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Metedeconk River
Watershed Protection Plan
Watershed Management Area 13

State of New Jersey
Department of Environmental Protection
Division of Water Monitoring and Standards
Bureau of Environmental Analysis, Restoration and Standards
PO Box 420, Mail Code: 401-04I
Trenton, New Jersey 08625-0420

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1.0 Identification of Waterbody, Pollutant of Concern and Pollutant Sources

1.1. Organization

New Jersey Department of Environmental Protection (Department/NJDEP), Division of Water Monitoring and Standards, Bureau of Environmental Analysis, Restoration and Standards

1.2. Point of Contact

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1.3. Project Title

Metedeconk River Watershed Protection Plan

1.4. Background

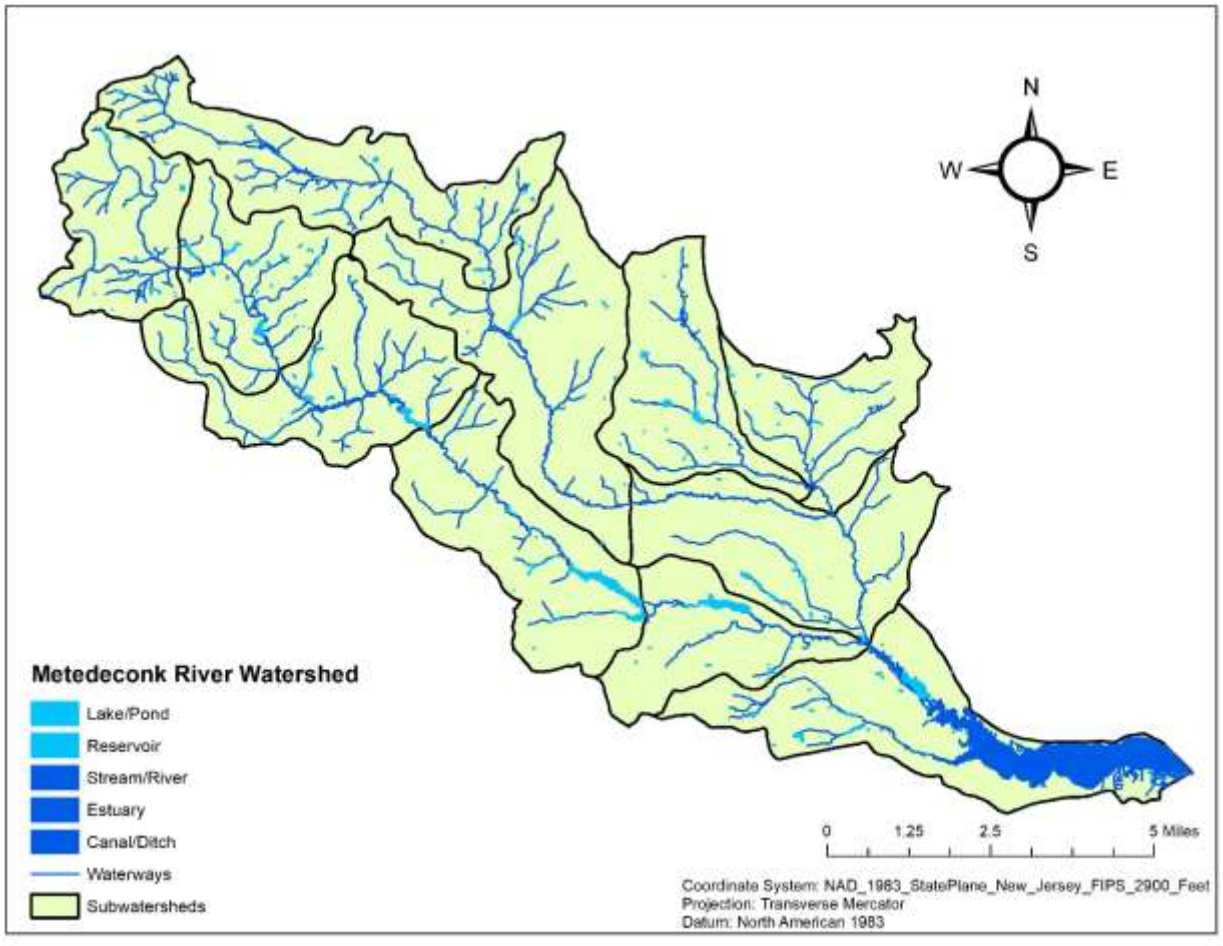
1.4.1. Metedeconk River Watershed

The Metedeconk River watershed spans approximately 90 mi^2 and consists of three major tributaries: the Metedeconk River North Branch, the Metedeconk River South Branch, and the Cedar Bridge Branch. The study area for *The Metedeconk River Watershed Protection Plan* (WPP) is comprised of 11 sub-basins (HUC 14s), located in the northern-most section of Watershed Management Area (WMA) 13. The WPP includes portions of Lakewood, Jackson, Freehold, Brick, and Howell Townships, with small portions of Millstone and Wall Townships. A map of the watershed can be found in **Figure 1**, and a map with alternate HUC 14 identifiers, which will be used to refer to each sub-basin henceforth, can be found in **Figure 2**.

The New Jersey Department of Environmental Protection (Department/NJDEP) is responsible for establishing comprehensive policies for the conservation of natural resources in the State, promoting environmental protection, preventing environmental pollution, and restoring areas where known contaminants are impairing designated uses. The **purpose** of this WPP is to protect and maintain the water

quality of the unimpaired subwatersheds (HUC 14s) in the Metedeconk River watershed. This WPP identifies a combination of regulatory and non-regulatory efforts to address the non-impaired waterbodies through specific Environmental Protection Agency (EPA) - approved Total Maximum Daily Loads (TMDLs), the continued implementation of the Brick Township Municipal Utilities Authority's (BTMUA) 9 element watershed-based plan, *Metedeconk River Watershed Restoration and Protection Plan* (WBP), stewardship programs and the enforcement of applicable state regulatory tools enacted to prevent water quality impacts. This WPP is built upon data, modeling results and research, generated by the Department in the 2016 *New Jersey Integrated Water Quality Assessment Report* (Integrated Report) TMDL reports and by BTMUA in their WBP. The WBP, serves as the basis for this *Metedeconk River Watershed Protection Plan,* the latter is a collaborative watershed-scale approach to bring together the many actions being implemented, concurrently to protect unimpaired waters while restoring impaired waters. The BTMUA's WBP may be viewed at http://www.brickmua.com/metedeconk/pdf/Metedeconk_River_Watershed_Plan_TEXT.pdf.

Figure 1. Metedeconk River Watershed Waterbodies



1.4.2. Watershed Protection Strategy Overview

Protecting the Metedeconk River watershed is a three-step strategy that begins with 1) New Jersey's laws, rules, standards and statewide programs, 2) source control programs, and 3) watershed specific projects and initiatives. This process is described in detail in **Section 4.** Implementation.

Water quality standards, monitoring and assessment 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. The Department's water quality program's activities are in accordance with federal and state statutes and regulations, which are regulatory (e.g., permits), non-regulatory (e.g., environmental education, local stewardship), and funding stakeholder activities. An early initiative undertaken by the state was the adoption of the New Jersey Water Pollution Control Act (NJWPCA; N.J.S.A. 58:10A-1 et. seq.), pursuant to the Federal Clean Water Act (CWA; 33 U.S.C. 1251 et. seq.). New Jersey's Surface Water Quality Standards (SWQS) are developed pursuant to the New Jersey Water Quality Planning Act (WQPA; N.J.S.A. 58:11A et. seq.), and the NJWPCA (N.J.S.A. 58:10A et. seq.), through New Jersey's Continuing Planning Process (CPP) (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 to meet SWQS. These SWQS establish criteria, as narrative descriptions and numerical thresholds, to limit the concentration of certain water quality parameters that are known pollutants, so that a healthy environment for human and aquatic organism use is maintained, protected, and restored where necessary. Furthermore, these standards are used as the regulatory basis for numerous NJDEP programs, including but not limited to the New Jersey Pollution Discharge Elimination System (NJPDES), Site Remediation, and Land Use Management Programs. These standards have been revised periodically to reflect the best available scientific information regarding human health and aquatic life as it relates to water quality.

To provide enhanced protection for waters of New Jersey from pollutants that were degrading water quality and impairing uses, the Department adopted antidegradation policies into the SWQS (N.J.A.C. 7:9) in the 1980's. Impairments to water uses are caused by a change in water quality from both anthropogenic and non-anthropogenic sources. The antidegradation policies ensure that water quality is protected to the minimum level required to attain the designated use of the waterbody without creating a negative social or economic impact on communities surrounding the waterbody. Surface waterbodies that are determined to be impaired are recorded in the Clean Water Act (CWA) 303(d) list of impaired waterbodies in the Integrated Report. The Section 303(d) of the CWA requires that restorative actions are implemented for the impaired waterbody through the creation of a TMDL. TMDLs set load reduction goals for pollutants of concern, from point (PS) and nonpoint sources (NPS), which will meet the threshold limits set forth in the water quality standards (EPA, 2018).

Under Section 303(d) of the Clean water Act, TMDLs had been the primary method for restoring the water quality in impaired waterbodies until 2013, when the United States Environmental Protection Agency (EPA) issued, *A Long-term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* (Vision Document), which provides flexibility to states to restore impaired waters using a variety of approaches beyond TMDLs, as well as recognizing the need to protect and maintain unimpaired waters. A state strategy for long-term watershed management through implementation of six priority goals was outlined: Public Engagement, Prioritization, Protection, Integration, Alternatives, and Assessment. New Jersey's Vision Document may be found in Appendix G of the 2016 Integrated Report: https://www.state.nj.us/dep/wms/bears/assessment.htm#/.

EPA identified restoration strategies, also known as WBPs, to aid states and stakeholders in local watersheds through the process of creating and implementing an alternate restoration plan. EPA published a guideline with nine (9) minimum requirements (*Handbook for Developing Watershed Plans to Restore and Protect our Waters*, 2006). The Metedeconk River WPP is based on the *Metedeconk River Watershed and Protection Plan* and is prepared to implement the Vision Document. Both the WBP and WPP are not legally mandated by the 303(d) Program but do provide for a collaborative watershed-scale approach to watershed protection and restoration. These plans do not preclude states from continuing to pursue water quality restoration through the creation of TMDLs.

NJDEP actively seeks public participation and stakeholder input with natural resource stewardship, including management practices within watersheds (discussed more in **Section 6**). There are numerous successes exemplifying where the outcomes of a project were only achievable through the collaborative effort between the Department, stakeholders, and the public. The early Whippany River Pilot Watershed process and resultant TMDL (1999), the *Barnegat Bay Ten-Point Action Plan* (NJDEP, 2010), and its companion the *Barnegat Bay Restoration, Enhancement, and Protection Strategy* (NJDEP, 2017), are just a few examples. The Department is committed to continued collaboration with the public and stakeholders on establishing a more comprehensive conservation strategy of the State's natural resources which incorporates State, municipal, and local goals. The importance of public partnership and engagement is emphasized as one of the primary goals in the New Jersey Vision document. (https://www.nj.gov/dep/wms/bears/docs/assessment-njvisionapproach2017.pdf).

Performance Partnership Agreement

The NJDEP's Performance Partnership Agreement (PPA) with EPA lays out jointly developed priorities and protection strategies of how EPA and New Jersey will work together to address priority needs for water pollution control. The PPA outlines performance measures for evaluating environmental progress. A complete list of performance measure descriptions may be found at the EPA website http://water.epa.gov/resource_performance/planning/FY-2015-NWPG-Measure-Definitions-Water-Quality.cfm. Thus, the *Metedeconk Watershed Protection Plan* fulfills part of the Department's WQ-27 commitment.

Measure Code: WQ-27

Extent of priority areas identified by each State that are addressed by EPA- approved TMDLs or alternative restoration approaches for impaired waters that will achieve water quality standards. These areas may also include protection approaches for unimpaired waters to maintain water quality standards.

1.5 HUCs Covered by 9 Element Watershed-Based Plan and Protection Plan

A total of 11 HUC 14s are covered by this WPP with 30 HUC 14/parameter combinations. Additionally, most of the area within the Metedeconk River watershed is contained within these 11 HUC 14s. While the HUC 14s "Beaverdam Creek" (02040301040010) and "Metedeconk R below Beaverdam Creek" (02040301040030) are part of the Metedeconk River watershed, they were not included in the spatial extent covered by the WBP because they are separated hydraulically and tidally influenced, thus they are not included in the WPP. All 11 HUC 14s are protected for total nitrogen (TN), 9 HUC 14s are protected for total phosphorus (TP), 9 HUC 14s are protected for total suspended solids (TSS), and 1 HUC 14s is protected for Fecal Coliform/E.Coli. Note that although the Department has replaced the freshwater pathogenic indicator with E. Coli, the fecal coliform TMDLs and the TMDL implementation plan remain in effect. All of the waterbodies in **Table 1** are designated Category One except for part of the Metedeconk R (Beaverdam Ck to confl.) watershed.

Table 1. 2016 Assessment Cycle of HUC 14s Watersheds Covered by the WPP

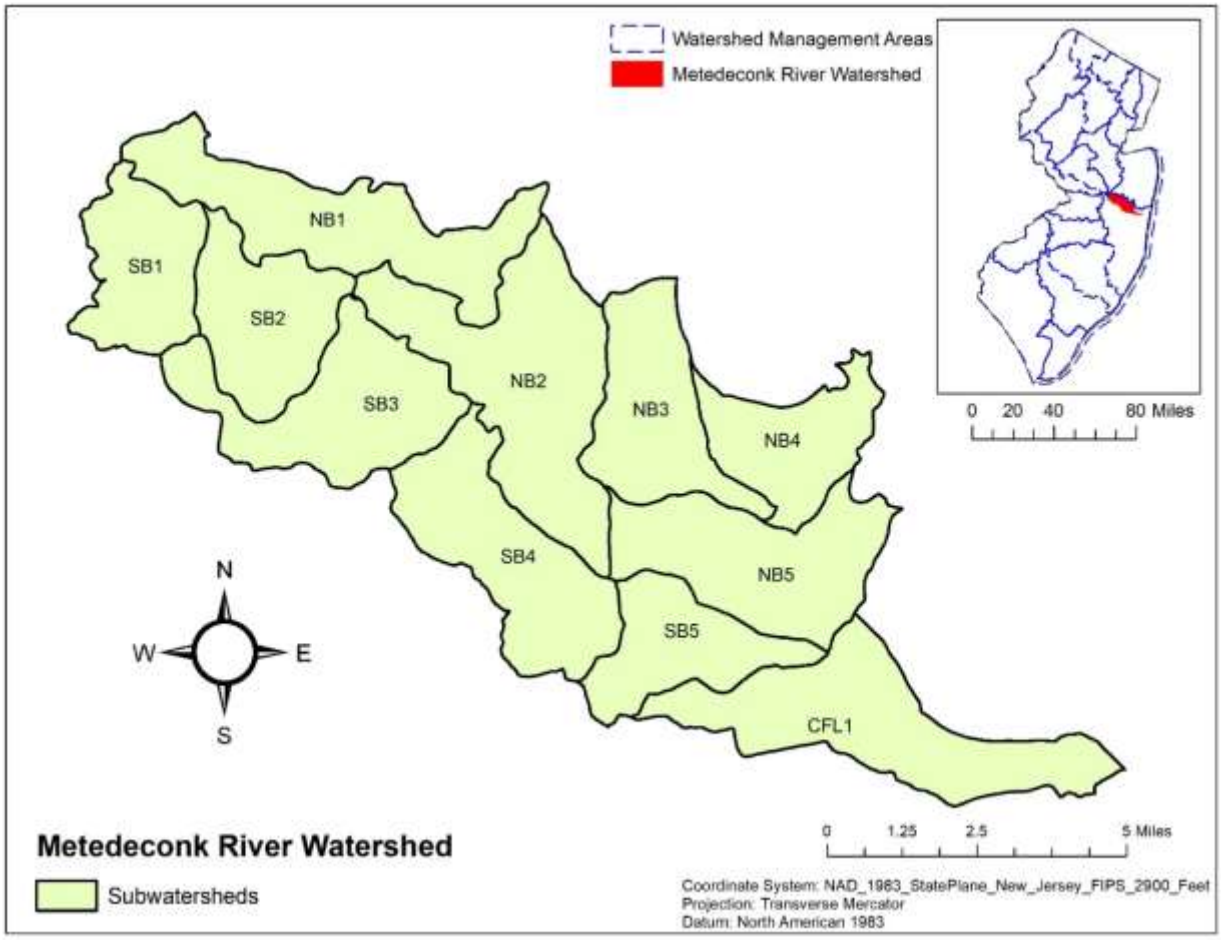
HUC 14	**HUC 14 Name**	Alternate ID [1]	Parameters Protected	TMDLs Completed
02040301020010	Metedeconk R NB (above I-195)	NB1	Nitrate, TSS	E.Coli, TP
02040301020020	Metedeconk R NB (Rt 9 toI-195)	NB2	TP, Nitrate, TSS, Turbidity	E.Coli
02040301020030	Haystack Brook	NB3	TP, Nitrate, TSS, Turbidity	E. Coli
02040301020040	Muddy Ford Brook	NB4	TP, Nitrate, TSS, Turbidity	E. Coli
02040301020050	Metedeconk R NB (confluence to Rt 9)	NB5	TP, Nitrate, TSS, Turbidity	E. Coli
02040301030010	Metedeconk R SB (above I-195 exit 21 Rd.)	SB1	TP, Nitrate	N/A
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	SB2	TP, Nitrate, Fecal Coliform/E.Coli	N/A
02040301030030	Metedeconk R SB (Bennetts Pd to 74d19m15s)	SB3	TP, Nitrate, TSS, Turbidity	N/A
02040301030040	Metedeconk R SB (Rt 9 to Bennetts Pond)	SB4	TP, Nitrate [2], TSS, Turbidity	E. Coli, Hg in fish tissue
02040301030050	Metedeconk R SB (confluence to Rt 9)	SB5	TP, Nitrate, TSS, Turbidity	E. Coli
02040301040020	Metedeconk R (Beaverdam Ck to confl)*		Nitrate, TSS, Turbidity	E. Coli

[1] Alternate Identifiers used in the WBP

[2] Attainment for nitrate and general un-ionized ammonia in 2016 IR, but insufficient data to classify un-ionized ammonia for trout

*Not all stream segments within this HUC 14 are designated C1

Figure 2. Metedeconk River HUC 14s with Alternate Identifiers



1.5.1 Discussion of Watersheds Protected

This Metedeconk River WPP reflects a watershed approach that is based on the implementation of the 2013 WBP and approved TMDLs which provide a benefit to unimpaired HUC 14s within the watershed. HUC 14s covered by this protection plan include those within the Metedeconk River watershed that attain or are below the SWQS for total phosphorus (TP), total nitrogen (TN), total suspended solids (TSS), and/or fecal coliform/E. Coli, in the 2016 Integrated Report (**Table 1)**. Refer to **Appendix B** to see a comparison of parameter attainment status between the 2016, 2014 and the 2012 Integrated Reports.

Figure 3. HUC 14s Protected from Total Nitrogen (Nitrate) in the Metedeconk River Watershed

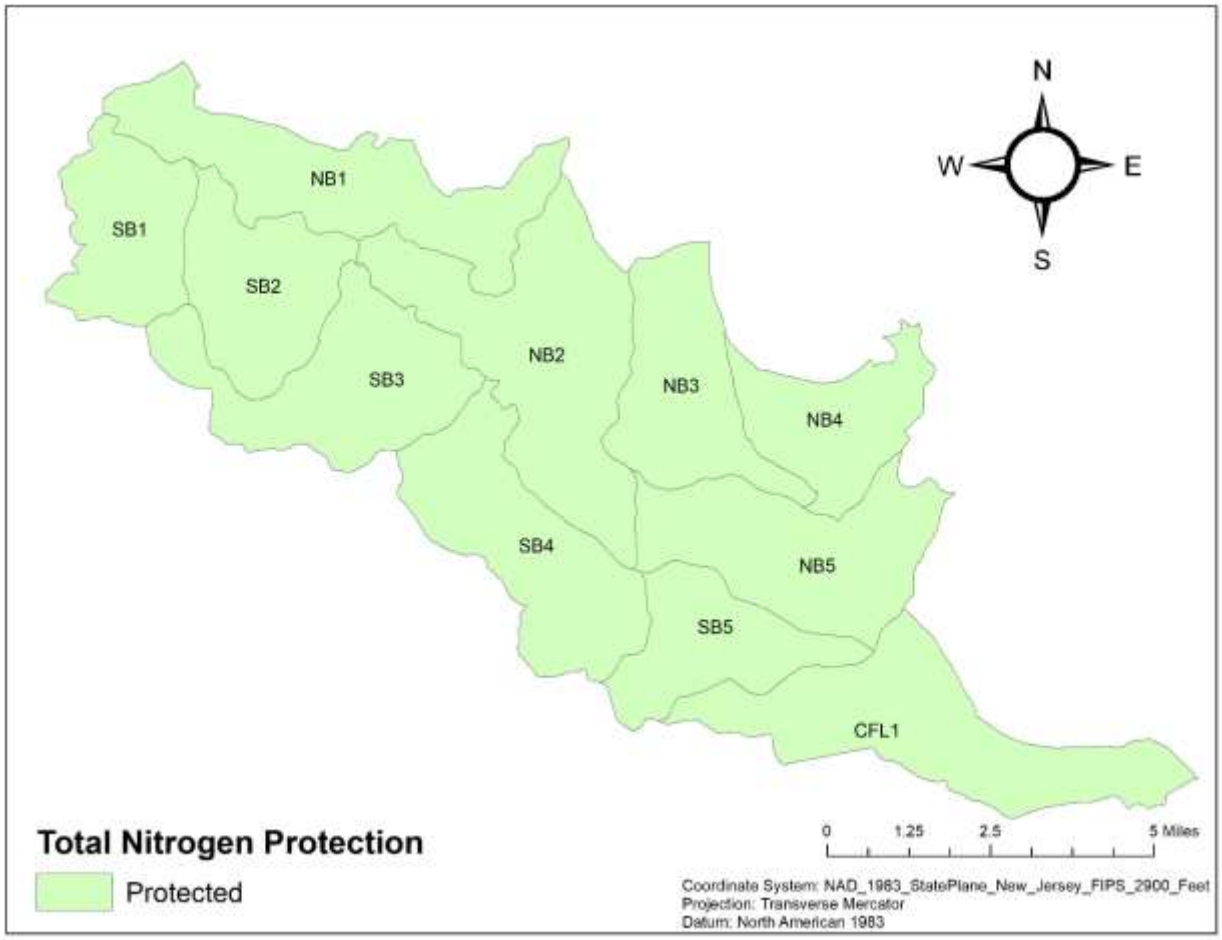
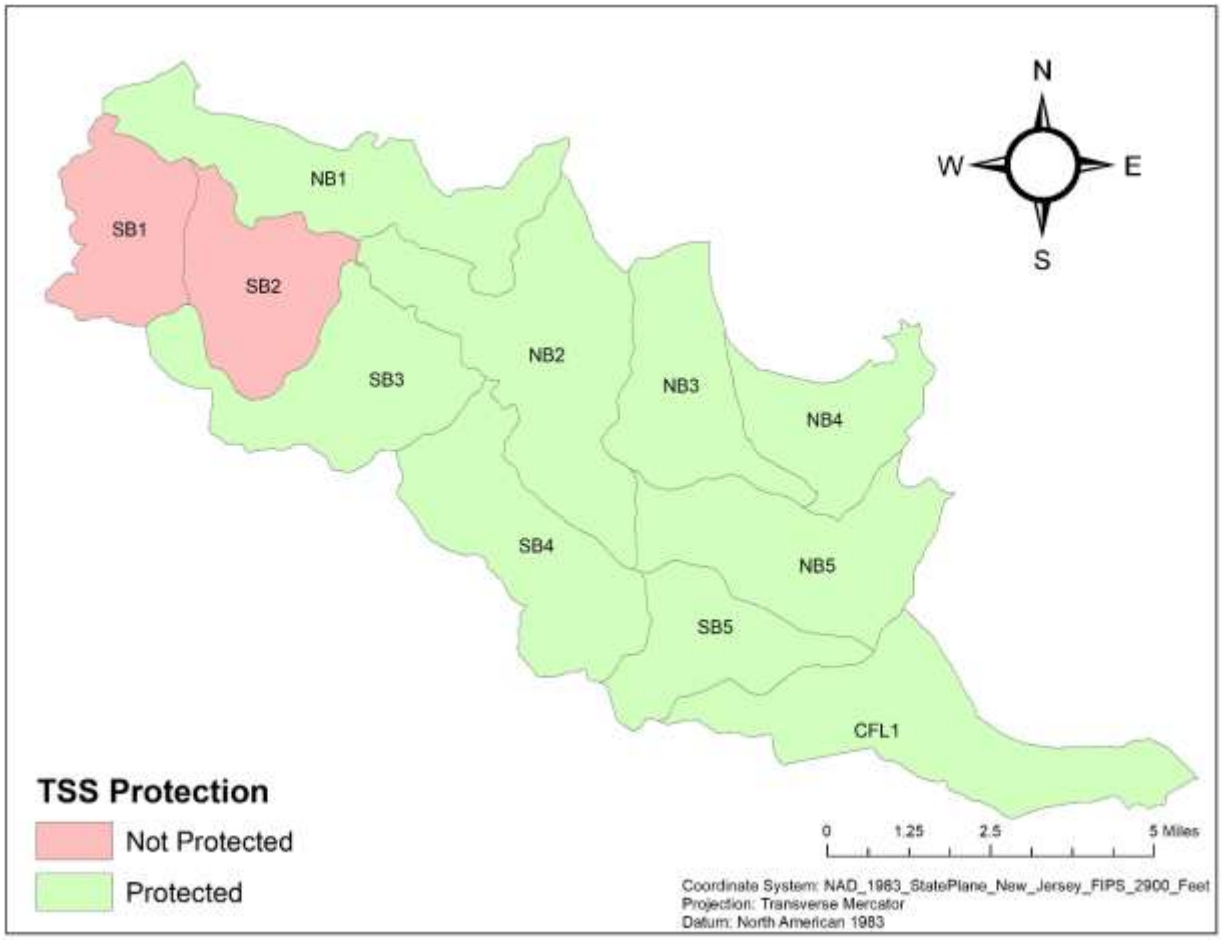


Figure 4. HUC 14s Protected from Total Suspended Solids in the Metedeconk River Watershed



1.6 Identification of Impaired Waters

1.6.1 Impaired Waters as Identified on 2016 303(d) List

Although this is a protection plan, the 11 HUC 14s addressed in this plan are currently listed on the 2016 New Jersey 303(d) list of water quality limited waters for one or more of the following parameters: biological (7), *E. coli* (10), arsenic (10), vinylchloride (1), benzene (1), TCE (1), lead (3), DO (3), total phosphorus (2), turbidity (3), temperature (2), TDS (1), and TP (2). Additionally, 3 of these HUC 14s are on the 303(d) list for exceeding human health standards for toxics in fish tissue (3 mercury, 2 chlordane, 2 PCB, and/or 1 DDX). Refer to **Appendix C** for a detailed list. They will be addressed by TMDLs and/or other alternative approaches in accordance with EPA guidance.

1.6.1.1 Point Sources

It is noted, point sources of pollutants are not a major concern in the Metedeconk River watershed. There is only one active New Jersey Pollution Discharge Elimination System (NJPDES) regulated point source discharge, which discharges non-contact cooling water and does not contain pollutants. All regulated major sanitary wastewater treatment plants within the watershed discharge treated effluent to the Atlantic Ocean and does not affect the watershed.

1.6.1.2 Nonpoint Sources

Nonpoint Sources (NPS) are a major component of pollutant loading that enters waterbodies within the watershed. NPS pollution includes stormwater discharges not subject to regulation under the National Pollution Discharge Elimination System, such as smaller Tier B municipalities (see **Appendix G** for municipal tiers), and direct stormwater runoff from all land surfaces, as well as malfunctioning sewage conveyance systems, failing or inappropriately located septic systems, and direct contributions from wildlife, livestock and pets.

1.6.2 Land Use

The most recent published data available for land use in New Jersey is from 2012 and shows that the Metedeconk River watershed is composed of approximately 46% urban, 24% wetlands, 23% forests, 4% water, 3% agriculture, and 1% barren land, as seen in **Table 2** and **Figure 7**. The 9 element watershed-based plan, *Metedeconk River Watershed and Protection Plan* goes into further detail discussing changes in in land use from 2007 to 2012. The smallest change occurred in water, forests, and wetlands, all experiencing a change of less than +/- 1%. The greatest percent change in land use was in barren land, decreasing by approximately 25%. Agriculture and urban lands experienced moderate changes of -5% and +4% respectively.

Figure 5. Metedeconk River Watershed Land Use (2012)

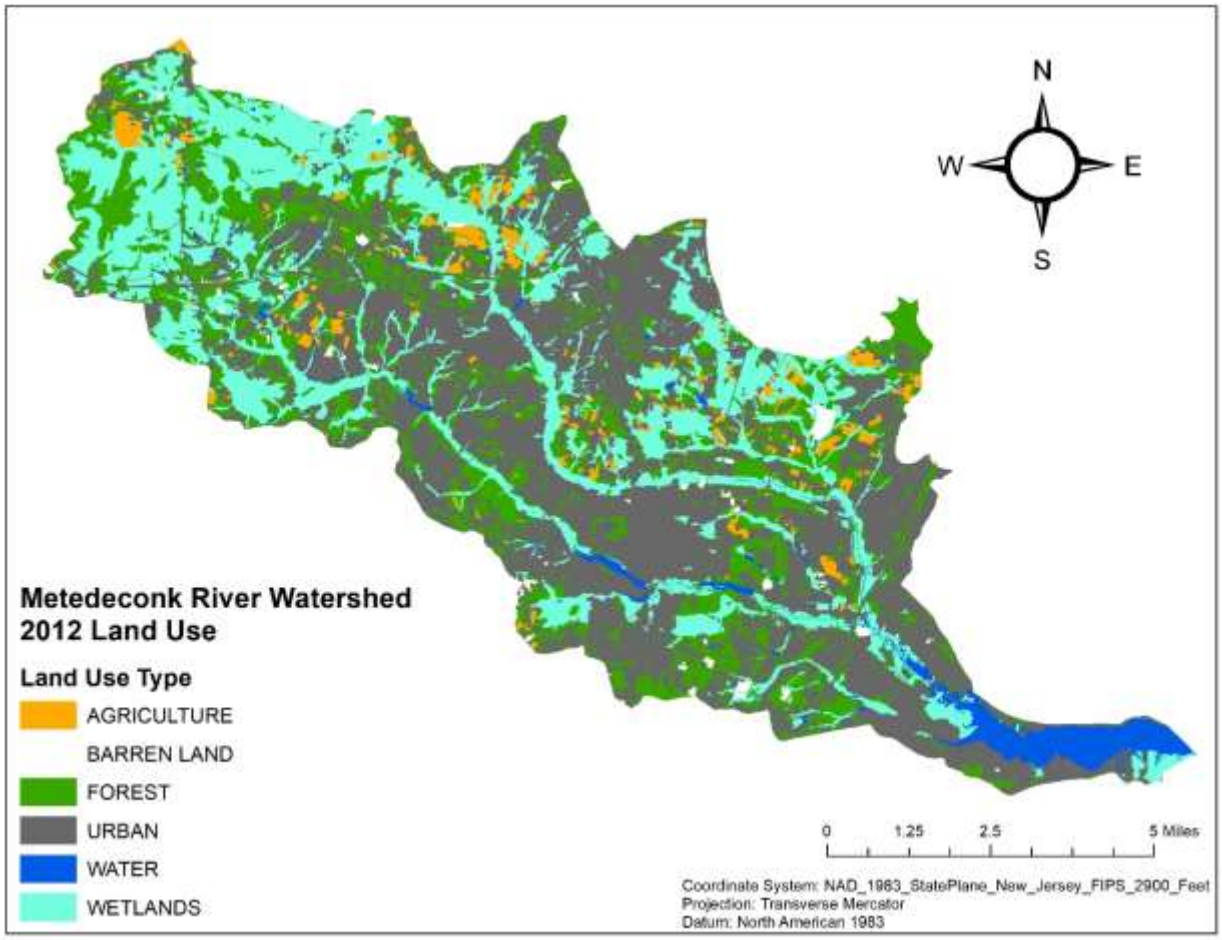


Table 1. Land Use in the Metedeconk River Watershed

Land Use Classification	Acres 2012	Percent 2012
Agriculture	1657.1	3.0
Barren Land	544.7	1.0
Forest	12791.4	22.9
Urban	25415.0	45.5
Water	2216.3	3.7
Wetlands	13225.3	23.7
TOTAL	55849.9	100.0

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

New Jersey Surface Water Quality Standards

The New Jersey Surface Water Quality Standards (SWQS) are established at levels that are intended to support the designated uses assigned to a waterbody. The SWQS provide the metrics for evaluating water quality data to determine where waters are: 1. high quality (better than standards), 2. attaining, or 3. impaired (not attaining standards). They also include policies to ensure that high quality waters are protected. It is critical that SWQS reflect the best science so that they serve their intended purpose.

The waterways within the Metedeconk River watershed are mainly freshwater, and therefore assigned the surface water classification of Freshwater 2 (FW2). The estuarine portion of the Metedeconk River is located between Forge Pond and Barnegat Bay, and is classified as FW2/Saline Estuarine 1 (SE1) due to tidal forces affecting the boundary position between fresh and saline waters (3.5 parts per trillion), seen in **Figure 6**. The designated uses protected by these water classifications as listed in the SWQS N.J.A.C. 7:9B-1.12(c) include:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary Contact Recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment;
5. Shellfish Harvesting in permitted areas; and
6. Any other reasonable uses.

While portions of the Metedeconk River can support trout maintenance (TM), most of the river is designated as Non-Trout (NT). This compatibility is determined by the incidence of occurrence of trout related species within the river. The Metedeconk River watershed also includes both Category 1 (C1) and Category 2 (C2) designated waters, a designation relevant to antidegradation status. The freshwater portion of the Metedeconk River and its tributaries are protected under C1 antidegradation designation based on its exceptional water supply significance. It provides a source of potable water after conventional treatment for more than 100,000 residents living within the watershed. The C1 designation protects waters from any measurable change in the water quality. In C2 waters, existing water quality is to be maintained where it is better than the standards; however, lowering of water quality can be allowed to accommodate necessary social and economic development, provided standards are attained. The only portion of the Metedeconk River which is designated as C2 is the portion residing within the estuarine system. A list of SWQS for protected parameters can be found in **Table 3**.

The C1 antidegradation designation is a key tool employed by NJDEP to provide additional protection to waterbodies that help prevent water quality degradation and discourage development where it would impair or destroy natural resources and water quality. C1 waters are protected from any measurable change in existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources.

Implementation of Category One Waters

• New Jersey Pollutant Discharge Elimination System (NJPDES) Rules at N.J.A.C. 7:14A: new or expanded wastewater discharges must maintain the existing water quality of the receiving stream. If the discharge is located above a C1 segment the applicant must meet "no measurable change" at the C1 boundary. See www.nj.gov/dep/dwq/.

• Flood Hazard Area Control Act Rules at N.J.A.C. 7:13: 300-foot riparian zones are imposed through Flood Hazard Area Control Act rule permits to all C1 waters and their upstream tributaries within the same sub-watershed or HUC 14. See www.nj.gov/dep/landuse/.

Figure 6. Metedeconk River Watershed Stream Segment Classifications

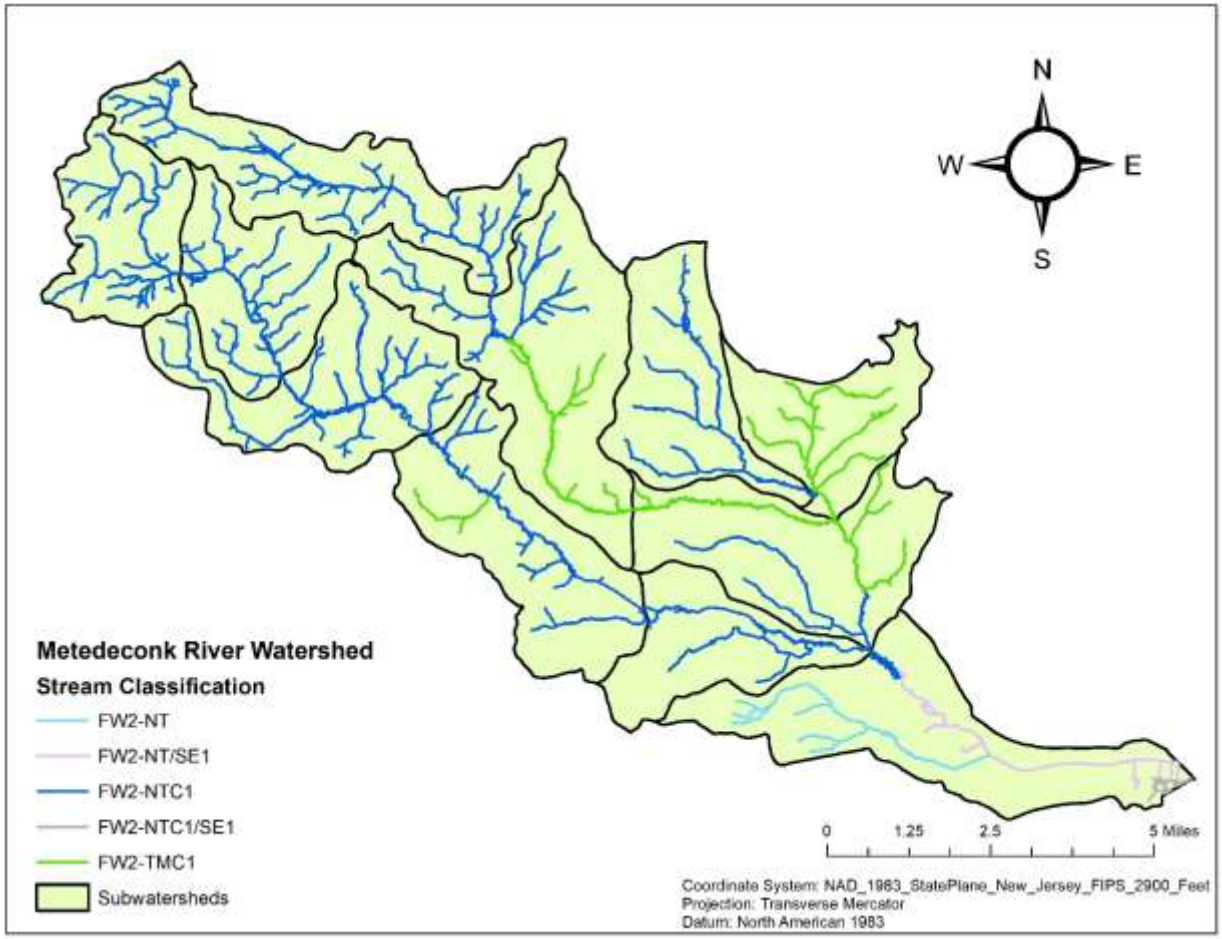


Table 2. Applicable Surface Water Quality Standards for Eligible Parameters in the WPP

Nutrients (narrative criteria) for all waters:	
N.J.A.C. 7:9B-1.5(d)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 mg/l 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 mg/l 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
Bacterial quality (Counts/100):	
i. Shellfish Harvesting: Bacterial Indicators shall not exceed, in all shellfish waters, the standard for approved shellfish waters as established by the National Shellfish Sanitation Program as set forth in its current manual of operations.	Shellfish Waters
ii. Primary Contact Recreation:	
(1) Enterococci levels shall not exceed a geometric mean of 35/100 ml, or a single sample maximum of 104/100 ml	SE1
(2) E. Coli levels shall not exceed a geometric mean of 126/100 ml or a single sample maximum of 235/100 ml.	All FW2

3.0 WBP and TMDL Allocations' Relationship to Protected HUCs

Metedeconk River Watershed Protection and Restoration Plan

In 2010, the Department awarded Brick Township MUA (BTMUA) a Section 319(h) nonpoint source pass through grant (No. RP09-058) for the development of a Watershed-Based Plan for the Metedeconk River watershed. As part of this grant, a comprehensive basin-wide evaluation was performed by BTMUA with CDM Smith and John S. Truman Consulting Engineers. This evaluation identified in-stream critical locations and determined the pollutant load reductions needed to attain the criteria specified in the SWQS, for which the Metedeconk River watershed was placed on the 2010 303(d) list of impaired waterbodies (NJDEP, 2012). The parameters included Arsenic, Dissolved Oxygen (DO), pH, Temperature, Mercury, Pesticides, PCBs, Total Phosphorus (TP), and Total Suspended Solids (TSS). Stormwater runoff was attributed as the primary source of impairment for these SWQS parameters, apart from mercury, which was determined to be the result of atmospheric deposition from sources outside the watershed. The estimated pollutant load reductions were calculated for the three major watershed pollutants: TP, TN, and TSS see **Table 5** and **Appendix D**.

In addition to this evaluation, BTMUA also established an advisory and steering committee consisting of a broad group of stakeholders, including academia, private sectors, government, and the public, to help determine the watersheds management goals and objectives that would be included in the WBP. Upon recommendation from this committee, five (5) goals with 26 objectives were established for the WBP, found in **Appendix A**. These goals included providing a sustainable water supply while maintaining natural water regimes, maintaining C1 designation and eliminating water quality impairments, supporting the health of Barnegat Bay, improving lake water quality within the watershed, and promoting education and outreach about watershed impacts due to growth.

The "*Metedeconk River Watershed Protection and Restoration Plan*", (https://www.state.nj.us/dep/wms/bears/docs/MetedeconkWBPlan.pdf) was published in May of 2013 after three years of collaboration between BTMUA, the stakeholder committee, and the Department. The measures and actions within the WBP were established to directly address the goals and objectives of the committee, which primarily focused around restorative efforts for impaired and threatened waterbodies in the watersheds that were on the 2010 303(d) list. The WBP addressed EPA's nine (9) minimum elements required for a Watershed Based Restoration and Protection Plan. Subsequently it was approved by the Department as an alternative restoration plan. In support of New Jersey's Long-Term Vision approach and WQ Measure 27 commitment, the WPP was created from this stakeholder initiative.

The WBP and TMDLs established load allocations (LAs) for NPS for nitrogen, phosphorus, and TSS because these water quality parameters are related to stormwater runoff issues and the primary source of impairments listed in the watershed. Additionally, these parameters are known to correlate with other water quality parameters, including DO, turbidity, and toxic substances. The results from the 2016 IR also indicate that the water quality within the watershed is improving, as five (5) of these HUC 14/parameter combinations were delisted from the 2012 IR, found in **Appendix B**. Furthermore, one of the 10 HUC 14s for which the fecal coliform TMDL was created, is now attaining E. coli bacterial quality criteria in the SWQS. As such, these eight (8) HUC 14/parameter combinations (5 HUC 14/ parameter combinations that were delisted in 2012 for nitrogen, phosphorus, and TSS and 1 HUC 14/parameter combinations that are now attaining E. coli bacterial quality criteria). **Table 4** below shows HUC 14s that have improved over the

past two reporting cycles and are of high priority for implementing protection measures since they were recently delisted. When additional water quality parameters attain the applicable SWQS within the Metedeconk River watershed and for which LAs can be ascertained, this plan may be amended to include them as priority for protective measures and subsequently added to the list of HUC 14/parameters being protected.

Table 4. HUC 14s In Metedeconk River Watershed that have Improved by Parameter

HUC 14 Assessment Unit ID	HUC 14 Assessment Unit Name	Parameters	2012 IR Status	2014 IR Status	2016 IR Status
02040301020040	Muddy Ford Brook	PHOSPHORUS, TOTAL	NOT ATTAINED	ATTAINED	ATTAINED
02040301020040	Muddy Ford Brook	TOTAL SUSPENDED SOLIDS (TSS)	NOT ATTAINED	ATTAINED	ATTAINED
02040301030010	Metedeconk R SB (above I-195 exit 21 rd.)	NITRATE	NOT ATTAINED	ATTAINED	ATTAINED
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	NITRATE	NOT ATTAINED	ATTAINED	ATTAINED
02040301040020	Metedeconk R (Beaverdam Ck to confl)	TOTAL SUSPENDED SOLIDS (TSS)	NOT ATTAINED	ATTAINED	ATTAINED

LAs can be achieved through a combination of regulatory actions and non-regulatory BMPs that aim to decrease the loads from each source to levels which would meet SWQS. The quantity that a pollutant load is reduced when regulatory and non-regulatory measures are implemented is known as the expected load reduction. There are many ways to calculate expected load reductions depending on complexity of the waterbody/watershed, level of precision necessary, and resources available. For the Metedeconk River watershed, with no point sources of pollution from wastewater treatment plants (municipal or industrial) and with land use that is split almost evenly between forests/wetlands and urban, a more simplified algorithm was determined to be acceptable when developing a WBP for low priority impairments. This process of setting pollutant load reductions is not limited to impaired waters but can also be used for healthy waterbodies whereby LAs can be determined for parameters of concern, or those known to have a high correlation to other water quality impairments. Expected load reductions can then be calculated for BMPs so that the water quality is maintained and protected from future degradation.

The LAs that were previously developed for TSS, TP, and TN in the Metedeconk River watershed utilized the Unit Area Load (UAL) assessment method. The UAL method is predicated on the land use type in the watershed surrounding the waterbody. The land use data used to develop these LAs were based on the 2007 NJDEP land use/land cover (LULC) database and are presented in the tables below. Since then, the 2012 LULC database has been made publicly available by NJDEP. However not much in the way of land use has changed in the past five years, as discussed in Section 2. Therefore, the target environmental goals from the UAL are still valid and will be incorporated as the environmental goals within this protection plan to ensure that the water quality remains unimpaired within the HUC 14/parameter combinations found to be attaining for TP, TSS, and TN identified in **Tables 1** and **4**.

The UAL is one such method for determining the pollutant loading from nitrogen, phosphorous, and TSS, and is predicated on the land use type in the spatially defined area surrounding a waterbody. The expected load reduction can be determined from the UAL by multiplying a BMPs reduction efficiency with the sum

of the pollutant loading attributed to the land uses within a watershed. Listed below is a brief procedural walkthrough for this method:

1) Determine the area of each land use type in the drainage area;
2) Multiply the area of each land cover type by the estimated loading rate from the NJ BMP Manual Table 3-1 Pollutant Loads by Land Cover;
3) Sum the loadings for the drainage area;
4) Multiply the influent loading by the reduction efficiency percentage (i.e. 0.75 for 75% reduction) for the applicable BMP and pollutant to obtain the estimated load reduction

$$\text{Expected Load Reduction} = BMP_{reduction} * (\sum SA * r_{Landuse})$$

BTMUA applied the UAL method when developing the LAs for TSS, TP, and nitrate within the 2013 WBP. BTMUA used the values set forth in NJDEP's BMP manual to determine the expected load reduction for nitrate and TSS. The expected load reduction for TP was based on the 2005 TMDL that was developed for NB1, the only sub-basin which includes phosphorus as an impairment on the 303(d) list within the Metedeconk River watershed. These expected load reductions that are presented in the tables below contain the expected load reductions for TSS, TP, and nitrate within the 11 HUC14's of the Metedeconk River watershed as determined by BTMUA (BTMUA et al., 2013).

Table 5. Load Reductions for Nitrogen, Phosphorus, and TSS by HUC 14. From Table 4-2 in the Metedeconk River Watershed Protection and Restoration Plan (BTMUA et al., 2013)

	Alternate ID	Load Reduction (lb/yr)		
HUC 14		**Nitrogen**	**Phosphorus**	**TSS**
02040301020010	**NB1**	5,358	1,067	158,844
02040301020020	**NB2**	25,199	4,339	446,157
02040301020030	**NB3**	12,093	2,083	217,045
02040301020040	**NB4**	5,858	1,091	144,841
02040301020050	**NB5**	21,258	3,567	341,680
02040301030010	**SB1**	1,979	398	62,894
02040301030020	**SB2**	4,730	861	103,529
02040301030030	**SB3**	11,072	1,981	222,902
02040301030040	**SB4**	17,953	3,040	299,261
02040301030050	**SB5**	12,220	2,025	187,754
02040301040020	**CNFL1**	21,116	3,496	318,951
Total		138,836	23,948	2,503,858

The highest estimated load reductions are within NB2. These estimates of load reductions are meant to serve as the target for this Plan.

A more in-depth review of pollutant sources and loading estimates can be found in Section 3.4 of the WBP. **Appendix D** shows a summary of anticipated load reductions for nitrogen, phosphorus, and TSS for each HUC 14, with a more in-depth review being found in Section 4.2 of the WBP.

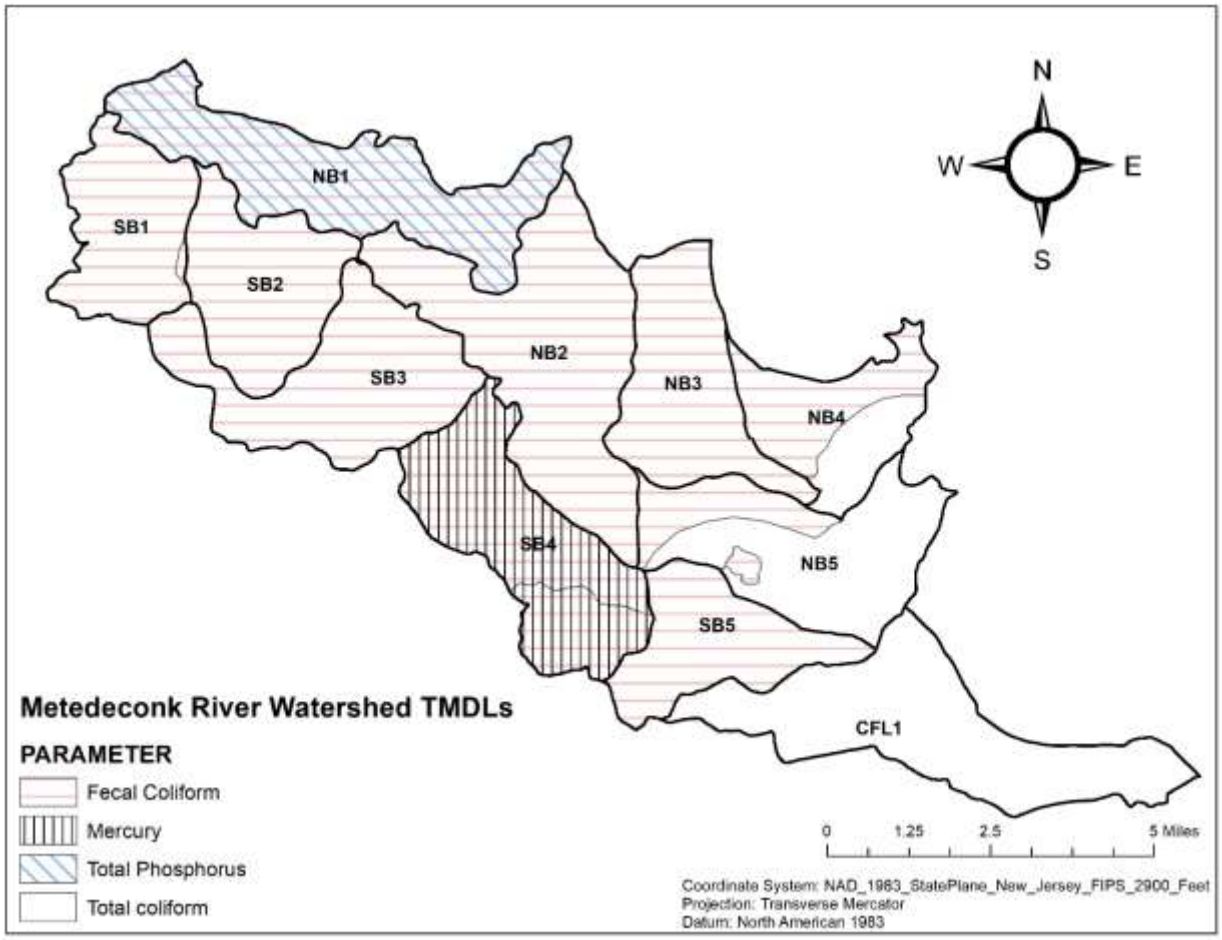
3.1 Metedeconk River Watershed TMDLs

In accordance with the CWA (33 U.S.C. 1315(B)), the State of New Jersey is required biennially to prepare and submit to the Environmental Protection Agency (EPA) a report that identifies waters that do not meet or are not expected to meet SWQS after implementation of technology-based effluent limitations or other required controls (303(d) list) and a report addressing the overall water quality of the State's waters (305(b) report). The *New Jersey Integrated Water Quality Assessment Report* (Integrated Report) combines these two reports and includes a priority ranking to establish TMDLs for impaired waterbodies.

A TMDL is a technical report that is developed to address the water quality goals of the state by determining the reduction necessary for a water quality parameter that would enable a waterbody, lake or stream, to attain the applicable SWQS, thereby ensuring adequate protection for their designated uses (EPA, 2018). Once a TMDL report has been developed, and approved by EPA, it can be adopted by the state as a formal report, pursuant to Water Quality Management Planning (WQMP) rules (N.J.A.C. 7:15 – 5.3 et. seq.), and Section 303(d) of the CWA (33 U.S.C. 1251 et seq). After which, a TMDL implementation plan can then be established for those surface waters, which specifies the necessary measures that would result in the attainment of SWQS.

Five TMDL reports have been adopted within the Metedeconk River watershed that focus on higher priority pollutants identified in previous IRs. These higher priority pollutants include pathogens as measured by fecal coliform and total coliform, nutrients as measured by phosphorus, and mercury. While other water quality impairments exist within the watershed, they have a low priority for TMDL development and may be addressed through an alternate restoration plan. A complete listing of HUC 14s and the status of their surface water quality parameters obtained from the 2016 Integrated Report can be found in **Appendix C**. A map of coverage for each TMDL by parameter can be found in **Figure 7**. The complete TMDL reports can be accessed through New Jersey's TMDL lookup tool at: http://www.nj.gov/dep/dwq/msrp-tmdl-rh.htm.

Figure 7. Metedeconk River Watershed Approved TMDLs



3.1.1 Fecal Coliform and Total Coliform

The 2002 Integrated Report identified several waterbodies in the Atlantic Coastal Water Region with pathogen impairments, as indicated by the presence of fecal coliform concentrations exceeding the SWQS criteria in place at that time of 200 Colony Forming Units (CFU)/100mL. A comprehensive Fecal Coliform TMDL was subsequently developed for these waterbodies and was adopted in 2003, titled *Total Maximum Daily Loads for Fecal Coliform to Address 31 Streams in the Atlantic Water Region*. A total of 31 waterbodies were covered as part of this TMDL report, which included almost the entire freshwater portion of the Metedeconk River, except for those residing in NB5 and CFL1. It was determined that stormwater runoff was the primary source of pathogen impairment, as observed by the major spikes in fecal coliform CFU concentrations occurring after precipitation events. To address the LA, a 90% load reduction was specified for fecal coliform along both branches of the Metedeconk River. In addition to fecal coliform impairments along the main reaches of the Metedeconk River, fecal coliform was also determined to be an impairment for Lake Carasaljo and Ocean County Park Lake in the 2004 Integrated Report. A TMDL was subsequently developed for both these lakes and adopted shortly thereafter in 2007, titled *Total Maximum Daily Loads for Pathogens to Address 18 Lakes in the Atlantic Coastal Water Region*. The TMDL specified an overall watershed load reduction of 99%, to a concentration of 15,300 million fecal

coliform colonies per year in Lake Carasaljo, and an overall watershed load reduction of 96%, to a concentration of 691 million fecal coliform colonies per year in Ocean County Park Lake. A TMDL was also adopted in 2006 to address the shellfish harvesting impairment occurring within the saline estuary waters of CFL1, titled *Fourteen Total Maximum Daily Loads for Total Coliform to Address Shellfish-Impaired Waters in Watershed Management Area 13 Atlantic Coastal Water Region*. This impairment is due to pathogen contamination associated with high total coliform concentrations, as based on the applicable National Shellfish Sanitation Program (NSSP). The TMDL determined that the primary source of total coliform contamination was stormwater runoff, and that an 87% load reduction was necessary to meet the applicable standards. While fecal and total coliform are being used as indicators for pathogens in these TMDLs, studies have shown that *E. coli* and *enterococci* are better indicators for the presence of pathogens. Subsequently, these studies were used as the scientific basis behind the switch from fecal coliform to *E. coli*, and total coliform to *enterococci* for the SWQS Bacterial Quality (N.J.A.C. 7:9b-1.14(d)1) for their respective water classifications. Despite this change in pathogen indicator organisms used, the LAs established through these TMDLs are still valid and necessary for attainment of the recreational water quality goals. Likewise, implementation of the Fecal Coliform TMDL protects those areas where *E. coli* concentrations attain standards in the Integrated Report.

3.1.2 Total Phosphorus

A TP TMDL was adopted in 2008 to address the water quality issues related to nutrients that were a direct result of excessive phosphorus loading, titled *Total Maximum Daily Loads for Phosphorus to Address 3 Stream Segments in the Atlantic Coastal Water Region*. Stormwater runoff was determined to be the primary source of impaired waterbodies within the water region. The overall load reduction goal for phosphorus within the water column was set at 49.8%, which was determined after performing a UAL assessment. Furthermore, the achievement of this phosphorus goal would require an 85% decrease in loads from urban and agricultural areas. NB1 is the only HUC 14 that is impaired for TP within the Metedeconk River watershed and is therefore the only HUC 14 included in the 2008 TP TMDL. NB1 was placed on the 303(d) list of impaired waterbodies for nutrient impairment in the 2004 Integrated Report and is still not attaining the TP SWQS as of the 2016 Integrated Report (NJDEP, 2019).

3.1.3 Mercury

A TMDL was adopted in 2010 to address statewide mercury impairments in surface waters that caused a bioaccumulation of mercury concentrations in fish tissue, titled *Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide*. Waterbodies in 122 HUC 14s that were encompassed by this TMDL had been placed on the 303(d) list of impaired waterbodies in the 2008 Integrated Report. This included the portion of the Metedeconk River flowing through SB4. The source of the mercury pollution was determined to be primarily from air deposition. However, New Jersey contributes only 12.5% to the state mercury deposition, with 52% from background deposition (natural and anthropogenic) and the remaining 35.5% comes from surrounding states, Mexico, and Canada. The Mercury TMDL set a target level of 0.18 µg/g in fish tissue, based on the New Jersey Fish Consumption Advisory Thresholds (1994), and could be accomplished through an 84.3% reduction in the overall mercury load. The required implementation of measures to achieve this reduction goal are outlined in the *New Jersey Mercury Reduction Action Plan* (NJDEP, 2009) details of which may be found at https://www.nj.gov/dep/dsr/mercury/. The achievement of mercury reduction goals within the state will also need to rely on nationwide and global reduction. As

stated in the Action Plan, the Department intends to support regional, national, and global efforts in mercury reduction like the Conference of the New England Governors' and Eastern Canadian Premiers, Northeast States for Consolidated Air Use Management (NESCAUM), Environmental Council of the States (ECOS), and EPA Mercury Action Plan. A Mercury Emission Trend Report published in 2017 summarized the measurable reductions in mercury emissions and the declined mean wet deposition mercury concentration observed under National Mercury Deposition Network (https://www.nj.gov/dep/dsr/trends/mercury.pdf). Periodically, as the Department prepares its 303(d) List of Impaired Waters it will be determined based on fish tissue data, if air deposition is the major source of mercury contamination and subject to the allocations specified in the 2010 Statewide Mercury TMDL.

3.1.4 Future TMDL Development

While all high priority impairments in the Metedeconk River watershed currently have approved TMDLs, some parameters causing use impairments are still not addressed by a TMDL. Sublist 5 of the 2016 Integrated Report lists these parameters with priority ranking for TMDL development. Low priority ranking parameters include arsenic, lead, chlordane in fish tissue, DDT and its metabolites in fish tissue, mercury in fish tissue, and PCB in fish tissue. Medium priority ranking parameters include phosphorus, turbidity and DO. These parameters and the effected HUC 14s can be found in **Appendix F**. **Table 5** specifies HUC 14s with at least one parameter recommended for future TMDL development and/or for alternate restoration plan development.

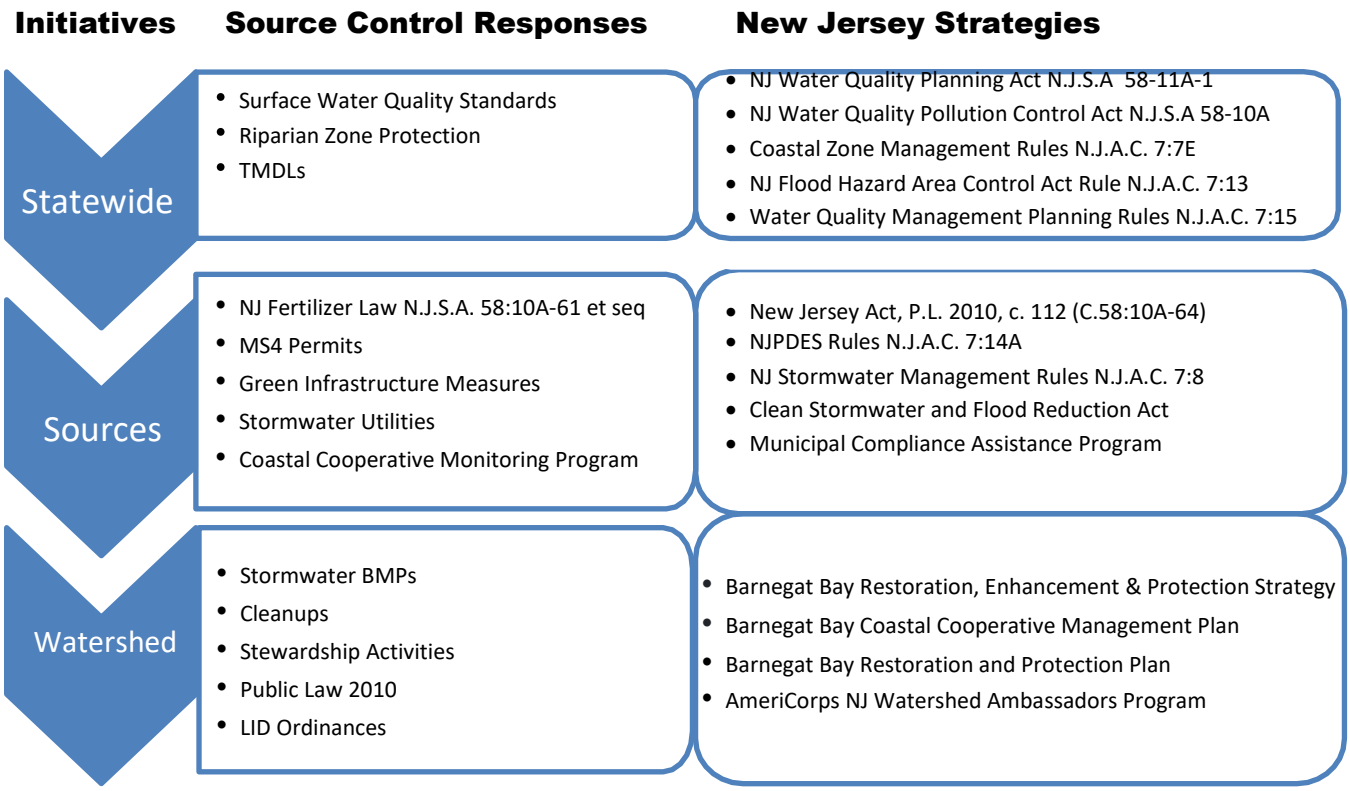
Table 5. HUC 14 Watersheds Recommended for TMDL and/or Watershed-Based Plan Development

HUC 14 Assessment Unit ID	HUC 14 Assessment Unit Name	Parameters	2012 IR Status	2014 IR Status	2016 IR Status
02040301020010	Metedeconk R NB (above I-195)	PHOSPHORUS, TOTAL	NOT ATTAINED	NOT ATTAINED	NOT ATTAINED
02040301020010	Metedeconk R NB (above I-195)	TURBIDITY	NOT ATTAINED	NOT ATTAINED	NOT ATTAINED
02040301020020	Metedeconk R NB (Rt 9 to I-195)	TURBIDITY	ATTAINED	ATTAINED	NOT ATTAINED
02040301030010	Metedeconk R SB (above I-195 exit 21 rd.)	TURBIDITY	ATTAINED	ATTAINED	NOT ATTAINED
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	TURBIDITY	NOT ATTAINED	NOT ATTAINED	NOT ATTAINED
02040301040020	Metedeconk R (Beaverdam Ck to confl)	PHOSPHORUS, TOTAL	NOT ATTAINED	ATTAINED	NOT ATTAINED

4.0 Implementation

This section describes various regulatory and non-regulatory approaches to restore and maintain water quality through a three-step strategy that entails statewide, source control and watershed-scale initiatives. Because NPS pollution is diffuse, effective management involves preventing the introduction of pollutants into the environment through source control while taking advantage of natural systems to filter and process pollutants in each watershed. The NJDEP, in collaboration with its partners working together is key to meeting water quality objectives complemented by targeted funding.

Figure 8. Regulatory and Non-regulatory Measures to Address and Protect Water Quality in the Metedeconk River Watershed



The New Jersey Water Quality Planning Act

The New Jersey Water Quality Planning Act, N.J.S.A. 58:11A-1, et seq., requires the State to restore, maintain, and preserve the quality of New Jersey's waters, including both surface and ground water, for the protection and preservation of the public health and welfare, food supplies, public water supplies, propagation of fish and wildlife, agricultural and industrial uses, aesthetic satisfaction, recreation, and other beneficial uses

New Jersey Water Pollution Control Act

The objective of the New Jersey Water Pollution Control Act (WQPA), N.J.S.A. 58:10A-1 et seq., is to prevent and control pollution of waters in the State.

Water Quality Management Planning Program

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 administers 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 WQMP rules (N.J.A.C. 7:15). Accordingly, the WQMP rules prescribe water quality management policies, procedures and standards. Additional information about the WQMP program is available on the NJDEP's website at http://www.nj.gov/dep/wqmp/wqmps.html.

Continuing Planning Process

The Clean Water Act and the WQPA require the NJDEP to articulate a continuing planning process (CPP) for water quality. The CPP is intended to integrate and unify water quality management planning processes, assess water quality, establish water quality goals and standards, and develop a statewide implementation strategy to achieve the water quality standards and maintain, improve, and protect water quality throughout the State. The document may be found at https://www.nj.gov/dep/wms/bears/docs/cpp2015-updated%202018.pdf.

Federal Coastal Zone Act

The Department is responsible for developing and administering a Coastal Nonpoint Pollution Control Program (CNPCP) in accordance with Section 6217 of the federal Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), 16 U.S.C. 1455b. A CNPCP describes how a state will implement NPS BMPs to reduce pollution associated with several sources, such as forestry practices, urban development, marinas and boating activities, hydromodification, and others. The Department is responsible for the CNPCP in New Jersey and applies statewide since most of New Jersey is federally defined as "coastal". Some of the management measures contained in the CNPCP are implemented by other state agencies, such as the New Jersey Department of Agriculture (NJDOA). However, most are implemented by the Department in coordination with other Department programs required under the federal CWA, including those included in the CPP, such as: Section 208 WQMP, Section 303(d) TMDLs, and Section 319(h) NPS Pollution Control Grants. The CNPCP is also coordinated with the Section 320 National Estuary Program. Additional information about New Jersey's Coastal NPS Pollution Control Program is available on the Department's website at: http://www.nj.gov/dep/cmp/czm_cnpp.html.

Cooperative Coastal Monitoring Program

If the NJDEP identifies persistent water quality problems at a recreational bathing beach, the Coastal Cooperative Monitoring Program will implement a source track down strategy in partnership with the Division of Water Monitoring and Standard's Bureau of Marine Water Monitoring, the local health agency and municipality. Background information is collected beginning with a review of existing water quality results and supplemented with monitoring studies to address data gaps and provide additional water quality data. Results from the monitoring studies allow the NJDEP to understand the spatial extent of any issues and identify areas of concern, which more efficiently directs resources. Additional investigation of infrastructure using techniques such as video surveillance and dye testing may be necessary. This strategy allows the responsible entity to locate problems and fix them. When infrastructure repair or replacement is necessary, additional funding is typically required. Details may be found at https://njbeaches.org/.

Barnegat Bay Restoration, Enhancement, and Protection Strategy

The NJDEP is moving science into action within the Barnegat Bay watershed in support of the Department's priority of using the best available science to protect New Jersey's waters. The *Barnegat Bay Restoration, Enhancement, and Protection (REP) Strategy* is built upon the data, modeling results, and research that emerged from the 2010 Ten Point Plan, also known as Barnegat Bay: Phase One. Please see https://www.nj.gov/dep/barnegatbay/index.htm. The NJDEP is building upon the accomplishments of Phase One by identifying restoration, enhancement, and protection actions as part of the Phase Two REP Strategy with the continued goal of improving the ecological health of Barnegat Bay and its watershed. The REP Strategy provides four major components: Restoration, Enhancement, Protection and Assessment. Each component includes short-term, mid-term, and long-term objectives and actions. Several key outputs were realized through the Barnegat Bay initiative as discussed below which are instrumental in the protection of the Metedeconk River watershed.

Existing Laws, Regulations, and Municipal Ordinances

Three new laws which protect water quality of the 11 HUC 14s of the WPP were promulgated because of the Barnegat Bay 10-point Action Plan. They are Public Law 2010, Chapter 114 (P.L. 2010, c. 114), the NJ State Fertilizer Law P.L. 2010, c. 112 (C.58:10A-64 et seq.), and the Soil Restoration Act (P.L.2010 Chapter 113) (NJDEP, 2010). A synopsis of these laws and regulations is provided below.

Public Law 2010

Public Law 2010 required that the New Jersey Department of Transportation (NJDOT) carry out a study which would create an inventory and assess the condition of state-owned stormwater basins in the Barnegat Bay watershed. The result of this study indicated that 37 out of the 125 state-owned stormwater basins residing in the Barnegat Bay watershed needed repairs or replacements, and as of 2015, all 37 stormwater basins received remedial action to address their needs (NJDOT, 2014). The study also included the capital cost for those repairs and replacements as well as the annual capital investment required to maintain the 125 stormwater basins. However, there remains approximately 2,500 stormwater basins and facilities in the Barnegat Bay watershed, owned by the county, municipalities, and other entities, that were not included as part of this inventory and analysis study. Additionally, there are approximately 422 stormwater basins, most of which were designed to address stormwater quantity, rather than quality, as dry detention basins, identified in the WBP.

Fertilizer Law

While the application of fertilizer can produce healthy lawns and increase yield from agricultural parcels, it can also produce excessive algae growth within waterbodies due to stormwater runoff. This problem of nutrient enrichment has been identified as one of the leading causes of water quality impairments across the nation and caused 31% of New Jersey's fresh waterbodies to not support the aquatic life uses due to an exceedance in the applicable numeric phosphorus criterion (NJDEP, 2017). New Jersey addressed this issue by enacting the State Fertilizer Law, New Jersey Act, P.L. 2010, c. 112 (C.58:10A-64 et seq.) on January 5th, 2011. This law helps protect water quality while maintaining healthy lawns and agricultural practices by reducing the allowable timeframe of fertilizer application, limiting the concentration of nitrogen and phosphorus within manufactured fertilizers, and establishing a certification process through New Jersey Agricultural Experiment Station at Rutgers University for all professional fertilizers. In addition to these requirements, the fertilizer law also established a minimum 25-foot buffer from any waterbody for the application of fertilizers. This buffer will be vital for reducing the input of nutrients from developed areas that lie within the 300-foot riparian zone that is established as part of the C1 designation.

Soil Erosion and Sediment Control Act

The Soil Erosion and Sediment Control Act (N.J.S.A. 4:24-39 et seq.) focuses on water quality pollution occurring from stormwater runoff in both developed urban areas as well as less developed rural areas of New Jersey. Measures are required to be implemented at construction sites to minimize the extent that soil erosion can occur during, and after completion of projects. This law also mandates that measures be implemented in urban, rural, and agricultural areas across the state to reduce NPS pollution caused by sediment, thereby enhancing the water quality in New Jersey as well as stormwater quality.

The Soil Restoration Act (P.L.2010 Chapter 113) was signed into law on January 5, 2011. Subsequently, the State Soil Conservation Committee, in consultation with Rutgers University, the New Jersey Secretary of Agriculture, and the NJDEP have developed standards that include soil restoration measures to address the potential soil compaction on all new construction regulated by New Jersey Soil Conservation Districts. The goal of this standard is to ensure soil quality is restored as best as possible through aeration and re-vegetation. The Department is developing a model ordinance that incorporates the soil restoration measures and standards.

The New Jersey Pollutant Discharge Elimination System (NJPDES) Rules

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. 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. To accomplish this, permits are issued limiting the mass and/or concentration of pollutants which may be discharged into ground water, streams, rivers, and the ocean. 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.

Stormwater Regulation

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 (large public colleges, prisons, hospitals, and military bases) 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 are required to implement various control measures that should substantially reduce TP and TSS loadings in the Metedeconk River watershed, preventing degradation of water quality in non-impaired 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 Stormwater Management Rules (N.J.A.C.7:8) https://www.nj.gov/dep/rules/rules/njac7_8.pdf contain provisions to protect against impacts of development. These rules contain standards related to stormwater volume and peak flow rates, requirements to maintain recharge at pre-development rates and quality requirements for total suspended solids (TSS) and nutrients in stormwater. The New Jersey Stormwater Best Management Practices Manual https://www.njstormwater.org/bmp_manual2.htm provides guidance to address the standards in the Stormwater Management Rules. The New Jersey Pollutant Discharge Elimination System Rules (N.J.A.C. 7:14A) https://www.nj.gov/dep/dwq/714a.htm implement the Stormwater Management rules and help to control impacts from existing development. Requirements include development of stormwater management plans, use of best practices and adoption of ordinances related to sources such as pet waste and yard waste.

In March 2020, the DEP adopted changes to its stormwater management rules including replacing the current requirement that major developments incorporate nonstructural stormwater management strategies to the "maximum extent practicable" to meet ground water recharge standards, stormwater runoff quantity standards, and stormwater runoff quality standards, with a requirement that green infrastructure be utilized to meet these same standards.

Stormwater Utilities

In March 2019, New Jersey Governor Phil Murphy signed into law the Clean Stormwater and Flood Reduction Act (Act) https://www.njleg.state.nj.us/2018/Bills/S1500/1073_R2.PDF, which empowers local government entities in New Jersey to create stormwater utilities. New Jersey joined more than 40 other states where stormwater utilities were already authorized. New Jersey's law allows, but does not require, local governments to establish stormwater utilities to collect fees that are based on a fair and equitable approximation of the proportionate contribution of the stormwater runoff from any real property. Funds generated from these fees are to finance the improvement of stormwater infrastructure, better control water pollution and flooding, restore and enhance the quality of the State's waters and protect the public health, safety, and welfare and environment. In New Jersey's older cities, combined-sewer systems can be overwhelmed by stormwater runoff, causing them to discharge raw sewage into waterways and to back up into streets and basements. A stormwater utility is a mechanism to raise enough funds for NPS

pollution control, allocate its costs more fairly, and help ensure that less polluted runoff reaches our streams and rivers.

Municipal Compliance Assistance Program

It is important to evaluate and ensure that maximum pollutant reductions are being attained through the existing regulatory framework before requiring municipalities and other regulated entities to implement new Additional Measures under the New Jersey Discharge Elimination System (NJPDES) Municipal Stormwater General Permits. To that end, NJDEP will provide compliance assistance to municipalities and other regulated entities within the Barnegat Bay watershed to help advance compliance with existing NJPDES permit requirements and achieve practical and tangible reductions. This approach succeeded in working with municipalities and local partners to address pathogen impairments through a "find and fix" approach and will be used in the Barnegat Bay watershed to identify sources of nutrient loading or other water quality impairments.

The Department's Office of Compliance and Enforcement will work with the Metedeconk River watershed municipalities and other regulated entities to improve NJPDES Municipal Stormwater General Permit compliance, including identifying unpermitted discharges and ensuring compliance with stormwater management rules. DEP will help inform appropriate municipal officials about applicable regulations and will provide technical support. Other goals include facilitating cross-media awareness, encouraging innovative approaches to compliance, providing support to municipal officials to assure compliance with all applicable rules within the municipality, establishing a working dialogue with municipal officials to assist with best use of resources to achieve reductions, and working together on solutions to address non-compliance issues. The ultimate goals are to improve compliance, improve water quality, and achieve positive environmental outcomes.

Low Impact Development Ordinances

As new development increases, the amount of impervious cover will increase. This can result in changes to stream flow in that it will be increasingly driven by stormwater runoff as opposed to baseflow. Impervious cover has been correlated with changes in potential stream quality. In general, watershed percent impervious cover between 10-25% is considered "impacted"; 25 – 60% is considered "non-supporting" and > 60% is considered urban drainage (Schueler, 1995; CWP, 2003). Besides potential water quality issues, there are also potential hydrologic impacts from increased impervious cover such as to channel stability and stream biodiversity. The impervious cover within the Metedeconk River watershed increases downstream as it gets closer to Barnegat Bay. Only the headwaters of the Metedeconk River (NB1, SB1, SB2) have an impervious cover below the "impacted" range. All the other HUC 14s are above 10% impervious cover, with a few approaching the 25% "non-supporting" range. Despite this, the water quality within the Metedeconk River watershed remains relatively high, with the majority of the SWQS parameters being met as of the 2016 IR.

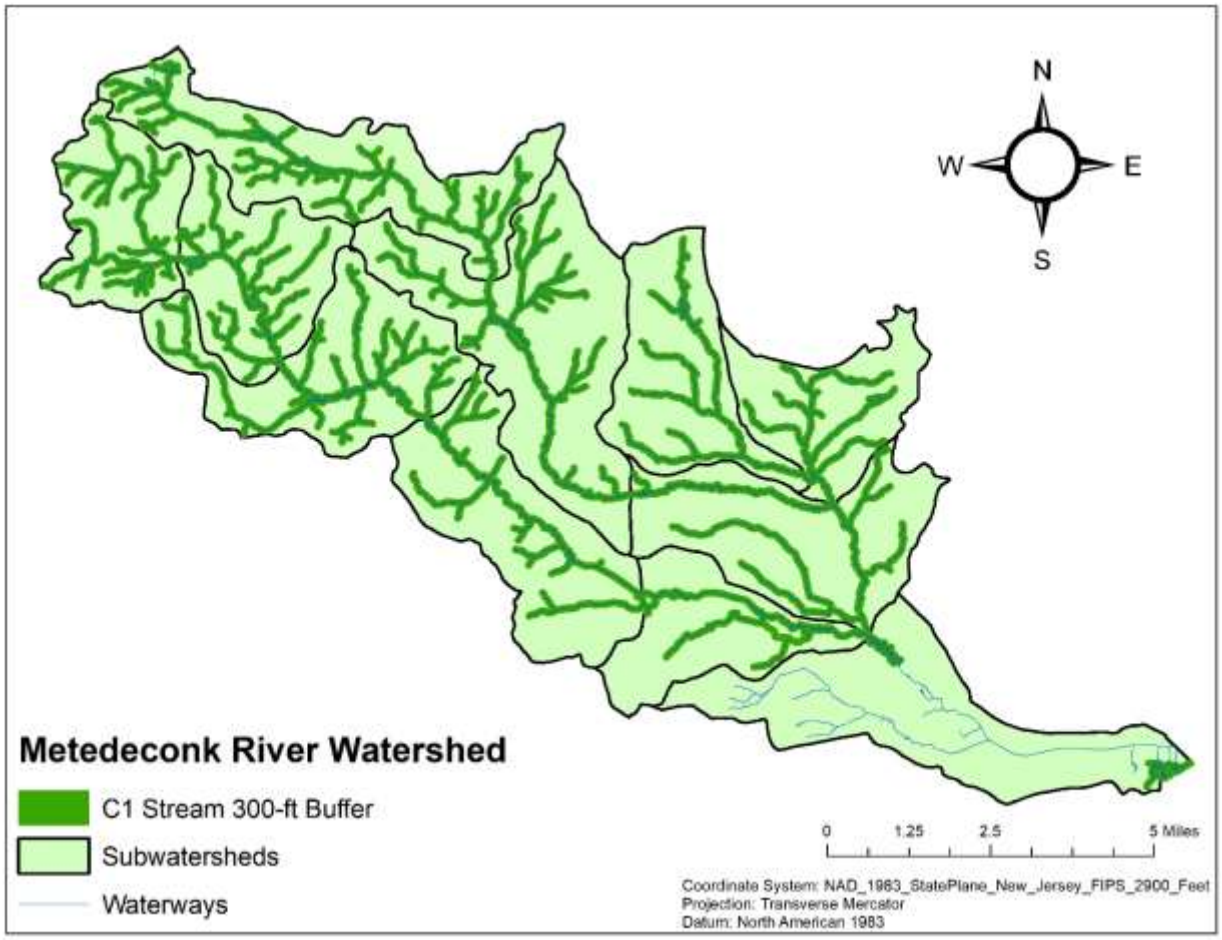
Upon completion of the Metedeconk WBP in 2013, the Stakeholder Advisory Committee developed a LID ordinance specifically for the watershed. The Committee's intent was to ensure a high level of stormwater management for future development that takes into full consideration the unique characteristics of the watershed (e.g., sandy, well-drained soils, etc.). The model ordinance was developed in close collaboration with NJDEP and with careful consideration of the New Jersey's Stormwater Management Regulations (N.J.A.C. 7:8) and BMP Manual. It was crafted to address both new development and

redevelopment. The ordinance provides both minimum mandatory and enhanced incentive-driven stormwater management standards prioritizing the use of Green Infrastructure. It is constructed with objective, predictable standards to facilitate effective and meaningful implementation of Green Infrastructure.

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 required with C1 streams and their tributaries) and other areas near streams, through the Flood Hazard Area Control Act Rules, N.J.A.C. 7:13. This protection provides an effective strategy to guard against further degradation of State waters. All HUC 14s with the Metedeconk River watershed have C1 classified streams, and only CFL1 has stream segments that are not classified as C1. Applying the Department's regulatory special water resource area designation of 300 feet on either side of a C1 waterbody, a Geographic Information Systems (GIS) analysis estimated that greater than 10,000 acres in protected buffers surrounded these streams, covering more than 20% of area within the watershed, (see **Figure 9)**. Protection and maintenance of these buffers will play a large role in maintaining water quality standards. Compliance with these measures is enforced through the Department's permitting programs. Additional information on this rule and associated programs are available on the Department's website at: http://www.nj.gov/dep/landuse/.

Figure 9. 300-ft Buffers surrounding C1 streams within the Metedeconk River Watershed



Runoff from Agricultural Land Use

As of the 2012, land designated for agricultural use in the Metedeconk River watershed was only 3% (**Table 2**). Although pollutant contributions from agricultural use may be small compared to other watersheds with larger agricultural areas, proper agricultural practices will still have a positive impact on the watershed. 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 in New Jersey runoff annually.

Stewardship

EPA identified land stewardship practices as key in reducing the amount of nitrogen and phosphorus loadings to our nation's waterways. To accomplish this goal, partnerships already exist in the Metedeconk 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 BTMUA, Barnegat Bay Partnership, and municipal stakeholders, who are also working with smaller watershed associations.

NJDEP actively seeks public participation and stakeholder input with natural resource stewardship, including management practices within watersheds. There are numerous successes exemplifying where the outcomes of a project were only achievable through the collaborative effort between the Department, stakeholders, and the public. The early Whippany River Pilot Watershed process and resultant TMDL (1999), the *Barnegat Bay Ten-Point Action Plan* (NJDEP, 2010), and its companion the *Barnegat Bay Restoration, Enhancement, and Protection Strategy* (NJDEP, 2017), are just a few examples. The Department is committed to continued collaboration with the public and stakeholders on establishing a more comprehensive conservation strategy of the State's natural resources which incorporates State, municipal, and local goals. The importance of public partnership is emphasized as one of the primary goals in the New Jersey Vision document (see Appendix G of 2016 Integrated Report).

The 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.

The AmeriCorps New Jersey 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 Metedeconk River watershed, the Watershed Ambassadors for WMA 13 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.

Barnegat Bay Blitz: First conducted in 2011, DEP's Barnegat Bay Blitz is a watershed-wide clean up event which is conducted to encourage the public to become involved in a clean-up of their communities. It also helps to instill ownership, pride, and stewardship of the watershed. The Blitz provides an opportunity for

residents to directly participate in restoration efforts and enhances public awareness of this natural resource. The Barnegat Bay Blitz unites people of all ages and backgrounds in a common goal – safeguarding Barnegat Bay. To date, the Blitz has engaged more than 32,000 volunteers and removed nearly 5,000 cubic yards of non-point source pollution from the bay (NJDEP, 2017b). See https://www.nj.gov/dep/barnegatbay/bbblitz.htm.

Barnegat Bay Rain Barrel Challenge: The Barnegat Bay Rain Barrel Challenge is a competition that encourages schools and youth groups located in the Barnegat Bay watershed to learn about the bay and what people can do to help protect its water quality and natural resources. See https://www.barnegatbaypartnership.org/rain-barrel-challenge-2020/ and https://www.nj.gov/dep/barnegatbay/rbc.htm. Rain barrels capture rainwater, helping to reduce stormwater runoff and nonpoint source pollution in local waterways. Rain barrels also reduce potable water use, storing rainwater for later use on yards and in gardens. The students investigate the theme for each year's challenge then work together to design and paint rain barrels that address the theme. The school/organization that wins the challenge receives a Barnegat Bay Festival Day sponsored by DEP and its partners. Rain barrels entered in the challenge are featured during the Blitz Opening Ceremony and are showcased at public venues throughout the watershed on the Rain Barrel Challenge Summer Tour.

Barnegat Bay Estuary Program

The Barnegat Bay Estuary Program is one of three National Estuary Programs (NEPs) in New Jersey. It is hosted by the Barnegat Bay Partnership who has the responsibility to prepare a Comprehensive Conservation and Management Plan (CCMP) that addresses the water quality, natural resources, and other issues of concern in the estuary and the associated watershed. The CCMP include specific short- and long-term actions intended to address the identified issues. The DEP is a partner in implementing the CCMP actions, including those that address NPS pollution. The Barnegat Bay Partnership's CCMP update is in the process of being finalized, https://www.barnegatbaypartnership.org/about-us/ccmp/. Activities include, but are not limited to, promoting water pollution research and monitoring efforts, supporting research to establish benchmarks for contaminants of concern, partnering in development and recruitment for citizen scientist wetlands/shoreline monitoring programs, supporting oyster management and shell planting, working collaboratively to improve the management of key species in the Estuary and development of TMDLs for areas listed on the 303(d) list of impaired waterbodies.

4.3 Schedule of Actions to Meet Water Quality Standards

A schedule of implementation actions needed to meet water quality standards was created by BTMUA in their WBP, and can be found in **Appendix E**. The schedule was separated into short-term, mid-term, and long-term timeframes to achieve load reductions and standards in a reasonable time. BTMUA hosts an interactive web page at http://brickmua.com/metedeconk/watershed.asp which keeps the public informed on restoration projects, ongoing educational workshops and water conservation measures. The water quality goals of the CCMP complement the Metedeconk River Watershed Protection Plan. The Department continues to fund projects identified in the plan as discussed below.

4.4 Implementation Projects and Plans

The Department prioritized funding for the Barnegat Bay watershed in the *2018 Nonpoint Source Program Request for Proposals*, awarding $10 million for the development of Watershed Based Plans and

implementation projects involving green infrastructure, living shoreline/resiliency, submerged aquatic vegetation restoration, oyster reef creation for habitat and water quality, sea nettle abatement measures, and municipal and public education and outreach programs. In addition to funds from Section 319(h) grants, the state also obtains funds through the Natural Resource Damages and Corporate Business Tax (CBT) programs. The entire suite of project narratives can be found at: https://www.state.nj.us/dep/wms/bears/2018grants.htm. Projects funded since 2014 that are within the Metedeconk River watershed are discussed below.

School House Branch/Duck Pond Sub-watersheds
Grantee: American Littoral Society

This project builds upon the Metedeconk Watershed plan implementation already underway by the BTMUA. This project implements a series of linked green infrastructure projects, consisting of a bioretention swale, living shoreline, curb-side tree boxes, stream bank stabilization and a floating wetland island that will work in unison to decrease NPS pollutant loading to the Metedeconk River, and ultimately the Barnegat Bay. This project will be conducted at Ocean County Park in Lakewood, located within the North Branch of the Metedeconk River watershed, is consistent with the recommendations of the approved plan and proposes to address the pathogen and phosphorus TMDL allocations. Project partners will include Ocean County Department of Parks (OCDP), Georgian Court University (GCU) and the BTMUA, who will assist in the development and review of the project design plans.

Stormwater Management for Jackson Township
Grantee: Rutgers Cooperative Extension of Ocean County

The headwaters of the South Branch of the Metedeconk River run through the northeastern portion of Jackson. This project seeks to expand stormwater implementation to Jackson Township through a partnership with the Rutgers Cooperative Extension of Ocean County, the BTMUA, and Jackson Township to implement stormwater best management practices in the portion of Jackson Township that drains to the Metedeconk River and to conduct effectiveness monitoring.

Designing and Installing Green Infrastructure and Nutrient Reduction Practices
Grantee: Brick Township Municipal Utilities Authority

This project will continue to implement priority stormwater quality improvement measures including: 1) Pathogen source tracking in the North Branch of the Metedeconk; 2) Implementation of urban (Lakewood) green infrastructure BMP's, such as tree filter boxes and rain gardens along with a constructed wetland; 3) Retrofitting a stormwater basin in Howell Township to promote infiltration (a priority project identified in the approved plan); and, 4) Initiating a winter salt alternative demonstration project that includes municipal government education and outreach.

Lakewood Township Stormwater Basin Retrofits
Grantee: South Jersey Resource Conservation and Development Council

The Camden Soil Conservation District will be implementing this project on behalf of the South Jersey Resource Conservation and Development Council (SJRC&D). This project is in partnership with the Lakewood Township Department of Public Works to perform 10-15 low cost stormwater basin retrofits within the Township.

Bay Friendly Stewardship Program
Grantee: Barnegat Bay Partnership

The Barnegat Bay Partnership (Partnership) is the lead for the Barnegat Bay National Estuary Program and functions by coordinating improvements in the Barnegat Bay watershed. The Partnership will develop and implement a Bay-Friendly Stewardship Certification Program that will be a comprehensive stewardship program for the Barnegat Bay, designed to certify residents, schools, and municipalities as "Bay-Friendly" through the completion of a suite of voluntary actions that target the reduction of non-point source pollution. The goals of this project are to actively engage community stakeholders in changing their behaviors to manage stormwater and reduce NPS pollution, and to provide programmatic support and guidance to them for meeting program standards and becoming certified.

Nonpoint Source Education for Municipal Officials (NEMO) and Municipal Stormwater Outreach
Grantee: Save Barnegat Bay

Save Barnegat Bay has been active in the Barnegat Bay Watershed since 1971, engaging local stakeholders in advocacy campaigns and educational initiatives. Save Barnegat Bay has developed and implemented 2 successful programs: Nonpoint Education of Municipal Officers (NEMO) and Municipal Stormwater Outreach. These programs educate municipal elected officials about the critical link between stormwater runoff and water quality. This project will expand Save Barnegat Bay's existing NEMO and Municipal Stormwater Outreach programs to encourage NPS problem-solving through development of Barnegat Bay specific education and outreach tools for Barnegat Bay municipalities.

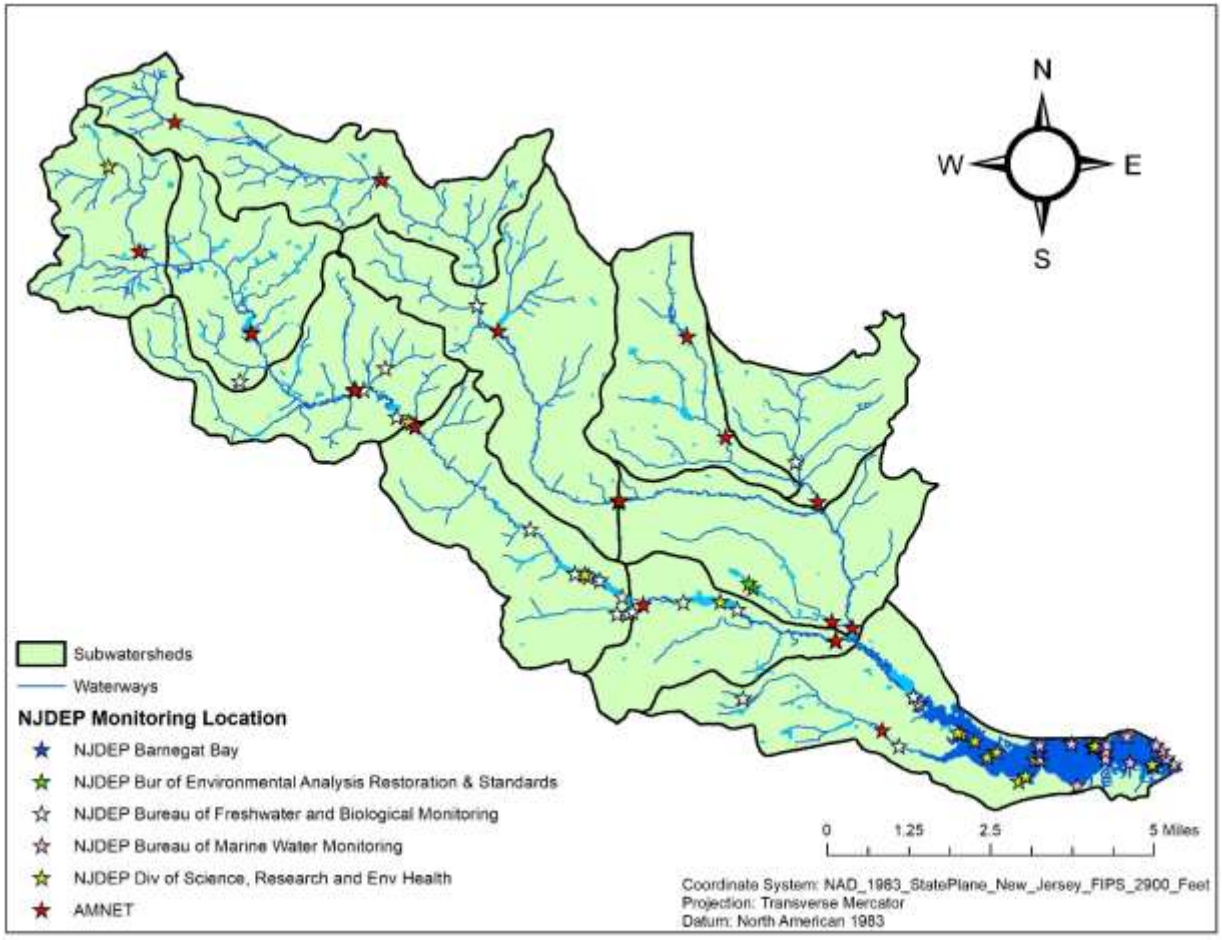
5.0 Monitoring Plan to Evaluate Effectiveness of Protection Plan

The CWA requires that states submit biennial reports to the EPA describing the quality of their waters. An integrated approach is used to assess water quality by compiling all existing and readily available water monitoring data, collected by numerous sources throughout the state. New Jersey's biennial Integrated Report provides information regarding New Jersey's water resources, current water quality conditions, and causes and sources of water quality impairment. This information is then used to guide water quality monitoring, restoration, and protection efforts throughout the state. The Integrated Report combines both the 305(b) Report and the 303(d) List. The 305(b) Report includes the status of principal waters in terms of overall water quality, support of designated uses, and potential strategies to maintain and improve water quality. The 303(d) List identifies waters within the state that are not attaining designated uses due to SWQS. Waterbodies on the 303(d) List must also be prioritized for TMDL development, to be established within the next two years.

By applying data originating from various outside entities with differing monitoring and analytical capabilities, the NJDEP must ensure that data used for assessments is representative, reliable, and of good quality. The *Integrated Water Quality Assessment Methods* (Methods Document) was written to describe methods used of compiling, analyzing, and interpreting data used in the Integrated Report. This ensures a clear and accurate evaluation of water quality that complies with applicable SWQS. 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.

A variety of water quality monitoring data has been collected through programs, either initiated by the Department or federally funded via EPA 319(h) pass through grant program, to 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 U.S. Geological Survey (USGS) have cooperatively operated the Ambient Stream Monitoring Network (ASMN) in New Jersey since the 1970s, which monitors background water quality. The Ambient Biological Monitoring Network (AMNET) is used for biological monitoring, assessing benthic macroinvertebrates to determine stream quality. Aquatic life monitoring is done through the Fish Index of Biotic Integrity (FIBI) for evaluating fish communities and stream quality and Fish Tissue Monitoring. A map of NJDEP water monitoring sites within the watershed can be found in **Figure 10**.

Figure 10. Metedeconk River Watershed AMNET Sites



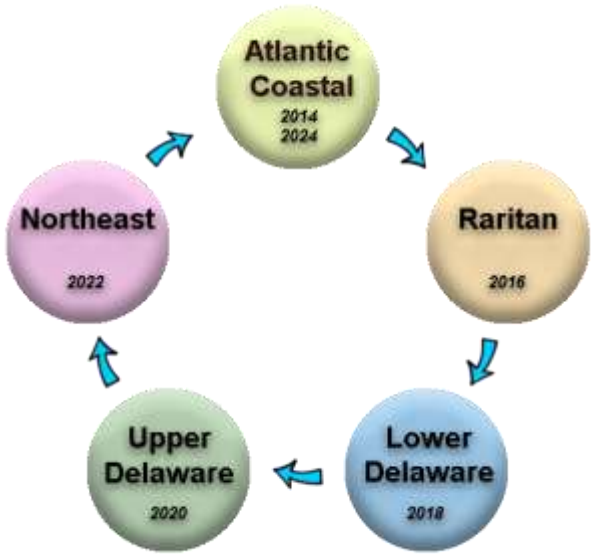
The monitoring data amassed from outside entities, such as federal, county government agencies, regional commissions and watershed associations, are also used to supplement NJDEP networks and expand the range and scope of information available for water quality assessment. Additional information about the NJDEP's water monitoring activities and networks is available on the website at: http://www.nj.gov/dep/wms/.

New Jersey uses a rotating regional approach to integrated water quality assessment since 2014. With this approach, the Department can conduct a more thorough assessment of water quality for each of New Jersey's five water regions: Atlantic Coastal, Raritan, Lower Delaware, Upper Delaware, and Northeast. As a result, a comprehensive assessment of all the water bodies in the entire state will be completed every ten years. This approach supports development of measures to restore, maintain, and enhance water quality specific to the unique circumstances of each region. The Metedeconk River falls within the Atlantic Coastal Water Region, which was the region of interest for the 2014 IR, and can be found here: https://www.state.nj.us/dep/wms/bears/docs/2014_final_integrated_report.pdf.

This new approach is explained in more detail in the Methods Document (NJDEP, February 2015). The Atlantic Coastal Water Region will be next assessed in 2024, allowing time for implementation and new data to have their successes be measured properly.

Figure 11. Water Regions of New Jersey

Figure 12. Schedule of Water Region Water Quality



6.0 Public Participation

The NJDEP has maintained a long-term commitment to the stakeholder process and public participation in the Metedeconk River watershed and Barnegat Bay. The Barnegat Bay Partnership works collaboratively with its broad array of partners to protect the Barnegat Bay-Little Egg Harbor estuary and its contributing watershed. In 2019 the BBP prepared the https://www.barnegatbaypartnership.org/about-us/ccmp/ through a collaborative process.

The 2018 *Request for Proposals for the Water Quality Restoration Grants* conducted two public information sessions which engaged the public in soliciting projects that would implement the *Metedeconk River Watershed Restoration and Protection Plan* as well as the *Barnegat Bay Restoration, Enhancement and Protection Strategy*. $10 million was made available in grants and principal forgiveness loans. Details may be found at https://www.state.nj.us/dep/wms/bears/2018grants.htm#/. The information sessions were composed of presentations on restoration and protection strategies for Barnegat Bay, water quality restoration grants, and examples of implementation projects. Question and answer sessions were also held, as well as one-on-one meetings between Department staff and interested parties to discuss potential projects.

The TMDL development also includes a public participation component. The WQMP Rules N.J.A.C. 7:15- require that the Department to initiate a public process prior to the development of each TMDL and to allow public input to the Department on policy issues affecting the development of the TMDL. Further, the Department shall propose each TMDL as an amendment to the appropriate areawide water quality management plan in accordance with procedures at N.J.A.C. 7:15-3.4(g). As part of the public participation process for the development and implementation of the subject TMDLs, the Department worked collaboratively with a series of stakeholder groups as part of the Department's ongoing watershed management efforts. As of the completion of this WPP, there exists TMDLs for total coliforms, fecal coliforms, mercury, and phosphorus in the Metedeconk River watershed, with each having done their own public participation process.

The 2016 Integrated Report development process included public participation in the data solicitation stage as well as public comment periods on the draft methods, lists and reports. Public participation began with a public request for data submissions. Once the Department reviewed all submitted data by other entities and incorporates the results as appropriate, the Department provided the opportunity for public review of the Methods Document and Draft Integrated List.

7.0 Conclusion

The *Metedeconk River Watershed Protection Plan* introduces a comprehensive strategy to preserve the unimpaired HUC 14s in the Metedeconk River watershed for a total of 11 HUC 14s with 30 HUC 14/parameter combinations. This plan encompasses, the 2013 WBP, TMDLs within the watershed, and implementation of the *Barnegat Bay Restoration, Enhancement and Protection Strategy* to protect HUC 14s that are attaining SWQS. The funding of the projects identified in the WMP remains a priority for the NJDEP. The collaborative, watershed approach described in this WPP will allow the NJDEP to be able to achieve the goals of restoration, maintenance, and protection of water quality within the Metedeconk River watershed, to be enjoyed by humans and wildlife together.

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Appendix A. Goals of Metedeconk River WBP

Goal 1	**Supply a sustainable water supply to the human population while maintaining natural water regimes**
Objective 1	*Improve natural freshwater flows*
Objective 2	*Promote water conservation and implement water re-use demonstrations projects on public properties*
Goal 2	**Maintain Category 1 designation and eliminate water quality impairments**
Objective 1	*Reduce stormwater flow via implementation of projects on public facilities and re-development projects*
Objective 2	*Reduce nitrogen, phosphorous, pathogens, TDS, and TSS*
Objective 3	*Implement TMDLs*
Objective 4	*Prevent habitat loss and support habitat restoration within riparian buffers to preserve and improve regional biodiversity*
Objective 5	*Address data gaps for groundwater and tributary water quality*
Objective 6	*Protect and restore critical wildlife habitat and natural lands identified by NJDEP, TPL, Rutgers University, Ocean County Natural Lands Trust and others*
Objective 7	*Minimize health risks to recreations contact water users from pathogens*
Objective 8	*Improve soil health for biological, chemical, and physical function; implement demonstration projects on public and/or priority properties*
Objective 9	*Identify multiple sources of funding for Plan implementation*
Goal 3	**Support the health of the Barnegat Bay**
Objective 1	*Reduce nitrogen, phosphorous, pathogens, and TSS*
Objective 2	*Reduce stormwater runoff to the bay*
Objective 3	*Provide passive recreational access*
Objective 4	*Protect natural shoreline buffers and open space; implement buffer setback*
Goal 4	**Improve the water quality of the watershed lakes**
Objective 1	*Reduce pathogen and phosphorous inputs*
Objective 2	*Address invasive plant species and sediment accumulation*
Goal 5	**Promote education and outreach regarding watershed impacts from growth**
Objective 1	*Enlist involvement and support of all levels of government, specifically municipal and/or county planning and zoning boards and environmental commissions, stormwater coordinators, DPWs, etc., for sustained effectiveness in managing watershed resources*
Objective 2	*Identify and encourage Low Impact Development standards appropriate for the Metedeconk Basin*
Objective 3	*Promote cooperation among the various regulatory agencies involved in watershed resources and development*
Objective 4	*Promote cooperation among various regulatory agencies involved in watershed resources and development*
Objective 5	*Support smart growth standards*
Objective 6	*Support open space planning and preservation*
Objective 7	*Work in concert with Barnegat Bay partnership and other organizations involved in education and outreach to: (1) expand the public's understanding of the watershed; (2) encourage public participation and support of improving watershed health; (3) promote public involvement in restoration activities*
Objective 8	*Increase public understanding of the Metedeconk watershed and the role the public plays in its health*

Objective 9	*Involve stakeholders in defining problems, objectives, and solutions*

Appendix B. Comparison of Parameter Attainment Statuses between 2012, 2014 and 2016 Integrated Reports

Assessment Unit ID	Assessment Unit Name	Parameters	2012 IR Status	2014 IR Status	2016 IR Status
02040301020010	Metedeconk R NB (above I-195)	PHOSPHORUS, TOTAL	NOT ATTAINED	NOT ATTAINED	NOT ATTAINED
02040301020010	Metedeconk R NB (above I-195)	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301020010	Metedeconk R NB (above I-195)	TOTAL SUSPENDED SOLIDS (TSS)	ATTAINED	ATTAINED	ATTAINED
02040301020010	Metedeconk R NB (above I-195)	TURBIDITY	NOT ATTAINED	NOT ATTAINED	NOT ATTAINED
02040301020020	Metedeconk R NB (Rt 9 to I-195)	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301020020	Metedeconk R NB (Rt 9 to I-195)	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301020020	Metedeconk R NB (Rt 9 to I-195)	TOTAL SUSPENDED SOLIDS (TSS)	ATTAINED	ATTAINED	ATTAINED
02040301020020	Metedeconk R NB (Rt 9 to I-195)	TURBIDITY	ATTAINED	ATTAINED	NOT ATTAINED
02040301020030	Haystack Brook	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301020030	Haystack Brook	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301020030	Haystack Brook	TOTAL SUSPENDED SOLIDS (TSS)	ATTAINED	ATTAINED	ATTAINED
02040301020030	Haystack Brook	TURBIDITY	ATTAINED	ATTAINED	ATTAINED
02040301020040	Muddy Ford Brook	PHOSPHORUS, TOTAL	NOT ATTAINED	ATTAINED	ATTAINED
02040301020040	Muddy Ford Brook	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301020040	Muddy Ford Brook	TOTAL SUSPENDED SOLIDS (TSS)	NOT ATTAINED	ATTAINED	ATTAINED
02040301020040	Muddy Ford Brook	TURBIDITY	ATTAINED	ATTAINED	ATTAINED
02040301020050	Metedeconk R NB (confluence to Rt 9)	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301020050	Metedeconk R NB (confluence to Rt 9)	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301020050	Metedeconk R NB (confluence to Rt 9)	TOTAL SUSPENDED SOLIDS (TSS)	ATTAINED	ATTAINED	ATTAINED
02040301020050	Metedeconk R NB (confluence to Rt 9)	TURBIDITY	ATTAINED	ATTAINED	ATTAINED
02040301030010	Metedeconk R SB (above I-195 exit 21 rd.)	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301030010	Metedeconk R SB (above I-195 exit 21 rd.)	NITRATE	NOT ATTAINED	ATTAINED	ATTAINED

02040301030010	Metedeconk R SB (above I-195 exit 21 rd.)	TOTAL SUSPENDED SOLIDS (TSS)	NOT ATTAINED	INSUFFFICIENT DATA	INSUFFICIENT DATA
02040301030010	Metedeconk R SB (above I-195 exit 21 rd.)	TURBIDITY	ATTAINED	ATTAINED	NOT ATTAINED
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	NITRATE	NOT ATTAINED	ATTAINED	ATTAINED
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	TOTAL SUSPENDED SOLIDS (TSS)	NOT ATTAINED	INSUFFFICIENT DATA	INSUFFICIENT DATA
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	TURBIDITY	NOT ATTAINED	NOT ATTAINED	NOT ATTAINED
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	FECAL COLIFORM (TMDL)	ATTAINED	ATTAINED	ATTAINED
02040301030030	Metedeconk R SB (Bennetts Pond to 74d19m15s)	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301030030	Metedeconk R SB (Bennetts Pond to 74d19m15s)	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301030030	Metedeconk R SB (Bennetts Pond to 74d19m15s)	TOTAL SUSPENDED SOLIDS (TSS)	ATTAINED	ATTAINED	ATTAINED
02040301030030	Metedeconk R SB (Bennetts Pond to 74d19m15s)	TURBIDITY	ATTAINED	ATTAINED	ATTAINED
02040301030040	Metedeconk R SB (Rt 9 to Bennetts Pond)	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301030040	Metedeconk R SB (Rt 9 to Bennetts Pond)	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301030040	Metedeconk R SB (Rt 9 to Bennetts Pond)	TOTAL SUSPENDED SOLIDS (TSS)	ATTAINED	ATTAINED	ATTAINED
02040301030040	Metedeconk R SB (Rt 9 to Bennetts Pond)	TURBIDITY	ATTAINED	ATTAINED	ATTAINED
02040301030050	Metedeconk R SB (confluence to Rt 9)	PHOSPHORUS, TOTAL	ATTAINED	ATTAINED	ATTAINED
02040301030050	Metedeconk R SB (confluence to Rt 9)	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301030050	Metedeconk R SB (confluence to Rt 9)	TOTAL SUSPENDED SOLIDS (TSS)	ATTAINED	ATTAINED	ATTAINED
02040301030050	Metedeconk R SB (confluence to Rt 9)	TURBIDITY	ATTAINED	ATTAINED	ATTAINED
02040301040020	Metedeconk R (Beaverdam Ck to confl)	PHOSPHORUS, TOTAL	NOT ATTAINED	ATTAINED	NOT ATTAINED
02040301040020	Metedeconk R (Beaverdam Ck to confl)	NITRATE	ATTAINED	ATTAINED	ATTAINED
02040301040020	Metedeconk R (Beaverdam Ck to confl)	TURBIDITY	ATTAINED	ATTAINED	ATTAINED
02040301040020	Metedeconk R (Beaverdam Ck to confl)	TOTAL SUSPENDED SOLIDS (TSS)	NOT ATTAINED	ATTAINED	ATTAINED

Appendix C. 2016 IR Final Parameter Assessment Results for Metedeconk River Watershed HUC14s

HUC14	HUC02040301020010	HUC02040301020020	HUC02040301020030	HUC02040301020040
Assessment Unit Name	Metedeconk R NB (above I-195)	Metedeconk R NB (Rt 9 to I-195)	Haystack Brook	Muddy Ford Brook
Biological-Cause Unknown	Non Attaining	Non Attaining	Attaining	Attaining
Biological-Cause Unknown (Trout)	NA	Attaining	NA	Attaining
DO	Non Attaining	Attaining	Attaining	Attaining
DO (Trout)	NA	Attaining	NA	Attaining
Temperature	Attaining	Attaining	Attaining	Attaining
Temperature (Trout)	NA	Non Attaining	NA	Attaining
pH	Attaining	Attaining	Attaining	Attaining
Total Phosphorus	Non Attaining	Attaining	Attaining	Attaining
Nitrate	Attaining	Attaining	Attaining	Attaining
Total Dissolved Solids	Attaining	Attaining	Attaining	Attaining
Total Suspended Solids	Attaining	Attaining	Attaining	Attaining
Turbidity	Non Attaining	Attaining	Attaining	Attaining
Unionized Ammonia	Attaining	Attaining	Attaining	Attaining
Sulfate	Attaining	Attaining	Attaining	Attaining
Chloride	Attaining	Attaining	Attaining	Attaining
E.coli	Non Attaining	Non Attaining	Non Attaining	Non Attaining
Enterococcus	NA	NA	NA	NA
Beach Closing (Enterococcus)	NA	NA	NA	NA
Total Coliform	NA	NA	NA	NA
Fecal Coliform	NA	NA	NA	NA
Arsenic - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Arsenic - Human Health	Non Attaining	Non Attaining	Non Attaining	Insufficient Data
Cadmium - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Cadmium - Human Health	Attaining	Attaining	Attaining	Attaining
Chromium - Human Health	Attaining	Attaining	Attaining	Attaining
Chromium - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Copper - Aquatic Life	Attaining	Insufficient Data	Attaining	Attaining
Copper - Human Health	Attaining	Attaining	Attaining	Attaining
Lead - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Lead - Human Health	Non Attaining	Attaining	Attaining	Attaining
Mercury - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Mercury - Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Attaining
Nickel - Aquatic Life	Attaining	Attaining	Attaining	Attaining

HUC14	HUC02040301020010	HUC02040301020020	HUC02040301020030	HUC02040301020040
Assessment Unit Name	Metedeconk R NB (above I-195)	Metedeconk R NB (Rt 9 to I-195)	Haystack Brook	Muddy Ford Brook
Nickel - Human Health	Attaining	Attaining	Attaining	Attaining
Selenium - Aquatic Life	Insufficient Data	Attaining	Insufficient Data	Attaining
Selenium - Human Health	Attaining	Attaining	Attaining	Attaining
Silver - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Silver - Human Health	Attaining	Attaining	Attaining	Attaining
Thallium Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Zinc - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Zinc - Human Health	Attaining	Attaining	Attaining	Attaining
PCB.Fish.Consumption	Non Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Mercury.Fish.Consumption	Non Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Chlordane.Fish.Consumption	Non Attaining	Insufficient Data	Insufficient Data	Insufficient Data
DDX.Fish.Consumption	Non Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Dioxin.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Anthracene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
alphaEndosulfan - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Antimony	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Barium	Attaining	Attaining	Attaining	Attaining
Benzene	Attaining	Attaining	Attaining	Attaining
Benzoapyrene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Benzokfluoranthene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Beryllium	Attaining	Attaining	Attaining	Attaining
Bis(2chloroethyl).ether	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Butylbenzylphthalate	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Carbontetrachloride	Attaining	Attaining	Attaining	Attaining
Chlorobenzene	Attaining	Attaining	Attaining	Attaining
Chloroform	Attaining	Attaining	Attaining	Attaining
Chlorpyrifos - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Chrysene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dichlorobenzidine33	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dichlorobromomethane	Attaining	Attaining	Attaining	Attaining
Dichloroethane12	Attaining	Attaining	Insufficient Data	Insufficient Data
Dichloroethylene11	Attaining	Attaining	Attaining	Attaining
Dichlorophenol24	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

HUC14	HUC02040301020010	HUC02040301020020	HUC02040301020030	HUC02040301020040
Assessment Unit Name	Metedeconk R NB (above I-195)	Metedeconk R NB (Rt 9 to I-195)	Haystack Brook	Muddy Ford Brook
Dichloropropane12	Attaining	Attaining	Attaining	Attaining
Dieldrin - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dieldrin - Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Diethylphthalate	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dinitrophenol24	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dinitrotoluene24	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Endosulfansulfate	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Fluorene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Heptachlorepoxide	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Hexachlorobenzene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Hexachlorobutadiene	Attaining	Attaining	Attaining	Attaining
Hexachloroethane	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
HHalphaEndosulfan	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Malathion - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Methyl bromide	Attaining	Attaining	Attaining	Attaining
Methylenechloride	Attaining	Attaining	Attaining	Attaining
Isophorone	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Nitrobenzene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
NNitrosodinpropylamine	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
NNitrosodiphenylamine	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pentachlorophenol	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pentachlorophenol - Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Phenol	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
ppDDD	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
ppDDE	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pyrene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Tetrachloroethane1122	Attaining	Attaining	Attaining	Attaining
Tetrachloroethylene	Attaining	Attaining	Attaining	Attaining
Toluene	Attaining	Attaining	Attaining	Attaining
Trichlorobenzene124	Attaining	Attaining	Attaining	Attaining
Trichloroethane111	Attaining	Attaining	Attaining	Attaining
Trichloroethane112	Attaining	Attaining	Attaining	Attaining
Trichloroethylene	Attaining	Attaining	Attaining	Attaining
Trichlorophenol246	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Vinylchloride	Attaining	Attaining	Attaining	Attaining

HUC14	HUC02040301020050	HUC02040301030010	HUC02040301030020	HUC02040301030030
Assessment Unit Name	Metedeconk R NB (confluence to Rt 9)	Metedeconk R SB (above I-195 exit 21 rd)	Metedeconk R SB (74d19m15s to I-195 X21)	Metedeconk R SB (BennettsPd to 74d19m15s)
Biological-Cause Unknown	Non Attaining	Attaining	Insufficient Data	Non Attaining
Biological-Cause Unknown (Trout)	Non Attaining	NA	NA	NA
DO	Attaining	Attaining	Non Attaining	Attaining
DO (Trout)	Attaining	NA	NA	NA
Temperature	Attaining	Attaining	Attaining	Attaining
Temperature (Trout)	Non Attaining	NA	NA	NA
pH	Attaining	Attaining	Attaining	Attaining
Total Phosphorus	Attaining	Attaining	Attaining	Attaining
Nitrate	Attaining	Attaining	Attaining	Attaining
Total Dissolved Solids	Attaining	Non Attaining	Attaining	Attaining
Total Suspended Solids	Attaining	Insufficient Data	Insufficient Data	Attaining
Turbidity	Attaining	Non Attaining	Non Attaining	Attaining
Unionized Ammonia	Attaining	Attaining	Attaining	Attaining
Sulfate	Attaining	Attaining	Attaining	Attaining
Chloride	Attaining	Attaining	Attaining	Attaining
E.coli	Non Attaining	Non Attaining	Attaining	Non Attaining
Enterococcus	NA	NA	NA	NA
Beach Closing (Enterococcus)	NA	NA	NA	NA
Total Coliform	NA	NA	NA	NA
Fecal Coliform	NA	NA	NA	NA
Arsenic - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Arsenic - Human Health	Non Attaining	Non Attaining	Non Attaining	Non Attaining
Cadmium - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Cadmium - Human Health	Attaining	Attaining	Attaining	Attaining
Chromium - Human Health	Attaining	Attaining	Attaining	Attaining
Chromium - Aquatic Life	Insufficient Data	Insufficient Data	Attaining	Insufficient Data
Copper - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining
Copper - Human Health	Attaining	Attaining	Attaining	Attaining
Lead - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Lead - Human Health	Non Attaining	Attaining	Attaining	Attaining
Mercury - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Mercury - Human Health	Attaining	Insufficient Data	Insufficient Data	Attaining
Nickel - Aquatic Life	Attaining	Attaining	Attaining	Attaining

HUC14	HUC02040301020050	HUC02040301030010	HUC02040301030020	HUC02040301030030
Assessment Unit Name	Metedeconk R NB (confluence to Rt 9)	Metedeconk R SB (above I-195 exit 21 rd)	Metedeconk R SB (74d19m15s to I-195 X21)	Metedeconk R SB (BennettsPd to 74d19m15s)
Nickel - Human Health	Attaining	Attaining	Attaining	Attaining
Selenium - Aquatic Life	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Selenium - Human Health	Attaining	Attaining	Attaining	Attaining
Silver - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Silver - Human Health	Attaining	Attaining	Attaining	Attaining
Thallium Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Zinc - Aquatic Life	Attaining	Attaining	Attaining	Attaining
Zinc - Human Health	Attaining	Attaining	Attaining	Attaining
PCB.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Non Attaining
Mercury.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Non Attaining
Chlordane.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Non Attaining
DDX.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dioxin.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Anthracene	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
alphaEndosulfan - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Antimony	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Barium	Attaining	Attaining	Attaining	Attaining
Benzene	Attaining	Attaining	Attaining	Attaining
Benzoapyrene	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Benzokfluoranthene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Beryllium	Attaining	Attaining	Attaining	Attaining
Bis(2chloroethyl).ether	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Butylbenzylphthalate	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Carbontetrachloride	Attaining	Attaining	Attaining	Attaining
Chlorobenzene	Attaining	Attaining	Attaining	Attaining
Chloroform	Attaining	Attaining	Attaining	Attaining
Chlorpyrifos - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Chrysene	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Dichlorobenzidine33	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dichlorobromomethane	Attaining	Attaining	Attaining	Attaining
Dichloroethane12	Attaining	Attaining	Insufficient Data	Attaining
Dichloroethylene11	Attaining	Attaining	Attaining	Attaining
Dichlorophenol24	Attaining	Insufficient Data	Insufficient Data	Insufficient Data

HUC14	HUC02040301020050	HUC02040301030010	HUC02040301030020	HUC02040301030030
Assessment Unit Name	Metedeconk R NB (confluence to Rt 9)	Metedeconk R SB (above I-195 exit 21 rd)	Metedeconk R SB (74d19m15s to I-195 X21)	Metedeconk R SB (BennettsPd to 74d19m15s)
Dichloropropane12	Attaining	Attaining	Attaining	Attaining
Dieldrin - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dieldrin - Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Diethylphthalate	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Dinitrophenol24	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Dinitrotoluene24	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Endosulfansulfate	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Fluorene	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Heptachlorepoxide	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Hexachlorobenzene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Hexachlorobutadiene	Attaining	Attaining	Attaining	Attaining
Hexachloroethane	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
HHalphaEndosulfan	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Malathion - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Methyl bromide	Attaining	Attaining	Attaining	Attaining
Methylenechloride	Attaining	Attaining	Attaining	Attaining
Isophorone	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Nitrobenzene	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
NNitrosodinpropylamine	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
NNitrosodiphenylamine	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pentachlorophenol	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pentachlorophenol - Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Phenol	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
ppDDD	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
ppDDE	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pyrene	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Tetrachloroethane1122	Attaining	Attaining	Attaining	Attaining
Tetrachloroethylene	Attaining	Attaining	Attaining	Attaining
Toluene	Attaining	Attaining	Attaining	Attaining
Trichlorobenzene124	Attaining	Attaining	Attaining	Attaining
Trichloroethane111	Attaining	Attaining	Attaining	Attaining
Trichloroethane112	Attaining	Attaining	Attaining	Attaining
Trichloroethylene	Attaining	Attaining	Attaining	Attaining
Trichlorophenol246	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Vinylchloride	Attaining	Attaining	Attaining	Attaining

HUC14	HUC02040301030040	HUC02040301030050	HUC02040301040010	HUC02040301040020
Assessment Unit Name	Metedeconk R SB (Rt 9 to Bennetts Pond)	Metedeconk R SB (confluence to Rt 9)	Beaverdam Creek	Metedeconk R (Beaverdam Ck to confl)
Biological-Cause Unknown	Insufficient Data	Non Attaining	Non Attaining	Non Attaining
Biological-Cause Unknown (Trout)	Insufficient Data	NA	NA	NA
DO	Attaining	Attaining	Insufficient Data	Non Attaining
DO (Trout)	Insufficient Data	NA	NA	NA
Temperature	Attaining	Attaining	Insufficient Data	Attaining
Temperature (Trout)	Insufficient Data	NA	NA	NA
pH	Attaining	Attaining	Insufficient Data	Attaining
Total Phosphorus	Attaining	Attaining	Insufficient Data	Non Attaining
Nitrate	Attaining	Attaining	Insufficient Data	Attaining
Total Dissolved Solids	Attaining	Attaining	Insufficient Data	Attaining
Total Suspended Solids	Attaining	Attaining	Insufficient Data	Attaining
Turbidity	Attaining	Attaining	Insufficient Data	Attaining
Unionized Ammonia	Attaining	Attaining	Insufficient Data	Attaining
Sulfate	Attaining	Attaining	Insufficient Data	Attaining
Chloride	Attaining	Attaining	Insufficient Data	Attaining
E.coli	Non Attaining	Non Attaining	Insufficient Data	Non Attaining
Enterococcus	NA	NA	Attaining	NA
Beach Closing (Enterococcus)	NA	NA	Insufficient Data	NA
Total Coliform	NA	NA	Non Attaining	NA
Fecal Coliform	NA	NA	NA	NA
Arsenic - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining
Arsenic - Human Health	Non Attaining	Non Attaining	Insufficient Data	Non Attaining
Cadmium - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining
Cadmium - Human Health	Attaining	Attaining	Insufficient Data	Attaining
Chromium - Human Health	Attaining	Attaining	Insufficient Data	Attaining
Chromium - Aquatic Life	Attaining	Insufficient Data	Insufficient Data	Attaining
Copper - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining
Copper - Human Health	Attaining	Attaining	Insufficient Data	Attaining
Lead - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining
Lead - Human Health	Attaining	Non Attaining	Insufficient Data	Attaining
Mercury - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining
Mercury - Human Health	Attaining	Attaining	Insufficient Data	Attaining
Nickel - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining

HUC14	HUC02040301030040	HUC02040301030050	HUC02040301040010	HUC02040301040020
Assessment Unit Name	Metedeconk R SB (Rt 9 to Bennetts Pond)	Metedeconk R SB (confluence to Rt 9)	Beaverdam Creek	Metedeconk R (Beaverdam Ck to confl)
Nickel - Human Health	Attaining	Attaining	Insufficient Data	Attaining
Selenium - Aquatic Life	Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Selenium - Human Health	Attaining	Attaining	Insufficient Data	Attaining
Silver - Aquatic Life	Attaining	Attaining	Insufficient Data	Insufficient Data
Silver - Human Health	Attaining	Attaining	Insufficient Data	Attaining
Thallium Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Zinc - Aquatic Life	Attaining	Attaining	Insufficient Data	Attaining
Zinc - Human Health	Attaining	Attaining	Insufficient Data	Attaining
PCB.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Mercury.Fish.Consumption	Non Attaining	Insufficient Data	Insufficient Data	Insufficient Data
Chlordane.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
DDX.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dioxin.Fish.Consumption	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Anthracene	Attaining	Insufficient Data	Insufficient Data	Attaining
alphaEndosulfan - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Antimony	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Barium	Attaining	Attaining	Insufficient Data	Attaining
Benzene	Non Attaining	Attaining	Insufficient Data	Attaining
Benzoapyrene	Attaining	Insufficient Data	Insufficient Data	Attaining
Benzokfluoranthene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Beryllium	Attaining	Attaining	Insufficient Data	Attaining
Bis(2chloroethyl).ether	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Butylbenzylphthalate	Attaining	Insufficient Data	Insufficient Data	Attaining
Carbontetrachloride	Attaining	Attaining	Insufficient Data	Attaining
Chlorobenzene	Attaining	Attaining	Insufficient Data	Attaining
Chloroform	Attaining	Attaining	Insufficient Data	Attaining
Chlorpyrifos - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Chrysene	Attaining	Insufficient Data	Insufficient Data	Attaining
Dichlorobenzidine33	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dichlorobromomethane	Attaining	Attaining	Insufficient Data	Attaining
Dichloroethane12	Attaining	Attaining	Insufficient Data	Insufficient Data
Dichloroethylene11	Attaining	Attaining	Insufficient Data	Attaining
Dichlorophenol24	Attaining	Insufficient Data	Insufficient Data	Attaining

HUC14	HUC02040301030040	HUC02040301030050	HUC02040301040010	HUC02040301040020
Assessment Unit Name	Metedeconk R SB (Rt 9 to Bennetts Pond)	Metedeconk R SB (confluence to Rt 9)	Beaverdam Creek	Metedeconk R (Beaverdam Ck to confl)
Dichloropropane12	Attaining	Attaining	Insufficient Data	Attaining
Dieldrin - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Dieldrin - Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Diethylphthalate	Attaining	Insufficient Data	Insufficient Data	Attaining
Dinitrophenol24	Attaining	Insufficient Data	Insufficient Data	Attaining
Dinitrotoluene24	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Endosulfansulfate	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Fluorene	Attaining	Insufficient Data	Insufficient Data	Attaining
Heptachlorepoxide	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Hexachlorobenzene	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Hexachlorobutadiene	Attaining	Attaining	Insufficient Data	Attaining
Hexachloroethane	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
HHalphaEndosulfan	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Malathion - Aquatic Life	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Methyl bromide	Attaining	Attaining	Insufficient Data	Attaining
Methylenechloride	Attaining	Attaining	Insufficient Data	Attaining
Isophorone	Attaining	Insufficient Data	Insufficient Data	Attaining
Nitrobenzene	Attaining	Insufficient Data	Insufficient Data	Attaining
NNitrosodinpropylamine	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
NNitrosodiphenylamine	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pentachlorophenol	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pentachlorophenol - Human Health	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Phenol	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
ppDDD	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
ppDDE	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Pyrene	Attaining	Insufficient Data	Insufficient Data	Attaining
Tetrachloroethane1122	Attaining	Attaining	Insufficient Data	Attaining
Tetrachloroethylene	Non Attaining	Attaining	Insufficient Data	Attaining
Toluene	Attaining	Attaining	Insufficient Data	Attaining
Trichlorobenzene124	Attaining	Attaining	Insufficient Data	Attaining
Trichloroethane111	Attaining	Attaining	Insufficient Data	Attaining
Trichloroethane112	Attaining	Attaining	Insufficient Data	Attaining
Trichloroethylene	Attaining	Attaining	Insufficient Data	Attaining
Trichlorophenol246	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Vinylchloride	Non Attaining	Attaining	Insufficient Data	Attaining

Table Footnotes: HH … Human Health, AQL … Aquatic Life, AQLc … Aquatic life Chronic, Refer to 7:9B1.14(f) for more information.

Appendix D. Load Reductions and LAs from WBP

Appendix D 1. Load Allocations for each Branch of the Metedeconk River Watershed.

Metedeconk River Watersheds	North Branch (NB1-NB5)	South Branch (SB1-SB5)	Confluence & Estuary (CFL1)
Land use data layer Year	2007	2007	2007
Area (acres)	24,486	19,722	5,911
Total TSS Load (lbs/year)	2,293,939	1,655,363	557,104
Areal Weighted TSS load (lbs/acre/year)	465	414	94
% of Total TSS Load	50.9	36.7	12.4
Total TP Load (lbs/year)	15,628	11,040	4,440
Areal Weighted TP load (lbs/acer/year)	3.11	2.73	0.75
% of Total TP Load	50.2	35.5	14.3
Total Nitrogen Load (lbs/year)	180,103	132,175	52,146
Areal Weighted Nitrogen load (lbs/acer/year)	36.08	33.03	8.82
% of Total Nitrogen Load	49.4	36.3	14.3

Appendix E. WBP Schedule of Implementation

Appendix E 1. Short-Term Implementation Schedule of WBP

	Year 1				Year 2			
Short-Term Measure	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Establish Metedeconk River Watershed Committee	X							
Initiate Education and Outreach Program		X	X	X	X	X	X	X
Establish Education/Outreach Subcommittee	X							
Expand WQ Monitoring Plan to Establish baseline water quality for tributaries	X	X	X	X				
Develop LID ordinances for each township			X	X	X	X		
Initiate 10 Additional Visual Assessments				X				X
Develop watershed wide stormwater basin survey and tracking database		X	X	X	X	X	X	X
Initiate at least 1 community goose management program and monitor				X	X	X	X	X
Construct BMP at project site (Phase II)	X	X	X	X				
Identify all critical stormwater projects	X	X	X	X	X	X	X	X
Retrofit catch basins		X	X	X	X	X	X	X
Complete full design of at least 3 primary projects (other than Phase II project)					X	X	X	X
Develop water conservation programs					X	X	X	X
Identify all stream-side agricultural operations					X	X	X	X

Construct a feasibility study for a stormwater utility authority	X	X	X	X				

Appendix E 2. Mid-Term Implementation Schedule of WBP

	Year 3				Year 4				Year 5			
Mid-Term Measure	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Continues Education and Outreach Programs	X	X	X	X	X	X	X	X	X	X	X	X
Review previous visual assessments	X	X										
Conduct 10 additional visual assessments				X				X				X
Update critical stormwater project list	X	X	X	X	X	X	X	X	X	X	X	X
Meet SWQS for phosphorus in NB1 (satisfy TMDL)							X	X				
Complete design for at least 10 projects within the watershed	X	X	X	X	X	X	X	X	X	X	X	X
Expand geese management to all critical sites	X	X	X	X	X	X	X	X	X	X	X	X
Stabilize sediment loading areas in NB4									X	X	X	X
Construct at least 5 projects within watershed									X	X	X	X
Continue catch basin retrofit	X	X	X	X	X	X	X	X	X	X	X	X

Appendix E 3. Long-Term Implementation Schedule of WBP

	Year 6				Year 7				Year 8			
Long-Term Measures	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Continue Education and Outreach Programs	X	X	X	X	X	X	X	X	X	X	X	X
Review previous visual assessments			X				X	X	X		X	
Conduct 10 additional visual assessments			X				X				X	
Expand geese management to all critical sites	X	X	X	X	X	X	X	X				
Achieve TMDLs for fecal coliform									X	X	X	X
Eliminate water quality impairment for TSS in Muddy Ford Brook	X	X	X	X	X	X	X	X	X	X	X	X
Reduce nitrogen loading by at least 50% to Barnegat Bay	X	X	X	X	X	X	X	X	X	X	X	X
Complete design for all critical projects in watershed									X	X	X	X
Complete construction of at least half of the critical projects in watershed												
Update watershed management plan												
Complete catch basin retrofits					X	X	X	X	X	X	X	X

Appendix E 4. Long-Term Implementation Schedule of WBP (> 9 years).

	Year 9				Year 10				>10 Years
Long-Term Measures	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	
Continue Education and Outreach Programs	X	X	X	X	X	X	X	X	X
Review previous visual assessments			X				X		
Conduct 10 additional visual assessments			X				X		
Expand geese management to all critical sites									
Achieve TMDLs for fecal coliform	X	X	X	X	X	X	X	X	X
Eliminate water quality impairment for TSS in Muddy Ford Brook	X	X	X	X	X	X	X	X	X
Reduce nitrogen loading by at least 50% to Barnegat Bay	X	X	X	X	X	X	X	X	
Complete design for all critical projects in watershed	X	X	X	X	X	X	X	X	
Complete construction of at least half of the critical projects in watershed									X
Update watershed management plan					X	X	X	X	
Complete catch basin retrofits	X	X	X	X	X	X	X	X	

Appendix F. 2016 Final 303(d) List of Water Quality Limited Waters with Sublist 5 Subpart and Priority Ranking for TMDL Development

HUC14	HUC14 Name	Parameter	Designated Use	Sublist 5 Subpart (A, R, L)	Priority Ranking for TMDL
02040301020010	Metedeconk R NB (above I-195)	Arsenic	Water Supply		Low
		Chlordane in Fish Tissue	Fish Consumption	L	Low
		DDT and its metabolites in Fish Tissue	Fish Consumption	L	Low
		Lead	Water Supply		Low
		Mercury in Fish Tissue	Fish Consumption		Low
		DO	Aquatic Life		Medium
		PCB in Fish Tissue	Fish Consumption	L	Low
		Turbidity	Aquatic Life	R	Medium
02040301020020	Metedeconk R NB (Rt 9 to I-195)	Cause Unknown	Aquatic Life, Aquatic Life - Trout		Low
02040301020050	Metedeconk R NB (confluence to Rt 9)	Arsenic	Water Supply		Low
		Cause Unknown	Aquatic Life, Aquatic Life - Trout		Low
		Lead	Water Supply		Low
02040301030010	Metedeconk R SB (above I-195 exit 21 rd)	Arsenic	Water Supply		Low
		Lead	Water Supply		Low
02040301030020	Metedeconk R SB (74d19m15s to I-195 X21)	Arsenic	Water Supply	A	Low
		DO	Aquatic Life		Medium
		Turbidity	Aquatic Life	R	Medium
02040301030030	Metedeconk R SB (BennettsPd to 74d19m15s)	Arsenic	Water Supply		Low
		Cause Unknown	Aquatic Life		Low
		Chlordane in Fish Tissue	Fish Consumption	L	Low
		Mercury in Fish Tissue	Fish Consumption		Low
		PCB in Fish Tissue	Fish Consumption	L	Low
02040301030040	Metedeconk R SB (Rt 9 to Bennetts Pond)	Arsenic	Water Supply	A	Low
02040301030050	Metedeconk R SB (confluence to Rt 9)	Lead	Water Supply		Low
02040301040020	Metedeconk R (Beaverdam Ck to confl)	Arsenic	Water Supply	A	Low
		Cause Unknown	Aquatic Life		Low
		Lead	Water Supply		Low

Appendix G. Municipalities Located in the Metedeconk River Watershed, NJPDES Permit Number and their MS4 Tier Designation

Municipality	County	Tier A or B	NJPDES Permit No.
Lakewood Township	Ocean	Tier A	NJG0148067
Jackson Township	Ocean	Tier A	NJG0150665
Brick Township	Ocean	Tier A	NJG0151394
Howell Township	Monmouth	Tier A	NJG0153940
Millstone Township	Monmouth	Tier A	NJG0153532
Wall Township	Monmouth	Tier A	NJG0153214
Freehold Township	Monmouth	Tier A	NJG0150797