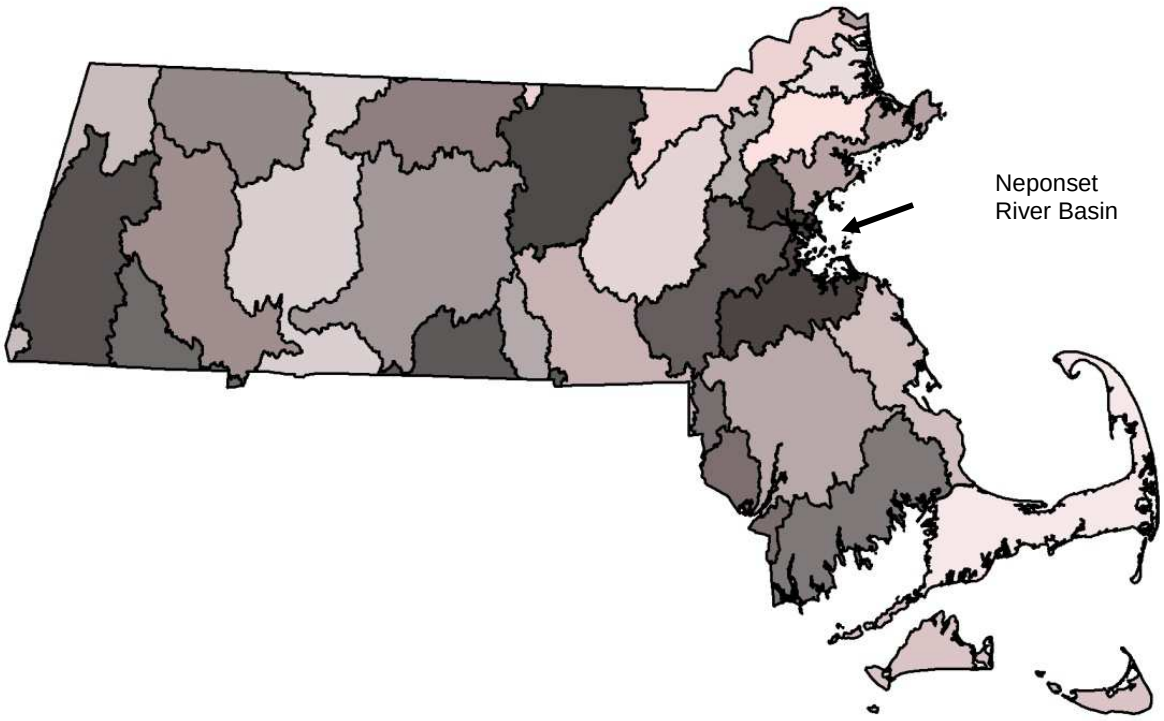
Addendum: Final Total Maximum Daily Loads of Bacteria for Neponset River Basin (CN 121.5)



Massachusetts Department of Environmental Protection
Division of Watershed Management
627 Main Street
Worcester, MA 01608

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1.0 Introduction

Section 303(d) of the Federal Clean Water Act (CWA) and Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR Part 130) require states to place waterbodies that do not meet established water quality standards on a list of impaired waterbodies (commonly referred to as the "303d Integrated List") and to develop Total Maximum Daily Loads (TMDLs) for listed waters and the pollutant(s) contributing to the impairment. As a result of monitoring and assessment activities, 4 impaired segments have been identified in the Neponset Watershed with the cause identified as bacteria (Escherichia coli) and listed in the Massachusetts Year 2012 Integrated List of Waters pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act. These segments require a Total Maximum Daily Load (TMDL) to be derived. Since a Neponset Bacteria TMDL (MassDEP 2002) was previously approved by EPA, the 4 new impaired segments were identified in the 2012 Integrated List as being covered by the Neponset Bacteria TMDL (MassDEP 2002).

The 2002 Neponset Bacteria TMDL report (MassDEP 2002) anticipated that any future impairment listings, where bacteria are identified as the cause, would be covered by the TMDL. Massachusetts procedure specifies that Watershed Bacteria TMDLs may, in appropriate circumstances, also apply to segments that are listed for bacteria impairment in future Massachusetts CWA § 303(d) Integrated List of Waters. For such segments, this Watershed Bacteria TMDL may apply if, "after listing the waters for bacteria impairment and taking into account all relevant comments submitted on the future CWA § 303(d) Integrated List of waters the Commonwealth determines with USEPA approval of the CWA § 303(d) list that previously approved Watershed Bacteria TMDL should apply to newly listed impaired segments". This addendum was developed by MassDEP with the intention of seeking approval to add these 4 segments to the "Final Bacteria TMDL for the Neponset Watershed (CN 121)", approved by EPA in 2002. A summary of the segments covered under this addendum is provided in Table 1 Addendum and the location of these new impairments is shown in Figure 1 Addendum.

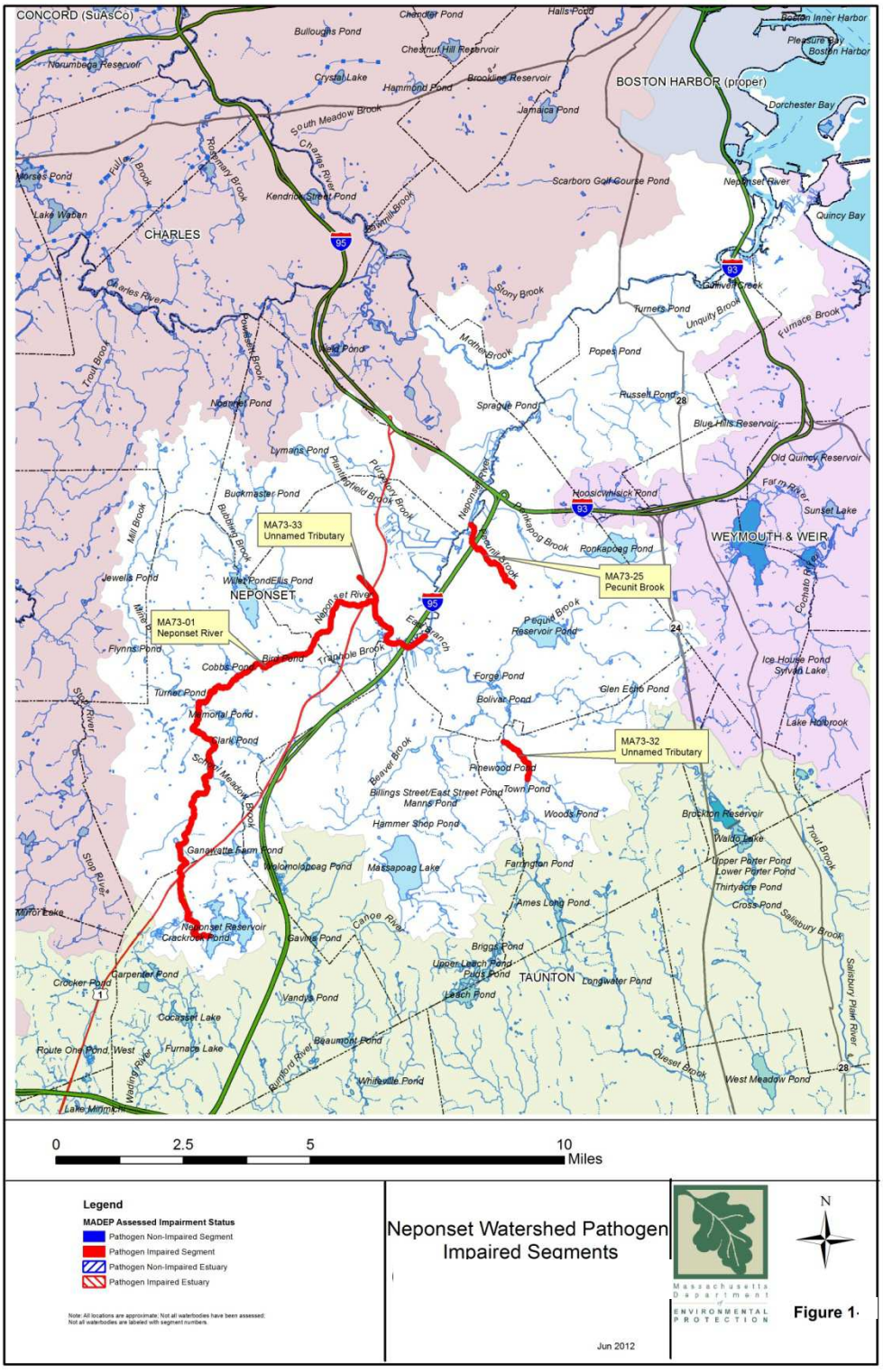
Within that Final 2002 Neponset Bacteria TMDL submission, Massachusetts included all impaired waterbodies with bacteria as the cause up to the "Massachusetts Year 2002 Integrated List of Waters" cycle. The Surface Water Quality Assessment Report for the Neponset published in 2004 identified an additional 4 impaired segments (Escherichia coli) that have been included in Category 5 of the Draft 2012 Integrated report (MassDEP 2010).

Sections 1, 4, 5, 6, 7, 8 and 11 of this addendum provide information that is relevant to the newly listed bacteria impaired segments. All other sections of the Bacteria TMDL for the Neponset Watershed that was approved in 2002 remain relevant. This addendum summarizes the information for these segments including impairment location (Figure 1 Addendum), Surface Water Quality Standards (Table 2 Addendum), Bacteria Sources (Table 3 Addendum), Bacteria TMDL Allocations (Table 4 and 6 Addendum) and Bacteria Load reductions (Table 5 Addendum).

Table 1. Addendum: 2012 Impairments Proposed for Coverage under Neponset Bacteria TMDL (CN 121).

Waterbody	Segment	New Impairment Cause(s)
Neponset River	MA73-01	Escherichia coli
Pecunit Brook	MA73-25	Escherichia coli
Unnamed Tributary	MA73-32	Escherichia coli
Unnamed Tributary	MA73-33	Escherichia coli

Figure 1 Addendum: Neponset Pathogen Impaired Segments (MassDEP 2012).



2.0 Neponset River Basin (See Final Neponset Bacteria TMDL (CN 121))

3.0 Problem Assessment (See Final Neponset Bacteria TMDL (CN 121))

4.0 Water Quality Standards

The 2002 "TMDL of Bacteria for Neponset River Basin" used Fecal Coliform Bacteria as the water quality standard criteria. At that time, for Class B waters such as the Neponset River and tributaries, the water quality standards required that fecal coliform bacteria shall not exceed a geometric mean of 200 organisms per 100 ml in any representative set of samples, nor shall more than 10 percent of the samples exceed 400 organisms per 100 ml.

In January, 2007, the Surface Water Quality Standards for Bacteria in the Commonwealth of Massachusetts were revised to Escherichia coli bacteria. Numerous water quality studies conducted nationwide had indicated that E. coli is a more representative indicator in determining the presence of pathogens that are a direct threat to human health. Even though Massachusetts has adopted the E. coli organism as the determining criteria in its Water Quality Standards, the intent of the fecal coliform criteria for the 20 segments in the original 2002 TMDL will still apply for those segments. Massachusetts believes that the magnitude of bacteria (fecal coliform) loading reductions outlined in the original 2002 TMDL will be sufficient to attain the revised Water Quality Standards criteria for E. coli. The E. coli criteria in the revised Standards (MassDEP, 2007) will be applied to the four additional segments in this Addendum as summarized in Table 2 below. The revised Standards can be accessed at the following website: http://www.mass.gov/dep/service/regulations/314cmr04.pdf.

Table 2 Addendum: Massachusetts Surface Water Quality Standards (MassDEP 2007) and Waste Load Allocations (WLAs) and Load Allocations (LAs) as Daily Concentrations (Cfu/100mL).

Surface Water Classification	Pathogen Source	Waste Load Allocation Indicator Bacteria (cfu/100 mL)[1]	Load Allocation Indicator Bacteria (cfu/100 mL)[1]
B (prohibited)	Illicit discharges to storm drains	0	Not applicable
	Leaking sanitary sewer lines	0	0
	Failing septic systems	Not Applicable	0
	Sanitary Sewer Overflows	0	0
B	Any regulated discharge- including stormwater runoff[2] subject to Phase I or II NPDES permits, NPDES wastewater treatment plant discharges [4,5], and combined sewer overflows[6].	Either; a) E. coli <=geometric mean[3] 126 colonies per 100 ml; single sample <=235 colonies per 100 ml; or b) Enterococci geometric mean[3] <= 33 colonies per 100 ml and single sample <= 61 colonies per 100 ml	Not Applicable

Surface Water Classification	Pathogen Source	Waste Load Allocation Indicator Bacteria (cfu/100 mL)[1]	Load Allocation Indicator Bacteria (cfu/100 mL)[1]
	Nonpoint source stormwater runoff[2]	Not Applicable	Either a) E. coli <=geometric mean[3] 126 colonies per 100 ml; single sample <=235 colonies per 100 ml; or b) Enterococci geometric mean[3]<= 33 colonies per 100 ml and single sample <= 61 colonies per 100 ml

[1] Waste Load Allocation (WLA) and Load Allocation (LA) refer to fecal coliform densities unless specified in table.
[2] The expectation for WLAs and LAs for stormwater discharges is that they will be achieved through the implementation of BMPs and other controls.
[3] Geometric mean of the 5 most recent samples is used at bathing beaches. For all other waters and during the non-bathing season the geometric mean of all samples taken within the most recent six months, typically based on a minimum of five samples.
[4] Or shall be consistent with the Waste Water Treatment Plant (WWTP) National Pollutant Discharge Elimination System (NPDES) permit.
[5] Seasonal disinfection may be allowed by the Department on a case-by-case basis.
Note: this table represents waste load and load allocations based on water quality standards current as of the publication date of these TMDLs. If the pathogen criteria change in the future, MassDEP intends to revise the TMDL by addendum to reflect the revised criteria.
[6] Or other applicable water quality standards for CSO's.

5.0 Bacteria Contamination in the Neponset River Watershed

The Neponset River Watershed 2004 Water Quality Assessment Report presents a summary of current water quality data/information in the Neponset River watershed used to assess the status of the designated uses as defined in the SWQS (MassDEP 2010). A summary of the four newly identified impairments, where bacteria is the cause, is outlined below in Table 3 Addendum along with the segment ID and description. These impaired segments will require additional bacterial source tracking work and implementation of structural and non-structural Best Management Practices (BMPs). It should be noted that in all cases, waters exceeding the water quality standards identified in Table 2 are considered impaired. A description of the water quality data to support the primary and secondary recreation contact assessment for the additional bacteria impacted segments is provided below.

Neponset River (Segment MA73-01)

The Neponset River segment (MA73-01) originates at the outlet of Neponset Reservoir, Foxborough and extends to its confluence with East Branch, Canton. The segment is a Class B, Warm water fishery and extends for about 13 miles (MassDEP 2010).

NepRWA collected water quality samples and analyzed them for E. coli samples at three sites in 2007 and 2008. The annual geometric means of the samples collected at each site during the primary contact season ranged from 22 CFU/100ml to 185 CFU/100ml. The results for at least one location within the segment exceeded the geometric mean criterion (126 CFU/100ml) for E. coli, and therefore, the waterbody was impaired for primary contact recreation (MassDEP 2010).

Pecunit Brook (Segment MA73-25)

The Pecunit Brook segment (MA73-25) originated at the headwaters east of York Street, Canton and extends to the inlet of Forge Pond, Canton. The segment is Class B and has a length of approximately 1.3 miles (MassDEP 2010).

NepRWA collected water quality samples and analyzed the for E. coli samples at one site in 2007 and 2008. The annual geometric means of the samples collected at each site during the primary contact season ranged from 93 CFU/100ml to 227 CFU/100ml. The results for at least one location within the segment exceeded the geometric mean criterion (126 CFU/100ml) for E. coli, and therefore, the waterbody was impaired for primary contact recreation (MassDEP 2010).

Unnamed Tributary (Segment MA73-32)

The unnamed tributary (MA73-32) segment extends from the outlet of Town Pond, Stoughton to the confluence with Steep Hill Brook, Stoughton. The segment is Class B and approximately 1 mile in length (MassDEP 2010).

NepRWA collected E. coli samples at one site in 2007 and 2008. The annual geometric mean of the samples collected at the site during the primary contact season was 143 CFU/100ml. These results violated the geometric mean criterion (126 CFU/100ml) for E. coli, and therefore, the waterbody was impaired for primary contact recreation (MassDEP 2010).

Unnamed Tributary (Segment MA73-33)

The unnamed tributary (MA73-33, locally known as "Meadow Brook") segment extends from where the underground/culverted stream emerges east of Pleasant Street, Norwood to confluence with Neponset River, Norwood. The segment is Class B and approximately 0.6 mile in length (MassDEP 2010).

NepRWA collected E. coli samples at one site in 2007 and 2008. The annual geometric means of the samples collected at the site during the primary contact season were 1412 CFU/100ml and 2862 CFU/100ml. These results violate the primary contact recreation geometric mean criterion (126 CFU/100ml) for E. coli and the secondary contact recreation geometric mean criterion (630 CFU/100ml) for E. coli. The waterbody was impaired for both primary and secondary contact recreation (MassDEP 2010).

6.0 Identification of Fecal Coliform Bacteria Sources

Largely through the efforts of the NepRWA, the stream teams (citizen monitoring groups active in several subwatersheds of the Neponset River watershed), and MassDEP field staff, additional bacteria impairments in the Neponset river basin have been identified. The NepRWA has effectively used its monitoring program to identify bacteria sources and initiate the implementation of necessary controls.

It is difficult to provide accurate quantitative estimates of bacteria contributions from the various sources in the Neponset River Basin because many of the sources are diffuse and intermittent, and extremely difficult to monitor or accurately model. Therefore, a general level of quantification according to source category is provided. This approach is suitable for the TMDL analysis because it indicates the magnitude of the sources and illustrates the need for controlling them. Additionally, many

of the sources (failing septic systems, leaking sewer pipes, sanitary sewer overflows, and illicit sanitary sewer connections) are prohibited because they indicate a potential health risk and, therefore, must be eliminated. Table 3, summarizes the river segments impaired due to measured E. coli contamination, and identifies suspected and known sources (MassDEP, 2002).

Table 3 Addendum: Summary of Suspected Bacteria Sources of Pollution.

Location	Surface Water Class	Description	Known and Suspected Sources
Neponset River MA73-01	B	Outlet of Neponset Reservoir, Foxborough to confluence with East Branch, Canton. (through former pond segments Crackrock Pond MA73010 and Bird Pond MA73002)	Illicit sewer connections, storm water runoff, and failing septic systems. Industrial and Commercial sources possible
Pecunit Brook MA73-25	B	Headwaters east of Carey Circle and west of Pecunit Street, Canton to the confluence with Neponset River, Canton.	Illicit sewer connections, storm water runoff, and failing septic systems
Unnamed Tributary MA73-32	B	From the outlet of Town Pond, Stoughton to the confluence with Steep Hill Brook, Stoughton.	Illicit sewer connections, storm water runoff, and failing septic systems.
Unnamed Tributary MA73-33	B	Locally known as "Meadow Brook" - From where the underground/culverted stream emerges east of Pleasant Street, Norwood to confluence with Neponset River, Norwood.	Primary cause is sewage exfiltration into sewer underdrains in Norwood. Additional sources include stormwater runoff including commercial sources along Route 1.

Illicit sewer connections into storm drains result in direct discharges of sewage via the storm drainage system outfalls. The existence of illicit sewer connections to storm drains is well documented in many urban drainage systems, particularly older systems that may have once been combined. Storm water runoff is another significant contributor of bacteria related pollution. During rain events, fecal matter from domestic animals and wildlife are readily transported to surface waters via the storm water drainage systems and/or overland flow. The natural filtering capacity provided by vegetative cover and soils is dramatically reduced as urbanization occurs because of the increase in impervious areas (i.e., streets, parking lots, etc.) in the watershed. Failed or non-conforming septic systems, however, can be a contributor of bacteria related pollution to the Neponset River and tributaries, though NepRWA feels their water quality data suggests failed septic systems are a relatively minor source in comparison with sewage and stormwater related sources. Wastes from failing septic systems can enter surface waters either as direct overland flow or via groundwater. Wet weather events typically increase the rate of transport of pollutant loadings from failing septic systems to surface waters because of the wash-off effect from runoff and the increased rate of groundwater recharge.

7.0 Total Maximum Daily Load Development

Section 303 (d) of the Federal Clean Water Act (CWA) requires states to place water bodies that do not meet the water quality standards on the Integrated List of impaired waterbodies. The CWA requires each state to establish Total Maximum Daily Loads (TMDLs) for listed waters and the pollutant

contributing to the impairment(s). TMDLs determine the amount of a pollutant that a waterbody can safely assimilate without violating the water quality standards. Both point and nonpoint pollution sources are accounted for in a TMDL analysis. Point sources of pollution (those discharges from discrete pipes or conveyances) receive a wasteload allocation (WLA) specifying the amount of pollutant each point source can release to the waterbody. Nonpoint sources of pollution (all sources of pollution other than point) receive a load allocation (LA) specifying the amount of a pollutant that can be released to the waterbody by this source. In accordance with the CWA, a TMDL must account for seasonal variations and a margin of safety, which accounts for any lack of knowledge concerning the relationship between effluent limitations and water quality. Thus:

TMDL = WLAs + LAs + Margin of Safety

Where:

WLA = Waste Load Allocation which is the portion of the receiving water's loading capacity that is allocated to each existing and future point source of pollution.

LA = Load Allocation which is the portion of the receiving water's loading capacity that is allocated to each existing and future non-point source of pollution (and point sources not subject to NPDES permits).

TMDLs may also be expressed as daily concentrations as described below.

Waste Load Allocations (WLAs) and Load Allocations (LAs) As Daily Concentration (cfu/100 mL).

The pollutant loading that a waterbody can safely assimilate is expressed as either mass-per-time, toxicity or some other appropriate measure (40 C.F.R. § 130.2(i)). Typically, TMDLs are expressed as total maximum daily loads, however, in 2002, MassDEP expressed the original Bacteria TMDL for Neponset River Basin in terms of the fecal coliform standard (then) that was expressed in terms of the concentration of organisms per 100 ml. With that particular TMDL, it was determined that to ensure attainment with Massachusetts' water quality standards for bacteria, all sources (at their point of discharge to the receiving water) must be equal to or less than the water quality standard. For this addendum TMDL submission, MassDEP will continue to express the TMDL in terms of the bacteria standard concentration, but instead of using fecal coliform criterion, it will use the Escherichia coli (E. coli) criterion as expressed in the current Water Quality Standards (314CMR4). The Neponset Bacteria TMDL is simply set equal to the standard for E. coli which is a geometric mean of less than 126 cfu/100mL.

The goal to attain water quality standards at the point of discharge is environmentally protective, and offers a practical means to identify and evaluate the effectiveness of control measures. In addition, this approach establishes clear objectives that can be easily understood by the public and individuals responsible for monitoring activities. Also, the goal of attaining standards at the point of discharge minimizes human health risks associated with exposure to pathogens because it does not consider losses due to die-off and settling that are known to occur.

Table 4 Addendum: E. coli Waste Load Allocations (WLAs) and Load Allocations (LAs) for the Neponset Watershed.

Surface Water Classification	Bacteria Source Category	WLA (cfu/100mL)	LA (cfu/100mL)
B	Illicit Discharges to Storm Drains	0	N/A
B	Leaking Sanitary Sewers	0	0

Surface Water Classification	Bacteria Source Category	WLA (cfu/100mL)	LA (cfu/100mL)
B	Failing Septic Systems	N/A	0
B	Sanitary Sewer Overflows	0	0
B	Storm Water Runoff	GM<126	GM<126

Ideally, the TMDL should provide a discussion of the magnitudes of the pollutant reductions needed to attain the goals of the TMDL. Since accurate estimates of existing sources are generally unavailable, it is difficult to estimate the pollutant reductions for specific sources. For the illicit sources, the goal is complete elimination (100% reduction). However, overall wet weather bacteria load reductions can be estimated using typical storm water bacteria concentrations from wet weather data observed within these four segments in the Neponset Basin.

Overall reductions in ambient instream bacteria levels needed to attain water quality standards can be roughly estimated using the NepRWA ambient E. coli data that are available for the Neponset Basin. Using ambient data is beneficial because it provides more realistic estimates of existing conditions and the magnitude of cumulative loading to the surface waters. However it is important to note that the NepRWA monitoring program collects individual grab samples which are not representative of the full range of loading conditions across a given storm. In addition, the NepRWA sampling program collects data at a limited number of sites and in many cases these sites are distant from individual pollution sources and as such may understate stream impacts associated with specific pollution sources. Reductions are calculated using data from both wet weather conditions and combined wet and dry conditions, and are presented in Table 5. Data are from 2007-2008, since NepRWA monitoring began within these four segments in 2007 (MassDEP 2010). This information indicates that for the four segments covered in this Addendum Report, reductions in ambient instream bacterial concentrations ranging from 0 to 96% will be necessary in order to meet bacterial water quality standards (see Table 5 Addendum below).

Table 5 Addendum: Estimates of Instream E. Coli Loading Reductions to the Neponset R. and Tributaries.

Segment	Neponset River (MA73-01)	Pecunit Brook (MA73-25)	Unnamed tributary (MA73-32	Unnamed tributary (MA73-33)
Wet Weather Geometric Mean	56 (cfu/100mL)	48 (cfu/100mL)	54 (cfu/100mL)	1,659 (cfu/100mL)
Percent Reduction – Primary Contact	0%	0%	0%	92%
Highest Geometric Mean/Location (wet&dry)	185 (cfu/100mL)	227 (cfu/100mL)	143 (cfu/100mL)	2,862 (cfu/100mL)
	2007, S. Street, N=4	2007, @ Rt 138, N=9	2008, @ Central St., N=5	2008, @Sunnyside Rd., N=5
Percent Reduction -Primary Contact	32%	44%	12%	96%
Geometric mean to be less than or equal to 126 organisms per 100 ml.				

Since there is no water quality data for Enterococcus, no load reductions can be calculated for this indicator.

TMDL Expressed as Daily Load (CFU/Day)

Flow in rivers and streams is highly variable. Nearly all are familiar with seeing the same river as a raging torrent and at another time as just a trickle. In many areas, seasonal patterns are evident. A common pattern is high flow in the spring when winter snow melts and spring rains swell rivers. Summer time generally is a period of low flows except for the extreme events of heavy rainfall that may include large storms or even hurricanes. Across the United States, the US Geological Survey and others maintain a network of stream gages that measure these flows on a continuous basis thus providing quantitative values to the qualitative scenes described above. These flow measurements are reported in terms of a volume of water passing the gage in a given time period. Often the reported values are in cubic feet per second. A cubic foot of water is 7.48 gallons, and flows can range from less than a cubic foot per second to many thousands of cubic feet per second depending on the time of year and the size of the river or stream. The size of the river or stream and the amount of water that it usually carries, is determined by the area of land it drains (known as a watershed), the type of land in the watershed, and the amount of precipitation that falls on the watershed. A common way that USGS reports flow is the cubic feet per second (cfs) averaged over a day since flow can vary even over the course of a day.

In addition to quantity, there is of course a quality aspect to water. Most chemical constituents are measured in terms of weight per volume, generally using the metric system with milligrams (mg) per liter (L) as the units. A milligram is one thousandth of a gram, 28 of which weigh one ounce. A liter is slightly more than a quart, so there are 3.76 L in a gallon. The total amount of material is called mass and is the quantity in a given volume of water. For instance, if a liter of water had 16 milligrams of salt and one evaporated all of the water, the 16 milligrams of salt would remain. A volume of two liters with the same 16 mg/L of salt would yield 32 milligrams of salt upon evaporation of the water. So, the total amount of material in a volume of water is the combination of the amount (volume) of water and the concentration of the substance being assessed. These two characteristics, in compatible units, are multiplied to determine the quantity of the material present. In the case of a river or stream, the total amount of material passing a gaging station in a day is the total volume multiplied by the concentration of the chemical being assessed. This quantity often is referred to as “load”, and if the time frame is a day, the quantity is called the “daily load”. If a year is used as the time frame it is called a “yearly” or “annual” load.

Bacteria also can be discussed in terms of concentrations and loads. However, the common way of expressing concentrations of bacteria is in terms of numbers rather than weight (although one could use weight). Bacteria standards for water are written in terms of concentrations, and while the method of determining the concentrations can be by direct count or estimated through the outcome of some reaction, it is numbers that are judged to be in a given volume of water. Once again, the load is determined by the concentration multiplied by the volume of water. As can be seen, changes in concentration and/or changes in flow result in changes in the loads. Also, maximum loads can increase and if flow increases in proportion, the concentration will remain the same. For instance, if the total number of bacteria entering a section of stream doubles, but the flow also doubles, the concentration remains the same. This means that as flow increases, allowable load can increase so that concentration remains constant (or lower if dilution occurs) while continuing to meet the water quality criterion. In its simplest application, this is the concept of the flow duration curve approach. At each given flow, the maximum load that can enter and still meet the concentration criterion is set. If the numbers of bacteria entering are higher than this allowable number, then a reduction is needed. As a practical matter, determining the flow at each sampling point is resource intensive, expensive and generally is not done.

Given this, however, some estimates of flow can be derived from USGS gages in the watershed or in nearby similar watersheds if there is no gage in the impaired stream.

The pollutant loading that a waterbody can safely assimilate is expressed as either mass-per-time, toxicity or some other appropriate measure (40 CFR § 130.2)1. Typically, TMDLs are expressed as total maximum daily loads. Expressing stormwater pathogen TMDLs in terms of daily loads is difficult to interpret given the very high numbers of indicator bacteria and the magnitude of the allowable load is dependent on flow conditions and, therefore, will vary as flow rates change. For example, a very high load of indicator bacteria is allowable if the volume of water that transports indicator bacteria is also high. Conversely, a relatively low load of indicator bacteria may exceed the water quality standard if flow rates are low. Given the intermittent nature of stormwater related discharges, MassDEP believes it is appropriate to express stormwater-dominated indicator bacteria TMDLs proportional to flow for flows greater than 7Q10. This approach is appropriate for stormwater TMDLs because of the intermittent nature of stormwater discharges. However, the WLAs for continuous discharges are not set based on the receiving water's proportional flow, but rather, are based on the criteria multiplied by the permitted effluent flow (applying the appropriate conversion factor). Because the water quality standard is also expressed in terms of the concentration of organisms per 100 mL, the acceptable in-stream daily load or TMDL is the product of that flow and the criterion.

In recognition that bacteria loads from stormwater are flow dependent, the total TMDL can be calculated as a function of flow, and allocated to different source categories, as shown in the following equation:

$$\mathbf{TMDL = WQS \times Q_T = WLA + LA + MOS + NB}$$

Where:
WLA = allowable load for point source categories (including piped stormwater)
LA = allowable load for nonpoint source categories
Q_T = stream flow on any given day when >7Q10
MOS = margin of safety
NB = natural background conditions
WQS = Massachusetts Water Quality Standard criterion

Calculating the TMDL as Daily Loads (Colonies/Day)

MassDEP believes it is appropriate to express indicator bacteria TMDLs proportional to flow. Because the water quality standard is also expressed in terms of the concentration of organisms per 100 mL, the acceptable in-stream daily load or TMDL is the product of that flow and the water quality standard criterion, which is the same approach used for any pollutant with a numerical criterion. In the case of embayments, contributing watershed runoff is the flow that is being used to determine the maximum daily load.

The TMDL is calculated based on flow or volume and the concentration of the applicable Massachusetts water quality standard criterion for bacteria in the river. Once the flow or volume is estimated, the total maximum daily load of bacteria in numbers per day is derived by multiplying the estimated flow or runoff volume by the water quality standard criterion for the indicator bacteria. The actual allowable load of bacteria in fresh water systems where the primary contact recreation standard applies, in numbers of bacteria per day, varies with flow at or above 7Q10 in each segment (as presented in Figure

2 Addendum [when E.coli is the indicator]] This approach sets a target for reducing the loads so that water quality criteria for indicator bacteria are met at all flows equal to or greater than 7Q10.

Example calculations for determining the TMDL are provided as follows:

For Rivers: The TMDL associated each 1.0 cubic foot per second of flow to meet a water quality standard of 126 cfu/100 ml (E.coli, Class B):

River Segment (E. coli, Class B) TMDL= (0.02832 m^3/sec) x (86,400 sec/day) x (1,000 liters/m^3) x (1,000 ml/liter) x (126 cfu/100ml) = 3.08 x 10^9 cfu/day.

For River segments the TMDL is proportioned between the WLA and LA by multiplying the daily load by the fraction impervious cover for the WLA, and by multiplying the daily load by the fraction pervious cover for the contributing watershed for the LA. Table 6 summarizes the TMDL for the fresh water segments in the Neponset Watershed.

Figure 2 Addendum – Maximum Load E.coli in Relation to River Flow.

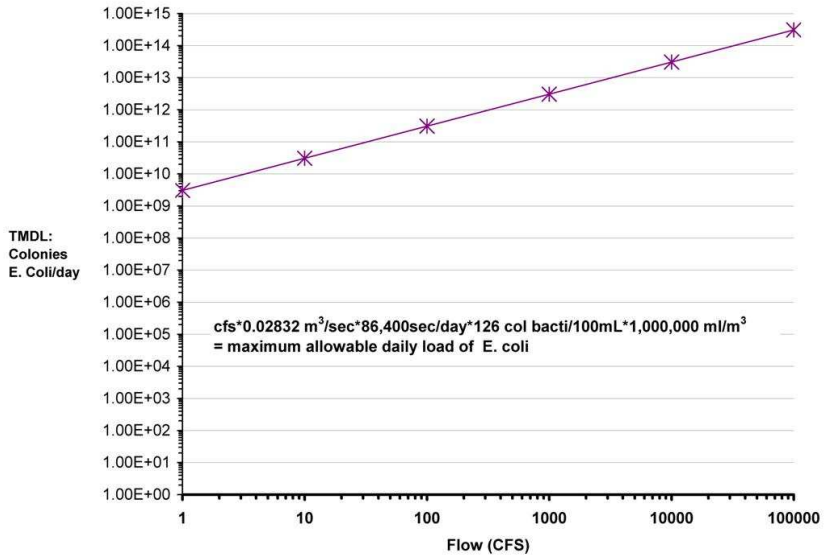


Table 6: Addendum: WLA and LA TMDL By River Segment for the Neponsett Watershed (E. coli indicator in CFU/Day).

	TMDL Allocation[1]	FLOW, cfs					
Segment[2], Waterbody	WLA						
WQS Classification	LA	1	10	100	1,000	10,000	100,000
Neponsett							
Neponset River, MA73-01, Class B	17.8%	5.49E+08	5.49E+09	5.49E+10	5.49E+11	5.49E+12	5.49E+13
	82.2%	2.54E+09	2.54E+10	2.54E+11	2.54E+12	2.54E+13	2.54E+14
Pecunit Brook, MA73-25, Class B	13.4%	4.14E+08	4.14E+09	4.14E+10	4.14E+11	4.14E+12	4.14E+13
	86.6%	2.67E+09	2.67E+10	2.67E+11	2.67E+12	2.67E+13	2.67E+14
Unnamed Tributary, MA73-32, Class B	22.4%	6.91E+08	6.91E+09	6.91E+10	6.91E+11	6.91E+12	6.91E+13
	77.6%	2.40E+09	2.40E+10	2.40E+11	2.40E+12	2.40E+13	2.40E+14
Unnamed Tributary, MA73-33, Class B	46.0%	1.42E+09	1.42E+10	1.42E+11	1.42E+12	1.42E+13	1.42E+14
	54.0%	1.67E+09	1.67E+10	1.67E+11	1.67E+12	1.67E+13	1.67E+14

[1] TMDL allocation: fraction of surface area of segment watershed for WLA (impervious) and LA (pervious), respectively

[2] All Class B segments based on 126 E. coli/100ml water quality standard.

Wasteload Allocations (WLAs) and Load Allocations (LAs)

There are several NPDES-permitted discharges within the watershed. NPDES discharge WLAs are set at the WQS. In addition, there are numerous storm water discharges from storm drainage systems throughout the watershed. All piped discharges are, by definition, point sources regardless of whether they are currently subject to the requirements of NPDES permits. Therefore, a WLA set equal to the WQS will be assigned to the portion of the storm water that discharges to surface waters via storm drains.

WLAs and LAs are identified for all known source categories including both dry and wet weather sources for the Class B segments within the Neponset watershed to which this addendum is applicable. Establishing WLAs and LAs that only address dry weather indicator bacteria sources would not ensure attainment of standards because of the significant contribution of wet weather indicator bacteria sources to WQS exceedances. Illicit sewer connections and deteriorating sewers leaking to storm drainage systems represent the primary dry weather point sources of indicator bacteria, while failing septic systems and possibly leaking sewer lines represent the non-point sources. Wet weather point sources include discharges from storm water drainage systems (including MS4s) and sanitary sewer overflows (SSOs). Wet weather non-point sources primarily include diffuse storm water runoff.

Stormwater Contribution

Part of the stormwater contribution originates from point sources and is included in the waste load allocation, and part comes from non-point sources and is included in the load allocation of the TMDL. The fraction of the runoff load attributed to the waste load allocation is estimated from the fraction of the watershed that has impervious cover because storm water from impervious cover is more likely to be diverted, collected and conveyed to the receiving water by storm water collection systems than non-impervious areas. The fraction of the TMDL associated with the wasteload allocation was estimated, using MassGIS and the algorithm within it to estimate the extent of impervious surface. The wasteload

allocation was then defined by multiplying the TMDL for each segment by the percent of imperviousness in each watershed. Likewise the load allocation was estimated using the percent pervious cover in each watershed. MassDEP believes this approach is conservative because it assumes that all runoff from impervious areas actually makes it to the waterbody segment in question, which may or may not always be the case.

Land use information from MassGIS was used to estimate the extent of impervious surface for each impaired segment. For example land use associated with the Neponset River segment MA73-01 is estimated to have 17.8% impervious land surface and 82.2% pervious. Thus, 17.8% of the acceptable bacteria load at a given flow is assigned as waste load allocation while 82.2% of the total load represents the load allocation. In this Class B segment the allowable bacteria load (E. coli) per day at a flow of 10 cfs is 5.49 $x10^9$ bacteria per day (Waste Load allocation) and 2.59 $x10^{10}$ bacteria per day (load allocation).

Margin of Safety

This section addresses the incorporation of a Margin of Safety (MOS) in the TMDL analysis. The MOS accounts for any uncertainty or lack of knowledge concerning the relationship between pollutant loading and water quality. The MOS can either be implicit (i.e., incorporated into the TMDL analysis through conservative assumptions) or explicit (i.e., expressed in the TMDL as a portion of the loadings). This TMDL uses an implicit MOS, through inclusion of two conservative assumptions. First, the TMDL does not account for mixing in the receiving waters and assumes that zero dilution is available. Realistically, influent water will mix with the receiving water and become diluted below the water quality standard, provided that the receiving water concentration does not exceed the TMDL concentration. Second, the goal of attaining standards at the point of discharge does not account for losses due to die-off and settling of indicator bacteria that are known to occur. Third, the TMDL assumes that all the runoff from impervious areas throughout the contributing watershed actually makes it to the impaired segment, which is generally not the case especially in large watersheds where impervious surfaces are not continually connected.

Seasonal Variability

In addition to a Margin of Safety, TMDLs must also account for seasonal variability. Pathogen sources to Neponset Watershed waters arise from a mixture of continuous and wet-weather driven sources, and there may be no single critical condition that is protective for all other conditions. This TMDL has set WLAs and LAs for all known and suspected source categories equal to the Massachusetts WQS independent of seasonal and climatic conditions. This will ensure the attainment of water quality standards regardless of seasonal and climatic conditions. Controls that are necessary will be in place throughout the year, protecting water quality at all times.

8.0 TMDL Implementation

The Final Neponset Bacteria TMDL (CN 121) included an Implementation Plan that identified a variety of actions to be taken by various stakeholders in the watershed. The provisions of the original TMDL Implementation Plan remain applicable to the additional stream segments which are the subject of the present TMDL Addendum.

Subsequent to the issuance of the 2002 Neponset Bacteria TMDL, Mass DEP and USEPA developed the 2005 document entitled “Mitigation Measures to Address Pathogen Pollution in Surface Waters: A TMDL Implementation Guidance Manual for Massachusetts: A Companion Document to Watershed-Specific Pathogen TMDL Reports.” Although not specific to the Neponset River Watershed Association, this document provides useful

information for stakeholders such as municipal MS4 program managers, conservation commissioners, and private landowners on strategies for effective implementation of Bacteria TMDLs. The recommendations of the 2005 manual should be considered applicable to stream segments identified in this TMDL Addendum, as well as to areas identified in the original 2002 Neponset Bacteria TMDL (MassDEP 2005).

The forthcoming revised EPA Phase II MS4 Stormwater Permit is expected to place additional, requirements on municipalities in the Neponset Watershed. A summary of the draft general permit can be viewed at the following link. http://www.epa.gov/region1/npdes/stormwater/mimsc_sms4.html

The new permit spells out requirements related to public education and participation, illicit connection detection and elimination, and good housekeeping for municipally owned facilities. The permit will require municipal regulation of post construction stormwater impacts at new development and redevelopment sites outside of areas of Wetlands Act jurisdiction, using a framework that mirror existing requirements under the MA Stormwater Policy in areas that are subject to Wetlands Act jurisdiction. The existing MA Stormwater Management Handbook requires permittees subject to Wetlands Protection Act jurisdiction to propose stormwater management measures that respond to applicable TMDLs, a requirement that will effectively be extended to upland areas by the expected requirements of the new MS4 permit. All of this, taken in conjunction with the expected TMDL-specific requirements of the new MS4 permit, will significantly strengthen the regulatory framework supporting implementation of the Neponset Bacteria TMDL and this Addendum.

The original 2002 Neponset Bacteria TMDL includes data on fecal coliform and E. coli concentrations in urban stormwater runoff from both local and national datasets. This data indicates that in order to comply with the required load allocations and waste load allocations, bacteria concentrations associated with urban runoff from new and existing impervious areas need to be reduced by at least 90% and in many cases more than 99% in order to meet the requirements of the TMDL for the Neponset Watershed. Reasonably available structural and non-structural BMPs should be implemented to minimize the amount of bacteria in stormwater runoff to the maximum extent practicable. This approach should apply to activities addressing both the municipally owned collection system (good housekeeping, IDDE, Structural BMPs), to public education activities, and to the exercise of their regulatory authority under the Wetlands Act and bylaws required by the Phase II Stormwater Permit.

Existing stormwater BMPs that have the capacity to remove bacteria from stormwater such as bioretention practices, infiltration, and stormwater wetlands, when properly designed and maintained have the potential to remove roughly 50-90% of the bacteria load from the treated effluent. The default water quality volume required under the MA Stormwater Policy is the first half inch of runoff.

9.0 TMDL Monitoring (See Final Neponset Bacteria TMDL (CN 121))

10.0 Reasonable Assurances (See Final Neponset Bacteria TMDL (CN 121))

11.0 Public Participation / Public Outreach

The Final Neponset Bacteria TMDL was approved by EPA in 2002. As part of that process two public meetings were held to present the bacteria TMDL for the Neponset River (Metropolitan District Commission's (MDC) Blue Hills Trailside Museum in Milton 6:30 to 9:00 pm on December 18, 2001 and 7:00 to 9:00 pm on February 12, 2002). All documentation concerning public review and comment is included in the original report (MassDEP 2002).

The public process for approval of the newly listed segments is as follows:

1. A Notice of Availability for public review of the Neponset Bacteria TMDL Addendum was published in the June 20, 2012 publication of the Environmental Monitor..

2. The public notice included a web link to the Neponset Bacteria TMDL (CN121), the 2012 Draft Integrated List and Neponset Bacteria TMDL Addendum (CN121.5). All the documents were posted on MassDEPs web site.
3. The public comment period ended on July 30, 2012.
4. A separate e-mail announcing the public comment period for the TMDL addendum was made to a target list of organizations and "stakeholder" groups, as well as to key contacts at other government agencies, as is typically done for DRAFT TMDL announcements.
5. MassDEPs response to public comment received is attached to this addendum.

12.0 References

MassDEP, 2002. Neponset River Pathogen TMDL can be found on the website: http://www.mass.gov/dep/water/resources/tmdls.htm. Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Department of Environmental Protection, Division of Watershed Management, Worcester, MA.

MassDEP 2005. Mitigation Measures to Address Pathogen Pollution in Surface Water: A TMDL Implementation Guidance Manual for Massachusetts, http://www.mass.gov/dep/water/resources/impguide.pdf.

MassDEP, 2007. Revised Water Quality Standards can be found on the following website: http://www.mass.gov/dep/water/laws/regulati.htm#wqual. Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Department of Environmental Protection, Division of Watershed Management, Boston, MA.

MassDEP, 2010. Neponset River Watershed 2004 Water Quality Assessment Report can be found on the following website: http://www.mass.gov/dep/water/resources/wqassess.htm#wqar. Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Department of Environmental Protection, Division of Watershed Management, Worcester, MA.

MassDEP, 2011. Notes from DWM Staff on the Neponset River Watershed 2004 Water Quality Assessment Report. Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Department of Environmental Protection, Division of Watershed Management, Worcester, MA.

Mass DEP 2012, Proposed Massachusetts Year 2012 Integrated List of Waters, Proposed Listing of the Condition of Massachusetts' Waters Pursuant to Sections 303(d) and 305(b) of the Clean Water Act, Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Department of Environmental Protection, Division of Watershed Management, Worcester, MA.

Attachment 1 – Public Notice Addendum

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
Central Regional Office • 627 Main Street, Worcester MA 01608 • 508-792-7650

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

Notice of Availability: Draft Addendum: Final Total Maximum Daily Loads of Bacteria for Neponset River Basin (CN 121.5)

The Massachusetts Department of Environmental Protection (MassDEP) announces the availability for public comment the Draft Addendum: Final TMDL of Bacteria for the Neponset Watershed.

Section 303(d) of the Federal Clean Water Act (CWA) and Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR Part 130) require states to place waterbodies that do not meet established water quality standards on a list of impaired waterbodies (commonly referred to as the "303d List") and to develop Total Maximum Daily Loads (TMDLs) for listed waters and the pollutant(s) contributing to the impairment. A TMDL establishes a maximum amount of pollution that a water body can accept and still meet water quality standards. The TMDL serves as the technical basis for developing more detailed local implementation plans designed to find, prioritize, and address specific sources of pathogens throughout the watershed and restore the water quality.

A Neponset Bacteria TMDL was previously approved by EPA in 2002 (CN: 121). In the interim since the Neponset Pathogen TMDL was finalized in 2002, the 2004 Neponset Surface Water Quality Assessment Report identified an additional 4 segments impaired for bacteria (impairment cause is E. coli) that have been included in Category 5 of the Draft Massachusetts Year 2012 Integrated List of Waters pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act. (see http://www.mass.gov/dep/water/resources/wqassess.htm for assessment reports). These segments require a Total Maximum Daily Load (TMDL) to be developed.

Massachusetts procedure specifies that Watershed Bacteria TMDLs may, in appropriate circumstances, also apply to segments that are listed for bacteria impairment in future Massachusetts CWA § 303(d) Integrated List of Waters. For such segments, this Watershed Bacteria TMDL may apply if, "after listing the waters for bacteria impairment and taking into account all relevant comments submitted on the future CWA § 303(d) Integrated List of waters the Commonwealth determines with USEPA approval of the CWA § 303(d) list that previously approved Watershed Bacteria TMDL should apply to newly listed impaired segments". This addendum was developed by MassDEP with the intention of seeking approval to add these 4 segments to the "Final Bacteria TMDL for the Neponset Watershed (CN 121)", approved by EPA in 2002. A summary of the segments covered under this addendum is provided in Table 1 Addendum and the location of these new impairments is shown in Figure 1 Addendum.

Electronic copies of the following documents are available on MassDEP's website at:
http://www.mass.gov/dep/water/resources/tmdls.htm#boston

- Draft Addendum: Final Total Maximum Daily Loads of Bacteria for Neponset River Basin (CN 121.5)
- Final Total Maximum Daily Loads of Bacteria for Neponset River Basin (CN 121), 2002
- Proposed Massachusetts Year 2012 Integrated List of Waters

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TDD# 1-866-539-7622 or 1-617-574-6868
MassDEP Website: www.mass.gov/dep
Printed on Recycled Paper

MassDEP will consider all comments and the Draft Addendum TMDL Report will be revised as appropriate prior to submittal to EPA Region 1 for final approval. All public comments, which should refer to report number CN 121.5, must be received in writing, preferably in electronic format, by July 30, 2012 and be addressed to:

Massachusetts Department of Environmental Protection, Division of Watershed Management
627 Main St., 2nd Floor, Worcester, MA, 01608
Attn: Dr. Kimberly Groff
Phone: (508) 767-2876
Email: kimberly.groff@state.ma.us

Attachment 2 – Response to Comments

Comments received from the Neponset River Watershed Association

1. Comment: On behalf of the Neponset River Watershed Association (the Association), we would like to thank you for the opportunity to comment on MassDEP's "*Draft Addendum: Final Total Maximum Daily Loads of Bacteria for the Neponset River Basin (CN 121.5).*" We would also like to thank you for taking time to answer our questions over the phone as we prepared our comments.

In general, we applaud MassDEP's efforts to ensure that the Neponset Bacterial TMDL remains up to date and that all relevant stream segments are addressed. That said, we do have a number of suggestions regarding the Draft Addendum which are influenced in part by deficiencies in the TMDL itself.

Need to Update the Neponset TMDL Implementation Plan
As MassDEP states in the Executive Summary of the Addendum: *In order to ensure that the river meets state water quality standards, the TMDL establishes bacterial limits and outlines corrective actions to achieve that goal. [Emphasis added]*

All water quality data submitted to MassDEP by the Association since our Bacteria TMDL was issued in 2002 clearly indicate that the goal of attaining primary and secondary contact recreational uses has not been achieved for any of the stream segments listed in the TMDL or in the Draft Addendum.

We believe that this is in part due to the fact that the "corrective actions" contained in the 2002 TMDL (and included in the Addendum by reference), and in particular the section on "TMDL Implementation," are so vague as to provide no meaningful guidance to the cities and towns in the watershed which are primarily responsible for implementing it. The TMDL Implementation Plan is particularly deficient in the guidance it provides to communities in regard to addressing urban runoff, which is now a primary contributor to the Neponset's bacteria problems.

The existing TMDL has also, apparently, not resulted in the state addressing bacteria in the Neponset under its own relevant regulatory programs (except, indirectly, under the Wetlands Protection Act) such as water pollution control regulations under the state Clean Waters Act, water quality certification under the federal Clean Water Act, and programs relating to ACECs and rare species. These deficiencies are not, unfortunately, corrected in the TMDL Addendum.

Although the TMDL states that the "proposed" implementation strategy includes "a mandatory program for implementing storm water BMPs and eliminating illicit sources," in fact neither the TMDL nor the Addendum set mandatory requirements at all. Indeed, they do not even suggest, must less require, the use of specific regulatory mechanisms for local governments to use in implementing the TMDL, such as:

- Requiring projects under the Wetlands Protection Act to institute BMPs that are effective at treating bacteria;
- Amending local Stormwater Bylaws required under the 2003 MS 4 General Permit to specifically address bacteria, and/or

- Stressing bacteria in the implementation of the other five "minimum control measures" required under the General Permit: public education and outreach, public participation, IDDE, construction-site bylaws, and "Good Housekeeping.

The Association very much regrets that MassDEP did not use the opportunity presented by the addition of four Neponset stream segments to the 303(d) list to more fully amend the TMDL. Amending TMDLs "as necessary," is a requirement under the Clean Water Act Regulations[1]. That said, we are very much aware of MassDEP's limited staff resources, and we therefore would offer to draft a proposed amended Neponset Bacteria TMDL (or at least a revised Implementation Plan) ourselves, which would reduce the resources MassDEP would have to dedicate to producing a final Amended TMDL.

As an interim measure until such time as the TMDL can be more fully amended, we would offer a variety of suggestions for expanding the addendum to at least partially address some of the deficiencies in the TMDL.

MassDEP Response: Thank you for your comments and the acknowledgement of MassDEP's efforts. As explained in paragraph 1 of the Draft Addendum: Final Total Maximum Daily Loads of Bacteria for Neponset River Basin (CN 121.5) the purpose of the above cited report is simply to include four newly identified bacteria impaired segments in the previously approved Final Neponset Bacteria TMDL (MassDEP Division of Watershed Management Report Number 121). Monitoring and assessment activities as part of the Year 2012 305(b) and 303(d) reporting cycle identified these 4 new impairments in the Neponset watershed and the Final TMDL set out a procedure to incorporate future impairments into the Final Bacteria TMDL for the Neponset Watershed..

The comment language "As MassDEP states in the Executive Summary of the Addendum: *In order to ensure that the river meets state water quality standards, the TMDL establishes bacterial limits and outlines corrective actions to achieve that goal. [Emphasis added]"* pertains to the final Neponset TMDL report which is not open to public comment (MassDEP Division of Watershed Management Report Number 121). Therefore, your comments are not relevant to the addendum (CN 121.5) for which public comment was requested. It is MassDEP's position that the circumstances and regulatory programs have not changed significantly since 2002 to warrant re-opening the Final Neponset Bacteria TMDL at his time.

That being said, new resources have been developed since the Neponset TMDL was finalized in 2002. MassDEP developed a companion document to provide additional support to communities to address pathogen pollution. The guidance is entitled "Mitigation Measures to Address Pathogen Pollution in Surface Waters: A TMDL Implementation Guidance Manual for Massachusetts, A Companion Document to the Watershed-Specific Pathogen TMDL Reports. A link to this report is provided below.
http://www.mass.gov/dep/water/resources/impguide.pdf.MassDEP will include this information in the implementation section of the Final Neponset TMDL addendum.

In paragraph 7 above you refer to "a mandatory program for implementing storm water BMPs and eliminating illicit sources,". The comment also states that the TMDL nor the Addendum set mandatory requirements. In response to this statement please note that a total maximum daily load (TMDL) is the greatest amount of a pollutant that a water body can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation, and fishing. A TMDL specifies how much of a specific pollutant can come from various sources, including stormwater discharges, and identifies generalized strategies for reducing the pollutant discharges from these sources. A TMDL report is not a permit or enforcement document. The regulatory vehicles that you identify (e.g., Requiring projects under the Wetlands Protection Act to institute BMPs that are effective at treating bacteria; Amending local Stormwater

[1]40 CFR Section 130.1(b)(3) states: "The Act also requires that each State initially submit to EPA and **revise as necessary**… TMDLs…. " 40 CFR Section 130(d) says that states: "After control measures (contained in the state's Water Quality Management, or WQM, Plan) are in place, the State evaluates the extent of the resulting improvements in water quality, conducts additional data gathering and planning to determine needed modifications in control measures and again institutes control measures.

Bylaws required under the 2003 MS 4 General Permit to specifically address bacteria, and/or Stressing bacteria in the implementation of the other five "minimum control measures" required under the General Permit: public education and outreach, public participation, IDDE, construction-site bylaws, and "Good Housekeeping) are already in place as part of the current regulatory framework. To date these programs are managed locally by the municipalities and conservation commissions.

MassDEP understands the frustration in the length of time it takes to implement measures that will facilitate the achievement of the TMDL goals. Once a TMDL is completed MassDEP experience shows that it can take many years to fully implement restoration measures and more time after that to observe measurable water quality improvement. This involves significant financial investment, time, energy and resources. It is important to note that MassDEP realizes that an iterative approach to achieving compliance with this pathogen TMDL is warranted, given the vast potential number of bacteria sources, and the difficulty of identifying and removing some sources (e.g., stormwater). While the stated goal in the TMDL is to meet the water quality standard at the point of discharge it also attempts to be clear that MassDEP's expectation is that adaptive management is needed for implementation of stormwater control measures that includes prioritization of outfalls and the application of BMPs. MassDEP believes this is approach is consistent with EPA guidance and regulations as stated in a November 22, 2002 EPA memo from Robert Wayland.

The purpose of the Final Neponset Bacteria TMDL was to identify bacteria impaired waters, identify generic sources to the Neponset River system, their impact on water quality, and to define a generalized implementation approach to guide future implementation activities. The TMDL does not attempt to identify specific BMPs. The reason it did not attempt this is because the amount of reduction is highly site specific and depends on many factors including, but not limited to: 1) the type of BMP (including whether it is structural or non-structural), 2) the location, 3) the effectiveness of the BMP and 4) how well the BMP is maintained over time. As stated in the TMDL, the agencies believe that a combination of illicit source elimination, CSO and SSO programs, source controls, and implementation of non-structural and structural BMPs coupled with the existing regulatory programs that you mention, has the potential to achieve water quality standards over time through adaptive management. However, it should be recognized that continued investigation will be needed as part of the implementation process to identify the optimal storm water management programs for various types of drainage areas. These investigations should involve detailed characterization of drainage areas, identification of illicit sources, and the implementation of non-structural and perhaps structural BMPs.

Since there is no timeline for an end to development and watershed changes it is anticipated that the effort to restore water quality in the Neponset and other watersheds throughout the commonwealth will continue in an adaptive manner. The bacteria allocations presented in the TMDL represent reductions that will require substantial time and financial commitment to be attained. Achieving the goals of the Neponset Bacteria TMDL will require an iterative process that sets realistic implementation goals and schedules by local entities that are adjusted as warranted based on ongoing monitoring and assessment of control activities.

2. Comment: Scope of Addendum
The allowable scope of the Addendum remains unclear to us; specifically whether the Addendum can be used as a vehicle to address some of the deficiencies of the existing TMDL as they apply the stream segments originally included in that TMDL, or whether the scope of the addendum applies only to those stream segments being added to the TMDL. Even if the scope of the Addendum extends only to the small number of streams being added, we would strongly recommend that MassDEP use the addendum to clarify key implementation issues.

MassDEP Response: The allowable scope of the TMDL addendum is simply to include the four newly impaired segments to the previously approved TMDL. Reopening and revising the previously approved Neponset Bacteria TMDL is a different process entirely. EPA has developed Draft guidance entitled "Considerations for Revising and Withdrawing TMDLs". You can review this draft guide at the following link.
http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/techsupp.cfm

The Draft Considerations for Revising and Withdrawing TMDLs identifies circumstances involving withdrawing a TMDL or revising and re-submitting a TMDL to EPA, as well as those situations that would not be considered TMDL revisions. With over 46,000 approved TMDLs nationwide to date, the circumstances where a TMDL was developed and approved may have changed over time, and therefore, states may wish to revisit the original TMDL. EPA recognizes that states need to consider both the resources needed to revise TMDLs, as well as the resources needed to develop new TMDLs and implement existing TMDLs. It is MassDEP understanding that this guidance will be finalized by the end of 2012. That being said it is MassDEP's position that the circumstances and regulatory mechanisms have not changed significantly since the Neponset Bacteria TMDL was finalized to warrant revising the TMDL.

3. Comment: Structural Stormwater BMPs for New Development and Redevelopment
Under the Massachusetts Stormwater Policy, Conservation Commissions are empowered to require BMPs "consistent" with applicable TMDLs, under the Wetlands Act. The draft EPA Phase II Stormwater Permit is likely to require communities to apply the requirements of the MA Stormwater Policy to many areas outside of Wetlands Act jurisdiction. The Association has heard from several of our local conservation commissions that they feel the current TMDL does not provide adequate direction as to how they should handle stormwater from redevelopment and new development projects.

Although the existing TMDL indicates that bacteria concentrations in urban runoff (meaning runoff free from direct sewage contamination) are far in excess of the load and waste load allocations, the TMDL does not clearly indicate that new development and redevelopment projects will need to incorporate structural and non-structural stormwater BMPs that reduce bacterial concentrations. MassDEP should address this issue in the Implementation Plan, identifying BMPs that should be required for new development and redevelopment projects so that they comply with the load and waste load allocations.

MassDEP Response: MassDEP policy and regulation concerning the application of stormwater BMPs for new development and redevelopment are specified in the In 1996, the Massachusetts Department of Environmental Protection (the "Department" or "MassDEP") Stormwater Policy that established Stormwater Management Standards aimed at encouraging recharge and preventing stormwater discharges from causing or contributing to the pollution of the surface waters and groundwaters of the Commonwealth. In 1997, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy. The Stormwater Management Standards and Massachusetts Stormwater Handbook are designed to promote increased stormwater recharge, the treatment of more runoff from polluting land uses, low impact development (LID) techniques, pollution prevention, the removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater best management practices (BMPs). MassDEP applies the Stormwater Management Standards pursuant to its authority under the Wetlands Protection Act, M.G.L. c. 131, § 40, and the Massachusetts Clean Waters Act, M.G.L .c. 21, §§ 26-53. The revised Stormwater Management Standards have been incorporated in the Wetlands Protection Act Regulations, 310 CMR 10.05(6)(k) and the Water Quality Certification Regulations, 314 CMR 9.06(6)(a).

The Stormwater Management Standards (310 CMR 10.05(6)) address water quality (pollutants) and water quantity (flooding, low base flow and recharge) by establishing standards that require the implementation of a wide variety of stormwater management strategies. These strategies include environmentally sensitive site design and LID techniques to minimize impervious surface and land disturbance, source control and pollution prevention, structural BMPs, construction period erosion and sedimentation control, and the long-term operation and maintenance of stormwater management systems.

For land uses with higher potential pollutant loads (such as those identified through the TMDL process), source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for

such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Proper selection of non-structural and structural stormwater management practices is an essential component of any plan to reduce these pollutants. These non-structural BMPs begin with environmentally sensitive site design, pollution prevention and source control. By reducing impervious surfaces and allowing stormwater to infiltrate into the ground and by selecting a landscape design that minimizes the need for fertilizers and pesticides, developers can substantially reduce the concentration of pollutants in stormwater runoff from development and redevelopment projects. Once a project is complete, ongoing action is needed to prevent additional pollutants from entering the stormwater management system. Raw materials and wastes should be stored inside or under cover with adequate containment. Snow, sand, deicing chemicals, fertilizers, pesticides, and solid waste should be properly managed. An effective street-sweeping program should be implemented. Structural BMPs that can remove the pollutants of concern must be designed, constructed, operated and maintained. Infiltration BMPs, bioretention areas, constructed stormwater wetlands, and filter systems may be effective tools for reducing the concentration of nutrients and bacteria in stormwater discharges.

If a proponent is proposing a project that is in the watershed of a water body with a TMDL, and if the project is subject to wetlands jurisdiction, the proponent must select structural BMPs that are consistent with the TMDL. Because pollution prevention is an interest identified in the Wetlands Protection Act, conservation commissions and MassDEP may require use of such BMPs when reviewing projects subject to jurisdiction under the Act. The TMDL may contain information on appropriate BMPs. See http://mass.gov/dep/water/resources/tmdls.htm.

A redevelopment projects are required to meet the Stormwater Management Standards to the maximum extent practicable (eg., Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable). A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions. The selection of appropriate BMPs for a given location is site- specific. It is not appropriate for MassDEP to "identifying BMPs that should be required for new development and redevelopment projects" in the TMDL.

4. Comment: BMP Based Approach
From a practical standpoint, it would be very challenging to ask towns with MS4s and thousands of private landowners across the Neponset watershed to monitor bacteria concentrations in their stormwater effluent to ensure they are meeting the WLAs and LAs "at the point of discharge," as proposed in the Addendum. What should be required is that they implement all reasonably available structural and non-structural BMPs to minimize the amount of bacteria in stormwater runoff to the maximum extent practicable. This approach should apply to activities addressing both the municipally owned collection system (good housekeeping, IDDE, Structural BMPs), to public education activities, and to the exercise of their regulatory authority under the Wetlands Act and bylaws required by the Phase II Stormwater Permit. The Addendum should enunciate this approach under the TMDL Implementation section.

MassDEP Response: MassDEP agrees with your comment above. It should be clarified that the "goal" of the Final Neponset Bacteria TMDL as well of the addendum is to meet the WLA and LA. However, conformance with the TMDL will be determined through ambient monitoring.

NPDES wastewater discharge WLAs for WWTPs are set at the water quality standards. All piped discharges are, by definition, point sources regardless of whether they are currently subject to the requirements of NPDES permits. Therefore a WLA set equal to the WQS criteria will be assigned to the portion of the stormwater that discharges to surface waters via storm drains. For any illicit sources including illicit discharges to stormwater systems and sewer system overflows (SSO's) the goal is complete elimination (100% reduction). The specific goal for controlling combined sewer overflows (CSO's) is meeting water quality standards through implementation of approved Long-

Term Control Plans. It is recommended that these concentration targets be used to guide implementation. The goal to attain WQS at the point of discharge is environmentally protective, and offers a practical means to identify and evaluate the effectiveness of control measures. In addition, this approach establishes clear objectives that can be easily understood by the public and others responsible for monitoring activities. Success of control efforts and subsequent conformance with TMDL will be determined by documenting that a sufficient number of bacteria samples from receiving water meet the appropriate indicator criteria (WQS) for the water body. MassDEP believes that all appropriate and relevant mechanisms are in place to implement the measures required to restore water quality and designated use goals in the Neponset. However, Secton 8 of the TMDL Addendum will be revised to include the following language.

"The Final Neponset Bacteria TMDL (CN 121) included an Implementation Plan that identified a variety of actions to be taken by various stakeholders in the watershed. The provisions of the original TMDL Implementation Plan remain applicable to the additional stream segments which are the subject of the present TMDL Addendum.

Subsequent to the issuance of the 2002 Neponset Bacteria TMDL, Mass DEP and USEPA developed the 2005 document entitled "Mitigation Measures to Address Pathogen Pollution in Surface Waters: A TMDL Implementation Guidance Manual for Massachusetts: A Companion Document to Watershed-Specific Pathogen TMDL Reports." Although not specific to the Neponset River Watershed Association, this document provides useful information for stakeholders such as municipal MS4 program managers, conservation commissioners, and private landowners on strategies for effective implementation of Bacteria TMDLs. The recommendations of the 2005 manual should be considered applicable to stream segments identified in this TMDL Addendum, as well as to areas identified in the original 2002 Neponset Bacteria TMDL.

The forthcoming revised EPA Phase II MS4 Stormwater Permit is expected to place additional, requirements on municipalities in the Neponset Watershed. A summary of the draft general permit can be viewed at the following link. http://www.epa.gov/region1/npdes/stormwater/mimsc_sms4.html

The new permit spells out requirements related to public education and participation, illicit connection detection and elimination, and good housekeeping for municipally owned facilities. The permit will require municipal regulation of post construction stormwater impacts at new development and redevelopment sites outside of areas of Wetlands Act jurisdiction, using a framework that mirror existing requirements under the MA Stormwater Policy in areas that are subject to Wetlands Act jurisdiction. The existing MA Stormwater Management Handbook requires permittees subject to Wetlands Protection Act jurisdiction to propose stormwater management measures that respond to applicable TMDLs, a requirement that will effectively be extended to upland areas by the expected requirements of the new MS4 permit. All of this, taken in conjunction with the expected TMDL-specific requirements of the new MS4 permit, will significantly strengthen the regulatory framework supporting implementation of the Neponset Bacteria TMDL and this Addendum.

The original 2002 Neponset Bacteria TMDL includes data on fecal coliform and e. coli concentrations in urban stormwater runoff from both local and national datasets. This data indicates that in order to comply with the required load allocations and waste load allocations, bacteria concentrations associated with urban runoff from new and existing impervious areas need to be reduced by at least 90% and in many cases more than 99% in order to meet the requirements of the TMDL for the Neponset Watershed Reasonably available structural and non-structural BMPs should be implemented to minimize the amount of bacteria in stormwater runoff to the maximum extent practicable. This approach should apply to activities addressing both the municipally owned collection system (good housekeeping, IDDE, Structural BMPs), to public education activities, and to the exercise of their regulatory authority under the Wetlands Act and bylaws required by the Phase II Stormwater Permit.

Existing stormwater BMPs that have the capacity to remove bacteria from stormwater such as bioretention practices, infiltration, and stormwater wetlands, when properly designed and maintained have the potential to remove roughly 50-90% of the bacteria load from the treated effluent. The default water quality volume required under the MA Stormwater Policy is the first half inch of runoff."

5. Comment: Required Reductions in Bacteria Concentrations
The Addendum states: "Overall reductions needed to attain water quality standards can be estimated using the NepRWA ambient E. coli data." While this statement is largely true, it needs to be amended to reflect the limitations of the NepRWA data in fully characterizing ambient wet weather bacteria concentrations.

MassDEP Response: The addendum will be revised with the following language *"Overall reductions in ambient instream bacteria levels needed to attain water quality standards can be roughly estimated using the NepRWA ambient E. coli data that are available for the Neponset Basin."*

6. Comment: The TMDL load allocation for stormwater discharges is designed to be met at the point of discharge—not at distant downstream locations such as NepRWA's sampling locations—to ensure that water quality standards are attained throughout all sections of all streams under varying weather conditions, and to provide the required margin of safety.

The statement in the Draft Addendum regarding the required reduction in ambient bacteria concentrations is likely to confuse readers, because the required ambient reductions differ significantly from the levels of bacteria reduction that will be required for individual discharges to meet their load allocation. Therefore we would recommend that the Addendum incorporate language to clarify the level of reductions that is required of individual stormwater discharges in order to comply with the load and waste load allocations.

MassDEP Response: *Presently there are not enough data to clarify the level of reductions that would be required of "an individual* stormwater discharges in order to comply with the load and waste load allocations" that were aggregated in the TMDL. The EPA 2002[2] guidance available at the time this TMDL was prepared states that*,* "NPDES-regulated storm water discharges must be addressed by the wasteload allocation component of a TMDL….It may be reasonable to express allocations for NPDES-regulated storm water discharges from multiple sources as a single categorical wasteload allocation when data and information are insufficient to assign each source or outfall individual WLAs." Additionally, during the implementation process, individual site evaluations will be necessary to determine the most cost effective solution.

The time involved and cost associated with developing and incorporating a parcel by parcel land use analysis into the Final TMDL was well beyond the scope of this project and would have created significant delays in the TMDL being reviewed and approved and therefore significant delays in implementing any aspect of the TMDL. The agencies believe that this type of detailed land use analyses is more prudent as part of the implementation process whereby the agencies, NGOs and municipalities can partner in evaluating the most cost effective methods for acquiring bacteria reductions. The parcel- by- parcel application would unnecessarily constrain actions to attain the goal of watershed reductions.

7. Comment: Guidance on BMP's
As mentioned above, one of the deficiencies of the existing Neponset Bacteria TMDL is its failure to provide clear and detailed direction on BMPs that can be used to address the goals of the TMDL. Subsequent to the publication of the Neponset TMDL, MassDEP and USEPA retained ENSR to develop the 2005 document entitled "Mitigation Measures to Address Pathogen Pollution in Surface Waters: A TMDL Implementation Guidance Manual for Massachusetts; A Companion Document to Watershed-Specific Pathogen TMDL Reports."

The TMDL and TMDL Addendum should require use to this Guidance Manual by all relevant local and state permitting programs, as well as by all new development and redevelopment projects, to select reasonably available BMPs.

[2] EPA memorandum titled "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs" by Robert H. Wayland and James A. Hanlon of EPA (11/22/02).

This Manual is in itself somewhat generic and nonspecific, with much more detail offered in Volume 2 Chapter 2 of the Massachusetts Stormwater Handbook.. Of particular concern is that some of the guidance on BMPs in the Manual seems at first glance to conflict with the Handbook ,as indicated in the Table below.

BMP	**Stormwater Handbook**	**EPA Guidance Manual**
Bioretention Areas and Rain Gardens	Insufficient Data; can remove bacteria and other pollutants to "varying degrees"	Likely to remove bacteria; good mitigation
Infiltr./Biofilter Swales/ Water Qual. Swales	Insufficient Data	Can be significant; good mitigation
Sand Filters	Insufficient Data	Have achieved 40% removal in summer; moderate mitigation
Extend.Detention Ponds/ Extended Dry Detention Basin	Less than 10% effective	Reduces bacteria; moderate mitigation

While we would acknowledge that resolving these conflicts between the Stormwater Handbook and the Bacteria TMDL Manual is beyond the scope of the present TMDL Addendum, these issues highlight the need for a more thorough amendment of the TMDL itself to provide clearer guidance to municipalities charged with implementing the TMDL. However at a minimum, we would recommend that the TMDL Addendum reference the existence of the Bacteria TMDL Manual as well as the Stormwater Handbook as resources to better support implementation of the Neponset TMDL.

MassDEP Response: As noted in the response to the first comment above, MassDEP will incorporate the reference to the "Mitigation Measures to Address Pathogen Pollution in Surface Waters: A TMDL Implementation Guidance Manual for Massachusetts, A Companion Document to the Watershed-Specific Pathogen TMDL Reports in the Implementation section of the Final Neponset TMDL addendum. It should be noted that this report is publically available and posted on MassDEP's website. It should also be noted that stormwater BMP technology is evolving and guidance is intended to be just that. As a result stormwater professionals should be able to tap into all available and promising technologies in addition to the guidance provided in the Stormwater Handbook.

In response to your concern is that some of the guidance on BMPs in the Manual seems at first glance to conflict with the stormwater Handbook, we offer the following: The major focus in Massachusetts Stormwater Handbook for BMP performance is Total Suspended Solids (TSS) removal, in order to meet the requirement that new development subject to wetlands or 401 permitting remove 80% of the TSS load to meet 310 CMR 10.05(6)(k)(4) and 314 CMR 9.06(6)(a)(4). The TSS removal ratings published in the Massachusetts Stormwater Handbook were developed based on review of scientific literature and discussion with members of advisory committee. Also note that the removal efficiencies provided in the Massachusetts Stormwater Handbook are representative of average annual performance. Studies conducted in one time of year may not reflect results during a different season, such as winter, when removal efficiency is reduced in cold weather climates such as Massachusetts.

Also, BMP designs vary even within the same class of BMP, and the varying designs will provide varying performance. For example, biorention systems that consist of a filter only may have less pathogenic removal capability than exfiltrating designs due to reduced contact time. Tree canopy density above bioretention may also potentially affect pathogen removal by reducing UV exposure.

Water quality swale design may also affect performance for pathogen reduction. Water quality swales have varying design, some are wet, others dry, and longitudinal slope may be steep in some cases and relatively flat in others. In one 319 study (excerpt below) prepared for MassDEP which only was able to sample 2 storms due to limited funding, the swales examined were found to not remove fecal coliform, instead they bio-magnified the fecal coliform.

Zimmerman 2009) found median loads of total coliform bacteria increased slightly, while e coli decreased slightly in USGS study that examined multiple LID practices in Ipswich River Basin,. See http://pubs.usgs.gov/sir/2010/5007/pdf/sir2010-5007_Web.pdf

MassDEP respectfully disagrees with your statement that the EPA manual conflicts with the Massachusetts Stormwater Handbook, particularly regarding swale performance. The Stormwater Standards in the Wetland regulations at 310 CMR 10.05(6)(k) clearly indicate that BMPs must be designed in accordance with the Massachusetts Stormwater Handbook. So at least for projects in wetland resource areas and buffer zones subject to requirement to file a NOI, specifications provided in Massachusetts Stormwater Handbook must be followed.

In general, the guidance in the Massachusetts Wetland's Stormwater Handbook is the "minimum" that must be done and then consideration should be given of other available guidance fully recognizing that new data and information become available every day.

Fecal Coliform

Overall, fecal coliform results were inconclusive and varied (See Tables 3-7 to 3-9). In two events, the Howland™ Swale had higher concentrations of fecal coliform at the outlet compared to the inlet. All samples collected from the Howland™ Swale exceeded the DEP standards for swimming and boating, 200 cfu/100mL and 1,000 cfu/100mL, respectively. During both sampling rounds in the first event, fecal coliform concentrations were higher at the outlet than the inlet. Of particular note, the outlet sample from the first round of the first event had the highest fecal coliform concentration (15,000 cfu/100mL). In the first round of sampling during the second storm event, the outlet fecal coliform concentration was over five times higher than the inlet, 12,000 cfu/100mL compared to 2,800 cfu/100mL, respectively. The only fecal coliform reduction occurred during the second round of sampling during the second event (11,000 cfu/100mL compared to 6,200 cfu/100mL, respectively). The reason for elevated fecal coliform concentrations at the outlet was not determined. However, the swale is a vegetated strip in the midst of a large impervious parking lot. It is possible that the swale attracts displaced birds and wildlife, which leave fecal matter in the swale.

8. Comment: Water Quality Volume for Structural BMPs
As mentioned above, the TMDL contains information which indicates that urban runoff from all land uses typical in the Neponset Basin will require 90% to 99% plus reduction in bacterial concentrations to meet their load allocation. Also as mentioned above, we recommend that communities take a BMP based approach to implementing the TMDL particularly when exercising their regulatory authority over new development and redevelopment projects. The ability of communities to effectively implement this requirement would be dramatically enhanced by specifying the design water quality volume that should be used when developing effective structural BMPs.

Existing stormwater BMPs that have the capacity to remove bacteria from stormwater such as bioretention practices, infiltration, and stormwater wetlands, when properly designed and maintained have the potential to remove roughly 50-90% of the bacteria load from the treated effluent.

The default water quality volume required under the MA Stormwater Policy is the first half inch of runoff. The attached analysis of more than 100 years of rainfall records from Logan Airport, indicates that capturing and treating the first half-inch of rainfall in a 24 hour period, results in capturing roughly 65% of annual rainfall. When one applies removal efficiencies of 50-90% to 65% of annual rainfall, one achieves removal of only 33% to 59% of the annual bacterial load, well below the 90% to 99% reduction required to meet the load allocation.

The same rainfall analysis indicates that a stormwater treatment system designed around a water quality volume of the first inch of runoff will capture and treat 85% of average annual rainfall. When one applies removal efficiencies of 50-90% to 85% of annual rainfall, one achieves removal of only 43% to 77% of the annual bacterial load. While this still falls well short of the reductions required to meet the load allocation, at the higher end it at least begins to approach the required level of treatment.

Therefore, we recommend that the implementation plan for the Addendum specify a goal of treating the first inch of runoff from impervious cover using BMPs that have the removal efficiencies at the higher end of available technologies.

MassDEP Response: As stated above the purpose of the TMDL is to set load or percent reduction of a pollutant required to restore water quality. The TMDL also provide a generalized plan for implementation. The TMDL is not an enforcement document and therefore, it would be inappropriate to specify BMPs or BMP capture efficiencies beyond the measures specified in the MA Stormwater Management Handbook, that requires permittees subject to Wetlands Protection Act jurisdiction to propose stormwater management measures that respond to applicable TMDLs.

The default volume to be treated is calculated as 0.5 inches of runoff times the total impervious area of the post-development project site for all discharges. For discharges to critical areas, the volume to be treated is calculated as 1.0 inch of runoff times the total impervious area of the post-development project site. Critical areas are Outstanding Resource Waters (ORWs) (314 CMR 4), Special Resource Waters as Designated in 314 CMR 4, recharge areas for public water supplies as defined in 310CMR 22.02 (Zone Is, IIs, and Interim Wellhead Protection Areas for groundwater sources and Zone As for surface water sources) shellfish growing areas as defined in 310 CMR 10.04 and 314CMR 9.02, , swimming beaches as defined in 105 CMR 445, cold water fisheries as defined in 310 CMR 10.04, and 314 CMR 4. 314 CMR 9.02.

BMPs approved for use near critical areas, designed to treat 1.0 inch of runoff times the total impervious surface of the post-development project site are generally limited to:

Extended detention basins
Wet ponds
Constructed wetlands
Water quality swales
Sand filters
Organic filters
Infiltration basins
Infiltration trenches
Deep sump and hooded catch basins (used with other BMPs)

For land uses with higher potential pollutant loads (such as impaired water with an approved TMDL), source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

9. Comment: Prioritization of Stream Segments
The Watershed Association objects to the proposed scheme for prioritizing stream segments included in the TMDL Addendum. The 2002 TMDL itself does not include such a prioritization scheme. The Clean Water Act Regulations allow prioritization only in the choice of stream segments for which TMDLs should be adopted, not for those already subject to a TMDL(see 40 CFR Sec. 130.7(a), (b), and (b)(4)).

Section 5.0 of the Addendum states "MassDEP believes the higher concentrations are indicative of the potential presence of raw sewage and therefore they pose a greater risk to the public." While we recognize the need to prioritize remediation efforts, the proposed prioritization scheme fails to specify in what context this prioritization scheme should be applied and by whom the prioritization scheme should be used.

Are the bacteria concentration thresholds proposed a scheme for evaluating wet weather stormdrain outfall survey results? If so, we would generally agree that counts over 100,000 found in wet weather stormwater

discharges are more likely to be indicative of sanitary sewer overflows or other sewer discharges. However, applying this scheme to the analysis of dry-weather outfall sampling results would be nonsensical. It would be similarly nonsensical if applied to ambient instream water quality monitoring data, or if applied to the design of structural stormwater BMP's at a new development site.

Equally problematic is the question of who is supposed to use the prioritization scheme. There are hundreds of stakeholders that have a role in implementing the BMP. If a given community has pollution sources that violate the TMDL, but all of them are classified as low priority, does that mean the community should not actively develop a program to address these violations?

Similarly, it is undisputed fact that untreated sewage is the major factor contributing to the alarmingly high dry weather bacteria numbers at Segment MA73-33 or Meadow Brook as it is locally known. For more than 20 years Meadow Brook has been recognized as the worst source of sewage pollution in the Neponset watershed, yet under the proposed prioritization schedule this segment would receive "medium" priority.

We would suggest that at a minimum, the threshold levels for the prioritization of segments be reduced so that Meadow Brook would receive the highest priority level available. One suggestion would be to assign a low priority level to segments with bacteria concentrations between 126 and 500 cfu/100mL, medium priority for concentrations between 500 and 1000 cfu/100mL and high priority to all segments where concentrations are above 1000 cfu/100mL.

A better solution would be to develop a more meaningful prioritization scheme that distinguished between different type of data sets (ambient, dry weather outfall, wet weather outfall) and which established recommendations for how each of the various stakeholders should conduct a prioritization process (communities with SSO vs. communities with no SSO's vs. private parties that operate parking lots vs. state agencies prioritizing enforcement resources).

We recognize that developing a meaningful prioritization scheme is a significant undertaking, and would therefore acknowledge that given the limited resources available to prepare the TMDL Addendum, perhaps the simplest solution is to not include any prioritization scheme as part of the Addendum.

MassDEP Response: As you are aware MassDEP has taken a watershed based approach to addressing pathogen impairment throughout the state with final Bacteria TMDLs completed for the Cape, Buzzards Bay and the Charles River, three Bays and Mount Hope and Narragansett. . The Neponset Bacteria TMDL was one of the first in the state. Since that time many other pathogen TMDLs have been approved and EPA has requested that the state prioritize segments based on the scheme outlined in the addendum to help communities focus their resources. The reason for this was to help guide implementation efforts by severity of health risk, but was not intended to imply that segments identified as low priority should not be addressed. We agree that segments may be prioritized differently based on ambient water quality during dry or wet weather, however we don't always have these data sets available to us. Since the Final Neponset TMDL did not include this prioritization scheme and since you do not find this helpful we will eliminate this information from the Final Neponset TMDL addendum pursuant to this comment.

Thank you for the information on Segment MA73-33 or Meadow Brook. The addendum will be revised to show that untreated sewage is the major factor contributing to the alarmingly high dry weather bacteria numbers in this waterbody.

10. Comment: Indicator Organism
Finally, some of the requirements in the Addendum should clearly apply to all stream segments subject to the TMDL, such as use E coli or Enterococci limits instead of fecal coliform limits in WLAs and LAs.

MassDEP Response: The Surface Water quality standards (314CMR4) were updated, in the interim since the Neponset Bacteria TMDL was finalized in 2002, to include thresholds for e.coli and enterococcus. . As a result all Massachusetts surface waters must meet the following standards.

Either;

E. coli <=geometric mean 126 colonies per 100 ml; single sample <=235 colonies per 100 ml;

Enterococci geometric mean <= 33 colonies per 100 ml and single sample <= 61 colonies per 100 ml

We trust that this response clarifies that the current water quality standards not only apply to the 4 newly listed waters covered under the Neponset Bacteria TMDL Addendum but all the waters covered under the Final Neponset TMDL that was published in 2002.

11. Comment: Conclusion
We appreciate the opportunity to comment on this very important Draft Addendum to our Neponset River Basin Bacteria TMDL. For your convenience, we have also attached a redline version of the TMDL Addendum which includes specific language suggestions to implement the changes proposed in the comment letter, and which address several other minor typos and corrections to the document.

Response MassDEP: Thank you for your efforts to facilitate the completion of the TMDL addendum. We will take your suggested revisions into consideration.