May 4, 2016

Review of Total Maximum Daily Loads (TMDLs) for the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids New Jersey

This document contains EPA's review of the above-referenced TMDLs. This TMDL review document includes TMDL review guidelines that summarize and provide guidance regarding currently effective statutory and regulatory requirements relating to TMDLs. These TMDL review guidelines are not themselves regulations. Any differences between these guidelines and EPA's TMDL regulations should be resolved in favor of the regulations themselves. The italicized sections of this document describe EPA's statutory and regulatory requirements for approvable TMDLs. The sections in regular type reflect EPA's analysis of New York's compliance with these requirements.

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable TMDLs. Additional information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable.

1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the waterbody as it appears on the State's/Tribe's 303(d) list. The waterbody should be identified/georeferenced using the National Hydrography Dataset (NHD), and the TMDL should clearly identify the pollutant for which the TMDL is being established. In addition, the TMDL should identify the priority ranking of the waterbody and specify the link between the pollutant of concern and the water quality standard (see section 2 below).

The TMDL submittal should include an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading, e.g., lbs/per day. The TMDL should provide the identification numbers of the NPDES permits within the waterbody. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of the natural background. This information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation.

The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the spatial extent of the watershed in which the impaired waterbody is located; (2) the assumed distribution of land use in the watershed (e.g., *urban, forested, agriculture); (3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and (5) an explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments; chlorophyll a and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.*

A. Identification of Waterbodies and Background Information

EPA received for review and approval the New Jersey Department of Environmental Protection (NJDEP) document: "Amendment to the Lower Raritan/Middlesex, Mercer County, Monmouth County, Northeast, Upper Delaware and Upper Raritan Water Quality Management Plans, Total Maximum Daily Load Report for the Non-Tidal River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments, Watershed Management Areas 8, 9, and 10 (TMDL document) on February 2, 2016.

Along with the TMDL document, a copy of the notice seeking public comment was submitted. A companion document responding to public comments on the non-tidal Raritan TMDLs was also submitted. Collectively, these documents are referred to as "the TMDL submittal."

In addition to the TMDL submittal, technical reports that provide supplemental information on the data, assessment, modeling (including assumptions and calibration details) were prepared for NJDEP by Kleinfelder/Omni (2013)[1] and made available to EPA.

The TMDL document addresses a total of 45 combinations of pollutant/waterbody impairments: 32 total phosphorus (TP), 3 pH, and 10 total suspended solids (TSS) impairments in the streams and lakes within the non-tidal Raritan River basin.[2] The assessment units (watershed HUC 14), pollutant of concern and Section 303(d) 2012 priority ranking associated with each assessment unit are summarized below in Table 1. Assessment units noted with "NA" under the column, "Priority Ranking from 2012 List" were identified as impaired through supplemental data review as part of the TMDL study; these waterbody/pollutant combinations were not on NJ's 2012 303(d) List and therefore do not have an assigned priority ranking. Public notice on the impaired waters designation was provided through NJ's TMDL public notice.

Assessment unit, numbered 36 in Table 1 (NJ02030105100060-01 Millstone R (Cranbury Bk to Rocky Bk)), is listed for a dissolved oxygen impairment related to the ammonia discharge from Princeton Meadows wastewater treatment plant (NJ0024104).While EPA is not including this assessment unit in its approval of the TP and TSS TMDLs, the impairment has been addressed

1 .Kleinfelder/Omni. 2013. The Raritan River Basin Nutrient TMDL Study. Phase II Final Report, Watershed Model and TMDL Calculations, Volume 1, Volume 2 (appendices A-J), and Volume 3 (Appendices (K-T).
2 The TMDL that was public noticed identified 52 impairments which reflected the 2010 303(d) list. The February 2016 submittal is based on the 2012 Section 303(d) list and all the data and information gathered during the TMDL process. For further information on the specific changes in assessment units, see pp. 61-62 of the TMDL document.

through a water quality-based permit limit and can be considered an alternative restoration control strategy under the Section 303(d) program vision framework and a WQ-27 measure. [3] Further information on this assessment unit is provided under the Loading Capacity section of this document.

The three assessment units impaired for pH were addressed through a site-specific DO-pH relationship that allowed the calculation of a TP TMDL to resolve the pH impairment. Reducing the ortho-phosphorus component of the TP load was found to be critical to achieving the applicable pH standard. Additional information is provided under the Loading Capacity section of this document.

Table 1. Assessment units and pollutants in the non-tidal Raritan River basin.

TMDL	Watershed (HUC 14)	Name of Watershed	Parameter	Priority Ranking from 2012 List*
1[a]	NJ02030105010060-01	Raritan R SB(Califon br to Long Valley)	pH	NA**
2[a]	NJ02030105010080-01	Raritan R SB(Spruce Run-StoneMill gage)	TP	NA**
3[a]	NJ02030105020050-01	Beaver Brook (Clinton)	TP	H
4[a]	NJ02030105020070-01	Raritan R SB(River Rd to Spruce Run)	TP	H
5[a]	NJ02030105020070-01	Raritan R SB(River Rd to Spruce Run)	TSS	H
6[a]	NJ02030105020080-01	Raritan R SB(Prescott Bk to River Rd)	TSS	NA**
7[a]	NJ02030105020100-01	Raritan R SB(Three Bridges-Prescott Bk)	TP	H
8[a]	NJ02030105020100-01	Raritan R SB(Three Bridges-Prescott Bk)	TSS	NA**
9[a]	NJ02030105030060-01	Neshanic River (below FNR / SNR confl)	TP	H
10[a]	NJ02030105030070-01	Neshanic River (below Black Brk)	TP	H
11[a]	NJ02030105040010-01	Raritan R SB(Pleasant Run-Three Bridges)	TP	H
12[a]	NJ02030105040030-01	Holland Brook	TP	NA**
13[a]	NJ02030105040040-01	Raritan R SB(NB to Pleasant Run)	pH	H
14[a]	NJ02030105040040-01	Raritan R SB(NB to Pleasant Run)	TP	H
15[b]	NJ02030105050020-01	Lamington R (Hillside Rd to Rt 10)	TP	H
16[b]	NJ02030105050070-01	Lamington R(HallsBrRd-HerzogBrk)	TP	H
17[b]	NJ02030105050070-01	Lamington R(HallsBrRd-HerzogBrk)	pH	NA**
18[b]	NJ02030105050090-01	Rockaway Ck (below McCrea Mills)	TP	H
19[b]	NJ02030105050100-01	Rockaway Ck SB	TP	H
20[b]	NJ02030105050100-01	Rockaway Ck SB	TSS	H

3 EPA Memorandum : Information Concerning 2016 Clean Water Actions Section 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions. August 8, 2013. https://www.epa.gov/sites/production/files/2015-10/documents/2016-ir-memo-and-cover-memo-8_13_2015.pdf .

TMDL	Watershed (HUC 14)	Name of Watershed	Parameter	Priority Ranking from 2012 List*
21[b]	NJ02030105060040-01	Raritan R NB (Peapack Bk to McVickers Bk)	TP	NA**
22[b]	NJ02030105060040-01	Raritan R NB(Peapack Bk to McVickers Bk)	TSS	NA**
23[b]	NJ02030105080020-01	Raritan R Lwr (Rt 206 to NB / SB)	TP	H
24[b]	NJ02030105080030-01	Raritan R Lwr (Millstone to Rt 206)	TP	NA**
25[b]	NJ02030105080030-01	Raritan R Lwr (Millstone to Rt 206)	TSS	NA**
26[c]	NJ02030105090050-01	Stony Bk(Province Line Rd to 74d46m dam)	TP	H
27[c]	NJ02030105090060-01	Stony Bk (Rt 206 to Province Line Rd)	TP	H
28[c]	NJ02030105090070-01	Stony Bk (Harrison St to Rt 206)	TP	H
29[d]	NJ02030105090090-01	Stony Bk- Princeton drainage	TP	H
30[e]	NJ02030105100010-01	Millstone River (above Rt 33)	TP	H
31[e]	NJ02030105100010-01	Millstone River (above Rt 33)	TSS	H
32[e]	NJ02030105100020-01	Millstone R (Applegarth road to Rt 33)	TP	H
33[e]	NJ02030105100020-01	Millstone R (Applegarth road to Rt 33)	TSS	H
34[e]	NJ02030105100030-01	Millstone R (RockyBk to Applegarth road)	TP	H
35[e]	NJ02030105100050-01	Rocky Brook (below Monmouth Co line)	TP	H
36[e]	NJ02030105100060-01[4]	Millstone R (Cranbury Bk to Rocky Bk)	DO	NA**
37[e]	NJ02030105100060-01	Millstone R (Cranbury Bk to Rocky Bk)	TP	H
38[e]	NJ02030105100090-01	Cranbury Brook (below NJ Turnpike)	TP	NA**
39[e]	NJ02030105100110-01	Devils Brook	TP	NA**
40[e]	NJ02030105100130-01	Bear Brook (below Trenton Road)	TP	H
41[e]	NJ02030105100140-01	Millstone R (Rt 1 to Cranbury Bk)	TP	H
42[d]	NJ02030105110020-01	Millstone R (Heathcote Bk to Harrison St)	TP	NA**
43[f]	NJ02030105110050-01	Beden Brook (below Province Line Rd)	TP	H
44[f]	NJ02030105110100-01	Pike Run (below Cruser Brook)	TP	H
45[g]	NJ02030105120130-01	Green Brook (below Bound Brook)	TSS	M
46[g]	NJ02030105120140-01	Raritan R Lwr(I-287 Piscatway-Millstone)	TSS	M

Notes:

1. Superscript letters reflect the sub-watershed for which the assessment unit is covered under the TMDLs Tables 5-10 of the TMDL document and Appendix A of this document: a - South Branch Raritan River Watershed TMDL; b - North Branch Raritan River Watershed TMDL; c - Stony Brook Watershed TMDL; d - Carnegie Lake Direct Watershed TMDL; e - Upper Millstone River Watershed TMDL; f - Beden Brook Watershed TMDL; and, g - Lower Millstone/Mainstem Raritan River Watershed TMDL.
2. * denotes the Section 303(d) List priority ranking ("high", "medium", or "low") assigned to these waters for TMDL development. A detailed explanation of the priority ranking process can be found in Section 8 of the NJ's Section 303(d) 2012 Methods Document.

3. NA** (Not Applicable) - Impairment identified through supplemental data review as part of the TMDL study; these waterbody/pollutant combinations were not on NJ's 2012 303(d) List and therefore do not have an assigned priority ranking. Public notice on the impaired waters designation was provided through NJ's TMDL public notice.
4. Assessment Unit #36 – NJ020NJ02030105100060-01, Millstone R (Cranbury Bk to Rocky Bk) is not covered under this TMDL approval. The dissolved oxygen (DO) impairment is related to an ammonia discharge to this receiving water and is being addressed by an alternative restoration control strategy through a water quality-based effluent limit for the Princeton Meadows wastewater treatment plant. For further information, refer to the Loading Capacity Section of this document.

Figure 1 of the TMDL document shows the watershed management areas, the TMDL study areas and the stream classifications. The watershed management areas and waterbodies included in this TMDL are: portions of Watershed Management Areas 8, 9, and 10 which include the North and South Branch Raritan Rivers; Upper and Lower Millstone Rivers; Stony Brook; Bedens Brook; and the mainstem Raritan River to the Fieldville Dam. The TMDL study area is based on the extent of the model domains used to develop the TMDL. Drainage areas to Spruce Run Reservoir, Round Valley Reservoir, and Delaware and Raritan Canal were not within the model domain. The loadings from these drainage areas were introduced to the model as boundary inputs.

There are a total of 106 HUC-14 assessment units within the model domain. However, impairments in some assessment units were not addressed by these TMDLs. TP impairments in the mainstem Raritan River between the Millstone River confluence and Fieldville Dam are not addressed because while there is evidence of excessive primary productivity and associated non-attainment of pH, the water quality model could not reliably predict water quality responses. NJDEP will conduct additional studies to determine the appropriate management response. Impaired assessment units contributing to Spruce Run Reservoir, Round Valley Reservoir, and Delaware and Raritan Canal are managed as part of a water supply system and included only as boundary inputs to the TMDL study area. In addition, the Duhernal Lake watershed impairments will be addressed in a future separate TMDL report. The TMDLs also do not address 23 DO and pH impairments because the TMDL analysis did not demonstrate compliance with DO and pH standards in these assessment units. It is likely that as a result of the implementation of these TMDLs, standards will be met in these waterbodies. However, these waterbodies will remain on the 303(d) list and continue to be monitored and assessed. Refer to Table 2 of the TMDL document for further information.

Land use in the non-tidal Raritan River basin is shown in Figure 7 and summarized in Table 3 of the TMDL document. In general, agricultural and forested land uses are more prevalent in the northern, upstream portions, wetland areas are more prevalent in the south, and urban areas increase towards the downstream parts of the basin.

The following section provides a description of the TMDL watershed areas:

Watershed Management Area 8 - North and South Branch Raritan Rivers

This area includes the North and South Branches of the Raritan River and their tributaries located in the counties of Somerset, Hunterdon, and Morris. The South Branch of the Raritan River, which is 51 miles long, begins at the outlet of Budd Lake and flows from western Morris County through central Hunterdon County into western Somerset County before joining the North Branch near the confluence with the mainstem Raritan River. Major tributaries include the Neshanic River, Spruce Run Creek, Mulhockaway Creek and Cakepoulin Creek and major impoundments are the Spruce Run and Round Valley Reservoirs. Land use in the South Branch Raritan River watershed is mostly agricultural, but suburban-industrial development has been increasing. Near Neshanic Station, the South Branch is joined by the Neshanic River which, from its confluence, the river turns and flows north to its confluence with the North Branch, forming the Raritan River. The North Branch of the Raritan River is 23 miles long and flows from northwestern Morris County through Somerset County to the confluence with the South Branch between the towns of Branchburg and Raritan. The major tributaries are Peapack Brook, Rockaway Creek and Lamington River and the only major impoundment is Ravine Lake. Land use in the North Branch Raritan River watershed is primarily rural, woodland and agricultural with commercial and residential areas and intense development along the major road corridors.

<u>Watershed Management Area 9 - Lower Raritan, South River, Lawrence Brook</u>

Watershed Management Area 9 includes the mainstem of the Raritan River, the South River and Lawrence Brook, located in the counties of Middlesex, Somerset and Monmouth. The mainstem of the Raritan River begins at the confluence of the North and South Branches to the Raritan Bay. The Raritan River has two dams, Fieldsville and Calco and several small manmade recreational lakes and ponds, including the Watchung Lake, Surprise Lake, Spring Lake and Green Brook Pond. Land use in the mainstem Raritan River watershed is primarily urban/suburban, with industrial and commercial centers.

The drainage area of Duhernal Lake constitutes a large portion of this watershed, but it is not covered in these TMDLs.

<u>Watershed Management Area 10 – Millstone River</u>

Watershed Management Area 10 includes the Millstone River and its tributaries, located in the counties of Hunterdon, Somerset, Middlesex, Mercer and Monmouth.

The Millstone River is 38 miles long and flows from Millstone Township in Monmouth County to the Raritan River near Manville and Bound Brook. Major tributaries include Stony Brook, Cranbury Brook, Bear Brook, Ten Mile River, Six Mile River and Bedens Brook, and the largest impoundment is Carnegie Lake. Land use in the Millstone Watershed is primarily suburban development with scattered agricultural areas and extensive development present in the upper portion of the watershed.

B. Pollutants of Concern

The pollutants of concern are phosphorus and total suspended solids. When present in excessive amounts, phosphorus can lead to excessive primary productivity, in the form of algal and/or macrophyte growth. The presence of excessive plant biomass can, in itself, interfere with designated uses (such as swimming or boating), adversely affect the aquatic community (cause significant swings in pH and dissolved oxygen), impact drinking water use (cause taste and odor problems and treatment inefficiencies), and may result in an increase in disinfection byproducts such as trihalomethanes. In the presence of excessive plant biomass, the respiration cycle can cause significant swings in pH and dissolved oxygen, which can result in exceedances of criteria for these parameters, and adversely affect the aquatic community.

Evaluation of monitoring data and modeling analyses indicate that phosphorus is responsible for causing excessive primary productivity at many locations in the Raritan River basin, and in some locations, this excessive productivity is resulting in non-attainment of DO and pH water quality standards.

Total Suspended Solids (TSS) is the second pollutant of concern. Suspended solids are predominately carried to receiving waters from storm water runoff events. High concentrations of suspended solids can cause problems for stream health and aquatic life. Excessive TSS can bury benthic organisms and can affect the viability of organisms that reside in the water column.

C. Pollutant Sources

The Raritan River watershed is affected by both point and nonpoint sources. Point sources include domestic and industrial wastewater treatment plants that discharge to surface waters and storm water discharges subject to regulation under the National Pollutant Discharge Elimination System (NPDES) program. Regulated storm water discharges include facilities with individual or general industrial storm water permits and Tier A municipalities and state and county facilities regulated under the NJPDES municipal storm water permitting program. The forty-seven (47) wastewater treatment plants that discharge to the watershed are listed in Table 4 and shown in Figure 8 of the TMDL document. Tier A municipalities are identified in Appendix B of the TMDL document.

Nonpoint sources include storm water discharges that are not subject to regulation under the NPDES program, such as Tier B municipalities (identified in Appendix B of the TMDL document), which are regulated under the NJPDES municipal storm water permitting program, and direct storm water runoff from land surfaces, as well as malfunctioning sewage conveyance systems, failing or inappropriately located septic systems, and direct contributions from wildlife, livestock and pets.

Section IV.B. of the Kleinfelder/Omni report (2013, Volume 1) provides the source assessment for TP and TSS that was used in the water quality model. Figures 22 and 23 show the relative contributions in each sub-watershed from wastewater point sources, background, regulated storm water runoff, agricultural runoff, tributary baseflow and boundary inputs. Wastewater treatment plants are the main source of TP in most sub-watersheds (Figure 22) Runoff is the predominant source of total suspended solids in all the sub-watersheds (Figure 23).

D. Priority Ranking

The priority ranking for the assessment units covered by this TMDL are provided in Table 1 of this document.

EPA finds that these TMDLs meet the requirements for describing the waterbody, the pollutant of concern, pollutant sources, and priority ranking.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. (40 C.F.R. §130.7(c)(1)). EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

The TMDL submittal must identify a numeric water quality target(s) a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

The assessment units covered by this TMDL are classified as Fresh Water 2 (FW2) for which N.J.A.C. 7:9B-1.12 c specifies the following uses:

1) Maintenance, migration and propagation of the natural and established aquatic biota;
2) Primary contact recreation;
3) Industrial and agricultural water supply;
4) Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and;
5) Any other reasonable uses.

FW2 waters are further designated with regard to the support of trout species. Waters are designated Non-Trout (NT), Trout Maintenance (TM), or Trout Production (TP). The Raritan River basin includes both Category 1 (C1) and Category 2 (C2) designated waters, a designation relevant to anti-degradation status. C1 streams are designated through rulemaking for protection from measurable changes in water quality because of their exceptional ecological significance, exceptional water supply, exceptional recreation, and exceptional fisheries to protect and maintain their water quality, aesthetic value, and ecological integrity. For C2 waters, existing water quality is to be maintained where it is better than standards; however, lowering of water quality can be allowed to accommodate necessary and important social and economic development, provided standards are attained. These designations are shown in Figure 2 of the TMDL document.

Numeric and narrative water quality criteria are found at N.J.A.C. 7:9B-1.14(d) and summarized below:

Nutrients:

Narrative criterion for nutrients:

> 4.i. Except as due to natural conditions, nutrients shall not be allowed in concentrations that render the waters unsuitable for the existing or designated uses due to objectionable algal densities, nuisance aquatic vegetation, diurnal fluctuations in dissolved oxygen or pH indicative of excessive photosynthetic activity, detrimental changes to the composition of aquatic ecosystems, or other indicators of use impairment caused by nutrients.

Numeric criteria for phosphorus for FW2 waters:

> 4.ii. Phosphorus, Total (mg/l):
> (1) Non Tidal Streams: Concentrations of total P shall not exceed 0.1 in any stream, unless watershed-specific translators are established pursuant to N.J.A.C. 7:9B-1.5(g)2 or if the Department determines that concentrations do not render the waters unsuitable in accordance with (d)4i above.
>
> (2) Lakes: Concentrations of total P shall not exceed 0.05 in any lake, pond or reservoir, or in a tributary at the point where it enters such bodies of water, unless watershed-specific translators are developed pursuant to N.J.A.C. 7:9B-1.5(g)2 or if the Department determines that concentrations do not render the waters unsuitable in accordance with (d)4i above.

As stated in N.J.A.C. 7:9B-1.5(g), the nutrient policies are as follows:

1. These policies apply to all waters of the State.
2. The Department may develop watershed-specific translators or site-specific criteria through a Total Maximum Daily Load (TMDL). Site specific criteria shall be incorporated at N.J.A.C. 7:9B-1.14(g).
3. The Department shall establish water quality-based effluent limits for nutrients, in addition to or more stringent than the effluent standard in N.J.A.C. 7:14A-12.7, as necessary to meet a wasteload allocation established through a TMDL, or to meet the

criteria at N.J.A.C. 7:9B-1.14(d)4.

4. Activities resulting in the nonpoint discharge of nutrients shall implement the best management practices determined by the Department to be necessary to protect the existing or designated uses.

Dissolved Oxygen:

Dissolved oxygen (mg/L) criteria vary by designation and are found in N.J.A.C. 7:9B-1.14(d)(2). Those that apply to the Raritan River basin are included below:

i.	Not less than 7.0 at any time;	FW2 – TP
ii.	24 hour average not less than 6.0. Not less than 5.0 at any time (see paragraph viii below);	FW2 - TM
iii.	24 hour average not less than 5.0, but not less than 4.0 at any time (see paragraph viii below);	FW2-NT
viii.	Supersaturated dissolved oxygen values shall be expressed as their corresponding 100 percent saturation values for purposes of calculating 24 hour averages.	FW2 TM, NT

pH:

Criteria applicable in the Raritan River basin can be found N.J.A.C. 7:9B-1.14(d)(5) and are summarized below:

pH (standard units)

i. 6.5 - 8.5	FW2 waters listed at 1.15(d), (f), (g) and (i)
ii 4.5 – 7.5	FW2 waters listed at 1.15(c), (e) and (h)

Total Suspended Solids:

The water quality criteria for TSS that apply to the Raritan River basin are found in N.J.A.C. 7:9B-1.14(d) (7) are summarized below:

Solids, Suspended (mg/L) (Non-filterable residue)

i.	25.0	FW2-TP, FW2-TM
ii.	40.0	FW2-NT

EPA finds that these TMDLs meet the requirements for identifying the applicable water quality standard and numeric water quality targets.

3. Loading Capacity – Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a waterbody for the applicable pollutant. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). The TMDL submittal should describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model.

The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation. TMDLs must take into account critical conditions for stream flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable critical conditions and describe their approach to estimating both point and nonpoint source loadings under such critical conditions. In particular, the TMDL should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

A. Loading Capacity

The modeling approach for the non-tidal Raritan River basin TMDLs is summarized in Section 5.0 of the TMDL document. Details on the data sets, modeling framework and calibration are available in the Omni/Kleinfelder report and appendices (2013). All phases of the monitoring program and modeling development were peer reviewed by an independent group of scientists through Rutgers EcoComplex. The modeling approach is based on the integration of two models: HydroWAMIT and the Water Quality Analysis Simulation Program 7.1 (WASP7.1). A schematic of the modeling framework is shown in Figure 7 in Kleinfelder/Omni (2013, Volume 1, p. 25). HydroWAMIT is a hydrologic model which provides hydrodynamic (e.g. stream flow) and nonpoint source inputs to WASP7.1.

A detailed description and flow diagram for the HydroWAMIT model is included in Kleinfelder/Omni Report (2013, Volume 1, p.37-40 and Volume 2, Appendix C). HydroWAMIT inputs include point source flows, cross-sectional geometry of streams, land use distribution, weather data, hydrologic parameters and the concentrations of pollutants in surface runoff and baseflow. HydroWAMIT was designed to capture the spatial and temporal variability of parameters for multiple sub-watersheds and to perform continuous simulations on a daily time step. The model uses event mean concentrations (EMC) and baseflow concentrations (BFC) of constituents (e.g., forms of phosphorus, TSS, etc.) to calculate watershed yields from various land uses, incorporating factors such as nutrient cycling, buildup, and wash-off processes. An EMC is an estimate of the total mass of pollutant delivered divided by the total storm flow volume and is defined for each constituent and specific to each land use type for each sub-watershed. The BFCs are also defined for each constituent and vary by sub-watershed. The BFCs and EMCs are estimated from field measurements and representative of the areas they are applied to in the model. In addition, the HydroWAMIT model captures the streamflow routing to generate the hydrodynamic input file for WASP7.1.

WASP7.1, an EPA supported dynamic water quality model, simulates the fate and transport of conventional and toxic water quality constituents. WASP7.1 was modified by EPA specifically for the Raritan River basin to include a sub-model (PERIPHYTON) for this TMDL application. The PERIPHYTON sub-model is an enhancement of the original EUTRO sub-model and simulates the phenomenon of nutrient luxury uptake which occurs in the Raritan River. This phenomenon occurs when excess levels of nutrients, beyond the immediate needs for growth, are taken up by the plants and used at a later time to sustain growth of algae and aquatic plants when the levels of nutrients in the water column decrease. The processes modeled within WASP7.1 are shown in Figure 15 of the Kleinfelder/Omni Report (2013, Volume 1, p. 41) and described in Section 5 of the TMDL document. WASP 7.1 includes physical-chemical processes that affect the transport and interaction among nutrients, phytoplankton, benthic algae (and/or macrophytes), carbonaceous material, and dissolved oxygen in the receiving water.

Due to the large spatial extent of the watershed (865 square miles), the non-tidal Raritan River basin was modeled by dividing the basin into five sub-basins, with each sub-basin having its own model: North and South Branch Raritan River; Upper Millstone River; Stony Brook; Beden Brook/Lower Millstone River; and Mainstem Raritan (shown in Figure 9 of the TMDL report). The TMDL analyses were conducted by applying the models to these five sub-basins within the Raritan River basin. This allowed for more sensitive parameters such as nitrification rate, growth rate of phytoplankton and benthic algae, respiration and death rates to reflect the unique conditions of each watershed. Watershed modeling analyses were performed to assess the impact of nutrient reductions from point and nonpoint sources on DO, phosphorus concentrations, pH (through relationship with diurnal DO peaks), and TSS in streams and lakes throughout the system. The modeling framework and waterbodies addressed within each sub-basin are described in the Kleinfelder/Omni Report (2013, Volume 1, Section III).

Data to support the modeling were obtained through monitoring networks at stations located in/at/ to account for: 32 streams, 9 lakes, 6 tributaries, 9 baseflow conditions, 6 storm water outfalls and 13 waste water treatment plants. In addition, supplemental data were collected for this study through monitoring: 3 low-flow events (2 days each at 77 stations); 3 high flow events (2 days each at 69 stations); 8 ambient events at 41 stations, 3 diurnal events at 41 stations and 3 storm water events at 6 stations (Kleinfelder/Omni, 2013, Volume 1, Section D).

Inputs to the models, including assumptions and calculations for sources such as storm water from various land uses within each sub-basin, point sources, baseflow, etc. are described in detail in Kleinfelder/Omni Report (2013, Volume 1, p. 56). Table 29 of this report summarizes the pollutant loads associated with runoff from specific land uses such as residential, agriculture, etc. Nonpoint source (NPS) loads were derived by multiplying the EMCs and BFCs by the surface flow from each respective land use source area and baseflow from each sub-watershed. Details on how the EMCs and BFCs were derived and how the NPS loadings were calculated and adjusted to match the observed values can be found in the Kleinfelder/Omni report (2013, Volume 1, p. 56).

The simulation period for the Raritan Basin hydrologic and water quality models is from January 2002 through August 2005. This time frame is representative of a wide variety of flow conditions; years 2002 and 2005 are considered dry, 2003 wet and 2004 average. For the TMDL calculations, load reductions were determined to assure that water quality targets are met at the critical flow conditions. Refer to Critical Conditions (section 1.C. of this document) for further discussion.

The modeling framework and series of calibrations for the hydrologic and water quality models were reviewed and accepted by an independent academic peer review panel. The hydrodynamic and water quality simulations, including goodness-of-fit statistics are included in Volumes 1 and 2 of the Kleinfelder/Omni report (2013). Model calibration and validation focused on seven parameters: DO, ammonia nitrogen (NH3-N), nitrate nitrogen (NO3-N), TP, orthophosphate (OrthoP), chlorophyll-a, and TSS at 75 stations throughout the model domain.

The procedure for calculating the TMDLs to achieve the water quality standards for pH, TP, and TSS and DO is described in Section V of the Kleinfelder/Omni Report (2013, Volume 1) and summarized in Section 3.0 of the TMDL document. Figure 9 of the TMDL document shows the "drivers" or critical points for calculating the TMDL in each sub-watershed. Consistent with NJ's water quality standards, a stream TP criterion of 0.1 mg/L was applied at all HUC14 outlets and a lake TP criterion of 0.05 mg/l or natural condition was applied at lakes within each sub-basin.

Total phosphorus reductions based on the endpoints described above were shown to result in compliance with the TSS criteria at all sub-watershed outlets within the model domain. This is due to TP removal practices, which when implemented, will remove TSS to an even greater extent than needed to meet water quality standards for TSS where there are TSS impairments. Tables 8 to 10 of the TMDL document which include TSS reductions for point and nonpoint sources by sub-watershed include a negative percent reduction for wastewater treatment plants. As noted in the footnote to this table, the negative allocation reflects discharging up to the permitted flow (the condition modeled in the TMDL and shown to meet standards) and existing permit limits for TSS (shown in Table 12 of the TMDL document). However, the required removal of TP at wastewater treatment plants will likely reduce TSS to levels lower than existing permitted concentrations. Additional information on the approach to addressing TSS impairments can be found in the Kleinfelder/Omni report (2013, Volume 1, p. 188).
Since pH was not directly modeled, site-specific DO-pH relationships were used to determine compliance with the pH criteria. As described in Section II.B of the Kleinfelder/ Omni Report (2013, Volume 1), photosynthesis pumps DO into the water column and utilizes carbon dioxide,

which increases pH during the day. High productivity, caused by excessive phosphorus loads, results in diurnal swings of DO and pH. DO and pH diurnal swings are well correlated, both being caused directly by the diurnal photosynthesis and respiration cycles. In order to relate model predictions of diurnal DO to the maximum pH target of 8.5, site-specific correlations between diurnal pH peaks and diurnal DO peaks were developed based on data from diurnal monitoring performed during late summer low-flow periods. These DO-pH site-specific relationships are shown in Table 2 and Figure 5 of the Kleinfelder/Omni Report (2013, Volume 1, p. 17-18). In some areas, water quality modeling was not successfully simulated for diurnal DO and pH swings; therefore, these assessment units were excluded from the TMDLs. These assessment units are identified as "unaddressed" in Table 2 of the TMDL document and they will remain on NJ's section 303(d) list.

There are assessment units impaired for pH where a DO-pH site specific relationship allowed the calculation of a TMDL for TP to resolve the pH impairment. Reducing the ortho-phosphorus component of the TP load was found to be critical to achieving the applicable pH standard. Through water quality modeling analyses, levels of ortho-phosphorus in wastewater treatment plants were linked to diurnal DO and pH swings. In calculating the TMDLs, an assumption was made regarding the relative distribution of forms of TP (ortho-phosphorus, organic phosphorus) in wastewater treatment plant effluents. The TMDL analysis is based on reducing levels of TP, including ortho-phosphorus, such that the applicable pH standard is met.

The TMDL document identifies one assessment unit (NJ02030105100060-01, Millstone R Cranbury Bk to Rocky Bk), as impaired for DO. The DO impairment at this location, represented by the monitoring station at UMR3, is unrelated to excess phosphorus. As part of this study, it was determined that the ammonia discharge from the Princeton Meadows WWTP (NJ0024104) is the cause of the DO impairment, which will be addressed by implementation of the seasonal ammonia limitation of 6.64 mg/l (summer) and 10.33 mg/l (winter) in the Princeton Meadows WWTP permit. These values were used as inputs to the water quality model and were shown to result in compliance with the applicable DO standard in this assessment unit. While EPA is not including this assessment unit in its approval of the TP and TSS TMDLs, the assessment unit has been addressed through a water quality-based permit limit and can be considered an alternative restoration control strategy under the Section 303(d) program vision framework and a WQ-27 measure.

The TMDLs, waste load allocations (WLAs), load allocations (LAs) and margin of safety (MOS) for the sub-basins within the non-tidal Raritan River basin are identified in Tables 5 to 11 of the TMDL document and in Table 1 in Appendix A of this document.

B. Cause-and-Effect Relationship between Numeric Target and Pollutant

Phosphorus can cause designated use impairments by stimulating excessive growth of algae and aquatic plants, which can cause oxygen supersaturation during the day and oxygen depletion at night. Large diurnal variations of DO are often associated with large diurnal variations of pH, both of which can be induced by excessive growth in the system. As a result, phosphorus is related, through primary productivity, to both DO and pH. Through the review of monitoring and modeling studies in the non-tidal Raritan River basin, phosphorus has been shown to cause excessive productivity, resulting in non-attainment of DO and pH criteria. The WASP 7.1 water quality model was used to predict the impact of phosphorus loadings on receiving water quality to confirm observed data. Because of the relationship between productivity and DO and pH, several of the DO and pH impairments will be addressed by controlling excessive productivity As described above, site-specific DO and pH correlations were used to determine compliance with the pH criteria.

The TMDLs for TP will result in meeting standards for TP and pH. (Note that, as described above, the assessment unit that is impaired due to low DO will be addressed by an alternative restoration strategy for ammonia.)

High concentrations of TSS can impact the health of benthic and aquatic organisms. The predominant source of TSS is from storm water. Therefore, the TMDLs provide reductions in TSS from storm water that are designed to meet NJ's TSS criteria.

The TMDLs are calculated to meet the TP and TSS criteria at the outlet of the applicable assessment unit (HUC14). The natural condition or 0.05 mg/l TP, or whichever is higher, was applied to lakes within the basin. The natural condition was modeled with the assumption that all land use is forested. The natural condition provision is included in NJAC 7:9-1.14(d).

C. Critical Conditions

A wide range of conditions was captured in the monitoring period that was used to develop the model, including wet, dry and average hydrologic conditions (refer to "Seasonal Variation" section of this document for further discussion on monitored and modeled conditions). The model was continuously simulated over a period of 44 months, from January 2002 through August 2005. These 3.7 years include a range of hydrologic conditions, both seasonal and year-to-year. The summer season is the critical period for biological activity and most likely to result in excess primary productivity and swings in DO and pH. Compliance with standards under critical conditions are ensured through the inclusion of water years 2002 and 2005 which were characterized with extreme low flows and hot summers.

High flows generally produce higher loadings of TSS which are predominantly from storm water. Higher flows were represented by the modeled year of 2003 which was characterized as having wetter than normal spring and summer periods. The TMDLs were calculated to meet the applicable standards under all critical conditions.

EPA concludes that the loading capacity has been adequately identified and critical conditions have been considered.

D. Reserve Capacity

A reserve capacity is included in the TMDLs to allow for future growth for new or expanded wastewater treatment plants (WWTP). As shown in Tables 5 to 11 of the TMDL document, a reserve capacity is included in each sub-watershed in kg/day and was calculated based on a percentage of the gross WLA for the wastewater treatment plant dischargers. Details on the reserve capacity component set for each modeled sub-watershed are provided in the Kleinfelder/Omni Report (2013, Volume 1, p. 155). A smaller reserve capacity (2.3% of the WWTP allocations) was allocated to the South Branch Raritan River sub-watershed to ensure continued anti-degradation protection for Category 1 waters.

EPA requests notification on the allocation of the reserve capacity to a wastewater treatment plant discharger. Any future changes in allocations should be consistent with EPA's most recent guidance on revising and withdrawing TMDLs.[4]

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future nonpoint sources and to natural background. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, load allocations should be described separately for natural background and nonpoint sources.

Load allocations for nonpoint sources are provided in Tables 5 to 11 of the TMDL document. For each sub-watershed, TP and TSS nonpoint source load allocations (in kg/day) are provided for: boundary; tributary baseflow; runoff from agriculture; runoff from forest/barren lands; runoff from wetlands; and atmospheric deposition. No reductions were assigned to runoff from wetlands, forest/barren lands, boundary inputs, or atmospheric deposition.

The implementation section of the TMDL document (and section 10 of this document) describes how the reductions for tributary baseflow and runoff from agriculture will be achieved. As described in the Loading Capacity Section of this document, reductions in TSS from storm water in the TSS TMDL are assigned the same level of reduction as storm water in the TP TMDL. TSS reductions will be achieved at the same or greater level when TP reductions are implemented.

Table 1 in Appendix A of this document lists the current loading for each source, and the load allocations needed to meet the TMDLs for the non-tidal Raritan River basin.

EPA concludes that the TMDLs have identified load allocations for nonpoint sources of total phosphorus and total suspended solids.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h),

4 EPA Draft Memorandum: Considerations for Revising and Withdrawing TMDLs. March 22, 2012. https://www.epa.gov/sites/production/files/2015-10/documents/draft-tmdl_32212.pdf.. Note that this is draft guidance. The final guidance should be used when it becomes available.

40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permitees should be notified of any deviations from the initial individual WLAs contained in the TMDL. EPA does not require the establishment of a new TMDL to reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

The TMDLs provide TP and TSS WLAs for 45 wastewater treatment plants (WWTPs) and storm water from residential land and urban land uses.

Wastewater Treatment Plants

Wastewater treatment plant TP reductions range from 25% to 84%. Tables 5 to 11 of the TMDL document provide the sum of individual WLAs for TP and TSS in each sub-watershed. For TP, these values represent the average of seasonal loading. Table 12 of the TMDL document provides the individual WLAs for the 45 WWTPs[5] for TP and TSS[6] on a seasonal basis for the periods May to October and November-April. TSS concentrations reflect current permit concentrations. However, the removal of TP required to meet the TP WLAs will reduce the levels of TSS below the current permitted concentrations. Table 12 also includes concentrations of ortho-phosphorus for eleven (11) facilities. Through water quality modeling analyses, levels of ortho-phosphorus were linked to diurnal DO and pH swings in several assessment units. In calculating the TMDLs, an assumption was made regarding the relative distribution of forms of TP (ortho-phosphorus, organic phosphorus). Permit modifications for these facilities will include monitoring for ortho-phosphorus to ensure that the assumption is valid and these levels are achieved through the reduction of TP.

Storm Water

The TMDLs include TP and TSS WLAs for regulated storm water from residential land areas and other urban land use areas for each sub-watershed. Due to lack of information regarding drainage areas that contribute to each MS4 outfall, WLAs are provided as gross allocations to

5 The modeling analysis included 47 WWTPS. After the TMDL was developed, permits were revoked for two facilities: VA Supply Depot (NJ0020036) and Elementis (NJ0004243). Therefore, these facilities did not receive WLAs (refer to Table 4 of the TMDL document).

6 TSS WLAs are presented in units of mg/L. which can be expressed as a daily load as follows: Permitted flow of facility (mg/d) multiplied by TSS (mg/l) multiplied by conversion factor of 8.34 will provide the daily load in lbs/d.

residential and urban land use areas within each sub-watershed. EPA's 2014 memorandum[7] recognizes that it "may be reasonable to express allocations for NPDES-regulated storm water discharges from multiple point sources as a single categorical wasteload allocation when data and information are insufficient to assign each source or outfall individual WLAs."

As noted previously, TP and TSS storm water WLAs are based on the same level of reduction. The reductions in TP needed to meet the TP targets also result in meeting the TSS targets. Implementation of best management practices to reduce TP loadings in storm water will likely reduce TSS levels beyond what it required by the TMDLs.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

A margin of safety was explicitly provided in calculating the point source wastewater treatment plant WLAs and in the nonpoint source LAs. For wastewater treatment plants, 10% of the point source loading that was input into the model to determine the allowable loadings without exceeding the water quality standard was assigned as the MOS. The remaining 90% of the simulated wastewater treatment plant loading was distributed into individual WLAs. This is a reasonable margin of safety due to the lower uncertainty and regular monitoring and enforcement associated with wastewater treatment plants discharges.

A 20% explicit MOS was assigned to storm water and nonpoint source LAs for TSS and TP. The uncertainty associated with reducing and calculating pollutant loads from storm water and nonpoint source loads is higher than for other types of pollutant loads and thus warrants a higher MOS.

EPA concludes that these TMDLs incorporate an adequate margin of safety.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of

[7]USEPA. 2014. *Revisions to the November 22, 2002 Memorandum "establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs.* http://www.epa.gov/sites/production/files/2015-12/documents/epa_memorandum_establishing_tmdl_wlas_for_stormwater_sources_2014_00000002.pdf

seasonal variations. The TMDL must describe the method chosen for including seasonal variations. (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

A range of hydrologic and water quality conditions were captured in the monitoring and modeling in support of TMDL development. Continuous model simulations over a period of 44 months included a range of seasonal hydrologic conditions, including spring rains, summer thunderstorms, summer dry periods and low flows. Years 2002 and 2005 are representative of hot, dry summers and extreme low flows, 2004 represents a typical year with a range of hydrologic conditions from very dry low flow periods to flood conditions, while 2003 represents a wetter than normal spring and summer period. The TMDLs were calculated to ensure water quality standards are met under all conditions.

EPA concludes that these TMDLs have adequately considered seasonal variation to ensure that the water quality standards are achieved throughout the year.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved.

The non-tidal Raritan River TMDLs include reductions from continuous point source discharges (wastewater treatment plants), permitted storm water point sources and nonpoint sources. Significant reductions are required from both point and nonpoint sources; overall point and nonpoint source TP percent reductions vary by sub-watershed but range between 36% and 74%. Wastewater treatment plant TP reductions range from 25% to 84% (for additional information, refer to Tables 5-11 of the TMDL document).

Reductions in point sources will be achieved in accordance with NPDES permitting regulations. Wastewater treatment plants listed in Table 12 of the TMDL document will be required to meet seasonal and/or annual TP concentrations and loads identified in the Table. Compliance with these levels will also ensure compliance with the TSS levels.

Reductions in urban and residential storm water will be achieved through the implementation of NJ's Stormwater Management Rules, NJ's Fertilizer Rule, and several green infrastructure initiatives (see Section 11 below for further information).

Reductions in nonpoint source loads are already being implemented through several funded projects identified in Table 13 of the TMDL document. Section 319 Watershed Restoration Plans have already been developed which include specific measures needed to achieve the nonpoint source load reductions for each sub-watershed, as well as suggested responsible entities, funding sources and schedules for implementing the specific measures.

EPA concludes that these TMDLs provide reasonable assurance that nonpoint source load reductions will be met.

9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

The U.S. Geological Survey and the NJDEP will continue to monitor water quality through NJDEP's Ambient Stream Monitoring Network (ASMN) at 115 stations in New Jersey. The stations are routinely monitored on a quarterly basis. In order to provide increased spatial coverage, NJDEP, through its Supplemental Ambient Surface Water Network, conducts monitoring at an additional 100 ambient monitoring stations. Data collected through these monitoring programs as well as data provided by stakeholders will be used to assess progress towards meeting the TMDLs and achieving water quality standards. Several implementation projects require monitoring to assess the effectiveness of control measures to reduce pollutant loads. Compliance with WLAs for wastewater treatment plants will be assessed using required monthly discharge monitoring data.

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint *sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.*

Although implementation plans are not a requirement for EPA approval of a TMDL, the TMDL document identifies several actions designed to achieve water quality standards.

The implementation plan is described in Section 7.0 of the TMDL document and summarized below. Reductions in TP and TSS are required from wastewater treatment plants, regulated storm water runoff, runoff from agriculture and tributary baseflow. While tributary baseflow originates from groundwater, it is delivered to streams and modeled based on ambient data collected from small tributaries. Therefore, tributary baseflow levels of TP and TSS are influenced by runoff from land use cover, and in dry conditions, are affected by continuous point source dischargers in small tributaries. Figure 25 of Kleinfelder/Omni (2013, Volume 1, p. 139) shows the positive relationship between storm water reductions in TP and the resulting decreases in baseflow concentrations. Therefore, reductions in baseflow are achieved through watershed-wide reductions in storm water runoff (e.g. agricultural, urban, and residential) and to a lesser extent, from reductions in wastewater treatment plants. Actions to reduce specific sources of TP and TSS are described below.

Wastewater Treatment Plants

Section 7.1 of the TMDL document provides details on how permit limits will be derived from the WLAs and is consistent with guidance provided in EPA's Technical Support Document for Water Quality-based Toxics Control (1991). In addition, the four facilities discharging to Category 1 waters are specifically identified and the permit limits for these facilities will be maintained at existing limits to maintain current water quality conditions for pollutants covered under these TMDLs. As noted previously, the TMDLs provide ortho-phosphorus concentrations for eleven wastewater treatment plants that discharge to three receiving waters where the DO-pH relationship is linked to ortho-phosphorus concentrations. Permit modifications for these facilities will include monitoring for ortho-phosphorus to ensure that the TP/ortho-phosphorus assumption is valid and these levels are achieved through the reduction of TP.

Storm Water

Load reductions are generally expected to be achieved through implementation of the BMPs required through storm water permits, supplemented by the additional measure of fertilizer management ordinances. The NJPDES regulations pertaining to the Municipal Stormwater Regulation Program require municipalities, highway agencies, and regulated "public complexes" to develop storm water management programs consistent with the NJPDES permit requirements. The storm water discharged through "municipal separate storm sewer systems" (MS4s) is also regulated under the Department's storm water rules (MS4s are identified in Appendix B of the TMDL document). Under these rules, Tier A municipalities are required to implement additional control measures if they discharge to impaired waters. NJDEP is currently evaluating the effectiveness of these measures and if needed, will identify additional controls to be implemented to further reduce TP and TSS loadings.

NJDEP's Stormwater Management Rules (N.J.A.C 7:8) establish statewide minimum standards for storm water management from new development. In addition, through these rules, regional storm water management plans are developed to address specific impairments within a particular drainage basin. The rules require every project to evaluate methods to prevent pollutants from entering storm water runoff through better site design (i.e., low impact development). Municipalities are required to adopt and implement municipal storm water management plans and storm water control ordinances consistent with the Stormwater Management Rules.

Additional protection for Category 1 waters is provided through the New Jersey Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) which require a 300 foot buffer or riparian zone for all regulated activities within the 300 foot riparian zone that is adjacent to designated C1 waters and upstream tributaries within the same HUC 14.

NJDEP promotes the application of green infrastructure methods for managing storm water runoff. Table 13 of the TMDL document includes a list of green infrastructure projects that have been implemented.

New Jersey's Healthy Lawns Healthy Water initiatives include a fertilizer law that has been implemented in three phases (2011-2013). Phase I required the best management practices to reduce the impacts of fertilizers on waters and public education regarding correct fertilizer use; Phase II created a certification program for professional fertilizer applicators and lawn care providers; and Phase III required manufacturers to reformulate fertilizers with reduced nitrogen and zero phosphorus content, unless a soil test indicates the need for phosphorus.

NJ's AmeriCorps Watershed Ambassadors Program assigned watershed ambassadors to actively engage with the public on monitoring and protecting local watersheds. Within the Raritan River basins, they have completed public education and installation of rain barrels to capture storm water.

Runoff from Agricultural Land Use

Several programs are available to assist farmers in the development and implementation of conservation management plans and resource management plans. The Natural Resource Conservation Service (NRCS) is the primary source of assistance for landowners in the development of resource management pertaining to soil conservation, water quality improvement, wildlife habitat enhancement, and irrigation water management. The TMDL document identifies specific funding sources including the Environmental Quality Incentive program, the Conservation Reserve Program and the Conservation Reserve Enhancement Program (CREP). NJ"s CREP is affiliated with the US Department of Agriculture' s Conservation Reserve Program which offers financial incentives for agricultural landowners to voluntarily implement conservation practices.

NJ's goal is to enroll 30,000 acres of eligible farmland into CREP for the planning of grass waterways, contour grass strips, filter strips and riparian buffers. This effort will result in reducing 26,000 pounds of TP and 7 million pounds of TSS annually. As of June 19, 2013, there are 192 New Jersey CREP contracts, totaling 703.8 acres. Only about 2% of this area is within the Raritan watershed, but there is significant potential for future enrollment to achieve nutrient and TSS reductions.

The non-tidal Raritan River watershed has been positively impacted by a wide range of stakeholder involvement including the NJ Water Supply Authority, Raritan River Basin Alliance, Sustainable Raritan River Initiative, NY/NJ Baykeeper/ Raritan Riverkeeper, Stony Brook Millstone Watershed Association, Upper Raritan Headwaters Association, municipalities, county government and Rutgers University. Many of these larger groups are working with smaller watershed associations which are the recipients of grants aimed at improving water quality within the watershed. Table 13 of the TMDL document provides a list of projects and associated funding within each sub-watershed. Details on each of these projects are included in Appendix E of the TMDL document.

Further information on implementation can be viewed in Section 7 of the TMDL document.

11. Public Participation

EPA policy is that there should be full and meaningful public participation in the TMDL development process. The TMDL regulations require that each State/Tribe must subject calculations to establish TMDLs to public review consistent with its own continuing planning process (40 C.F.R.§130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval should describe the State's/Tribe's public participation process, including a summary of significant comments and the State's/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. §130.7(d)(2)).

Provision of inadequate public participation may be a basis for disapproving a TMDL. If EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

Public involvement in the development of these TMDLs has been extensive, beginning in fall of 2000 with the creation of several workgroups and the Raritan River Watershed Alliance. In all phases of TMDL development, including, monitoring, modeling, and planning, NJDEP and/or Kleinfelder/Omni provided stakeholders, interested members of the public, and peer reviewers with key information through a series of 21 meetings/presentations from 2004 to 2012. In 2001, NJDEP contracted with Rutgers New Jersey EcoComplex, a group of university professors, to review the technical approaches and monitoring, and modeling framework for developing the TMDLs.

NJDEP published the TMDLs on June 16, 2014, in the NJ Register and in newspapers of general circulation in the affected area. A public hearing was held on July 16, 2014. The 60-day comment period closed on August 15, 2014. A response to comments is provided in Section 9 of the TMDL document.

EPA has concluded that the State provided adequate public participation and has responded to comments.

12. Submittal Letter

A submittal letter should be included with the TMDL submittal, and should specify whether the TMDL is being submitted for a technical review or final review and approval. Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final review and approval, should contain such identifying information as the name and location of the waterbody, and the pollutant(s) of concern.

The non-tidal Raritan River TMDLs were received by EPA Region 2 on February 1, 2016, and were accompanied by a letter dated January 19, 2016, requesting EPA's review and approval of the TMDLs.

13. Administrative Record

While not a necessary part of the submittal to EPA, the State/Tribe should also prepare an administrative record containing documents that support the establishment of and calculations/allocations in the TMDL. Components of the record should include all materials relied upon by the State/Tribe to develop and support the calculations/allocations in the TMDL, including any data, analyses, or scientific/technical references that were used, records of correspondence with stakeholders and EPA, responses to public comments, and other supporting materials. This record is needed to facilitate public and/or EPA review of the TMDL.

NJDEP has prepared an administrative record to support this TMDL; it is available at NJDEP's offices in Trenton, NJ.

Table 2a. TMDLs/WLAs/LAs for TP for sub-watersheds within the non-tidal Raritan basin.

Long Term Average Daily Load (kg/d TP)	South Branch Raritan River Watershed			North Branch Raritan River Watershed*			Raritan River Basin Upstream of Millstone River Confluence**		
	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction
Sum of Wasteload Allocations (WLAs)	106.4	65.0	39.0%	78.2	30.5	60.9%	184.6	95.5	48.3%
Treated Effluent from WWTP Dischargers***	72.4	54.5	24.8%	44.2	17.7	60.0%	116.6	72.2	38.1%
Stormwater from Residential Land Cover Areas	25.8	7.9	69.4%	23.1	8.7	62.3%	48.8	16.6	66.1%
Stormwater from Other Urban Land Cover Areas	8.2	2.6	68.5%	10.9	4.2	61.8%	19.1	6.7	64.7%
Sum of Load Allocations (LAs)	85.2	44.3	48.0%	62.6	29.7	52.6%	147.8	74.0	49.9%
Boundary Inputs	11.8	11.8	0.0%	0.9	0.9	0.0%	12.7	12.7	0.0%
Tributary Baseflow	32.9	14.8	54.9%	28.3	13.1	53.8%	61.2	27.9	54.4%
Stormwater from Agricultural Land Cover Areas	31.9	9.1	71.5%	25.6	7.9	69.0%	57.5	17.0	70.4%
Stormwater from Forest and Barren Land Cover Areas	2.4	2.4	0.0%	3.3	3.3	0.0%	5.7	5.7	0.0%
Stormwater from Wetlands Land Cover Areas	6.2	6.2	0.0%	4.4	4.4	0.0%	10.5	10.5	0.0%
Air Deposition onto Water Land Cover Areas	0.06	0.06	0.0%	0.06	0.06	0.0%	0.12	0.12	0.0%
Total Margin of Safety (% of LC)	n/a	11.8	9.6%	n/a	9.0	12.8%	n/a	20.8	10.8%
STP MOS		4.8	3.9%		2.0	2.8%		6.8	3.5%
Stormwater and NPS MOS		7.0	5.7%		7.1	10.0%		14.0	7.3%
Reserve Capacity (% of WWTP load)	n/a	1.3	2.3%	n/a	1.3	7.3%	n/a	2.6	3.5%
Loading Capacity (LC)	191.6	122.3	36.2%	140.7	70.5	49.9%	332.3	192.8	42.0%

Assessment units covered under each sub-watershed TMDL are identified in Table 1 of this document.
* Includes the portion of the mainstem Raritan River upstream of the Millstone River confluence
** Equal to South Branch Raritan River Watershed plus North Branch Raritan River Watershed
*** Average of seasonal TMDL loading. Seasonal loading for each facility is identified in Table 3 of this document and Table 12 of the TMDL document.
n/a - not applicable

Table 2b. TMDLs/WLAs/LAs for TP for sub-watersheds within the non-tidal Raritan basin

Long Term Average Daily Load (kg/d TP)	Upper Millstone River Watershed			Stony Brook Watershed			Carnegie Lake Direct Watershed		
	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction
Sum of Wasteload Allocations (WLAs)	27.8	5.5	80.2%	20.9	2.3	89.0%	2.7	0.4	84.0%
Treated Effluent from WWTP Dischargers***	15.9	3.6	77.4%	10.1	0.6	94.4%	0.0	0.0	0.0%
Stormwater from Residential Land Cover Areas	6.6	1.1	84.0%	8.1	1.3	84.0%	1.4	0.2	84.0%
Stormwater from Other Urban Land Cover Areas	5.2	0.8	84.0%	2.7	0.4	84.0%	1.2	0.2	84.0%
Sum of Load Allocations (LAs)	22.9	16.1	29.8%	14.8	6.1	58.9%	0.5	0.3	45.7%
Boundary Inputs	0.0	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0	0.0%
Tributary Baseflow	14.9	11.0	25.9%	3.2	1.0	69.2%	0.3	0.1	62.1%
Stormwater from Agricultural Land Cover Areas	3.5	0.6	84.0%	7.7	1.2	84.0%	0.1	0.0	84.0%
Stormwater from Forest and Barren Land Cover Areas	0.1	0.1	0.0%	1.5	1.5	0.0%	0.0	0.0	0.0%
Stormwater from Wetlands Land Cover Areas	4.3	4.3	0.0%	2.4	2.4	0.0%	0.1	0.1	0.0%
Air Deposition onto Water Land Cover Areas	0.02	0.02	0.0%	0.02	0.02	0.0%	0.02	0.02	0.0%
Total Margin of Safety (% of LC)	n/a	1.0	4.4%	n/a	1.0	10.2%	n/a	0.1	13.6%
WWTP MOS		0.4	1.7%		0.1	0.7%		0.0	0.0%
Stormwater and NPS MOS		0.6	2.7%		0.9	9.5%		0.1	13.6%
Reserve Capacity (% of WWTP load)	n/a	0.5	14.2%	n/a	0.05	8.8%	n/a	n/a	n/a
Loading Capacity (LC)	50.6	23.1	54.4%	35.7	9.4	73.8%	3.2	0.8	74.5%

Table 1c. TMDLs/WLAs/LAs for TP for sub-watersheds within the non-tidal Raritan basin.

Long Term Average Daily Load (kg/d TP)	Total Carnegie Lake Basin*			Beden Brook Watershed		
	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction
Sum of Wasteload Allocations (WLAs)	51.3	8.2	84.0%	17.4	6.0	65.7%
Treated Effluent from WWTP Dischargers***	26.0	4.2	84.0%	7.4	2.8 **	62.6%
Stormwater from Residential Land Cover Areas	16.1	2.6	84.0%	6.7	2.1	68.0%
Stormwater from Other Urban Land Cover Areas	9.2	1.5	84.0%	3.3	1.1	68.0%
Sum of Load Allocations (LAs)	38.1	22.4	41.3%	17.8	9.3	47.8%
Boundary Inputs	0.0	0.0	0.0%	0.0	0.0	0.0%
Tributary Baseflow	18.4	12.1	34.1%	3.6	1.6	56.2%
Stormwater from Agricultural Land Cover Areas	11.3	1.8	84.0%	9.5	3.0	68.0%
Stormwater from Forest and Barren Land Cover Areas	1.6	1.6	0.0%	1.8	1.8	0.0%
Stormwater from Wetlands Land Cover Areas	6.8	6.8	0.0%	2.8	2.8	0.0%
Air Deposition onto Water Land Cover Areas	0.05	0.05	0.0%	0.01	0.01	0.0%
Total Margin of Safety (% of LC)	n/a	2.1	6.2%	n/a	2.1	12.1%
STP MOS		0.5	1.4%		0.3	1.8%
Stormwater and NPS MOS		1.6	4.9%		1.8	10.3%
Reserve Capacity (% of WWTP load)	n/a	0.6	13.4%	n/a	0.1	3.7%
Loading Capacity (LC)	89.5	33.2	62.8%	35.1	17.4	50.4%

* Total Carnegie Lake Basin is the sum of the Upper Millstone River Watershed, the Stony Brook Watershed, and the Carnegie Lake Direct Watershed.

Table 2d. TMDLs/WLAs/LAs for TSS for sub-watersheds within the non-tidal Raritan basin

Long Term Average Daily Load (kg/d TSS)	South Branch Raritan River Watershed			North Branch Raritan River Watershed*			Raritan River Basin Upstream of Millstone River Confluence**		
	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction
Sum of Wasteload Allocations (WLAs)	8,094	3,582	55.7%	7,748	3,346	56.8%	15,843	6,927	56.3%
Treated Effluent from WWTP Discharges[#]	998	1,390	-39.4%	281	532	-89.6%	1,278	1,923	-50.4
Stormwater from Residential Land Cover Areas	4,879	1,492	69.4%	4,408	1,657	62.4%	9,286	3,150	66.1%
Stormwater from Other Urban Land Cover Areas	2,218	699	68.5%	3,060	1,156	62.2%	5,278	1,855	64.8%
Sum of Load Allocations (LAs)	9,723	5,150	47.0%	8,036	4,405	45.2%	17,760	9,555	46.2%
Boundary Inputs	592	592	0.0%	70	70	0.0%	662	662	0.0%
Tributary Baseflow	1,201	1,201	0.0%	1,011	1,011	0.0%	2,211	2,211	0.0%
Stormwater from Agricultural Land Cover Areas	6,393	1,819	71.5%	5,257	1,625	69.1%	11,649	3,444	70.4%
Stormwater from Forest and Barren Land Cover Areas	864	864	0.0%	1,214	1,214	0.0%	2,078	2,078	0.0%
Stormwater from Wetlands Land Cover Areas	674	674	0.0%	485	485	0.0%	1,160	1,160	0.0%
Total Margin of Safety (% of LC)	n/a	1,003	10.2%	n/a	1,110	12.4%	n/a	2,112	11.3%
Reserve Capacity (% of WWTP load)	n/a	82	5.9%	n/a	57	10.7%	n/a	139	7.2%
Loading Capacity (LC)	17,817	9,816	44.9%	15,785	8,917	43.5%	33,602	18,733	44.3%

* Includes the portion of the mainstem Raritan River upstream of the Millstone River confluence

** Equal to South Branch Raritan River Watershed plus North Branch Raritan River Watershed

[#] Although the TSS TMDL allocation is reflective of discharging up to current permitted flow and existing NJDPES permit TSS limits, the WLAs for total phosphorus effectively limit loadings due to TP being present in suspended solids in WWTP effluent.

Table 2e. TMDLs/WLAs/LAs for TSS for sub-watersheds within the non-tidal Raritan basin.

Long Term Average Daily Load (kg/d TSS)	Upper Millstone River Watershed			Stony Brook Watershed			Carnegie Lake Direct Watershed		
	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction
Sum of Wasteload Allocations (WLAs)	3,961	1,506	62.0%	2,286	401	82.5%	602	96	84.0%
Treated Effluent from WWTP Discharges[#]	502	953	-89.6%	20	38	-89.6%	0	0	0%
Stormwater from Residential Land Cover Areas	1,615	258	84.0%	1,529	245	84.0%	272	44	84.0%
Stormwater from Other Urban Land Cover Areas	1,843	295	84.0%	737	118	84.0%	329	53	84.0%
Sum of Load Allocations (LAs)	2,775	2,060	25.8%	2,624	1,328	49.4%	58	49	14.9%
Boundary Inputs	0	0	0.0%	0	0	0.0%	0	0	0.0%
Tributary Baseflow	1,267	1,267	0.0%	297	297	0.0%	29	29	0.0%
Stormwater from Agricultural Land Cover Areas	851	136	84.0%	1,543	247	84.0%	10	2	84.0%
Stormwater from Forest and Barren Land Cover Areas	51	51.	0.0%	525	525	0.0%	6	6	0.0%
Stormwater from Wetlands Land Cover Areas	605	605	0.0%	260	260	0.0%	13	13	0.0%
Total Margin of Safety (% of LC)	n/a	172	4.5%	n/a	152	8.0%	n/a	24	14.4%
Reserve Capacity (% of WWTP load)	n/a	103	10.8%	n/a	25	66.5%	n/a	0	n/a
Loading Capacity (LC)	6,735	3,841	43.0%	4,909	1,906	61.2%	660	170	74.2%

Table 2f. TMDLs/WLAs/LAs for TSS for sub-watersheds within the non-tidal Raritan basin

Long Term Average Daily Load (kg/d TSS)	Lower Millstone/Raritan River (except Beden)*			Total Lower Millstone/ Raritan River Watershed*		
	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction
Sum of Wasteload Allocations (WLAs)	13,791	8,590	37.7%	16,011	9,396	41.3%
Treated Effluent from WWTP Discharges[#]	3,127	4,325	-38.3%	3,187	4,439	-39.3%
Stormwater from Residential Land Cover Areas	5,835	2,334	60.0%	7,103	2,740	61.4%
Stormwater from Other Urban Land Cover Areas	4,829	1,932	60.0%	5,720	2,217	61.2%
Sum of Load Allocations (LAs)	42,171	25,741	39.0%	45,255	27,531	39.2%
Boundary Inputs**	39,091	23,575	39.7%	39,091	23,575	39.7%
Tributary Baseflow	460	460	0.0%	665	665	0.0%
Stormwater from Agricultural Land Cover Areas	1,523	609	60.0%	3,428	1,219	64.4%
Stormwater from Forest and Barren Land Cover Areas	399	399	0.0%	1,067	1,067	0.0%
Stormwater from Wetlands Land Cover Areas	698	698	0.0%	1,004	1,004	0.0%
Total Margin of Safety (% of LC)	n/a	1,219	3.4%	n/a	1,544	4.0%
Reserve Capacity (% of WWTP load)	n/a	156	3.6%	n/a	171	3.8%
Loading Capacity (LC)	55,961	35,707	36.2%	61,266	38,641	36.9%

* Lower Millstone/Raritan River Watershed includes the Millstone River watershed downstream of Carnegie Lake and the portion of the non-tidal mainstem Raritan River watershed downstream of the Millstone confluence.

** Boundary inputs to Lower Millstone/Raritan River Watershed include the Raritan River upstream of the Millstone River confluence and Carnegie Lake.

Table 2g. TMDLs/WLAs/LAs for TSS for sub-watersheds within the non-tidal Raritan basin

Long Term Average Daily Load (kg/d TSS)	Total Carnegie Lake Basin*			Beden Brook Watershed		
	Existing Condition	TMDL Allocation	Percent Reduction	Existing Condition	TMDL Allocation	Percent Reduction
Sum of Wasteload Allocations (WLAs)	6,848	2,003	70.8%	2,220	806	63.7%
Treated Effluent from WWTP Discharges	522	991	-89.6%	60	115	-89.6%
Stormwater from Residential Land Cover Areas	3,416	547	84.0%	1,269	406	68.0%
Stormwater from Other Urban Land Cover Areas	2,909	465	84.0%	891	285	68.0%
Sum of Load Allocations (LAs)	5,457	3,437	37.0%	3,085	1,789	42.0%
Boundary Inputs	0	0	0.0%	0	0	0.0%
Tributary Baseflow	1,593	1,593	0.0%	205	205	0.0%
Stormwater from Agricultural Land Cover Areas	2,405	385	84.0%	1,905	610	68.0%
Stormwater from Forest and Barren Land Cover Areas	582	582	0.0%	668	668	0.0%
Stormwater from Wetlands Land Cover Areas	877	877	0.0%	306	306	0.0%
Total Margin of Safety (% of LC)	n/a	349	5.9%	n/a	325	11.1%
Reserve Capacity (% of WWTP load)	n/a	128	12.9%	n/a	14	12.2%
Loading Capacity (LC)	12,305	5,917	51.9%	5,305	2,934	44.7%

* Total Carnegie Lake Basin is the sum of the Upper Millstone River Watershed, the Stony Brook Watershed, and the Carnegie Lake Direct Watershed above.

Table 3 – Individual WLAs for TP and TSS * (from Table 12 of TMDL document).

NJPDES #	Facility Name	Permitted Flow (mgd)	Effluent Concentrations and Loads Associated with TMDL Condition							
			May - October				November - April			
			OrthoP (mg/L)	TP (mg/L)	TP (kg/d)	TSS* (mg/L)	OrthoP (mg/L)	TP (mg/L)	TP (kg/d)	TSS* (mg/L)
South Branch Raritan River sub-watershed										
NJ0028304[a]	Day's Inn - Roxbury - Ledgewood Property (1), (4)	0.04	0.08	0.50	0.08	n/a	0.11	0.50	0.08	n/a
NJ0021954[a]	Mt Olive Twp - Clover Hill STP (1), (4)	0.5	0.08	0.62	1.18	17.0	0.11	1.00	1.89	17.0
NJ0023493[a]	Washington Twp-Schooley's Mt (1)	0.5	0.08	0.68	1.29	10.0	0.11	0.71	1.35	10.0
NJ0109061[a]	Washington Twp-Long Valley (1)	0.244	0.08	1.34	1.24	30.0	0.11	1.37	1.27	30.0
NJ0028487[a]	NJDC Youth Correct-Mt View	0.26	0.09	0.18	0.18	30.0	0.13	0.25	0.25	30.0
NJ0078018[a]	Clinton West	0.25	0.09	0.18	0.17	30.0	0.13	0.25	0.24	30.0
NJ0035084[a]	Exxon Research & Eng Co	0.22	0.09	0.18	0.15	30.0	0.13	0.25	0.21	30.0
NJ0020389[a]	Town of Clinton WTP (1)	2.03	0.14	2.00	15.37	30.0	0.20	2.00	15.37	30.0
NJ0100528[a]	Glen Meadows/Twin Oaks (1)	0.025	0.43	2.23	0.21	n/a	0.61	2.41	0.23	n/a
NJ0028436[a]	Flemington Boro (wet weather only) (2)	3.85	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NJ0022047[a]	Raritan Twp MUA (1)	3.8	0.14	1.31	18.90	30.0	0.20	1.86	26.75	30.0
North Branch Raritan River sub-watershed										
NJ0000876[b]	Hercules Kenvil Works Facility (4)	0.135	0.30	0.59	0.30	n/a	0.50	1.00	0.51	n/a
NJ0022675[b]	Roxbury Twp-Ajax Terrace	2.0	0.10	0.20	1.50	16.0	0.18	0.36	2.73	16.0
NJ0026824[b]	Chester Shopping Center (1)	0.011	0.41	2.21	0.09	n/a	0.54	2.34	0.10	n/a
NJ0022781[b]	Valley Rd Sewer Co - Pottersville STP (1)	0.048	0.41	2.21	0.40	n/a	0.54	2.34	0.43	n/a
NJ0021865[b]	Fiddler's Elbow CC - Reynwood Inc (1)	0.03	0.41	2.21	0.25	n/a	0.54	2.34	0.27	n/a
NJ0102563[b]	Route 78 Office Area – Tewksbury	0.09653	0.07	0.13	0.05	n/a	0.12	0.23	0.08	n/a
NJ0023175[b]	Clinton BOE - Round Valley	0.009	1.25	2.50	0.09	n/a	1.25	2.50	0.09	n/a
NJ0098922[b]	Readington-Lebanon SA (1)	1.45	0.14	1.40	7.66	22.0	0.18	1.44	7.90	22.0
NJ0021334[b]	Mendham Boro (4)	0.45	0.27	0.54	0.92	30.0	0.36	0.72	1.23	30.0
NJ0026387[b]	Bernardsville	0.8	0.20	0.41	1.23	15.0	0.27	0.54	1.64	15.0

NJ0033995[b]	Environmental Disposal Corporation	2.1	0.25	0.50	3.97	20.0	0.25	0.50	3.97	20.0
Upper Millstone River sub-watershed										
NJ0029475[e]	Hightstown Boro Advanced WWTP	1.0	..	0.12	0.44	30.0	..	0.12	0.44	30.0
NJ0023787[e]	East Windsor Twp MUA	4.5	..	0.12	1.99	30.0	..	0.12	1.99	30.0
NJ0024104[e]	Princeton Meadows STP (3)	1.64	..	0.12	0.73	30.0	..	0.12	0.73	30.0
NJ0023922[e]	USDOE PPPL	0.637	..	0.09	0.22	n/a	..	0.09	0.22	n/a
NJ0000272[e]	David Sarnoff Research	0.096	..	0.35	0.13	n/a	..	0.35	0.13	n/a
NJ0031445[e]	Firmenich Inc	0.036	..	0.35	0.05	n/a	..	0.35	0.05	n/a
Stony Brook sub-watershed										
NJ0000795[c]	Bristol-Myers Squibb Co	0.172	..	0.18	0.12	5.0	..	0.18	0.12	10.0
NJ0035319[c]	Stony Brook RSA Pennington	0.445	..	0.18	0.30	5.0	..	0.18	0.30	10.0
NJ0000809[c]	Hopewell Business Park	0.128	..	0.18	0.09	30.0	..	0.18	0.09	30.0
NJ0022110[c]	Educational Testing Service	0.08	..	0.18	0.05	20.0	..	0.18	0.05	20.0
Beden Brook sub-watershed										
NJ0035301[f]	Stony Brook RSA - Hopewell	0.3	..	0.22	0.25	5.0	..	0.54	0.61	10.0
NJ0069523[f]	Cherry Valley STP	0.29	..	0.22	0.23	4.0	..	0.54	0.58	4.0
NJ0022390[f]	NJDHS - N Princeton Dev Center	0.5	..	0.22	0.41	n/a	..	0.54	1.02	n/a
NJ0023663[f]	Carrier Foundation Rehab STP	0.04	..	0.70	0.11	n/a	..	1.00	0.15	n/a
NJ0060038[f]	Montgomery Twp-Pike Brook	0.67	..	0.23	0.59	20.0	..	0.30	0.76	20.0
NJ0026140[f]	J & J Consumer Products	0.063	..	0.70	0.17	n/a	..	1.00	0.24	n/a
NJ0067733[f]	Montgomery Twp - Oxbridge	0.088	..	0.20	0.07	n/a	..	1.00	0.33	n/a
Lower Millstone/Mainstem Raritan River sub-watershed										
NJ0031119[g]	Stony Brook RSA-River Road	13.06				30.0	..	..	..	30.0
NJ0026905[g]	Montgomery Twp-Stage II	0.48	..	..	..	30.0	..	..	..	30.0
NJ0023019[g]	Industrial Tube Corp[5]	0.012	..	..	..	20.0	..	..	..	20.0
NJ0050130[g]	Montgomery Twp – Riverside[5]	0.145	..	..	..	30.0	..	..	..	30.0
NJ0024864[g]	Somerset Raritan SA	24.3		..	..	30.0	..	..	..	30.0
NJ0026727[g]	Colorado Café[5]	0.018	..	..	..	30.0	..	..	..	30.0

Footnotes:

1) Eleven (11) WWTPs where Ortho P input concentration reductions were needed to meet the TMDL pH endpoints.
2) The actual intermittent flow reported in the Discharge Monitoring Report (DMR) was used to characterize the wet weather load contributions from Flemington Boro WWTP for both existing and TMDL conditions. Effluent quality was modeled at the 90th percentile of DMR data. Facility discharges only during storm events and therefore does not impact productivity. No WLA or effluent limits are required to comply with this TMDL.
3) For Princeton Meadows WWTP, the model inputs for ammonia under the TMDL condition were set to 6.64 mg/l in summer and 10.33 mg/l in winter, equivalent to the derived NJPDES ammonia limits. The TMDL model simulation ensured that the applicable DO criteria are met under these inputs. It is expected that the derived NJPDES ammonia limits will be included upon permit renewal.
4) Discharges above or into waters designated as Category 1, therefore existing effective permit limits must be retained.
5) TSS concentrations were provided in an updated version of Table 12 of the TMDL document which was submitted via email on April 29, 2016.

n/a - not applicable

*for daily loads, multiply the following parameters: flow (mgd) x effluent concentration x 8.34 to yield lbs/day loading.

Dear Ms. Angelini:

Thank you for your email to President Obama regarding drinking water issues in Moorestown, NJ, which was forwarded to Environmental Protection Agency's (EPA) Region 2 Clean Water Division for response. EPA Region 2 is aware of the drinking water issues and has had follow up conversations with the New Jersey Department of Environmental Protection (NJDEP) to investigate. NJDEP indicated that the North Church Street Filtration Plant has been turned off and is not providing drinking water. NJDEP is evaluating options and working with the municipal water supplier on next steps. It is our understanding that the North Church Street Filtration Plant will not be reactivated until such time that appropriate treatment can installed to address the contamination issues.

EPA Region 2 will continue to work with and provide technical advice to NJDEP to resolve these contamination issues. Please contact Mr. Douglas Pabst, Chief of the Drinking Water and Municipal Infrastructure Branch at 212-637-3797 or pabst.douglas@epa.gov if you wish to discuss further.

Sincerely,

Jeffrey Gratz, Acting Director
Clean Water Division