

ATTACHMENT 6

**CITY OF MANCHESTER COMMENTS
Draft NPDES Permit
No. NH0100170**

Dated: November 14, 2013

Kevin A. Sheppard, P.E.
Public Works Director

Timothy J. Clougherty
Deputy Public Works Director

Frederick J. McNeill, P.E.
Chief Engineer



ATTACHMENT 6
Page 1 of 18
Commission
Raymond Hebert
Harold Sullivan
Rick Rothwell
Bill Skouteris
Philip Hebert

CITY OF MANCHESTER
Highway Department
Environmental Protection Division

November 14, 2013

Ms Meridity Timony
U.S. EPA Region 1 (New England)
5 Post Office Square
Suite 100 (Mail Code OEP06-01)
Boston, MA 02109-3912

#13-19-PS

RE: Comments to Nashua's Draft NPDES Permit NH0100170

Dear Ms Timony:

The City of Manchester is providing the following comments to the Nashua's 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 the "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

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..."

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 of 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 ug/l and a TP of 67 ug/l. Table 4 should read as follows:

Station	Date	Chlor-a ug/l	TP ug/l
02M-MER	7/27/2010	20.85	36
M070*	9/21/2010	2	67
MIN		2	67
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 10/5/207 sample.

The Phosphorus section in the Fact Sheet says, "*nutrients can promote 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 80 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 ug/l. By adding the effluent concentration (after dilution) to the new background concentration, there is*

potential to be at 130 ug/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.

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 in stream 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 of 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 mass loading calculates to an average daily phosphorus discharge of 4 mg/l at 5 mgd. Nashua's draft permit is for 1/6th 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 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.

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 of TP removed from the future "Reasonable Potential" load into the Merrimack River daily.

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 ug/l maximum facility discharge at 5 mgd with a concentration of 14 mg/l).

This does not include the 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.

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 pending 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 River 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 potential 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.

LOW DISSOLVED OXYGEN INDICATES NUTRIENT AND CHLOROPHYLL-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 any 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 ug/l. Upstream flow was at 2.5 X the 7Q10 equaling 1,225 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 ug/l giving an upstream TP concentration of 411 lbs. The newly calculated in stream median is 51.5 ug/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 ug/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 2**). 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.

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 ug/l, the average is 2 ug/l and the median is 2 ug/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 ug/l for freshwater chronic. As the average/median upstream concentration is 2 ug/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 ug/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 ug/l for typical non-clean sampling conditions and not the 20 ug/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 chronic aluminum criterion (87 ug/l) and does not correctly reference the Copper criterion as outlined in the NHDES CALM.

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 ug/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 ug/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 ug/l for freshwater chronic. As the upstream median is 0.5 ug/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 ug/l), as outlined in Table 3-32 of the CALM and multiply that by the dilution factor of 28.5 you get a leadr discharge concentration of 137 ug/l and not the 0.54 ug/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 concentration 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.

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 differing 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 gathered 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 given 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.

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 CFR § 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.

1. Misapplication of 40 CFR § 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 CFR 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 CFR 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 CFR 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.¹

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.²

On its face, 122.44(d) itself indicates that more restrictive limits only apply if the discharge “causes” a water quality criteria excursion³ 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.⁴

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.

¹ Sufficient does not mean that the individual facility must ensure WQS are attained, but that the selected criteria, when achieved will produce this result.

² 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.

³ The “or contributes” language means it is contributing to the “cause” of the violation.

⁴ *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);

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 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 discussion⁵ 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

⁵ 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.

waters are in violation of the narrative standard. The 1989 preamble discussion 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.⁶ 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 CFR 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 CFR 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

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) list.⁷ 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 the Merrimack River or assert that a narrative criteria violation related to nutrients exists in this waterbody.

⁶Under 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).

⁷As 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.

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)⁸.

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 in this permit action is arbitrary and capricious.

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)⁹, the Protocol for Developing Nutrient TMDLs (EPA, 1999)¹⁰, and EPA's guidance on Using Stressor-response Relationships to Derive Numeric Nutrient Criteria (2010)¹¹.

⁸ 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.

⁹ USEPA. September 1995. Technical Guidance Manual for Developing Total Maximum Daily Loads. Book II: Streams and Rivers. Part I: Biochemical Oxygen Demand/Dissolved Oxygen and Nutrients/Eutrophication. EPA 823-B-95-007.

¹⁰ USEPA. November 1999. Protocol for Developing Nutrient TMDLs. First Edition. EPA 841-B-99-007

¹¹ USEPA. November 2010. Using Stressor-response Relationships to Derive Numeric Nutrient Criteria. EPA-820-S-10-001.

[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 levels 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.

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 TP 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. 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.¹² Thus, the Region has also failed to properly apply the recommended approach specified in the "Gold Book."

¹² 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.

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.

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.

Based on the information contained in 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.

Respectfully submitted,

Ricardo Cantu
Superintendent, Manchester WWTP

Cc: Fred McNeill, P.E.
Harry T. Stewart, P.E., NHDES
Mario Leclerc, City of Nashua

