effluent limit be "consistent with the requirements of any available wasteload allocation for the discharge prepared by the State and approved by EPA," §122.44(d)(1)(vii)(B), there is no such mention of State listing decisions pursuant to CWA sections 305 and 303(d). Indeed, the State listing materials are not even mentioned in the list of "relevant information" set forth in 122.44(d)(1)(vi)(A), nor in the reasonable potential provision of the regulation.

percent or any sample collected between 14:00 and 19:00 with DO saturation less than 70 percent is an exceedance.

EPA acknowledges that the DO field tests on July 27 and September 21, 2010, the two sampling days with receiving water flow closest to 7Q10 flow, did not show any violations of the 5.0 mg/l criterion. However, almost all of the Winkler tests taken on September 21, 2010 both upstream and downstream of the Nashua WWTF discharge were significantly below this criterion (approximately 32 out of 33 Winkler tests that day were under 5 mg/l along the Merrimack River). Of the 33 Winkler tests that day, seven were taken between 05:00 and 08:00. Six out of those seven tests were below 4.5 mg/l, violating the CALM's criterion. The State's minimum DO criterion is applicable under all receiving water flow conditions.

In addition, the commenter referenced five field tests on these two days (July 27 and September 21, 2010) that were less than 75% DO saturation (one at M042, two at M049 and two at M047), but considers them questionable due to a higher DO value in either a retest or a corresponding Winkler test. In the first example, a DO saturation of 69.0% was measured at station M042 on July 27, 2010, but a second measurement (77.8%) at the same location and time was above the criterion. These samples were taken at 6:25 PM indicating that the 69% measurement is a violation per the CALM (i.e., less than 70% between 14:00 and 19:00) while the 77.8% measurement was not.

In the second example, at station M049 on September 21, 2010, two DO % saturation measurements (65.5% and 65.3%) were taken. These samples were taken at 3:30 AM and 3:45 AM, respectively, so would not be exceedances per the CALM. The commenter suggests that these are questionable because both of these were at 5.7 mg/l DO and a corresponding Winkler test was 8.0 mg/l. In the final example, at station M047 on September 21, 2010 two DO % saturation measurements (72.4% and 71.5%) were taken. These samples were taken at 2:35 AM and 2:50 AM, respectively, so would not be exceedances per the CALM. The commenter suggests that these are questionable because these measurements were at DO concentrations of 6.1 and 6.8 mg/l respectively and a corresponding Winkler test was 7.9 mg/l. Although EPA does acknowledge some discrepancies seem to exist between corresponding percent saturation and concentration measurements in the data, one (69% at station M042) of the five field tests referenced by the commenter is determined to be a violation per the CALM.

In summary, a review of all the relevant data shows that there are some discrepancies between the field tests and the Winkler tests. In some cases, the Winkler tests resulted in violations of the DO concentration criterion (5 mg/l) while corresponding field tests did not. In other cases, the field tests showed DO percent saturation violations, while corresponding Winkler tests do not indicate a violation. As mentioned, EPA agrees that there is some discrepancy between the field tests and Winkler tests at various sampling locations, but does not have sufficient QA/QC information to determine which data points most closely characterize the actual DO concentrations. EPA believes that the data does raise a significant level of concern regarding instream DO in the Merrimack River. As noted previously, these data were not determinative in EPA's reasonable potential calculations or in the decision to include a limit on total phosphorus in the permit.

EPA also notes that in many cases low DO may not be the best indicator of eutrophication. Depending on the time of day and water depth during sampling, a better indicator may be DO supersaturation and increased levels of chlorophyll *a*. Based upon the diurnal cycle of algae, these indicators represent evidence of algal growth (typically occurring during the day near the water surface), whereas low DO saturation represents evidence of algal die-off (typically occurring during the night near the river bottom). In this case, although there were only a few measurements below the 75% DO saturation criterion, a review of the data report from the July 2010 sampling event does indicate significant DO supersaturation (>100%) as well as increased levels of chlorophyll *a* (>15 µg/l) in the vicinity of the Nashua WWTF. Figures 1 and 2[13], shown below 3[13], illustrate the levels of chlorophyll *a* and DO saturation, respectively, along the Merrimack River on July 27. 2010. Both DO saturation and chlorophyll *a* levels increase appreciably as the Merrimack River flows from upstream to downstream, particularly in the vicinity of the Nashua WWTF. This data correlates with instream phosphorus concentrations detected in samples of the receiving water, as shown below in Figure 3[13], that were collected both upstream and downstream from the Nashua WWTF, which suggests eutrophic effects are present and the current discharge of phosphorus from the Nashua WWTF has the reasonable potential to cause or contribute to these effects. Hence, the permit contains a total phosphorus limit.

[13] From *the Upper Merrimack and Pemigewasset River Study Monitoring Data Report (*USACE December 2012))

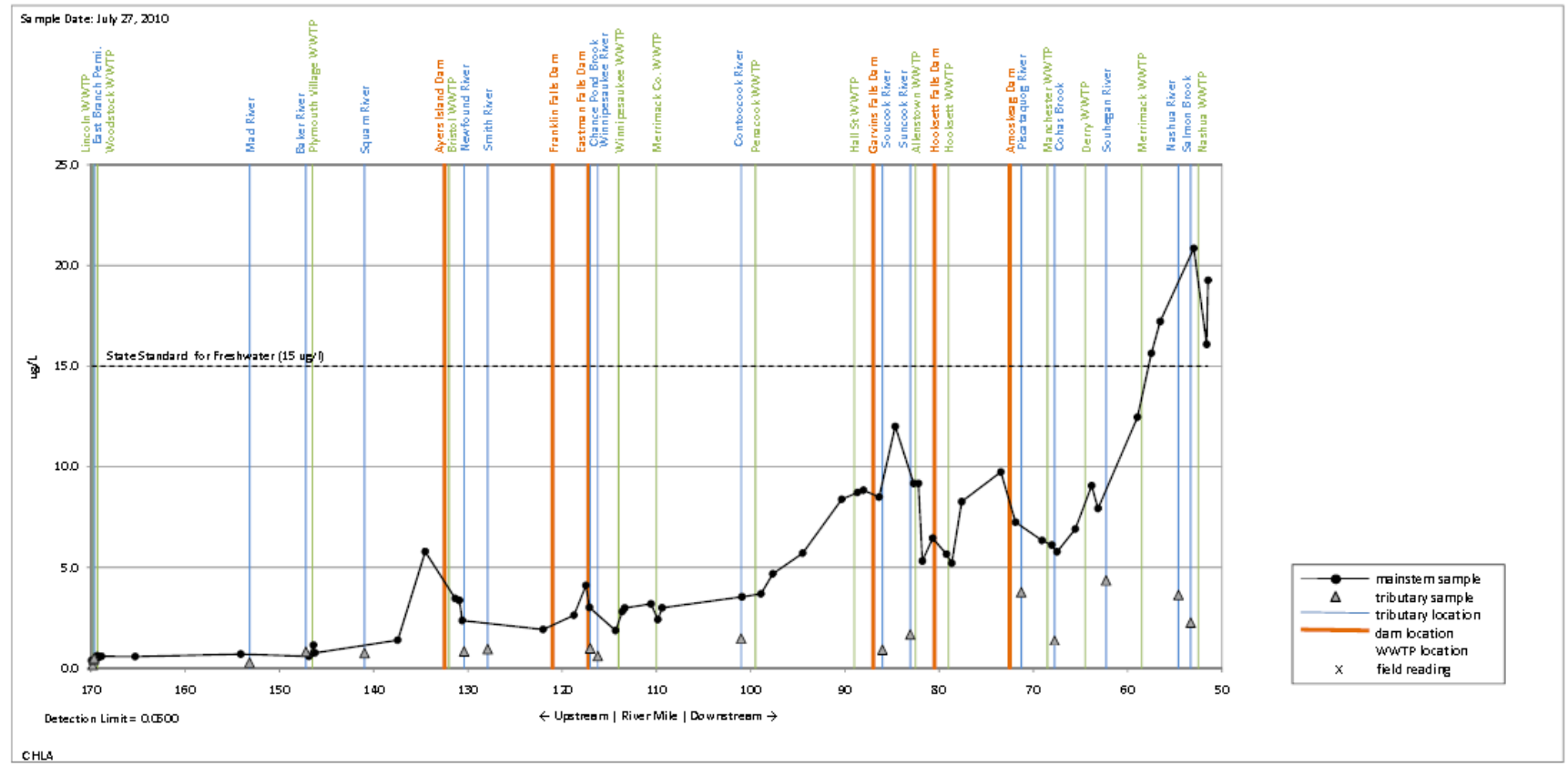

Figure 1 Instream Chlorophyll *a* Concentrations – July 27, 2010 (from the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* (USACE December 2012))

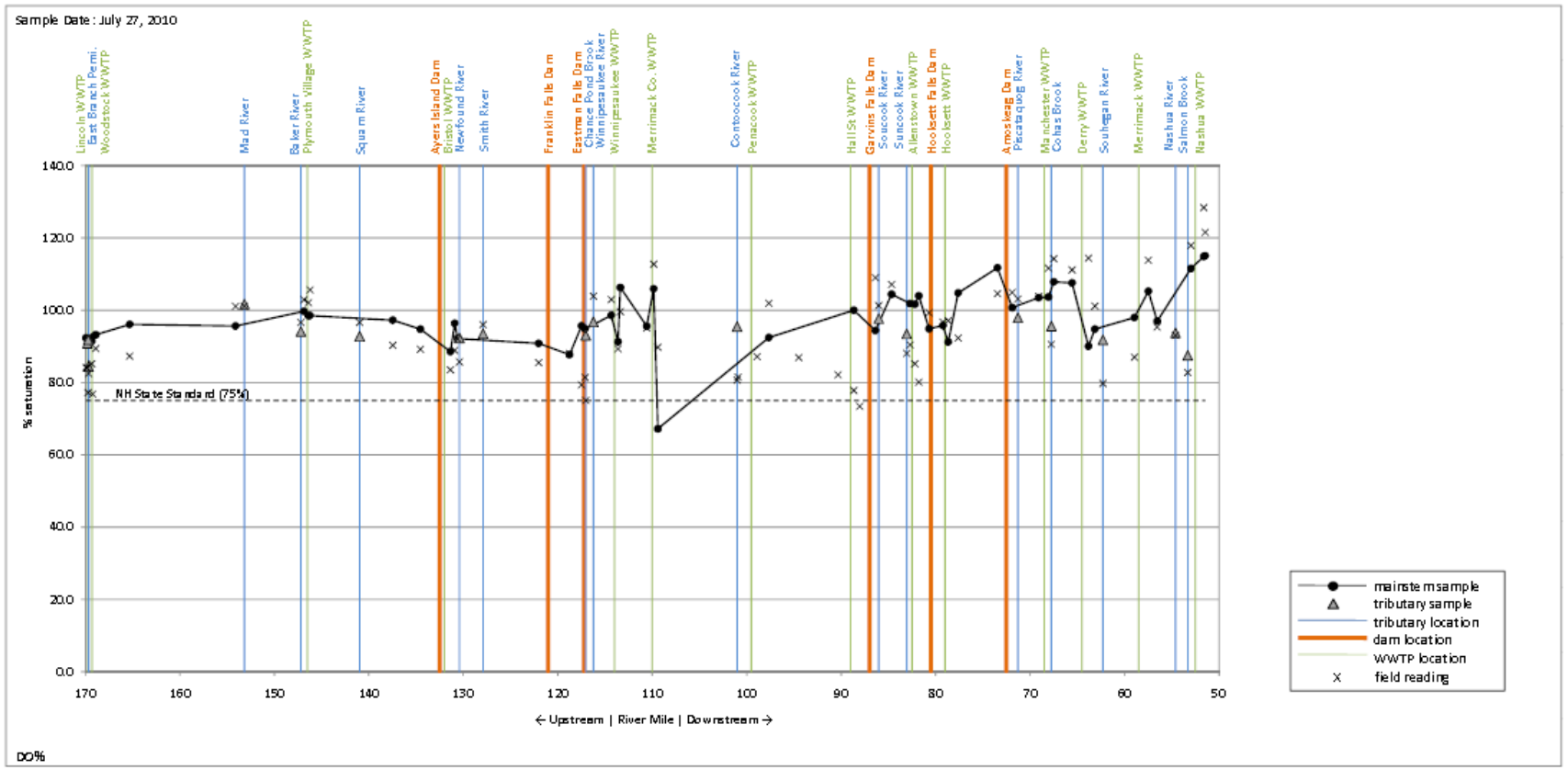

Figure 2 Dissolved Oxygen Percent Saturation- July 27, 2010 (from the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* (USACE December 2012))

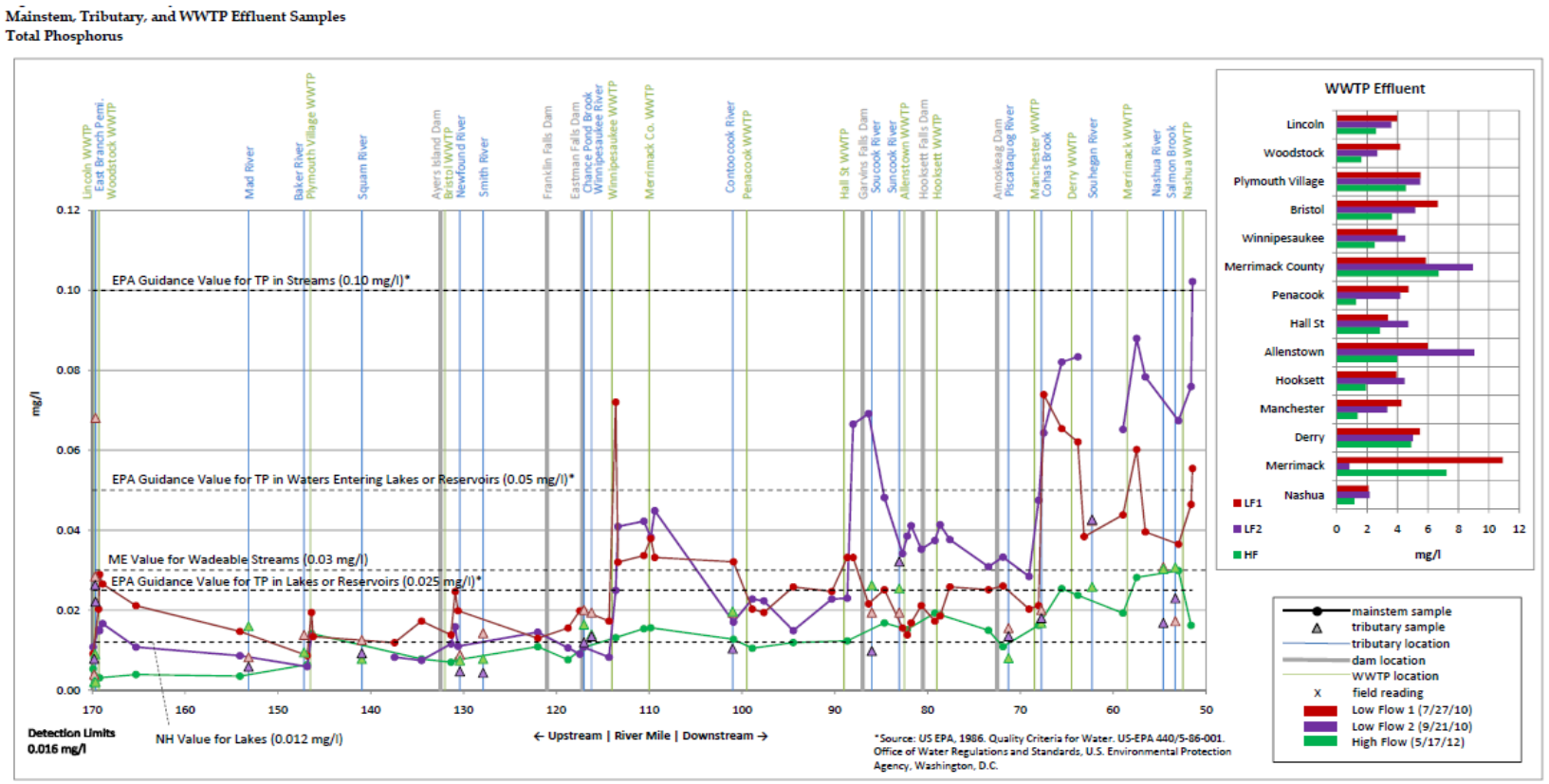

Figure 3 Instream Total Phosphorus (from the *Upper Merrimack and Pemigewasset River Study Monitoring Data Report* (USACE December 2012))

Comment C.9.

COPPER

Attachment H of Nashua's Draft Permit has a determination for reasonable potential for Copper. The Merrimack River is only listed as impaired for the metal Aluminum as outlined in paragraph 3 on page 11 of 36. There is no 303(d) impairment for copper. Attachment D (pg. xv) of the Draft Permit lists WET testing upstream from Nashua's outfall. The maximum concentration is 11 µg/l, the average is 2 µg/l and the median is 2 µg/l. None of these samples were taken via clean sampling techniques. Table 3-32 of the NHDES CALM lists WQ criteria for non-clean sampling as 15.7 µg/l for freshwater chronic. As the average/median upstream concentration is 2µg/l as sampled by non-clean methods, there is no WQ impairment evidenced in the Merrimack River for Copper when sampled using non-clean sampling techniques.

When you take the non-clean sampling concentration for copper (15.6 µg/l), as outlined in Table 3-32 of the CALM and multiply that by the dilution factor of 28.5 you get a copper discharge concentration of 447 µg/l for typical non-clean sampling conditions and not the 20 µg/l that is listed in the Draft Permit.

Also note in Attachment H at the bottom of page xxii, that the Draft Permit makes reference to the chronic aluminum criterion (87 µg/l) and does not correctly reference the Copper criterion as outlined in the NHDES CALM.

Response C.9.

EPA assumes that the commenter intended to reference Attachments D and H to the Fact Sheet which accompanied the Draft Permit. EPA also notes that Attachment H to the Fact Sheet, which provides an example reasonable potential analysis, included an incorrect reference to the chronic aluminum criterion. The correct reference is to the chronic copper criterion of 2.85 µg/l.

Sections 301 and 402 of the Act, and implementing regulations at 40 C.F.R. § 122.44(d), are the provisions that govern this permitting action, not Section 303(d) and associated non-binding listing guidance such as the CALM. Therefore, the CALM methodology (the methodology by which the state determines whether to list a receiving water as impaired) is not determinative. EPA's decision to include a water quality-based effluent limitation in the permit for a particular pollutant is not dependent on the receiving water being listed as impaired for that pollutant

Upon establishing that there was a reasonable potential for the discharge of copper from the Nashua WWTF to cause or contribute to excursions above the applicable water quality criteria, EPA was compelled to include a copper effluent limit sufficiently stringent to ensure compliance with standards. *See* 40 C.F.R. § 122.44(d)(1). This limit must be imposed whether or not the Merrimack River is designated as impaired for copper on the 303(d) list.

Inclusion of the metals data that were presented in the Fact Sheet is appropriate, as they represent samples that were collected in accordance with the *Freshwater Acute Whole Effluent Toxicity Test Procedure and Protocol* (February 28, 2011). Although permittees are welcome to submit data collected using methods whose level of sophistication exceeds that required by the

Freshwater Acute Whole Effluent Toxicity Test Procedure and Protocol (February 28, 2011), they are not required to do so, and EPA is not required to refrain from calculating NPDES permit limits and to indefinitely forestall their implementation in the absence of such data.

Comment C.10.

LEAD

Attachment H of Nashua's Draft Permit has a determination for reasonable potential for Lead. The Merrimack River is only listed as impaired for the metal Aluminum as outlined in paragraph 3 on page 11 of 36. There is no 303(d) impairment for Lead. Table 2 on pg 18 of 35 indicates a median upstream concentration of 0.5 µg/l. Footnote 5 states (Establishing a limit equal to the criterion would be appropriate because the median upstream concentration exceeds 90% of this value (.54 X .9 + 0.486 µg/l) of the Draft Permit lists WET testing upstream from Nashua's outfall. Table 3-32 of the NHDES CALM lists WQ criteria for non-clean sampling as 4.8 µg/l for freshwater chronic. As the upstream median is 0.5 µg/l (12.5% of allowed in-stream lead for non-sampling techniques) there is no WQ impairment for Lead as measured upstream and it is unfounded to set a lead limit in the Nashua permit as stated in footnote 5.

When you take the non-clean sampling concentration for lead (4.8 µg/l), as outlined in Table 3-32 of the CALM and multiply that by the dilution factor of 28.5 you get a lead discharge concentration of 137 µg/l and not the 0.54 µg/l that is listed in the Draft Permit. It may be appropriate for the EPA to nudge permittees toward the practice of clean sampling techniques as the EPA has moved permitted toward electronic DMR reporting, otherwise Table 3-32 of the CALM should be the guidance for metals concentrations when developing metals limitations.

Also note that when the DMRs are submitted the EPA does not allow a < or ND factor in the sheet. It has been requested that the detection limit be submitted to allow the program to accept the data. There is no indication in the Draft Permit if some of the data supplied was less than the detection limit or of the ND designation where a detection limit was used. The need to have a number in all spaces on the DMR skews the average and median concentrations toward higher calculations.

Response C.10.

Attachment H of the Fact Sheet includes an example reasonable potential determination for copper, not lead, as stated in the comment.

EPA has several issues with this comment. The commenter applies the metals criterion contained in NHDES's CALM, which are applied when the data is from samples that were collected using non-clean sampling techniques. These criteria, however, have not been approved by EPA nor have they been adopted into the State WQS.

The commenter also arrives at a proposed limit of 137 µg/l by multiplying the dilution factor by the criteria value found in the CALM. The commenter does not account for the 90% reserve capacity of the receiving water, as required by the NH WQS, nor does it account for background concentrations.

NHDES applies the values found in Table 3-32 of the CALM when making determinations as to whether the aquatic life designated use is supported in a fresh water body under CWA Section 303(d) (see *2012 NHDES Consolidated Assessment and Listing Methodology (CALM)* (NHDES 2012)). Sections 301 and 402 of the Act, and implementing regulations at 40 C.F.R. § 122.44(d), are the provisions that govern this permitting action, not Section 303(d) and associated non-binding listing guidance such as the CALM. Therefore, the values used in making use support determinations is not directly applicable to this permitting action and was not determinative in EPA's permitting decision.

EPA's decision to include a water quality-based effluent limitation in the permit for a particular pollutant is not dependent on the receiving water being listed as impaired for that pollutant. Upon establishing that there was a reasonable potential for the discharge of lead from the Nashua WWTF to cause or contribute to excursions above the applicable water quality criteria, EPA was compelled to include an effluent limit for lead that is sufficiently stringent to ensure compliance with standards. *See* 40 C.F.R. § 122.44(d)(1). This limit must be imposed whether or not the Merrimack River is designated as impaired for lead on the 303(d) list.

EPA acknowledges that there is currently no code available for signifying a test result that is less than the detection limit. However, the results of metals analyses conducted on samples of the effluent and receiving water in conjunction with WET tests, as well as the detection limits for these analyses, are provided in the WET test reports that are submitted to EPA and NHDES. Attachment D of the Fact Sheet, which includes effluent and receiving water metals data, clearly indicates those results which were reported as "non-detect," and also notes that these results were assigned a value equal to 0.

Comment C.11.

UNFUNDED MANDATE

Article 28-a of the State's Constitution, Bill of Rights, adopted on November 28, 1984 states, "The state shall not mandate or assign any new expanded or modified programs or responsibilities to any political subdivision in such a way as to necessitate additional local expenditures by the political subdivision unless such programs or responsibilities are fully funded by the state or unless such programs or responsibilities are approved for funding by a vote of the local legislative body of the political subdivision."

Section 541-A:25 Unfunded State Mandates II of the Administrative Procedures Act State, "Such programs also include, but are not limited to, functions such as police, fire and rescue, roads and bridges, solid waste, sewer and water, and construction and maintenance of buildings and other municipal facilities or other facilities or functions undertaken by a political subdivision."

The NHDES is establishing new limits for phosphorus, copper and lead at the Nashua WWTP and within the Merrimack River where clearly, the "sound science" data of the MPR-Study indicates there is no impairment in the Merrimack River. Without the establishment of TMDLs the appearance of regulatory overreach is prominent when viewing the different TP loads for Concord, Merrimack and Nashua. The "Reasonable Potential" loadings as expressed in the

permit narrative were at times exceeded during the extensive consensus/population MPR-Study with no impairment results. This contradicts the NHDES' "Reasonable Potential" argument as evident through the massive amount of data collected in the Phase II MPR-Study. The MPR-Study demonstrates that a phosphorus limit is not needed for the Merrimack WWTP and that the Merrimack River is in compliance with WQ standards.

The Army Corps of Engineers along with the NHDES and several municipal stakeholders has begun Phase III of the MRP-Study that will specifically measure metals by clean-sampling techniques. The data gathered from this third round of extensive sampling will determine whether or not there is metals contamination in the Merrimack River from Manchester through Amesbury Massachusetts. It is premature at this time to insist there is contamination within the Merrimack by viewing data that was not sampled via clean-sampling techniques. The sampled data is below the limits criteria for non-clean sampling concentration as outlined in the CALM, Table 3-32 and insistence in placing these concentrations in Nashua's permit is an unfunded mandate.

The NHDES "Reasonable Potential" argument is mandating Nashua to upgrade their facility to meet phosphorus removal capabilities far below those mass limits given to upstream WWTPs that will cost the City millions of dollars for design, construction, equipment and ongoing operations and maintenance costs. It is clear that the average monthly concentration limit of 0.6 mg/l limit included in the Draft Permit based on "reasonable potential", but clearly contradicted by the scientific findings of the MPR-Study, is an unfunded mandate that will cost the rate payers of Nashua unneeded expenses to achieve a reduction of a pollutant that does not currently, nor will it during the next permit cycle, cause a water quality violation.

The NHDES must revisit the mass loading allocations give to Concord and proposed for Merrimack and assure that Nashua and other future permittees like Manchester, Derry and Hudson are all receiving equal riparian rights and would be assured with an established TMDL.

Response C.11.

It is assumed that the reference in the third paragraph to the Merrimack WWTP was intended to be for the Nashua WWTF.

By its terms, Section 541-A:25 Unfunded State Mandates II applies to the State, not EPA in issuing a federal NPDES permit. To the extent that the reference to "unfunded mandates" also refers to the requirements of the Unfunded Mandate Reform Act of 1995 (UMRA), the UMRA is inapplicable to this permitting action. The UMRA applies to rulemaking, and not individual NPDES permit decisions. For example, in *In re City of Blackfoot Wastewater Treatment Facility*, NPDES Appeal No. 00-32 (EAB September 17, 2001), the Environmental Appeals Board denied a petition for review of compliance with UMRA on grounds that UMRA applies only to regulations, not to individual NPDES permits, which are more akin to licenses than a regulation.

The State generally adopts federal NPDES permits as State permits so that facilities can lawfully discharge wastewater under State law, specifically RSA 485-A:13, I(a). However, no issue

under Part I, Article 28-a of the N.H. Constitution arises when that happens. Any costs incurred to comply with the federal NPDES permit are attributable to the federal action in issuing the permit. The costs to Nashua to comply with the permit will not increase as a result of the State's adoption of the federal NPDES permit as a state permit. There thus are no "additional local expenditures" that can be attributed to the State's actions. RSA 541-A:25, which is the General Court's interpretation of Part I, Article 28-a, likewise does not apply to this case. RSA 541-A:25, I, to which the language quoted by Manchester refers, establishes that the section applies to a "state agency to which rulemaking authority has been granted". The Department is not aware of any case in which RSA 541-A:25 has been applied outside of a rulemaking proceeding.

EPA assists in financing the cost of treatment needed to achieve compliance with the Clean Water Act through the Clean Water Act State Revolving Fund (SRF). Through the SRF program, New Hampshire maintains revolving loan funds to provide low cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize the SRF program are provided through federal government grants and state matching funds (equal to 20% of federal government grants). EPA has provided New Hampshire with a total of $358,419,565 in Clean Water Act SRF grant funds for the period from 1989 through 2012.

Regarding the "sound-science" data of the MPR-Study, the commenter does not accurately characterize the data or the findings of the study (see Responses C.7. and C.8.). EPA believes that the data support the reasonable potential determination presented in the Fact Sheet.

Comment C.12.

STATUTORY AND REGULATORY AUTHORITY

Phosphorus

The proposed permit includes a water quality-based effluent limitation for phosphorus even though New Hampshire does not have numeric nutrient criteria. EPA included this limitation in an attempt to interpret and implement the state's narrative criteria with respect to phosphorus. (Fact Sheet at 10) The pertinent part of this standard reads as follows:

> Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring… Existing discharges containing either phosphorus or nitrogen which encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards.

Env-WS 1703.14.

The Fact Sheet (at 11) further notes that cultural eutrophication is defined in Env-Ws 1702.15 as, "… the human-induced addition of wastes containing nutrients which results in excessive plant growth and/or decrease in dissolved oxygen."

This limitation was based upon application of EPA's 1986 Gold Book value for flowing waters. The Fact Sheet with the Draft Permit states that the Gold Book criterion was used because it was

developed from an effects-based approach versus eco-regional criteria which are based on reference conditions. (Fact Sheet at 11)

> "The effects-based approach provides a threshold value above which adverse effects (i.e., water quality impairments) are likely to occur. It applies empirical observations of a causal variable (i.e., phosphorus) and a response variable (i.e., chlorophyll *a*) associated with designated use impairments."

At a minimum, this narrative standard requires that there be a demonstration that the discharge is causing impairment, either excessive plant growth that impairs uses or plant growth that causes a dissolved oxygen criteria violation. Moreover, in applying the Gold Book criterion, there needs to be some showing that use impairment is occurring due to plant growth caused by the discharge of phosphorus from anthropogenic sources.

However, the only demonstration provided in the Fact Sheet is that the discharge from the City of Nashua POTW may cause an exceedance of the Gold Book value based on mixing under design flow conditions. EPA attempts to justify this approach citing 40 C.F.R. § 122.44(d)(1). As discussed below, application of the Gold Book criterion as presented in the Fact Sheet is not supported by any Clean Water Act (CWA) requirements. In issuing the Draft Permit, the Region has made three very important unsubstantiated assumptions: first, the Merrimack River is impaired by nutrients; second, the applicable numeric criteria should be the 0.1 mg/L suggested as a possible objective in the 1986 Quality Criteria of Water ("Gold Book"), and; three, the Town of Nashua WWTF is causing or contributing to an excursion above the assigned instream phosphorus criteria. As explained below, we have several significant objections with the assumptions and determinations made by the Region in developing this limit.

Response C.12.

The commenter incorrectly cites the phosphorus discussion in the Fact Sheet as being found on pages 10 and 11. The phosphorus section in the Fact Sheet is found pages on 19-24.

Please see Response C.8 for a detailed explanation of the legal and regulatory basis for imposing water quality based effluent limits in NPDES permits.

EPA will address these comments in detail as they are raised specifically below.

Comment C.13.

1. Misapplication of 40 C.F.R. § 122.44(d)

The CWA is a "science-based" statute that requires the establishment of criteria "accurately reflecting the latest scientific information" regarding "…the effects of pollutants on biological community diversity, productivity and stability…" Section 304(a)(1); *accord*, 40 C.F.R. 131.3(c) (criteria developed by EPA are based on "the effect of a constituent on a particular aquatic species"). No criteria (including a narrative criteria interpretation) can be approved unless it is "based on a sound scientific rationale". 40 C.F.R. 131.11(a). Likewise, the effluent

limit generated to meet the "applicable standard" must be demonstrated to be "necessary" and "which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria". 40 C.F.R. 122.44(d)(1)(vi). Obviously compliance with the statute and applicable regulations requires an objective scientific assessment to show that the selected approach is both necessary and sufficient to achieve criteria compliance.[14]

Given the language of the Act and the implementing regulations, it is not surprising that Courts have determined "that neither the language of the Act nor the intent of Congress appears to contemplate liability without causation" NAMF v. EPA, 719 F. 2d 624, 640 (3rd. Cir. 1983); Ark. Poul. Fed. V. EPA, 852 F. 2d 324, 328 (8th Cir. 1988) (the discharge must at least be "a cause" of the violation.) In the TMDL context, such nutrient wasteload allocations must be based on a documented "cause and effect" relationship using appropriate water quality models:

> An integral part of the TMDL process is the analysis of cause-effect relationships via a mathematical model of loading input and resulting water quality response.[15]

On its face, 122.44(d) itself indicates that more restrictive limits only apply if the discharge "causes" a water quality criteria excursion[16] as discussed in the *Upper Blackstone* decision. The *Upper Blackstone* decisions repeatedly refer to the fact that nutrients were demonstrated to be "causing" extensive "cultural eutrophication" as the basis for imposing more restrictive limitations.[17]

Because there are no such analyses for Merrimack River, EPA asserts that it may use the procedures identified in Section (d)(1)(vi) to not only develop an effluent limitation but to also use that endpoint to declare that the waters do not attain the state's narrative standard in the first instance. EPA is interpreting 122.44(d) in a manner inconsistent with the rule language, as well as the structure of the Act. Had EPA not done this, these stringent permit limits would never have been imposed.

A created numeric value cannot be used to determine that narrative criteria (which describes a desired physical or biological condition in the water body) are being violated. As with the New Hampshire narrative criteria, the Rhode Island narrative in the *Upper Blackstone* case also was based on preventing "cultural eutrophication" as evidenced by nutrients causing excessive algal

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[14] Sufficient does not mean that the individual facility must ensure WQS are attained, but that the selected criteria, when achieved will produce this result.

[15] Technical Guidance Manual for Developing Total Maximum Daily Loads Book 2: Rivers and Streams; Part 1: Biochemical Oxygen Demand/ Dissolved Oxygen and Nutrients/ Eutrophication. USEPA March 1997 at 4-27.

[16] The "or contributes" language means it is contributing to the "cause" of the violation.

[17] ***Upper Blackstone Water Pollution Abatement Dist. v. EPA*, 690 F.3d 9 (1st Cir. 2012)**
"An influx of nitrogen and phosphorus from sewage treatment plants ***is causing serious problems*** for the River's waters and those downstream. The Blackstone, Seekonk, and Providence Rivers, and Narragansett Bay, all suffer from severe cultural eutrophication." (at 11). "State water quality standards generally supplement these effluent limitations, so that where one or more point source dischargers, otherwise compliant with federal conditions, are nonetheless ***causing a violation of state water quality standards***, they may be further regulated to alleviate the water quality violation. Id. *§ 1311(b)(1)(C)* (at 14);

growth, low DO and other deleterious effects. In that case, the court first looked to see if the effects of "cultural eutrophication" existed and were documented to be caused by nutrients:

> An influx of nitrogen and phosphorus from sewage treatment plants is causing serious problems for the River's waters and those downstream. The Blackstone, Seekonk, and Providence Rivers, and Narragansett Bay, all suffer from severe cultural eutrophication.(at 11)…. Here, the EPA states, and the record reflects, that the MERL model demonstrated the relationship between nitrogen loading, dissolved oxygen, and chlorophyll *a* production for a range of loading scenarios in a water environment similar to the Bay's. (at 27). ***Subsequently,*** in order to address the severe and ongoing phosphorus-driven cultural eutrophication in the Blackstone River, the EPA incorporated a more stringent phosphorus limit into the 2008 permit. In formulating this limit, the EPA considered the national and regional guidance criteria and recommended values it had recently published. (at 31) (Emphasis supplied)

After this fact was confirmed the court determined that EPA's derivation of permit limits using the methods described in Section (vi) was acceptable, not that EPA could claim impairments based on those values absent documenting cultural eutrophication caused by excessive nutrient loads.

Under EPA's approach used in the City of Nashua's NPDES permit, "cultural eutrophication" (the condition intended to be regulated under the adopted narrative criteria) is equated with a numeric value to conclude more restrictive limits are "necessary" *even if the water body is not exhibiting signs of cultural eutrophication.* However, the NPDES regulation was intended to implement the adopted standard as closely as possible with the state's intent – not to substitute a new numeric value in place of it. See, *Am Iron and Steele v. EPA.*

The structure of the rule and "relevant" preamble discussion[18] confirms this is how the rule is to apply. Under Section 122.44(d)(1)(ii) the permit writer first determines if "a discharge… causes or contributes to an instream excursion". In the case of a narrative standard one looks to see if the characteristics that are intended to be prevented are evidenced in the waters (i.e., cultural eutrophication causing some type of system imbalance). If it is determined that an excursion is occurring (or likely to occur) then and only then "the permitting authority must establish effluent limits using one or more of the following methods…" The structure of the rule is clear; the methods for picking a protective instream level are only used to set the effluent limits, not to decide that the waters are in violation of the narrative standard. The 1989 preamble discussion

[18] The preamble indicates that one does not need to wait for impairment to trigger the application of a more restrictive limit under 122.44(d). That is true, but irrelevant. One may project a violation of a narrative standard (i.e., that "cultural eutrophication" is predicted to occur in the future) if adequate modeling or other reliable predictive capabilities are available, considering the physical parameters of the system. This would restrict future load INCREASES. However, in this instance, EPA is dramatically lowering the existing load to the system, claiming that it is currently far too high. In this case, EPA should be able to readily identify the existing cultural eutrophication and identify, with a reasonable scientific certainty, how phosphorus caused the excessive plant growth to occur. However, there is no such demonstration.

further supported that the methods used to derive the effluent limit was not the same method used to determine if an excursion existed:

> Subparagraph (i) should assist the permitting authority in determining whether it is necessary, under Federal regulations, to establish limits for a pollutant. Note, however, this is different from calculating water quality-based effluent limits. …Proposed subparagraph (iv) addresses the situation in which…the permitting authority does not have a numeric criteria to use *in deriving a water quality-based limit.*" 54 Fed. Reg. 1303,104 January 12, 1989 (emphasis supplied)

As is clear from these quotes, Section (vi) is used to set the permit limits *after the excursion (violation) is identified*, not to declare the waters in exceedance (violation) of a state's narrative standard. Any other approach would turn the structure of the Act on its head.[19] EPA is not implementing the adopted narrative standard; EPA is replacing it with a new numeric standard as if it was the adopted narrative standard. That plainly violates the Alaska Rule and 40 C.F.R. 131.21.

EPA is simply jumping over that process by claiming that exceeding a non-specific nutrient concentration constitutes a narrative criteria violation, regardless of whether or not nutrients are actually causing excessive plant growth or DO violations. Thus, it is apparent, that EPA's latest position is a major reinterpretation of 40 C.F.R. 122.44(d), without rulemaking and contrary to the structure of the Act. It is thus, therefore, patently illegal and may not be applied in this instance. *U.S. Telecom. Ass'n v. FCC*, 400 F.3d 29 at 35 ('a substantive change in the regulation,' requires notice and comment) (quoting *Shalala v. Guernsey Mem'l Hosp.*, 514 U.S. 87, 100 (1995).

Response C.13.

The criteria approval and TMDL process, and regulations and guidance pertaining thereto, are not directly applicable to this permit proceeding. There is no approved phosphorus TMDL for the segment of the Merrimack River into which the Nashua WWTF discharges. Moreover, EPA is implementing an existing narrative water quality standard for nutrients under Section 402 and 40 C.F.R. Part 122, so the criteria approval process is not relevant to its determinations. Manchester's legal objections have been resolved by the EAB's decision in *In re Town of Newmarket Treatment Plant*, NPDES Appeal No. 12-05, 16 E.A.D. __ (EAB December 2, 2013), *slip op.* at 62-64, including the applicability of the Alaska Rule and whether the Region's

[19]Under EPA's approach, under Section 303(d) a state could determine that an area is not exhibiting "cultural eutrophication" and therefore not place the water on the Section 303(d) impaired waters list, regardless of the nutrient concentration present. However, when it comes time for permitting, EPA substitutes its chosen numeric criteria for the narrative standard and determines that a more restrictive limit is needed to meet the narrative criteria, contrary to Section 301(b)(1)(C) and the Section 303(d) determination which only allows the imposition of more restrictive water quality based limits where "necessary to meet the applicable water quality standards." The applicable standard is the narrative definition of the intended biological condition (e.g., no excessive plant growth).

derivation of an instream target for a pollutant under 40 C.F.R. § 122.44(d)(1) amounted to an illegal rulemaking.[20]

The commenter misquotes 40 C.F.R. §122.44(d)(1)(ii) above as stating that a permit writer first determines if "*a discharge… causes or contributes to an instream excursion*." The regulation actually states that the permitting authority must determine whether "*a discharge causes, has the reasonable potential to cause, or contributes to an instream excursion.*" As stated in Response C.8. above and restated here, EPA is not required to demonstrate that nutrients are "causing" extensive "cultural eutrophication" but simply that there is the "reasonable potential to cause" such water quality excursions.

Manchester's interpretation of the First Circuit's decision in Upper Blackstone is entirely without merit. Manchester contends that the *Upper Blackstone* decision actually stands for the proposition that "causation" must be proven prior to imposition of a water quality-based effluent limitation under 40 C.F.R. § 122.44(d), superficially pointing to the Court's use of the word "causing" and its reference to EPA's conclusion, based on a laboratory experiment, "that the basic causal relationship demonstrated in the MERL experiments 'corresponds to what is actually occurring in the Providence /Seekonk River system.'" Although the Court in *Upper Blackstone* may indeed have been convinced that EPA's record demonstrated that the District's treatment plant was "causing" a water quality standards excursion, it nowhere suggested that such a finding was necessary prior to imposing a water quality-based effluent limitation. On the contrary, the court specifically acknowledges the full breadth of the regulations:

> EPA regulations require permitting authorities to include in NPDES permits conditions which control all pollutants or pollutant parameters . . . [that] are or may be discharged at a level which will cause, *have the reasonable potential to cause*, [emphasis supplied] or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality. We thus reject the notion that in order to strengthen the District's discharge limits, the EPA must show that the new limits, in and of themselves, will cure any water quality problems [internal quotation marks and citations omitted]. *Upper Blackstone Water Pollution Abatement Dist. v. U. S. EPA*, 690 F.3d 9, 33 (1st Cir. 2012).

Manchester's reading of the case is impossible to reconcile with the Court's view that, "[R]ecognizing…the developing nature of [the field]…[t]he [EPA] Administrator may apply his expertise to draw conclusions from suspected, but not completely substantiated, relationships between facts, from trends among facts, from theoretical projections from imperfect data, from probative preliminary data not yet certifiable as 'fact,' and the like." *Id.* at 24 (quoting *Ethyl Corp. v. EPA*, 541 F.2d 1, 27-28 (D.C. Cir. 1976). Manchester should be aware that the

[20] This is unsurprising, as the Region notes that the commenter has merely copied and pasted portions of petitioner's submissions in the Newmarket permit appeal. *See* http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/Filings%20By%20Appeal%20Number/E3E03BFDEDDDF6D485257B21006F63D0/$File/Reply%20to%20EPA's%20Memo%20in%20Opposition%20...40.pdf. EPA rebutted that filing at http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/Filings%20By%20Appeal%20Number/B85DF6EB6B3EC40B85257B320044E0D9/$File/Respondent%20EPA's%20Sur-Reply...46.pdf and, in the interest of efficiency, incorporates those responses here.

reasonable potential determinations in the Blackstone permit were *not* based on a causal model, but correlations among data sets, as here.

Similarly, Manchester badly misreads the Board's decision in the Blackstone case, where it held, the "[Agency] does not need to justify the decision to impose a permit limit based on a site-specific demonstration that nutrients are causing the claimed impairments in the water body of concern, but need only demonstrate that the discharge causes, *has the reasonable potential to cause, or contributes* to an in-stream excursion above a numeric or narrative criteria within a state water quality standard." *In re Upper Blackstone Water Pollution Abatement Dist*., NPDES Appeal Nos. 08-11 to 08-18 & 09-06, slip op. at 32 (May 28, 2010).

EPA rejects the commenter's premise that the receiving waters are not evidencing signs of cultural eutrophication. As described in Responses C.7. and C.8. above, EPA believes there is sufficient evidence of algal growth and DO violations in the Merrimack River in the receiving water in the vicinity of the discharge to conclude that New Hampshire's narrative criteria regarding cultural eutrophication have been violated. In fact, the segment of the Merrimack River into which the Nashua WWTF discharges (NHRIV700061206-24), is impaired for chlorophyll *a*, which is indicative of nutrient enrichment. This is contrary to the commenter's assertion that EPA is equating cultural eutrophication with a numeric value "*even if the water body is not exhibiting signs of cultural eutrophication.*" In fact, the data illustrates DO supersaturation (>100%) and an increase in chlorophyll *a* (>15 µg/l), both of which are indications that cultural eutrophication is occurring in the vicinity of the discharge. Also contrary to the comment above, EPA is not required to demonstrate that the receiving water does not attain water quality standards before applying a permit limit. Nor is EPA required to demonstrate that an excursion is "likely to occur." Rather, EPA is required to demonstrate that there is *reasonable potential* for the discharge to cause or contribute to a water quality violation. In this case, reasonable potential was determined based upon the documented excursions above the EPA interpreted numeric criterion (0.1 mg/l) combined with instream evidence of excessive downstream algal growth.

Manchester's claim that EPA erred by consulting 40 C.F.R. § 122.44(d)(1)(vi)(A) for guidance on how to interpret the narrative criterion is unfounded. EPA in issuing an NPDES permit must, by necessity, translate existing narrative criteria into instream numeric concentrations when developing water quality-based effluent limitations. *Am. Paper Inst., Inc. v. EPA*, 996 F.2d 346, 351 (D.C. Cir. 1993). The process of translating or interpreting a narrative criterion is governed by 40 C.F.R. § 122.44(d)(1)(vi), subsection (A) of which describes a process for calculating a protective instream numeric concentration for the pollutant of concern. This calculated numeric instream target, along with other information relied on by EPA such as evidence of elevated chlorophyll *a* and total phosphorus levels in the receiving waters, is facially relevant and material to EPA's determination of whether the receiving water's assimilative capacity for phosphorus had been reached, and whether a reasonable potential for the discharge to cause, or to contribute, to a water quality criterion exceedance exists. The commenter fails to identify any reason why EPA should be precluded from utilizing an instream numeric target as a part of its reasonable potential analysis, which as described above was intended to be a flexible process to allow the permit writer to carry out the objectives of the Act, including ensuring compliance with state

water quality standards. The commenter, moreover, neglects to describe what alternative technical methodology, other than a conclusive cause-and-effect demonstration, it would employ in order to make such a reasonable potential determination.

The proposed numeric thresholds are neither new nor revised water quality standards, so the alleged significance of the "Alaska Rule" is misplaced. In this instance, the only applicable standard in the State water quality standards are *existing* approved narrative criteria for nutrients, which, as explained above, require translation or interpretation in order to yield a numeric effluent limitation. The legal/regulatory requirements associated with criteria adoption are not applicable to permitting decisions based on existing criteria, such as the New Hampshire narrative nutrient criterion applicable in this proceeding.

Similarly, issues associated with impaired waters designation are more appropriately addressed through the 303(d) listing process. Independent of any State decisions associated with 303(d) lists, EPA clearly documented a reasonable potential to exceed the narrative nutrient criteria in the Fact Sheet and has affirmed that conclusion through this Response to Comments document.

As stated in footnote (12) above, "the preamble indicates that one does not need to wait for impairment to trigger the application of a more restrictive limit under 122.44(d)." The commenter claims that this is irrelevant because it should be interpreted to apply to future increased loads. However, the preamble specifically states that "more restrictive limits" may be applied, indicating a reduction from current levels, and furthermore says nothing about any reasonable potential findings having to be based on cause-and-effect models or demonstrations.

Comment C.14.

2. Waters Not Listed as Nutrient Impaired

Under section 303(d) of the Clean Water Act, New Hampshire is given primary authority for identifying which of its waterbodies are not meeting the governing water quality standards and for what reasons. EPA has limited authority (inapplicable in this instance) to intrude into this State responsibility. With regard to Merrimack River, New Hampshire has never identified the waterbody as nutrient impaired on the State's 303(d).[21] Moreover, Region 1 specifically approved New Hampshire's decision not list the waterbody as nutrient impaired, indicating that the current instream conditions and loadings are acceptable. If EPA wishes to amend a State's 303(d) listing decision, there is a specific process for doing so. Until such steps are taken, however, EPA has no authority to presume nutrients are impairing Merrimack River or assert that a narrative criteria violation related to nutrients exists in this waterbody.

Response C.14.

See Responses C.8. and C.13. for a more detailed discussion.

[21] As mentioned in the Draft Permit, stretches of the Merrimack River are identified as impaired by aluminum, dissolved oxygen, pH, and *Escherichia coli*. Unlike numerous other waterbodies in New Hampshire, chlorophyll *a* (surrogate for plant growth) is not the basis of impairment.

Including a limit in the permit for a particular pollutant is not dependent on the receiving water being listed as impaired for that pollutant. Regardless of whether waters are listed as impaired under Section 303(d), EPA has an independent duty under Section 301(b)(1)(C) of the Act to impose limits as stringent as necessary to meet applicable water quality standards. As stated in Response C.13., "The preamble indicates that one does not need to wait for impairment to trigger the application of a more restrictive limit under 40 C.F.R. § 122.44(d)."

Comment C.15.

3. State Narrative Criteria Misapplied

Currently, the only duly promulgated New Hampshire water quality criteria addressing nutrients in estuaries are found at Env-Wq 1703.14(b), which states:

> *Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring*. (emphasis supplied). The regulations continue:
>
> *Existing discharges containing either phosphorus or nitrogen which encourage cultural eutrophication shall be treated … to ensure attainment and maintenance of water quality standards.* Env-Wq 1703.14(c).
>
> *"Cultural eutrophication" is defined as "human-induced addition of wastes containing nutrients to surface waters which results in excessive plant growth and/or a decrease in dissolved oxygen."* Env-Wq 1702.15.

DES also has a narrative standard regarding "aquatic community integrity," which indicates, in relevant part, that "differences from naturally occurring conditions shall be limited to non-detrimental differences in community structure and function." Env-Wq 1703.19(b).

The key evidentiary component of the narrative nutrient criterion is that a violation is only found when it is demonstrated that phosphorus *is causing* an impairment (*e.g.*, "in such concentrations that would impair"; "human-induced addition of … nutrients … which results in"). This requires a "cause and effect" demonstration to find a violation of the narrative criteria. In issuing the Draft Permit, EPA relied on the Gold Book phosphorus criterion as an appropriate "narrative translator" and applied the Gold Book phosphorus criterion as though it represented a toxic substance by applying the criterion at the 7Q10 stream flow. However, the Gold Book notes that phosphorus concentrations critical to noxious plant growth vary and nuisance growth may result from a particular concentration of phosphate in one geographical area but not in another. Thus, even the Gold Book, upon which EPA relied upon to identify a potential criterion, cautioned that adverse effects cannot be assumed but must be confirmed.

To claim a nutrient limitation is necessary to eliminate use impairments and protect ecological resources under the state's narrative standard, EPA must first demonstrate that the nutrient at issue (phosphorus) caused the impairment, otherwise defined as "cultural eutrophication" (excessive algal growth causing impairment such as DO violations – Env-Wq 1702.15) under

state law. Moreover, any "narrative translator" must be based on a system-specific defined "cause and effect" relationship showing the nutrients have caused such "cultural eutrophication."

The permit action is premised on the *assumption* that the waters are nutrient impaired, that the Gold Book phosphorus criterion is an appropriate numeric translator, and that a simple mass balance under design conditions is sufficient to demonstrate reasonable potential. However, there is no indication that "cultural eutrophication" has occurred as a result of the discharge, and the 303(d) list does not identify the waters as impaired by nutrients.

- **Deposition Testimony Confirmed Cause and Effect Demonstration Required for Narrative Criteria Violation**

The DES has identified the Great Bay Estuary as nutrient impaired based on a scientifically deficient draft criteria document specific to the estuary, and EPA has applied the draft criteria in setting NPDES limits for several municipal dischargers to the estuary. This action was challenged and several DES staff were deposed and gave testimony on application of the state's narrative nutrient criteria. Mr. Paul Currier of DES confirmed that any claim of narrative criteria violations requires a documented *causal relationship* between nutrients and excessive plant growth adversely impacting designated uses (*See* Currier Dep. at 18, 19, 134)[22].

The Gold Book phosphorus criterion cannot be a proper translator of the existing narrative criteria without a causal demonstration that phosphorus is causing cultural eutrophication. Moreover, both Mr. Currier and Mr. Trowbridge noted that merely exceeding values contained in the draft 2009 Criteria (and, in this case, the Gold Book criterion) does not provide a demonstration that a narrative violation exists. (Currier Dep. at 80; Trowbridge Dep. at 332-333)

Based on these sworn acknowledgements on how state law is intended to operate, it was improper for EPA to presume that the exceeding the Gold Book levels will or has caused impairment anywhere in the Merrimack River. It was equally improper for EPA to presume that attaining compliance with the numeric values contained in the Gold Book, was necessary to avoid violating the state's narrative criteria. Finally, it was also improper to presume that the Gold Book criterion accurately reflected the level of scientific demonstration required by the existing narrative standard to designate waters as nutrient impaired. Such speculation is not a basis for narrative criteria implementation and does not constitute "weight of evidence" that phosphorus has triggered narrative criteria violations as assumed in EPA's proposed permitting action. Consequently, the necessary evidence to support use of the Gold Book criterion as a "narrative translator" has not been provided and the use of the Gold Book criterion is this permit action is arbitrary and capricious.

Response C.15.

Deposition testimony of NHDES staff (or rather Manchester's argumentative interpretation thereof) does not supplant EPA's obligations under section 301(b)(1)(C) of the Act to ensure

[22] Full copies of the Currier, Short and Trowbridge Depositions, plus exhibits have been provided to EPA by the Coalition's counsel. Due to the voluminous nature of those documents they are not being resubmitted with these comments.

compliance with state water quality standards or to implement its regulations, including those pertaining to reasonable potential. Again, Manchester's legal objections have been resolved by the EAB's decision *In re Town of Newmarket Treatment Plant*, NPDES Appeal No. 12-05, 16 E.A.D. __ (EAB December 2, 2013), including issues relating to cause-and-effect and relevance of the NHDES depositions, which the Region adopts here. EPA simply fails to see the relevance of deposition testimony in an unrelated state court proceeding to the federal permit proceeding here.

Manchester appears to believe that EPA's NPDES regulations require cause-and-effect proof between a pollutant discharge and a water quality impairment before the permit writer can derive a numeric instream target to interpret a narrative water quality criterion, or impose a water quality-based effluent limitation to implement that criterion. Manchester fundamentally misunderstands—or simply ignores—the legal threshold under 40 C.F.R. § 122.44(d)(1)(i) for determining the need for a water quality-based effluent limitation (***i.e.***, "reasonable potential"), and the types of information that may be used to establish that limit (***e.g.***, "relevant information"). ***Id.*** at § 122.44(d)(1)(vi). Under NPDES regulation, permit issuers are required to determine whether a given point source discharge "cause[s], ha[s] the reasonable potential to cause, or contribute[s] to an excursion above" the narrative or numeric criteria set forth in state water quality standards. 40 C.F.R. § 122.44(d)(1)(i). Thus, the regulations require nothing more than a *reasonable potential to cause, or contribute to* an excursion of a numeric or narrative state water quality criterion; whenever such a potential exists, a permit must contain effluent limits to meet state water quality standards. ***See id.*** § 122.44(d)(1), (5) (providing in part that a permit must incorporate any more stringent limits required by CWA § 301(b)(1)(C)). "'Reasonable potential' requires some degree of certainty greater than a mere possibility, but it leaves to the permit writer's scientific and technical judgment how much certainty is necessary." ***See In re Upper Blackstone Water Pollution Abatement Dist.***, NPDES Appeal Nos. 08-11 to 08-18 & 09-06, slip op. at 32-33, n.29 (May 28, 2010). As EPA's preamble to its final rulemaking promulgating 40 C.F.R. § 122.44(d)(1)(vi) explained:

> Some commenters said that the phrase "reasonable potential to cause" was too vague and could apply to permittees that are not actually exceeding a water quality criterion. EPA does not believe that it is appropriate to be more specific because a permitting authority has a significant amount of flexibility in determining whether a particular discharge has a reasonable potential to cause an excursion above a water quality criterion, taking the factors in subparagraph (ii) into account.

54 Fed. Reg. 23,868, 23,873 (June 2, 1989). This regulatory provision has been upheld as a reasonable, authorized approach of necessary gap-filling in the CWA statutory scheme as it provides permit writers with guidance on how to interpret state narrative water quality standards in deriving effluent limitations. ***See Am. Paper Inst. v. EPA***, 996 F.2d 346, 348, 351 (D.C. Cir. 1993); ***see also Am. Iron & Steel Inst. v. EPA***, 115 F.3d 979, 990-991 (D.C. Cir. 1997). ***Upper Blackstone***, slip op. at 31-32 (The "regulations . . . require a precautionary approach when determining whether the permit must contain a[n] effluent limit for a particular pollutant."); ***accord Upper Blackstone Water Pollution Abatement Dist. v. U. S. EPA***, 690 F.3d 9, 33 (1st Cir. 2012) ("EPA regulations require permitting authorities to include in NPDES permits conditions which control all pollutants or pollutant parameters . . . [that] are or may be discharged at a level

which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality. We thus reject the notion that in order to strengthen the District's discharge limits, the EPA must show that the new limits, in and of themselves, will cure any water quality problems." (internal quotation marks and citations omitted)). EPA in the Final Rule Preamble for 40 C.F.R. § 122.44(d)(1) dispels any doubt over the necessity of proving an impairment and causation of that impairment prior to either deriving a numeric instream target to implement a narrative water quality criterion, or imposing a water quality-based effluent limitation to implement that criterion:

> Several commenters asked if it was necessary to show in-stream impact, or to show adverse effects on human health before invoking [§ 122.44(d)(1)(vi)] as a basis for establishing water quality-based limits on a pollutant of concern. It is not necessary to show adverse effects on aquatic life or human health to invoke this paragraph [iv]. The CWA does not require such a demonstration and it is EPA's position that it is not necessary to demonstrate such effects before establishing limits on a pollutant of concern.

54 Fed. Reg. at 23,878. EPA's preamble explanation of what is actually required is at odds with the City's view that a mathematical model, or controlled experiment, demonstrating direct cause and effect related to harm is the standard to which EPA should be held in the NPDES permitting process.

EPA agrees that merely exceeding the 0.1 mg/l instream value does not demonstrate that a narrative water quality violation is occurring. However, such a violation does not need to be demonstrated in order to determine that a discharge has the reasonable potential to cause or contribute to a future violation. In this case, however, EPA believes that evidence of a violation does exist (*see, e.g.*, Response C.7.. and C.8.) which confirms the reasonable potential determination and supports the inclusion of a total phosphorus permit limit. EPA imposed the limit only after weighing all the evidence before it, including water quality data pertinent to cultural eutrophication, as well as different methodological approaches and values from the scientific literature.

Comment C.16.

4. No Evidence of Excessive Algal Growth

The conceptual model relating nutrients to aquatic life impairment requires that nutrient loads stimulate aquatic plant growth which, in turn, causes an adverse effect (e.g., dissolved oxygen criteria violations, impaired macroinvertebrate communities). That is, "cultural eutrophication" is a prerequisite to narrative criteria implementation. This model is well known and documented in EPA's Gold Book (1986), the Technical Guidance Manual for Developing Total Maximum Daily Loads (EPA, 1995)[23], the Protocol for Developing Nutrient TMDLs (EPA, 1999)[24], and

[23] USEPA. September 1995. Technical Guidance Manual for Developing Total Maximum Daily Loads. Book II: Streams and Rivers. Part 1: Biochemical Oxygen Demand/Dissolved Oxygen and Nutrients/Eutrophication. EPA 823-B-95-007.
[24] USEPA. November 1999. Protocol for Developing Nutrient TMDLs. First Edition. EPA 841-B-99-007

EPA's guidance on Using Stressor-response Relationships to Derive Numeric Nutrient Criteria (2010)[25].

> [I]f the maximum possible chlorophyll *a* level that could be achieved is extremely low, it will usually be safe to conclude that nutrients do not pose a problem in relation to water column algae.
>
> In most natural systems, especially flowing streams, the actual chlorophyll *a* levels that occur will be substantially less than the maximum potential under a combination of ideal conditions. Collection of chlorophyll *a* data could be used to verify the estimated chlorophyll *a l*evels and to determine whether a problem exists.
>
> (Technical Guidance Manual at 4-8)

If the designated use impairment identified for the Merrimack River (chlorophyll *a*, primary contact recreation as outlined on pg. 11 of 36 of the Draft Permit) is due to phosphorus, there must be a showing that algal levels in the river are elevated and these elevated algal levels cause or contribute to the low dissolved oxygen. However, there are no data reported in the Fact Sheet that address algal concentrations in the river that contributed to low dissolved oxygen. Without any data to support a key component of the conceptual model, EPA's presumption that phosphorus is causing a violation of the state's narrative criteria is arbitrary and capricious.

Response C.16

As described in Responses C.7. and C.8. above, EPA believes there is sufficient evidence of algal growth in the Merrimack River in the vicinity of the discharge to conclude that New Hampshire's narrative criteria have been violated. The data illustrates DO supersaturation (>100%) and a peak in chlorophyll *a* (>15 µg/l), both of which are indications that "cultural eutrophication" is occurring downstream of the discharge. As described in the Fact Sheet, the 15 µg/l threshold used by the NHDES CALM for primary contact recreation is only a guideline used for recreational purposes, not for aquatic life. The segment of the Merrimack River receiving the Nashua WWTF's discharge is within Ecoregion VIII, Nutrient Poor Largely Glaciated Upper Midwest and Northeast. The recommended criteria for this ecoregion is a total phosphorus concentration of 10 µg/l (0.01 mg/l) and a chlorophyll *a* concentration of 0.63 µg/l (0.00063 mg/l) (*Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion VIII* (USEPA December 2001 [EPA 822-B-01-015]). Additionally, the following table provides a summary from the literature of the trophic status for fresh water systems as characterized by mean chlorophyll *a*[26].

[25] USEPA. November 2010. Using Stressor-response Relationships to Derive Numeric Nutrient Criteria. EPA-820-S-10-001.

[26] Algae are either the direct or indirect cause of most problems related to excessive nutrient enrichment; e.g., algae are directly responsible for excessive, unsightly periphyton mats or surface plankton scums, and may cause high turbidity, and algae are indirectly responsible for diurnal changes in DO and pH. Chl *a* is a photosynthetic pigment and sensitive indicator of algal biomass. It can be considered the most

Freshwater System Trophic Status Based on Mean Chlorophyll *a**				
Trophic Status	Wetzel (2001)	Ryding and Rast (1989)	Smith (1998)	Novotny and Olem (1994)
Eutrophic	> 10 µg/l	6.7 – 31 µg/l	---	>10 µg/l
Mesotrophic	2 – 15 µg/l	3 – 7.4 µg/l	3.5 – 9 µg/l	4 – 10 µg/l
Oligotrophic	0.3 – 3 µg/l	0.8 – 3.4 µg/l	---	< 4 µg/l

* Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll *a* for the Chesapeake Bay and Its Tidal Tributaries. U.S. EPA Region III. April 2003.

Based upon this literature, freshwater systems may be characterized as eutrophic at chlorophyll *a* concentrations as low as 6.7 µg/l. Compare this to the chlorophyll *a* samples collected in the vicinity of the Nashua discharge on July 27, 2010, which range from 16.09 µg/l to 19.26 µg/l (See Table 4 of the Fact Sheet, which references data presented in the *Upper Merrimack and Pemigewasset River Study Field Program 2009-2012 Monitoring Data Report*, U.S. Army Corps of Engineers dated December 2012)).

Applying the CALM state indicator threshold for primary contact recreation, the State of New Hampshire's 2010 *Final List of Threatened or Impaired Waters That Require a TMDL* designates the segment of the Merrimack River into which the Nashua WWTF discharges (NHRIV700061206-24) as impaired for chlorophyll *a*.

In consideration of the available information, which suggests eutrophic conditions in the Merrimack River are currently occurring, as well as the finding that the discharge has reasonable potential to cause or contribute to a violation of water quality standards, the total phosphorus limit in the Final Permit is necessary.

Comment C.17.

5. Gold Book Not Applicable as Criteria without Site-Specific Data Confirmation

As described above, EPA simply assumed that the Gold Book's 0.1 mg/L preliminary recommendation for phosphorus was the applicable instream target for the Merrimack River without using any site-specific data to confirm (1) the existence of a nutrient impairment or (2) whether such a criterion is necessary to protect the applicable uses. In so doing, EPA has effectively adopted a numeric criterion for all similar-situated waters in the state (i.e., free-flowing without a direct link to a lake or reservoir). Moreover, in this case, EPA has effectively concluded that 0.1 mg/l limit should be applied to all flowing waters without considering any of the relevant physical factors or whether the nutrient level is actually causing any use impairment. Such EPA action is both procedurally and substantively improper. First, States have primary authority to amend existing water quality standards and all amendments (state or federal) must be subjected to a public notice and comment process. For other states where EPA has determined that a numeric criterion was the applicable translator for a state's narrative standard, EPA has undergone notice and comment rulemaking. This is required by 40 C.F.R. §§ 131.21 and 22.

important biological response variable for nutrient-related problems. *Nutrient Criteria Technical Guidance Manual Rivers and Streams* (EPA-822-B-00-002 July 2000).

EPA's recent nutrient criteria adoption action in Florida was an example of such agency decision-making. Second, the Gold Book does not recommend that a 0.1 mg/L TP nutrient level be established for streams. Rather, the Gold Book expressly qualifies its recommendation for nutrients because of the dynamic interplay nutrients have with individual ecosystems and the range of potentially appropriate nutrient levels given varied site-specific conditions.[27] Thus, the Region has also failed to properly apply the recommended approach specified in the "Gold Book."

Response C.17.

As already explained, the Region imposed permit limits on a site-specific basis and has *not* "adopted a numeric criterion for all similar-situated waters in the state" in implementing the existing narrative criteria. Rather, the Region has translated the State's narrative criterion in accordance with 40 C.F.R. § 122.44(d)(1)(ii) and (vi), which allow consideration of EPA technical guidance and recommended criteria, including the Gold Book. The record clearly shows that EPA evaluated site-specific data in making a determination that a phosphorus limit was "necessary" within the meaning of regulations governing the NPDES permitting process.

Contrary to the comment, the Gold Book does cite the 0.1 mg/l as a recommended value for free-flowing streams. However, EPA agrees that the Gold Book elaborates on site-specific natural conditions that dictate the consideration of either a more or less stringent phosphorus level. Specifically, page 241 of the Gold Book states:

> "*There are natural conditions, also, that would dictate the consideration of either a more or less stringent phosphorus level. Eutrophication problems may occur in waters where the phosphorus concentration is less than that indicated above [100 μg/l] and, obviously, such waters would need more stringent nutrient limits. Likewise, there are those waters within the Nation where phosphorus is not now a limiting nutrient and where the need for phosphorus limits is substantially diminished. Such conditions are described in the last paragraph of this rationale.*"

This rationale indicates that in any free-flowing stream where total phosphorus is a limiting nutrient (such as the portion of the Merrimack River in question), the recommended total phosphorus value would be either 100 μg/l or less, if eutrophication problems could potentially occur at a lower concentration. The paragraph referenced above is found on page 243 of the Gold Book as follows:

"*It should be recognized that a number of specific exceptions can occur to reduce the threat of phosphorus as a contributor to lake eutrophy:*

1. Naturally occurring phenomena may limit the development of plant nuisances.

[27] Quality Criteria of Water (Gold Book) EPA 440/5-86-001 (May 1, 1986) (Recognizing that instream phosphorus levels "do not directly impact streams and rivers" and that "a number of specific exceptions can occur to reduce the threat of phosphorus"). Furthermore, EPA's document entitled "National Recommended Water Quality Criteria – Correction" (USEPA April 1999) specifies that no numeric recommendation has been proposed for phosphorus – only a "narrative statement" applies. This narrative statement requires consideration of site-specific information on whether or not the nutrient level is actually causing excessive plant growth and impairment of uses.

2. Technological or cost-effective limitations may help control introduced pollutants.
3. Waters may be highly laden with natural silts or colors which reduce the penetration of sunlight needed for plant photosynthesis.
4. Some waters morphometric features of steep banks, great depth, and substantial flows contribute to a history of no plant problems. Waters may be managed primarily for waterfowl or other wildlife.
5. In some waters nutrient other than phosphorus is limiting to plant growth: the level and nature of such limiting nutrient would not be expected to increase to an extent that would influence eutrophication.
6. In some waters phosphorus control cannot be sufficiently effective under present technology to make phosphorus the limiting nutrient."

In this case, the Nashua WWTF discharges into a free-flowing segment of the Merrimack River with evidence of eutrophication downstream (see Response C.8.) and with no lakes or impoundments immediately downstream. Based on the DO and chlorophyll *a* data which suggests that eutrophication is occurring downstream (see Response C.8.), it is clear that items one through four are not characteristic of the receiving water to the extent that they preclude nutrient growth. Additionally, EPA believes that phosphorus is a limiting nutrient in the receiving water and that it can be sufficiently controlled to effectively limit nutrient-related impairment (addressing items five and six). Hence, EPA considers the Gold Book value (100 µg/l) to be appropriate and protective given the site-specific ecological setting and a total phosphorus limit is thus justified and necessary to meet this instream target. EPA made this determination only after considering a range of other potential instream values in addition to the Gold Book, and upon reviewing the available water quality data pertaining to eutrophic response variables in the receiving water.

Comment C.18.

6. Reference Waters

The Fact Sheet discusses several guidance documents which contain recommended total phosphorus criteria based on an evaluation of the concentration of phosphorus expected in reference waters. Although the Fact Sheet notes that EPA did not choose to apply a reference-based phosphorus criterion, we note that such application is inconsistent with New Hampshire's narrative criterion, which requires a demonstration that phosphorus is causing excessive plant growth and/or dissolved oxygen impairment. Moreover, the application of reference-based nutrient criteria to implement the state's narrative criterion was rejected by the court in the State of Florida (February 2012).

The circumstances in Florida are identical to the circumstances in New Hampshire. Both narrative criteria limit nutrient concentrations to prevent designated use impairments. The court found that reference-based criteria are premised on preventing any change in nutrient concentrations that increase above the "reference" concentration. However, the narrative criteria limit increases in nutrient concentrations above the concentration that causes harm. Consequently, before the reference-based criteria can be applied, EPA must first demonstrate that these criteria are set at a threshold above which use impairment is caused by phosphorus.

Response C.18.

For reasons discussed above, EPA disagrees with the claim that a cause-and-effect link must be established between phosphorus and cultural eutrophication in the receiving water prior to implementing the state's narrative nutrient water quality standard through an NPDES permit limit, regardless of the methodological approach (*i.e.*, effects-based or reference). The decision cited to by Manchester is inapposite, and did not involve the circumstances under which EPA could impose of effluent limitations under Section 402 and 301 of the Act to implement an existing narrative water quality standard. As described in the Fact Sheet and acknowledged by the commenter, EPA did not choose to apply the reference-based Ecoregion phosphorus criterion, but rather the effects-based EPA Gold Book criterion as a numeric interpretation of New Hampshire's narrative water quality standards. This choice was based on a determination that the referenced-based criterion might be more stringent than necessary, based on the methodology used to generate the value, not on a reading of the NH WQS. Had it been determined that the reference-based criterion were more appropriate, EPA would simply need to demonstrate that this criterion is protective of water quality standards.

Comment C.19.

7. 7Q10 Flow Inappropriate for Nutrient Regulation

The phosphorus limit proposed in the City of Nashua permit was based and developed upon the calculated 7Q10 flow. However, nutrients are not toxics and their impacts are manifested over a growing season as discussed in EPA's Protocol for Developing Nutrient TMDLs (1999) (at 4-3).

> TMDL developers should be aware that nutrient problems tend to be seasonally expressed and in many cases might result from the accumulation of year-round loadings.

Criteria based on the prevention of toxic effects utilize low flow conditions in the development of water quality-based effluent limits to ensure that adverse effects, which are expressed over a short exposure period, do not occur. However, impairments associated with nutrients are not expressed in the same way. Rather, nutrient concentrations must stimulate plant growth which then causes use impairment. This conceptual model has a longer averaging period and does not require application under extreme low flow conditions as discussed in EPA's NPDES Permit Writers' Manual (September 2010).

> [T]he recommended nutrient criteria represent conditions of surface waters that have minimal impacts caused by human activities rather than values derived from laboratory toxicity testing.
>
> [S]tates may adopt seasonal or annual averaging periods for nutrient criteria instead of the 1-hour, 24-hour, or 4-day average durations typical of aquatic life criteria for toxic pollutants.
>
> (NPDES Permit Writers' Manual at 6-6)

Thus, it is well-settled that nutrient concerns for streams and rivers, to the extent they exist at all, are only a concern during the growing season (e.g. April – September). During this period, snow melt and wet weather result in stream flows typically far greater than 7Q10. As a result, the proposed limit was developed using a non-representative flow and is, consequently, unnecessarily stringent.

Response C.19.

The Clean Water Act requires that effluent limitations meet State water quality standards; therefore if a state's water quality standards require that water quality-based effluent limits be based upon a single, non-seasonal receiving water low flow to, for instance, introduce pollutant buffering capacity in the receiving water, the Clean Water Act would not allow these limits to be based on seasonal flows. Use of critical low flows to develop permit limits is consistent with New Hampshire Standards (*See* Env-Wq 1705.02(d), and with the reasonably conservative approach the Region has adopted in nutrient permitting in general. The Region has determined it is necessary in this case in particular to address evidence of cultural eutrophication in the receiving waters. Additionally, EPA notes that 7Q10 critical low flow conditions would typically occur during portions of the growing season (July – August) and are, thus, appropriate for permit limit development. During the growing season, when light and temperature are optimal for plant growth and the receiving water is subject to elevated nutrients concentrations, aquatic plant biomass growth can proliferate in relatively short periods of time. A permit limit of 0.1 mg/l calculated using seasonal flows would have the potential to allow periods of excessive loading of nutrients during and around critical low flow conditions while still meeting the overall limit. The resulting biomass from any plant growth would violate water quality standards and have the potential to settle into the sediments and contribute to future water quality violations. It is imperative, therefore, to ensure that phosphorus effluent discharges from the WWTF and the resulting ambient phosphorus concentrations are maintained at consistently low levels. A phosphorus effluent limit that assumes worst case hydrological conditions will accomplish the objective of maintaining consistently low phosphorus instream concentrations.

Comment C.20.

Based on these comments, it is respectfully requested that the Region withdraw the phosphorus, copper and lead limits from the Draft Permit. Under New Hampshire law, a narrative criteria violation requires some demonstration that a water body is being impaired by nutrients. The MPR-Study conducted on the Merrimack River by the USACOE demonstrated that this impairment does not exist. To impose a phosphorus limit, the Region must demonstrate that nutrients are, in fact, causing impairments in the Merrimack River and develop an instream phosphorus target based on the site-specific data used in that determination. Moreover, it is inappropriate to presume that a 0.1 mg/L TP level is required to protect all flowing waters from nutrient impacts. It is also scientifically inappropriate to base the proposed limit on the rarely occurring 7Q10 flow that does not control the degree of plant growth occurring in the river. Given the assumptions in the Region's approach to interpreting the state's narrative standard and setting phosphorus limits, the draft provision of 0.06 mg/l should be withdrawn.

Response C.20.

Based on EPA's responses above to each of the issues raised herein, the total phosphorus limit will remain in the Final Permit.

D. Comments from Martha Morgan, Water Programs Director, Nashua River Watershed Association ("NRWA")

Opening Comment:

The NRWA's goal for the Nashua River is to protect water quality for a variety of uses, including wildlife, fish and recreations. The Nashua River is an important recreational resource for local communities; the continued enjoyment of the river and survivability of aquatic life and wildlife depend on ongoing improvements in water quality.

There is renewed interest in the health of the Nashua River and its relation to economic viability in downtown Nashua, as evidenced by the newly-formed Nashua Waterways Committee. NRWA supports this revived interest in the river, and has a team of volunteer monitors sample at four sites along the Nashua River in downtown Nashua once a month from April to October to evaluate water quality.

NRWA is pleased that the City of Nashua has upgraded the Nashua Wastewater Treatment Facility, added the Wet Weather Flow Treatment Facility and will be providing at least primary disinfection treatment to high stormwater flows in the future, and understands the City has done so at considerable expense.

Response to Opening Comment:

EPA acknowledges the comment.

Comment D.1.

NRWA, in general, supports the provisions of the NPDES permit. Our comments primarily concern CSOs into the Nashua River. NRWA's overarching goal for the Nashua River would be to eliminate all CSOs entirely from occurring into the river. However, given that such events will occur, we request that the NRWA and public be notified of the timing, flow duration and volume when a CSO has occurred.

Condition #4 of the State Permit Conditions required under New Hampshire Statute RSA 485-A13, I(c), that "the wastewater facility shall give immediate notice of a bypass or upset to all public or privately owned water systems drawing water from the same receiving water and located within 20 miles downstream of the point of discharge regardless of whether or not it is on the same receiving water or on another surface water to which the receiving water is tributary".

NRWA requests that this notice be extended to the general public via a newspaper notice or website posting, for both the CSOs entering the Merrimack River and the CSOs along the Nashua River. Ideally, this notice would occur immediately following the CSO event, and not weeks or months later. Of particular concern are CSOs #7 and #8, located most upriver along the Nashua (and hence, affording more opportunity for river-to-people contact through downtown).

Notice of when, where and for how long CSOs occur, and the total volume released, should be made available for the safety of the public. NRWA's volunteers sample during and after wet weather events, and knowledge of CSO occurrence would allow us to extend a cautionary notice to our volunteers. Additionally, we would incorporate information regarding CSOs into year-end data reports.

Response D.1.

The conditions under which CSO discharges may occur are the nine minimum controls (NMCs) set forth in Part I.B of the Draft Permit. NMC #8 requires the implementation of a program to provide the public with adequate notification of CSO occurrences and impacts (i.e., a "public notification program"). Part I.B spells out numerous requirements relating to the NMCs including, but not limited to, requirements for:

- reviewing and updating its NMC implementation program within 12 months of the effective date of the permit (Part I.B.1.c),
- updating its website to include the most current information on CSO activations within six months of the effective date of date of the permit (Part I.B.3.e (6)), and
- developing a planned notice list for CSO discharges within one month of the effective date of the permit (Part I.B.3.e (7)).

EPA encourages the City to incorporate the suggestions in the above comment in any revisions to its public notification program. The City should consider broadening the notifications to downstream water supply systems of CSO discharges as set out in Part I.B.3.e (7) to include persons or groups requesting such notice, providing real-time notice on the City's web site, and/or providing e-mail notifications within 24 hours of the onset of a CSO discharge to persons or groups requesting such notice. Finally, it should be noted that the monitoring results which Manchester submits to EPA may be accessed by the public via the online tool *Enforcement and Compliance History Online* (ECHO), found at echo.epa.gov.