June 2018

Non-tidal Raritan River Watershed Protection Plan

Watershed Management Areas 8, 9 and 10

New Jersey Department of Environmental Protection
Division of Water Monitoring and Standards
Bureau of Environmental Analysis, Restoration and Standards
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Non-tidal Raritan River Watershed Protection Plan

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Protection is consistent with the central tenant of the Clean Water Act – restore and maintain goal. Under a watershed approach, equal emphasis is placed on protecting healthy waters and restoring impaired ones. Protection can be a critical component of successful restoration; particularly where upstream protection improves waters downstream by providing cleaner upstream waters.

1.0 Identification of Waterbody, Pollutant of Concern and Pollutant Sources

1.1 Organization

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1.3 Project Title

Non-tidal Raritan River Watershed Protection Plan

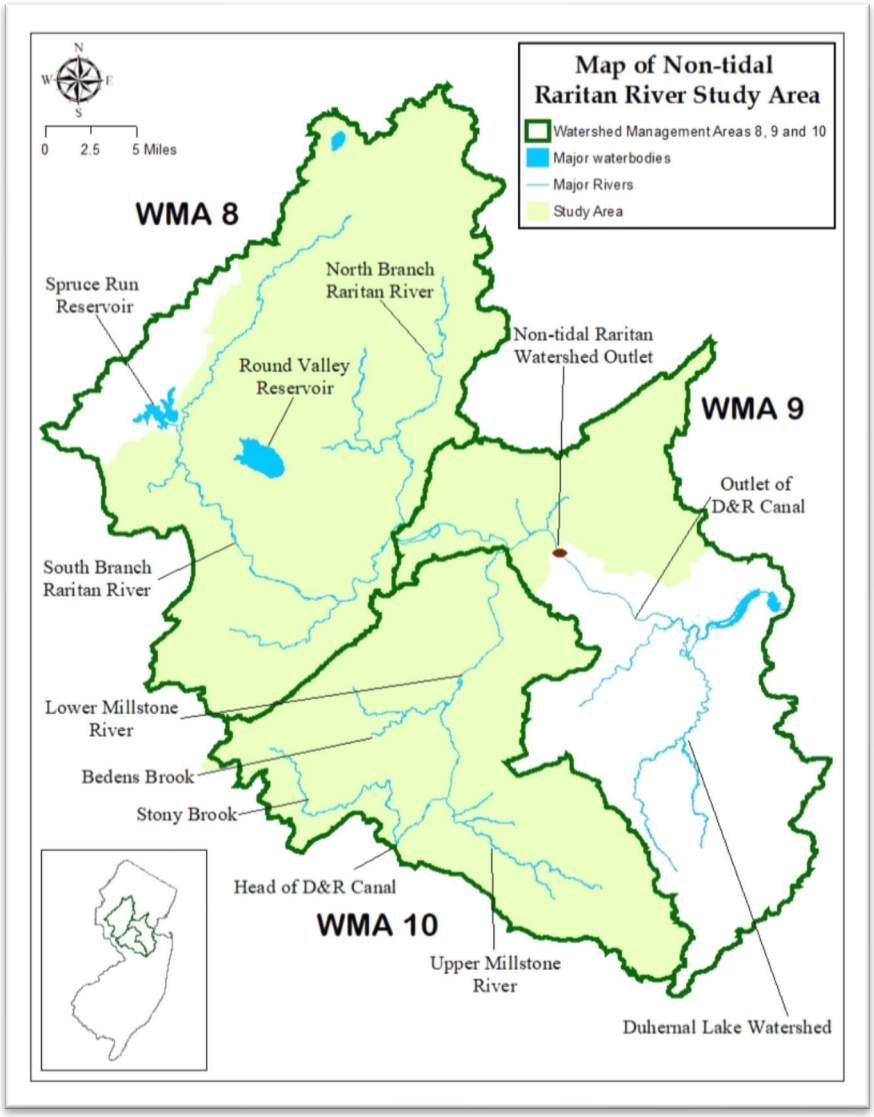
1.4 Background

1.4.1 Raritan River Watershed

The Raritan River Basin encompasses 1,105 mi^2 in north-central New Jersey draining to the Raritan Bay at Perth Amboy. The study area for *The Raritan River Watershed Protection Plan* (WPP) focuses on the non-tidal portion of the watershed, which includes Watershed Management Area (WMA) 8 (North and South Branch Raritan) (excluding the watershed of Spruce Run Reservoir), part of WMA 9 (Lower Raritan, South River, and Lawrence) and all of WMA 10 (Millstone). The study area (830 mi^2) is shown in **Figure 1**.

The New Jersey Department of Environmental Protection (Department/NJDEP) is charged with formulating comprehensive policies for the conservation of the natural resources of the State, the promotion of environmental protection, and the prevention of pollution to the environment. The **purpose** of the WPP is to preserve the unimpaired subwatersheds (HUC14s) in the non-tidal Raritan River basin based upon the implementation of the *Total Maximum Daily Load Report for the Non-Tidal Raritan River Basin* (TMDL Report). Protection is sustained through the minimization or avoidance of water quality degradation in the waterbody due to specific stressors that present threats to its condition. This WPP is built upon the data, modeling results, and research generated for the TMDL Report, which was initiated in 2004 and approved by the EPA in 2016. In the intervening years, restoration and protection efforts

Figure 1. Study Area of Non-tidal Raritan River Watershed Protection Plan



helped delist five of the non-tidal Raritan's subwatershed/parameter combinations that were previously on the 303(d) list of impaired waterbodies (noted with an asterisk in **Table 1**). Concurrent with the NJDEP's focus on the Raritan Water Region for comprehensive water quality assessment in the 2016 *New Jersey Integrated Water Quality Assessment Report* (Integrated Report), the WPP provides a collaborative watershed-scale approach to bring together the many ongoing and new actions being implemented, simultaneously protecting unimpaired waters while restoring impaired waters.

1.4.2 Raritan River Total Maximum Daily Loads (TMDLs)

In accordance with the Federal Clean Water Act (CWA) (33 U.S.C. 1315(B)), the State of New Jersey is required biennially to prepare and submit to the EPA a report that identifies waters that do not meet or are not expected to meet Surface Water Quality Standards (SWQS) after implementation of technology-based effluent limitations or other required controls (commonly known as the 303(d) list) and a report addressing the overall water quality of the State's waters (commonly known as the 305(b) report). The *Integrated Water Quality Assessment Report* (Integrated Report) combines these two assessments. The report includes a priority ranking to establish Total Maximum Daily Loads (TMDLs) for impaired waterbodies. Previously, the *New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report* identified 30 waterbodies in the non-tidal Raritan basin as high priority for TMDL development to address phosphorus impairments.

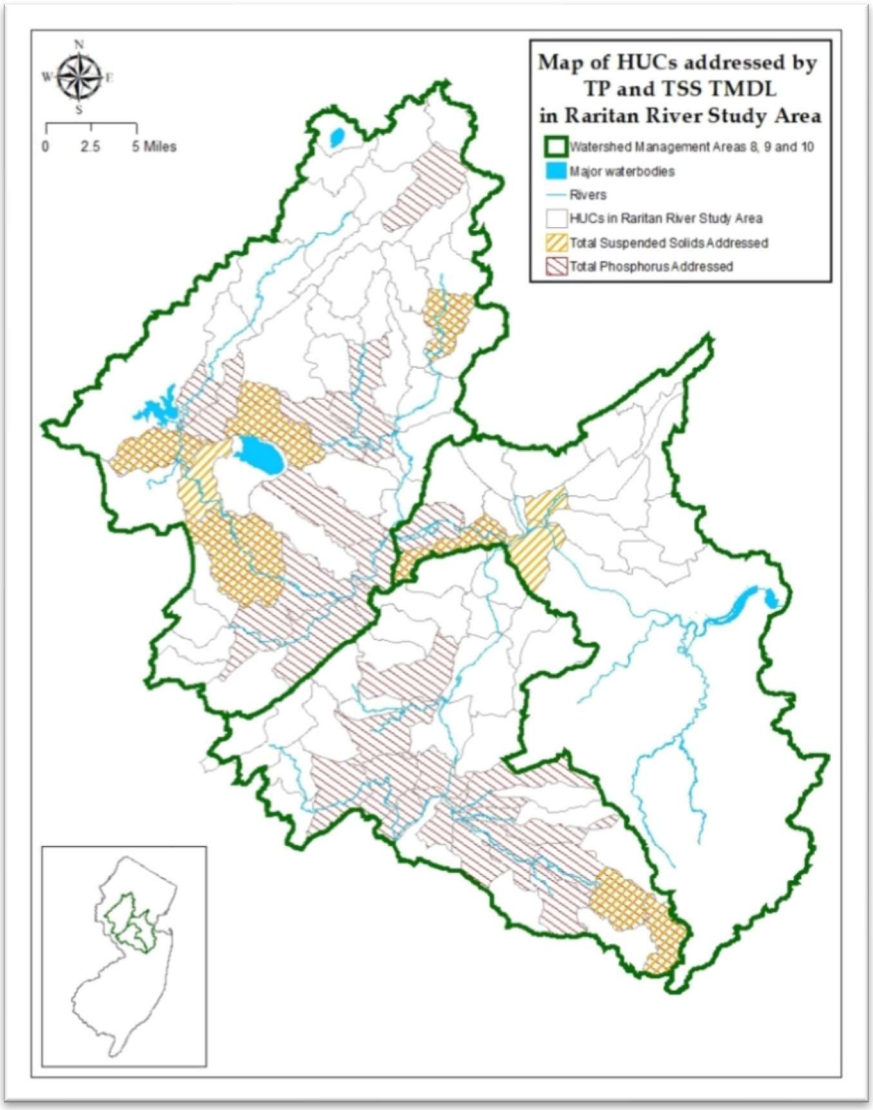
The Department funded a basin-wide study to identify in-stream critical locations and determine the pollutant load reductions needed to attain the total phosphorus (TP), dissolved oxygen (DO), pH, and total suspended solids (TSS) criteria specified in the Surface Water Quality Standards for the multiple stream

classifications present in the non-tidal Raritan River basin. The TMDL study was conducted by Kleinfelder/Omni and resulted in two reports, one summarizing the monitoring work that served as the foundation for the modeling and the other presenting the model development and outcomes. The first report is entitled *The Raritan River Basin TMDL Phase I Data Summary and Analysis Report* (December 2005). The second report is entitled *The Raritan River Basin Nutrient TMDL Study – Phase II Watershed Model and TMDL Calculations* (August 2013). Links to these reports can be found in the references of this document.

These studies were reviewed by the Rutgers New Jersey EcoComplex TMDL review panel which found the model to be appropriate for use in developing the TMDLs. Using these studies, the Department addressed 42 assessment unit/impairment combinations for TSS and TP (as well as 3 for pH and one for DO), as described in the TMDL report (2014), listed in **Appendix A** and shown in **Figure 2**.

The Kleinfelder/Omni reports (2005, 2013) describe the development of integrated hydrodynamic and water quality models used to develop the TMDLs. The water quality model used was Water Quality Analysis Simulation Program 7.1 (WASP 7.1), and the hydrologic model used is called HydroWAMIT. The latter component provides hydrodynamic and nonpoint source inputs to WASP 7.1. Due to the large spatial extent of the watershed, 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 River. The watersheds of the Spruce Run Reservoir, Round Valley Reservoir, and the Delaware and Raritan Canal were not modeled as part of this study, but were included as boundary inputs. The models were constructed and calibrated for nutrients, DO and TSS,

Figure 2. Area Covered by the Non-tidal Raritan River TMDL



accounting for critical conditions and seasonal variations. The linked models were used to simulate water quality and flow in the non-tidal Raritan River under various scenarios and to calculate the pollutant load reductions needed to meet the critical water quality end point that would ensure attainment of SWQS for the subject parameters throughout the study area.

The total allowable load was disaggregated among wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources, along with a required margin of safety (MOS), while providing for reserve capacity (RC) for future loads. The WLAs and LAs, MOS and RC are summarized in Section 5.0 of the TMDL report and are listed in **Appendix B** of this document. The details on how these values were calculated can be found in the Kleinfelder/Omni report (Kleinfelder/Omni Environmental LLC. August 2013).

The TMDL report for the non-tidal Raritan River watershed, approved by EPA on May 9, 2016, is applicable to attaining the SWQS for the 46 assessment unit/pollutant combinations (using a hydrologic 14 digit unit scale e.g. HUC 14) addressed by the TMDL. This Watershed Protection Plan extends the coverage of the TMDL implementation plan, with some additional actions, as the means of maintaining water quality in the 66 assessment units where SWQS for TP and/or TSS were attained according to the 2014 Integrated Report (listed in **Table 1**). A combination of regulatory and non-regulatory tools that result in reductions in TP and TSS loading and lead to future attainment of SWQS in the TMDL subwatersheds, as well as assuring continued protection of the subwatersheds which currently attain criteria for TP and/or TSS are described below. A list of the relevant websites is provided in the references section.

1.4.3 Watershed Protection Strategy

Water quality standards, monitoring, and assessment programs provide the scientific foundation for restoration and protection of New Jersey's water resources and serve to direct and support the Department's water quality programs and activities designed to protect, maintain and enhance water quality for all waters of the State in accordance with federal and state statutes and regulations. These efforts include regulatory (e.g., permits), non-regulatory (e.g., environmental education, local stewardship), and funding activities. Furthermore, water quality standards, monitoring, and assessment of New Jersey's water resources and are implemented through the federal Clean Water Act (CWA), the New Jersey Water Quality Planning Act (WQPA) and the New Jersey Water Pollution Control Act (WPCA) through New Jersey's Continuing Planning Process (available on the Department's website at http://www.nj.gov/dep/wrm/docs/cpp.pdf) for water quality management planning and implementation. The goal of this regulatory framework is to protect, restore and maintain the chemical, physical and biological integrity of New Jersey's waters.

The Department has integrated these programs into a comprehensive monitoring, assessment, and restoration program implemented through a rotating basin approach (described in detail in Section 5) that will produce a comprehensive assessment of the entire State every ten years. This approach will support public engagement and prioritization of waters for the development of measures to restore, maintain, and enhance water quality and maximize effectiveness and efficiency in achieving positive environmental outcomes that are tailored to the needs of each water region.

In December 2013 USEPA prepared, *A Long-term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* (Vision Document) to provide flexibility to states to restore impaired waters using a variety of approaches beyond TMDLs, such as alternative restoration control strategies which will attain designated uses and water quality standards. The Vision Document provides additional flexibility for states to identify and prioritize waterbodies for restoration and protection

through whatever means are appropriate under existing programs regulatory frameworks, and achieve water quality objectives in accordance with the state's priorities, so long as national water quality goals are also met. The NJDEP continues to be involved with USEPA's vision concept. In *New Jersey's Vision Approach for Assessment, Restoration and Protection of Water Resources under the Clean Water Act Section 303(d) Program* found in Appendix G of the 2014 Integrated Report (http://www.state.nj.us/dep/wms/bears/docs/2014_final_integrated_report.pdf) the NJDEP identified the Raritan River watershed as an area for initial prioritization and planning for water quality restoration and protection. The Non-tidal Raritan River Watershed Protection Plan was prepared as a result of this policy; to articulate and recognize a formal strategy that the NJDEP has set in place to protect unimpaired waters within the Raritan Water basin.

Moreover, in addition to the regulatory framework, this watershed protection plan reflects the USEPA's guidance memo: *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions* (March 2011) and recommendation: "Of most importance is prioritizing watersheds on a state-wide basis, setting load-reduction goals for these watersheds based on available water quality information, and then reducing loadings through a combination of strengthened permits for point-sources and reduction measures for nonpoint sources and other point sources of stormwater not designated for regulation."

1.5 HUCs covered by TMDL and Protection Plan

1.5.1 Discussion of Watersheds Protected

This protection plan for the non-tidal Raritan reflects a watershed approach that is based on the implementation of approved TMDLs which will provide a benefit to unimpaired HUCs within the watershed. Assessment units covered by this protection plan include those that attain or are below the SWQS for total phosphorus and/or total suspended solids on the 2014 Integrated List and that are within the area covered by the non-tidal Raritan River TMDL study. There are a total of 110 HUC14s within the non-tidal Raritan watershed. However, the HUCs above Spruce Run Reservoir were not included in the model, so the TMDL study area for TSS included 106 of these assessment units. Further, the mainstem Lower Millstone River and the mainstem Raritan River between the Millstone River confluence and Fieldville Dam were deferred for TP pending further study, so the study area for TP included a subset of 82 HUCs. This protection plan covers the same areas as the TMDL study area, as shown in **Figures 3** and **4** and listed in **Appendix A.** Implementation of the TMDL includes water quality restoration actions in both impaired and unimpaired HUCs, and as such are expected to protect and maintain water quality in HUCs that are already meeting the applicable SWQS.

Figure 3. Area Eligible for Total Phosphorus Protection Plan

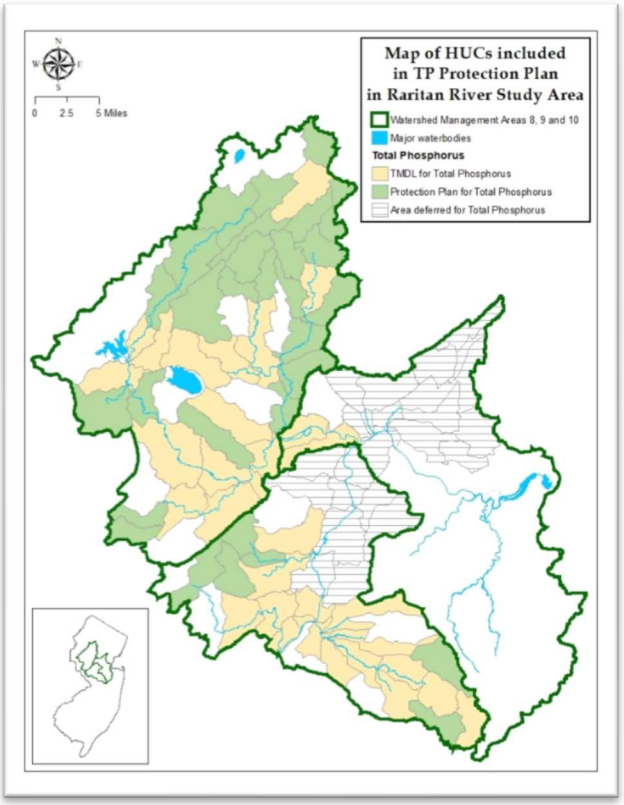
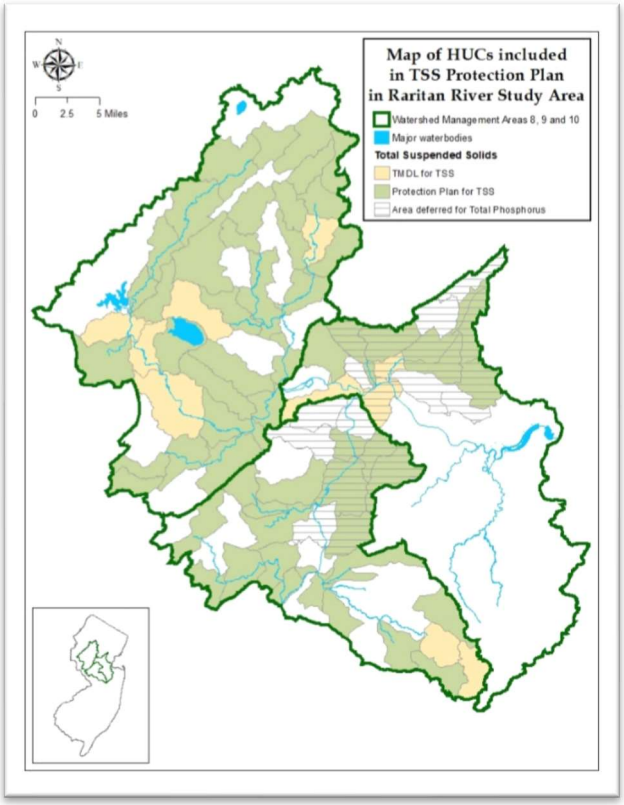


Figure 4. Area Eligible for Total Suspended Solids Protection Plan



1.5.2 List of Watersheds Protected

A total of 90 separate HUC14/parameter combinations in 66 separate HUC14s are identified for protection through this Watershed Protection Plan (WPP). A total of 36 HUC14s would be protected for TSS; 6 for TP and 24 for both TSS and TP. See **Table 1** and **Figures 3** and **4**.

Table 1. 2014 Assessment Cycle HUC 14s Watershed Covered by this Protection Plan

WPP#[1]	HUC14	HUC14 Name	Designated as C1[2]	Parameter Protected
1[a]	02030105010020	Drakes Brook (below Eyland Ave)	C1	TP
2[a]	02030105010020	Drakes Brook (below Eyland Ave)	C1	TSS
3[a]	02030105010050	Raritan R SB (LongValley br to 74d44m15s)	C1	TP
4[a]	02030105010050	Raritan R SB (LongValley br to 74d44m15s)	C1	TSS
5[a]	02030105010060	Raritan R SB (Califon br to Long Valley)	C1	TP
6[a]	02030105010060	Raritan R SB (Califon br to Long Valley)	C1	TSS
7[a]	02030105010070	Raritan R SB (StoneMill gage to Califon)	C1	TP
8[a]	02030105010070	Raritan R SB (StoneMill gage to Califon)	C1	TSS
9[a]	02030105010080	Raritan R SB (Spruce Run-StoneMill gage)		TSS
10[a]	02030105020050	Beaver Brook (Clinton)	C1	TSS
11[a]	02030105020060	Cakepoulin Creek	C1	TP
12[a]	02030105020060	Cakepoulin Creek	C1	TSS
13[a]	02030105020080	Raritan R SB (Prescott Bk to River Rd)		TP

WPP#[1]	HUC14	HUC14 Name	Designated as C1[2]	Parameter Protected
14[a]	02030105020090	Prescott Brook / Round Valley Reservior	C1	TSS
15[a]	02030105030030	Headquarters trib (Third Neshanic River)		TP
16[a]	02030105030030	Headquarters trib (Third Neshanic River)		TSS
17[a]	02030105030040	Third Neshanic River		TP
18[a]	02030105030040	Third Neshanic River		TSS
19[a]	02030105030060	Neshanic River (below FNR / SNR confl)		TSS
20[a]	02030105030070	Neshanic River (below Black Brk)		TSS
21[a]	02030105040010	Raritan R SB (Pleasant Run-Three Bridges)		TSS
22[a]	02030105040020	Pleasant Run		TP
23[a]	02030105040020	Pleasant Run		TSS
24[a]	02030105040030	Holland Brook		TSS
25[a]	02030105040040	Raritan R SB (NB to Pleasant Run)*		TSS
26[b]	02030105050010	Lamington R (above Rt 10)	C1	TP
27[b]	02030105050020	Lamington R (Hillside Rd to Rt 10)	C1	TSS
28[b]	02030105050030	Lamington R (Furnace Rd to Hillside Rd)	C1	TP
29[b]	02030105050040	Lamington R (Pottersville gage-FurnaceRd)	C1	TP
30[b]	02030105050040	Lamington R (Pottersville gage-FurnaceRd)	C1	TSS
31[b]	02030105050050	Pottersville trib (Lamington River)	C1	TP
32[b]	02030105050070	Lamington R (HallsBrRd-HerzogBrk)*	C1	TSS
33[b]	02030105050080	Rockaway Ck (above McCrea Mills)	C1	TP
34[b]	02030105050080	Rockaway Ck (above McCrea Mills)	C1	TSS
35[b]	02030105050090	Rockaway Ck (below McCrea Mills)	C1	TSS
36[b]	02030105050130	Lamington R (Hertzog Brk to Pottersville gage)	C1	TP
37[b]	02030105050130	Lamington R (Hertzog Brk to Pottersville gage)	C1	TSS
38[b]	02030105060010	Raritan R NB (above/incl India Bk)	C1	TP
39[b]	02030105060010	Raritan R NB (above/incl India Bk)	C1	TSS
40[b]	02030105060020	Burnett Brook (above Old Mill Rd)	C1	TP
41[b]	02030105060020	Burnett Brook (above Old Mill Rd)	C1	TSS
42[b]	02030105060030	Raritan R NB (incl McVickers to India Bk)	C1	TP
43[b]	02030105060030	Raritan R NB (incl McVickers to India Bk)	C1	TSS
44[b]	02030105060050	Peapack Brook (above/incl Gladstone Bk)	C1	TP
45[b]	02030105060050	Peapack Brook (above/incl Gladstone Bk)	C1	TSS
46[b]	02030105060060	Peapack Brook (below Gladstone Brook)	C1	TP
47[b]	02030105060060	Peapack Brook (below Gladstone Brook)	C1	TSS
48[b]	02030105060070	Raritan R NB (incl Mine Bk to Peapack Bk)	C1	TP
49[b]	02030105060070	Raritan R NB (incl Mine Bk to Peapack Bk)	C1	TSS
50[b]	02030105060090	Raritan R NB (Lamington R to Mine Bk)		TP
51[b]	02030105060090	Raritan R NB (Lamington R to Mine Bk)		TSS
52[b]	02030105070010	Raritan R NB (Rt 28 to Lamington R)		TP
53[b]	02030105070030	Raritan R NB (below Rt 28)*		TP
54[b]	02030105070030	Raritan R NB (below Rt 28)*		TSS
55[b]	02030105080010	Peters Brook		TSS

WPP#[1]	HUC14	HUC14 Name	Designated as C1[2]	Parameter Protected
56[c]	02030105090020	Stony Bk (74d 48m 10s to 74d 49m 15s)		TP
57[c]	02030105090020	Stony Bk (74d 48m 10s to 74d 49m 15s)		TSS
58[c]	02030105090040	Stony Bk (74d46m dam to/incl Baldwins Ck)	C1	TSS
59[c]	02030105090050	Stony Bk (Province Line Rd to 74d46m dam)	C1	TSS
60[c]	02030105090060	Stony Bk (Rt 206 to Province Line Rd)	C1	TSS
61[c]	02030105090070	Stony Bk (Harrison St to Rt 206)	C1	TSS
62[d]	02030105090090	Stony Bk- Princeton drainage		TSS
63[e]	02030105100040	Rocky Brook (above Monmouth Co line)		TP
64[e]	02030105100040	Rocky Brook (above Monmouth Co line)		TSS
65[e]	02030105100050	Rocky Brook (below Monmouth Co line)		TSS
66[e]	02030105100070	Cranbury Brook (above NJ Turnpike)		TP
67[e]	02030105100070	Cranbury Brook (above NJ Turnpike)		TSS
68[e]	02030105100110	Devils Brook		TSS
69[e]	02030105100130	Bear Brook (below Trenton Road)		TSS
70[e]	02030105100140	Millstone R (Rt 1 to Cranbury Bk)		TSS
71[d]	02030105110010	Heathcote Brook*		TSS
72[f]	02030105110040	Beden Brook (above Province Line Rd)		TP
73[f]	02030105110050	Beden Brook (below Province Line Rd)		TSS
74[f]	02030105110060	Rock Brook (above Camp Meeting Ave)		TP
75[f]	02030105110060	Rock Brook (above Camp Meeting Ave)		TSS
76[f]	02030105110070	Rock Brook (below Camp Meeting Ave)		TP
77[f]	02030105110070	Rock Brook (below Camp Meeting Ave)		TSS
78[f]	02030105110100	Pike Run (below Cruser Brook)		TSS
79[d]	02030105110110	Millstone R (BlackwellsMills to BedenBk)		TSS
80[d]	02030105110120	Sixmile Run (above Middlebush Rd)	C1	TSS
81[d]	02030105110130	Sixmile Run (below Middlebush Rd)	C1	TSS
82[d]	02030105110140	Millstone R (AmwellRd to BlackwellsMills)		TSS
83[g]	02030105120020	Green Bk (N Plainfield gage to Blue Bk)		TSS
84[g]	02030105120040	Green Bk (Bound Bk to N Plainfield gage)		TSS
85[g]	02030105120050	Middle Brook EB		TSS
86[g]	02030105120060	Middle Brook WB		TSS
87[g]	02030105120080	South Fork of Bound Brook		TSS
88[g]	02030105120090	Spring Lake Fork of Bound Brook		TSS
89[g]	02030105120100	Bound Brook (below fork at 74d 25m 15s)		TSS
90[g]	02030105120180	Middle Brook		TSS

[1]HUCs covered by this Watershed Protection Plan (WPP) are grouped with the following TMDL areas:
a - South Branch Raritan River watershed TMDL group; b - North Branch Raritan River watershed TMDL group; c - Stony Brook watershed TMDL group; d - Carnegie Lake direct watershed TMDL group; e - Upper Millstone River watershed TMDL group; f - Beden Brook watershed TMDL group; g - Lower Millstone/Mainstem Raritan River watershed TMDL group.

[2] All or portions of streams within these 36 HUC 14s are designated Category 1 (C1) waters (an anti-degradation category described below in Section 2 and shown in **Figure 7**).

*HUCs removed (delisted) from 303(d) list of impaired waters in 2012 due to attainment of applicable SWQS.

1.6 Identification of Impaired Water Segments

1.6.1 Impaired Water Segments as Identified on 2014 303(d) List

A total of 99 of the 106 HUC14s in the study area of the non-tidal Raritan River are currently listed on the 2014 New Jersey 303(d) list of water quality limited waters for one or more of the following parameters: *E.coli* (71), biological (58), total phosphorus (43), arsenic (36), pH (20), dissolved oxygen (18), temperature (18), total suspended solids (9), total dissolved solids (2) and turbidity (2). In addition, 23 of these HUC 14s are on the 303(d) list for exceeding the human health standard for toxics in fish tissue (20 mercury, 5 PCB, 2 DDT, and/or 1 chlordane). Since finalizing the 2014 303(d) list, the NJDEP has adopted the Raritan River TMDL (see section 1.4.2) and will delist 32 of the 2014 pollutant listings in the forthcoming 2016 list. Refer to **Appendix A** for a detailed list.

1.6.2 Pollutant Sources

Point Sources

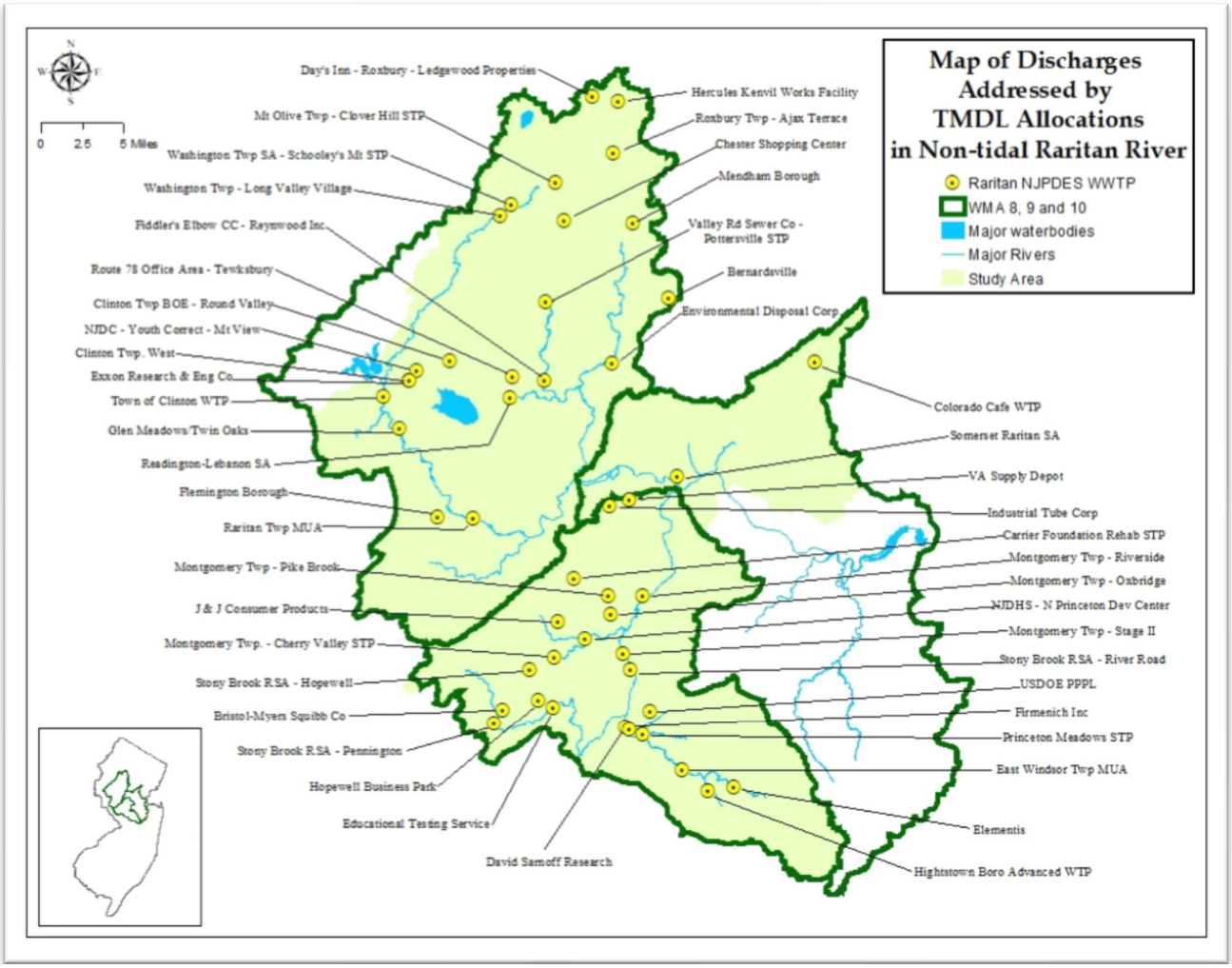
Point sources (PS) of total phosphorus and total suspended solids in the non-tidal Raritan watershed include domestic and industrial wastewater treatment plants that discharge to surface water, as well as stormwater discharges subject to regulation under the National Pollutant Discharge Elimination System (NPDES), including Tier A municipalities (see **Appendix C** for municipal tiers) and state and county facilities. There are no CSOs in the study area.

A total of 47 point sources, shown in **Figure 5** and listed in Table 4 of the TMDL document, were identified in the TMDL for individual WLA development. Thirty-one of these are located within, and another 13 are upstream of HUC14s covered by this protection plan.

Nonpoint Sources (NPS)

Nonpoint sources (NPS) are a major component of the loading that enters into the waterbodies within the study area. NPS pollution in the Raritan watershed include stormwater discharges that are not subject to regulation under NPDES, such as Tier B municipalities (see **Appendix C** for municipal tiers), and direct stormwater 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.

Figure 5. Discharges Addressed by Non-tidal Raritan River TMDL



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1.6.3 Land Use

Land use in the study area is approximately 41% urban, 27% forest and 17% agriculture (see **Table 2** and **Figure 6**), based on 2012 aerial photography. Land use changed less than 1% in all types compared to the 2007 land use data that the TMDL load allocations were based upon.

Figure 6. 2012 Land Use in the Non-tidal Raritan River Study Area

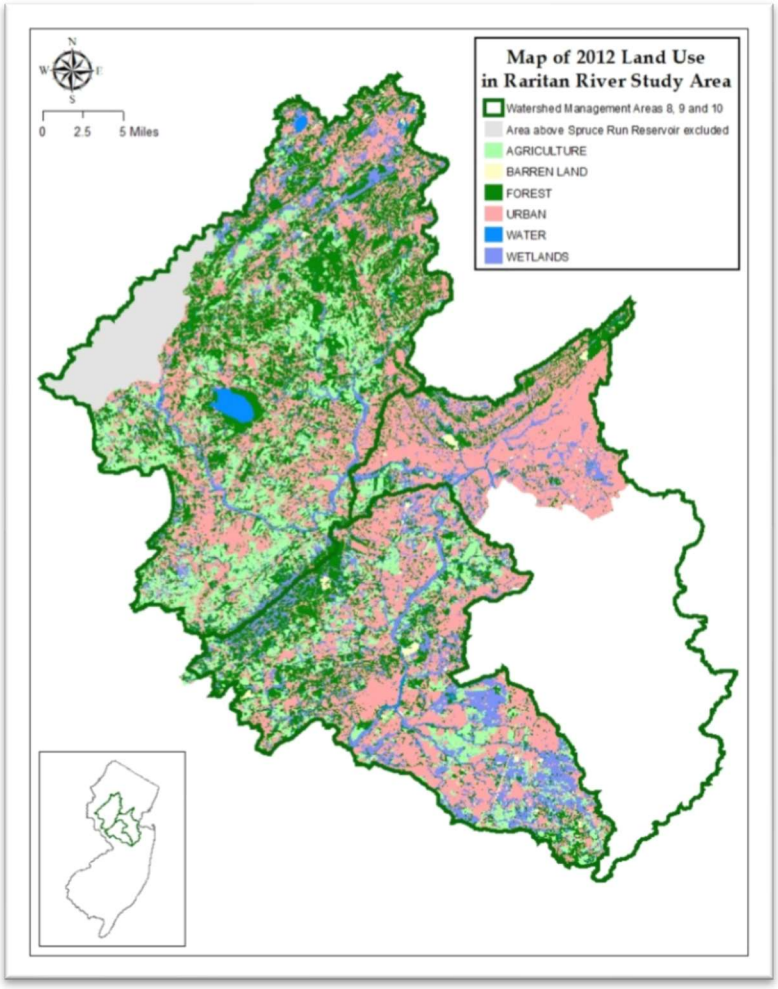


Table 2. 2012 Land Use in Non-tidal Raritan Study Area

Land use Classification (TYPE12)	Acres	Percent
Agriculture	91,574.5	17.2
Barren Land	4,460.8	0.8
Forest	142,830.2	26.9
Urban	216,651.9	40.8
Water	9,221.4	1.7
Wetlands	66,222.5	12.5
TOTAL	530,961.4	100.0

2.0 Description of the Applicable Water Quality Standards and Numeric Water Quality Targets

All of the assessment units addressed in this plan are classified as Fresh Water 2 (FW2) (see **Figure 7**). In all FW2 waters, the designated uses are set forth in N.J.A.C. 7:9B-1.12 c:

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 receive an additional designation related to status with respect to support of trout species. Within the study area, 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 (*Surface Water Quality Standards Rules* at N.J.A.C. 7:9B) 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. In C2 waters, similar to C1 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. The applicable water quality standards addressed by this plan (TP and TSS) are quoted in **Table 3**. **Figure 7** displays the applicable SWQS for the waters in the study area. The HUC14s containing C1 stream segments are noted in **Table 1**.

Figure 7. Surface Water Quality Standards

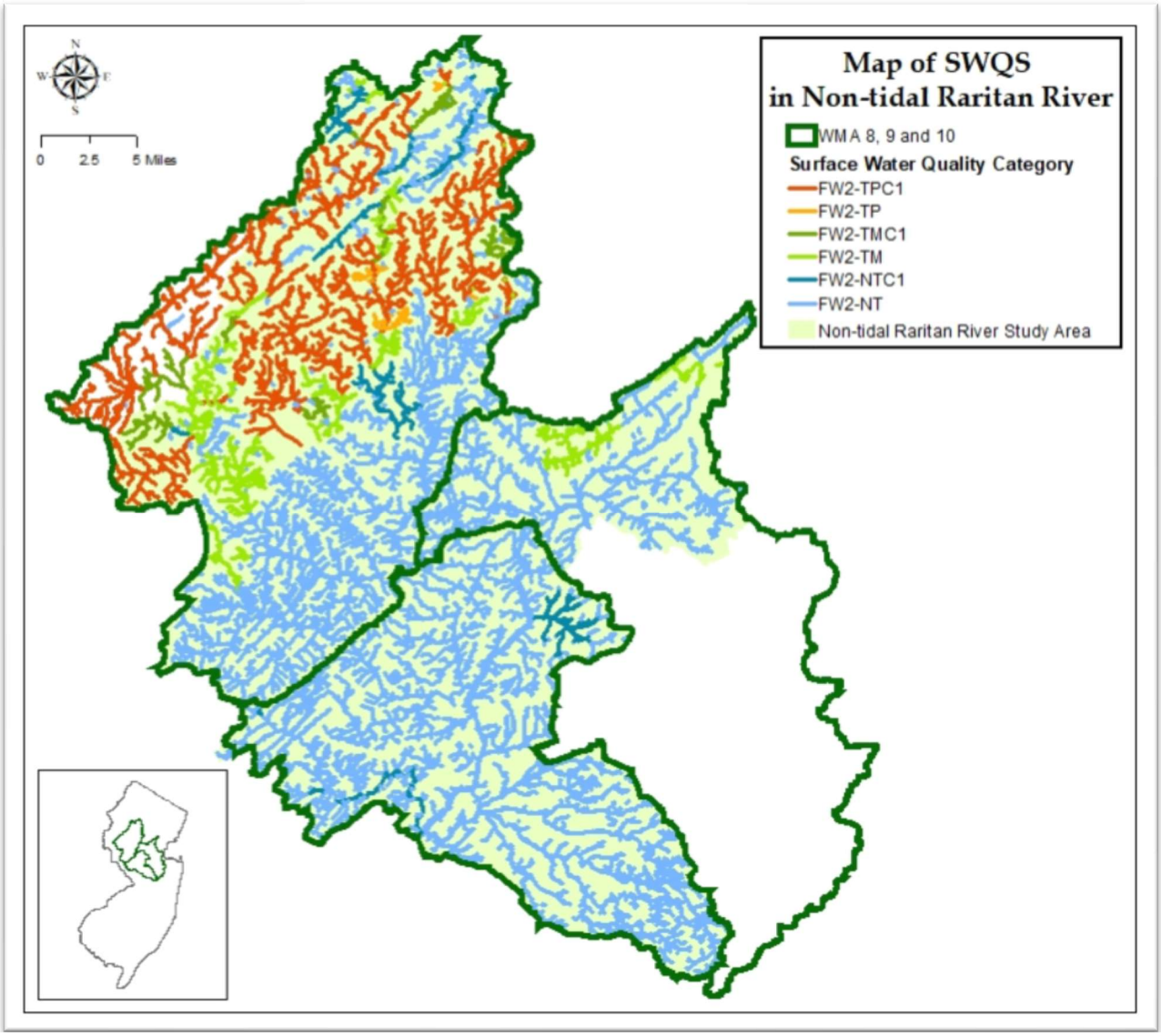


Table 3. Applicable Water Quality Standards (N.J.A.C. 7:9B-1.14)

Nutrients (narrative criteria) for all waters:	
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.	
Phosphorus (mg/l) for FW2 waters:	
(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	
Solids, Suspended (mg/L) (Non-filterable residue) for waters as specified below:	
i. 25.0	FW2-TP, FW2-TM
ii. 40.0	FW2-NT

3.0 TMDL Allocations' Relationship to Protected HUCs

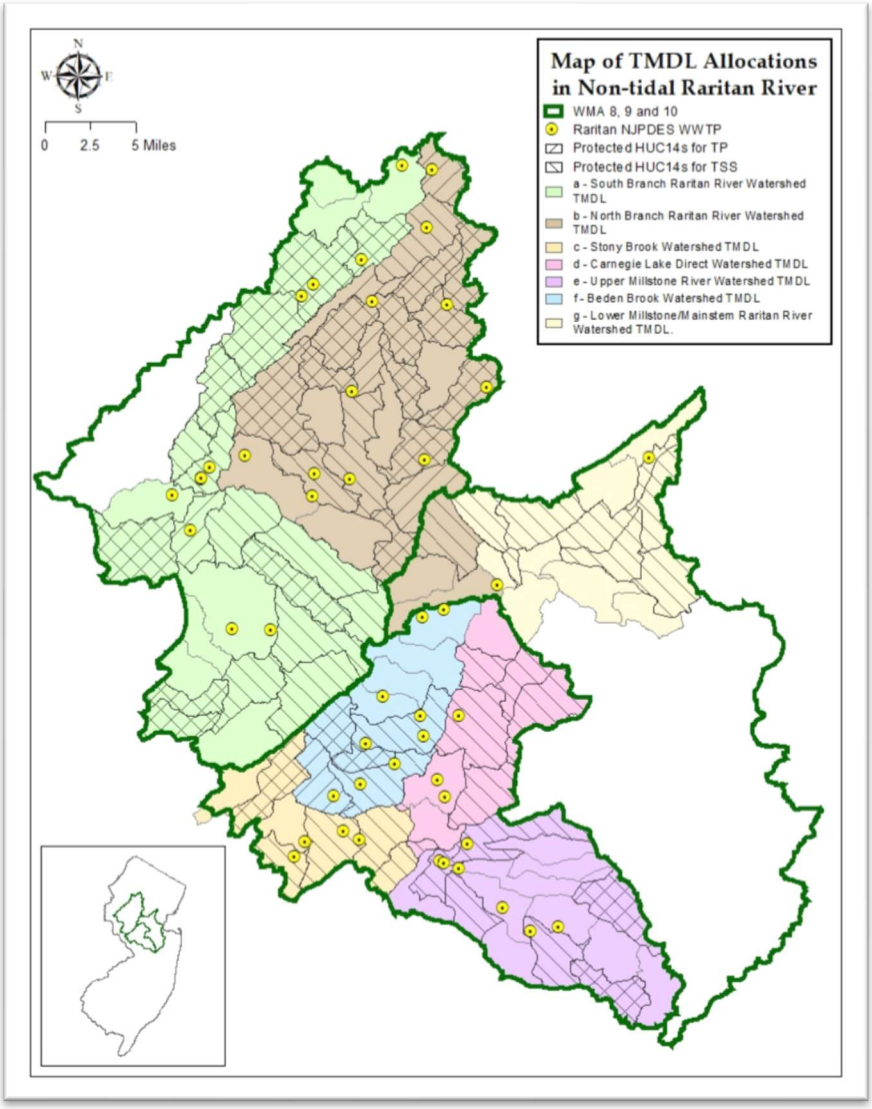
The 2014 TMDL Report established WLAs for all point sources, while LAs were established for nonpoint sources, as these sources are defined in the CWA and as required for each TMDL.

The assignment of WLAs to each WWTP is based on model inputs set at permitted flows and the input effluent concentrations that will result in attainment of the SWQS (described in section 7.1 of the TMDL document) in impaired HUCs. Allocation of the loading capacity for the TMDL critical locations is presented in **Appendix B**. Individual WLAs are set forth in Table 12 of the TMDL document. Most of the point sources (44 of the 47 discharges) addressed by the TMDL are within and/or upstream of the protected HUCs (see **Figure 5**), therefore these load reductions provide assurance of protection of the existing water quality in unimpaired watersheds.

Additional protection of unimpaired streams is provided by the C1 anti-degradation designation of stream segments in 36 HUCs in the study area (see **Table 1 and Figure 8**). Point source discharges into or above C1 streams must meet the existing better-than-criterion water quality and cannot cause a measurable change in the water quality.

Nonpoint sources receive a load allocation (see **Appendix B**), also expressed as a percent load reduction related to land uses that are designated as a surrogate for this type of pollutant loading. Technical details on how the NPS loadings were calculated and adjusted to match the observed values can be found at Kleinfelder/Omni's report (2013, Volume 1, p. 56).

Figure 8. Non-tidal Raritan River TMDL Allocation Areas



Total phosphorus reductions based on the applicable water quality standards (see **Table 3**) as endpoints 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 (TMDL, 2014; USEPA, 2016). The distribution of TP WLAs and LAs among source categories for the seven critical watershed locations from the approved TMDL are listed in **Appendix B1 through B3**, while the allocations of TSS are shown in **Appendix B4 through B7**.

The NPS load reductions implemented for the approved TMDL apply to impaired and unimpaired watersheds. This will result in protecting the unimpaired subwatersheds from future degradation from TP and TSS that otherwise could occur. A summary of the unimpaired HUCs covered by this Protection Plan shown grouped according to the watershed-specific TMDL load calculations is presented in **Figure 8 and Appendix A**. Similarly, the LAs addressing nonpoint sources are implemented on a watershed-wide basis (including HUCs addressed by the TMDL, as well as unimpaired and unassessed HUCs), as described in Section 4 of this plan. Therefore, these allocations are relevant to maintaining the SWQS in unimpaired watersheds through the TMDL and this protection plan.

Two HUC14s that are protected for both TP and TSS were selected to illustrate how the unimpaired HUCs are protected by the TMDL load reductions. The model was run to simulate the in-stream TP concentration for two month timeframes and the results are shown in **Figures 9 and 10**. The graphs illustrate the pre-TMDL in-stream TP concentrations (solid black line) compared to the TMDL simulation (dashed red line). The simulated TP concentration reflects the planned reductions which will be achieved through the implementation of the TMDL for impaired HUCs. These reductions, when implemented, will improve and

maintain existing water quality in the unimpaired HUCs within the watershed. In these examples, which are representative of the protected HUCs, the model predicts that TP concentrations are lowered after implementation of the TMDL, resulting in water quality that is improved from the existing condition and below the SWQS of 0.1 mg/l.

Figure 9. Simulation result of TP TMDL reduction (red) in comparison to modeled in-stream TP concentration (black) within RPP HUC 02030105050030 (Lamington R (Furnace Rd to Hillside Rd)

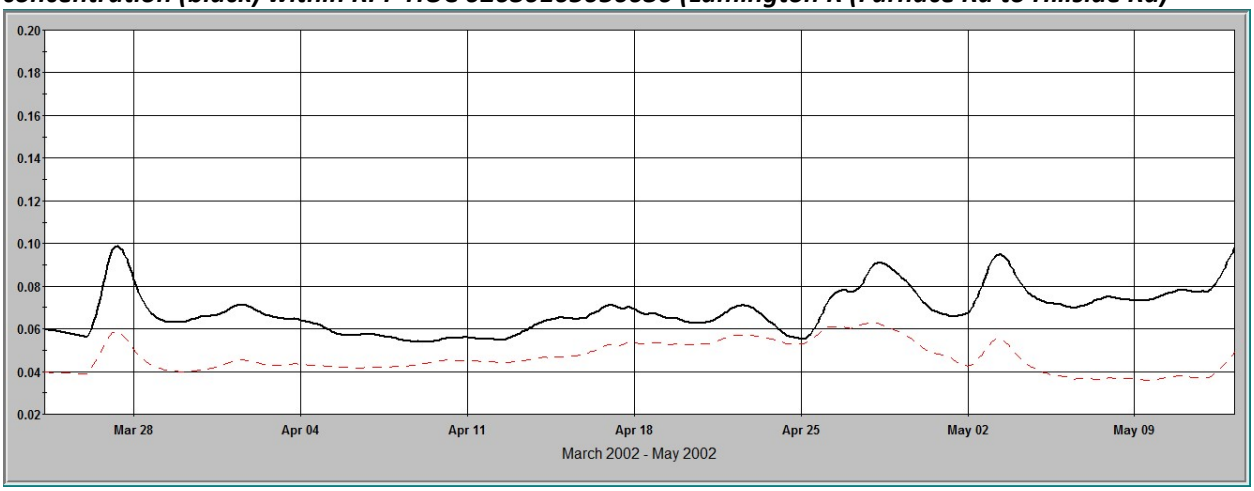
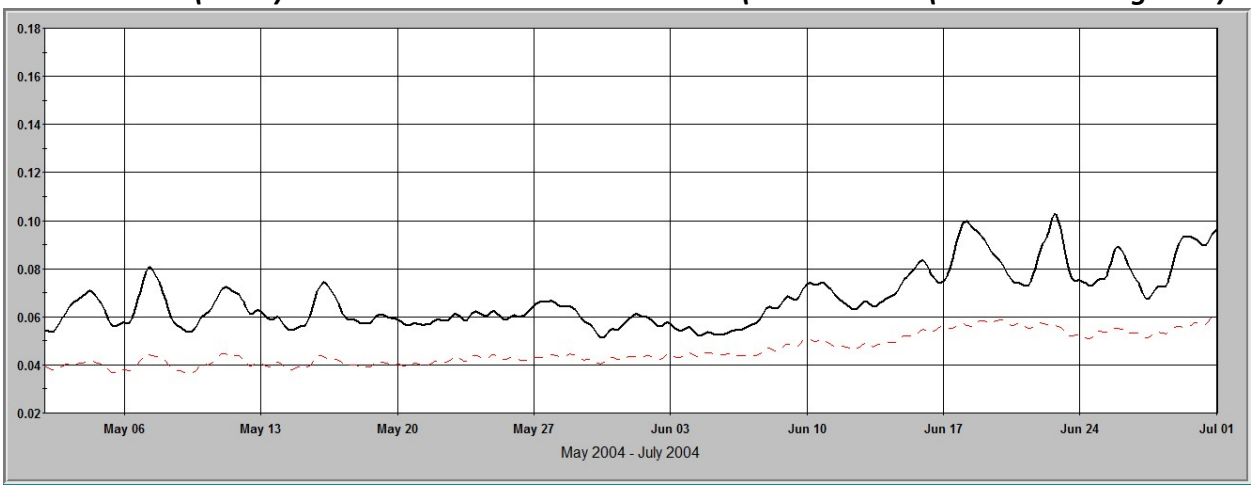


Figure 10. Simulation result of TP TMDL reduction (red) in comparison to modeled in-stream TP concentration (black) within RPP HUC 02030105070010 (Raritan R NB (Rt 28 to Lamington R)



4.0 Implementation

A full complement or rules, tools and partnerships are key to restore and maintain water quality as implemented through both regulatory and nonregulatory approaches as described below in this Section. Based on findings from an August 2009 Task Group of state and EPA water quality and drinking water officials and managers, a follow-up memorandum from EPA entitled *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions* states, "EPA recognizes that the best approaches [to achieve improvements in water quality] will entail

States, federal agencies, conservation districts, private landowners and other stakeholders working collaboratively to develop watershed-scale plans that target the most effective practices to the acres that need it most." (EPA, March 2011)

4.1 Water Quality Management Planning and Wastewater Treatment Plants

One of the tools the NJDEP uses to assure that both current decision making and future planning adequately consider protection of water quality and quantity is the Water Quality Management Planning Program (WQMP). The NJDEP's administers the WQMP pursuant to the New Jersey Water Quality Planning Act (N.J.S.A. 58:11A-1 et seq.), the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.), and the Water Quality Management Planning rules (N.J.A.C. 7:15). Accordingly, the WQMP rules prescribe water quality management policies, procedures and standards. Additional information about the WQM Planning program is available on the NJDEP's website at http://www.nj.gov/dep/wqmp/wqmps.html.

There are twelve designated areawide Water Quality Management Planning Areas in New Jersey. The NJDEP adopted the non-tidal Raritan River TMDL document as an amendment to the Lower Raritan/Middlesex, Mercer County, Monmouth County, Northeast, Upper Delaware and Upper Raritan Water Quality Management Plans (WQMPs) in accordance with N.J.A.C. 7:15-6.

Section 7.1 of the TMDL document provides details on how permit limits were derived from the WLAs and is consistent with guidance provided in EPA's *Technical Support Document for Water Quality-based Toxics Control* (1991). The TMDL sets forth individual WLAs for a total of 47 of the 123 existing point sources in the study area. Furthermore, the permit limits for the 30 existing facilities discharging to C1 waters will be maintained at existing limits to maintain current water quality conditions for pollutants covered under this protection plan, as required by the *Surface Water Quality Standards Rules* at N.J.A.C. 7:9B. Locations of WWTPs are shown in **Figure 5** and listed in Table 4 of the TMDL document. The allocation tables from the TMDL are included in **Appendix B** of this plan.

4.2 Regulated Stormwater

Effluent limitations and schedules of compliance are administered and enforced through discharge permits issued by the NJDEP under the authority of CWA Section 402, the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the implementing rules at N.J.A.C. 7:14A. The New Jersey Pollutant Discharge Elimination System (NJPDES) Permit Program protects New Jersey's surface and ground water quality by assuring the proper treatment and discharge of wastewater (and its residuals) and stormwater from various types of facilities and activities. Protection of SWQS is expected to be achieved through implementation of the BMPs required through stormwater permits, as well as by municipal ordinances and the state's fertilizer law.

The NJPDES rules for the Municipal Stormwater Regulation Program (http://www.nj.gov/dep/dwq/msrp_home.htm) require municipalities, highway agencies, and regulated "public complexes" that operate "municipal separate storm sewer systems" (MS4s) to develop stormwater management programs for those MS4s consistent with the NJPDES permit requirements. Under these rules and associated general permits, Tier A municipalities (mapped and listed in **Appendix C**) are required to implement various control measures that should substantially reduce TP and TSS loadings in the Raritan River watershed, preventing degradation of water quality in unimpaired watersheds while improving water quality in impaired watersheds. These control measures include

adoption and enforcement of a pet waste disposal ordinance, prohibiting the feeding of unconfined wildlife on public property, street sweeping, cleaning catch basins, performing good housekeeping at maintenance yards, and providing related public education and employee training. The NJDEP is currently assessing the effectiveness of these measures and if needed, will identify additional measures to be implemented to further reduce TP and TSS loadings.

The NJDEP's *Stormwater Management Rules* (N.J.A.C 7:8, date last amended: June 20, 2016, http://www.state.nj.us/dep/stormwater/) establish statewide minimum standards for the management of stormwater from new development, to prevent increased pollutant loading in both impaired and unimpaired waters. These rules also provide for the development of regional stormwater management plans to address specific impairments. The rules require every project to evaluate methods to prevent pollutants from becoming available to stormwater runoff and to design the project to minimize runoff impacts from new development through better site design, also known as low impact development. Municipalities are required to adopt and implement municipal stormwater management plans and stormwater control ordinances consistent with the Stormwater Management Rules.

The NJDEP promotes the application of green infrastructure methods (http://www.nj.gov/dep/gi/) for managing stormwater runoff. Traditional ("grey") stormwater infrastructure design focuses on collecting and conveying rainwater off-site, often through pipes, so it is ultimately discharged into a downstream waterway. In contrast, green infrastructure mimics natural processes utilizing soils and vegetation to manage rainwater where it falls by allowing it to infiltrate into the soils, where it can be used by plants or recharge aquifers and stream base flow. In addition, green infrastructure can reduce runoff volumes by capturing the rainfall in manufactured structures, such as rain barrels or cisterns, where it is stored until it can be reused for non-potable uses such as irrigation. The NJDEP supports the use of green infrastructure as a preferred method of stormwater management. Many green infrastructure projects that have been implemented or are in progress are discussed below in Sections 4.5 and 4.6.

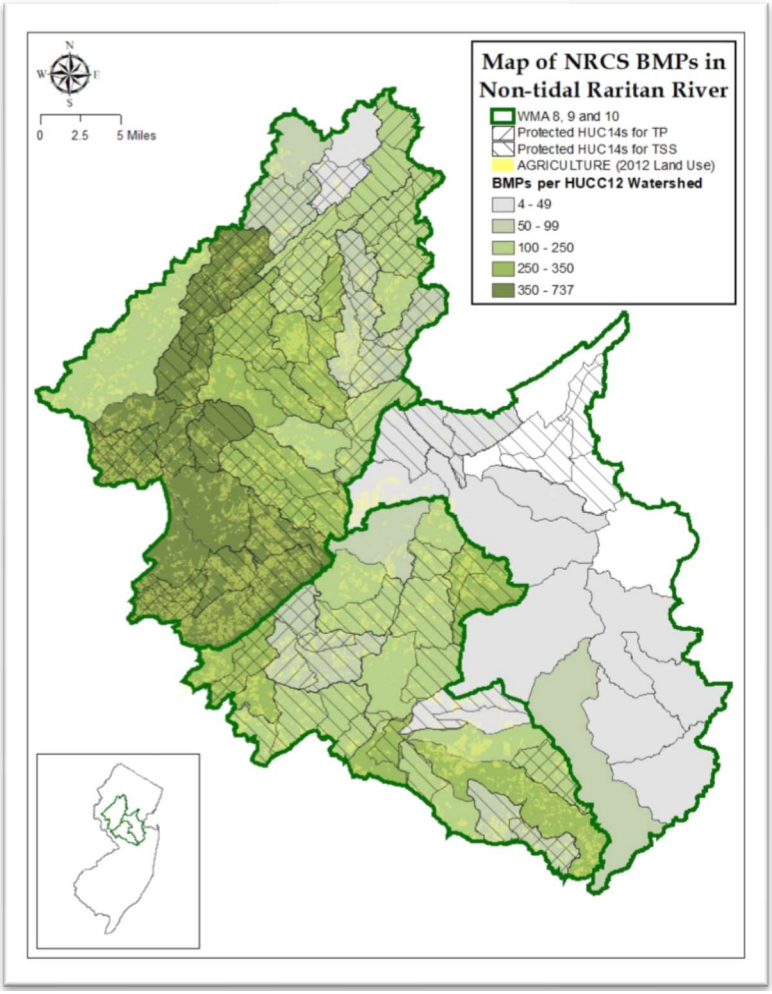
4.3 Riparian Zones

Intact riparian zones provide an excellent means to control pollutants carried by stormwater runoff to streams. New Jersey's water quality protection programs include protection of riparian zones (including the 300-foot riparian zone associated with Category One streams and their tributaries) and other near stream areas through the Flood Hazard Area Control Act Rules, N.J.A.C. 7:13. These protections provide an effective strategy to guard against further degradation of the State's waters. Compliance with these measures is enforced through the NJDEP's permitting programs. Additional information on this rule and associated programs are available on the NJDEP's website at: http://www.nj.gov/dep/landuse/.

4.4 Runoff from Agricultural Land Use

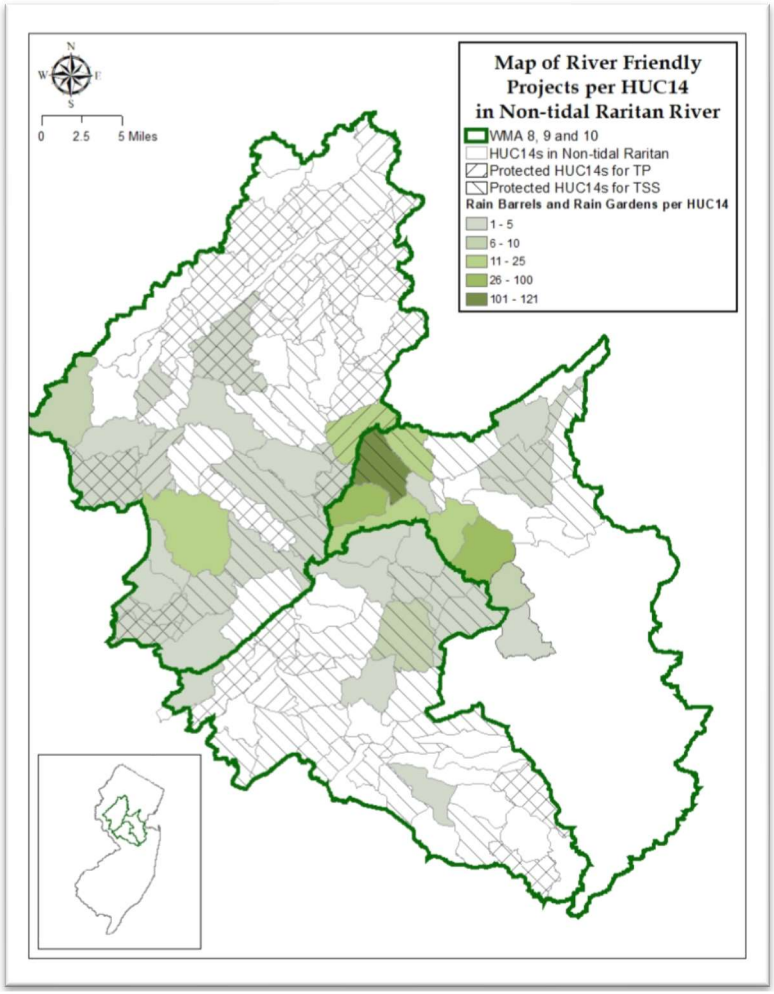
Several programs are available to assist farmers in the development and implementation of conservation management plans and resource management plans. The Natural Resource Conservation Service (NRCS) is the primary source of assistance for landowners in the development of resource management pertaining to soil conservation, water quality improvement, wildlife habitat enhancement, and irrigation water management. The USDA Farm Services Agency performs most of the funding assistance. All agricultural technical assistance is coordinated through the county Soil Conservation Districts. The funding programs include the Environmental Quality Incentive Program (EQIP), the Conservation Reserve Program (CRP), and the Conservation Reserve Enhancement Program (CREP). New Jersey'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 conservation practices that will improve the quality of runoff from agricultural land by implementing BMPs such as riparian buffers, filter strips, contour grass strips and grass waterways. This effort will result in reducing 26,000 pounds of TP and 7 million pounds of TSS from agricultural runoff annually. As of June 19, 2013, there were 192 New Jersey CREP contracts, totaling 703.8 acres. Only about 2% of this area is within the Raritan River watershed, but there is significant potential for future enrollment to achieve nutrient and TSS reductions. **Figure 11** illustrates the number of agricultural BMPs implemented per HUC12 watershed to date in the Raritan River watershed (Rutgers Sustainable Raritan River Initiative, 2017).

Figure 11. NRCS Restoration Projects



A 2017 Water Quality Restoration Grant for $145,000 (CBT funds) was awarded to the NJ Water Supply Authority to implement Raritan Agricultural Mini-Grants (https://www.raritanbasin.org/ag-mini-grants/). This project is a continuation of a previously funded CBT grant. This project will implement BMP's on 10 specific farms within priority areas of the Raritan River Basin, leveraging Farm Bill funding to cover the majority of the costs. The NJ Water Supply Authority will work with individual farms to shepherd them through the NRCS Farm Bill funding application process and cover any matching costs required by the specific Farm Bill programs.

Figure 12. River-friendly Program Projects



4.5 Stewardship

EPA has identified land stewardship practices as key in alleviating the amount of nitrogen and phosphorus loadings to our nation's waterways. To accomplish this goal, numerous partnerships already exist in the Raritan River watershed that have been and will continue to apply successful approaches to achieve improvements in water quality.

The partners for TMDL implementation and watershed protection include: the NJ Water Supply Authority, Raritan River Basin Alliance, Sustainable Raritan River Initiative, NY/NJ Baykeeper/Raritan Riverkeeper, Stony Brook-Millstone Watershed Association, Raritan Headwaters Association, engaged municipalities, county governments 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.

The River-Friendly Certification Program (https://www.njriverfriendly.org/) is an outreach effort implemented through a partnership among the Stony Brook-Millstone Watershed Association, NJ Water Supply Authority and Raritan Headwaters Association. The program promotes voluntary action by individuals, businesses, golf courses and schools to reduce pollution, conserve water, restore habitat for wildlife and educate the public about becoming better environmental stewards. **Figure 12** illustrates the number of rain barrels and rain gardens installed per HUC14 through the River-Friendly Program (Rutgers Sustainable Raritan River Initiative, 2017).

New Jersey's Healthy Lawns Healthy Water (http://www.nj.gov/dep/healthylawnshealthywater/) initiative aims to reduce the impacts of fertilizers on waterways. In 2011, Phase I required the use of BMPs and provided public education regarding correct fertilizer use. In 2012, Phase II created a certification program for professional fertilizer applicators and lawn care providers. Phase III, enacted in 2013, required manufacturers to reformulate fertilizers with reduced nitrogen and zero phosphorus content, unless a soil test indicates the need for total phosphorus.

Jersey-friendly Yards (http://www.jerseyyards.org/), developed by the Barnegat Bay Partnership with a

grant from the NJDEP, promotes landscaping for a healthy environment throughout the state, including interactive resources for homeowners including 8 Steps to a Jersey-Friendly Landscape, Jersey-Friendly Yards Success Stories, education about "Healthy Soils, Healthy Waters", rain gardens and landscaping for pollinators.

New Jersey's AmeriCorps Watershed Ambassadors Program (http://www.nj.gov/dep/wms/bears/americorps.htm) is an environmental community service program administered by the NJDEP to raise public awareness about water and watershed issues and to promote watershed stewardship through direct community involvement. Within the Raritan River watershed, the Watershed Ambassadors for WMA 8, 9 and 10 continue to carry out public education, installation of rain barrels to capture stormwater, tree plantings, biological monitoring and other projects that contribute to the goals of restoring, enhancing and maintaining water quality.

Community-based volunteer monitoring can be an effective means to produce a more comprehensive assessment of the quality of New Jersey's waterways. A CBT grant for $240,000 was awarded through the 2017 Water Quality Restoration Grant to the Stony Brook-Millstone Watershed Association to develop a Statewide Volunteer Monitoring Program. Establishing a volunteer monitoring network will provide a mechanism through which community-based groups can effectively communicate with NJDEP. By investing in this network, the NJDEP in turn invests in each monitoring group in the state, leading to improved water quality monitoring and assessment. The following goals provide further detail on how the network will achieve this:

- Increase quality of volunteer-collected data, thereby increasing the quantity of data made available for assessments made by the Integrated Report;
- Expand the geographic range of HUC14s assessed in the state and coordinate sites between volunteers and the state more effectively;
- Develop and maintain consistency of methodology between volunteer programs;
- Improve sustainability of volunteer monitoring programs to continue monitoring activities independent of government-run monitoring programs.

4.6 Restoration Projects and Plans

4.6.1 Funding Sources

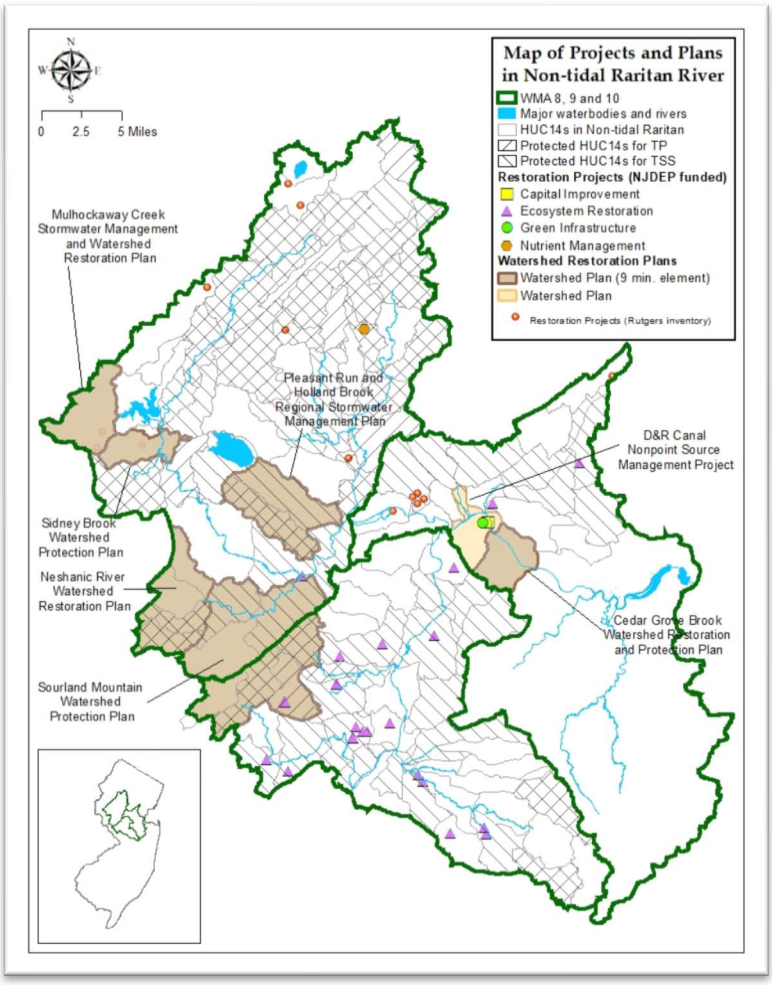
The NJDEP utilizes a variety of funds for various nonpoint source control activities. For example, the 2017 Water Quality Restoration Grants Request for Proposals (http://www.state.nj.us/dep/wms/bears/npsrestgrants.html) awarded grants with funds from Section 319(h) of the CWA, in addition to Corporate Business Tax (CBT) funds. These grants were available to award pass-through grants to eligible recipients to carry out targeted water quality restoration initiatives throughout the state.

4.6.2 Watershed Based Plans

The annual federal 319(h) grant requires the Department to award at least 50% of the funds to projects that implement approved watershed-based plans and approved Total Maximum Daily Loads (TMDLs). Watershed Restoration Plans elaborate on TMDL implementation plans by identifying the specific measures that would be needed to achieve the NPS load reduction assigned to a subwatershed, as well as the suggested responsible entities, funding sources and schedules for implementing the specific measures. Seven such plans in the non-tidal Raritan River watershed meeting EPA's 9 minimum components of a watershed plan as specified in *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (USEPA, 2008) are shown in **Figure 13** and listed below:

- Cedar Grove Brook Watershed Restoration and Protection Plan
- Delaware and Raritan Canal Nonpoint Source Management Project
- Mulhockaway Creek Stormwater Management and Watershed Restoration Plan
- Neshanic River Watershed Restoration Plan
- Pleasant Run and Holland Brook Regional Stormwater Management Plan
- Sidney Brook Watershed Protection Plan
- Sourland Mountain Watershed Protection Plan

Figure 13. Restoration Projects and Plans



Links to these plans are available online:

http://www.state.nj.us/dep/wms/bears/npsrestgrants.html.

These grants have been awarded to partners at the county, local and regional levels. **Figure 13** illustrates the BMPs and green infrastructure projects that have been implemented in the non-tidal Raritan River watershed. The partnerships established and the experience gained in completing these 46 projects will provide a foundation for implementing future restoration projects. Current projects are described below, while information about many completed projects can be found in Table 13 of the TMDL document.

4.6.3 Implement Neshanic River Watershed Restoration Plan

The Neshanic River Watershed is located in Hunterdon County and includes parts of Raritan Township, East Amwell Township, Delaware Township and Flemington Borough. Water quality issues from nonpoint source pollution in the Neshanic River watershed result from increased urbanization, as well as runoff from the significant percentage of agricultural land in the watershed. The *Neshanic River Watershed Restoration Plan (RP12-028)* proposed restoration strategies including implementation of the River-Friendly Programs for golf courses, businesses, residents and schools (described above in section 4.5); retrofit of stormwater management facilities; installation of bioretention systems to capture, treat and infiltrate stormwater at the source before it reaches the stormwater infrastructure system or a stream; retrofit of roadside ditches to reduce the sediment load that is generated, and also treat runoff from the adjacent land; and non-agricultural riparian buffer restorations.

The North Jersey Resource Conservation and Development Council (NJRC&D), NJWSA, Rutgers, and the New Jersey Institute of Technology (NJIT) were awarded $541,300 to implement several projects recommended in the plan. A *Comprehensive Targeted Agricultural Assistance Program* is being implemented for the Neshanic River watershed to complement the NJWSA's Agricultural Mini-Grant Program (described in section 4.4). This voluntary program provides funding for agricultural conservation planning, technical assistance and BMP implementation. The NJRC&D is the lead on the project, with support from partners such as the South Branch Watershed Association, Raritan Township, East Amwell Township, Delaware Township, Flemington Borough and the Natural Resources Conservation Service (NRCS).

An additional 319(h) grant for $1,295,000 was awarded to the NJRC&D to fund the *Neshanic River Watershed Agricultural and Stormwater Alternatives (WM17-050)* TMDL implementation projects. The first goal focuses intense efforts on keeping agricultural soil in place and reducing erosion through the application of cover crops and the Soil Health Initiative in the combined Neshanic and Sourland watershed area. Continued education aimed at farmers promotes the River-friendly Certification standards and encourages the use of NRCS funding that can be used to remediate potential environmental impacts on their farms. The second goal is to continue efforts currently underway to disconnect impervious surfaces associated with residential and commercial development in the Neshanic watershed to reduce stormwater runoff and pollutant loading to the waterway. The third goal is to incorporate sustainable stormwater and landscape design on the Hunterdon Land Trust Dvoor Farm property to address flooding and erosion of Walnut Brook. This project builds on the wetland creation and streambank stabilization practices implemented in 2009 towards the goal of improve the water quality of the Walnut Brook.

4.6.4 Implement Pleasant Run and Holland Brook Regional Stormwater Management Plan

Pleasant Run and Holland Brook are tributaries of the South Branch Raritan River, encompassing parts of Clinton, Readington and Branchburg Townships. The water quality and overall ecology of both streams are being impacted by inadequately managed stormwater runoff.

The Raritan Township Environmental Commission (RTEC), which served as the Lead Planning Agency for the NJDEP approved (2009) Watershed Protection Plan for Holland Brook and Pleasant Run, was awarded a $650,000 grant for *Restoration Along Holland Brook and Pleasant Run (WM16-013)*. The RTEC has a long history of working in concert with the two primary project partners, Princeton Hydro and the Raritan Headwaters Association. This grant supports the implementation of water quality improvement projects

identified in the watershed plan and serves to implement the non-tidal Raritan River TMDL. These projects include green infrastructure BMPs in both suburban and agricultural areas. The project also includes partnership with the NRCS to utilize Farm Bill funding assistance to implement projects in agricultural areas. Readington Township is providing matching funds in the amount of $38,600.

4.6.5 Implement Sourland Mountain Watershed Protection Plan

The Sourland Mountains are a unique natural feature spanning southern Hunterdon, southwestern Somerset and northwestern Mercer counties, centralized in East Amwell Township but also including parts of the Townships of Hillsborough, Montgomery, and Hopewell. The Sourland Mountains serve as the headwaters for the Neshanic River, the Stony Brook and the Millstone River that ultimately discharge to the non-tidal portion of the Raritan River. East Amwell Township was the lead entity, stakeholder coordinator and grantee for the 319(h) grant supported Sourland watershed plan development project.

East Amwell Township was awarded a $446,000 grant for *Targeted Stormwater Management in the Back Brook Headwaters (WM15-017)* and committed to provide $29,000 of in-kind services as match to the grant funds. The approved watershed plan focuses on the first and second order streams of these waterways. The project will implement a series of rain gardens to complement a stormwater basin retrofit in Clawson Park, a rain garden at the East Amwell elementary school, and rain gardens and grass swales at the East Amwell municipal complex. The implementation of green infrastructure techniques to reduce storm water runoff through infiltration ultimately will provide for some reduction of the phosphorus and sediment loads as required by the approved TMDL for the non-tidal portion of the Raritan River.

The Stony Brook-Millstone Watershed Association has an actively funded 319(h) project (WM15-015), the main objective of which is to perform Impervious Cover Assessments (ICAs) for the public/commercial properties of 16 municipalities (partially or entirely within WMA 10 and including impaired and unimpaired HUCs), and design Reduction Action Plans (RAPs) for those sites that are considered high priority. One of the long-term goals of this ICA project is to inform municipalities, and to lay the groundwork with "ready-to-go" assessments and RAPs for implementation as part of the stormwater management implementation strategy. Through this process, four (4) project properties in Hopewell Borough were chosen for $400,000 319(h) funding through a 2017 Water Quality Restoration Grant for the *Restoration of Beden Brook*. The selected properties are important because of other criteria including: their proximity to the headwaters of the eastern Hopewell Borough tributary; level of willingness demonstrated by the property owner to implement green infrastructure on-site or at sister sites; and because the SBMWA chosen project could coincide with the property owner's preexisting plans to redevelop their site, potentially giving the added benefits of local fund matching for replacing grey infrastructure with green/non-structural BMPs.

4.6.6 Implement Cedar Grove Brook Watershed Restoration and Protection Plan and Delaware and Raritan Canal Nonpoint Source Management Project

Within the non-tidal Raritan River watershed, an additional 2017 Water Quality Restoration Grant will fund *Stormwater Basin Retrofits Phase 1 in Franklin Township, Somerset County* through a $600,000 CBT grant awarded to NJWSA. This project is a continuation of the previously funded 319(h)/CBT grants that were designated for the implementation of the approved watershed plan for the D&R Canal. This project includes retrofits on 5 stormwater basins associated with Cedar Grove Creek (D&R Canal infall 32). A buffer restoration will also be completed along the Cedar Grove Brook and remaining funds will be utilized

for small scale stormwater projects such as disconnection of impervious surfaces, riparian buffer improvement, and agricultural BMPs.

4.6.7 Implement Non-tidal Raritan River TMDL

Based upon a preliminary land cover analysis of the entire Raritan River basin, the watershed contains approximately 140 square miles (89,482 acres) of impervious cover. Through the support of another Federal grant program, Rutgers Cooperative Extension Water Resources Program (WRP) completed regional stormwater management plans and restoration plan for 54 municipalities within the Raritan River basin. These plans identify green infrastructure BMP techniques for improving water quality and reducing flooding largely through the infiltration of stormwater runoff from impervious surfaces, prior to entering the stormwater infrastructure system.

The NJDEP funded the *Implementation of the Raritan River TMDL (WM16-011)* through a 319(h) grant awarded to Rutgers WRP in the amount of $700,000. This project will design and implement water quality improvement projects identified in these stormwater management plans and will serve to implement the non-tidal Raritan River TMDL. The projects to be installed include many small scale green infrastructure projects (e.g. rain gardens, porous paving, etc.) to reduce stormwater and protect water quality throughout the affected watershed.

The Royce Brook Watershed, located in Hillsborough Township, Somerset County, has a drainage area of 16.5 square miles, 17.4% of which is impervious cover, far exceeding the 10% maximum recommended by the Center for Watershed Protection for unimpaired water quality. The Royce Brook flows into the Millstone River which discharges to the non-tidal portion of Raritan River. Rutgers Cooperative Extension of Somerset County was awarded a grant of $175,539 for the *Royce Brook Best Management Practice Implementation (Raritan River Watershed) (WM15-016).* This project will implement various green infrastructure techniques such as rain gardens and infiltration structures to reduce nutrient levels in stormwater discharges within the Royce Brook watershed. This reduction in nutrients will contribute to the reduction in phosphorus required by the TMDL for the non-tidal Raritan River. The Rutgers Cooperative Extension Offices work closely with the Rutgers WRP, relying on the WRP for BMP design and technical assistance. Some extension offices house "Watershed Agents" that are focused on working with local partners to implement BMPs consistent with the recommendations of approved TMDLs and watershed plans. The Watershed Agent positions were developed through a previous NJDEP funded CBT grant that provided financial support for these agents strategically placed in priority watershed areas. Rutgers University continued to support these positions and these agents are involved with many of the active grant projects implementing approved watershed plans. The Rutgers Cooperative Extension Office has committed $17,539 of in-kind services as match to this grant and will work with the SBMWA and the Rutgers WRP to design and implement green infrastructure BMPs in the Royce Brook watershed.

The Millstone River watershed encompasses 265 square miles and receives stormwater runoff from all or part of 25 municipalities within the counties of Monmouth, Mercer, Middlesex and Somerset, ultimately discharging to the non-tidal Raritan River just east of Somerville. A 2017 grant for $300,000 was awarded to the Stony Brook-Millstone Watershed Association for *Implementation of the Raritan River TMDL Through Actions in the Millstone River Watershed (WM15-015).* The SBMWA will partner with Rutgers WRP to implement the TMDL for phosphorus in the non-tidal Raritan River. Impervious Cover Assessments (ICAs) and Reduction Action Plans (RAPs) will be developed for 16 municipalities within the Millstone River watershed. This project includes implementation of green infrastructure techniques in

areas targeted by the ICAs and RAPs to reduce stormwater runoff volume, nutrients and sediment discharges to the Millstone River and ultimately the non-tidal Raritan River. The SBMWA has committed a 50% ($150,000) in-kind services match to the grant funds.

4.7 Schedule of Actions to meet Water Quality Standards

Reductions in point sources will be achieved in accordance with NPDES permitting regulations. Upon permit renewal, wastewater treatment plants shown in **Figure 5** will be required to meet seasonal and/or annual TP concentrations and loads identified in the approved TMDL. Compliance with these levels will also ensure compliance with the TSS levels. Many of the point sources addressed by the TMDL are within and/or upstream of the unimpaired HUCs and reductions in TP and TSS point sources will ensure the continued attainment of SWQS in these areas.

Reductions in urban and residential storm water will be achieved through the implementation of NJ's Stormwater Management Rules, NJ's Fertilizer Rule, agricultural nonpoint source reduction programs, stewardship and several green infrastructure initiatives. Reductions in nonpoint source loads are currently being implemented through several funded projects discussed above, including rain barrels and riparian buffers.

EPA's 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* concluded that the TMDLs provide reasonable assurance that NPS load reductions will be met in the impaired subwatersheds. Since the projects implemented for the approved TMDL apply consistently to unimpaired as well as impaired watersheds, this will result in protecting these subwatersheds from future degradation from TP and TSS.

Short-term (5 year) timeframe for WPP implementation is provided in **Table 4** below:

Table 4. Short-term (5 year) Timeframe for WPP Implementation

Objective	Action	Milestone	2018	2019	2020	2021	2022
Reduce PS to improve water quality and meet SWQS	Permit limit revisions	Required upon NJPDES facility permit renewal	X	X	X	X	X
	Regulated Stormwater control measures	MS4 permit renewal and BMP refinement	X	X	X	X	X
Maintain Regulatory Protection	Protect Category 1 Waters	Revise rule (if need arises) to ensure antidegradation	X	X	X	X	X
	Reduce nutrient loading from lawn fertilizer	NJ Fertilizer Law	X	X	X	X	X
Promote Stewardship to reduce NPS	Conduct AmeriCorps NJ Watershed Ambassador Program throughout the State	Continue to educate and participate in projects benefitting water quality	X	X	X	X	X
	Support citizen science and volunteer		X	X	X	X	X

Objective	Action	Milestone	2018	2019	2020	2021	2022
	monitoring groups and partner with them to identify NPS sources and implementation solutions						
	Carry out and partner with others in programs aimed at debris control		X	X	X	X	X
	Statewide Volunteer Monitoring Program (CBT grant awarded to SBMWA)	Inventory and audit current programs; develop website, listserv and materials; hold meetings, workshops and training	X	X	X		
Fund/Support NPS reduction projects	Operate 319(h) grant program to maximize effective use of funds provided to achieve measurable water quality outcomes	Timely awards in accordance with NJDEP prioritization of TMDL implementation.	X	X	X	X	X
	Work with Department of Agriculture and NRCS to prioritize award of Farm Bill funds to reduce NPS	Attend State Technical Committee meetings	X	X	X	X	X
	Make CWSRF fund available for NPS reduction measures	Carry out effectiveness monitoring with EPA assistance	X	X	X	X	X
	Work with partners to leverage State resources to increase NPS available funding	Identify eligible NPS projects and priorities in annual Priority System/Project Priority List; and attend meetings as active partner in NJ NEPPS	X	X	X	X	X
	Restoration of the Beden Brook Watershed (319(h) grant awarded to SBMWA)	Installation of green infrastructure, effectiveness monitoring and signage	X	X	X		
	Stormwater Basin Retrofits, Franklin Twp.	Completion of stormwater basin retrofits, load	X	X			

Objective	Action	Milestone	2018	2019	2020	2021	2022
	(CBT grant awarded to NJWSA)	reduction assessment and final report					
	Raritan Agricultural Mini-Grants (CBT grant awarded to NJWSA)	Implement conservation practices, model load reductions, final report	X	X	X		
	Implement Neshanic Watershed Plan (grant RP12-028 awarded to NJRC&D, NJWSA, Rutgers & NJIT)	Implement River-friendly Programs, green infrastructure projects and Comprehensive Targeted Agricultural Assistance Program	X	X			
	Neshanic River Watershed Agricultural and Stormwater Alternatives (WM17-050) awarded to NJRC&D	Implement agricultural BMPs, small scale bioretention BMPs, and projects at Dvoor Farm	X	X	X		
	Implement Raritan River TMDL (grant WM16-011 awarded to Rutgers WRP)	Design and implement green infrastructure BMPs within the Raritan River basin	X	X			
	Restoration Along Holland Brook and Pleasant Run (grant WM16-013 awarded to Readington Twp.)	Implement green infrastructure BMPs in both suburban and agricultural areas; partner with NRCS in agricultural areas	X	X			
	Implement Targeted Stormwater Mgmt. in the Back Brook Headwaters (grant WM15-017 awarded to East Amwell Twp.)	Implement a series of rain gardens and grass swales	X	X			
	Royce Brook BMP Implementation (grant WM15-016 awarded to Rutgers Coop. Extension of Somerset Co.)	Implement various green infrastructure techniques such as rain gardens and infiltration structures	X	X			

Objective	Action	Milestone	2018	2019	2020	2021	2022
	Implement TMDL Through Actions in the Millstone River Watershed (grant WM15-015 awarded to SBMWA)	Develop ICAs and RAPs for 16 municipalities; implement green infrastructure BMPs	X	X			
	Implementation of the Raritan River Total Maximum Daily Load (319(h) grant awarded to Rutgers Univ.)	Installation of green infrastructure, effectiveness monitoring and signage	X	X	X		
Assess water quality	Integrated Report to assess water quality	NJDEP release of draft	X		X		X
		Public Comment	X		X		X
		EPA approval	X		X		X

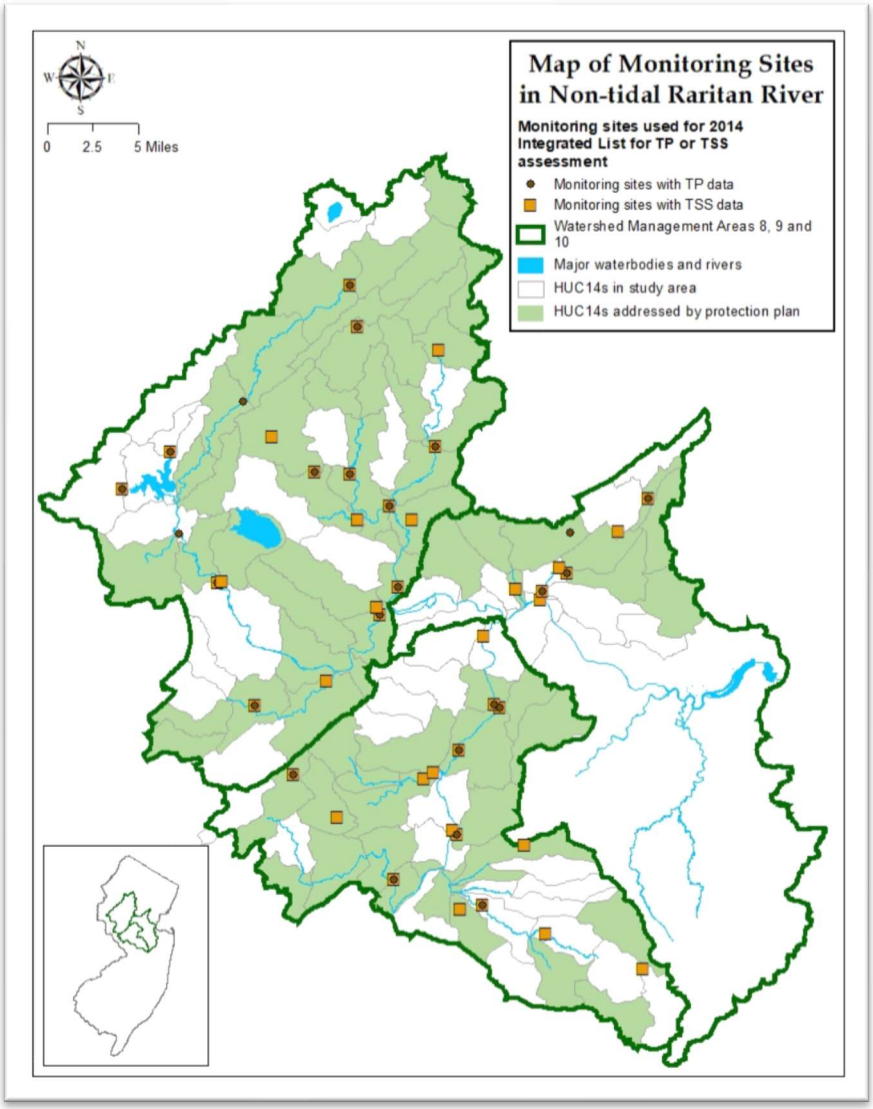
5.0 Monitoring Plan to Evaluate Effectiveness of Protection Plan

The federal Clean Water Act mandates that states submit biennial reports to the U.S. Environmental Protection Agency (USEPA) describing the quality of their waters. To fulfill this requirement, the Integrated Water Quality Assessment Report (Integrated Report) includes the status of New Jersey's waters in terms of overall water quality and support of designated uses, strategies to maintain and improve water quality as well as the "303(d) List" that identifies waters that are not attaining designated uses because they do not meet SWQS. Integrated Reports are intended to provide effective tools for maintaining high quality waters (i.e., where there is no water quality impairment) and improving the quality of waters that do not attain their designated uses (i.e., contain impaired waterbodies).

The NJDEP is required to use all existing and readily available data to assess water quality for the 303(d) and Integrated Lists. With data originating from a host of different entities with different monitoring and analytical capabilities, the NJDEP must ensure that the data used for assessment purposes is representative, reliable and of good quality. The NJDEP must also determine how to use the diverse types of data it generates and receives in a consistent manner to ensure an accurate evaluation of water quality, to determine compliance with applicable water quality standards and to assess support of applicable designated uses. The methods used to compile, analyze, and interpret data used for water quality assessment are described in the Integrated Water Quality Assessment Methods (Methods Document). Detailed information about the biennial water quality assessment process and the related lists and documents is available at http://www.state.nj.us/dep/wms/bears/assessment.htm.

The NJDEP's water quality monitoring projects emphasize watershed monitoring and efficiently measure a wide range of parameters including chemical/physical (nutrients, metals, discharge, etc.), biological and bacteriological. Chemical and biological monitoring are often co-located to correlate chemical conditions with biological response. The NJDEP and the U.S. Geological Survey have cooperatively operated the Ambient Stream Monitoring Network (ASMN) in New Jersey since the 1970s. Biological monitoring includes the Ambient Biological Monitoring Network (AMNET) which uses benthic macroinvertebrates for the assessment of stream quality; Fish Index of Biotic Integrity (FIBI) for evaluating fish communities and stream quality; and Fish Tissue Monitoring.

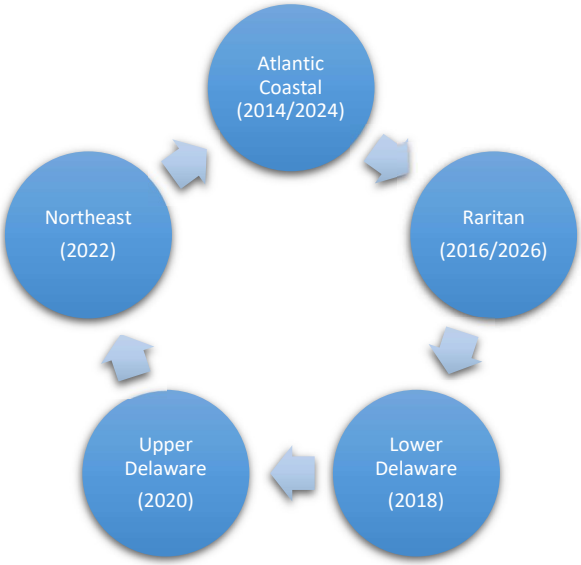
Figure 14. Monitoring



Monitoring conducted by other entities, such as federal and county government agencies, regional commissions and watershed associations (including the expanded community-based volunteer monitoring discussed in Section 4.5) is also used to supplement these networks and expand the range and scope of information available for water quality assessment. Additional information about the NJDEP's water monitoring activities and networks is available on the website at: http://www.nj.gov/dep/wms/. **Figure 14** illustrates the monitoring sites used for the 2014 Integrated List for TP or TSS assessment within the non-tidal Raritan River watershed, and, although this map is not prescriptive of future monitoring activities, indicates the significant extent of monitoring within the watershed.

In addition, the NJDEP has enhanced the biennial Integrated Report assessments by adding a "Water Region Rotating Basin Approach" to gather more detailed monitoring and to perform a comprehensive assessment in each of the five NJ water regions on a ten-year cycle as illustrated below. This approach

will allow the NJDEP to focus resources on the Raritan Water Region (Watershed Management Areas 8, 9 and 10) in the 2016 Integrated Report (and again in 2026), to assess attainment of standards and evaluate trends in both impaired and unimpaired waters. This new approach is explained in more detail in the 2014 *New Jersey Integrated Water Quality Assessment Methods* (Methods Document) (New Jersey Department of Environmental Protection, February 2015).



Since certain implementation steps will occur on a similar ten-year timeframe (e.g. WWTP permit limit revision and potential facility capital improvements), the NJDEP considers the rotating basin approach will serve as an appropriate measure of TMDL implementation effectiveness. Further, a component of some of the implementation projects includes effectiveness monitoring. This information will help determine localized effectiveness of specific practices put in place to reduce pollutant loads. In addition, monthly discharge monitoring data submitted to the NJDEP from regulated treatment facilities will provide information regarding attainment of the WLAs assigned to these sources.

The biennial Integrated Report process will effectively: a) demonstrate maintenance of water quality standards in protection HUCs; b) demonstrate progress made toward achieving water quality standards in impaired HUCs; c) evaluate the success of implementation actions; and d). identify needed improvements for adaptive modification and additional projects necessary to achieve water quality goals.

6.0 Public Participation

The NJDEP has maintained a long-term commitment to the stakeholder process and public participation in the Raritan River basin. Stakeholder involvement has been continuous, beginning with the collaborative process associated with the NJDEP's watershed initiative that began in the fall of 2000. Several workgroups were created. The Raritan Basin Watershed Alliance, an offshoot of that process, has been instrumental in facilitating and maintaining a stakeholder process in the Raritan River basin.

The TMDL was developed with assistance and direct input from stakeholders in Watershed Management Areas 8, 9 and 10. Throughout the development of the TMDLs for the Raritan River basin, progress was reported to and reviewed by the Rutgers New Jersey EcoComplex (NJEC) TMDL review panel. The NJEC consists of a review panel of New Jersey university professors whose role is to provide comments on the

NJDEP's technical approaches and tools for the development of TMDLs and other management strategies. Their comments on the TMDL study resulted in refinements to the modeling work upon which the TMDL document was based. A series of public presentations were held at key points between 2005 and 2014 on the Phase I, Phase II and TMDL reports. The Raritan River Basin TMDL was approved by EPA May 9, 2016 and the TMDL was adopted as an amendment to the Lower Raritan/Middlesex, Mercer County, Monmouth County, Northeast, Upper Delaware and Upper Raritan Water Quality Management Plans in accordance with New Jersey's *Water Quality Management Planning Rules* at N.J.A.C. 7:15-6.

The Integrated Report development process includes public participation in the data solicitation stage as well as public comment periods on the draft methods, lists and reports. As discussed in the preceding section, the NJDEP developed a new "Water Region Rotating Basin Approach" that will produce a comprehensive assessment of the entire state every ten years. This approach will support development of effective measures to restore, maintain, and enhance water quality uses.

The Raritan Water Region is the focus of the 2016 Integrated Report. The NJDEP has partnered with the Sustainable Raritan River Initiative (SRRI, http://raritan.rutgers.edu/the-initiative/) to engage Raritan stakeholders to participate in a prioritization process and strategy for restoration, protection and enhancement of waterbodies in the Raritan Water Region to inform the 2016 Integrated Report. The SRRI is a joint program of Rutgers' Edward J. Bloustein School of Planning and Public Policy and Rutgers' School of Environmental and Biological Science. The initiative works with various stakeholders around the Raritan Basin and Bay to balance social, economic and environmental objectives toward the common goal of restoring the Raritan River, its tributaries and its estuary for current and future generations. Recent stakeholder participation included:

June 30, 2016	Raritan Water Regional Informal Work Group
November 9, 2016	Raritan Integrated Report Stakeholder Engagement Workshop
February 23, 2017	Raritan Integrated Report Stakeholder Engagement Workshop
June 9, 2017	The 9th Annual Sustainable Raritan Conference and Awards Ceremony

This collaborative watershed approach resulted in the submittal of a number of grant proposals from a variety of entities to implement the non-tidal Raritan River TMDL that the NJDEP has funded (as described in section 4 of this plan). A broad range of stakeholders, including watershed associations, governmental organizations and universities, have demonstrated long-term commitment to lead, engage in, and implement projects to achieve water quality improvement and protection. Continuing stakeholder involvement will ensure that future water protection and restoration actions are tailored to the unique circumstances of the watersheds within the Raritan Water Region.

7.0 Conclusion

The Non-tidal Raritan River Watershed Protection Plan articulates a formal strategy that the NJDEP has set in place to protect unimpaired waters within the Raritan River basin. The watershed approach of this protection plan, which augments the implementation of the non-tidal Raritan River TMDL, will support achieving the NJDEP's goal of restoration, maintenance and preservation of water quality in the Raritan River watershed.

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    - https://issuu.com/rutgerswater/docs/gi-brochure_web-view
  - Rutgers Green Infrastructure Guidance Manual for New Jersey
    - https://issuu.com/rutgerswater/docs/2015-03-22_manual
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  - Jersey-friendly Yards
    - http://www.jerseyyards.org/
  - River-friendly Certification Program

        - https://www.njriverfriendly.org/

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Appendix A. Non-tidal Raritan River Study Area Existing TMDLs and 2014 303(d) List[1]

HUC14[2]	WMA	Assessment Unit Name	2014 Assessment[3]		Plan Type - TP	Plan Type - TSS	C1?[4]	2014 Integrated Report Impairments
			TP	TSS				
a - South Branch Raritan River Watershed TMDL								
02030105010010	08	Drakes Brook (above Eyland Ave)	I	I			C1	temperature
02030105010020	08	Drakes Brook (below Eyland Ave)	A	A	TP Protection Plan	TSS Protection Plan	C1	
02030105010030	08	Raritan R SB (above Rt 46)	I	I			C1	
02030105010040	08	Raritan R SB (74d 44m 15s to Rt 46)	I	I			C1	mercury (fish)
02030105010050	08	Raritan R SB (LongValley br to 74d44m15s)	A	A	TP Protection Plan	TSS Protection Plan	C1	biological, *E.coli*, mercury (fish)
02030105010060	08	Raritan R SB (Califon br to Long Valley)	A	A	TP Protection Plan	TSS Protection Plan	C1	DO, temperature, pH, *E.coli*, mercury (fish)
02030105010070	08	Raritan R SB (StoneMill gage to Califon)	A	A	TP Protection Plan	TSS Protection Plan	C1	biological, *E.coli*, arsenic
02030105010080	08	Raritan R SB (Spruce Run-StoneMill gage)	A	A	TMDL	TSS Protection Plan		temperature, *E.coli*
02030105020050	08	Beaver Brook (Clinton)	Non	A	TMDL	TSS Protection Plan	C1	biological, temperature, pH, TP, *E.coli*
02030105020060	08	Cakepoulin Creek	A	A	TP Protection Plan	TSS Protection Plan	C1	DDT (fish)
02030105020070	08	Raritan R SB (River Rd to Spruce Run)	Non	Non	TMDL	TMDL	C1	temperature, TP, TSS
02030105020080	08	Raritan R SB (Prescott Bk to River Rd)	A	A	TP Protection Plan	TMDL		temperature, pH, *E.coli*, arsenic
02030105020090	08	Prescott Brook / Round Valley Reservior	Non	A		TSS Protection Plan	C1	TP, *E.coli*, arsenic, mercury (fish)
02030105020100	08	Raritan R SB (Three Bridges-Prescott Bk)	Non	A	TMDL	TMDL		biological, temperature, pH, TP, *E.coli*, mercury (fish)
02030105030010	08	First Neshanic River	I	I				biological
02030105030020	08	Second Neshanic River	I	I				biological
02030105030030	08	Headquarters trib (Third Neshanic River)	A	A	TP Protection Plan	TSS Protection Plan		DO, *E.coli*
02030105030040	08	Third Neshanic River	A	A	TP Protection Plan	TSS Protection Plan		biological, DO, *E.coli*
02030105030050	08	Back Brook	I	I				biological, *E.coli*

HUC14[2]	WMA	Assessment Unit Name	2014 Assessment[3]		Plan Type - TP	Plan Type - TSS	C1?[4]	2014 Integrated Report Impairments
			TP	TSS				
02030105030060	08	Neshanic River (below FNR / SNR confl)	Non	A	TMDL	TSS Protection Plan		biological, DO, pH, TP, *E.coli*, arsenic
02030105030070	08	Neshanic River (below Black Brk)	Non	A	TMDL	TSS Protection Plan		biological, DO, pH, TP, *E.coli*, arsenic
02030105040010	08	Raritan R SB (Pleasant Run-Three Bridges)	Non	A	TMDL	TSS Protection Plan		TP, *E.coli*, arsenic, mercury (fish)
02030105040020	08	Pleasant Run	A	A	TP Protection Plan	TSS Protection Plan		bio, *E.coli*
02030105040030	08	Holland Brook	Non	A	TMDL	TSS Protection Plan		bio, pH, TP
02030105040040	08	Raritan R SB (NB to Pleasant Run)	Non	A	TMDL	TSS Protection Plan		pH, TP, arsenic, mercury (fish)
above Spruce Run - not addressed by TMDL								
02030105020010	08	Spruce Run (above Glen Gardner)	A	A	above Spruce Run		C1	temperature, *E.coli*
02030105020020	08	Spruce Run (Reservior to Glen Gardner)	A	A	above Spruce Run		C1	temperature, *E.coli*
02030105020030	08	Mulhockaway Creek	A	A	above Spruce Run		C1	DO, temperature, *E.coli*
02030105020040	08	Spruce Run Reservoir / Willoughby Brook	Non	I	above Spruce Run		C1	temperature, pH, TP, Mercury (fish)
b - North Branch Raritan River Watershed TMDL								
02030105050010	08	Lamington R (above Rt 10)	A	I	TP Protection Plan		C1	
02030105050020	08	Lamington R (Hillside Rd to Rt 10)	Non	A	TMDL	TSS Protection Plan	C1	bio, DO, TP, *E.coli*
02030105050030	08	Lamington R (Furnace Rd to Hillside Rd)	A	I	TP Protection Plan		C1	*E.coli*
02030105050040	08	Lamington R (Pottersville gage-FurnaceRd)	A	A	TP Protection Plan	TSS Protection Plan	C1	*E.coli*, arsenic
02030105050050	08	Pottersville trib (Lamington River)	A	I	TP Protection Plan		C1	temperature, *E.coli*
02030105050060	08	Cold Brook	I	I			C1	
02030105050070	08	Lamington R (HallsBrRd-HerzogBrk)	Non	A	TMDL	TSS Protection Plan	C1	temperature, pH, TP, *E.coli*
02030105050080	08	Rockaway Ck (above McCrea Mills)	A	A	TP Protection Plan	TSS Protection Plan	C1	biological, temperature, arsenic
02030105050090	08	Rockaway Ck (below McCrea Mills)	Non	A	TMDL	TSS Protection Plan	C1	biological, pH, TP, *E.coli*, arsenic
02030105050100	08	Rockaway Ck SB	Non	Non	TMDL	TMDL	C1	bio, temperature, TP, TSS, *E.coli*

HUC14[2]	WMA	Assessment Unit Name	2014 Assessment[3]		Plan Type - TP	Plan Type - TSS	C1?[4]	2014 Integrated Report Impairments
			TP	TSS				
02030105050130	08	Lamington R (Hertzog Brk to Pottersville gage)	A	A	TP Protection Plan	TSS Protection Plan	C1	temperature, *E.coli*
02030105060010	08	Raritan R NB (above/incl India Bk)	A	A	TP Protection Plan	TSS Protection Plan	C1	*E.coli*
02030105060020	08	Burnett Brook (above Old Mill Rd)	A	A	TP Protection Plan	TSS Protection Plan	C1	
02030105060030	08	Raritan R NB (incl McVickers to India Bk)	A	A	TP Protection Plan	TSS Protection Plan	C1	DO, temperature, *E.coli*
02030105060040	08	Raritan R NB (Peapack Bk to McVickers Bk)	A	Non	TMDL	TMDL	C1	TSS
02030105060050	08	Peapack Brook (above/incl Gladstone Bk)	A	A	TP Protection Plan	TSS Protection Plan	C1	biological
02030105060060	08	Peapack Brook (below Gladstone Brook)	A	A	TP Protection Plan	TSS Protection Plan	C1	biological
02030105060070	08	Raritan R NB (incl Mine Bk to Peapack Bk)	A	A	TP Protection Plan	TSS Protection Plan	C1	biological, arsenic
02030105060080	08	Middle Brook (NB Raritan River)	I	I				biological, *E.coli*
02030105060090	08	Raritan R NB (Lamington R to Mine Bk)	A	A	TP Protection Plan	TSS Protection Plan		DO *E.coli*
02030105070010	08	Raritan R NB (Rt 28 to Lamington R)	A	I	TP Protection Plan			biological, *E.coli*, arsenic
02030105070020	08	Chambers Brook	I	I				biological, *E.coli*
02030105070030	08	Raritan R NB (below Rt 28)	A	A	TP Protection Plan	TSS Protection Plan		pH, *E.coli*, arsenic
02030105080010	09	Peters Brook	I	A		TSS Protection Plan		biological, *E.coli*
02030105080020	09	Raritan R Lwr (Rt 206 to NB / SB)	Non	I	TMDL			temperature, pH, TP, turbidity, *E.coli*, mercury (fish)
02030105080030	09	Raritan R Lwr (Millstone to Rt 206)	Non	Non	TMDL	TMDL		biological, temperature, pH, TP, TSS, turbidity, *E.coli*, mercury (fish)
c - Stony Brook Watershed TMDL								
02030105090010	10	Stony Bk (above 74d 49m 15s)	I	I			C1	*E.coli*
02030105090020	10	Stony Bk (74d 48m 10s to 74d 49m 15s)	A	A	TP Protection Plan	TSS Protection Plan		biological, DO, *E.coli*, arsenic
02030105090030	10	Stony Bk (Baldwins Ck to 74d 48m 10s)	I	I				*E.coli*

HUC14[2]	WMA	Assessment Unit Name	2014 Assessment[3]		Plan Type - TP	Plan Type - TSS	C1?[4]	2014 Integrated Report Impairments
			TP	TSS				
02030105090040	10	Stony Bk (74d46m dam to/incl Baldwins Ck)	I	A		TSS Protection Plan	C1	*E.coli*
02030105090050	10	Stony Bk (Province Line Rd to 74d46m dam)	Non	A	TMDL	TSS Protection Plan	C1	TP, *E.coli*, arsenic, mercury (fish)
02030105090060	10	Stony Bk (Rt 206 to Province Line Rd)	Non	A	TMDL	TSS Protection Plan	C1	TP, *E.coli*, arsenic
02030105090070	10	Stony Bk (Harrison St to Rt 206)	Non	A	TMDL	TSS Protection Plan	C1	biological, TP, *E.coli*, arsenic
d - Carnegie Lake Direct Watershed TMDL								
02030105090090	10	Stony Bk- Princeton drainage	Non	A	TMDL	TSS Protection Plan		biological, TP, arsenic
02030105110010	10	Heathcote Brook	A	A	deferred area	*TSS Protection Plan (deferred TP)*		bio, *E.coli*
02030105110020	10	Millstone R (HeathcoteBk to Harrison St)	Non	I	TMDL			temperature, pH, TP, *E.coli*, mercury (fish)
02030105110030	10	Millstone R (Beden Bk to Heathcote Bk)	Non	I	deferred area			DO, temperature, pH, TP, *E.coli*, arsenic
02030105110110	10	Millstone R (BlackwellsMills to BedenBk)	Non	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, TP, arsenic, mercury (fish)
02030105110120	10	Sixmile Run (above Middlebush Rd)	Non	A	deferred area	*TSS Protection Plan (deferred TP)*	C1	biological, TP, *E.coli*
02030105110130	10	Sixmile Run (below Middlebush Rd)	Non	A	deferred area	*TSS Protection Plan (deferred TP)*	C1	TP
02030105110140	10	Millstone R (AmwellRd to BlackwellsMills)	Non	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, TP, arsenic, mercury (fish)
02030105110170	10	Millstone R (below Amwell Rd)	Non	I	deferred area			biological, pH, TP, *E.coli*, mercury (fish)
e - Upper Millstone River Watershed TMDL								
02030105090080	10	Duck Pond Run	I	I				biological, *E.coli*
02030105100010	10	Millstone R (above Rt 33)	Non	Non	TMDL	TMDL		biological, TP, TSS, *E.coli*, arsenic
02030105100020	10	Millstone R (Applegarth road to Rt 33)	Non	Non	TMDL	TMDL		biological, TP, TSS, *E.coli*, arsenic
02030105100030	10	Millstone R (RockyBk to Applegarth road)	Non	I	TMDL			biological, DO, TP, *E.coli*
02030105100040	10	Rocky Brook (above Monmouth Co line)	A	A	TP Protection Plan	TSS Protection Plan		arsenic

HUC14[2]	WMA	Assessment Unit Name	2014 Assessment[3]		Plan Type - TP	Plan Type - TSS	C1?[4]	2014 Integrated Report Impairments
			TP	TSS				
02030105100050	10	Rocky Brook (below Monmouth Co line)	Non	A	TMDL	TSS Protection Plan		DO, TP, As, mercury (fish), chlordane (fish), PCB (fish), DDT (fish)
02030105100060	10	Millstone R (Cranbury Bk to Rocky Bk)	Non	Non	TMDL			biological, DO, TP, TSS, arsenic
02030105100070	10	Cranbury Brook (above NJ Turnpike)	A	A	TP Protection Plan	TSS Protection Plan		*E.coli*
02030105100080	10	Cedar Brook (Cranbury Brook)	I	I				
02030105100090	10	Cranbury Brook (below NJ Turnpike)	Non	I	TMDL			TP, *E.coli*
02030105100100	10	Shallow Brook (Devils Brook)	I	I				biological
02030105100110	10	Devils Brook	Non	A	TMDL	TSS Protection Plan		biological, DO, TP, *E.coli*, arsenic
02030105100120	10	Bear Brook (above Trenton Road)	I	I				*E.coli*, arsenic
02030105100130	10	Bear Brook (below Trenton Road)	Non	A	TMDL	TSS Protection Plan		bio, DO, TP, *E.coli*, arsenic, mercury (fish)
02030105100140	10	Millstone R (Rt 1 to Cranbury Bk)	Non	A	TMDL	TSS Protection Plan		DO, TP, arsenic
f - Beden Brook Watershed TMDL								
02030105110040	10	Beden Brook (above Province Line Rd)	A	I	TP Protection Plan			*E.coli*, arsenic
02030105110050	10	Beden Brook (below Province Line Rd)	Non	A	TMDL	TSS Protection Plan		TP, *E.coli*, arsenic
02030105110060	10	Rock Brook (above Camp Meeting Ave)	A	A	TP Protection Plan	TSS Protection Plan		*E.coli*
02030105110070	10	Rock Brook (below Camp Meeting Ave)	A	A	TP Protection Plan	TSS Protection Plan		bio, arsenic
02030105110080	10	Pike Run (above Cruser Brook)	I	I				biological
02030105110090	10	Cruser Brook / Roaring Brook	I	I				biological, *E.coli*
02030105110100	10	Pike Run (below Cruser Brook)	Non	A	TMDL	TSS Protection Plan		biological, TP, *E.coli*
02030105110150	10	Royce Brook (above Branch Royce Brook)	I	I	deferred area			biological, *E.coli*
02030105110160	10	Royce Brook (below/incl Branch Royce Bk)	I	I	deferred area			biological, *E.coli*

g - Lower Millstone/Mainstem Raritan River Watershed TMDL.								
0203010512 0010	09	Green Bk (above/incl Blue Brook)	I	I	deferred area			temp, *E.coli*
0203010512 0020	09	Green Bk (N Plainfield gage to Blue Bk)	A	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, pH, TDS, *E.coli*, arsenic
0203010512 0030	09	Stony Brook (North Plainfield)	A	I	deferred area			biological, *E.coli*, arsenic
0203010512 0040	09	Green Bk (Bound Bk to N Plainfield gage)	A	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, pH, *E.coli*
0203010512 0050	09	Middle Brook EB	Non	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, DO, temperature, TP, TDS, arsenic
0203010512 0060	09	Middle Brook WB	A	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, *E.coli*
0203010512 0070	09	Cuckels Brook	I	I	deferred area			biological
0203010512 0080	09	South Fork of Bound Brook	Non	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, TP, *E.coli*, mercury (fish), PCB (fish)
0203010512 0090	09	Spring Lake Fork of Bound Brook	Non	A	deferred area	*TSS Protection Plan (deferred TP)*		TP, *E.coli*, PCB (fish)
0203010512 0100	09	Bound Brook (below fork at 74d 25m 15s)	Non	A	deferred area	*TSS Protection Plan (deferred TP)*		biological, TP, *E.coli*, mercury (fish), dioxin (fish), PCB (fish)
0203010512 0110	09	Ambrose Brook (above/incl Lake Nelson)	I	I	deferred area			
0203010512 0120	09	Ambrose Brook (below Lake Nelson)	I	I	deferred area			biological
0203010512 0130	09	Green Bk (below Bound Brook)	Non	Non	deferred area	TMDL		biological, DO, pH, TP, TSS, *E.coli*, PCB (fish)
0203010512 0140	09	Raritan R Lwr (I-287 Piscatway-Millstone)	Non	Non	deferred area	TMDL		bio, pH, TP, TSS, *E.coli*, arsenic, mercury (fish)
0203010512 0180	09	Middle Brook	A	A	deferred area	*TSS Protection Plan (deferred TP)*		bio, arsenic, mercury (fish)

Footnotes:

[1] HUCs covered by this protection plan are highlighted in grey. They are listed separately in **Table 1**.

[2] HUCs covered by this Watershed Protection Plan (WPP) are grouped with the following TMDL areas:
a - South Branch Raritan River watershed TMDL group; b - North Branch Raritan River watershed TMDL group; c - Stony Brook watershed TMDL group; d - Carnegie Lake direct watershed TMDL group; e - Upper Millstone River watershed TMDL group; f - Beden Brook watershed TMDL group; g - Lower Millstone/Mainstem Raritan River watershed TMDL group.

[3] 2014 Integrated Report assessment for TP and TSS: A=attainment; Non=Non-attainment; I=Insufficient Data.

[4] All or portions of streams within these 36 HUC 14s are designated Category 1 (C1) waters (an anti-degradation category described in Section 2 and shown in **Figure 7**).

Appendix B. Raritan River TMDL Waste Load Allocations and Load Allocations

Appendix B1. Distribution of TP WLAs and LAs among source categories for the North & South Branch Raritan River watershed

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%

* 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.
n/a - not applicable
Source: TMDL, 2014

Appendix B2. Distribution of TP WLAs and LAs among source categories for parts of the Carnegie Lake watershed

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%

n/a - not applicable

Source: TMDL, 2014

Appendix B3. Distribution of TP WLAs and LAs among source categories for Carnegie Lake and Beden Brook watersheds

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 above.

** Average of seasonal TMDL loading.

n/a - not applicable

Source: TMDL, 2014

Appendix B4. Distribution of TSS WLAs and LAs among source categories for the North & South Branch Raritan River watershed

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.

n/a - not applicable

Source: TMDL, 2014

Appendix B5. Distribution of TSS WLAs and LAs among source categories for parts of the Carnegie Lake watershed

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%

[#] 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.
n/a - not applicable

Source: TMDL, 2014

Appendix B6. Distribution of TSS WLAs and LAs among source categories for Carnegie Lake and Beden Brook watersheds

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 on previous table.

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.

n/a - not applicable

Source: TMDL, 2014

Appendix B7. Distribution of TSS WLAs and LAs among source categories for the Lower Millstone River and Total Raritan River watershed

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.

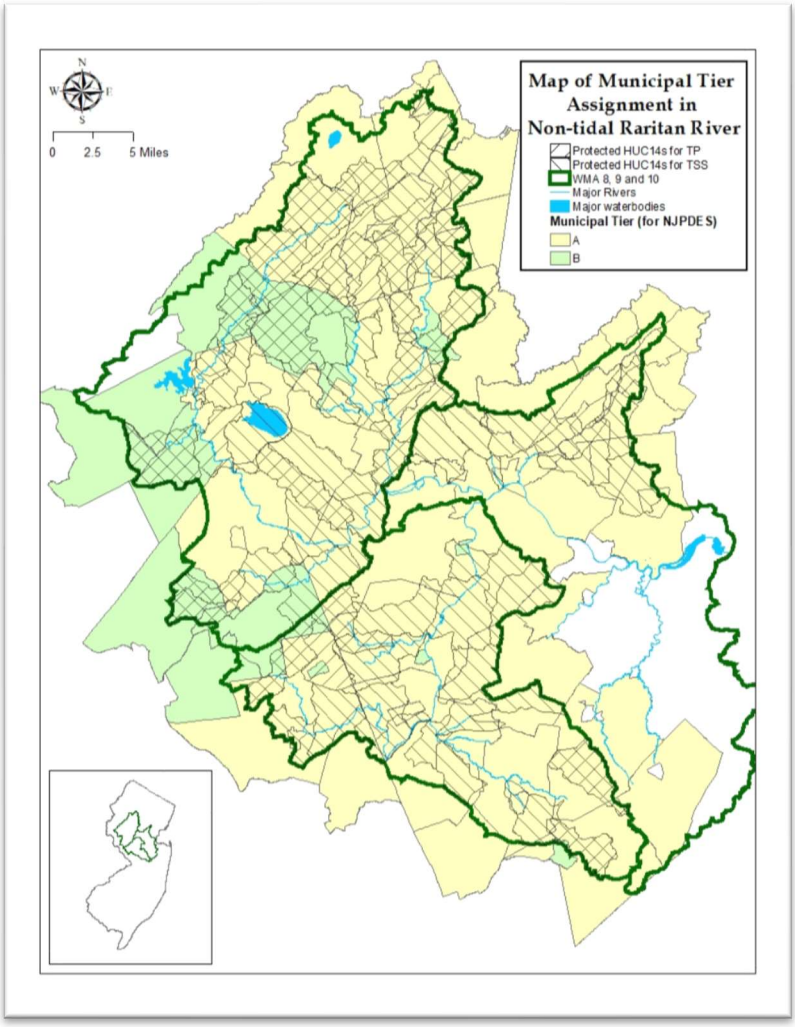
** Boundary inputs to Lower Millstone/Raritan River watershed include the Raritan River upstream of the Millstone River confluence and Carnegie Lake.

[#] The TSS TMDL allocation is reflective of discharging up to current permitted flow and existing NJDPES permit TSS limits.

n/a - not applicable

Source: TMDL, 2014

Appendix C. Municipalities Located in the Raritan River Basin, NJPDES Permit Number and their MS4 Tier Designation



Municipal Name	County	WMA(s)	Tier A or B	NJPDES Permit No.
Alexandria Township	Hunterdon	8	Tier B	NJG0149659
Califon Borough	Hunterdon	8	Tier B	NJG0149641
Clinton Town	Hunterdon	8	Tier A	NJG0148237
Clinton Township	Hunterdon	8	Tier A	NJG0151475
Delaware Township	Hunterdon	8	Tier B	NJG0150673
East Amwell Township	Hunterdon	8,10	Tier B	NJG0151581
Flemington Borough	Hunterdon	8	Tier A	NJG0150908
Franklin Township	Hunterdon	8	Tier B	NJG0149501
High Bridge Borough	Hunterdon	8	Tier A	NJG0153656
Lebanon Borough	Hunterdon	8	Tier A	NJG0151050
Lebanon Township	Hunterdon	8	Tier B	NJG0148041
Raritan Township	Hunterdon	8	Tier A	NJG0149241
Readington Township	Hunterdon	8	Tier A	NJG0149942
Tewksbury Township	Hunterdon	8	Tier B	NJG0154890

Municipal Name	County	WMA(s)	Tier A or B	NJPDES Permit No.
Union Township	Hunterdon	8	Tier B	NJG0152978
West Amwell Township	Hunterdon	8,10	Tier B	NJG0150703
East Windsor Township	Mercer	10	Tier A	NJG0150461
Hightstown Borough	Mercer	10	Tier A	NJG0152889
Hopewell Borough	Mercer	10	Tier B	NJG0152986
Hopewell Township	Mercer	10	Tier A	NJG0150622
Lawrence Township	Mercer	10	Tier A	NJG0149560
Pennington Borough	Mercer	10	Tier A	NJG0153141
Princeton	Mercer	10	Tier A	NJG0152064
Robbinsville Township	Mercer	10	Tier A	NJG0149004
West Windsor Township	Mercer	10	Tier A	NJG0149977
Cranbury Township	Middlesex	10	Tier A	NJG0148482
Dunellen Borough	Middlesex	9	Tier A	NJG0152480
Edison Township	Middlesex	9	Tier A	NJG0155063
Metuchen Borough	Middlesex	9	Tier A	NJG0153389
Middlesex Borough	Middlesex	9	Tier A	NJG0150444
Monroe Township	Middlesex	9,10	Tier A	NJG0148318
North Brunswick Township	Middlesex	10	Tier A	NJG0153117
Piscataway Township	Middlesex	9	Tier A	NJG0149934
Plainsboro Township	Middlesex	10	Tier A	NJG0152391
South Brunswick Township	Middlesex	9,10	Tier A	NJG0154636
South Plainfield Borough	Middlesex	9	Tier A	NJG0153966
Manalapan Township	Monmouth	9,10	Tier A	NJG0150886
Millstone Township	Monmouth	9,10	Tier A	NJG0153532
Roosevelt Borough	Monmouth	10	Tier B	NJG0149713
Chester Borough	Morris	8	Tier A	NJG0151467
Chester Township	Morris	8	Tier A	NJG0151238
Mendham Borough	Morris	8	Tier A	NJG0151483
Mendham Township	Morris	8	Tier A	NJG0150819
Mine Hill Township	Morris	8	Tier A	NJG0153133
Mount Arlington Borough	Morris	8	Tier A	NJG0153265
Mount Olive Township	Morris	8	Tier A	NJG0148326
Randolph Township	Morris	8	Tier A	NJG0152501
Roxbury Township	Morris	8	Tier A	NJG0152641
Washington Township	Morris	8	Tier A	NJG0152471
Bedminster Township	Somerset	8	Tier A	NJG0151459
Bernards Township	Somerset	8,9	Tier A	NJG0148661
Bernardsville Borough	Somerset	8	Tier A	NJG0151068
Bound Brook Borough	Somerset	9	Tier A	NJG0148725
Branchburg Township	Somerset	8	Tier A	NJG0148539
Bridgewater Township	Somerset	8,9	Tier A	NJG0147893
Far Hills Borough	Somerset	8	Tier B	NJG0151599
Franklin Township	Somerset	9,10	Tier A	NJG0147869
Green Brook Township	Somerset	9	Tier A	NJG0149276
Hillsborough Township	Somerset	8,9,10	Tier A	NJG0153231
Manville Borough	Somerset	9,10	Tier A	NJG0150347

Municipal Name	County	WMA(s)	Tier A or B	NJPDES Permit No.
Millstone Borough	Somerset	10	Tier B	NJG0154806
Montgomery Township	Somerset	10	Tier A	NJG0148261
North Plainfield Borough	Somerset	9	Tier A	NJG0149586
Peapack-Gladstone Borough	Somerset	8	Tier A	NJG0153711
Raritan Borough	Somerset	8,9	Tier A	NJG0153427
Rocky Hill Borough	Somerset	10	Tier B	NJG0149705
Somerville Borough	Somerset	9	Tier A	NJG0150941
South Bound Brook Borough	Somerset	9	Tier A	NJG0152404
Warren Township	Somerset	9	Tier A	NJG0154202
Watchung Borough	Somerset	9	Tier A	NJG0149993
Berkeley Heights Township	Union	9	Tier A	NJG0147923
Fanwood Borough	Union	9	Tier A	NJG0154415
Mountainside Borough	Union	9	Tier A	NJG0154946
New Providence Borough	Union	9	Tier A	NJG0153494
Plainfield City	Union	9	Tier A	NJG0151271
Scotch Plains Township	Union	9	Tier A	NJG0149985
Springfield Township	Union	9	Tier A	NJG0153885
Summit City	Union	9	Tier A	NJG0153613
Westfield Town	Union	9	Tier A	NJG0150100

Source: TMDL, 2014