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New Hampshire

Nonpoint Source Management Program Plan

2025-2029

Cover image: The Lake Winnipesaukee watershed from Mount Major, Alton, New Hampshire.

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Acronyms

Acronym	Definition
ACEP	Agricultural Conservation Easement Program
ALE	Agricultural Land Easements
AOP	Aquatic Organism Passage
AoT	Alteration of Terrain
ARP	Advance Restoration Plans
ARM	Aquatic Resource Mitigation
ASAP	Automated Standard Application for Payments
AU	Assessment Unit
AUID	Assessment Unit ID
BIL	Bipartisan Infrastructure Law
BMPs	Best Management Practices
BMWPs	Best Management Wetlands Practices
CAFO	Concentrated Animal Feeding Operation
CALM	Consolidated Assessment and Listing Methodology
CEI	Comprehensive Environmental, Inc.
Chl-*a*	Chlorophyll-*a*
CISA	Climate Informed Science Approach
CLF	Conservation Law Foundation
CMF	Cyanobacteria Mitigation Fund
CRP	Conservation Reserve Program
CSP	Conservation Stewardship Program
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
CZMA	Coastal Zone Management Act
DWGTF	Drinking Water and Groundwater Trust Fund
DWSRF	Drinking Water State Revolving Fund
EMD	Environmental Monitoring Database
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
EWP	Emergency Watershed Protection Program
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FHA	Flood Hazard Area
FVA	Freeboard Value Approach
GB 2030	Great Bay 2030
GBNNPSS	Great Bay Nitrogen Nonpoint Source Study
GBTNGP	Great Bay Total Nitrogen General Permit
GRTS	Grants Reporting and Tracking System
GSOWA	Granite State Onsite Wastewater Installers Association
HB	House Bill
HUC	Hydrologic Unit Code
IC	Impervious Cover
IPM	Integrated Pest Management
LAC	Local River Management Advisory Committees

LCHIP	Land and Community Heritage Investment Program
LID	Low-Impact Development
LLMP	Lakes Lay Monitoring Program
MAAM	Municipal Alliance for Adaptive Management
MAGEX	Magnitude of Exceedance Thresholds
MCL	Maximum Contamination Level
MS4	Small Municipal Separate Storm Sewer System
MTRS	Measures Tracking and Reporting System
MVD	Merrimack Village District
MtBE	Methyl Tertiary Butyl Ether
NEIWPCC	New England Interstate Water Pollution Control Commission
NHACD	New Hampshire Association of Conservation Districts
NHCAW	New Hampshire Coastal Adaptation Workgroup
NHCP	New Hampshire Coastal Program
NHDAMF	New Hampshire Department of Agriculture, Markets and Food
NHDES	New Hampshire Department of Environmental Services
NHDFL	Division of Forests and Lands
NHDOT	New Hampshire Department of Transportation
NHFG	New Hampshire Fish and Game
NHGS	New Hampshire Geological Survey
NHMA	New Hampshire Municipal Association
NLCD	National Land Cover Database
NPS	Nonpoint Source
NHSSSC	New Hampshire Shoreland Septic Systems Commission
NHSCI	New Hampshire Stream Crossing Initiative
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWQI	National Water Quality Initiative
PCR	Primary Contact Recreation
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PPCP	Pharmaceuticals and Personal Care Product
PPI	Protection Potential Integrated
PPST	Protection Potential Screening Tool
ppt	Parts Per Trillion
PREP	Piscataqua Region Estuaries Partnership
PTAP	Pollution Tracking and Accounting Project
QAPP	Quality Assurance Project Plan
RCPP	Regional Conservation Partnership Program
RDA	Residual Designation Authority
RFP	Requests for Proposal
RPI	Recovery Potential Integrated
RPST	Recovery Potential Screening Tool
RMPP	Rivers Management and Protection Program
RPC	Regional Planning Commission

RSA	Revised Statutes Annotated, or laws
SADB	Supplemental Assessment Database
SADES	Statewide Asset Data Exchange System
SASC	Smart About Salt Council
SCM	Stormwater Control Measure
SIMA	Snow and Ice Management Association
SLA	Squam Lakes Association
SLAMM	Sea-Level Affecting Marsh Migration
SOAKNH	Soak Up the Rain New Hampshire
SRPC	Strafford Regional Planning Commission
SWMP	Stormwater Management Plan
SWQPA	Shoreland Water Quality Protection Act
SWRPC	Southwest Region Planning Commission
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TSP	Technical Service Provider Program
TSS	Total Suspended Solids
VLAP	Volunteer Lake Assessment Program
VRAP	Volunteer River Assessment Program
UNH	University of New Hampshire
UNHSC	University of New Hampshire Stormwater Center
UNH T2	University of New Hampshire Technology Transfer Center
USDA	U.S. Department of Agriculture
WAS	Watershed Assistance Section
WBP	Watershed-based Plan
WFPO	Watershed and Flood Prevention Operations Program
WMB	Watershed Management Bureau
WMNF	White Mountain National Forest
WQQ	Water Quality and Quantity
WQSAC	Water Quality Standards Advisory Committee
WQSIE	Water Quality Standards Information Exchange
WRE	Wetland Reserve Easements
WWTF	Wastewater Treatment Facilities
WWTP	Wastewater Treatment Plants
303(d) List	Section 303(d) Surface Water Quality List
305(b) Report	Section 305(b) Surface Water Quality Report

1.0 Introduction

New Hampshire's Nonpoint Source (NPS) Management Program was developed in response to the Federal Water Pollution Control Act, commonly called the Clean Water Act (CWA), Section 319 provisions to address water quality problems caused by pollution from nonpoint sources. Unlike point source pollution, which comes from pipes or other easily identifiable sources, NPS pollution comes from many different sources that are spread across the landscape and are often difficult to identify and quantify.

According to the New Hampshire Department of Environmental Services (NHDES) "2020/2022 Section 305(b) Surface Water Quality Report," 50 percent of all impaired waterbodies in New Hampshire are impaired due to stormwater runoff and the NPS pollutants carried with it (NHDES, 2022b). Statewide management of NPS problems relies on a mix of regulatory and voluntary programs that focus on protecting clean water where it currently exists and restoring it where development and other current or historical environmental stressors have made the water unsuitable for fishing, swimming or other designated uses. Major sources of NPS pollution in New Hampshire include developed land, hydrologic and habitat modification, transportation, septic systems, lawns and turfgrass management and agriculture. The problems caused by these sources are compounded by the changing climatic conditions and population growth that the state is currently facing.

New Hampshire has been getting warmer and wetter over the last century and the rate of change has increased over the last four decades. Annual precipitation has already increased 12 percent and is projected to increase an additional 12-20 percent by the end of the century. Six of the ten wettest summers on record in New Hampshire have happened since 2000, and larger temperature and precipitation increases are expected for winter and spring, raising concerns of rapid snowmelt, high peak stream flows and flood risk (Hoplamazian, 2023). Extreme precipitation events have also increased, the impact of which is evident in the several large floods that have occurred across New Hampshire since 2006. These extreme events are expected to occur more frequently. Of greatest concern is the projected increase in storms that drop more than four inches of precipitation in 48 hours (Wake, et al., 2014). Local and state stormwater-related infrastructure planning must address potential impacts from these events as they relate to stream crossings, erosion control and stormwater treatment and storage. Increased sea level elevation has led to a corresponding groundwater rise that has the potential to increase NPS pollution from septic systems, landfills, basements and failing stormwater infrastructure and associated stormwater management and treatment practices. Aging stormwater infrastructure and treatment measures were not designed to accommodate these increases in precipitation, associated runoff and inundation from groundwater. Adaptation strategies to build community resiliency to reduce the impacts from these climate-related changes are essential to achieving continued success of watershed-scale, municipal, local and residential initiatives to address stormwater and NPS management independently or in collaboration with the NPS Management Program in New Hampshire.

An essential tool for New Hampshire stormwater management practitioners is the 2008 *New Hampshire Stormwater Manual*. In response to changing environmental conditions, evolving science and available technologies for stormwater management as well as new and increasing local and federal stormwater permit requirements, a 2020 collaborative assessment of the *New Hampshire Stormwater Manual* was conducted that laid the groundwork for an updated manual to be developed through a partnership between NHDES and the University of New Hampshire Stormwater Center (UNHSC), with consulting assistance from Comprehensive Environmental, Inc. (CEI). The revised *New Hampshire Stormwater Manual* is a guidance document and planning tool for municipalities, developers, designers and members of regulatory boards, commissions and agencies involved in stormwater programs in New Hampshire. The manual presents the current (2024) state-of-the-practice for stormwater management in New Hampshire and the key to effective management of stormwater runoff being volume reduction of stormwater generated, promotion of stormwater infiltration and management of stormwater at its source.

To align with current state-of practice presented within the *New Hampshire Stormwater Manual*, the New Hampshire Nonpoint Source Management Program has adopted stormwater control measures (SCMs) as the new term for what had previously been called best management practices (BMPs). Structural, nonstructural and source control techniques and practices are recognized as SCMs with the same goals associated with BMPs of reducing downstream quality and quantity impacts of stormwater. In addition to SCMs, recommended practices for activities such as construction and winter road, parking lot and walkway management can also reduce the impacts of pollutants on downstream waterbodies.

Figure 1. The New Hampshire NPS Management Program has adopted SCMs to align with industry professionals.

The New Hampshire NPS Management Program collaborates closely with entities that are regulated under National Pollutant Discharge Elimination System (NPDES) permits, including the New Hampshire Municipal Separate Storm Sewer System (MS4) General Permit and Great Bay Total Nitrogen Permit as a means to address NPS pollution and manage stormwater in a holistic manner. While utilizing Section 319 funds to implement NPDES permit requirements is not permissible, the products of these collaborative efforts go above and beyond the scope of the NPDES permits. Leveraging these partnerships are a vital component of managing stormwater throughout the state and thus are highlighted throughout the 2025-2029 NPS Management Program Plan.

New Hampshire's NPS Management Program and its many partners have been working diligently to address the impacts of NPS pollution to water quality across the state. Since 2000, restoration activities that were made possible through the NHDES Watershed Assistance Grants Program, with funding provided by EPA under Section 319 of the CWA, have led to the publishing of 11 NPS Success Stories of documented water quality improvements and removal of designated use impairments. The work of the NPS Management Program's partner organizations and individuals are vital to achieving New Hampshire's NPS Management Program goals. It is essential that resources and funding for NPS management programs continue in order to maintain success and achieve additional milestones toward protecting and restoring water quality in New Hampshire. This 2025-2029 NPS Management Program Plan updates the 2020-2024 plan. It establishes priorities for planning and implementation activities and sets goals, objectives and measurable milestones for identified major and minor categories of sources of NPS pollution over the next five years.

2.0 Nonpoint Source Management Program Overview

NHDES' mission is to help sustain a high-quality of life for all citizens by protecting and restoring the environment and public health in New Hampshire. New Hampshire's NPS Management Program contributes to that mission by protecting and restoring the state's rivers, lakes, ponds, estuaries and other waters from the negative impacts of nonpoint source pollution. Specifically, the NPS Management Program works with stakeholders across multiple sectors to improve land management practices and to implement SCMs in order that water quality in impaired watersheds is restored and water quality in healthy watersheds is not degraded.

The goals of this updated New Hampshire NPS Management Program Plan ("the Plan") are to:

- Promote the use of NHDES and University of New Hampshire Stormwater Center (UNHSC) defined SCMs throughout New Hampshire to control nonpoint sources and encourage the adoption of innovative strategies to address new challenges.
- Promote voluntary, locally led, incentive-based strategies to address NPS issues.
- Establish and strengthen partnerships among stakeholders at local, state and federal levels in the management of NPS pollution sources.
- Encourage proper management of working timber and agricultural lands.
- Ensure wetlands, riparian corridors, floodplains, natural areas, estuaries and green infrastructure are restored or maintain healthy watersheds.
- Set priorities for addressing NPS pollution sources in New Hampshire.
- Identify long-term goals for protecting and restoring waters and watersheds impacted by NPS pollution.
- Use a watershed-based management approach as a coordinating framework to organize public and private sector efforts to identify, prioritize and implement activities to address NPS problems to restore NPS impaired waters or protect waters threatened by NPS pollution.
- Establish specific, short-term objectives and measurable milestones, to be accomplished over the next five years, that will help attain long-term NPS Management Program goals.

This Plan serves as a non-regulatory road map to address NPS pollution problems and to guide communication, outreach, collaboration and NPS planning and implementation projects over the next five years. The Plan documents progress that has been made to address priority NPS pollutant categories since the 2020-2024 Plan implementation period. A key tool to aid in the prioritization of watersheds in need of restoration or protection is the Recovery Potential Screening Tool (RPST) and the Protection Potential Screening Tool (PPST) developed by the United States Environmental Protection Agency (EPA) and expanded upon by the NHDES Total Maximum Daily Load (TMDL) Program Coordinator. The RPST and PPST use the ecological, stressor and social characteristics of each watershed and assessment unit (AU) to identify those places with the greatest likelihood for restoring or maintaining water quality. Representative indicator metrics were selected by NHDES and used to calculate a specific recoverability for each AU or protection score for each watershed. Depending on the score, each AU and watershed were assigned low, medium or high recovery or protection potential. The restoration and protection priorities and rationale are described in their respective sections within the Priority Watersheds section of this Plan. A complete description of the prioritization results using the RPST, including the geographic scope, AU and hydrologic unit code (HUC)-12 watershed delineation, indicator metrics used, data gathering, sources, ranking and mapping results is described in the *Priority Areas for Nonpoint Source Management Activities in New Hampshire: NHDES Methodology for Prioritizing Water Quality Restoration and Protection Activities* in Appendix A.

Each section of this Plan reflects progress, current status and projected efforts relative to NPS management associated with major NPS pollutant categories. Changes in regulations, programs, projects and personnel are also recognized. Most importantly, the Plan identifies goals, objectives, milestones and measures of success with a five-year schedule for completion.

2.1 Who Implements the NPS Management Program?

The NPS Management Program is formally managed by the Watershed Assistance Section (WAS) in the Watershed Management Bureau (WMB) within the Water Division at NHDES; however, NHDES is just one of many stakeholders working to protect and restore the surface waters of the state. Individual homeowners, lake, pond, river and estuary watershed associations, businesses, municipalities, non-governmental organizations, universities and state and federal agencies all continue to partner with the NPS Management Program to protect and restore surface waters and associated natural resources.

2.2 Description of Program Components – EPA Key Components

Appendix A of the "2024 EPA Nonpoint Source Program and Grants Guidelines for States and Territories" characterizes the essential "Key Components of an Effective State Nonpoint Source Management Program."

Table 2-1: Location of EPA NPS Program Key Components

1	The state program identifies water restoration and protection goals and program strategies (regulatory, nonregulatory, financial and technical assistance, as needed) to achieve and maintain water quality standards. It includes relevant, current and trackable annual milestones that best support program implementation. Pages 1-105: New Hampshire's NPS Management Program
2	The state program identifies the primary categories and subcategories of NPS pollution and a process for prioritizing impaired and unimpaired waters and identify how national and state priorities may align. Pages 31-40: Priority Watersheds and Pages 41-101: Priority NPS Pollutant Categories
3	The state program identifies management measures (i.e., systems of practices) that will be undertaken to reduce pollutant loadings resulting from each category, subcategory or particular nonpoint source identified in component 2 above. The measures should also consider the impact of the BMPs on groundwater quality. Pages 1-105: New Hampshire's NPS Management Program
4	The state uses both watershed projects and well-integrated regional or statewide programs to restore and protect waters, achieve water quality benefits and advance any relevant climate resiliency goals. Pages 1-105: New Hampshire's NPS Management Program
5	The state identifies and enhances its collaboration with appropriate federal, state, interstate, Tribal and regional agencies as well as local entities (including conservation districts, private sector groups, utilities and citizen groups) that will be utilized to implement the state program. Furthermore, the state supports capacity-building in communities with environmental justice concerns. Pages 6-17: New Hampshire's Watershed Management Framework, Pages 19-26: Partnerships, Pages 31-40: Priority Watersheds and Pages 41-101: Priority NPS Pollutant Categories
6	The state manages and implements its NPS Plan efficiently and effectively, including necessary financial management. Page 18: NPS Management Program Evaluation and Pages 27-30: Section 319 Program Administration
7	The state evaluates its NPS Plan using environmental and functional measures of success and revises its NPS Plan at least every five years. Page 18: NPS Management Program Evaluation and Pages 27-30: Section 319 Program Administration

3.0 New Hampshire's Watershed Management Framework

The NHDES WMB uses an integrated approach to achieve clean water goals. Both regulatory and non-regulatory programs work together within the WMB to integrate science, policy, planning and education to address point and NPS pollution, stormwater and exotic species. There are over twenty programs and activities within the WMB that form the basis for watershed management in New Hampshire.

The NPS Management Program utilizes the data and assessments from WMB programs that make up the Watershed Management Framework (Figure 2) to prioritize the development and implementation of watershed-based plans, coordinate TMDL implementation and develop and provide additional NPS resources and technical assistance to internal and external stakeholders and partners.

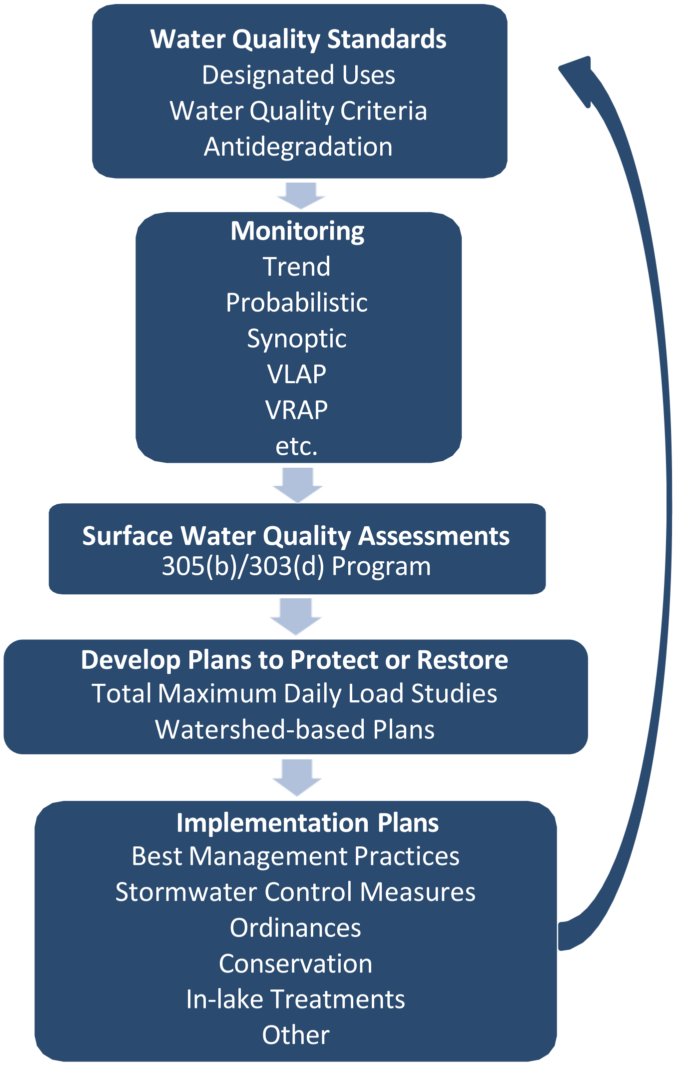

Figure 2. NHDES Watershed Management Framework

3.1 New Hampshire's Water Quality Standards

Water quality standards are used to protect the state's surface waters. Water quality standards consist of three parts:

1. Designated uses such as aquatic life integrity, fish consumption and recreation including swimming, boating and fishing.
2. Numerical or narrative criteria to protect the designated uses.
3. An antidegradation policy that maintains existing high-quality water that exceeds the criteria.

Criteria are established by statute RSA 485-A:8 and administrative rules Env-Wq 1700. Surface waters are routinely sampled and assessed on a biennial basis for compliance relative to water quality standards as part of the Surface Water Quality Assessments 305(b) and 303(d) Program.

The Water Quality Standards Advisory Committee (WQSAC) was established over twenty years ago to advise NHDES in drafting revised water quality regulations. The core of the WQSAC activities have been carried forward as the Water Quality Standards Information Exchange (WQSIE). Participation in the WQSIE is less formal compared to prior membership with WQSAC. The WQSIE provides a more inclusive format for public input and solicitation of ideas and provides a venue for the discussion of focused surface water quality standards issues. The WQSIE convenes at the discretion of NHDES with meetings open to the public who can participate fully in the discussions.

3.2 Water Quality Monitoring

The NHDES WMB is responsible for many water quality monitoring programs, including volunteer-based efforts like the Volunteer Lake Assessment Program (VLAP) and Volunteer River Assessment Program (VRAP). Surface water quality monitoring efforts by WMB staff and volunteers associated with VLAP and VRAP have resulted in over two million data records being collected from the state's surface waters.

Volunteer monitoring programs like VLAP, VRAP and University of New Hampshire's (UNH) Lakes Lay Monitoring Program (LLMP) are operated under the guidance and requirements of programmatic Quality Assurance Project Plans (QAPPs). The data is stored in the NHDES Environmental Monitoring Database (EMD) for use by the NHDES Water Quality Planning Section to assess surface waters for the Section 305(b) and 303(d) assessments. Additionally, water quality data is submitted to EPA's Water Quality Exchange (WQX). Relative to the New Hampshire Nonpoint Source Management Program Plan, the data collected by volunteer monitoring programs are an integral component for identifying NPS pollutant sources and for the development of the RPST and PPST. In addition to the data collected through WMB programs, the WMB utilizes data from other organizations and NHDES programs.

Figure 3. A VRAP volunteer conducts water quality monitoring

The "New Hampshire Department of Environmental Services Water Monitoring Strategy" covers a 10-year time frame (2014-2024) and is designed to fulfill the dual purpose of satisfying the requirements of the 2003 EPA guidance document, "Elements of a State Water Monitoring and Assessment Program," and serving as a "manual" to NHDES in implementing surface water monitoring programs. The latter was recognized by NHDES staff as an important need to maximize program efficiency and accountability.

The primary outcome of the strategy is high-quality data that can be used to meet a variety of surface water management objectives. To this end, the revised strategy is organized around a basic conceptual model (Figure 4). The strategy is based on the collection and usage of water quality data for water management decisions and communication of waterbody conditions to the public.

The strategy relies on three primary monitoring program design components which are at the center of the model (probability, trend and synoptic). These are intended to feed data directly to a series of objectives. **Probabilistic water quality surveys** allow NHDES to report on the overall status of surface water quality through intensive sampling of a subset of randomly selected sample locations within each lake, pond, stream or river. **Trend-based monitoring** tracks the trajectory of important water quality indicators over time through repetitive sampling at fixed monitoring stations. **Synoptic monitoring** maintains a statewide repository of data from lakes, ponds, streams and rivers using a standardized rotational watershed approach to maintain current records of water quality conditions where information is needed for assessment purposes or from waters that would otherwise not be sampled. Trend and synoptic monitoring of estuarine and ocean water is addressed through cooperation with state partners including the Piscataqua Region Estuaries Partnership (PREP) and UNH. Collectively, the strategy makes efficient use of limited monitoring resources to sample New Hampshire's surface waters, analyze data and provide timely reporting.

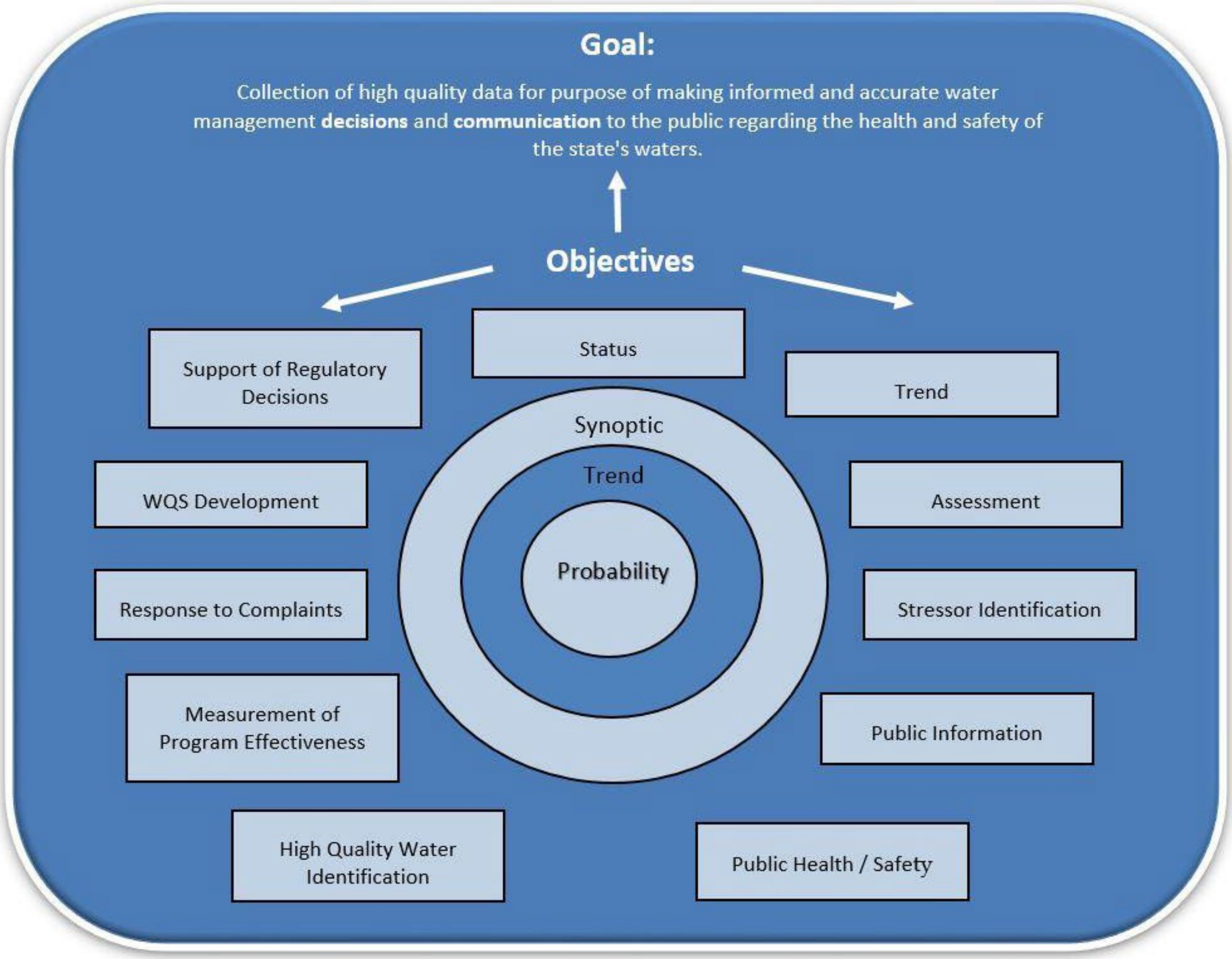

Figure 4. WMB Water Quality Monitoring Strategy

3.3 Surface Water Quality Assessments

New Hampshire's rigorous surface water quality assessment process identifies whether surface waters in the state support their designated uses. With few waters being fully assessed for all designated uses, and in the absence of a documented impairment, it is assumed that water quality standards are achieved in non or partially-assessed surface waters, making them eligible for protection activities that may include applying for NHDES Source Water Protection Grants, NPS Management Program Water Quality Planning Grants or NHDES Clean Water State Revolving Fund (CWSRF) Stormwater Planning Loans to develop watershed-based plans. Surface water quality assessments operate on a lowest common denominator hierarchal framework. Therefore, a waterbody may be listed as impaired based upon a single parameter that fails to meet state water quality standards despite any number of other parameters that are fully attaining water quality standards.

The CWA requires each state to submit two surface water quality documents to EPA every two years.

1. Section 305(b) of the CWA requires submittal of a report (the Section 305(b) Surface Water Quality Report, commonly called the "305(b) Report") that describes the quality of a state's surface waters and an analysis of the extent to which waters provide for the protection and propagation of a balanced population of shellfish, fish and wildlife and support recreational activities in and on the water.
2. Section 303(d) of the CWA requires the submittal of a report (the Section 303(d) Surface Water Quality List, commonly called the "303(d) List") that presents surface waters that are:
   a) Impaired or threatened by a pollutant or pollutant(s).
   b) Not expected to meet water quality standards within a reasonable time, even after application of best available technology standards for point sources or SCMs for nonpoint sources.
   c) Requiring development and implementation of a comprehensive water quality TMDL study, which is designed to meet water quality standards.

The NHDES Surface Water Quality Assessment Program produces an Integrated Surface Water Quality Report (Integrated Report) every two years that contains the Section 305(b) Surface Water Quality Report and Section 303(d) Surface Water Quality List. The Integrated Report contains the following five categories of waters.

Category 1: Attains all designated uses and no use is threatened.

Category 2: Attains some of the designated uses; no use is threatened; and insufficient or no data and information are available to determine if the remaining uses are attained or threatened (i.e., more data are needed to assess some of the uses).

Category 3: Insufficient or no data and information are available to determine if any designated use is attained, impaired or threatened (i.e., more monitoring is needed to assess any use).

Category 4: Impaired or threatened for one or more designated uses but does not require development of a TMDL because of the following:

4a: A TMDL has been completed.

4b: Other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near future.

4c: The impairment is not caused by a pollutant.

Category 5: Impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (this is the 303(d) List).

The NHDES "Consolidated Assessment of Listing Methodology (CALM)" describes, in detail, the process used to make surface water quality attainment decisions for 305(b) reporting and 303(d) listing purposes from available data. The term "listing" refers to the process of placing a waterbody on the 303(d) List. The CALM also includes descriptions and definitions of the many terms used in the presentation of assessment results; consequently, reviewing the CALM prior to reviewing the assessments helps with the understanding and interpretation of assessment results.

It is important to understand that assessment methodologies are dynamic and change as new information and assessment techniques become available. This is why the CALM is updated every two years. Such changes can also impact monitoring strategies designed to determine if waterbodies are attaining water quality standards. Updates of the methodology every two years results in more accurate and reliable assessments and, therefore, better management of water resources in the future. Applicants to the Water Quality Planning and Watershed Assistance Grants utilize the NHDES Surface Water Quality Assessment Viewer to determine the impairment status of the waterbody or watershed their proposed project pertains to.

3.4 Total Maximum Daily Load Studies

Under the federal CWA, NHDES must develop TMDL studies for waterbodies impaired by a pollutant. A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody, each day while still meeting the state's water quality standards for a particular designated use. A TMDL study provides a plan to control or reduce the pollution entering a waterbody to meet the total maximum daily load. The development of the TMDL requires the identification of all pollutant sources. These sources are categorized as "point sources" or "nonpoint sources". Once all pollutant sources are identified, the water quality goals or target values needed to achieve water quality standards are determined, and a specific load allocation is assigned to each of the sources. Water quality goals are based on the assimilative capacity for the waterbody, which is an estimate of the waterbody's capacity to receive a pollutant and still maintain water quality standards.

The "2022-2032 Vision for the Clean Water Act Section 303(d) Program," also known as the "2022 Vision," is a guidance document intended to provide flexibility and a long-term framework for the NHDES 303(d) Program with a focus on the TMDL Program. The 2022 Vision builds upon the Long-Term Vision for Assessment, Restoration and Protection under the CWA Section 303(d) Program, referred to as the "2013 Vision." Planning and prioritization, restoration, protection, data and analysis and partnership goals provide a framework for long-term planning to meet the 2022 Vision restoration goals. In addition, the three focus areas on communities with environmental justice concerns, incorporation of changing environmental conditions and program capacity building will further inform restoration efforts and strengthen partnerships between the NPS Management and TMDL Programs within NHDES.

TMDL planning will build upon past success with statewide TMDLs by developing core restoration documents for prioritized impairment types such as bacteria, nutrients and chlorides. Core documents will provide a basis for TMDLs and advance restoration plans (ARPs). ARPs are a restoration approach within the TMDL Program aimed at meeting restoration goals in advance of the implementation of a TMDL. The core restoration document identifies common pollutant sources, applicable water quality standards, pollutant management options, outreach resources, general TMDL and ARP guidance and monitoring guidance. Overall, advance restoration plans will prioritize water quality impairments related to human health and aquatic life integrity.

When feasible, staff within the TMDL Program and NPS Management Program will collaborate to ensure newly created watershed-based plans (WBPs) qualify as ARPs. To accomplish this, WBPs will clearly identify pollutant load sources, water quality targets required to meet water quality standards and the load reductions needed to achieve water quality targets. The 305(b) Report's, category 4b restoration approach, allows time for impaired waterbodies with pollution control measures in place to meet water quality standards. Adaptive management plans are plans that maintain restoration goals but with a flexible path towards meeting water quality standards, allowing plans to change in response to new information or changing conditions.

While the NHDES TMDL Program is responsible for the 2022 Vision, it relies upon and works closely with the monitoring and assessment programs at NHDES. Coordination and collaboration with other programs and sections is also needed to meet the goals of the 2022 Vision and improve efficiency. Coordination with the NPS Management Program will help meet surface water quality goals and maximize available resources. This cooperation extends to other programs and sections within NHDES as well as to organizations/partners outside of the department, both locally and regionally.

3.5 Watershed-Based Plans

Watershed-based management or restoration plans are tools for managing existing and future watershed conditions, including confirmed and/or potential NPS impacts on water quality and land use planning. Plans identify existing pollution contributions and sources, establish water quality goals, estimate the reductions or limits of pollutants needed to meet water quality goals and identify the actions needed, regulatory or non-regulatory, to achieve pollutant reductions sufficient to maintain or restore designated uses. Watershed-based management and restoration plans prioritize recommended actions based on cost/benefit analyses and set an implementation timeline. They also describe potential sources of funding that may be available to carry out components of the plan, identify responsible partners relative to carrying out BMPs and maintenance of SCMs, and identify measures to document success of implementation actions, etc., according to the nine mandatory elements (a-i) for watershed-based planning required by EPA and NHDES. Although many different components may be included in a watershed-based plan, EPA has identified a minimum of nine elements that are critical for achieving improvements in water quality. EPA requires that these nine elements be addressed for watershed plans funded using Section 319 funds and strongly recommends that they be included in all other watershed-based plans that are intended to remediate water quality impairments.

(a) An identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed-based plan (and to achieve any other watershed goals identified in the watershed-based plan), as discussed in item (b) immediately below. Sources that need to be controlled should be identified at the significant subcategory level with estimates of the extent to which they are present in the watershed (e.g., number of septic systems in failure; linear feet of dirt/gravel roads susceptible to erosion and tons of sediment delivered from them to receiving waters; acres of row crops needing improved nutrient management or sediment control; number of undersized stream crossings in the watershed that are vulnerable to increased runoff, overtopping and failure; and linear miles of eroded streambank needing remediation).

(b) An estimate of the load reductions expected for the management measures described under paragraph (c) below (recognizing the natural variability and the difficulty in precisely predicting the performance of management measures over time). Estimates should be provided at the same level as in item (a) above (e.g., the total load reduction expected for updated septic systems; row crops; or eroded streambanks).

(c) A description of the NPS management measures that will need to be implemented to achieve the load reductions estimated under paragraph (b) above (as well as to achieve other watershed goals identified in the watershed-based plan), and an identification (using a map or a description) of the critical areas in which those measures will be needed to implement the plan.

(d) An estimate of the amounts of technical and financial assistance needed, associated costs and/or the sources and authorities that will be relied upon, to implement the plan. As sources of funding, states should consider the use of their Section 319 programs, State Revolving Funds, U.S. Department of Agriculture's (USDA) Environmental Quality Incentives Program and Conservation Reserve Program, and other relevant federal, state, local and private funds that may be available to assist in implementing the plan.

- **(e)** An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing and implementing the NPS management measures that will be implemented.
- **(f)** A schedule for implementing the NPS management measures identified in the plan that is reasonably expeditious.
- **(g)** A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.
- **(h)** A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether the watershed-based plan needs to be revised or, if a NPS TMDL has been established, whether the NPS TMDL needs to be revised.
- **(i)** A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item (h) immediately above.

The New Hampshire NPS Management Program solicits projects to address NPS pollution through the implementation of watershed-based plans. Projects must comprehensively address NPS problems and have a quantitative way to assess progress and determine success. Watershed-based plans must have a clear water quality goal and include the nine, minimum elements (a) through (i) required by EPA. Funded projects must make reasonable progress toward achieving the water quality goal established in the plan.

The solicitation process for Watershed Assistance Grant funds administered by the New Hampshire NPS Management Program stipulates that projects must not use grant funds to implement requirements of a MS4 General Permit, the Multi-Sector General Permit or the Construction General Permit. EPA guidance clarifies that Section 319 funds may be used to fund any urban stormwater activities that do not directly implement a final MS4 permit. Municipal applicants to the Watershed Assistance Grant program for a project in a regulated MS4 area, sign their full proposals acknowledging that their project location is within a regulated MS4 area, and they certify that the actions undertaken through the project do not implement requirements of a MS4 Permit, Multi-Sector General Permit or Construction General Permit. Additionally, the municipality will not claim work completed through this project for credit toward implementation of MS4 requirements.

Therefore, collaboration between the New Hampshire NPS Management Program and New Hampshire MS4 communities remains strong as the programs work together to go beyond what is required under municipal MS4 permits while simultaneously implementing watershed-based plans.

In 2019, the CWSRF added a category to the intended use plan for Stormwater Planning with principal forgiveness. Currently, CWSRF offers 100 percent of principal forgiveness up to $100,000 to a municipality for Stormwater Planning loans. That loan amount provides the majority of funding needed to cover the costs associated with developing a WBP for most lakes in New Hampshire. This funding also covers additional work on a WBP in an area of concern or allows for updates of older watershed-based plans.

New Hampshire's NPS Management Program website provides links to completed watershed-based plans and guidance for the development of watershed-based plans to assist organizations in the development and implementation of plans designed to address EPA's key elements for watershed management planning and implementation. More information on how the New Hampshire NPS Management Program prioritizes development and implementation of watershed-based plans is described in the Priority Watersheds section of this Plan.

3.6 New Hampshire Small MS4 General Permit

In the 1987 amendment to the CWA, stormwater runoff from urban areas, construction activities and industrial sites were identified as significant sources of pollution to surface waters. As a result, EPA implemented a two-phased approach to address this through the NPDES program - NPDES Phase I and NPDES Phase II. In 1990, Phase I was implemented and addressed medium and large MS4s, construction activities associated with five or more acres of land disturbance and ten categories of industrial activities. While New Hampshire was impacted by the NPDES Phase I construction and industrial general permits, it was not impacted by the MS4 Permit. NPDES Phase I included populations of 100,000 or more, and there were no New Hampshire municipalities that met these criteria. In 1999, NPDES Phase II was promulgated and expanded upon the NPDES Phase I program by reducing the land disturbance from five acres to one acre and increased the industrial sectors from ten to twenty-nine. It was during NPDES Phase II that New Hampshire MS4 designated operators in urban areas with a population of 50,000 or more people were impacted. Entities that met this population criteria were designated as small MS4 permittees and obliged under these general permit requirements. In New Hampshire, the majority of the New Hampshire Small MS4 General Permit permittees are located in the more populated southern and southeastern portions of the state. The following small MS4 operators were identified in New Hampshire: traditional cities and towns; state, federal, county and other publicly owned properties (non-traditional) and the New Hampshire Department of Transportation (NHDOT). In 2003, EPA authorized the first New Hampshire Small MS4 General Permit. Since 2018, New Hampshire MS4 permittees have been authorized under the 2017 New Hampshire Small MS4 General Permit. While this permit expired on July 1, 2023, it was administratively extended until a new permit is administrated by EPA.

EPA is the MS4 permitting authority for New Hampshire, while the NPS Management Program provides technical assistance and guidance to the regulated entities in complying with the permit requirements. New Hampshire MS4 permittees initially organized three regional stormwater coalitions to collaborate on and address the New Hampshire MS4 Permit requirements. In recent years they have reorganized into two regional stormwater coalitions: the New Hampshire Lower Merrimack Valley Stormwater Coalition (NHLMV) and Seacoast Stormwater Coalition (SSC). The NPS Management Program is instrumental in facilitating monthly meetings for both regional stormwater coalitions with assistance from the designated municipal chairpersons and UNHSC. Assistance includes scheduling the meetings, identification of agenda items to meet New Hampshire MS4 Permit requirements, templates, guest speakers, funding opportunities, presentation of pertinent resources and preparation of meeting minutes. All resources are available on the New Hampshire MS4 website, hosted and maintained by NHDES. The NPS Management Program routinely collaborates with other NHDES programs, UNHSC, NHLMV, SSC, UNH Sea Grant, PREP and other entities on the creation of resources to meet the multitude of New Hampshire MS4 Permit requirements. While some resources are specific to New Hampshire MS4 permittees, resources created by NHDES and the New Hampshire stormwater coalitions are available, and often provided, to communities and organizations outside of the regulated MS4 areas. These resources are beneficial tools for all entities managing stormwater and with the goal of improving water quality. Available resources include the winter maintenance templates, stormwater ordinances templates, Illicit Discharge Detection and Elimination Plan template, Inspection and Maintenance Forms, education and outreach and a variety of other stormwater-related materials.

The NPS Management Program provides expertise and collaborates with other experts in the stormwater field to provide resources for permittees. These resources include the NHDES funded NPS Pollutant Loading Data project, commonly referred to as “hot spot mapping.” The hot spot mapping project provides an individualized report for each permittee, ranking and listing the municipally owned parcels (excluding conservation land) that would be the most cost-effective way to treat the greatest amount of impervious cover (IC) within the permittee’s New Hampshire MS4 regulated area. The individualized reports also contain information on the amount of total suspended solids (TSS), total nitrogen and total phosphorus loading occurring from each property. Permittees are encouraged to install new or retrofit existing SCMs, referred to as BMPs in the New Hampshire MS4 Permit, on these municipally owned properties to reduce pollutant loading to receiving waters.

The data provided to the New Hampshire MS4 permittees generated from the Hot Spot Mapping Reports helps to develop resources for communities with nitrogen impairments, phosphorus impairments or phosphorus TMDLs. New Hampshire MS4 permittees with nutrient related impairments/TMDLs are required to meet several New Hampshire MS4 Permit requirements including the creation of Nitrogen Source Identification Reports for those permittees with nitrogen impairments, Phosphorus Source Identification Reports for those permittees with phosphorus impairments and Lake Phosphorus Control Plans for those permittees with lake phosphorus TMDLs. The data from the Hot Spot Mapping Reports allows these permittees to identify which of their municipally owned properties would be the best location to implement structural and/or non-structural SCMs to reduce the amount of nitrogen/phosphorus loading into the associated impaired waterbody.

New Hampshire MS4 permittees are encouraged to use the Pollutant Tracking and Accounting Project (PTAP) database to track their nutrient reductions associated with structural and non-structural SCMs implemented within their MS4 regulated area. PTAP was developed by the UNHSC and NHDES, utilizing the EPA Region 1 approved performance curves, to provide New Hampshire communities with a method to track their nutrient reductions in order to report them within their New Hampshire MS4 Annual Reports. PTAP allows New Hampshire MS4 permittees the benefit of utilizing a uniform, defensible and consistent method for tracking nutrient reductions which can easily be shared with other entities including EPA, NHDES and other New Hampshire MS4 communities and interest groups.

Addressing the multitude of requirements associated with the New Hampshire MS4 Permit is daunting and financially challenging for the regulated New Hampshire MS4 communities and entities. As a result of the commitment from NHDES, the NPS Management Program will continue to provide technical assistance and support to permittees. While specific activities required by the New Hampshire MS4 Permit are ineligible for Section 319 Watershed Assistance Grant funds, there is crossover with the overall goals to improve water quality throughout New Hampshire regardless of a regulated MS4 community or unregulated community. NHDES has created two dedicated positions within the NPS Management Program to assist New Hampshire MS4 permittees in meeting their requirements and identifying potential funding sources to support compliance efforts.

New Hampshire MS4 permittees qualify for Section 604(b) Water Quality Planning Grants. Permitees may use funding from Water Quality Planning Grants to meet New Hampshire MS4 Permit requirements. Under Section 319 Watershed Assistance Grants, New Hampshire MS4 permittees may not use grant funds to meet permit requirements. However, Watershed Assistance Grant funding is available to projects that do not implement the requirements of the New Hampshire MS4 Permit. One of the funding sources that has been instrumental to New Hampshire MS4 permittees is the CWSRF Loan Program. NPS Management Program staff manage all CWSRF stormwater and NPS projects providing continuity and integral connections to New Hampshire MS4 permittees and other communities in addressing water quality issues. Continued success for the New Hampshire MS4 permittees relies on a combination of committed NHDES personnel resources and viable funding sources to support the New Hampshire MS4 permittees' MS4 programs. Collaboration between the New Hampshire NPS Management Program and New Hampshire MS4 communities remains strong, with efforts focused on exceeding the requirements of the New Hampshire MS4 Permit.

3.7 Cyanobacteria

Cyanobacteria (formerly known as blue-green algae) are a natural part of New Hampshire's freshwater ecosystems. However, cyanobacteria blooms are increasing due to anthropogenic impacts to the state's lakes, ponds, rivers and streams. Cyanobacteria blooms increase in likelihood with warming water temperatures and increasing amounts of nutrients, particularly phosphorus, in the state's waterbodies. During blooms, cyanobacteria can produce toxins at levels that threaten the health and safety of humans, pets, livestock and wildlife recreating in or drinking water from a waterbody. Potential health effects range from mild skin irritation to death. Testing for toxins is neither simple nor rapid, meaning that avoiding exposure is the most effective way to limit risk.

NHDES issues a cyanobacteria warning for a waterbody when cyanobacteria cell concentrations exceed 70,000 cells/mL. Warnings are not based on toxin evaluation but are issued when cyanobacteria cell count densities are at a level where toxin production may be likely. Warnings are intended as a precautionary measure for short-term exposure to cyanotoxins. When a warning is issued, resampling is performed weekly until the bloom subsides. Warnings are issued from May 15 through October 15.

NHDES may also issue a watch for a waterbody to serve as a statement to be on the lookout for a potential cyanobacteria bloom. Sometimes watches become warnings, and sometimes the bloom will pass before a warning is issued. Watches remain active for one week. Resampling only occurs if further bloom reports are submitted. Watches are issued year-round as needed.

The presence of cyanobacteria blooms can significantly interfere with recreational opportunities such as swimming. Chronic cyanobacteria blooms can have significant negative economic impacts to property values, municipal budgets and business revenues (Dodds et al., 2009; Wolf and Klaiber, 2017; Zhang et al., 2022). In 2017, UNH researchers conducted a valuation of activities in New Hampshire's freshwaters. Their findings showed that recreational fishing spending totaled $215 million per year, the economic value of visitors to New Hampshire freshwater state parks was estimated at approximately $40 million. The study also showed that non-New Hampshire registered boater visits in the state contribute $100 million to the economy (Rodgers and Watts, 2019). Warnings placed on waterbodies due to cyanobacteria blooms negatively affect the frequency of these activities and, in turn, the amount of money spent on recreation in New Hampshire. Additional studies have linked decreased water clarity and cyanobacteria blooms to decreased property values resulting in a loss of tax revenue (Dodds et al., 2009; Wolf and Klaiber, 2017; Zhang et al., 2022).

NHDES has tracked reports of cyanobacteria, primarily in the state's lakes and ponds, since the early 2000s. The frequency of bloom watches and warnings has increased due to a combination of an increasing number of blooms and public awareness. From 2004 to 2023, cyanobacteria warnings were issued for 122 waterbodies across the state (Figure 5). The New Hampshire 2020/2022 303(d) List has 94 waterbodies impaired by cyanobacteria (NHDES, 2022a). From 2018 to 2022 the average length that a cyanobacteria warning was in place was 25 days. In some waterbodies blooms have lasted more than 100 days.

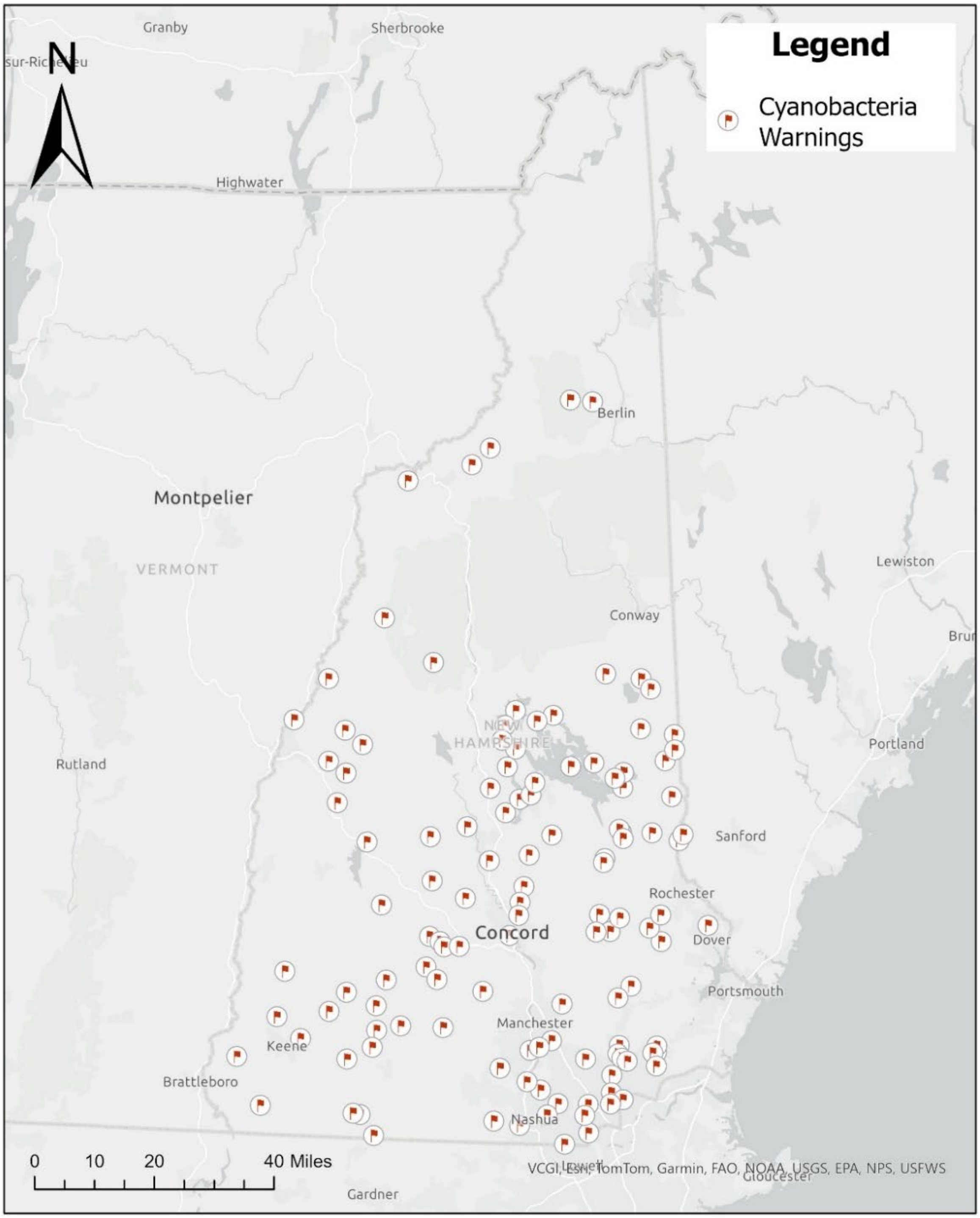

Figure 5. A map of locations with cyanobacteria bloom warnings in New Hampshire from 2004 to 2023.

In response to growing concerns about cyanobacteria blooms and the threats they pose to public health, tourism, property values and the economy, the New Hampshire legislature passed a bill directing NHDES to develop a statewide strategy to prevent and manage cyanobacteria blooms. NHDES worked with a 17-member advisory committee to develop "New Hampshire's Cyanobacteria Plan: a Statewide Strategy," which was published in November 2023. The cyanobacteria plan includes four strategies to reduce and manage blooms: 1) reduce nutrient inputs that cause blooms; 2) increase education/outreach; 3) improve monitoring and communication about active blooms and 4) protect public drinking water sources. The cyanobacteria plan includes priorities and milestones to implement each of these four strategies over the next 10 years (NHDES, 2023). The cyanobacteria plan has generated a good deal of public interest, and its implementation is a shared priority of NHDES and local stakeholders.

The cyanobacteria plan explicitly recognizes the implementation of watershed-based plans or approved alternative plans as an important part of existing and future efforts to reduce the NPS nutrient pollution that increases the likelihood of cyanobacteria blooms. As the number of blooms and public awareness of them has increased, NHDES has seen a corresponding increase in the number of lake associations inquiring about watershed planning as a tool to reduce the nutrient pollution that causes blooms. NHDES expects that trend to continue or accelerate over the coming five years.

3.8 New Hampshire Coastal Program

New Hampshire's coastal watershed has long been an important region for New Hampshire's NPS Management Program efforts. The watershed is threatened by habitat loss, NPS pollution and the effects of changing environmental conditions. Partnerships with PREP, the New Hampshire Costal Program (NHCP), Great Bay 2030 (GB 2030) and the Municipal Alliance for Adaptive Management (MAAM) offer productive avenues for leveraging the region's capacity and funding sources to conduct meaningful NPS management projects that benefit multiple priorities and programs.

One example of successful coastal NPS management includes the NPS Management Program's work with the NHCP, which is one of 34 federally approved coastal programs authorized under the Coastal Zone Management Act (CZMA) and is administered by NHDES. Through this partnership, the NHCP has provided funding to the NPS Management Program to cost-share important coastal NPS management projects including the Great Bay NPS Pollution Tracking and Accounting Project, coastal NPS Pollutant Loading Data Mapping project ("hot spots") and for support of the Seacoast Stormwater Coalition. This partnership also ensures that the NHCP fulfills its coastal NPS management responsibilities under Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990.

Additionally, NPS Management Program staff are deeply involved in the work of the Great Bay 2030 project which aims to promote a healthy Great Bay estuary system through partnerships and funding opportunities. Through GB 2030, regional partners collaborate to identify meaningful projects for funding consideration. This collaboration is conducted by work groups that focus on five focal areas including Water Quality and Quantity (WQQ). Through participation in the WQQ work group, NPS Management Program staff have helped secure GB 2030 funding for several critical coastal NPS management projects including construction of SCMs, development of a watershed-based plan for a coastal waterbody and implementation of an alternatives analysis to assess operational improvements for regional street sweeping efforts.

4.0 NPS Management Program Evaluation

The NPS Management Program staff review and, as appropriate, work with partners to revise and update the NPS Management Program Plan every five years to ensure that Section 319 funding, technical support and other resources are directed in an effective and efficient manner to support state efforts to address water quality issues on a priority watershed-scale basis. This allows for periodic revision to update program goals, objectives, milestones and measures as existing activities are completed and new activities develop.

Section 319 provisions require that states report on progress in meeting annual milestones to demonstrate NPS Management Program success and track satisfactory performance. The following evaluation measures are used to determine NPS Management Program success.

- Tracking of milestones and other NPS activities in the NHDES Measures Tracking and Reporting System (MTRS).
- Annual reporting of progress made toward objectives and milestones in the NPS Management Program Annual Report. Annual reports are available on the Watershed Assistance Section's webpage.
- Annual financial and performance reports are completed for each Section 319 grant, as required under the grant's terms and conditions.

In addition, the majority of Section 319 Watershed Assistance Grant implementation project partners are required to report pollutant load reductions achieved and track these reductions against the total reduction goal in their watershed-based plan. Most project partners also measure water quality improvement through long-term monitoring, typically through NHDES' VLAP and VRAP or UNH's LLMP. These data are tracked and reported through pollutant load reduction reports and biannual surface water quality assessments.

Annual reporting of pollutant load reduction estimates resulting from Watershed Assistance Grant implementation projects are entered in EPA's Grants Reporting and Tracking System (GRTS). GRTS is the primary tool for management and oversight of EPA's Nonpoint Source Pollution Control Program. Additional information about GRTS is available on EPA's website.

Post-implementation, water quality monitoring of restoration project sites is conducted in accordance with the CALM to determine whether an impaired waterbody AU has been restored and can be removed from the state's 303(d) List of impaired waters. New Hampshire's 305(b) Surface Water Quality Report and 303(d) Surface Water Quality List are updated and reported to EPA every two years.

5.0 PARTNERSHIPS

New Hampshire's NPS Program partners with many organizations using a variety of formal and informal mechanisms. These partners are identified, by milestone, in the Goals, Objectives and Milestones section of each NPS category of this Plan.

NHDES seeks involvement and solicits comment on significant proposed program changes from NPS Management Program partners and stakeholders through a variety of ways, depending upon the change and the specific audiences involved. When soliciting input for programmatic changes, NHDES may form expert advisory groups, host informal meetings, attend stakeholder meetings and solicit input via email or social media. When announcing programmatic changes, NHDES may use social media, blog posts, NHDES' *Environmental News*, *The Municipal EcoLink*, press releases, stakeholder email or other outreach venues to inform stakeholders.

Additional funding from partners may also be available to implement stormwater planning or infrastructure projects. These financial resources may also be used to supplement or leverage Section 319 or 604(b) grant awards. These funds are subject to congressional approval or other authority and may vary in amount from year to year.

5.1 CLEAN WATER STATE REVOLVING FUND LOAN PROGRAM

The 1987 amendments to the CWA created the CWSRF Loan Program, which provides below-market interest rates on loans to assist communities with the planning, design and construction of eligible water pollution control infrastructure projects. EPA capitalizes the CWSRF with annual grants which are used to provide loans to eligible entities. Borrowers are typically municipal or other local government entities. CWSRF funding is also available for water pollution control, watershed protection and restoration and estuary management projects that contribute to the protection of public health and water quality. Projects that address stormwater or NPS pollution problems are encouraged. Each year, New Hampshire sets aside a portion of the CWSRF for "green infrastructure" projects. In addition, the NHDES CWSRF currently offers additional subsidy for projects funded from the Project Priority List in the form of principal forgiveness. NHDES presents the CWSRF Intended Use Plan for the upcoming year's appropriation on an annual basis. Special CWSRF Loan Program initiatives for 2024 include 100 percent principal forgiveness, up to $100,000, for select wastewater and stormwater planning evaluations, including the development of (a) through (i) watershed-based plans. It also provides up to $30,000 per phase in grants for the development of a wastewater asset management program, and a maximum of $30,000 in grants for the development of a stormwater asset management program.

5.2 EPA SECTION 604(B) WATER QUALITY PLANNING GRANTS

Section 604(b) Water Quality Planning Grants are available to planning entities such as watershed organizations in New Hampshire for water quality planning purposes. Funds are allocated to project partners for conducting water quality planning, including:

- Identifying the most cost effective and appropriate NPS measures to meet and maintain water quality standards.
- Developing an implementation plan to obtain state and local financial and regulatory commitments to implement water quality plans.

- Determining the nature, extent and causes of water quality problems in New Hampshire.
- Determining which publicly owned treatment works should be constructed, taking into account the relative degree of effluent reduction attained and the consideration of alternatives to such construction.

Other eligible projects that address water quality concerns include, but are not limited to, developing corridor management plans for designated rivers; conducting monitoring to address water quality concerns; planning stormwater retrofits to address water quality impairments; green infrastructure projects that manage wet weather to maintain or restore natural hydrology; working with municipalities to adopt specific model ordinances and/or to meet regulations (MS4 permits) to address priority water quality planning concerns; and developing watershed-based plans in accordance with EPA's criteria requiring nine required elements (a) through (i).

Between $60,000 to $150,000 is made available each year through a competitive application process managed by the NHDES NPS Management Program. Funds are made available to NHDES through EPA pursuant to Section 604(b) of the CWA.

5.3 New Hampshire Drinking Water and Groundwater Trust Fund (DWGTF) Grants

In 2003, the State of New Hampshire brought a suit against the manufacturers of the gasoline additive methyl tertiary butyl ether (MtBE) because of its negative impact on the groundwater and drinking water of the state. All manufacturers but Exxon-Mobil settled before trial. The state won the lawsuit and was awarded damages for the harm caused to its groundwater and drinking water. The Legislature used this money plus accumulated interest to establish the DWGTF. The DWGTF is administered by the New Hampshire Drinking Water and Groundwater Advisory Commission who manage several loan and grant award programs with these funds. The Commission awards funding for eligible applicants and projects under three major funding categories: construction projects, source water protection projects (water supply land protection grants) and small water system feasibility studies. The commission endeavors to leverage the DWGTF to the greatest extent possible. Source Water Protection grants are capped at $500,000 per project and will fund up to 50 percent of total project costs to permanently protect high-priority water supply lands defined as wellhead protection areas, hydrologic areas of concern or high-yield stratified drift aquifers classified as GA2. Typically, two million dollars is available each funding round.

5.4 New Hampshire Local Source Water Protection Grants

Local Source Water Protection Grants, administered through the NHDES Drinking Water Source Protection Program, are available to public water systems, municipalities, regional planning commissions, nonprofit organizations, county conservation districts, state agencies, watershed associations and educational institutions for source water protection projects that include, but are not limited to, development and implementation of (a) through (i) watershed-based plans to protect public water supply sources, salt mitigation measures, low-impact development (LID), riparian buffer code adoptions and innovative stormwater practice designs. Any eligible project outlined in the application packet for the current grant cycle may apply for a grant of up to $25,000, or $30,000 for projects that address changing environmental conditions, with no match required. The grant program recently modified its eligibility criteria to allow funding for implementation of source water protection activities under New Hampshire MS4 permits. Approximately $400,000 was available for the 2024 grant round.

5.5 Conservation & Heritage License Plate Program (Moose Plate Grant)

The New Hampshire State Conservation Committee's Conservation Moose Plate Grant Program, is an annual, competitive grant program, that supports and promotes programs and partnerships throughout the state that protect, restore and enhance the state's valuable natural resources. The Conservation Grant Program's six project categories include: Water Quality and Quantity; Wildlife Habitat; Soil Conservation and Flooding; Best Management Practices; Conservation Planning and Land Conservation.

Eligible applicants include municipalities, county conservation districts, qualified nonprofit organizations engaged in conservation programs, county cooperative extension natural resource programs, public and private schools (K through 12) and scout groups.

The State Conservation Committee's Conservation and Heritage Number Plate program is funded through the purchase of license plates, known as "Moose Plates." All funds raised through the purchase of Moose Plates are used to promote, protect and invest in New Hampshire's natural, cultural and historic resources. Moose Plate funding is entirely non-federal and can be used to match Section 319 Watershed Assistance Grant funds when project goals meet the criteria for each funding program.

5.6 Aquatic Resource Mitigation (ARM) Fund

The ARM Fund, administered through the NHDES Wetland Bureau, offers an alternative to permittee-responsible mitigation when there are unavoidable impacts to streams and wetlands. In these instances, NHDES is authorized to collect funds *in-lieu of* other forms of wetland mitigation under RSA 482-A:28 and Env-Wt 800 as part of a wetlands permit application. Using a watershed-based approach, the ARM Fund payments are collected to compensate for the unavoidable losses to aquatic resources and functions. Funds are pooled according to nine, HUC-8 watersheds also known as service areas. Funds are then made available as competitive grants to fund restoration, enhancement and, in certain circumstances, preservation activities across the state. As the In-Lieu Fee sponsor, NHDES holds and manages these funds and announces an annual grant round (also called a Request for Proposals).

The ARM Fund's goal is to provide sustainable compensatory mitigation meeting the federal goal of "no net loss" of functions and values of aquatic resources by supporting restoration, enhancement, establishment and, in certain circumstances, preservation activities that are ecologically important and will effectively sustain aquatic resource functions in the watershed for the long term. The ARM Fund targets non-tidal and tidal wetland and stream projects that will compensate for lost functions in service areas where funding is available. Eligible projects include those involving reversing impacts to aquatic resources due to historic or permitted land alteration; restoring aquatic organism passage (AOP) by barrier removal and reconnecting impassable or degraded aquatic habitat; re-establishing floodplain connectivity; living shoreline and coastal habitat restoration and land protection of difficult to replace aquatic resources in certain circumstances.

Any New Hampshire municipality, town conservation commission, county government, regional planning commission, county conservation district, watershed and river association, state agency, institution of higher education, public school district and nonprofit organization or for-profit organization with a project located within the service areas is eligible to apply, provided the projects are consistent with the request for proposals and meet the terms and conditions required for Governor and Council approval.

All funded projects must be completed within three years from the grant award; result in a significant enhancement to aquatic resources at the landscape and watershed scale; include a minimum of five years of monitoring and budget for adaptive management; include long-term legal protection of all restored areas and buffer protection, as appropriate, and incorporate restricted use limitations within aquatic resource areas and buffers and comply with NHDES Wetland Rules and the Federal Compensatory Mitigation Rule.

5.7 New Hampshire Coastal Resilience Grants

The New Hampshire Coastal Program is one of 34 federally approved coastal programs authorized under the CZMA and is administered by NHDES. The Coastal Program provides funding and staff assistance to towns and cities and other local and regional groups who protect clean water, restore coastal habitats and help make communities more resilient to flooding and other natural hazards. The Coastal Program supports the region's economy by helping to preserve the environmental health of New Hampshire's coast, Great Bay and Hampton-Seabrook estuaries for fishing and shellfishing and assisting with the maintenance of New Hampshire ports, harbors and tidal rivers for commercial and recreational uses.

The Coastal Program has developed a five-year strategy under Section 309 of the CZMA that was last updated in 2020. The current revision of the Section 309 Assessment and Strategy identifies coastal hazards, cumulative and secondary impacts of development and wetland protection and restoration as high priority issues. The strategy identifies specific projects for addressing these priorities.

Additionally, the Coastal Program has targeted funds available for municipal projects that can be used to plan for resilience to coastal hazards and build sustained capacity to implement resilience plans. In 2023, approximately $160,000 was available to fund projects ranging from almost $40,000 to $60,000. Funds for this grant opportunity are provided by the National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management, under the CZMA, in conjunction with the Coastal Program.

Projects must take place within one of the 17 coastal zone municipalities and have project timeframes between 12 to 18 months. For the purposes of this funding opportunity, coastal resilience is defined as the capacity of a community or system to proactively prepare for and bounce back better from hazardous events such as hurricanes, coastal storms and long-term sea-level rise and associated impacts, rather than the ability to simply react and respond to events. Eligible applicants include all 17 coastal zone municipalities and/or municipal consultants, including nonprofit, quasi-governmental or private organizations. A 2:1 federal grant funds to non-federal match through cash or in-kind services is required.

5.8 Exotic Species Program Grants

The NHDES Exotic Aquatic Plant Control Grants are funded through fees related to boating registration and include the following:

Control Grants for Exotic Aquatic Plants are awarded to local lake associations and municipalities for the control and management of exotic aquatic plants, such as milfoil, and include the development of long-term management plans for each waterbody that requests funding. Control Grants will cover 100 percent of the treatment costs for a new infestation and will match up to 50 percent for repeat management practices. Approximately $250,000 is awarded each year.

Milfoil and Other Exotic Plant Prevention Grants have funding available each year for forward-thinking strategies that seek to prevent new infestations of exotic plants, including outreach, education, Lake Host

Programs and other activities. Approximately $225,000 to $280,000 is awarded each year.

Research Grants are available for innovative research projects by institutions of higher learning that focus on issues associated with exotic aquatic plant management, control, biology, ecology or prevention. Awards have ranged from around $5,000 to $30,000 depending on the project description and need.

5.9 Natural Resources Conservation Service (NRCS) Funding Opportunities

The USDA's NRCS provides technical and financial assistance to private landowners, many of which are agricultural producers. Some of these "working lands programs" address resource concerns associated with agricultural operations. Applications for funding are ranked and prioritized based on the environmental benefits associated with the completion of SCMs and BMPs. Applications for program funding are accepted year-round at seven field office locations (Epping, Milford, Walpole, Concord, Conway, Orford and Lancaster).

The **Conservation Stewardship Program** (CSP) is for working lands. It is the largest conservation program in the United States with agricultural and forest lands voluntarily enrolled. Eligible producers have a single opportunity to enroll in a five-year contract. There is an opportunity for a contract renewal if the initial contract was successful and additional conservation objectives are added. The program provides many benefits including increased crop yields, decreased inputs, wildlife habitat improvements and resilience to weather extremes.

The **Environmental Quality Incentives Program** (EQIP) provides financial and technical assistance to agricultural and forestry operators to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation and improved or created wildlife habitat. Financial assistance covers part of the costs to implement conservation practices on working farms, ranches and forests. Payment rates for conservation practices are reviewed and set each fiscal year. Through the National Water Quality Initiative (NWQI), EQIP funds and Section 319 funds can be targeted to mutually agreed upon priority watersheds.

The **Emergency Watershed Protection Program** (EWP) was set up by Congress to respond to emergencies created by natural disasters. It is designed to relieve imminent hazards to life and property caused by floods, hurricanes, tornadoes, windstorms, fires and other natural occurrences. The purpose of EWP is to help groups of people with a common problem. It is generally not an individual assistance program. All projects undertaken must be sponsored by a political subdivision of the state, such as a city, town, county or conservation district. The program is administered by NRCS, which provides technical and financial assistance to preserve life and property threatened by excessive erosion and flooding.

The **Agricultural Conservation Easement Program** (ACEP) protects the agricultural viability and related conservation values of eligible land by limiting nonagricultural uses which negatively affect agricultural uses and conservation values. This program aims to protect grazing uses and related conservation values by restoring or conserving eligible grazing land and protecting, restoring and enhancing wetlands on eligible land.

The **Watershed and Flood Prevention Operations Program** (WFPO) are locally led watershed solutions. These watershed conservation projects are planned and carried out jointly by local, state and federal agencies with the support of community landowners and citizens in the watershed. Communities identify resource problems to be addressed and practices to be installed, and carry out major portions of a watershed-based plan, such as obtaining easements, rights of ways, permits and local cost-share funding. All WFPO projects must have a local sponsor that can act as the fiscal agent and provide project management and oversight throughout the different phases of construction, implementation and project lifespan.

The **Regional Conservation Partnership Program** (RCPP) makes investments in climate-smart agriculture by taking a voluntary approach to expand the reach of conservation efforts and climate-smart agriculture through public-private partnerships. Funding has direct climate mitigation benefits, advances a host of other environmental co-benefits and offers farmers, ranchers and foresters new revenue streams.

In 2023, an unprecedented $1.1 billion investment was made to fund 81 projects. For fiscal year 2024, $1.5 billion is available for partner-driven conservation solutions on agricultural land.

5.10 Cyanobacteria Mitigation Loan and Grant Program

The NHDES Cyanobacteria Mitigation Fund (CMF) Program was established in June 2023 to provide low interest loans or grants to municipalities, community water systems or nonprofit lake and river watershed associations whose testing shows confirmed and chronic exceedances of the state health warning for cyanobacteria. Eligibility for CMF financial support is also extended to publicly-owned and nonprofit lake or river watershed associations that have a watershed-based plan which specifies and prioritizes sources of phosphorus loading approved by NHDES.

Eligible projects include mitigation projects in watersheds that have surface waters that have chronic and extended cyanobacteria blooms that NHDES considers to be a threat to the long-term health of waterbodies; or an NHDES approved watershed-based plan that specifies and has prioritized the external and internal sources of nutrient loading.

Figure 6. Cyanobacteria bloom on a New Hampshire lake.

5.10.0.a Partnerships Goal, Objectives and Milestones

Partnerships (P) Goal: The NPS Management Program has strong partnerships with local, state and federal agencies, as well as other organizations in New Hampshire.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective P-1 Existing and new NPS Management Program partnerships result in an increased understanding of NPS issues and the importance of clean water.	**Milestone P-1.1** Existing and new NPS partners and stakeholders participate in statewide NPS programs and watershed projects. *Partners: NHDES, Section 319 grantees, Section 604(b) grantees, watershed organizations, municipalities, nongovernmental organizations and universities*	**Measure P-1.1a** NHDES staff present NPS related issues in two NPS outreach activities per year through planning assistance or presentations.					
		Measure P-1.1b NPS Management Program staff assist with two watershed project outreach-related activities annually.					
	Milestone P-1.2 NPS Management Program partner/stakeholder audiences, including 319 grantees, have access to NPS information and are able to obtain answers to NPS-related questions. *Partners: NHDES NPS Management Program, Section 319 grantees, Section 604(b) grantees, municipalities and watershed organizations*	**Measure P-1.2a** Press releases are distributed for Section 319 Grant projects when awarded.					
		Measure P-1.2b Regular updates are provided using the Watershed Protection and Restoration Forum.					
	Milestone P-1.3* New Hampshire municipalities are familiar with low-impact	**Measure P-1.3a** At least 20 New Hampshire Stormwater Coalition meetings are coordinated and facilitated annually.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	development practices, local stormwater regulations, technical assistance and other technical and financial resources. *Partners: NHDES, Natural Resource Outreach Coalition, municipalities, Lower Merrimack Valley Stormwater Coalition and Seacoast Stormwater Coalition*	**Measure P-1.3b** Outreach materials are reviewed or updated annually for New Hampshire MS4 permittees to meet water quality goals.	■	■	■	■	■
		Measure P-1.3c Coordinate with New Hampshire MS4 stormwater coalition chairs to convene a regional stormwater coalition meeting.					■
		Measure P-1.3d NPS Management Program staff maintain the New Hampshire MS4 website with meetings, resources and calendar updates.	■	■	■	■	■
		Measure P-1.3e NPS Management Program staff update New Hampshire stormwater coalitions with the most current impairments and TMDLs from the Section 303(d) and 305(b) assessments.		■		■	
	Milestone P-1.4 Align priority watersheds with the TMDL Program. *Partners: NHDES NPS Management Program and NHDES TMDL Program*	**Measure P-1.4a** TMDL Program staff consult the NPS Management Program watershed priority list to identify priority watersheds for TMDL development.	■	■	■	■	■
		Measure P-1.4b Watersheds with TMDLs are priorities for watershed-based plan development.	■	■	■	■	■
	Milestone P-1.5 The CWSRF Program regularly funds stormwater and nonpoint source projects, including development of watershed-based plans. *Partners: NHDES NPS Management Program and NHDES CWSRF Program*	**Measure P-1.5** At least six eligible CWSRF loans available for stormwater planning and nonpoint source projects are on the project priority list to be funded annually.	■	■	■	■	■

***** This milestone does not implement any federal permit requirements. While the NPS Management Program collaborates closely with entities regulated under NPDES Permits to mitigate the effects of stormwater runoff throughout the state, Section 319 funds are not allocated to meeting federal permit requirements.

6.0 Section 319 Program Administration

The 1987 amendments to the CWA established the Section 319 NPS Management Program. Under Section 319, EPA provides funding to states, territories and tribes to implement a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific NPS implementation projects.

NHDES administers the Section 319 grant award received from EPA in accordance with the national EPA guidance for state NPS management programs and the EPA-NHDES Performance Partnership Agreement. Currently, the Section 319 award is divided into two categories, NPS program funds and watershed project funds. Section 319 grant NPS program funds are used to support the implementation of the goals and activities described in this Plan including staff time. Following EPA requirements, the New Hampshire NPS Management Program uses at least 50 percent of funds (watershed project funds) to implement on-the-ground watershed projects guided by a watershed-based plan (a through i) or an EPA-approved alternative plan. Project funds may not be used for planning activities such as developing a watershed-based plan or TMDL unless authorized to do so by EPA.

The Section 319 NPS Management Program in New Hampshire follows EPA's "Nonpoint Source Program and Grants Guidelines for States and Territories," issued May 4, 2024, and operates under the NHDES NPS Management Program Quality Assurance Program Plan – RFA# 20097 dated September 1, 2020.

The staff within the NHDES Watershed Assistance Section administer New Hampshire's NPS Management Program. In addition to collaborating with NPS partners to implement statewide programs, WAS staff administer the pass-through Watershed Assistance Grants Program that awards and monitors sub-grants of EPA's Section 319 and 604(b) grant awards to NHDES. Under the pass-through grant programs, WAS staff work with municipalities, universities, state agencies, nonprofits, watershed associations, regional planning commissions (RPCs) and other organizations to develop watershed-based plans, river corridor plans or other planning projects with Section 604(b) Water Quality Planning Grants and to implement watershed-based plans or alternative plans with Section 319 funds. Section 319 grant recipients implement projects to restore impaired waters and protect high-quality waters. Past projects have led to 11 NPS Success Stories though the restoration of waterbodies impaired by NPS pollutants and subsequent removal of designated use impairments. EPA NPS Success Stories highlight projects that result in partially or fully restored waters (Type 1), waters that show progress toward achieving water quality goals (Type 2) and waters that show ecological restoration (Type 3). Additionally, projects that result in the protection of high-quality waters through the prevention of water quality degradation caused by NPS pollution and/or watershed alteration (Type 4) and in waters where projects to improve water quality are implemented but have not resulted in an observed water quality improvement yet (Type 5) may be highlighted in future, New Hampshire NPS Success Stories.

New Hampshire NPS Management Program staff also collaborate on other water quality planning and implementation projects using alternative funding such as the CWSRF. A staff member from WAS is assigned as a project manager to each NPS grant project to provide technical support and monitor a grantee's progress toward implementing the project's goals and deliverables. These grants and loans support local projects that generate actions to restore or protect water quality and enhance the designated uses of the state's waters by addressing sources of NPS pollution, hydromodification of surface waters and habitat losses.

NHDES has well-established financial management and programmatic systems to ensure that Section 319 funds are used efficiently and consistently in accordance with EPA guidance. All statutory and grant conditions applicable to Section 319 grants received by the state are included in contracts and grant awards made to subgrantees to ensure that all recipients follow all federal requirements. Further, such requirements are included in grant funding announcements and requests for proposals issued by WAS so that subgrantees are aware of them prior to commencing a project.

The State of New Hampshire has an integrated accounting system with separate accounts for individual programs. The accounts are reconciled monthly between the State of New Hampshire’s accounting System (NHFIRST) and NHDES’ Oracle system (NHDES Ledger) to ensure the proper recording of financial transactions. Payment is then requested and received via electronic funds transferred through the federal Automated Standard Application for Payments (ASAP) on the following business day. Procedure manuals and approval processes are in place to strengthen internal controls and ensure the terms and obligations defined in the EPA grant agreement are met.

Implementation of the NPS Management Program Plan focuses on a combination of internal and partner programs and is based upon a foundation of what is currently practical and resourced. The issue of NPS pollution in New Hampshire is much larger than the program can accomplish with current resources. Many local programs are either oversubscribed or lack the funding required to alleviate the burden of matching funds. This severely limits the commitment among potential partners willing to address NPS pollution in New Hampshire. The NPS Management Program could not carry the heavy workload nor leverage as many funds without its partners.

There is a perpetual need to address statewide NPS stressors and to identify the resources, partnerships and capacity to strategically and effectively administer the 319 NPS Management Program as outlined in this Plan. Concurrently, there is an acute need for continued, holistic, strategic and effective watershed-based planning and implementation activities to address the escalating occurrence, frequency, severity and longevity of harmful, and with increasing regularity, toxic cyanobacteria blooms on freshwater lakes, ponds and even rivers. The environmental, economic and human health impacts from increased nutrient runoff and concentrations of phosphorus and nitrogen in New Hampshire surface waters require an aggressive strategy to either maintain or restore designated uses of swimming, fishing and boating. Designing and installing SCMs, implementing non-structural BMPs and in-lake treatments within the context of implementing watershed-based plans throughout the state needs to incorporate state of the science resiliency in order for these practices to continue to generate the pollutant load reductions expected.

Several sources of funding are available to conduct NPS assessment, planning and mitigation work in New Hampshire. These include grants, loan programs (CWSRF), direct funding and in-kind contributions. However, many of these resources are highly competitive, limit how funds can be spent and have numerous requirements which can present a significant challenge to organizations in securing the resources needed to protect and restore New Hampshire’s vast network of water resources. Successful NPS mitigation at the watershed scale often leverages multiple funding sources and takes a significant amount of effort to raise and maintain funding. New Hampshire NPS Management Program staff invest significant time administering grant awards to grantees, working alongside project partners to identify and secure necessary funding to create or implement WBPs, and to raise awareness, build capacity and empower NPS project partners to address the major NPS pollutant categories and management strategies identified within this five-year NPS Management Program Plan.

6-A Section 319 Program Goal, Objectives and Milestones

Section 319 Program Administration (319) Goal: The NPS Management Program is managed efficiently and effectively.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective 319-1 The NPS Management Program Plan is up-to-date and used to track satisfactory progress.	**Milestone 319-1.1** Completion of annual milestones, objectives and goals in the NPS Management Program Plan are tracked and reported in the NPS Program Annual Report. *Partner: NHDES NPS Management Program.*	**Measure 319-1.1** Documentation of completed plan elements in the NPS Annual Report, the Measures Tracking and Reporting System (MTRS) and other relevant reports and systems.					
	Milestone 319-1.2 The NPS Management Program Plan is updated every five years to reflect program changes and success toward meeting NPS Program goals and progress is reported annually. *Partners: NHDES, existing NPS partners, and future NPS stakeholders to be determined.*	**Measure 319-1.2a** The completed NPS Management Program Plan update for years 2030-2034 is approved by EPA prior to October 1, 2029.					
		Measure 319-1.2b The NPS Management Program Report is submitted to EPA annually.					
	Milestone 319-1.3 Grant work plans are developed, applications for Section 319 funding are submitted and required reports are completed. *Partners: NHDES Watershed Assistance Section, EPA, 319 Grantees and NPS partners to be determined.*	**Measure 319-1.3a** NPS Management Program staff work plans are recorded in the MTRS database with regular progress reporting.					
		Measure 319-1.3b Annual grant progress reports are submitted to EPA.					
Objective 319-2 Funding is adequate to fulfill NPS Management Program Plan objectives and dollars are used	**Milestone 319-2.1** Apply and manage Section 319 funding from EPA as part of the NHDES Performance Partnership Grant (PPG) and continuing environmental program grant.	**Measure 319-2.1** Grant dollars are spent by the grant end date and no later than five years from the start date.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
efficiently and are consistent with legal obligations.	*Partners: NHDES NPS Management Program and EPA.*						
	Milestone 319-2.2 Update/review scoring criteria and project eligibility requirements for 319 and other funded projects managed by the NPS Management Program. *Partner: NHDES Watershed Assistance Section.*	**Measure 319-2.2** Grant application scoring and eligibility criteria are reviewed and updated annually.					
	Milestone 319-2.3 Requests for Proposal (RFPs) for 319 sub-awards are released to allow ample time for state and EPA approval and the execution of 319 sub-awards by NHDES as soon as feasible after federal 319 dollars are made available. *Partners: NHDES Watershed Assistance Section and EPA.*	**Measure 319-2.3** 319 sub-awards are obligated within one year after the EPA grant award.					

7.0 PRIORITY WATERSHEDS

Restoration of NPS-impaired waters remains the primary goal of the New Hampshire NPS Management Program; however, not all waters in New Hampshire have sufficient data to determine whether or not water quality impairments exist. For example, as of 2022, about 65 percent of lakes and 89 percent of rivers had enough data to be assessed for the aquatic life integrity designated use. Per Env-Wq 1702.17, aquatic life integrity is defined by a surface water's ability to support aquatic life, including a balanced, integrated and adaptive community of organisms having a species composition, diversity and functional organization comparable to that of similar natural habitats of the region. This designated use has the strongest correlation with NPS impacts from stormwater-related pollutants in New Hampshire. According to the "2020/2022 Section 305(b) Report," 50 percent of all impaired waterbodies in New Hampshire are impaired due to stormwater runoff and the NPS pollutants carried with it. NHDES has categorized stormwater influenced parameters to include substances such as bacteria, nutrients, metals, sediments, dissolved oxygen, chloride, fish and bug bioassessments, as well as habitat assessments (NHDES, 2022b). See Table 7-2 for the complete list of stormwater influenced parameters.

New Hampshire's NPS Management Program provides funding for both restoration and protection activities at the watershed scale. Based upon history and current active projects it is estimated that over the next five years, approximately 80 percent of the program's time and funding will be expended on restoring impaired waters with the remaining 20 percent devoted to protecting and improving threatened waters.

Table 7-1: Number of Assessment Units (AUs) in Each of NHDES' Assessment Categories for the Aquatic Life Integrity Designated Use

	NHDES Assessment Category*	Fresh Water Impoundment	Fresh Water Lake	Fresh Water River	Salt Water Estuary	Salt Water Ocean	Grand total
Full Support	2-G	-	-	-	-	1	**1**
	2-M	-	-	-	-	-	**-**
Insufficient Information	3-PAS	20	28	272	2	-	**322**
	3-ND	1,118	1,015	4,609	27	25	**6,794**
	3-PNS	10	51	88	1	-	**150**
Impairments	4A-M	2	152	2	-	-	**156**
	4A-P	-	31	1	-	-	**32**
	4B-M	-	-	1	-	-	**1**
	4B-P	-	-	1	-	-	**1**
	4B-T	-	-	1	-	1	**2**
	4C-M	6	11	8	-	-	**25**
	4C-P	5	4	6	-	-	**15**
	5-M	44	213	690	5	-	**952**
	5-P	18	59	263	36	-	**376**
	5-T	1	-	1	-	-	**2**
Grand total		**1,224**	**1,564**	**5,943**	**71**	**27**	**8,829**

***** Definitions for Assessment Categories can be found in the New Hampshire CALM.

There are many factors that affect the actual allocation of program resources directed toward restoration versus protection activities in a given year including but not limited to partner participation, existence of a NHDES- and EPA-approved (a) through (i) watershed-based plan or alternative plan, cost/benefit ratio, scheduling, likelihood of success, consideration of the project's impact on communities with environmental justice concerns, the project's incorporation of changing environmental conditions and general quality and thoroughness of the proposal.

New Hampshire's NPS Management Program recognizes that there are still important water quality benefits to be gained from implementing protection projects that prevent further degradation or protect high-quality water where it exists. This section describes the process of prioritizing restoration and protection activities to achieve clean watersheds in New Hampshire.

7.1 Priority Areas for NPS Management Activities

In 2024, NHDES completed a priority analysis, using the RPST developed by EPA, to identify geographic areas of the state where NHDES should focus its limited resources among the large number of waters in need of restoration or protection.

The RPST and PPST uses the ecological, stressor and social characteristics of each watershed and AU to identify those places with the greatest likelihood for restoring or maintaining water quality. Representative indicator metrics (shown in Tables 7-3 and 7-4) were selected by NHDES and used to calculate a specific recoverability or protection score for each watershed and AU. Depending on the score, each watershed was assigned low, medium or high recovery or protection potential.

The restoration and protection priorities and rationale are described in their respective sections below. A complete description of the prioritization activity using the RPST and PPST, including the geographic scope, AU and HUC-12 watershed delineation, indicator metrics used, data gathering methods, ranking and mapping results is described in the *Priority Areas for Nonpoint Source Management Activities in New Hampshire: NHDES Methodology for Prioritizing Water Quality Restoration and Protection Activities* in Appendix A.

Priority watersheds identified in the NPS Management Program Plan may also serve as the basis for decision-making with respect to priorities for monitoring, TMDL development and implementation, CWSRF loans for NPS projects and, most importantly, for developing (a) through (i) watershed-based plans in New Hampshire.

Table 7-2: Stormwater Influenced Parameters

Stormwater Influenced Parameter Name
Aluminum
Ammonia (Total)
Ammonia (Un-ionized)
Benthic-Macroinvertebrate Bioassessments (Streams)
BOD, Biochemical oxygen demand
Chloride
Chlorophyll-*a* (chl-*a*)
Copper
Cyanobacteria hepatotoxic microcystins
Dissolved oxygen saturation
Enterococcus
Escherichia coli
Excess Algal Growth
Fecal Coliform
Fishes Bioassessments (Streams)
Habitat Assessment (Streams)
Lead
Low flow alterations
Other flow regime alterations
Oxygen, Dissolved
Sedimentation/Siltation
Total Suspended Solids (TSS)
Turbidity
Nitrogen (Total)
Phosphorus (Total)
Zinc

7.2 Priorities For Restoration Activities

In New Hampshire, impairments are made at the AU level. An AU is the basic unit of record for conducting and reporting the results of all water quality assessments. To provide a finer level of detail for the recoverability analysis, NHDES received assistance from Cadmus Group to obtain a subset of ecological, stressor and social characteristics at the AU level. The recoverability analysis for restoration activities included all AU watersheds that have one or more NPS-related impairment(s). The recoverability analysis calculated recovery scores based upon the ecological, stressor and social metrics in Table 7-2.

7.2.1 Rivers

New Hampshire has nearly 17,000 stream and river miles that flow through the state (NHDES, 2022a). Priority for restoration activities is given to those river AUs and associated watersheds that have completed NHDES and EPA-approved (a) through (i) watershed restoration plans or alternative plans, or that ranked medium or high priority in the RPST analysis and meet the following river priority criteria:

1. The waterbody has a committed organization, association or other group associated with it such as a state Designated River local advisory committee or watershed association.
2. The waterbody has an established water quality monitoring program.
3. The organization has regular interaction with water quality professionals.

The river priority criteria (1-3 listed above) can be met by participating in VRAP. See Appendix B for the River Watersheds Recovery Potential Ranking List.

7.2.2 Lakes

New Hampshire has over 800 lakes and ponds greater than ten acres in size, also known as great ponds. The priority for restoration activities is given to those lake watersheds that have completed NHDES and EPA-approved (a) through (i) watershed restoration plans or alternative plans, or that ranked medium- or high-priority in the RPST analysis and meet the following lake priority criteria:

1. The waterbody has a committed organization, association or other group associated with it.
2. The waterbody has water quality data regularly collected under a NHDES recognized sampling program.
3. The organization has regular interaction with limnology professionals.

The lake priority criteria listed above can be met by participating in VLAP or LLMP.

4. Alternatively, the lake priority criteria can be met if the waterbody is an impoundment with impairments directly related to an artificial barrier, and a decision has been made to investigate barrier removal.

See Appendix C for the Priority Lake and Impoundments Recovery Potential Ranking List.

Table 7-3: Recoverability Metrics Used in Recovery Potential Analysis

Characteristic	Metric
Ecological	Watershed Size
	Watershed % Draining to ≤ 3rd Order Streams*
	Watershed % In-state
	Watershed % Unimpaired
	Watershed % Forested
	Watershed % Natural Cover
	Watershed % Wetlands
	Active River Area % Forested
	Active River Area % Natural Cover
	Active River Area % Wetlands
Stressor	Watershed Aquatic Barriers
	Corridor Road Crossing Density
	Watershed Mean Soil Erodibility
	Number of 303(d) Listed Causes
	Watershed % Agriculture
	Watershed % Impervious Cover
	Watershed % Urban
	Watershed % 100-year Flood Zone
	Active River Area % Agriculture
	Active River Area % Impervious Cover
	Active River Area % Urban
Social	Approved TMDL
	EPA Approved (a) Through (i) or Alternative Watershed-Based Plan
	Jurisdictional Complexity
	Local River Advisory Committee
	Number of Drinking Water Intakes
	Watershed % Assessed
	Watershed % in New Hampshire MS4 Regulated Area
	Watershed % Low-Income Population
	Watershed % Protected Land

* Percent Draining to ≤ 3rd Order Streams was not included in the ecological metrics for the lakes recovery priority analysis.

7.2.3 Beaches

A designated beach is an area on a waterbody with a separate AU that is operated for bathing, swimming or other primary water contact (NHDES, 2022c). New Hampshire has nearly 400 freshwater and coastal designated beaches. According to an EPA-approved TMDL, nearly 150 public bathing beaches of the designated beaches have documented allowable bacteria loadings and associated reductions needed to meet water quality standards. Priority for restoration activities is given to designated beaches with a bacteria TMDL or that is impaired by stormwater influenced parameters. The list of priority beaches is included in Appendix D. Beach TMDLs are provided in the following documents:

- "Total Maximum Daily Load (TMDL) Report for 3 Bacteria Impaired Waters in New Hampshire" (NHDES, September 2015).
- "Total Maximum Daily Load (TMDL) Report for 44 Bacteria Impaired Waters in New Hampshire" (NHDES, September 2013).
- "Total Maximum Daily Load (TMDL) Report for 58 Bacteria Impaired Waters in New Hampshire" (NHDES, August 2011).
- "New Hampshire Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters" (FB Environmental for NHDES, September 2010).
- "Total Maximum Daily Load (TMDL) Study for Bacteria in Mill Pond Town Beach, Washington, NH" (NHDES, September 2006).
- "Total Maximum Daily Load (TMDL) Study for Bacteria in Sand Dam Village Pond Town Beach, Troy, NH" (NHDES, September 2006).
- "Total Maximum Daily Load (TMDL) Study for Bacteria in Hampton/Seabrook Harbor" (NHDES, May 2004).

7.2.4 Estuaries

The Great Bay and Hampton-Seabrook estuaries are the largest, distinct estuarine systems in New Hampshire. The Great Bay estuary begins at the confluence of the Piscataqua River with the Atlantic Ocean and extends to the head-of-tide dams on the Winnicut, Squamscott, Lamprey, Oyster, Bellamy, Cocheco, Salmon Falls and Great Works Rivers. The Great Bay estuary covers approximately 13,440 acres (21 square miles). The Hampton-Seabrook Estuary starts at the confluence of the Hampton River with the Atlantic Ocean and extends to the head-of-tide on the Taylor, Blackwater, Browns and Hampton Falls Rivers. The Hampton-Seabrook Estuary covers approximately 1,227 acres (1.9 square miles). Other estuaries of importance include Little Bay, Little Harbor and Rye Harbor, as well as portions of their tidal tributaries. Because of their environmental, cultural and economic significance, NHDES has assigned high priority to all the state's estuaries and their tidal tributaries.

7.3 Priorities for Protection Activities

The protection of healthy waters, including high-quality, unimpaired and at-risk waters that are degrading but not yet impaired is a vital component of managing NPS pollution (EPA, 2024b). New Hampshire does not have a formal list of healthy waters. Therefore, in the absence of a documented impairment, water quality is assumed to be high and supporting designated uses. In many cases, an AU that is only impaired for one parameter or designated use ranks high for protection consideration and NPS implementation activities due to generally high-quality for other parameters or designated uses. This Plan's protection analysis was completed at the HUC-12 scale by calculating protection scores based upon the ecological, stressor and social metrics in Table 7-4.

Table 7-4: Protection Metrics Used in the Protection Potential Analysis

Characteristic	Metric
Ecological	Watershed % Draining to ≤ 3rd Order Streams
	Watershed % Forest
	Watershed % Natural Cover
	Watershed % Wetlands
	Active River Area % Forest
	Active River Area % Natural Cover
	Active River Area % Wetlands
Stressor	Watershed Aquatic Barriers
	Watershed % in 100-year Flood Zone
	Watershed % Impervious Cover
	Watershed % Urban
	Active River Area % Impervious Cover
	Active River Area % Urban
	Corridor Road Crossing Density
	Number of 303(d) Listed Causes
Social	EPA Approved (a) Through (i) or Alternative Watershed-Based Plan
	Jurisdictional Complexity
	Local River Advisory Committee
	Number of drinking water intakes
	Watershed % Agriculture
	Watershed % in New Hampshire MS4 Regulated Area
	Watershed % In-state
	Watershed % Low-Income Population
	Watershed % Protected Land

Priority for protection activities is given to those watersheds that have completed, NHDES and EPA-approved (a) through (i) watershed-based plans or approved alternative plans, or that ranked medium or high priority in the PPST analysis. See Appendix E for the HUC-12 Protection Potential Ranking List.

7-A Priority Watersheds Goal, Objectives and Milestones

Priority Watersheds (PW) Goal: Water quality in priority watersheds is protected and restored.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective PW-1 Grant Funding is awarded to projects with the greatest likelihood for successful restoration or protection activities.	**Milestone PW-1.1** Annual grant solicitation process utilizes watershed prioritization as the basis for funding projects. *Partner: NHDES NPS Management Program.*	**Measure PW-1.1** 100% of grants awarded annually are in watersheds deemed a priority by NPS Management Program staff.					
Objective PW-2 Watershed-based plans are developed and implemented in priority watersheds.	**Milestone PW-2.1** Restoration and protection projects identified in existing watershed-based plans are implemented. *Partners: NHDES NPS Management Program and Section 319 grantees.*	**Measure PW-2.1** Sixteen restoration and four protection projects are completed through a competitive grant award process by 2029.					
	Milestone PW-2.2 New watershed-based plans are developed, and existing watershed-based plans are updated, where needed, to comply with EPA's nine minimum elements (a) through (i). *Partners: NHDES Watershed Assistance Section, Section 319 and 604(b) grantees and CWSRF partners.*	**Measure PW-2.2** Five new or updated watershed-based plans or alternative watershed-based plans in restoration or protection priority watersheds that meet EPA's nine minimum elements (a) through (i) are developed by 2029.					
	Milestone PW-2.3 Progress toward implementing watershed-based plans is efficiently tracked, including action item implementation, condition and maintenance surveying of SCMs and other relevant information. *Partners: NHDES NPS Management Program and Section 319 grantees.*	**Measure PW-2.3a** Five SCM condition assessments are completed per year to determine general conditions of 319 or CWSRF loan-funded SCM installations.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
		Measure PW-2.3b Every SCM implementation project requires SCM Operation and Maintenance agreements to support follow-up maintenance for 319 or CWSRF loan funded SCMs to improve performance and life expectancy.	■	■	■	■	■
Objective PW-3 Progress toward water quality improvement is quantified.	**Milestone PW 3.1** Watershed-based plan implementation efforts result in measurable water quality benefits. *Partners: NHDES NPS Management Program, Section 319 grantees and other monitoring programs.*	**Measure PW-3.1** Estimated annual reductions of nitrogen, phosphorus, sediment and other project-relevant parameters are reported annually into GRTS and included in the NPS Management Program Annual Report.	■	■	■	■	■
	Milestone PW-3.2 Potential assessment unit delisting, partial delisting and implementation projects are tracked so that EPA NPS Success Stories can be drafted as soon as possible. *Partners: NHDES, Section 319 grantees, EPA and volunteer monitoring groups.*	**Measure PW-3.2** Confirmation monitoring is completed annually in watersheds where watershed-based plans have been implemented to determine whether delisting of water quality impairments is warranted.	■	■	■	■	■
	Milestone PW-3.3 EPA NPS Success Stories (Types 1-5) are approved and published on EPA and NHDES websites to demonstrate program success. *Partners: NHDES NPS Management Program, Section 319 grantees and EPA.*	**Measure PW-3.3** Two EPA-approved NPS Success Stories are completed by 2029.		■			■

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	Milestone PW-3.4 NHDES and agency partners provide assistance to applicants seeking permits for in-lake treatments to prevent chronic cyanobacteria blooms and remove related impairments by addressing internal loading of phosphorus to lakes and ponds from benthic sediments. In-lake treatments occur once installations of SCMs to control external nutrient loading have achieved sufficient progress toward meeting pollutant load reduction targets established in watershed-based plans. *Partners: NHDES, Section 319 grantees and Cyanobacteria Mitigation Fund grantees.*	**Measure PW – 3.4** Successful treatment of one lake or pond using a permitted in-lake treatment to inactivate internal loading of phosphorus from benthic sediment when warranted under Administrative Rule Env-Wq 2300.					

8.0 Priority NPS Pollutant Categories

NPS pollutant sources are divided into minor and major categories. Goals, objectives and measurable annual milestones are included in this Plan for each Major NPS Pollutant Category.

8.1 Major NPS Pollutant Categories

Major categories of NPS pollution are sources that cause the most water quality impairments or threaten water quality degradation in high-quality watersheds. The priority restoration and protection activities associated with these major categories include technical and financial assistance, planning and implementation. A detailed description of the pollutant category, measures to control NPS pollution, key programs and partners, goals, objectives, milestones and measures of success are included for each Major NPS Pollutant Category.

Major NPS Pollutant Categories in New Hampshire include:

- Developed Land
- Hydrologic and Habitat Modification
- Subsurface (Septic) Systems
- Transportation
- Lawns and Turfgrass Management
- Agriculture

8.1.1 Developed Land

Background

New Hampshire’s population reached 1,402,054 on July 1, 2023 according to U.S. Census Bureau estimates. Though the state had more deaths than births in the past three years, the state gained population because nearly 31,000 more people moved to the state than out of it. New Hampshire’s percent population gain since 2020 exceeded that of every state in the Northeast except Maine and was greater than the overall U.S. gain.

All ten of New Hampshire’s counties gained population between 2020 and 2023, compared to only 52 percent of all counties gaining population nationwide. Rockingham County, situated in southeast New Hampshire, had the largest population gain of 6,500 people (U.S Census Bureau, 2024). According to the New Hampshire Department of Business and Economic Affairs, the population in New Hampshire is projected to reach 1,501,909 in 2025. Migration to New Hampshire will be the main factor of population growth. “Between 2020 and 2025, the state is projected to have a net in-migration of 51,600 and we anticipate that in-migration to be consistent – between 50,000 and 52,500 in each 5-year time period” (Scardamalia, 2022).

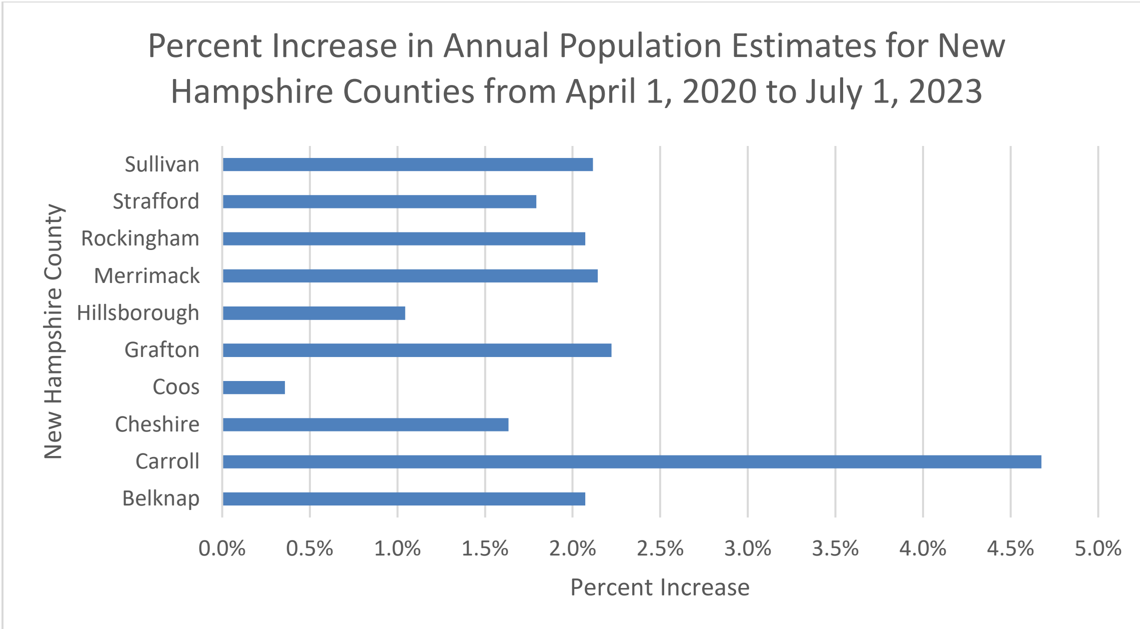

Figure 7. The percent increase in the estimated annual population of New Hampshire counties from April 1, 2020 to July 1, 2023.

With the growth of population comes growth of impervious surfaces. Treating runoff from impervious surfaces is an important strategy for nonpoint source pollution management. Impervious surfaces, such as parking lots, roads and buildings do not allow precipitation to soak into the ground. When rainwater falls on these surfaces, stormwater runoff can carry pollutants into nearby waterbodies. Studies show that water quality declines in watersheds with more than 10 percent impervious cover (Schueler, T.R., 1994). As New Hampshire's population continues to grow and more land is developed, impervious surfaces are increasing. In the Piscataqua Region watershed, for example, impervious surfaces have increased to 48,427 acres in 2021 compared to 46,594 acres in 2015, an increase of 1,834 acres, or 4 percent (2023, PREP). Some of the largest increases of impervious surfaces in the coastal watershed between 2015 and 2021 occurred in Rochester (155 acres), Dover (109 acres) and Epping (72 acres) (PREP, 2023). Statewide impervious cover estimates developed by NHDES show that impervious cover accounts for less than 2 percent of the land area in rural regions of the state but comprises 4 to 12 percent of land area in more populated regions of the state (Figure 8).

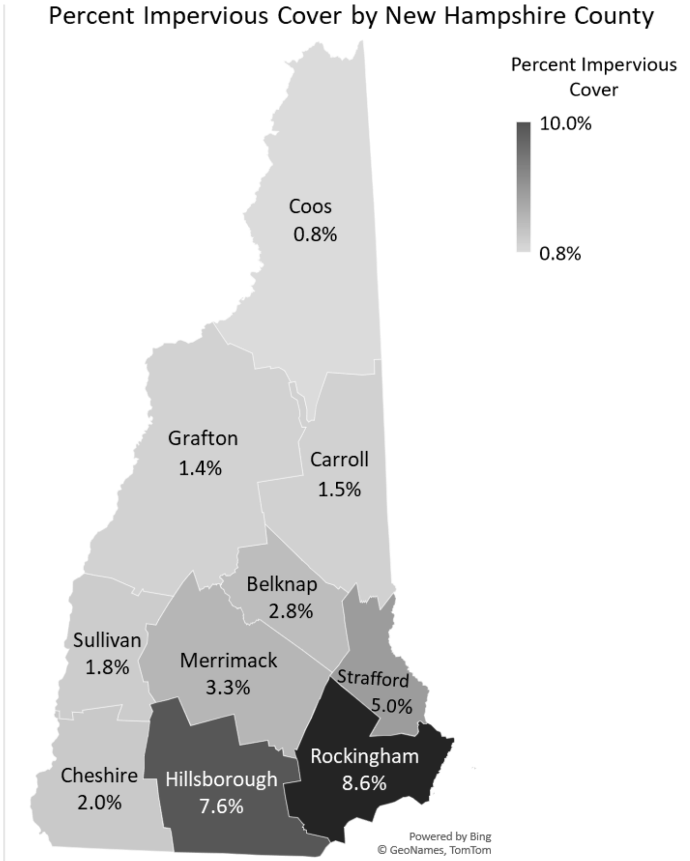

Figure 8. The percent of impervious cover by New Hampshire county 2021.

According to the "NHDES 2020/2022 Section 305(b) Surface Water Quality Report", approximately 50 percent of impaired waterbodies are impaired due to stormwater influenced parameters including bacteria, nutrients, metals, sediments, dissolved oxygen, chloride, fish and bug assessments and habitat assessments. Approximately 21 percent of impaired waterbodies are impaired by nutrient related parameters such as ammonia, total nitrogen, total phosphorus, cyanobacteria, excess algal growth, dissolved oxygen and chl-*a*. Out of all types of impaired waterbodies in the state, estuarine waters are most negatively impacted by stormwater runoff, with approximately 97 percent impaired due to stormwater influenced parameters. Nine square miles, or 53 percent of impaired estuaries are impaired by nutrient related parameters (NHDES, 2022b). The "Great Bay Nitrogen Non-Point Source Study" (GBNNPSS) reports that stormwater runoff delivers 34 percent of the nitrogen load to Great Bay. Without adequately addressing the existing problems associated with stormwater runoff across the state, additional degradation of the state's water resources is likely (NHDES, 2014).

Changing environmental conditions exacerbates the challenges already faced by population growth and increased land development. The frequency of extreme precipitation events is projected to more than double by 2100 under a high emissions scenario of 4°C warming by 2100 compared to pre-industrial levels measured from 1851-1900 (Runkle et al, 2022). These extreme rain events lead to an increase in stormwater runoff, causing issues such as an increase in pollutants and destabilization of channels and erosion. Additionally, increased impervious surfaces can cause stormwater flows to dramatically increase within a shorter time span. More rapid flows and greater volumes of stormwater allow for increases in sediment transport that is contaminated with pollutants, bank erosion, stream downcutting and the potential for exposure and damage to critical infrastructure.

Severe rain events can also put an added strain on wastewater treatment plants that process stormwater. In a combined flow system, an increase in rain events can inundate a stormwater system and lead to more overflows of untreated water being released directly into local streams, rivers, lakes and other waterbodies. Overflows of untreated water degrade water quality, including drinking water sources, like rivers and reservoirs. Furthermore, land development that includes expansion of roadways and parking lots, can prompt higher winter salt usage, resulting in runoff that is contaminated with chlorides that can adversely impact the quality of surface water and groundwater, including private and municipal drinking water sources. This not only affects water quality, but negatively affects aquatic life and may contribute to infrastructure degradation via corrosion.

Figure 9. Banfield Brook inlet after a major storm event. Photo Credit: Big Pea Porridge Watershed Preservation Association

Another extreme weather condition that is expected to have environmental impacts on New Hampshire is warming ambient temperatures. Southern counties in New Hampshire are projected to have the greatest increase in hot days due to changing environmental conditions. Rockingham County is projected to have 5 to 20 more days above 95°F, compared to 1990-2020; based on the low emissions scenario of 2°C warming and high emissions scenario of 4°C warming by 2100 compared to pre-industrial levels measured from 1851-1900, respectively (USGCRP, 2024). According to the New Hampshire Climate Assessment, more frequent warm-season droughts are projected through the 21st century (Lemcke-Stampone et al, 2022). As droughts become more prevalent, water supplies may deplete as groundwater and surface water sources are not replenished naturally by rainfall. Drought also affects soil compaction and contributes to the likelihood of flash floods, further exacerbating water quality issues.

An increase in extreme precipitation events will become more likely with changing environmental conditions, and contribute to excessive stormwater runoff, compared to slower moving, gradual, rain events that allow for more infiltration. As the number of days over 95°F increase (Figure 10) and stormwater runoff surges due to extreme rain events, this could lead to additional nutrient loading and cyanobacteria blooms in surface waters. In New Hampshire, sea levels are expected to rise 0.6 to 2.0 feet by 2050 and 1.6 to 6.6 feet by 2100. It is important to plan for increases in sea level that will affect current and future development (New Hampshire Coastal Risk and Hazards Commission, 2016).

As changing environmental conditions continue to influence stormwater concerns, there will be a greater need for data-informed considerations during the design of new stormwater systems or the upgrade of existing systems during land development. This could involve integration of historical, current and future projected flood conditions when considering an appropriate SCM or designing for capacity needs of stormwater infrastructure.

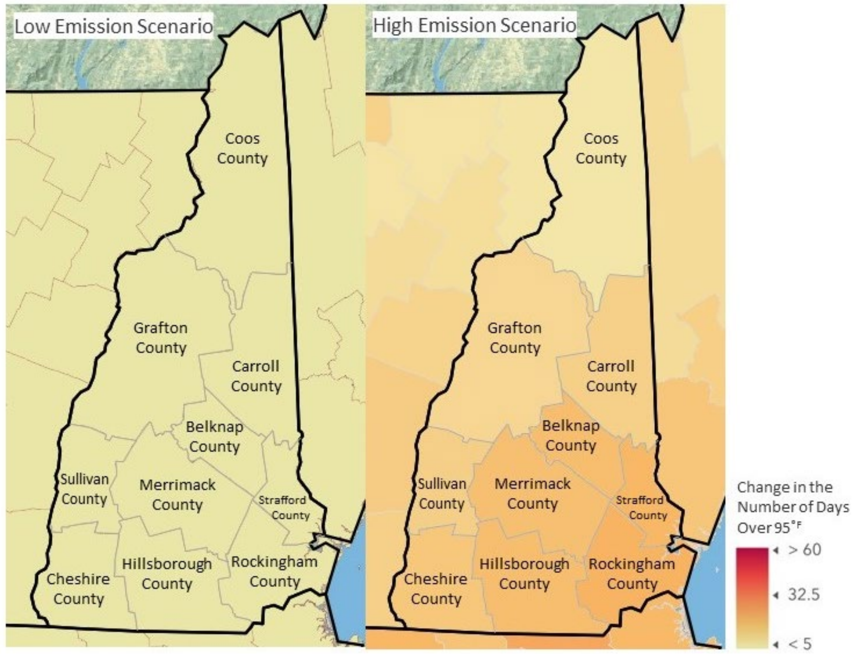

Figure 10. Change in number of days over 95˚F (left - low emissions scenario, right - high emissions scenario).

Over the past few decades, New Hampshire stormwater programs and guidance documents have been developed to provide municipalities, property owners, designers, developers and regulatory personnel with tools to help address and minimize the impacts of development and balance the needs of a healthy environment with other societal interests and economic growth. One of these documents is the *New Hampshire Stormwater Manual*, developed in 2008 by NHDES, in conjunction with stormwater practitioners. The goal of the stormwater manual is to provide a reference guide for the selection, design and application of measures to manage stormwater from newly developed and redeveloped properties, while meeting environmental objectives of New Hampshire regulations.

In response to evolving science and available technologies for stormwater management, new, local and federal permit requirements and increasing precipitation events, an assessment of the 2008 *New Hampshire Stormwater Manual* was conducted in 2020 as a collaborative effort between NHDES, EPA, New Hampshire municipalities, UNHSC, stormwater experts and practitioners. The assessment identified specific areas of the existing stormwater manual to update, such as best practices and stormwater regulations; and now includes changing environmental conditions and detailed information on site design/evaluation. The assessment laid the groundwork for the updated stormwater manual, which was developed through a partnership between NHDES and UNHSC, with consulting assistance from Comprehensive Environmental, Inc.

The primary goal of the stormwater manual update is to present state-of-the-practices for stormwater management in New Hampshire. The manual also provides guidance on stormwater design criteria required by various local, state and federal regulations and permitting programs. As the science and available technologies for stormwater management are constantly evolving, a state-of-the-practice may in some cases be “a step ahead” or differ from regulatory requirements and related design criteria which are only updated periodically. Stormwater practioners and watershed management partners are encouraged to contact applicable regulatory programs for the most up-to-date rules and regulations.

Municipalities statewide are under increasing pressure to address water quality issues caused by stormwater runoff, primarily through stormwater general permits administered by EPA under the NPDES General Permit for Stormwater Discharges, including the New Hampshire Small MS4 General Permit. Permit requirements are met through collaborative efforts between NHDES, the stormwater coalitions, UNHSC and other organizations, including the creation of templates, outreach materials and other stormwater related resources to provide an efficient and holistic means of addressing New Hampshire's water quality issues.

Another NPDES stormwater permit is the Great Bay Total Nitrogen General Permit (GBTNGP) which covers 13 eligible wastewater treatment facilities (WWTF) that discharge treated wastewater containing nitrogen within the Great Bay watershed in New Hampshire. One objective of the load limits established for the WWTFs through the GBTNGP is that limited investments would be necessary for facility upgrades in the short term, with potential investments only occurring in the long term if flows increase (based on population growth) and the facility must then treat nitrogen to a lower concentration in order to continue to meet the load limit at higher flows. This trade-off allows municipalities to plan for immediate and ongoing voluntary investments in nonpoint source and stormwater point source nitrogen reductions, while planning for and incorporating investments at the WWTFs, if necessary, in the future.

NPS Management Program staff partner with UNHSC and MAAM to support the Pollution Tracking and Accounting Project (PTAP) database and to assist communities in entering NPS implementation activities for tracking and load reduction quantification. NHDES is no longer funding PTAP which had received funding from many NHDES sources including NHCP, CWSRF and Section 319 Watershed Assistance Grants over the years. PTAP is currently funded by MAAM, a group of municipalities subject to the GBTNGP.

Addressing the New Hampshire MS4 Permit and GBTNGP requirements, and other stormwater related issues associated with land development, is financially challenging for communities. The CWSRF has been utilized by several communities for planning, implementation and the creation of asset management programs for stormwater. Though funding comes from CWSRF, project management is supported by NPS Management Program staff.

Though New Hampshire doesn't currently have any municipalities with stormwater utilities, regulatory pressure may eventually drive stormwater utility development in New Hampshire, as it has where EPA proposed the use of Residual Designation Authority (RDA). The RDA allows EPA to require NPDES permits for other stormwater discharges or categories of discharges on a case-by-case basis. This has resulted in the adoption of stormwater utilities in cities and towns in Maine, Massachusetts and Vermont. Stormwater utilities provide a means to collect fees from residents and businesses to be used for stormwater resource improvements and implementation of SCMs. Stormwater utilities provide financial resources to address the significant stormwater infrastructure needs documented in the 2022 Clean Watershed Needs Survey. This survey estimated the cost of managing effective municipal stormwater programs in New Hampshire to be over $767 million for stormwater and $36 million for hydromodification (USEPA, 2022). The documented needs occur both in regulated MS4 areas and outside of MS4 areas throughout New Hampshire.

Funding municipal stormwater infrastructure has been an ongoing challenge in New Hampshire. Stormwater management and planning competes for funding with services like schools, fire and police, drinking water and more. Across the country and in surrounding states, stormwater utilities are increasingly becoming a resource to assist municipalities with meeting costs to manage effective stormwater programs. Despite enabling legislation and several attempts to engage municipalities in exploring stormwater utilities, none have been adopted in New Hampshire. Assistance efforts have included:

- In 2008 and 2009, the NHDES Watershed Assistance Grants Program provided funding for studies in Manchester, Dover, Portsmouth and Nashua to determine the feasibility of stormwater utilities as a funding source for their municipal stormwater programs.
- In 2008, RSA 149-I was adopted to enable municipalities to create municipal stormwater utilities.
- In 2010, the New Hampshire Legislative Committee to Study Issues Related to Stormwater recommended using "stormwater utilities as a means of providing the revenues, as well as the incentives needed to facilitate implementation of stormwater management programs statewide." (HB 1295, 2010)
- In 2017, EPA Region 1, UNHSC, NHDES and other partners hosted the New England Stormwater Finance Forum at UNH, Durham.
- NHDES, EPA Region 1, UNHSC, New Hampshire stormwater coalitions and Great Bay National Research Reserve hosted and/or promoted several stormwater utility related workshops, presentations and webinars.
- In 2019, a Coastal Fellow was hired to work with the NHCP and PREP. Work was completed for a feasibility study to bring a stormwater utility to Dover, New Hampshire. The stormwater utility was voted down in 2023.
- In 2020, Concord, New Hampshire published a Stormwater Utility Feasibility Study, however this was not adopted by the City.
- In 2023, New Hampshire's Cyanobacteria Plan recommended that municipalities adopt stormwater utilities as a tactic to reduce the likelihood of cyanobacteria blooms.

NHDES and the NPS Management Program will continue to work with any municipality that would like assistance with implementing a stormwater utility.

The Soak Up the Rain New Hampshire (SOAKNH) program addresses stormwater runoff and associated pollutants from residential and small business properties. It is a statewide, voluntary program that works through outreach and education, technical assistance and capacity and partnership building. The program is based around NHDES' *New Hampshire Homeowner's Guide to Stormwater Management Do-It-Yourself Stormwater Solutions for Your Home*.

Figure 11. A rain garden at the Woodman Museum in Dover.

The New Hampshire NPS Management Program will continue to work, collaboratively and holistically with partners of all sizes to manage stormwater originating from developed lands. These measures include education and outreach, training opportunities, social media resources, source controls, design techniques, structural and non-structural measures and construction practices designed to minimize adverse hydrologic and water quality impacts to New Hampshire's landscapes.

Resources

- New Hampshire Alteration of Terrain (AoT) Permit Program (RSA 485-A:17)
- New Hampshire Alteration of Terrain Permit Program (Env-Wq 1500)
- EPA National Pollutant Discharge Elimination System Programs
- New Hampshire Small MS4 General Permit
- Great Bay Total Nitrogen General Permit
- New Hampshire Stormwater Regional Coalitions' MS4 Website
- New Hampshire 401 Water Quality Certification
- Soak Up the Rain New Hampshire
- New Hampshire Stormwater Manual
- Model Stormwater Standards for Coastal Watershed Communities
- Post Construction Model Stormwater Standards for Coastal Watershed Communities, 2017

8.1.1-A Developed Land Goal, Objectives and Milestones

Developed Land (DL) Goal: Runoff from developed lands is managed in such a way that water quality is not degraded.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective DL-1 NPS Management Program partners understand the costs associated with managing stormwater from developed lands.	**Milestone DL-1.1** Federal, state and local decision makers understand New Hampshire's stormwater capital needs and associated costs and identify potential funding sources. *Partners: NHDES, municipalities and New Hampshire stormwater coalitions.*	**Measure DL-1.1** Potential funding sources are identified as they become available, and announcements are provided to municipalities regarding viable sources.					
	Milestone DL-1.2 The CWSRF is used for the development of an Asset Management Program for municipalities. *Partners: NHDES, municipalities and New Hampshire stormwater coalitions.*	**Measure DL-1.2** At least four CWSRF Asset Management loans/ grants are awarded annually to New Hampshire municipalities specific to stormwater assets.					
Objective DL-2 NPS Management Program partners have access to an array of funding opportunities to implement stormwater-related projects.	**Milestone DL-2.1** The 604(b) Water Quality Planning Grants are used for NPS and stormwater-related planning projects. *Partners: NHDES Watershed Assistance Section and 604(b) Grantees.*	**Measure DL-2.1** At least one 604(b) grant is awarded to NPS and stormwater-related planning projects each year.					
	Milestone DL-2.2 Municipalities pursue the development of individual or regional stormwater utilities in New Hampshire to provide adequate, diverse and sustainable funding of equitable stormwater programs. *Partners: NHDES, legislators, municipalities, New Hampshire stormwater coalitions, NHCP and UNHSC.*	**Measure DL-2.2** Assistance is provided to municipalities to complete at least one new stormwater utility feasibility study by 2029.					
	Milestone DL-2.3 The CWSRF is used to fund NPS and stormwater projects in New Hampshire.	**Measure DL-2.3a** At least one annual meeting is held with the NHDES Wastewater Engineering Bureau to					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	Partners: NHDES CWSRF Program, municipalities and New Hampshire stormwater coalitions.	discuss barriers to obtain CWSRF funds and work creatively to increase opportunities for stormwater and nonpoint source projects.					
		Measure DL-2.3b* An annual announcement is made to New Hampshire Stormwater Coalitions and other New Hampshire municipalities to promote stormwater projects for CWSRF applications.					
		Measure DL-2.3c CWSRF loans are awarded for priority NPS and stormwater, stormwater asset management, stormwater planning and stormwater resiliency planning CWSRF projects annually.					
	Milestone DL-2.4 NHDES Watershed Assistance Grants are used for nonpoint source and stormwater projects that protect or restore water quality in New Hampshire. *Partners: NHDES, municipalities, regional planning commissions, nonprofit organizations, county conservation districts, state agencies, watershed associations, water suppliers and local advisory committees.*	**Measure DL-2.4** At least three priority NPS and stormwater projects that protect or restore water quality are awarded Watershed Assistance Grants annually.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective DL-3 State and local regulatory programs are more fully protective of water quality and minimize the stormwater impacts from developed lands.	**Milestone DL-3.1** Determine whether changes are needed to the AoT Rules (Env-Wq 1500) to improve water quality protection and climate resilience. *Partners: NHDES, NHDES AoT Bureau, New Hampshire Chapter of American Council of Engineering Companies and UNHSC.*	**Measure DL-3.1** The NHDES AoT section and NPS Management Program coordinate biannually to discuss potential changes to rules and regulations as they pertain to NPS pollution.					
	Milestone DL-3.2 Attend CWSRF and Drinking Water State Revolving Fund (DWSRF) Sustainability Meetings. *Partners: NHDES NPS Management Program, CWSRF Program and DWSRF Program.*	**Measure DL-3.2** At least six CWSRF and DWSRF Sustainability Meetings are attended annually.					
Objective DL-4 Professional engineers, state and local regulators and regulated entities have an improved understanding of how stormwater SCMs function and perform over the long term.	**Milestone DL-4.1*** The use of methods as described in Appendix F of the 2017 New Hampshire Small MS4 General Permit to calculate phosphorus and nitrogen load reduction credits for structural and non-structural SCMs are encouraged. *Partners: NHDES NPS Management Program, NHDES AoT Bureau, CWSRF Program, ARM Program, UNHSC, municipalities and watershed groups*	**Measure DL-4.1** The load reductions resulting from SCM implementation activities are credited using methods outlined in the 2017 New Hampshire Small MS4 General Permit.					
	Milestone DL-4.2* The tracking and accounting of NPS implementation activities through the Great Bay Pollution Tracking and Accounting Project (PTAP) is promoted. The use and adoption of PTAP by municipalities beyond the Great Bay watershed is encouraged. *Partners: NHDES NPS Management Program, UNHSC and municipalities.*	**Measure DL-4.2** The PTAP database is utilized by municipalities to track implementation of SCMs and quantification of SCMs and the performance of other NPS implementation activities.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	Milestone DL-4.3 The use of watershed pollution hot spot maps in planning and implementing cost effective NPS controls are promoted and encouraged. The use of hot spot mapping methods for other regions of the state is encouraged. *Partners: NHDES NPS Management Program, UNHSC, NH GRANIT, regional planning commissions, municipalities and watershed groups.*	**Measure DL-4.3** Pollution hot spot maps are produced and/or updated; regional and municipal partners use maps to plan and implement NPS management actions annually.					
	Milestone DL-4.4 The *New Hampshire Stormwater Manual* is reviewed bi-annually. *Partners: UNHSC and NHDES.*	**Measure DL-4.4** The Stormwater Manual is reviewed by NPS Management Program and UNHSC staff. New technology and scientific data are reviewed, and the manual is revised as appropriate.					
	Milestone DL-4.5 Outreach is conducted for the updated *New Hampshire Stormwater Manual*. *Partners: UNHSC and NHDES.*	**Measure DL-4.5** Outreach on the updated stormwater manual is conducted.					
	Milestone DL-4.6 Southeast Watershed Alliance Post Construction Stormwater Management Standards are finalized. *Partners: UNHSC and NHDES.*	**Measure DL-4.6** Southeast Watershed Alliance Post Construction Stormwater Management Standards are finalized by 2029.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective DL-5 Stormwater SCMs are adequately maintained and continue to function through their intended design life.	**Milestone DL-5.1** Hands-on training and technical assistance is provided to municipal public works staff and professional landscapers on the installation and maintenance of low-impact development stormwater practices. *Partners: New Hampshire Municipal Association members, UNHSC, New Hampshire Landscape Association, UNH Cooperative Extension, New Hampshire Sea Grant and NHDES NPS Management Program.*	**Measure DL-5.1** One training is conducted biannually.					
Objective DL-6 New Hampshire residents understand the connection between land use and water quality.	**Milestone DL-6.1** Resources are provided to local organizations interested in participating in the SOAKNH Program. *Partners: NHDES*	**Measure DL-6.1** SOAKNH Program resources are updated and made available annually.					
	Milestone DL-6.2 Collaborations with stakeholder organizations are established to build capacity to create local SOAKNH groups who work in their communities to spread the "Soak Up the Rain" message and install SCMs. *Partners: NHDES and SOAKNH Program-eligible organizations.*	**Measure DL-6.2** At least one local watershed group is engaged annually.					
	Milestone DL-6.3 Site-level SCMs are installed through the SOAKNH program. *Partners: NHDES and SOAKNH Program-eligible organizations.*	**Measure DL-6.3** At least one SCM installation is completed annually. Installation information including location and pollutant loading estimates are reported on the SOAKNH website.					

***** This milestone does not implement any federal permit requirements. While the NPS Management Program collaborates closely with entities regulated under NPDES Permits to mitigate the effects of stormwater runoff throughout the state, Section 319 funds are not allocated to meeting federal permit requirements.

8.1.2 Hydrologic and Habitat Modification

Background

The management of rivers and streams in New Hampshire has deep historic roots due to persistent human use of these resources for transportation, food, water, power and waste disposal. The benefits provided by flowing waters brought human development to the banks of rivers and caused conflicts between humans and natural forces in river corridors and their floodplains. Evidence of these conflicts are most noticeable on the valley floors and floodplains of large river basins where river channels were physically moved and straightened across entire valleys to make room for agriculture, transportation and housing. Early management of river channels often worked against natural river processes. When trying to treat a problem in this manner, the typical result is that the problem gets worse. These problems have been further exacerbated by more frequent extreme weather events in recent years that have increased the risk to public and private infrastructure, often leading to costly, long-term commitments to managing rivers. In New Hampshire and much of the northeast United States, historic changes to river and stream corridors have disrupted natural form and processes, and have often led to increased channel instability, catastrophic flooding, reduced water quality and the impairment of aquatic habitat.

Figure 12. The Suncook River after extensive restoration efforts to stabilize the stream channel due to an avulsion during the 2006 Mother's Day flood.

There is a growing movement of managing and restoring rivers to return natural processes whenever and wherever possible within the context and limitations of the current watershed condition. As river and stream protection and restoration project planning has evolved, so too have the principals of design. Scientists and community-based restoration and protection groups are coming together to try and move towards standard design methodologies and monitoring protocols. Every project is different, yet standardization of design protocols, based on problem identification, river or stream type, corridor condition, watershed characteristics and project objectives, advances the practice of river and stream restoration toward a truly natural-process approach. Integration of fluvial geomorphology principles and natural stream channel design concepts whenever possible at the watershed and stream or river reach scale is imperative.

The New Hampshire landscape is crisscrossed with almost 17,000 miles of stream and river corridors where poor river and stream planning and management practices meet at the intersection of high-risk and high-hazard stream and river crossings, over-developed floodplains, increasing development patterns and more frequent and extreme weather events (NHDES, 2022a). Planners and practitioners from federal, state, municipal, local, nonprofit and private sectors must continue to pursue resilient flood mitigation strategies that balance infrastructure, public safety, flood attenuation, river continuity, aquatic organism passage, water quality, water quantity and aquatic habitat.

New Hampshire is fortunate to have a strong river and stream assessment, protection and restoration community that thrives on networking, sharing expertise and experiences and partnering resources to address centuries-old impacts to river and stream form and function. The NPS Management Program has been, and continues to be, an important partner in river and stream protection and restoration efforts across the state. This is only possible with the support from a network of external and internal fluvial geomorphologists, natural stream channel design experts, academic researchers, fisheries specialists, wetland scientists and nonprofit organizations throughout the state and region dedicated to the protection and restoration of natural resources and professional engineers who specialize in stream and river restoration project design, permitting and construction. Multiple river and stream restoration projects achieved through selective dam removal, state-of-the-science stream crossing improvements, stream daylighting and natural channel design and bioengineering applications throughout the state showcase stream and river management and restoration success based upon sound planning, design, permitting and construction. The growing suite of successful stream and river restoration and stabilization projects in New Hampshire is an invaluable resource for NPS Management Program staff to refer to and visit with prospective project partners interested in restoring water quality, hydrologic and hydraulic connectivity, floodplain function, AOP and building resilience into existing infrastructure.

Perhaps the most dramatic examples of successful hydrologic and habitat modification restoration successes in New Hampshire are associated with stream and river restoration through selective dam removals. Although considered some of the most complex and controversial environmental restoration projects to undertake, river and stream restoration projects through selective dam removal have yielded multiple NPS success stories in New Hampshire, restored miles of aquatic organism passage and flood storage capacity behind outdated, unstable and in many cases, too costly to repair barriers that have interrupted the natural function and form of streams and rivers throughout the state. Dam removal projects provide opportunities to realize what true environmental restoration looks and sounds like when these barriers are removed. This is especially impactful at head of tide dams where the tide cycle, freshwater flows and migratory fish runs are returned to their natural conditions after more than a century of interrupted flow. Much work remains to be done and it can only be accomplished with the continued support of committed stream and river restoration professionals from federal and state agencies, municipalities, nonprofit organizations and individual property owners who are dedicated to protecting and restoring New Hampshire’s flowing surface waters and furthering the understanding of impacts from human activities that alter hydrology and habitat.

Rivers

The New Hampshire Rivers Management and Protection Program (RMPP) was established in 1988 with the passage of RSA 483 to protect certain rivers, called designated rivers, for their outstanding natural and cultural resources, and to provide a forum to balance the competing uses of the state's rivers. Currently, there are over 1,000 miles of designated rivers, spanning 125 communities and five unincorporated places and state parks. Twenty-two Local River Management Advisory Committees (LACs), made up of over 200 volunteers, are charged with developing local river corridor management plans and reviewing and commenting on activities affecting designated rivers, including alteration of terrain, wetlands, shoreland, water quality certifications, underground storage tank and pesticide permit applications. LAC members also review and comment on Federal Energy Regulatory Commission relicensing processes and provide valuable outreach and education services to their communities. In many cases, LACs are the first point of contact for community members who notice unusual stormwater discharges into a stream, or who are concerned about erosion and stormwater runoff. LACs also work with local and state officials when unpermitted discharges or water quality issues are discovered.

One aspect of the RMPP is the NHDES Instream Flow Program, which is designed to ensure that designated rivers have adequate flow during periods of drought to support the habitat needs of fish and wildlife while also supplying water for drinking, agriculture, industry and recreation. Protected instream flows are developed for each river that reflect the critical magnitude, timing, duration and frequency of flows necessary for the most sensitive uses of the river. Once protected flows are defined, NHDES staff work with water users to ensure that critical water needs are met for both humans and wildlife.

Of the 19 designated rivers in New Hampshire, two rivers, the Lamprey and Souhegan rivers, have defined protected instream flows and are under flow management plans. Two additional rivers have approved and adopted instream flows with water management plans either nearly completed (Cold River) or in progress (Warner River). Three rivers, the Ashuelot, Isinglass and Pemigewasset, are under study for development of instream flows. River studies for the development of instream flows involves a survey of the full length of the river from headwaters to confluence or designated river segments when gaps exist relative to designated river status in the RMPP. River corridor surveys involve noting areas of erosion, ecological communities, discharges and water withdrawals. Study data establishes a baseline on the rivers' health, which will serve as a reference point for comparing data collected during ongoing, long-term monitoring. The RMPP prioritizes each designated river for inclusion in the Instream Flow Program by analyzing the availability of historical stream flow data with the expectation that 30 years of flow and discharge records must be recorded or modeled for reliable flow criteria to be calculated. The prioritization process goes through public review and comment before a river is identified as candidate for inclusion in the Instream Flow Program.

Wetlands and Shoreland

The New Hampshire Shoreland Water Quality Protection Act (SWQPA) was enacted in 1991 and established minimum standards for the subdivision, use and development of shorelands adjacent to the state's public water bodies. In 2008, several changes were made to the SWQPA, including addressing limits on impervious surfaces, the removal of vegetation in waterfront buffers, shoreland protection along rivers designated under RSA 483 and the establishment of a permit requirement for many new construction, excavation and filling activities within the protected shoreland. During the 2011 legislative session, changes were made to vegetation requirements within the natural woodland and waterfront buffers and the impervious surface limitations, and a new shoreland permit-by-notification process was added.

In March 2004, the NHDES Wetlands Bureau adopted a set of mitigation rules that establish what is necessary for an applicant to provide for wetland compensation. The rules spell out ratios for wetland creation, restoration and upland preservation, relative to the type of wetland lost through the proposed development. During the 2006 legislative session, the General Court enacted Senate Bill 140, known as Aquatic Resource Mitigation. The law became effective on August 18, 2006, and NHDES adopted rules for operation of a wetland mitigation fund on June 20, 2007.

In lieu of the traditional forms of mitigation, NHDES adopted a payment option for applicants unable to find other meaningful mitigation. The ARM Fund (see Section 5.6) provides wetland permit applicants the opportunity to make a payment into a watershed account; payments are aggregated on a watershed basis and are then disbursed to significant restoration or land conservation projects through a competitive application process. The ARM Fund program has been very helpful for permit applicants and has resulted in many significant wetland preservation and restoration projects across the state.

The NPS Management Program and sub-grantees have leveraged ARM resources on several occasions, implementing comprehensive restoration projects to address severe degradation of aquatic and shoreland habitats within scopes of work defined in Watershed Assistance Grant project areas. Several of these projects have led to the removal of existing impairments and contributed to publication of NPS success stories.

Figure 13. Perched culverts impede AOP.

Stream Crossing and Flooding

An example of New Hampshire's strong river and stream stewardship efforts lies in the New Hampshire Stream Crossing Initiative (NHSCI). Created from a 2008 legislative recommendation, this partnership has brought together experts from NHDES, NHDOT, New Hampshire Fish and Game, New Hampshire Division of Homeland Security and Emergency Management and the University of New Hampshire Technology Transfer Center (UNH T2) to develop and maintain a unified stream crossing assessment protocol. The long-term goal of NHSCI is to conduct field assessments of every stream crossing (culverts and bridges) in the state. Field data is then analyzed to score stream crossings based on geomorphic compatibility, hydraulic vulnerability, aquatic organism passage and structure condition. As of 2024, 74 percent of the 21,780 stream crossings throughout New Hampshire have been assessed. The initiative demonstrates the successful collaboration of multiple partners and experts, across agencies, working together to address the problem posed by undersized culverts in the state, relative to flood risk, infrastructure failure, water quality impacts and diminished or non-existent aquatic organism passage in stream networks.

For each stream crossing assessed, a suite of data on the crossing structure and the river or stream in which the structure resides is publicly available online via the Statewide Asset Data Exchange System (SADES) and NHDES Aquatic Restoration Mapper. The *New Hampshire Stream Crossing Initiative Field Manual* specifies that a total of six photographs be collected at each stream crossing, including the bed and banks upstream and downstream. For each assessed crossing, final datasets are run through a geomorphic compatibility tool, which provides guidance on crossings that are not fully compatible with river and stream processes, and an aquatic organism passage compatibility tool, which identifies crossings that are partially or completely incapable of aquatic species passage. Crossings, typically culverts, that are not fully compatible geomorphologically are those that are undersized compared to the river or stream channel that enters them or have an entry angle not aligned with the stream. Additionally, the New Hampshire Geological Survey (NHGS), with multiple state partners and one regional planning commission, evaluates assessed culverts for hydraulic vulnerability, or the ability of a culvert to pass a range of predicted flows (5, 10, 25, 50 and 100-year recurrence intervals). Hydraulic vulnerability evaluations identify culverts that are predicted to overtop the roadway above the culvert during high-flow events. The collected, assessed, published and publicly available data allows New Hampshire to have a robust repository of data and photographs pertaining to its rivers and streams across the state which can support a variety of decision-making processes, beyond culverts themselves. In recent years, the data have been used to support stream crossing replacement projects to ensure properly sized crossings statewide. Stream crossing assessment data has also been included in river corridor management plans, watershed-based plans and local hazard mitigation plans.

NHDES is currently pursuing grant funding to develop stream crossing replacement prioritization planning tools and an associated training program to further encourage the use of this data set to promote multi-benefit stream crossing replacement projects. The training program will feature in-person and virtual training modules as well as a suite of 'how to' guidance documents on incorporating stream crossing prioritization into existing and new planning processes and documents such as watershed-based plans, capital improvement plans and hazard mitigation plans. In the face of changing environmental conditions, planning and merging traditional asset management techniques with resiliency tools such as the prioritization planning tool is pivotal to focus sufficient funding on multi-benefit infrastructure projects that will function for their entire lifespan. This training will help to bridge the gap between the transportation and environmental sectors, educating practitioners and decision-makers on the benefits of looking beyond the culvert or beyond the fish passage counts to incorporate nature-based solutions into roadway safety projects with methodologies such as bank stabilization, floodplain restoration and aquatic organism passage in mind. Incorporating this training into the suite of training offerings regularly hosted by UNH T2, like the existing partnership between NHDES and UNH T2 for the Certified Culvert Maintainer program, will provide a stable and broad-reaching platform for the work with a well-established support network and infrastructure.

Additionally, during the late 2000s through the mid-2010s, NHDES, led by NHGS, oversaw the collection of river reach geomorphic condition data for 394 miles of rivers in New Hampshire. Coverage is primarily concentrated in southern and western New Hampshire. For those rivers assessed, data is available on locations of bank armoring, erosion, channel straightening, accumulations of large woody material jams, alluvial fans, among other geomorphic features. This data, though considerably more limited in spatial scope as compared to the stream crossing data, is available to watershed management practitioners by request and may be used alongside the stream crossing data for future river corridor and watershed management planning efforts. Information on specific locations assessed are available from NHGS at NHDES.

River And Stream Restoration Through Selective Dam And Barrier Removal

Under New Hampshire RSA 482:2, II and Env-Wr 101.09, a dam is any artificial barrier that impounds or diverts water and has a height of six feet or more, or is located at the outlet of a great pond. The New Hampshire River Restoration Task Force, formed in 2000, continues to explore opportunities to remove dams selectively and strategically for a variety of reasons, and to work collaboratively to assemble the financial and technical resources needed to achieve project success. Primary catalysts for considering selective dam removal in New Hampshire continue to be restoring rivers and streams, eliminating public safety hazards associated with aging infrastructure, increasing flood storage capacity restoring aquatic life integrity and addressing public health concerns on impoundments that do not meet their designated uses for primary and secondary contact recreation. The NPS Management Program works directly with the NHDES Dam Bureau River Restoration Coordinator, consultants, nonprofit organizations, dam owners and watershed stakeholders to determine the feasibility of restoring river or stream segments throughout the state by removing existing barriers.

New Hampshire has more than 5,250 active and inactive, registered dams and countless unregistered dams and artificial barriers that impede stream and river flow and aquatic organism passage. This number is constantly changing due to the discovery of dams that were constructed and not registered or have breached. Many of these barriers no longer provide a valuable function and instead, contribute to water quality or habitat impairments. Selective barrier removal can restore streams and rivers to healthier, free-flowing conditions and can remove barrier-related impairments to water quality and habitat. Dams and barriers (culverts, collapsed bridges etc.) identified for removal in New Hampshire may be eligible for EPA CWA Section 604(b) Water Quality Planning Grant or Section 319 Watershed Assistance Grant funds. To determine project eligibility, the New Hampshire NPS Management Program will consider the following:

- The dam or barrier impounds or diverts water.
- The waterbody and associated AUID upstream and/or downstream of the dam or barrier does not support designated uses.
- The dam or barrier owner has contacted either the NHDES Dam Bureau, the River Restoration Program coordinator or NPS Management Program staff to express their interest in removal.
- A feasibility study, geomorphic assessment or other recognized alternative to a watershed-based plan has been completed to be eligible for Watershed Assistance Grant implementation funds.
- The barrier is in poor condition, has reduced or no aquatic organism passage, is mostly or fully incompatible relative to geomorphic compatibility and is either vulnerable or overtops during the 10-year storm according to the New Hampshire Aquatic Restoration Mapper.
- Implementation of restoration activities will result in the AU associated with the dam or barrier meeting some or all of the following conditions:
    a) The waterbody partially (meets some, but not all, of the initially impaired) or fully (meets all) water quality standards or designated uses.
    b) The waterbody shows significant progress toward achieving water quality goals, but not meet water quality standards. The project will result in measurable, in-stream reductions in a pollutant, or generate improvements to aquatic life integrity, aquatic organism passage or geomorphic condition.

c) The waterbody demonstrates ecological restoration resulting from implementation efforts not associated with water quality problems on the 303(d) List.

Often, dam regulations necessitate costly infrastructure and safety-related repairs that dam owners weigh against the diminishing benefits of owning and operating the dam, along with the liability inherent with being a dam owner. Dam removal often becomes an appealing option that can reduce risk and liability, restore designated uses and eliminate what can often become a long-term economic and liability burden for the dam owner. However, the complications of property ownership, legacy contaminants and an extensive permitting and approval process can make removal an expensive and lengthy process. NHDES is committed to partnering with the appropriate stakeholders and working internally to streamline dam and barrier removal implementation where water quality, public safety, flood attenuation and resiliency and aquatic passage can be improved.

One example of a recent successful dam removal is the Sawyer Mill Dam Removal Project which resulted in the removal of two obsolete dams on the Bellamy River in Dover (Upper Sawyer Mill Dam and Lower Sawyer Mill Dam). Both dams were removed in 2020. Fish passage for alewives, blueback herring, American eel and other fish species was significantly improved through removal of both dams which did not have fish passage prior to this project. Additionally, prior to dam removal, the impoundment upstream of the Upper Sawyer Mill Dam was listed on the state's 303(d) List for Primary Contact Recreation (PCR) due to high levels of chl-*a*. Water quality monitoring conducted by NPS Management Program staff following dam removal demonstrated that chl-*a* levels are below the state's threshold for PCR and the river reach (AUID) can now be de-listed from the 303(d) list, allowing the project to meet the requirements for publication of a NPS Success Story. A robust partnership was formed to support this project. The NHDES Coastal Program provided leadership for the duration of the project with the NHDES Dam Bureau providing additional support. Other project partners included the dam owner, New Hampshire Fish and Game (NHFG), The Nature Conservancy (TNC) and the City of Dover. Additionally, Section 319 Watershed Assistance Grants from the NPS Management Program provided support for design and construction activities.

Figure 14. Sawyer Mill Dam post dam removal.

During the Patriot's Day floods of 2007, the Oyster River in Barrington, New Hampshire exceeded the capacity of the nine-foot culvert supporting the only road providing access to the 100-plus home Emerald Acres Housing Cooperative, preventing residents from leaving and emergency response resources from entering the neighborhood for nearly a week. This stream crossing culvert had been contributing to water quality degradation and preventing adequate wildlife passage such as the American brook lamprey, American eel, eastern brook trout and the Blanding's turtle that are known inhabitants of the Oyster River corridor. An emergency repair was made to restore the road access and the Emerald Acres Housing Community began working to identify funding for a long-term stream crossing solution that would balance public safety and environmental integrity. In the fall of 2023, thanks to a partnership between The Nature Conservancy, Emerald Acres Cooperative and Sterling Realty with funding provided from NHDES' Critical Flood Risk Infrastructure Grant, Aquatic Resource Mitigation Fund and a Section 319 Watershed Assistance Grant (among others), the undersized culvert was replaced with a 50-foot, channel-spanning bridge. The new structure is sized to pass a greater than 100-year storm, whereas the previous structure was estimated to accommodate only up to a 50-year storm. According to The Nature Conservancy's article, "Adaptation at Work: A Community Solves for Floods and Fish," on the Topaz Drive project, it "was truly a local affair: engineering was done by Streamworks of Madbury, New Hampshire and the bridge was built and installed by Hansen Bridge, LLC of Springfield, New Hampshire using locally-sourced wood for the decking." (The Nature Conservancy, 2023). This replacement drastically improves public safety, opens five miles of fish, turtle and other semi-aquatic and terrestrial wildlife passage, eliminates an impaired reach of the Oyster River and prevents flood-related damages from re-occurring at this location during larger storm events.

Figure 15. Before and after photos of the project site where the Oyster River passes under Topaz Drive.

Climate Resilience

The New Hampshire NPS Management Program recognizes the importance of adapting to existing and anticipated impacts from changing environmental conditions on New Hampshire's freshwater lakes, ponds, streams, rivers and estuarine and coastal habitats (including wetlands), resulting from more frequent and intense rain events and increasing temperatures. In 2021, NHDES and UNH published the "New Hampshire Climate Assessment" which confirms "that human influence has unequivocally warmed the atmosphere, ocean and land since 1750, and that the rate of warming is unprecedented in at least the last 2,000 years," and provides projections for temperature and precipitation changes in the coming decades (Lemcke-Stampone et al., 2022). Similarly, the "2019 New Hampshire Coastal Flood Risk Summary Part I: Science" provides projections for sea-level rise, coastal storms and groundwater rise.

More extreme storms and heavy rains are placing aging water infrastructure (such as dams, stream crossings, sewers and water treatment facilities) at risk. Much of the water infrastructure in New Hampshire is nearing the end of its planned life, or well beyond it in many regions of the state. Severe and more frequent storms will further strain the ability of stormwater and stream crossing conveyances to operate as designed and lead to public safety and health hazards. Changing environmental conditions in New Hampshire continues to harm water quality and create significant changes to the hydrology, hydraulics and surface water habitats. Increased precipitation leads to more runoff of sediments, nutrients, pathogens and other substances into waterbodies. Increases in nutrient runoff, along with warming water temperatures has led to more frequent, chronic and long-lasting cyanobacteria blooms across the state. These cyanobacteria blooms can kill fish, shellfish and other wildlife. Cyanobacteria blooms also make drinking and recreational waters unsafe for people and pets. The science behind changing environmental conditions provides the basis and justification for the development of priorities, strategies and implementation of actions that enable adaptation in the face of these unprecedented changes to New Hampshire's hydrology and habitats.

In New Hampshire coastal communities, resource experts continue to document the existing and predicted changes to hydrology and habitats (salt marsh migration and conversion to mudflats as well as freshwater wetlands emerging due to rising groundwater) associated with sea-level rise. Existing regulations in New Hampshire are inadequate to handle the current and predicted increases in rainfall amounts and extreme precipitation events. It is necessary to continue implementing adaptation strategies. For instance, strategic replacement of undersized culverts with structures that are properly sized for the streams in which they reside; dam removals and installation of living shorelines and nature-based shoreline management are being incorporated into state and municipal regulations, policies and programs.

To protect federally funded projects from flood risk, the Federal Emergency Management Agency's (FEMA) Federal Flood Risk Management Standard (FFRMS) provides a flood standard to determine the level that infrastructure must be resilient to, in order to address current and future flood hazards. Infrastructure projects that receive federal funding, including the State Revolving Fund, conducting new construction, substantial improvement projects worth more than 50 percent of the market value or replacement cost of the facility or to address substantial structure or facility damage must implement FFRMS. FFRMS provides three different approaches to determine the project's flood hazard area (FHA) the Climate Informed Science Approach (CISA), Freeboard Value Approach (FVA) and the 500-year floodplain. The CISA utilizes the elevation and flood hazard area resulting from the best-available, actionable hydrologic and hydraulic data and methods in that take current and future conditions into account. The FVA uses elevation and flood hazard area resulting from an additional two feet to the base flood elevation for non-critical actions and three feet to the base flood elevation for critical actions. The 500-year floodplain employs the area subject to flooding by the 0.2 percent-annual-chance-flood (EPA, 2024a).

The New Hampshire Coastal Risk and Hazards Commission was one of the first groups to develop adaptation strategies for New Hampshire communities. Established by legislation in 2013, the commission has helped coastal communities and the appropriate state agencies prepare for projected sea-level rise and other coastal watershed hazards. In addition, Sea-Level Affecting Marsh Migration (SLAMM) models were run for the coastal watershed, which provide additional information about how sea-level rise may impact estuarine river systems and their marsh systems. The commission completed its work in 2016 with the publication of "Preparing New Hampshire for Projected Storm Surge, Sea-Level Rise, and Extreme Precipitation Final Report and

Recommendations." An audit of NHDES rules and regulations was completed in 2018 to determine and recommend needed rule changes. Recommendations generated from the audit are intended to enable NHDES to better manage the precipitation and sea-level rise challenges mentioned in the Final Report. For example, based on the commission's findings and audit, the NHDES AoT Program adopted new rules that require permit applicants to factor in precipitation increase volumes by 15 percent for stormwater management modeling and designs in the coastal region. Discussions are ongoing to amend that rule to apply to the whole state.

In 2019 and 2020, the New Hampshire Coastal Flood Risk Summary "Part I: Science" and "Part II: Guidance for Using Scientific Projections" were published, respectively, that directs NHDES to supervise updates to the 2014 Coastal Flood Risk and Hazard Commission's Science and Technical Advisory Panel report at least every five years. Part I: Science provides a synthesis of the state-of-the-science relevant to coastal flood risks in New Hampshire and includes updated projections of relative sea-level rise, coastal storms, groundwater rise, precipitation and freshwater flooding. Part II: Guidance for Using Scientific Projections provides science-based and user-informed guiding principles and a step-by-step approach for incorporating the updated coastal flood risk projections from Part I: Science into private, local, state and federal projects, including planning, regulatory and site-specific efforts.

Another major effort to address sea-level rise and resiliency in the coastal watersheds of New Hampshire is the NHDES Coastal Program's Resilient Tidal Crossings Initiative. In 2018, the NHDES Coastal Program and its partners assessed all known tidal crossings in New Hampshire's 17 coastal communities in accordance with the "New Hampshire Tidal Crossing Assessment Protocol." Tidal crossing assessment data were used to rank and prioritize sites based upon structure condition, flood risk and ecosystem health. The Resilient Tidal Crossings Initiative was designed to better enable community officials and road managers to enact the strategic repair or replacement of tidal crossing infrastructure, and to identify high-priority restoration and conservation opportunities at tidal crossing sites.

In addition to tidal crossing impacts, increasing erosion and inundation of coastal wetlands due to sea-level rise and storms continues to threaten property and natural resources in New Hampshire. Historic shoreline stabilization practices of rip rap, revetments and seawalls can make erosion worse, destroy intertidal habitat and alter sediment transport patterns. For these reasons, hard structural solutions are either the least preferred alternative or prohibited in sensitive coastal areas. Under Env-Wt 602.29, living shorelines in suitable areas present a resilient approach to shoreline stabilization that can protect people, property and important coastal habitats.

The NHDES Coastal Program is working with partner organizations to advance the understanding, application and success of living shoreline stabilization approaches in coastal New Hampshire. Several initiatives and support networks have been established to inform and support stakeholders interested in design and implementation of living shorelines in New Hampshire. For example, the Coastal Program published a Living Shoreline Site Suitability Assessment mapper intended to help property owners and other interested parties understand the potential suitability of living shoreline approaches on any coastal shoreline.

Over the next five years, New Hampshire's NPS Management Program will prioritize and support efforts to address hydrologic and habitat modification and reduce threats from more frequent, intense and sustained extreme weather events across New Hampshire. In watersheds where streams and rivers are the primary conduits of NPS pollutants, implementation efforts will focus on projects that remove, replace or upgrade aging infrastructure (culverts, bridges and dams), utilize nature-based solutions and strive for geomorphic equilibrium to build self-sustaining channels that are resilient. Stakeholders will continue to enact policies to improve hydraulic and hydrologic connectivity, aquatic organism passage, geomorphic integrity and protection of existing buffers around lakes, ponds, estuaries and stream and river corridors. Protecting and restoring freshwater and coastal habitats will help capture carbon, provide quality habitat for terrestrial and aquatic species, improve water quality, build resilience to both flooding and low flow conditions and increase access to and engagement with natural spaces for local communities.

Resources

- RSA 482-A:29 Aquatic Resource Compensatory Mitigation
- RSA 483 New Hampshire Rivers Management and Protection Program
- RSA 483-B Shoreland Water Quality Protection Act
- Env-Wq 1400 Shoreland Protection Administrative Rules
- Env-Wq 1800 Designated River Nomination Rules
- Env-Wq 1900 Instream Flow Rules
- Env-Wt 600 Coastal Lands and Tidal Waters/Wetlands
- Env-Wt 900 Stream Crossings Administrative Rules
- Innovative Land Use Planning Techniques: A Handbook for Sustainable Development (WD-08-19), Section 2.4 - Wetland Protection, Section 2.6 - Shoreland Protection and Section 2.7 - Fluvial Erosion Hazard Area Planning
- A Guide to River Nominations
- A Guide to River Corridor Management Plans
- NHDES Fact Sheet: The New Hampshire Instream Flow Program
- Shoreland Water Quality Protection Act, A Summary of the Minimum Standards
- Guidelines for Naturalized River Channel Design and Bank Stabilization
- White Paper: River Restoration and Fluvial Geomorphology
- New Hampshire Coastal Flood Risk Summary
- NHSCI Field Manual
- Aquatic Restoration Mapper
- New Hampshire Tidal Crossings Assessment Protocol
- New Hampshire Climate Assessment 2021
- Understanding The Federal Flood Risk Management Standard for State Revolving Fund Projects

8.1.2-A Hydrologic and Habitat Modification Goal, Objectives and Milestones

Hydrologic and Habitat Modification (H) Goal: The NPS Management Program works with partners to identify, prioritize and implement projects such as living shorelines, culvert upgrades, dam and barrier removals and stream and river restoration to address hydrologic and habitat modification.

<table>
<tr><th>Objective</th><th>Milestone</th><th>Measure of Success</th><th>2025</th><th>2026</th><th>2027</th><th>2028</th><th>2029</th></tr>
<tr><td rowspan="3">Objective H-1 NPS Management Program maintains partnerships and capacity to implement living shoreline projects throughout New Hampshire to address hydrologic and habitat modification.</td><td>Milestone H-1.1 Living shoreline projects are identified throughout New Hampshire. Potential living shoreline projects are identified by NPS Management Program partners for partial funding through NPS Management Program grants.
Partners: NHDES Coastal Program, NHFG, NOAA Office for Coastal Management, UNH Coastal Habitats Restoration Team, watershed organizations, lake associations, municipalities and conservation districts.</td><td>Measure H-1.1 A list of living shoreline projects and their partners that would be eligible for partial NPS funding is developed.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Milestone H-1.2 Implement living shoreline project(s). A proposal for NPS funding to implement at least one living shoreline project with project partners is submitted for partial funding and the project is implemented.
Partners: NHDES Coastal Program, NHDES Land Resources Management, NHFG, UNH Coastal Habitat Restoration Team, watershed organizations, lake associations, municipalities and conservation districts.</td><td>Measure H-1.2a A living shoreline proposal for partial NPS funding is developed and submitted.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Measure H-1.2b If the full proposal is selected for partial NPS funding, the project is implemented and a final report of living shoreline project implementation is on file and available as reference for future NPS living shoreline project partners.</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective H-2 Stream crossings that do not meet geomorphic integrity thresholds, AOP criteria or their appropriate recurrence interval are identified within watershed-based plans.	**Milestone H-2.1** Freshwater stream crossings and tidal crossings not meeting geomorphic, AOP or the recurrence interval threshold appropriate for the drainage area associated with the identified crossings are identified and prioritized for restoration efforts within watershed-based plans or geomorphic assessments performed at the watershed scale. *Partners: NHDES Coastal Program, Great Bay Stewards, NHDES Geological Survey, watershed organizations, municipalities, NHDOT, The Nature Conservancy and NHFG.*	**Measure H-2.1** By 2029, the NHDES Stream Crossing Initiative Assessment Protocols are fully executed in at least two watersheds undergoing the development of a watershed-based plan, geomorphic assessment, feasibility study or flood risk study. Protocol results are then used to develop a priority ranking for culverts, barriers and stream crossings in need of removal or upgrade to improve geomorphic equilibrium, resilience, AOP, hydraulic and hydrologic connectivity and full tidal cycling.					
Objective H-3 Barrier and dam removals in New Hampshire result in NPS Success Stories.	**Milestone H-3.1** Freshwater and tidal dams or barriers that co-occur with AUs on the 303(d) List for NPS-related parameters; or fail to meet geomorphic integrity, AOP or the 10-year storm event; have a geomorphic assessment or feasibility study completed; or are identified within a watershed-based plan as a priority action item are identified for potential removal. *Partners: New Hampshire River Restoration Task Force, NHDES Geological Survey, NHDES Dam Bureau, NHDES Water Quality Section, dam owners, NHFG, watershed organizations and municipalities.*	**Measure H-3.1** By 2029, at least one dam or barrier removal project receiving partial funding from the NPS Management Program results in restoration of designated uses and an EPA-approved Type I or Type II NPS Success Story that documents a fully or partially restored waterbody respectively. See Milestone PW-3.3.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective H-4 Develop 'how to' modules for incorporating multi-benefit stream crossings into watershed-based plans, Hazard Mitigation Plans, Road Safety Plans, Capital Improvement Plans and similar planning documents or initiatives that balance resilience, public safety and watershed integrity.	**Milestone H-4.1** A series of instructive manuals is developed to guide stream crossing practitioners and project partners that clearly illustrate the financial, public safety, environmental and resilience multi-benefits when stream crossings are properly sized and installed. *Partners: NHDES Coastal Program, NHDES Water Quality Section, NHFG, NHDES Geological Survey, watershed organizations, TNC, municipalities, regional planning commissions and NHDOT.*	**Measure H-4.1** By 2029, at least one watershed-based plan, hazard mitigation plan, road safety plan, capital improvement plan or similar planning documents or initiatives include the multi-benefit stream crossing approach module criteria as recommendations or requirements.					
	Milestone H-4.2 Stream crossing prioritization planning training modules are developed that present the information contained in the instructive manuals for prioritizing stream crossings to achieve multi-benefits. *Partners: NHDES Coastal Program, NHDES Water Quality Section, NHFG, NHDES Geological Survey, watershed organizations, TNC, municipalities, regional planning commissions and NHDOT.*	**Measure H-4.2** By 2028, one in-person and one virtual training module have been developed and facilitated for interested stream crossing prioritization planning and implementation stakeholders and practitioners.					

8.1.3 Subsurface Systems

Background

In New Hampshire, subsurface systems, commonly called septic systems, are primarily utilized for wastewater treatment in regions of low to medium density development. Generally, these areas are not serviced by municipal wastewater treatment facilities. An estimated 85 percent of households in New Hampshire utilize private septic systems for disposal of waste (NHSSSC, 2020). Inadequate or failed septic systems represent a significant threat to ground and surface water from loading of nitrogen, phosphorus and pathogens. Causes of septic system malfunction or failure include age, lack of maintenance, unsuitable site conditions, installation issues and other associated factors. Efforts to address water quality concerns related to septic systems are a priority management approach for New Hampshire's NPS Management Program.

Regulatory Framework

Under RSA 485-A:29, NHDES is responsible for the regulation of septic systems, including the licensing of designers and installers (RSA 485-A:35 and RSA 485-A:36). Septic system design and installation has been regulated since 1967 and the licensing of designers and installers since 1979. The state's controlling role in septic systems has made for consistently high standards throughout the state.

If a septic system is not functioning properly, it may be because it was built before state standards were in effect, the system was not properly maintained or the system has simply exceeded its functional life. Current NHDES data indicate that approximately one-third of new septic system approval applications address repair or replacement of existing systems. The Subdivision and Individual Sewage Disposal System Design Rules Env-Wq 1000, require that if approval for a replacement system is obtained for a failed system, the replacement system must be installed prior to the expiration date of the approval (90 days). Further, since the 2016 re-adoption of Env-Wq 1000, if approval for a replacement system is obtained for any reason other than to address a system in failure, and the system being replaced has never received prior NHDES approval, the system must be installed following current regulations. This change was intended to address systems installed prior to 1967 and to help ensure that all septic systems in New Hampshire are designed and constructed in accordance with current standards.

Requirements for septic systems on developed waterfronts or properties within 250 feet of tidal waters, a great pond or fourth order or higher river changed in 2024 with the passage of HB 1113. Systems in the protected shoreland are now required to be evaluated by a state-licensed septic system evaluator at the time of a property's sale or transfer. Any system that was approved prior to September 1, 1989 or has not received approval from NHDES, must be evaluated by a permitted designer. Systems within the protected shoreland that are determined to be in failure are required to be replaced within 180 days of the property's transfer, and NHDES and the municipality must be notified of the failure. The new evaluation requirements were instituted to reduce nutrient pollution and bacterial contamination in New Hampshire's waterbodies.

Many of New Hampshire's shorelines were developed prior to regulations regarding septic system design, including setbacks to waterbodies. Env-Wq 1000 requires that a new application for septic system approval be submitted for conversion from seasonal to year-round use or for other changes in usage. If the system that served the property at the time of conversion had never received prior NHDES approval, a newly designed system must be constructed. However, if the system is state approved, the system is not required to be upgraded to accommodate the additional use. In situations where waterfront lots have inadequate systems, a single community system that collects wastewater from multiple residences may be a viable solution to wastewater disposal.

As concerns about water quality impacts from septic systems increase, several municipalities have developed regulations to address septic system management at the local level (Table 8-1). Municipal authority to regulate septic systems is based on RSA 147:10, which prohibits septic systems that affect public health. RSA 147:1 then grants municipal authority to enact regulations to prevent and remove such nuisances (Slack, 2019). At the time of this Plan update, additional New Hampshire municipalities are exploring ways to regulate septic systems. For example, Moultonborough is exploring the creation of a shoreland overlay district versus establishing rules and guidelines. Either approach would include ordinances for septic systems.

Table 8-1: Examples of New Hampshire Municipal Septic System Regulations

Municipality	Description of Regulation	NPS Pollutant of Concern	Link
Chesterfield	A health regulation requires evaluation of septic systems within 500 feet of Spofford Lake and to be pumped once every three years. Also specifies the conditions under which replacing the system is required.	Nutrients	Town of Chesterfield Wastewater Health Regulation
Meredith	A health ordinance requires evaluation of all septic systems within 250 feet of Lake Waukewan; replacement is required under certain circumstances.	Nutrients	Town of Meredith Septic System Regulations
Rye	Septic systems in the Parsons Creek watershed must be pumped every three years.	Pathogens	Town of Rye Health Regulation Septic Systems
Sunapee	All developed properties with septic systems in the Shoreline Overlay District shall be pumped a minimum of once every three years. When a developed waterfront property is sold or transferred, a copy of the Waterfront Property Site Assessment Study required by NHDES Env-Wq 1025 regulations must be submitted to the town within 10 days of the sale.	Nutrients & Pathogens	Town of Sunapee Shoreland Overlay District Septic System Regulations
Windham	Cobbetts Pond Village District Ordinance requires septic tank pump out and inspection at least once every three years; promotes education in the characteristics of systems and proper procedures for altering, operating and maintaining them; establishes and maintains records of septic systems.	Nutrients	Town of Windham Onsite Wastewater Treatment for Cobbetts Village District

Addressing Nonpoint Source Pollutants of concern from Septic Systems

Septic systems offer an opportunity for NPS Management Program project managers and watershed-based plan partners to implement projects to identify and prioritize septic systems for replacement or upgrades. These efforts are an important implementation strategy for achieving pollutant load reductions to meet water quality goals for NPS pollutants of concern as identified in watershed-based plans such as pathogens and nutrients including nitrogen in estuarine waters and phosphorus in freshwater systems.

Pathogens

When septic systems fail, pathogens can be transported for significant distances in groundwater and surface waters (USEPA, 2002). Septic systems in failure can allow untreated, or minimally treated, septic wastewater to be present at the ground surface, or in surface waters. Pathogens in septic system wastewater can cause communicable diseases through direct or indirect contact or ingestion of contaminated water or shellfish. The presence of pathogens in recreational swimming waters can result in beach closures and may pose health hazards to humans and pets who encounter contaminated water. Additionally, excess bacteria can lead to closure of shellfish beds. Studies conducted in the Parsons Creek watershed to aid in remediation of sources of bacterial contamination in the creek and downstream swimming areas estimated that out of 700 septic systems in the watershed, 24 percent were likely to be in failure (NHDES, 2011).

Successful nonpoint source management approaches have been used in New Hampshire to address bacterial contamination from septic systems. For example, bacteria from a failed septic system impaired water quality and recreation at Veasey Park beach on Pleasant Lake, a popular destination in Deerfield New Hampshire. These problems led NHDES to include Veasey Park beach on its 2012 Clean Water Act Section 303(d) Impaired Waters list due to elevated levels of *Escherichia coli* bacteria and failure to support Primary Contact (swimming). The Town of Deerfield, with support from other local partners, and partial funding provided through NHDES and EPA, resulted in a project to install composting toilets as an alternative septic system in the new beach bathhouse and implementation of erosion control practices to reduce stormwater runoff across the beach. As a result of this restoration work, Veasey Park beach at Pleasant Lake now meets state water quality standards and was removed from the impaired waters list in 2014.

Nitrogen

While conventional septic systems are designed to remove or inactivate pathogens, they typically are not designed to address nutrient pollution from nitrogen or phosphorus. The 2020/2022 water quality assessments found that 10 of the 19 assessment zones in the Great Bay estuary were impaired due to elevated concentrations of nitrogen (NHDES, 2022e).

According to the GBNNPSS, septic systems contribute 30 percent of the nonpoint source nitrogen load to the Great Bay estuary (NHDES, 2014). This calculation was determined from a detailed analysis of the number of septic systems in the watershed, a nitrogen generation rate of 10.6 pounds per person and the distance of septic systems from the estuary. Generally, the forms of nitrogen within septic system effluent are highly soluble in water and can travel long distances when reaching underlying groundwater. Almost all the nitrogen in groundwater tends to discharge to surface waters like lakes, streams and coastal waters, where it contributes to water quality impairment (FB Environmental Associates, 2023).

A recent septic system expert panel review conducted by PREP determined that many options exist for implementing policy changes and structural technologies to reduce nitrogen loads from septic systems. The panel's report, "Expert Panel Process for Advanced Septic System Treatment Technologies," provides a robust set of recommendations for future actions to reduce nitrogen from septic systems.

Phosphorus

For freshwater waterbodies, phosphorus is the nutrient of concern delivered by septic systems. Phosphorus is not completely removed by conventional septic system processes, but rather is adsorbed to varying degrees by the soil and plant roots through which effluent passes on its way to surface waters. When the adsorption capacity of the soil is reached, phosphorus export will occur. This problem is typical of densely developed shoreland areas near lakes and ponds. Conducting regular maintenance, increasing the distance from the leach field to the waterbody, increasing the distance to the seasonal high-water table and upgrading systems to meet current regulations will provide greater treatment.

Several recent watershed-based plans estimated the percentage of phosphorus contributions from septic systems based on a count of septic systems, the number of people per housing unit, seasonal occupancy in number of days the home is occupied, estimated pounds of phosphorus per person using the system and soil retention rates. The plans found the following percent contributions of phosphorus from septic systems:

- Squam Lake 11% (Squam Lake Association, 2020)
- Country Pond 14% (Country Pond Lake Association, 2021)
- Spofford Lake 15% (Southwest Region Planning Commission, 2018)
- Pine River Pond 22% (Pine River Pond Association, 2023)
- Sunrise Lake 22% (Strafford Regional Planning Commission, 2021)
- Tucker Pond 22% (FB Environmental Associates and Tucker Pond Improvement Association, 2022)

Recent efforts conducted by New Hampshire's NPS Management Program partners to replace and upgrade older, malfunctioning septic systems in lake watersheds have been successful, resulting in significant phosphorus load reductions. Additionally, adopting policies and best practices to reduce phosphorus pollution from septic systems is one of the priorities identified in New Hampshire's new cyanobacteria plan.

Future Risks

New Hampshire's coastal septic systems are at risk of impacts from rising seas including more extensive coastal flooding during storms and high astronomical tides. As sea levels rise, groundwater levels also rise, increasing threats to septic system functions beyond the immediate New Hampshire coastline. This elevates concerns that septic systems could fail, mobilizing contaminants as rising groundwater inundates septic system leaching fields (Wake, et al. 2019). NHDES and its partners are considering these risks in future planning, guidance and regulations for septic system site and design requirements. The "New Hampshire Coastal Flood Risk Summary Part II: Guidelines for Using Scientific Projections" and the "NHDES Audit of Laws Governing the Coastal Region to Enable Authorities to Take Appropriate Actions to Prepare for Coastal Flood Risks" provide collaboration opportunities for additional septic system risk analyses.

Additionally, the Shoreland Septic System Study Commission (NHSSSC), which was established in 2019 by the New Hampshire Legislature with the approval of HB 475, provided recommendations for septic system management, including actions to address future risks facing septic systems from changing environmental conditions. Recommendations include regulatory requirements for minimum separation distances for projected seasonal high-water levels, consideration of horizontal distances between septic systems and waterbodies and enhanced efforts to conduct modeling and mapping to identify vulnerable areas (NHSSSC, 2020).

Conclusion

Over the next five years, New Hampshire's NPS Management Program will prioritize and support efforts to address pollutant loading from septic systems and address threats from future risks to septic systems. In watersheds where nutrients and pathogens are pollutants of concern, implementation efforts will focus on projects that replace or upgrade aging systems, utilize alternative technologies to remove nutrients from septic system effluent and help to enact policies to improve septic system management. Additionally, efforts will be made to partner with coastal stakeholders to identify and prioritize septic systems at risk from inundation resulting from sea level rise.

Resources

- RSA 485-A Water Pollution and Waste Disposal
- Env-Wq 1000 Subdivisions; Individual Sewage Disposal Systems
- New Hampshire Association of Conservation Districts
- New Hampshire Association of Natural Resource Scientists
- Granite State Onsite Wastewater Association
- NHDES Septic System Resources
- Massachusetts Alternative Septic System Test Center
- Expert Panel Process for Advanced Septic System Technologies

8.1.3-A Subsurface Systems Goal, Objectives and Milestones

Subsurface Systems (S) Goal: Septic systems are designed, installed and maintained in a way that allows them to function without degrading water quality.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective S-1 Reduce nitrogen and phosphorus pollution and bacterial contamination from septic systems through system maintenance, system replacement, alternative technologies and development of community systems.	**Milestone S-1.1** Alternative technologies that reduce nitrogen export to Great Bay are evaluated and demonstrated. *Partners: Conservation districts, Granite State Onsite Wastewater Association (GSOWA), watershed associations, Conservation Law Foundation (CLF), PREP and MAAM.*	**Measure S-1.1a** Candidate sites are identified for the installation of denitrifying systems in the Great Bay watershed.	Yes	Yes	Yes		
		Measure S-1.1b One denitrifying system in the Great Bay watershed is implemented and the performance is evaluated.				Yes	Yes
	Milestone S-1.2 The capacity is developed to implement a community septic system in a watershed that has an approved watershed-based plan. *Partners: GSOWA, NHMA, CWSRF, municipalities, watershed associations and regional planning commissions.*	**Measure S-1.2** A candidate community septic system site is identified.				Yes	Yes
	Milestone S-1.3 Opportunities for septic system replacement and development of community systems are provided. *Partners: NHDES, GSOWA, NHMA, CWSRF, New Hampshire Health Officers*	**Measure S-1.3a** CWSRF loans and other funding sources are available for septic system replacements or community systems.	Yes	Yes	Yes	Yes	Yes

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	Association, New Hampshire Building Officials Association, PREP, New Hampshire Housing Authority and USDA Rural Development	**Measure S-1.3b** Nonpoint Source Management Program staff coordinate with CWSRF staff on opportunities for increasing access to CWSRF funding for septic system replacement projects.					
	Milestone S-1.4 Septic system evaluation and priority ranking are conducted for the replacement of older, malfunctioning septic systems in high-quality waters, watersheds with bacteria and nutrient impairments, or areas at risk from inundation due to sea level rise; implement septic system replacement programs for high-priority systems. *Partners: Watershed associations, municipalities, RPCs, conservation districts and NHCP.*	**Measure S-1.4a** A list of septic systems is developed for replacement prioritization in high-quality and/or impaired waters or for coastal waters identified as being at future risk from inundation due to sea level rise.					
		Measure S-1.4b At least two priority systems are replaced, and pollutant load reductions are quantified.					
Objective S-2 Research approaches and policies for improved septic system management.	**Milestone S-2.1** State legislative and municipal activity relative to septic system regulations are tracked and incorporate new legislation and regulations, if enacted, into NPS programs and projects. *Partner: NHDES.*	**Measure S-2.1** NPS Management Program staff track and promote state and municipal activities relative to septic systems. Any changes are incorporated into NPS programs and projects as relevant.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	Milestone S-2.2 Output and recommendations are incorporated from the PREP septic system expert panel process, NHSSSC and the state's cyanobacteria plan into septic system projects and programs as appropriate. *Partners: PREP, NHDES, NHCP, MAAM, NHSSSC, UNHSC and RPCs.*	**Measure S-2.2** The outcomes from PREP expert panel, NHSSC and New Hampshire's cyanobacteria plan are reviewed by NPS Management Program staff to identify opportunities and incorporate recommendations into septic system projects and program work.					
	Milestone S-2.3 Through collaboration with coastal partners, opportunities are identified to prioritize and address coastal septic systems at- risk due to inundation from sea level rise. *Partners: NHCP,* New Hampshire Coastal Adaptation Workgroup *(NHCAW), PREP, RPCs and municipalities.*	**Measure S-2.3** NPS Management Program staff coordinates with partners to identify opportunities for collaboration on projects to better understand and address future risks to septic systems.					

8.1.4 TRANSPORTATION

BACKGROUND

New Hampshire's freshwater resources provide numerous values to both residents and visitors. New Hampshire has approximately 1,000 lakes and ponds, almost 17,000 miles of streams and rivers and 220 miles of estuarine shoreline that form the foundation of a strong and essential "nature economy" (NHDES, 2022c). Visitors to New Hampshire regularly spend over $5 billion per year at New Hampshire destinations while recreation remains a vital part of the high quality of life residents of New Hampshire (Rogers and Watts, 2019). The New Hampshire roads and highway system is the backbone of the transportation system that moves goods, services and people that support a tourism-driven economy and quality of life for permanent and seasonal residents. NHDOT is responsible for approximately 4,600 miles of Primary and Secondary State Highways and 49 miles of recreational roads. NHDOT is focused on managing the state's road network as efficiently and effectively as possible to meet the vital transportation needs of the state. Another 12,100 miles of Compact Highways and local roads are maintained by municipalities. Erosion during and after construction or routine maintenance of roads, highways and bridges, can contribute sediment and other contaminants including metals, oils and chlorides (winter ice management or summer dust control) to receiving waters, which can adversely impact surface and groundwater quality (NHDOT, 2024).

There are hundreds of miles of private, woods or camp roads in New Hampshire that have long been recognized as significant NPS issues, particularly in lake watersheds. Improper construction and maintenance of these camp roads and the countless stream crossings associated with them can disrupt stream channel morphology, cause streambank erosion, prevent natural passage of fish and other aquatic organisms or lead to flooding and catastrophic failure of bridges and culverts. In New Hampshire watersheds, camp roads contribute a disproportionate amount of NPS pollution to lake and pond quality problems due to their proximity to the water and their sub-standard construction, which is largely because most camp roads were originally intended to only provide seasonal access. Typical problems identified on camp roads during development of watershed-based plans include erosion of the road surface, road shoulders and ditches, unstable and undersized stream crossings, poor road surface materials and inadequate swale sizes and lack of swales and turn-outs for stormwater runoff to access. Many of these camp road problems can also be found on state and municipal roads, but there are fewer resources available to property owners on private roads relative to proper design, construction and long-term maintenance of transportation infrastructure.

One similarity that all road networks in New Hampshire and those responsible for maintaining them share is snow and ice management during winters that involve a coordinated effort from the state, municipalities and the private sector. Sodium chloride, or road salt, is the most used de-icing or anti-icing chemical agent due its availability, low cost and ease of use either as a solid or liquid (brine). When applied, sodium chloride dissolves into sodium and chloride ions, which have environmental consequences. Chloride is toxic to aquatic life and contaminates drinking water, while sodium can alter soil chemistry and impact both surface and groundwater resources. The number of surface waters and wells impaired by chloride contamination continues to be on the rise as winter weather in New Hampshire trends toward more freezing rain and icing events as opposed to sustained snowfall events that require only the mechanical removal of snow (plowing) and less reliance upon anti-icing and de-icing strategies that involve large quantities of chlorides.

Chloride impairments are a statewide issue. There are over 50 known chloride-impaired waterbodies across New Hampshire, mostly concentrated in the southeastern region. Between 2000 and 2011, the median chloride levels in drinking water wells across the state increased by 150 percent over levels recorded in previous decades

(Medalie, 2012). In several watersheds analyzed in the southern I-93 corridor, more than 50 percent of the winter salt application load was determined to come from private roads and parking lots (NHDES, 2021). The other major sources are state and local roads and highways. To address this issue, NHDES and affected communities have developed multi-year chloride reduction plans and employed best practices to reduce the amount of road salt and chloride entering waterbodies.

Guided by RSA 489-C, NHDES began the Voluntary Certified Salt Applicator (Green SnowPro) Program in November 2013 for commercial winter maintenance professionals. New Hampshire Certified Green SnowPros are leaders in the snow and ice management industry who are trained in the most up-to-date technologies and snow fighting practices. This ensures a high level of service and safety to their customers while improving water quality. The three goals of the Green SnowPro Program are to improve efficiency in salt use, such that the least amount of salt is used to ensure safe conditions on surfaces traveled by pedestrians and vehicles in winter conditions; reduce the amount of salt used by commercial applicators, as measured in tons of salt per acre or lane miles, per year, over time while maintaining safe conditions for pedestrians and vehicles in winter conditions and establish a voluntary system for commercial and municipal salt applicators to track their salt use and provide information annually to NHDES.

The number of Commercial Green SnowPro certificates issued each year has grown significantly since the program's inception in 2013 when a total of 35 certificates were issued. Currently, an average of over 700 commercial certificates are issued annually.

In 2024, RSA 489-C was amended to add the Municipal Winter Maintenance Certification (Municipal Green SnowPro) Program. This voluntary program allows municipalities the opportunity to become Green SnowPro certified and to train their municipal employees conducting winter maintenance in best practices to reduce salt use. The Municipal Green SnowPro Program differs from the commercial program in that it certifies a whole governmental unit instead of each individual person. The municipal program offers three tiers of certification: Standard, Advanced and Expert. Standard certification reflects the commercial program with a focus on salt accounting, record keeping and proper storage of materials. Advanced and Expert certifications require the implementation of additional salt reduction practices with Expert certification requiring more best practices to be implemented than Advanced. Municipalities select from an approved list of best practices which provides flexibility in the selection and implementation of salt reduction measures that best fit their needs and budget.

The options for completing required Green SnowPro training have grown in response to the increasing number of Green SnowPro applicants. Since 2013, NHDES and UNH T2 have hosted a variety of Green SnowPro approved Initial and Refresher trainings. In 2023, a new Green SnowPro Refresher training course, *Lunch 2 Go – Salt Spreader Calibration*, was introduced and will continue to be offered for the foreseeable future. Other Green SnowPro approved trainings administered by UNH T2 are under development including courses focused on liquids as well as another course that targets marketing salt reduction practices to clients. In 2020, NHDES partnered with the Smart About Salt Council (SASC) to provide an online training platform for Green SnowPro Initial and Refresher trainings. These online options allow additional flexibility for the Green SnowPro audience, who are busy landscaping in warmer months and fighting snow and ice in winter months, as the courses can be completed virtually and at any time. In 2021, attendance to the Snow and Ice Management Association (SIMA) annual symposium was approved as a Green SnowPro Refresher training. SIMA and NHDES have hosted the annual Salt Symposium every September since 2014. Since 2022, the annual Salt Symposium includes both a commercial and municipal track as there had been increased interest in municipalities, particularly those from New Hampshire MS4 communities, to attend the symposium. The Salt Symposium will continue to incorporate both a commercial and municipal track now that New Hampshire municipalities are eligible for Green SnowPro certification. Many Commercial Green SnowPro Master certificate holders have taken advantage of the option to become Approved Trainers. Once approved by NHDES, Approved Trainers can administer the Green SnowPro training materials and exam to others, primarily their Green SnowPro Subordinate certificate holders. NHDES provides all training materials and companies are able to achieve significant costs savings on training fees.

In 2023, the NHDES Nonpoint Source Management and Drinking Water Source Protection Programs awarded a Watershed Assistance Grant to the Merrimack Village District (MVD) for a first-of-its-kind project to develop a sodium chloride-based watershed restoration plan. MVD's *Naticook Brook Watershed/ Litchfield Tributaries Watershed Management Plan* project is supported through the Drinking Water State Revolving Loan Fund program and matching funds provided by MVD. The watershed-based plan is being developed by a team of watershed stakeholders and contractors and will evaluate winter salt use throughout the Naticook Brook source water protection area to develop a sector load (private, commercial, municipal and state) allocation for salt and priority-based chloride reduction goals for protection of surface and groundwater paired with recommended best practices to be implemented to achieve the published reduction goals needed to restore production from currently contaminated MVD high-yield drinking water wells. This innovative watershed-based plan will recommend a series of actions for watershed stakeholders across all salt application sectors with the intention of meeting the watershed-based plan salt reduction goals within ten years. This will be the first watershed-based plan in New Hampshire where sodium chloride is identified as the target pollutant impacting both surface and groundwater resources.

Figure 16. Excess de-icing materials enter surface waters through stormwater runoff.

In conjunction with the voluntary efforts put forth by New Hampshire muncipalities and winter maintenance professionals, the communities regulated under the New Hampshire MS4 General Permit must meet requirements related to winter maintenance. All regulated communities are required to develop, implement, enforce and update annually a written Stormwater Management Plan (SWMP). Permittees must include winter road maintenance procedures that outline the best practices that will be implemented to reduce municipal salt usage, storage of salt and opportunities for the use of alternative materials in their SWMP.

In addition to the SWMP, 21 permittees with a chloride impairment or TMDL must meet additional requirements. Seventeen of these New Hampshire MS4 permittees have discharges to water quality limited impaired waterbodies where chloride is the cause of the impairment. These permittees must also create and implement a Salt Reduction Plan that includes best practices designed to achieve chloride reduction on municipal roads, municipally maintained properties and facilities that drain to the MS4. The remaining four New Hampshire MS4 permittees have an approved TMDL for chlorides. These permittees are required to either develop a Chloride Reduction Plan that includes specific actions designed to achieve chloride reduction on municipal roads and facilities and on private facilities that drain to the MS4; or work with NHDES to develop an Alternative Chloride Reduction Plan consistent with the TMDL.

Ongoing efforts to promote and grow the Municipal Green SnowPro Program and update the Green SnowPro Winter Best Practices Manual, proficiency exam and training materials will be a focus over the next five years. Through outreach and education, the NPS Management Program will continue to work with New Hampshire residents and communities to implement strategies to reduce the over-use of winter salt and understand the impacts on surface and drinking water.

Resources

- RSA 489-C Salt Applicator Certification Option
- NHDES Road Salt Reduction Program
- NHDES Commercial Green SnowPro Certification Program
- NHDES Municipal Green SnowPro Certification Program
- NHDES Environmental Fact Sheet: Storage and Management of Deicing Materials
- NHDES Environmental Fact Sheet: Road Salt and Water Quality
- NHDES Environmental Fact Sheet: Snow and Ice Removal Tips for the Business Owner
- NHDES Environmental Fact Sheet: Best Management Practices and Salt Use Minimization Efforts in Chloride-Impaired Watersheds of New Hampshire
- NHDES Environmental Fact Sheet: Snow Disposal Guidelines
- 2017 New Hampshire Small MS4 General Permit
- UNH T2 Training Calendar
- Smart About Salt Council - Online New Hampshire (NH) Green SnowPro Training
- Concentrations of Chloride and Sodium in Groundwater

8.1.4-A Transportation Goal, Objectives and Milestones

Transportation (T) Goal: Reduce winter salt applications while maintaining the current level of services on public and private roads, driveways, sidewalks and parking lots.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective T-1 New Hampshire commercial salt applicators are trained and Green SnowPro certified in winter snow and ice management best practices.	**Milestone T-1.1** Voluntary commercial salt applicators are trained in winter snow and ice management best practices each year. *Partners: NHDES NPS Management Program,* UNH T2*, SASC and SIMA.*	**Measure T-1.1** At least 1,250 voluntary commercial salt applicators complete Green SnowPro approved certification training within five years.					
	Milestone T-1.2 Voluntary commercial salt applicators demonstrate proficiency in and the use of salt reduction practices through Green SnowPro approved training and receive Green SnowPro certification from NHDES. *Partners: NHDES NPS Management Program,* UNH T2*, SASC and SIMA.*	**Measure T-1.2** At least 550 voluntary commercial salt applicators receive Green SnowPro certification each year.					
Objective T-2 NHDES has an increased understanding of the amount of winter salt applied in New Hampshire.	**Milestone T-2.1** The number of voluntary commercial and municipal salt applicators submitting annual salt use reports increases. *Partners: NHDES NPS Management Program and salt applicators.*	**Measure T-2.1a** Reporting and re-certification reminders are sent annually to Green SnowPro certified salt applicators.					
		Measure T-2.1b 100% of voluntary commercial and municipal salt applicators seeking re-certification submit an annual salt use report to NHDES.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	Milestone T-2.2 Analyze salt use/salt loading data received from NHDOT, Town of Merrimack, commercial salt applicators, Merrimack Village District (MVD) and homeowners within the Naticook Brook watershed and generate sector load allocation, adjusted for weather severity. *Partners: NHDES, NHDOT, MVD, Town of Merrimack and other watershed salt applicators.*	**Measure T-2.2** The NaCl-specific watershed-based plan for the Naticook Brook watershed is published and includes winter salt sector load allocations.					
Objective T-3 Identify and prioritize watersheds with chloride impairments for salt reduction initiatives.	**Milestone T-3** Engage with communities and commercial contractors in at least one priority watershed for Green SnowPro certification and implementation of salt reduction strategies. *Partners: NHDES NPS Management Program and Green SnowPro Commercial Contractors.*	**Measure T-3** Municipal and commercial salt applicators are certified as Green SnowPro within a priority watershed and engage with NHDOT and residents (where applicable) to adopt salt reduction best practices.					
Objective T-4 Educate MS4 communities and enable them to implement salt reduction practices.	**Milestone T-4*** Work with MS4 communities and assist with addressing chloride impairments, salt reduction and snow and ice management best practices. *Partners: NHDES NPS Management Program and New Hampshire MS4 communities.*	**Measure T-4** Guidance and templates are provided to the New Hampshire MS4 communities through the New Hampshire stormwater coalitions.					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective T-5 New Hampshire municipal salt applicators are trained and Green SnowPro certified in winter maintenance best practices.	**Milestone T-5.1** Voluntary municipal salt applicators are trained in winter maintenance best practices each year. *Partners: NHDES NPS Management Program,* UNH T2*, SASC and SIMA.*	**Measure T-5.1** At least 120 voluntary municipal salt applicators completed Green SnowPro approved certification training within five years.					
	Milestone T-5.2 Voluntary municipal salt applicators demonstrate proficiency in and use of salt reduction practices through Green SnowPro approved training and municipalities receive Green SnowPro certification from NHDES. *Partners: NHDES NPS Management Program,* UNH T2*, SASC and SIMA.*	**Measure T-5.2** At least 30 municipalities are certified by the Municipal Winter Maintenance Certification (Green SnowPro) Program by 2029.					
Objective T-6 Update the New Hampshire Voluntary Green SnowPro certification curriculum and best practices manual.	**Milestone T-6** Salt applicators certified as Green SnowPro receive state of the art salt reduction practice training, proficiency exams, an industry standard best practices manual and up-to-date training materials and associated reference materials. *Partners: NHDES NPS Management Program, SIMA, Harrier, LLC, UNH T2 and SASC.*	**Measure T-6** Updated and industry standard winter salt reduction best practices manual and training materials are available for new and existing Green SnowPro certified salt applicators.					

***** This milestone does not implement any federal permit requirements. While the NPS Management Program collaborates closely with entities regulated under NPDES Permits to mitigate the effects of stormwater runoff throughout the state, Section 319 funds are not allocated to meeting federal permit requirements.

8.1.5 LAWNS AND TURFGRASS MANAGEMENT

BACKGROUND

Turfgrass that is planted and maintained on lawns, golf courses and recreational fields is the largest "crop" in the United States. It is estimated that this grass covers between 225,600 acres and 330,900 acres of turf in New Hampshire, which would cover between 3.8-5.5 percent of the state (Milesi, et al., 2005). An important part of protecting and restoring water quality in New Hampshire is proper management of lawns and turfgrass areas. Thoughtful fertilizer use is a key component, given that excess fertilizer use applied to turfgrass can be a source of nitrogen and phosphorus to surface waters and both fresh and salt waterbodies are showing signs of excessive nutrient inputs. New Hampshire's NPS Management Program provides education, outreach and guidance to communities and watershed organizations on proper turfgrass management, including fertilizer use.

Plants will not absorb more phosphorus and nitrogen than they can use. Soil and soil microbes actively absorb and recycle nutrients in the root zone, but excessive amounts of nutrients can be carried by stormwater runoff into nearby waterbodies. Excess phosphorus is of primary concern in New Hampshire's freshwater lakes and rivers, while excess nitrogen is of primary concern in saltwater systems, including estuaries like Great Bay on New Hampshire's seacoast.

NHDES VLAP data from 1990 through 2023 show stable median total phosphorus and chl-a levels in New Hampshire Lakes (NHDES, 2024). In 2009, NHDES published the "Lake Nutrient Assessment Study" that determined upper thresholds for chl-*a* and phosphorus by trophic class using data from 233 lakes in New Hampshire. In the 2020/2022 water quality assessments, 60 of the 310 lakes that have current data are considered impaired for the aquatic life integrity designated use due to elevated concentrations of chlorophyll-a and/or phosphorus (NHDES, 2022b). Because phosphorus is a limiting nutrient in the growth of aquatic plants, algae and cyanobacteria in New Hampshire's freshwaters, waterbodies impaired due to elevated concentrations of phosphorus may experience an increase in the prevalence of cyanobacteria blooms (NHDES, 2023). The number of cyanobacteria warnings is increasing, with 69 warnings issued in 2023, compared to 48 warnings in 2022. As of 2024, cyanobacteria warnings were issued at 122 lakes across the state.

According to the "State of Our Estuaries 2023" report, the estimated annual total nitrogen load from 2017 to 2020 to the Great Bay estuary averaged 895 tons, which is similar to the 2012 to 2016 average (903 tons per year), but lower than the high point from the mid-2000s (1,225 tons) (PREP, 2023).

Comparing data from 2012 and 2020, there was a 64 percent decrease in overall point source nitrogen loading from wastewater treatment facilities (PREP, 2023). This decrease can be attributed to the substantial improvements made by municipalities to their wastewater treatment facilities to reduce the amount of nitrogen discharged. However, nonpoint source nitrogen loading averaged 699 tons per year from 2017 to 2020, which is 15 percent higher than the 2012 to 2016 annual average of 607 tons per year. In recognition of the need to pursue load reductions from nonpoint sources, municipalities in the region are currently working together to implement efforts to identify and install projects to reduce nitrogen from nonpoint sources of pollution including lawns and turfgrass.

Nitrogen loading remains higher than the amount recommended in the analyses supporting the Great Bay Total Nitrogen General Permit, issued in 2021. To meet the long-term goal, nitrogen loading would have to be further reduced by approximately 39 percent from the baseline load of 1,225 tons per year (PREP, 2023).

Figure 17. Grass clippings enter storm drains and carry excess nutrients to surface water.

The GBNNPSS report details the following regarding delivered nonpoint source loads of nitrogen to Great Bay estuary from lawns and turf:

- Chemical fertilizer contributed 15 percent of the total NPS load, or 110-150 tons of nitrogen per year.
- Lawns contributed 70 percent of the chemical fertilizer load, or about 10.5 percent of the total NPS load.
- Recreational fields, including golf courses, were responsible for 8 percent of the chemical fertilizer load, or about 1 percent of the total NPS load (NHDES, 2014a).

Reductions from fertilizer loading are needed as part of the overall effort to reduce nonpoint source nitrogen loading to the Great Bay estuary.

The solution to reducing water quality impacts from fertilizer is complicated by many factors. For example, a school playing field has different requirements than a residential lawn. Turfgrass nutrient needs vary depending on existing soil conditions, as well as turf use and management objectives. Each turfgrass manager has different goals or objectives based on intensity of use, desired appearance, environmental impacts, available funds and time.

UNH Extension and New Hampshire Sea Grant work with local partners to incorporate the latest science into outreach and education efforts. Educational programs and resources include Landscaping for Water Quality, Green Grass & Clean Water and continuing education for licensed pesticide applicators. UNH Extension specialists regularly advise clients which include homeowners, landscapers, municipalities and other land managers on best management practices for lawns and landscapes. UNH Extension also partners with Master Gardeners, Natural Resource Stewards, New Hampshire Landscapers' Association, New Hampshire Plant Growers Association and other interested stakeholders to promote ecologically sound landscape and turf management practices. NPS Management Program staff maintain contact with coordinators of these programs to keep up to date on the most effective best management practices and recommendations to ensure consistent messaging for grantees and members of the public.

In 2013, the New England Interstate Water Pollution Control Commission (NEIWPCC) worked closely with states and EPA to facilitate the Northeast Voluntary Turf Fertilizer Initiative – a turf fertilizer stakeholder process to develop Regional Clean Water Guidelines for Fertilization of Urban Turf aimed at protecting water quality. The guidelines provide consistent recommendations to potentially alleviate the need for legislation in states that have not passed laws on turf fertilizer, to supplement laws in states that have passed legislation and to serve as a basis for public education and outreach.

Local and state regulations can complement or reinforce voluntary efforts to reduce nutrient pollution from fertilizer. For example, the SWQPA, RSA 483-B, states that no fertilizer, except limestone, can be applied within 25 feet of the reference line, and only slow or controlled release fertilizer may be used between 25 and 250 feet. However, local town ordinances in several New Hampshire towns and cities have restrictions that are more stringent than the SWQPA. RSA 431:4-a and RSA 431:4-b limit the amount of nitrogen and phosphorus, respectively, that is allowable which is printed on fertilizer bags.

NHDES and their partners are moving forward on outreach, education and legislative efforts related to turfgrass management and water quality. Consistent science-based information is more important than ever as many New Hampshire municipalities, watershed organizations, professional landscapers and residents are looking at organic or other alternative methods to reducing impacts to water quality from turf management. Sharing and promoting the appropriate best management practices will continue to be a focus of the milestones related to maintaining lawns and commercial turfgrass.

RESOURCES

- Green Grass and Clear Water: Environmentally Friendly Lawn Care Recommendations for Northern New England
- New England Regional Nitrogen and Phosphorus Fertilizer and Associated Management Practice Recommendations for Lawns Based on Water Quality Considerations
- Changing Homeowner's Lawn Care Behavior to Reduce Nutrient Losses in New England's Urbanizing Watersheds: The Report of Findings from Social Science Research
- Landscaping at the Water's Edge
- New Hampshire's Turf Fertilizer Law: What You Should Know
- Northeast Voluntary Turf Fertilizer Initiative
- Environmental Management for Golf Courses
- NHDES Fact Sheet: Lawn Care within the Protected Shoreland
- Assessment of Chlorophyll-a and Phosphorus in New Hampshire Lakes for Nutrient Criteria Development
- Regional Clean Water Guidelines for Fertilization of Urban Turf
- RSA 483 B Shoreland Water Quality Protection Act
- RSA 431:4-a Nitrogen Content of Fertilizer
- RSA 431:4-b Phosphorus Content of Fertilizer
- Great Bay Total Nitrogen Permit
- New Hampshire Landscape Association
- New Hampshire Plant Growers Association
- Trainings:
    - Spring Landscape Conferences Workshop
    - Pesticide Safety Education Training
    - New Hampshire Master Gardener Course
    - Natural Resource Stewards Volunteer Training
    - Landscaping for Water Quality

8.1.5-A Lawns and Turfgrass Management Goal, Objectives and Milestones

Lawns and Turfgrass Management (L) Goal: Pollutants from turf management and landscaping practices do not run off or leach to surface or groundwater.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective L-1 Fertilizer from lawns and turfgrass management practices does not degrade water quality.	**Milestone L-1.1** NPS partners and stakeholders have access to and an understanding of current soil, turf, water quality and social sciences in order to reduce water quality impacts from lawns and turfgrass management practices related to fertilizer application. *Partners: UNH Extension, New Hampshire Sea Grant, NHDES Coastal Program, Conservation Districts, New Hampshire Department of Agriculture, Markets and Foods, NEIWPCC, Master Gardeners, garden clubs, 319 Grantees, Natural Resource Stewards, professional landscapers and turf managers.*	**Measure L-1.1a** The current science, research, outreach resources and BMPs related to fertilizer impacts to water quality from lawns and turfgrass management is tracked and documented as a dynamic list of links that will be reviewed and updated at least every five years. Information is obtained from Department of Agriculture, UNH Extension and Sea Grant and NEIWPCC.					■
		Measure L-1.1b Current water quality and landscaping/turf management science research, outreach messaging and events are posted to NHDES social media venues (blogs and Facebook) quarterly.	■	■	■	■	■
		Measure L-1.1c Information on water quality impacts from lawns and turfgrass fertilizer, management practices and BMPs to protect water resources is provided to partners and other organizations conducting outreach on related topics.	■	■	■	■	■
	Milestone L-1.2 New Hampshire residents are aware of BMPs to reduce water quality impacts from lawn care activities including	**Measure L-1.2a** Existing homeowner outreach program components focused on fertilizer use are regularly evaluated.	■	■	■	■	■

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	fertilizer use. *Partners: UNH Extension and New Hampshire Sea Grant.*	**Measure L-1.2b** New outreach messages and methods identified in Measure L-1.2a evaluations are created, updated and implemented.					
	Milestone L-1.3 Landscapers and lawn care professionals are aware of and incorporate BMPs to reduce water quality impacts from fertilizer applications. *Partners: New Hampshire Landscape Association, UNH Extension and New Hampshire Sea Grant*	**Measure L-1.3a** Two *Landscaping for Water Quality* Workshops are hosted by 2029.					
		Measure L-1.3b Participants of the *Landscaping for Water Quality* Workshop and list are tracked on the UNH Extension website.					
	Milestone L-1.4 Garden centers, nurseries and town halls promote BMPs to reduce water quality impacts from fertilizer use. *Partners: UNH Cooperative Extension, New Hampshire Sea Grant, New Hampshire Plant Growers Association, garden centers, plant nurseries, New Hampshire MS4 communities and watershed groups.*	**Measure L-1.4** Outreach materials on best fertilizer practices are created and offered to at least two garden centers, nurseries and town halls.					
	Milestone L-1.5 Municipal field managers are aware of and use BMPs to reduce water quality impacts from turfgrass management. *Partners: NHDES Coastal Program, New Hampshire Municipal Association, New Hampshire stormwater coalitions, UNH Extension and New Hampshire Sea Grant.*	**Measure L-1.5*** Guidance and tools regarding BMPs for municipal turf management and water quality are promoted to local decision makers, New Hampshire MS4 permit responsible staff, municipal field managers and other interested parties.					

***** This measure does not implement any federal permit requirements. While the NPS Management Program collaborates closely with entities regulated under NPDES Permits to mitigate the effects of stormwater runoff throughout the state, Section 319 funds are not allocated to meeting federal permit requirements.

8.1.6 Agriculture

Background

Well-managed agricultural operations are an important part of New Hampshire's working landscape and are integral to maintaining good water quality. In light of changing environmental conditions, agricultural best management practices build more resilient farms, help sequester carbon and can save on operating costs. Agriculture in New Hampshire contributes to the state's economy with the farm-related income in 2019 of $181.3 million (NHDAMF, 2021). Good soil health, use of cover crops, reduced tillage and beneficial use of nutrients, such as those contained in animal manure, are key components to water quality and a healthy agricultural sector. Water quality concerns related to agriculture include sediment, nutrients, bacteria, herbicides and pesticides.

According to the 2023 New Hampshire cropland data layer, 187,206 acres of New Hampshire's land area, or about 3.2 percent, is used for crops or pasture (USDA, 2024b). The 2022 Census of Agriculture counted 42,204 farm acres as being treated with commercial fertilizer, lime and soil conditioners; 26,263 acres treated with manure and 850 acres treated with organic fertilizer in New Hampshire. The total number of fertilized acres has decreased by approximately 7,000 over the past five years (USDA, 2024a).

To understand how agriculture can fit in proportionally with other nonpoint sources, it is helpful to review the GBNNPSS (NHDES, 2014). The GBNNPSS researched the categories of sources contributing nitrogen to the impaired Great Bay estuary and determined the contributions of each source category. For agriculture, the study determined fertilizer loading from data available through the US Department of Agriculture, National Agricultural Statistics Service and several other sources. For animal waste, the study analyzed data available from U.S. Census of Agriculture and the New Hampshire Department of Agriculture Markets and Food (NHDAMF). Figure 18 summarizes the total NPS nitrogen load to the Great Bay estuary. The GBNNPSS found that chemical fertilizer on agricultural lands accounts for 58,562 lbs/year, or approximately 4 percent of the total NPS nitrogen load. Animal waste from agricultural operations was found to contribute 133,396 lbs/year or about 8 percent of the total NPS nitrogen load. NHDES collaborates with stakeholders to reduce the amount of nonpoint source pollution created by agricultural operations in New Hampshire.

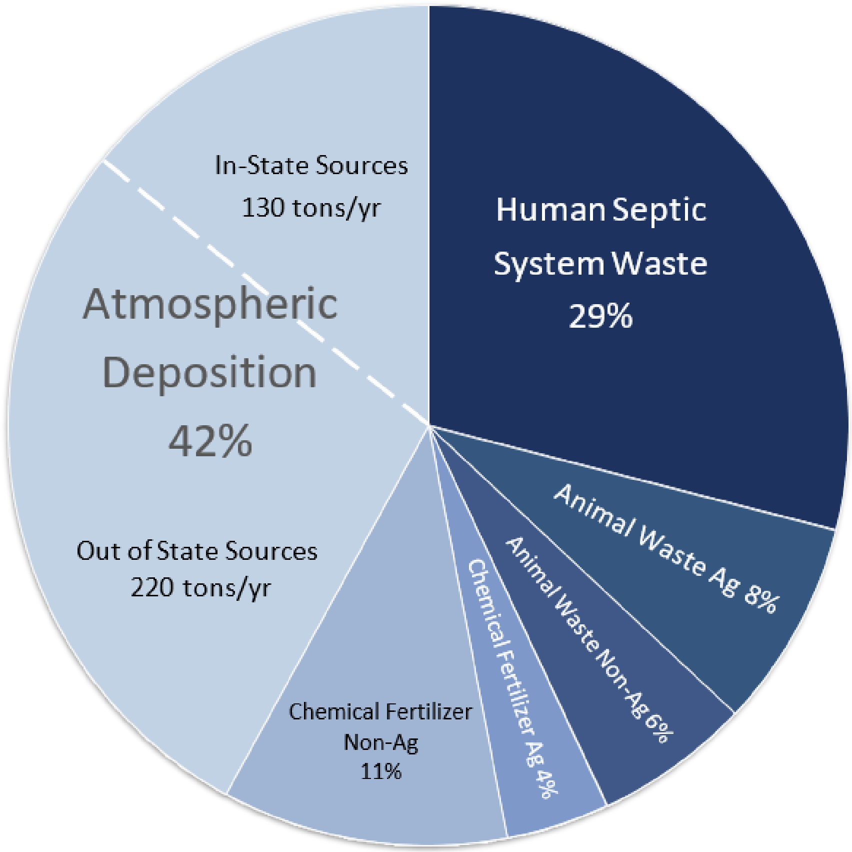

Figure 18. NPS nitrogen delivered to Great Bay estuary by source type.

The Agriculture Improvement Act of 2018, also referred to as the 2018 Farm Bill, was established to provide support to agricultural operators and forest managers through farm support programs that provide disaster relief and promote sustainability and conservation. In 2023, the Further Continuing Appropriations and Other Extensions Act (H.R. 6363), was passed, extending the 2018 Farm Bill through September 30, 2024. The USDA's NRCS implements the Conservation title of the 2018 Farm Bill. Through the bill, NRCS in New Hampshire provides technical and financial assistance to agricultural producers and landowners to adopt conservation practices on agricultural and forest lands to protect and improve water quality and quantity, soil health, wildlife habitat and air quality. The assistance provided by NRCS benefits landowners and agricultural operations by increasing resiliency to changing environmental conditions and droughts, improving soil health and enhancing the efficiency of nutrients.

Assistance is provided for conservation practices through the EQIP and the Conservation Stewardship Program, while land is protected via easements with the Agricultural Conservation Easement Program. Through these voluntary programs, NRCS collaborates with landowners to create conservation plans and implement best management practices on working land such as cover crops, reduced till, no-till, nutrient management, manure storage, rotational grazing and riparian buffers. Agricultural best management practices provide water quality benefits by reducing sedimentation and excess nutrients to surface and groundwater resources. To protect sources of drinking water in New Hampshire, NRCS is required to prioritize EQIP applications within source water protection areas and allocate at least 10 percent of annual funds for projects within these areas.

NRCS has developed many partnerships and training events to help farmers understand the benefits of implementing conservation practices on their farms. The Technical Service Provider program provides funds for farmers to hire agricultural professionals who are qualified to provide technical assistance to help plan and implement practices on their farms. To further improve the technical delivery to private landowners, NRCS, along with UNH Extension, conservation districts and producer groups provide several trainings to staff, partners and landowners on a variety of topics each year. Some of the topics commonly covered to reduce nonpoint source pollution from farming activities include nutrient management, working effectively with organic producers, grazing school, cover cropping and reduced till. The support from NRCS has aided in noticeable changes in agricultural practices, as seen in the 2022 Census of Agriculture. This data reveals a significant shift showing there has been a 17 percent increase over five years in the amount of cropland utilizing no-till or reduced tillage methods and in turn, a decrease of 11 percent in the acreage of cropland using conventional or extensive tillage practices in New Hampshire (USDA, 2024a).

To further incentivize conservation practices on agricultural land, landowners may qualify for tax exempt status from implementing certain agricultural BMPs. Under administrative rule Env-C 211, any person or company may apply to NHDES for a determination under RSA 72:12-a for a tax exemption on certain water pollution control facilities. Examples may include manure storage and receiving facilities, roofed heavy use areas and manure slurry tanks.

The National Water Quality Initiative (NWQI) was established in 2012 as a cooperative effort between NRCS, state water quality agencies and EPA to address agricultural sources, primarily nutrients and sediments, of water pollution in jointly agreed upon priority watersheds. The New Hampshire NPS Management Program and NRCS identified Clark and Oliverian Brooks in the Connecticut River watershed and Kearsarge Brook in the Saco River watershed as candidate priority watersheds under NWQI for the development of nine-element or alternative watershed-based plans. NRCS has provided assistance to landowners with implementing manure setback practices adjacent to Clark and Oliverian Brooks. Since 2021, NHDES has received EPA Regional Laboratory Assistance from the Chelmsford, Massachusetts laboratory to conduct in-stream water quality monitoring to track progress in meeting water quality goals through land protection efforts and agricultural BMPs. This partnership has resulted in annual sampling of the Clark and Oliverian Brooks watershed from May to October and expanded in 2024 to include Eastman Brook and other direct tributaries to the Connecticut River in the vicinity of these three watersheds. The data collected continues to inform the models needed to track the implementation of the Clark and Oliverian Brooks Watershed-based Plan. NHDES will continue this pivotal collaboration with NRCS and EPA to ensure the protection and restoration of the Clark and Oliverian Brooks watershed and to establish baseline and tracking data in the Eastman Brook and direct tributary watersheds as additional agricultural best practices are adopted.

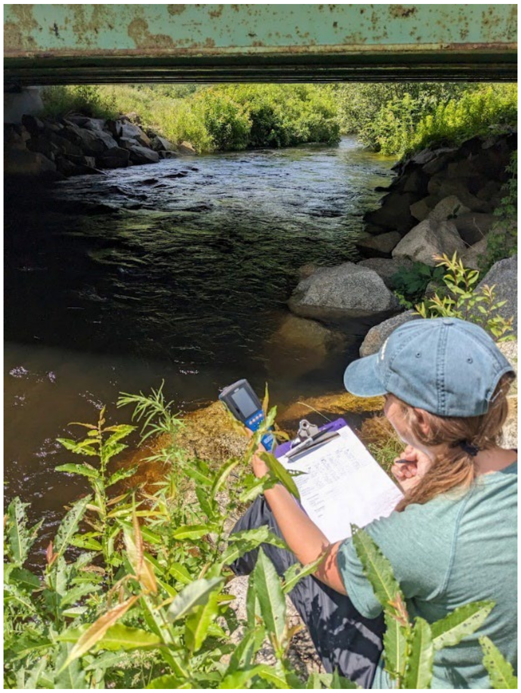

Figure 19. Water quality monitoring in the Clark and Oliverian Brooks watersheds.

The New Hampshire Department of Agriculture, Markets, and Food's (NHDAMF) *Manual of Best Management Practices (BMPs) for Agriculture in New Hampshire* provides agronomic/vegetative and structural practices that allow for economically viable production while achieving the least possible negative impact on the environment, including human, animal and plant health as well as water quality. Due to the fact that many agricultural operations include working on land defined as wetlands, NHDAMF published the *Best Management Wetlands Practices (BMWPs) for Agriculture Manual*. The manual is meant to assist agricultural landowners with reducing erosion and sedimentation affecting wetlands while still meeting the needs of agricultural operations. The NHDES revised Wetlands Rules refer to the BMWPs for Agriculture Manual under Env-Wt 522.

The New Hampshire Fertilizer Law, RSA 431, is administered by the Commissioner of NHDAMF. This law requires NHDAMF to investigate complaints of improper handling of manure, agricultural compost and chemical fertilizer. Where improper management is found, NHDAMF is required to provide notice in writing explaining the specific actions needed to conform with best management practices. If compliance is not met, the local health officer and NHDES shall be notified to take such action as their authority permits.

The NHDAMF, Division of Pesticide Control, in cooperation with federal agencies, works to ensure the safe and proper use of pesticides by enforcing federal and state pesticide laws and regulations impacting the sale, storage and application of all registered pesticides, examining and licensing pesticide dealers and users and registering pesticides sold and used within the state. In carrying out certain provisions of the federal pesticide program, NHDAMF maintains a federally approved state plan for certification of commercial and private pesticide applicators. The rules of the New Hampshire Pesticide Control Board require licensing of all commercial and private pesticide applicators as well as pesticide dealers through an examination and recertification process every five years.

Integrated pest management (IPM) combines the use of biological, cultural, physical and chemical tactics in ways that reduce economic, health and environmental risks when controlling pests. New Hampshire's IPM Program is a tool to promote, through education and training, a sustainable approach to managing pests and "to bring about the broadest possible application of the principles of integrated pest management to agriculture, horticulture, arboriculture, landscape and building maintenance, and any other areas in which economic poisons are employed" (RSA 430:50). In 2015, the New Hampshire Legislature increased the percentage of pesticide registration fees that are deposited into the IPM fund from 10 to 25 percent. These funds are utilized to bolster New Hampshire's IPM Program, including funding for IPM grants.

EPA is the permitting authority for concentrated animal feeding operations (CAFOs) in New Hampshire. Once permitted, a CAFO is legally no longer designated as a nonpoint source and becomes regulated under the NPDES program. On December 21, 2018, EPA permitted the first and only CAFO in New Hampshire, the Forbes Farm Partnership, Inc., located in Lancaster and Guildhall, Vermont.

To promote the long-term sustainability of agriculture in New Hampshire, agricultural easements are available to conserve and limit non-agricultural uses of the land. There are many programs and land trusts that develop and fund conservation easements, resulting in conservation of farmland in perpetuity. Given the diversity of land conservation programs, it is important to maintain flexibility when adopting conservation easements in order to conserve natural resources as well as meet the needs of current and future farmers.

Improving soil health and protecting water quality are critical to the well-being of both New Hampshire residents and visitors alike. By encouraging agricultural land easements, the development of nutrient management plans, integrated pest management practices, agriculture BMPs and the installation of riparian buffers to protect water quality, NHDES and its partners will help ensure the viability of a healthy agriculture sector long into the future.

Resources

- Best Management Wetland Practices for Agriculture
- Manual of Best Management Practices (BMPs) for Agriculture in New Hampshire
- New Hampshire Department of Agriculture, Markets and Food
- New Hampshire Pesticide Laws and Administrative Rules
- USDA Natural Resources Conservation Service

8.1.6-A Agriculture Goal, Objectives and Milestones

Agriculture (A) Goal: Agricultural land is well managed and demonstrated to be a water quality asset with local agricultural commissions, conservation commissions, regional planning commissions and others working on land use issues.

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
Objective A-1 Foster good agricultural management through education, training and certification programs.	**Milestone A-1.1** Work to recruit new technical service providers for nutrient management, grazing practices and soil health planning. *Partners: Conservation districts, NRCS, NHDAMF and UNH Extension.*	**Measure A-1.1** Outreach to attract new agricultural technical service providers is conducted and three new service providers are recruited to enter NRCS' Technical Service Provider Program.				■	
	Milestone A-1.2 Agricultural BMPs and BMWPs are promoted through training workshops on BMPs for Agriculture, the 2019 Wetland Rules and 2019 BMWPs for Agriculture. *Partners: NHDAMF, NRCS and UNH Extension.*	**Measure A-1.2** Two training workshops are held by 2029.		■		■	
	Milestone A-1.3 Conservation and improved soil health are promoted through the continued support of education and technical assistance to agriculture operations, including small scale farmers. *Partners: New Hampshire Association of Conservation Districts (NHACD), NHDAMF, NRCS and UNH Extension.*	**Measure A-1.3** Outreach and technical assistance and partner engagement is provided through four events each year.	■	■	■	■	■
Objective A-2 Implementation of agricultural best management practices.	**Milestone A-2.1** Buffers and streambank stabilization practices on agricultural lands, including working buffers are promoted. *Partners: Conservation districts, NRCS and UNH Extension.*	**Measure A-2.1** Riparian buffers are installed on 25 properties, encompassing 25 acres by 2029.					■

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
	Milestone A-2.2 Increase the number of farms with nutrient management plans. *Partners: Conservation Districts, NHDAMF and UNH Extension.*	**Measure A-2.2a** Nutrient management plans are developed for 15 new farms by 2029.					
		Measure A-2.2b Agricultural BMPs are promoted through outreach and education to landowners on tax exempt status for certain water pollution control facilities under RSA 72:12-a. At least two outreach elements are created.					
	Milestone A-2.3 IPM practices are encouraged. *Partners: NHACD, NHDAMF, NRCS and UNH Extension.*	**Measure A-2.3** Continued work with the IPM workgroup. Outreach to farms is provided and 10 new IPM plans for private landowners are developed each year.					
Objective A-3 Support conservation easements for Agriculture.	**Milestone A-3.1** Farms or farmland parcels under Agricultural easements are promoted. *Partners: Land and Community Heritage Investment Program (LCHIP), NHDAMF, NH Farm Bureau and NRCS.*	**Measure A-3.1** Twenty-five new Agricultural Land Easements (ALE) and Wetland Reserve Easements (WRE), encompassing 4,000 acres are obtained by 2029.					
Objective A-4 Funding opportunities are maximized through partnerships with USDA and local stakeholders to make	**Milestone A-4.1** Attract funding to leverage Long Island Sound Futures Fund to protect and improve water quality in New Hampshire as it relates to agricultural activities. *Partners: State Technical Committee Members.*	**Measure A-4.1** Presentations are given at one State Tech Committee per year on topics such as NWQI or Conservation Reserve Program (CRP).					

Objective	Milestone	Measure of Success	2025	2026	2027	2028	2029
the best use of available resources to address NPS pollution.	**Milestone A-4.2** Work with NRCS to develop an approved watershed assessment/management plan and provide monitoring support to measure effectiveness of BMPs and conservation efforts within one NWQI priority watershed. *Partners: NHDES NPS Management Program, NRCS, watershed coalitions, conservancies and commissions.*	**Measure A-4.2a** Annual water quality monitoring is conducted to track trends in water quality in the Clark and Oliverian Brook watersheds to measure the effectiveness of agricultural BMPs on working land.	■	■	■	■	■
		Measure A-4.2b Through partner engagement, outreach and NRCS programs, the Kearsarge Brook alternative plan for the Saco is developed.					■

8.2 Minor NPS Pollutant Categories

A pollutant category is classified as minor if the category does not currently pose a major threat of NPS pollution in New Hampshire.

To keep these categories classified as minor, funding and support must be maintained for programs that protect and restore water quality from these pollutant sources, thus reducing the threat through regulatory oversight, enforcement and technical assistance. A general goal of the New Hampshire NPS Management Program is to collaborate with and provide support to these programs as appropriate and as needed to continue their effectiveness.

8.2.1 RECREATIONAL BOATING AND MARINAS

Background

For the last five years, the number of recreational boats registered in New Hampshire increased to over 100,000. The count of transient boaters who visit and recreate on New Hampshire's surface waters is unknown. The environmental impacts associated with boats require continuous attention.

Chemical pollutants such as solvents, paints or oils, can get into the state's surface waters when operating, cleaning or fueling motor craft. Many solvents for cleaning boats contain chlorine, ammonia and phosphates or other chemicals that could impact fish and plankton growth. Accidental releases of oil and gasoline from motors or at refueling stations contain hydrocarbons that have the potential to contaminate bottom sediments. Motorcraft activities can harm the environment through direct physical impacts, such as shoreline erosion and increased sedimentation, which results in adverse biological impacts to aquatic plants, fish and insects. Boats operating in shallow waters or with large motors can produce waves that have sufficient energy to cause shoreline erosion. Waves can contribute to slumping banks and loss of shoreline vegetation. Additionally, resuspension of bottom sediments can occur from even small boats, depending on the depth of the water. Increases in suspended sediment in waterbodies (also known as turbidity) can result in impacts to aquatic systems. Elevated turbidity causes waterways to appear darker by hindering light from penetrating into the water column. This may stunt submerged plant growth, resulting in reduced habitat for aquatic life or interfere with their feeding capabilities.

Shoreline erosion or resuspension of bottom sediments can also result in increased nutrients, including phosphorus, in the water column, thereby contributing to increased plant and algal growth. In addition, excessive water column turbidity can clog the gills of fish and insects in the water, making it harder for them to take up oxygen.

Boats can destroy habitat for aquatic animals directly by uprooting and cutting up aquatic plants. This can lead to the spread of exotic and invasive species as plant fragments can move to downstream areas or hitch a ride on a boat or fishing gear and then be transferred to a new waterbody.

The following programs and methods all work toward minimizing water quality impacts from marinas and recreational boating activities: NHDES Boat Inspection Program, Lakes Management Advisory Committee, New Hampshire Clean Lakes Program, NHDES Clean Vessel Act Program, Federal No Discharge Areas for New Hampshire waters, NHDOT, Marine Patrol, NHFG, Public Water Access Advisory Board, U.S. Fish & Wildlife Service and the New Hampshire Marine Trades Association.

Figure 20. The NHDES "Royal Flush" is a mobile pumpout service available to recreational boaters in New Hampshire throughout the summer months.

RESOURCES

- BMPs for New Hampshire Marinas: Guidelines for Environmentally Proactive Marinas
- The Boater's Guide of New Hampshire: A Handbook of Boating Laws and Responsibilities
- NHDES Clean Vessel Act Grants
- NHDES Lakes Management and Protection
- RSA 487 Control of Marine Pollution and Aquatic Growth
- Env-Wt 513.16 Additional Design Standards and Application Requirements for Marinas
- Env-OR 300 Aboveground Petroleum Storage Facilities
- NHDES Fact Sheet: Boat Washing and Engine Maintenance for Boat Owners
- NHDES Blog Lake Etiquette: It's Not "Whatever Floats Your Boat"
- New Hampshire Boat Pumpouts
- NHDES Fact Sheet: Marine Sanitation Devices – Equipping Your Boat to Comply with the Law
- Out-of-State Boater Decal
- NHDES Fact Sheet: Impacts of Motorized Craft on New Hampshire's Waterbodies

8.2.2 Residuals Management

Septage

RSA 485-A:2 defines septage as "material removed from septic tanks, cesspools, holding tanks or other sewage treatment storage units, excluding sewage sludge from public treatment works and industrial waste and any other sludge." New Hampshire is generating on average approximately 115 million gallons of septage annually, in which approximately 92 percent of that volume is managed at a wastewater treatment facility. As of 2023, New Hampshire has increased the amount of septage hauling vehicles from approximately 330 vehicles to over 525 vehicles.

Septage land application sites in the state are regulated and permitted according to the New Hampshire Code of Administrative Rule, Env-Wq 1600. Application site permits include phosphorus as a limiting nutrient when calculating land application rates of septage. There are only three sites in New Hampshire that land apply septage for beneficial use as a fertilizer for animal feed crops. These three sites will have to cease land application until phosphorus levels decrease or the applicants find new land to file a permit application/modification for continued use.

Biosolids

RSA 485-A:2 defines biosolids as "any sludge derived from a sewage wastewater treatment facility that meets the standards for beneficial reuse specified by NHDES." Biosolids are derived from sludge that has been treated to reduce pathogens and meet federal and state pollutant regulatory limits and standards. These residuals are used to fertilize or condition soil which improves soil physical and chemical properties and enhances crop growth. Biosolids come in different forms such as compost or manure-like cake to dried pellets. Farmers, landscapers and soil manufacturers use biosolids as an affordable soil amendment alternative that reduces the use of chemical fertilizers sourced from petroleum. Biosolids are regulated under the NHDES Sludge Management rules Env-Wq-800.

There are two classes of biosolids, Class A and Class B. Class A biosolids have undergone extensive treatment processes to reduce pathogens and are not subject to further regulations for distribution and use. Class A biosolids do not require a site permit for application but must follow federal and state regulations and guidance. Class B biosolids also undergo treatment to significantly reduce pathogens but unlike Class A, there are additional regulations that must be met before class B biosolids are land applied, including a state approved site permit.

Utilizing biosolids as a soil amendment is a sustainable practice for recycling nutrients and organic matter back into the environment. It also keeps biosolids out of landfills and incinerators. The beneficial use of biosolids through land application improves soil health and enables soil carbon sequestration. Soil carbon sequestration is the act of capturing carbon dioxide from the atmosphere and storing into the soil carbon sink through vegetative production and photosynthesis. Neither landfilling nor incineration of biosolids are effective in helping to reduce our carbon footprint.

NHDES requires that a sludge quality certificate (SQC) be obtained by a generator or authorized agent of the residual before they can distribute biosolids in New Hampshire. Applicants must provide, all industrial inputs into the treatment facility, annual volume generation, a description of the treatment process with proof of federal compliance and test reports of 177 required compounds. The biosolids must be analyzed by a third party. Sludge Quality Certificates hold a five-year term.

New Hampshire recycles approximately 39 percent to land application of the annual wastewater treatment facility sludge produced in the state; land filling approximately 43 percent of the total sludge generated and incinerating about 18 percent.

The NHDES Residuals Management Section is investigating PFAS impacts on wastewater treatment and sludge management facilities to better understand the source of PFAS conveyed through the wastewater collection system. In 2019, the NHDES Biosolids Program revised each permit for every generator of biosolids for New Hampshire distribution. The revisions require generators to sample for PFAS in biosolids, report on measures taken to reduce concentrations of PFAS and provide outreach to the public to reduce PFAS. NHDES is currently modeling soil leaching to assist in the development of Soil Remediation Standards for PFAS. These standards will provide the foundation to calculate the sludge standards to be implemented into Env-Wq 800 (NHDES, 2022d).

RESOURCES

- NHDES Biosolids
- NHDES Sludge and Septage Guidance and Factsheets
- NHDES Residuals Management Forms
- RSA 485-A:4, XVI-a, b Water Pollution and Waste Disposal, Duties of Department
- RSA 485-A:6, X-a Water Pollution and Waste Disposal, Rulemaking
- Env-Wq 402 Groundwater Discharge Permits and Registrations Rules
- Env-Wq 800 Sludge Management
- NHDES Interim Best Management Practices for Emerging Contaminants in Certified Biosolids
- EPA Standards for the Use or Disposal of Sewage Sludge

8.2.3 RESOURCE EXTRACTION

BACKGROUND

Resource extraction activities that can contribute to water quality degradation in New Hampshire include sand and gravel mining and recreational mining for gold. Sand and gravel excavations are governed by RSA 155-E, which includes both "express" operational standards, standards that all excavations must follow as well as "minimum" operational standards that certain excavations subject to local permitting must follow. These operational standards address such issues as setbacks from abutters and waterbodies, maintenance of vegetation, drainage and storage of fuels. The law also establishes reclamation standards which require that, within 12 months of the completion of an excavation operation, the area must be reclaimed, with attention paid to reseeding, disposal of debris and grading of slopes and drainage. The law designates planning boards as the local permitting authority unless the municipality votes to vest such authority in the selectmen or zoning board of adjustment.

Excavations larger than 100,000 square feet, or 50,000 square feet in a protected shoreland, also require an AoT permit from NHDES. Alteration of Terrain permits govern stormwater and the effects of earth disturbance on water quality.

Gold found in stream gravel is known as a placer deposit. Panning and dredging are methods for separating the heavy gold flakes and nuggets from stream gravels. Panners are prohibited from using a shovel to dig into the stream bottom or stream banks. However, scooping gravel up with a gold pan is allowed. Mineral seekers in the White Mountain National Forest (WMNF) must adhere to the WMNF regulations. Per Administrative Rule Res 7301.19 – Res 7301.21, New Hampshire state lands, such as state parks and geologic and historic sites have rules regarding mineral collecting.

Dredging and the use of sluice boxes involves disturbing the stream sediments on a larger scale than panning. Processing stream gravels in search of placer gold releases fine sediments back into the stream and is considered a nonpoint source pollutant. Sediment-laden streams can contribute to water quality degradation and interfere with support of the aquatic life integrity designated use of New Hampshire surface waters. Dredging and similar operations are regulated by the state under statutes RSA 482-A and RSA 485-A:17 because of the potential for environmental damage. Gold seekers who anticipate dredging, or similar scopes of work in New Hampshire, are required to obtain a permit.

RESOURCES

- Vegetating New Hampshire Sand and Gravel Pits
- RSA 155-E Local Regulation Excavations
- NHDES Wetlands
  - RSA 482-A Fill and Dredge in Wetlands
  - Env-Wt 700 Prime Wetlands
- NHDES AoT
  - RSA 485-A:17 Terrain Alteration
  - Env-Wq 1500 Alteration of Terrain
- NHDES Environmental Fact Sheet: Gold in New Hampshire

8.2.4 Timber Harvesting

Background

In the late nineteenth century, land clearing for agriculture and excessive logging reduced forest cover to about 47 percent statewide. Due to a cultural shift away from farming and policy changes resulting in land protection, forest cover peaked at 87 percent statewide in 1960 (NHFAP, 2020). According to the "2020 New Hampshire Forest Action Plan," 82 percent of the total land in New Hampshire is forested. This equates to 4.7 million acres, making New Hampshire the second most forested state in the nation. Seventy percent of this forested land is privately owned. New Hampshire's rural areas and working forests provide the backdrop for recreation and tourism, generating $3.1 billion annually. Additionally, the forest products industry generates $1.5 billion annually. Timber harvesting and forest market products are responsible for 7,200 direct jobs and 12,000 total jobs supported (New Hampshire Division of Forests and Lands, 2020).

Timber harvesting can result in soil erosion and sediment pollution to nearby waterbodies. Best management practices for timber harvesting operations have been established to minimize disruption to the landscape. Rules and regulations regarding timber harvesting have been enacted to ensure all timber harvesting occurs responsibly and with minimal environmental impacts. Among other duties, New Hampshire Forest Rangers in the Forest Protection Bureau within the New Hampshire Department of Natural and Cultural Resources Division of Forests and Lands are responsible for enforcing these laws. The NPS Management Program works with state partners, including NHDFL and the New Hampshire Timberland Owners Association, to support sustainable forest management and practices that protect water quality.

Despite the large percentage of forested land in New Hampshire, timber harvesting operations are considered a minor category because there are no documented water quality impairments in New Hampshire caused by timber harvesting. The BMP manuals in place are referenced in the administrative rules for both the NHDES Wetlands and AoT bureaus.

Resources

- New Hampshire Stream Crossing Guidelines
- Env-Wt 100-900 Wetlands
- Env-Wq 1400 Shoreland Protection
- New Hampshire Office of Professional Licensure and Certification Board of Foresters
- New Hampshire Timber Harvesting Council's Professional Loggers Program
- New Hampshire Best Management Practices for Erosion Control on Timber Harvesting Operations
- Best Management Practices for Forestry: Protecting New Hampshire's Water Quality.
- Good Forestry in the Granite State: Recommended Voluntary Forest Management Practices for New Hampshire
- Guide to New Hampshire Timber Harvesting Laws (July 2023)
- New Hampshire Forest Action Plan

9.0 Emerging NPS Issues

Emerging contaminants, or *contaminants of emerging concern*, can refer to many different kinds of chemicals, including those found in medicines, personal care products, pesticides and herbicides, fire suppressants, and household cleaning products. When these chemicals make their way to surface waters, they can have a detrimental effect on fish and other aquatic species. This section provides information about three areas of emerging concern related to New Hampshire's efforts to control NPS pollution:

- Perfluoroalkyl and polyfluoroalkyl substances (PFAS).
- N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD) and 6PPD-quinone (6PPD-q).
- Pharmaceuticals and personal care products.
- Marine debris, trash and microplastics.

Numerous federal and state regulations and programs are being created, updated or are already in place to control the release of toxic substances to the environment and, when needed, to remediate contaminated areas. However, in many cases, more research is needed on potential impacts and threats from emerging contaminants. As more information becomes available on the sources of these pollutants, the New Hampshire NPS Management Program may have a future role to help reduce these threats to human health, aquatic life and ground and surface water quality.

9.1 Perfluoroalkyl and Polyfluoroalkyl Substances

Background

Over the past few years, drinking water quality issues related to perfluorinated compounds has become a major focus for NHDES. PFAS are a group of synthetic chemicals that are resistant to degradation and can move through air, water and soil. PFAS have been widely used in commercial, industrial and household products that are resistant to water, stains, heat and oil since the 1940s. Long-term exposure to PFAS through drinking water, food or hand-to-mouth transfer from products containing PFAS may be harmful to human health, especially in individuals with weakened immune systems (NHDES, 2020). PFAS have been found in blood serum in humans and animals worldwide (NHDES, 2019e).

Perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorohexanesulfonic acid (PFHxS) and perfluorononanoic acid (PFNA) are all PFAS compounds that have been detected in New Hampshire's groundwater, drinking water, surface water, fish, soil, wastewater, biosolids, waste sites and landfills.

In 2020, New Hampshire HB 1264 was signed into law that established maximum contaminant levels (MCLs) for PFOA (12 parts per trillion (ppt)), PFOS (15 ppt), PFHxS (18 ppt) and PFNA (11 ppt) in drinking water. Community water systems and non-transient, non-community water systems are required to test for PFAS and notify customers of the exceedance. In 2024, EPA announced the final National Primary Drinking Water Regulation for PFOA (4 ppt), PFOS (4 ppt), PFHxS (10 ppt), PFNA (10 ppt) and Hexafluoropropylene Oxide (HFPO-DA) (10 ppt). Water systems must be in compliance with the new EPA MCLs by 2029 and provide public notification to customers if MCLs are violated (EPA, 2024c).

In 2019, NHDES submitted the "Plan to Generate PFAS Surface Water Quality Standards" to the New Hampshire Legislature. Within the plan, NHDES assessed the costs and time needed to adopt the surface water quality criteria for PFOA, PFOS, PFHxS and PFNA as well as the programmatic implications of adopting such criteria. Creating the criteria for water consumption, fish consumption advisory, fish/shellfish tissue and water, fish/shellfish and water consumption combined, recreational contact and aquatic life use will require extensive research and is an ongoing effort. The implications of new regulations on stormwater and other sources of NPS pollution are unknown at this time.

One way that PFAS contaminates groundwater and surface water is through atmospheric deposition which may come in the form of contaminated precipitation. This implies that stormwater runoff could be one means of transport across the landscape. Agricultural runoff is of concern where PFAS-contaminated soil amendments, such as biosolids from wastewater processing, have been utilized. Septic systems are another potential source of contamination through the use of household chemicals containing PFAS. The scientific research on PFAS has shown that contamination is widespread across the environment. These chemicals are difficult to remove and NPS treatment technologies are only beginning to be developed. Therefore, the likely near future of PFAS regulation and restoration in surface water will need to be a focus on controls at the source.

Future NPS Management Program activities could include source identification, watershed-based plan development, SCMs, treatment demonstration programs and outreach to affected communities.

RESOURCES

- EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan
- EPA Fact Sheet: PFAS National Primary Drinking Water Regulation
- Interstate Technology Regulatory Council PFAS Fact Sheets
- New Hampshire PFAS investigation website
- State of New Hampshire Plan to Generate PFAS Surface Water Quality Standards
- PFAS in New Hampshire: What you need to know

9.2 6PPD AND 6PPD-Q

BACKGROUND

N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine also known as 6PPD is a chemical additive used as an anti-degradant in tires. 6PPD forms 6PPD-q when combined with ozone and can enter surface waters through stormwater pathways. Both have been found to be acutely lethal to many fish species including brook trout, rainbow trout and others.

Waterways and communities near roadways are of additional concern as studies have shown the compounds to persist for days following storm events. SCMs such as bioretention systems may prevent acute mortality in fish, however more research is needed (Interstate Technology and Regulatory Council, 2023).

RESOURCES

- EPA 6PPD-quinone
- USGS 6PPD-quinone
- Interstate Technology and Regulatory Council's What We Know: 6PPD and 6PPD-quinone
- Chemical Profile for Motor Vehicle Tires Containing 6PPD

9.3 Pharmaceuticals and Personal Care Products

Background

Pharmaceuticals and personal care products (PPCPs) are a diverse group of chemicals including, but not limited to, prescription and over-the-counter drugs, fragrances, soap and sunscreen (EPA, 2023). PPCPs include a broad array of synthetic and naturally occurring compounds that are not commonly monitored or regulated in drinking water or aquatic environments.

These types of substances find their way into the environment through a variety of pathways, such as spills, wastewater effluent, landfill leachate and aquaculture waste. In recent years, concerns about the effects of PPCPs have led to sampling in surface and groundwater. Many PPCPs have been detected in surface and groundwater at low concentrations, often measured in ppt. Research is ongoing as to the health impacts on human and aquatic creatures, however some of these PPCPs have been implicated in studies of deformities and behavior changes in fish and other organisms. Some PPCPs can act as endocrine disruptors and negatively impact aquatic organisms' abilities to reproduce.

In 2023, EPA released the "National Pilot Study of Pharmaceutical and Personal Care Products in Fish Tissue". The study tested fish tissue from five effluent-dominated stream segments below wastewater treatment plants (WWTP) discharges around the nation for 24 pharmaceutical compounds and 12 personal care products. Seven pharmaceutical compounds and two personal care products were found in fish tissue at these sites. The study found that wastewater treatment technologies for each individual WWTP can substantially affect the removal efficiency of PPCPs from wastewater.

Many unknowns remain regarding the potential for negative ecological and human health effects from exposure to ingredients in PPCPs released and accumulated in the environment. For this reason, NHDES strongly supports research on this topic, especially for human health effects on sensitive populations such as children, pregnant women and those with compromised immune systems.

New Hampshire drinking water systems are required to take annual samples of 10 common PPCPs. Additionally, New Hampshire has an ambient groundwater quality standard of 0.32 µg/L for 1,4-dioxane, which is a contaminant associated with personal care products. To reduce the amount of PPCPs entering the environment, NHDES provides education and outreach on the proper disposal of pharmaceutical drugs, drug take-back programs and the locations of over 80 police departments and pharmacies around the state that have permanent pharmaceutical drop boxes.

From a NPS pollution perspective, the focus around PPCPs should be on encouraging additional research and educating the public about source control.

Resources

- NHDES Fact Sheet: Emptying the Medicine Cabinet: Disposal Guidelines for Pharmaceuticals in the Home
- National Pilot Study of Pharmaceuticals and Personal Care Products in Fish Tissue
- EPA Contaminants of Emerging Concern in Fish

9.4 Marine Debris, Trash and Microplastics

Background

When waste is not properly recycled or disposed of, it can become NPS pollution by entering oceans, streams, rivers and lakes. Plastics in the aquatic environment are of concern because of their persistence and effect on the environment, wildlife and human health.

NOAA funding through the NHDES Coastal Program enables the Blue Ocean Society for Marine Conservation to organize beach cleanups. Each year thousands of participants clear hundreds of miles and thousands of pounds of trash. In 2023, there were 348 beach cleanup events at 44 sites. The amount and type of debris recorded becomes part of the international ocean trash index, which is compiled by the Ocean Conservancy. Volunteers have removed over 195,000 pounds of litter from New Hampshire beaches since 2001 (Blue Ocean Society for Marine Conservation, 2023). To prevent plastics from entering the environment, the Blue Ocean Society for Marine Conservation and many lake associations have installed fishing line recycling bins near popular fishing spots.

Microplastics are small pieces of plastic that are less than five millimeters in length. Microplastics can enter waterbodies when plastic trash breaks down and through wastewater from everyday use of personal care products and washing of clothes made from synthetic fabrics. When microplastics are ingested by fish, the chemicals they contain can become concentrated in their tissue and ultimately consumed by humans. Research is ongoing on the extent and impact of microplastics on human health.

With funding provided by a New Hampshire Sea Grant development grant, researchers worked with citizen scientists to collect microplastic samples on eight New Hampshire beaches. In addition to raising awareness about microplastics, results compiled in 2014 indicated there were potentially 7.5 million pieces of microplastics present on those beaches (UNH Sea Grant, 2017). This research created sampling protocols and provided a baseline estimate of microplastic abundance that will help to inform future studies on the topic.

Microplastics have also been found in New Hampshire rivers and lakes. In 2022 and 2023, the Green Mountain Conservation Group conducted research on microplastics in the Lake Ossipee Watershed. This study found microplastics in the deep spot of Lake Ossipee and in sediment samples collected from five sampling sites. Studies conducted by Colby Sawyer College students found microplastics in sediment cores collected from Kezar Lake. Further research into the prevalence of microplastics in New Hampshire waterbodies, coupled with education and outreach efforts to mitigate pollution sources, are imperative for maintaining the quality of New Hampshire's waterways.

Resources

- EPA Trash Free Waters Program
- Blue Ocean Society for Marine Conservation

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Appendix A: Priority Areas for Nonpoint Source Management Activities in New Hampshire

NHDES Methodology for Prioritizing Water Quality Restoration and Protection Activities 2025 - 2029

I. About the Recovery Potential Screening Tool

The Recovery Potential Screening Tool (RPST) was developed by EPA as a resource for states to identify areas to focus limited resources among large numbers of NPS-impaired waters. The RPST provides a systematic approach for comparing waters or watersheds and identifying differences in how well they may respond to restoration. Using representative ecological, stressor and social characteristics of each assessment unit (AU) watershed, RPST identifies the geographic areas in the state with the greatest likelihood of successful water quality restoration efforts.

NHDES selected the RPST for its availability, ease of use, flexibility and usefulness of results. In 2023, Cadmus Group and the New Hampshire TMDL Coordinator provided data for a subset of indicators at the AU level to allow for more precise ranking. In addition to using the RPST for determining recovery potential, NHDES also used the tool for determining protection potential. This protection-related screening is referred to as the Protection Potential Screening Tool (PPST), which provides the geographic areas in the state with the greatest likelihood of successful water quality protection projects.

The New Hampshire NPS Management Program's methodology for using the RPST and PPST is described in this appendix.

II. Defining a Geographic Scope for Analysis

Screening can take place on any geographic scale that contains multiple smaller units (waters or watersheds) that need to be compared and contrasted. For recovery screening using the RPST, the AU level was selected, as it would provide the most useful scale of information to assign priority to waters and watersheds impaired or threatened by NPS pollution. For protection screening using PPST, the HUC-12 level was used, as it would provide the most useful and manageable scale of information. This recovery and protection potential assignment will assist in determining priority geographic areas to guide NHDES work and direct where grant funds and technical resources should be focused to obtain the maximum benefit for restoration and protection activities.

Each waterbody type (lakes, rivers, estuaries etc.) in New Hampshire is divided into smaller segments called assessment units. In general, AUs are the basic unit of record for conducting and reporting the results of all water quality assessments. AUs are intended to be representative of homogenous segments; consequently, sampling stations within an AU can be assumed to be representative of the segment. In general, the size of AUs should not be so small that they result in an unmanageable number of AUs for reporting. On the other hand, AUs should not be so large that they result in grossly inaccurate assessments.

Many factors can influence the homogeneity of a segment. Factors used to establish homogenous AUs are presented in the following table. Based on the criteria shown in the table, lake, river, impoundment, ocean and estuarine surface waters in New Hampshire were divided into over 8,800 (excluding wetlands) AUs for assessment and reporting purposes.

Table A-1: Factors Used to Establish Homogenous and Manageable AUs

Factor	Comments
Waterbody Type	Different waterbody types (i.e., river, lake, impoundment, estuary and ocean) have different water quality standards and may respond differently to pollutants. Consequently, to help ensure homogeneity, different AUs are needed for different waterbody types.
HUC-12 Boundaries	HUC stands for hydrologic unit code. Separate AUs were established wherever 12-digit HUC boundaries were crossed to prevent AUs from becoming too large and to facilitate the naming convention for AUs.
Water Quality Standards	All waters represented by an AU should have the same water quality standard; otherwise it's possible that a portion of an AU could meet standards while the other portion is in violation. This would lead to inaccurate assessments.
Pollutant Sources	The presence of major point and/or nonpoint sources of pollutants can have a significant impact on water quality and, therefore, homogeneity within an AU.
Maximum AU size for rivers and streams	To keep AUs for rivers and streams from becoming too large, the following criteria were applied: AU $\leq$ 10 miles for rivers and streams of 3rd order or less. AU $\leq$ 25 miles for rivers and streams greater than 3rd order.
Major changes in Land Use	Land use can have a significant impact on pollutant loading and quality of surface waters.
Stream Order/ Location of Major Tributaries	Stream order and location of major tributaries can have a significant impact on the quantity and quality of water due to the amount of dilution available to assimilate pollutants.
Public Water Supplies	Separate AUs were developed for these surface waters to facilitate reporting.
Outstanding Resource Waters	Outstanding Resource Waters are defined in the surface water quality regulations as surface waters of exceptional recreational or ecological significance and include all surface waters of the national forests and surface waters designated as natural under RSA 483-7-a,i.
Shellfish Program Categories	Tidal waters were divided into AUs based on the classification system for the NHDES Shellfish Program to facilitate reporting.
Designated Beaches	Designated beaches have more stringent bacteria criteria; consequently, separate AUs were established for these waterbodies.
Coldwater fish spawning areas	Coldwater fish spawning areas have different dissolved oxygen criteria than other surface waters. Consequently, separate AUs were established for these waterbodies where information was available from NHFG.

III. Query NHDES' Supplemental Assessment Database (SADB)

NHDES Water Quality Section personnel ran a query of the SADB for all current (2020/2022) AUs that are impaired for a NPS-related parameter, per the CALM. NHDES has chosen the following list of parameters to represent NPS-related parameters. This list only includes parameters that are able to be remediated through SCM implementation, stream restoration/stabilization, adopting best practices and changes to land use practices.

Table A-2: Stormwater influenced parameter impairment IDs from the Supplemental Assessment Database

SADB Impairment ID	SADB Impairment Name
87	Aluminum
91	Ammonia (Un-ionized)
100	BOD, Biochemical oxygen demand
105	Benthic-Macroinvertebrate Bioassessments (Streams)
138	Chloride
150	Chlorophyll-a
163	Copper
170	Cyanobacteria hepatotoxic microcystins
205	Dissolved oxygen saturation
215	Enterococcus
217	Escherichia coli
227	Excess Algal Growth
230	Fishes Bioassessments (Streams)
243	Habitat Assessment (Streams)
270	Low flow alterations
267	Lead
308	Ammonia (Total)
319	Other flow regime alterations
322	Oxygen, Dissolved
371	Sedimentation/Siltation
400	Fecal Coliform
403	Total Suspended Solids (TSS)
413	Turbidity
423	Zinc
458	Nitrogen (Total)
462	Phosphorus (Total)

Impairments are defined as a NHDES sub-category beginning with a 4 or 5, as defined in the CALM. The definitions of the NHDES sub-categories are presented in the Table A-3.

Table A-3: NHDES Impairment Sub-Categories

<table>
<tr><th>EPA ATTAINS Category</th><th>NHDES Sub-Category</th><th>Definition of NHDES Sub-Category for PARAMETERS</th></tr>
<tr><td rowspan="2">4A</td><td>4A-M</td><td>The parameter is a pollutant which is assessed as an impairment per the CALM, and an EPA-approved TMDL has been completed. However, the impairment is relatively slight or marginal, as defined below:
1. For parameters where the 10 percent rule applies, the number of exceedances equals or exceeds the number of exceedances needed to assess the parameter as impaired in Table 3-13 of the CALM, however, all of the exceedances are < the Magnitude of Exceedance Thresholds (MAGEX) threshold.
2. For bacteria, there are no magnitude of exceedances of the geometric mean and/or no MAGEX of the single sample criterion.
3. The Benthic Index of Biological Integrity (B-IBI) marginal category in under development.
4. For trophic class-based assessments, the calculated median > criteria.</td></tr>
<tr><td>4A-P</td><td>The parameter is a pollutant which is assessed as an impairment per the CALM, and an EPA-approved TMDL has been completed. However, the impairment is more severe and causes poor water quality conditions, as defined below:
1. For parameters where the 10 percent rule is violated, at least one violation is an exceedance of the MAGEX threshold.
2. Non-support is based upon two or more exceedances of the MAGEX threshold.
3. For bacteria, there is at least one magnitude of exceedance of the geometric mean or there are two or more exceedances of the single sample criterion with at least one exceeding the MAGEX.
4. The Benthic Index of Biological Integrity (B-IBI) ratio (score/threshold) is < 1.0.
5. For trophic class-based assessments, the calculated median > 2X criteria.</td></tr>
<tr><td rowspan="2">4B</td><td>4B-M</td><td>Parameter is a pollutant that is causing impairment as per the CALM but a TMDL is not necessary since other controls are expected to attain water quality standards within a reasonable time. The impairment is marginal as defined in NHDES sub-category 4A-M above.</td></tr>
<tr><td>4B-P</td><td>Parameter is a pollutant that is causing impairment as per the CALM but a TMDL is not necessary since other controls are expected to attain water quality standards within a reasonable time. The impairment is more severe and causes poor water quality as defined in NHDES sub-category 4A-P above.</td></tr>
<tr><td>4C</td><td>4C-M</td><td>Parameter is not a pollutant but is causing impairment per the CALM. The impairment is marginal as defined in NHDES sub-category 4A-M above.</td></tr>
</table>

EPA ATTAINS Category	NHDES Sub-Category	Definition of NHDES Sub-Category for PARAMETERS
	4C-P	Parameter is not a pollutant but is causing impairment per the CALM. The impairment is more severe and causes poor water quality as defined in NHDES sub-category 4A-P above.
5	5-M	Parameter is a pollutant that requires a TMDL. The impairment is marginal as defined in NHDES sub-category 4A-M above.
	5-P	Parameter is a pollutant that requires a TMDL. The impairment is more severe and causes poor water quality as defined in NHDES sub-category 4A-P above.

IV. Delineate Watersheds for Recovery Potential Screening

All lakes, rivers, impoundments and estuaries impaired for one or more of the NPS-related parameters described in Section III, had a unique watershed delineated for it. Watersheds were delineated using an automated ArcGIS model developed by Ken Edwardson, NHDES Senior Scientist. The tool uses a flow direction raster, which has been modified with Walls (HUC-12 boundaries), Breaches (NHD network) and Sinks (NHD network) for each of the five HUC-6 basins (i.e., Androscoggin, Connecticut, Merrimack, Piscataqua and Saco).

After the watersheds were delineated/created, they were clipped to the New Hampshire borders. This allowed for consistent data analysis, as some GIS coverages and data were only available for New Hampshire. The watersheds were also clipped using the HUC-12 boundaries that the AU resides in. For AUs that span multiple HUC-12s, the watershed was clipped to include all appropriate HUC-12s. This provided a manageable and realistic extent for which watershed organizations might seek grant funding to produce and implement a watershed management plan. Watersheds were manually checked for quality assurance by overlaying the watershed in ArcGIS on a topographic map to ensure watershed boundaries were accurately portrayed.

V. Delineate Watersheds for Protection Potential Screening

HUC-12 sub-watersheds, which are small watersheds covering typically 10,000 to 40,000 acres were used for the PPST analysis. The USGS has assigned Hydrologic Unit Codes (HUCs) from two to 12 digits long to watersheds across the country. These watersheds were delineated using topographical features and local information. A HUC-12 sub-watershed is the smallest watershed unit in the USGS system and is denoted with a unique 12-digit code.

VI. Data Gathering

Two primary methods were used to gather information on a variety of ecological, stressor and social indicator metrics (described below) to categorize assessment units and watersheds by their recovery and protection potential, respectively. The primary method used to gather data was through the use of ArcGIS analyses. Data were queried from internal databases, including the Environmental Monitoring Database (EMD) and the SADB.

Some of the indicator metrics were calculated at three levels. The AU and watershed level, which includes the area delineated as part of Section II. The third level, or Active River Area, is a framework based upon dominant processes and disturbance regimes used to identify areas within which important physical and ecological processes of the river or stream occur. The framework identifies five key subcomponents of the active river area including material contribution zones, meander belts, riparian wetlands, floodplains and terraces (TNC, 2008). The Active River Area framework was developed by The Nature Conservancy in 2009.

VII. Metrics used in the Recovery and Protection Potential Analyses

The recoverability analysis calculated recovery potential scores based upon the ecological, stressor and social metrics in Table A-4.

Table A-4: Recoverability Metrics Used in Recovery Potential Analysis

Characteristic	Metric
Ecological	Watershed Size
	Watershed % Draining to ≤ 3rd Order Streams*
	Watershed % In-state
	Watershed % Unimpaired
	Watershed % Forested
	Watershed % Natural Cover
	Watershed % Wetlands
	Active River Area % Forested
	Active River Area % Natural Cover
	Active River Area % Wetlands
Stressor	Watershed Aquatic Barriers
	Corridor Road Crossing Density
	Watershed Mean Soil Erodibility
	Number of 303(d) Listed Causes
	Watershed % Agriculture
	Watershed % Impervious Cover
	Watershed % Urban
	Watershed % 100-year Flood Zone
	Active River Area % Agriculture
	Active River Area % Impervious Cover
	Active River Area % Urban
Social	**Approved TMDL**
	EPA Approved (a) Through (i) or Alternative Watershed-Based Plan
	Jurisdictional Complexity
	Local River Advisory Committee
	Number of Drinking Water Intakes
	Watershed % Assessed
	Watershed % in New Hampshire MS4 Regulated Area

Characteristic	Metric
	Watershed % Low-Income Population
	Watershed % Protected Land

* Percent Draining to ≤ 3rd Order Streams was not included in the ecological metrics for the lakes recovery priority analysis.

Metrics in bold were weighted in analysis.

The protection analysis calculated protection potential scores based upon the ecological, stressor and social metrics in Table A-5.

Table A-5: Protection Metrics used in the Protection Potential Analysis

Characteristic	Metric
Ecological	Watershed % Draining to ≤ 3rd Order Streams
	Watershed % Forest
	Watershed % Natural Cover
	Watershed % Wetlands
	Active River Area % Forest
	Active River Area % Natural Cover
	Active River Area % Wetlands
Stressor	Watershed Aquatic Barriers
	Watershed % in 100-year Flood Zone
	Watershed % Impervious Cover
	Watershed % Urban
	Active River Area % Impervious Cover
	Active River Area % Urban
	Corridor Road Crossing Density
	Number of 303(d) Listed Causes
Social	**EPA Approved (a) Through (i) or Alternative Watershed-Based Plan**
	Jurisdictional Complexity
	Local River Advisory Committee
	Number of drinking water intakes
	Watershed % Agriculture
	Watershed % in New Hampshire MS4 Regulated Area
	Watershed % In-state
	Watershed % Low-Income Population
	Watershed % Protected Land

Metrics in bold were weighted in analysis.

ECOLOGICAL METRICS

- **Watershed Size** – The total area of the watershed in square meters.
- **% Draining to ≤ 3rd Order Streams** – Percent of the watershed that drains to headwater streams (1st, 2nd or 3rd order streams). This indicator was not selected for the lake and impoundment recovery potential analysis (Appendix C).
- **Watershed % Unimpaired –** All assessed AUs were quantified in a watershed. This included any AU that was not categorized as 3-ND in the 2020/2022 assessment cycle. Then, all AUs that were not impaired for any parameter except mercury and pH were quantified. The total number of assessed AUs in the watershed was divided by total number of assessed AUs without an impairment. That result was multiplied by 100 to get the percent of each watershed that was unimpaired.
- **Watershed % Forest** – Calculated as area of land within the watershed categorized in the 2021 NLCD as class: 41 (Deciduous Forest), 42 (Evergreen Forest) and 43 (Mixed Forest).
- **Watershed % Natural Cover or N-Index1** – Calculated as area of land within the watershed categorized in the National Land Cover Database (NLCD) 2021 Land Cover dataset as class: 31 (Barren Land, rock/sand/clay), 41 (Deciduous Forest), 42 (Evergreen Forest), 43 (Mixed Forest), 52 (Shrub/Scrub), 71 (Grassland/Herbaceous), 90 (Woody Wetlands) and 95 (Emergent Herbaceous Wetlands).
- **Watershed % Wetlands** – Calculated as area of wetlands within the watershed categorized in the 2021 NLCD as class: 90 (Woody Wetlands) and 95 (Emergent Herbaceous Wetlands).
- **Active River Area % Forest** – Calculated as area of land within the active river area categorized in the 2021 NLCD as class: 41 (Deciduous Forest), 42 (Evergreen Forest) and 43 (Mixed Forest).
- **Active River Area % Natural Cover or N-Index1** – Calculated as area of land within the active river area categorized in the 2021 Land Cover dataset as class: 31 (Barren Land, rock/sand/clay), 41 (Deciduous Forest), 42 (Evergreen Forest), 43 (Mixed Forest), 52 (Shrub/Scrub), 71 (Grassland/Herbaceous), 90 (Woody Wetlands) and 95 (Emergent Herbaceous Wetlands).
- **Active River Area % Wetlands** – Calculated as area of wetlands within the active river area from the 2021 NLCD categorized as class: 90 (Woody Wetlands) and 95 (Emergent Herbaceous Wetlands).

STRESSOR METRICS

- **Watershed Aquatic Barriers** – A count of the number of dams within the watershed using the NHDES Dam Bureau ArcGIS dataset.
- **Corridor Road Crossing Density** – A count of the number of intersections between the NHDOT road network and the NHDES assessment unit dataset filtered for rivers within a watershed, divided by the total number of stream miles within the watershed calculated form the NHD stream network.
- **Watershed Mean Soil Erodibility** – Average soil erodibility (K) factor in the watershed. From the Natural Resources Conservation Service Soil Survey Geographic database.
- **Number of 303(d) Listed Causes** – A count of the number of stormwater related impairments for the AUID. A parameter is only counted once even if it is an impairment for multiple designated uses (e.g.,

Primary Contact Recreation). An AU can have a maximum of 23 causes/parameters (e.g., dissolved oxygen, pH, Chlorophyll-a).

- **Watershed % Agriculture** – Calculated as area of land within the watershed categorized in the NLCD 2021 as 81 (Pasture/Hay) and 82 (Cultivated Crops). This indicator was categorized as a stressor metric for the recovery potential analysis.
- **Watershed % Impervious Cover** – Calculated as area of land within a watershed from the NLCD 2021 Percent Developed Imperviousness dataset.
- **Watershed % Urban** – Calculated as area of land within the watershed categorized in the 2021 NLCD as class: 21 (Developed, Open Space), 22 (Developed, Low Intensity), 23 (Developed, Medium Intensity) and 24 (Developed, High Intensity).
- **Watershed % 100-Year Flood Zone –** Percent of the watershed that is in the 100-year flood zone mapped by the Federal Emergency Management Agency (FEMA). The term 100-year flood describes a flood magnitude that has a 1 percent chance of occurring in a given year. Calculated from the FEMA Flood Insurance Rate Maps National Flood Hazard data layer.
- **Active River Area % Agriculture** – Calculated as area of land within the active river area categorized in the NLCD 2021 as 81 (Pasture/Hay) and 82 (Cultivated Crops).
- **Active River Area % Impervious Cover** – Calculated as area of land within the active river area from the NLCD 2021 Percent Developed Impervious dataset.
- **Active River Area % Urban** – Calculated as area of land within the active river area categorized in the 2021 NLCD as class: 21 (Developed, Open Space), 22 (Developed, Low Intensity), 23 (Developed, Medium Intensity) and 24 (Developed, High Intensity).

SOCIAL METRICS

- **Approved TMDL** – Yes (1)/No (0) field describing if there is an approved TMDL for any pollutant except pH and mercury in the watershed.
- **EPA Approved (a) Through (i) or Alternative Watershed-Based Plan** – Yes (1)/No (0) field describing if an (a) through (i) watershed-based plan or EPA approved alternative has been created for the HUC-12 that the AU is associated with. Considers the watershed-based plans available to NHDES developed in New Hampshire through a variety of partnerships and funding mechanisms.
- **Jurisdictional Complexity** – A count of the number of New Hampshire municipalities that intersect the watershed.
- **Local River Advisory Committee** – Yes (1)/No (0) field describing if the watershed intersects with a Designated River as defined under RSA 483. Once a river is designated, a volunteer Local River Advisory Committee is formed and tasked with developing and implementing a River Corridor Management Plan, so that the outstanding qualities of the river may be protected.
- **Number of Drinking Water Intakes** – A count of the number of community wells designated as active systems and having an active source, in the NHDES Drinking Water and Groundwater Bureau's ArcGIS layer.

- **Watershed % Agriculture** Calculated as area of land within the watershed categorized in the NLCD 2021 as 81 (Pasture/Hay) and 82 (Cultivated Crops). This indicator was categorized as a social metric for the protection potential analysis.
- **% of Watershed Assessed** – All AUs that are within a particular watershed were captured and the total number was calculated. AUs were then compared to data housed in the SADB to determine its overall status. The sum of waterbodies from all categories except 3-ND (no current data) were compared to the total number of waterbodies to determine the percent assessed.
- **Watershed % in MS4 Regulated Area** – Calculated as area of land within the watershed covered by EPA's 2017 New Hampshire MS4 General Permit.
- **Watershed % In-state** – The percent of the total watershed within New Hampshire boundaries. Calculated by dividing the "Watershed Area In-state (sqm)" by "Watershed Area Total (sqm)" and multiplied the result by 100 to obtain the Watershed % In-state.
- **Watershed % Low-Income Population –** The percent of the total population in the watershed that resides in a low-income, an income level that is less than or equal to twice the federal poverty level, household. Calculated from the low-income population count by block group from the US Census Bureau American Community Survey 2016-2020 Five-Year Summary.
- **Watershed % Protected Land** – Calculated as area of land within the watershed located in calculated from the Protected Areas Database of the United States Version 2.1.

VIII. Rank Data to Determine Recovery Potential and Protection Potential

In order to determine the recovery or protection potential of each of the watersheds relative to each other, NHDES used a methodology developed by EPA.

The tool uses a semi-automated process/spreadsheet to generate a recovery or protection potential score and rank for each watershed. The process involves:

- Entering the raw data for each metric into the spreadsheet.
- Normalizing indicator values to correct the unintentional weighting that would happen in a multi-metric index when some indicators measure values in thousands while others may be measured in fractions.
- Assigning weights, if desired.
- Calculating ecological, stressor and social indices. Within each of the three classes (ecological, stressor and social), a summary index is calculated for each watershed in the dataset by adding along each row all the normalized indicator values, dividing by the number of indicators selected in that class and then multiplying by 100.
- Calculating the Recovery Potential Integrated (RPI) or Protection Potential Integrated (PPI) score. The RPI/PPI score is calculated by adding Ecological, Social and 100 minus the Stressor index values and dividing by three, for each watershed. A higher RPI score implies better recovery potential. A higher PPI score implied better protection potential.

$$\text{RPI or PPI Score} = \frac{\text{Ecological Index} + \text{Social Index} + (100 - \text{Stressor Index})}{3}$$

- Rank-ordering. Rank-ordering organizes screened watersheds from highest to lowest recovery or protection potential based on their RPI/PPI scores.
- Each ranked AU watershed or HUC-12 was categorized as having high, medium or low recovery or protection potential. The category was assigned by dividing the total number of ranked watersheds by the number of categories (high, medium or low). The top third of the ranked watersheds were classified as "high", the middle third of the ranked watersheds were classified as "medium" and the bottom third of the ranked watersheds were classified as "low". If two watersheds with the same recovery/protection score were in different categories (i.e. top and middle third), both watersheds were assigned to the higher-ranking category. This ensured consistency in categorization, avoiding situations where watersheds with the same score were categorized as higher or lower than the other.

The Recovery Potential Screening Tool was not used to determine the list of beaches in New Hampshire that the NPS Management Program recognizes as priorities for restoration activities. The Priority Restoration List for Beaches in New Hampshire in Appendix D is a list of all New Hampshire beaches that have a stormwater related impairment or an approved TMDL for any parameter, except mercury and pH. The list is not ranked, therefore all AUs on the list are considered a high priority for restoration activities.

IX. Mapping the Results

Once the rank order was determined using the PPST, NHDES Water Quality Section staff were able to map the data in ArcGIS by creating a simple join between NHDES' HUC-12 coverage and an excel spreadsheet containing the HUC-12 and rank. This map, included in Appendix F, groups the Protection Potential rank into three evenly distributed categories: low, medium and high protection potential presented at the statewide scale.

X. Anticipated improvements to the RPST/PPST Methodology

Over the next five years, improvements to the methodology for running the RPST and PPST are anticipated. Because the Plan is updated every five years, NPS Management Program staff have found that the data in the Recovery and Protection Potential Ranking Lists can become outdated for ranking project proposals on an annual basis. For instance, watersheds where NPS pollution concerns have recently been identified may not be impaired or included in the lists due to a lack of data. To ensure the recovery and protection potential lists are up-to-date with the most recent water quality data, the RPST and PPST will be updated as new Section 303(d) Lists are approved by EPA. As a result, the Recovery and Protection Potential Ranking Lists will be amended and provided to grant and loan applicants, existing grantees and the public on the Watershed Assistance Section webpage.

Appendix B: River Watersheds Recovery Potential Ranking List

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHRIV600020302-02-01	Saco River	Conway, Bartlett	65.0	1	High
NHRIV600020304-01-01	Saco River	Conway	63.3	2	High
NHRIV700020108-01	Unnamed Brook - To Winona Lake - North Inlet	Ashland, Center Harbor, New Hampton	63.1	3	High
NHRIV600020301-04	East Branch Saco River - Unnamed Brook	Bartlett, Jackson	63.0	4	High
NHRIV600020301-01	East Br Saco R - East Fork East Br Saco R - Black Brk - Gulf Brk	Jackson, Beans Purchase, Chatham	62.9	5	High
NHRIV600020203-07	Swift River	Conway	62.7	6	High
NHRIV700020101-03	Wiley Brook	Wolfeboro	61.6	7	High
NHRIV600020802-05	Red Brook	Effingham, Ossipee	61.6	8	High
NHRIV801060101-09	Unnamed Brook - to North Inlet of Canaan Street Lake	Canaan	61.3	9	High
NHRIV801060101-16	Canaan Street Lake -Inlet at Fernwood Farms	Canaan	61.2	10	High
NHRIV700061002-14	Merrimack River	Nashua, Hudson, Litchfield, Merrimack	61.1	11	High
NHRIV802010501-05	Connecticut River	Hinsdale	61.1	12	High
NHRIV700060803-14-02	Merrimack River	Manchester, Bedford	60.8	13	High
NHRIV700061002-13	Merrimack River	Merrimack, Litchfield	60.7	14	High
NHRIV801070201-03	Unnamed Brook - to Crescent Lake from Northeast Inlet	Unity, Acworth	60.3	15	High
NHRIV700060302-24	Merrimack River	Concord	60.0	16	High
NHRIV700060302-25-02	Merrimack River	Bow, Concord, Pembroke	59.9	17	High
NHRIV700030204-04	Beard Brook - Unnamed Brook	Washington	59.4	18	High
NHRIV700010804-18	Lake Ave Trib	Franklin	59.2	19	High
NHRIV600030805-02	Exeter River	Exeter, Brentwood	59.2	20	High
NHRIV700060804-11	Merrimack River	Merrimack, Bedford, Litchfield, Manchester	59.2	21	High
NHRIV700061206-24	Merrimack River	Nashua, Hudson	59.0	22	High
NHRIV801010805-04	Burnside Brook - Unnamed Brook	Northumberland, Lancaster, Stark	59.0	23	High

NHRIV600030701-01	Lamprey River - And Headwater Tributaries	Northwood, Deerfield	59.0	24	High
NHRIV802010302-06	Unnamed Brook - Pine Inlet B	Swanzey	59.0	25	High
NHRIV802010101-08	Ashuelot River	Washington, Lempster	58.9	26	High
NHRIV600030704-07	Mountain Brook - Unnamed Brooks	Nottingham, Deerfield	58.7	27	High
NHRIV600030805-09	Exeter River	Exeter	58.7	28	High
NHRIV600030801-05	Fordway Brook - Unnamed Brook	Raymond, Chester	58.7	29	High
NHRIV700010203-01	Pemigewasset River	Woodstock	58.6	30	High
NHRIV801010301-02	Bishop Brook - Pond Brook	Clarksville, Stewartstown	58.5	31	High
NHRIV801030102-08	Johns River - Chase Brook	Dalton, Whitefield	58.5	32	High
NHRIV600030802-03	Exeter River	Sandown, Chester	58.4	33	High
NHRIV801010403-01	Simms Str - East Br Simms Str - Unnamed Brk - Uran Brk - Moran Brk - Boy Brk	Columbia, Dixville	58.2	34	High
NHRIV700010804-05	Sucker Brook - Unnamed Brooks	Andover	58.2	35	High
NHRIV700010804-07	Sucker Brook - Unnamed Brook	Andover, Franklin	58.2	36	High
NHRIV700020201-20	Governors Park Stream	Laconia	58.1	37	High
NHRIV700030403-09	Bradley Brook - Unnamed Brook	Warner, Andover, Salisbury	58.0	38	High
NHRIV801070201-01	Cold River	Unity, Acworth	58.0	39	High
NHRIV600020305-02	Saco River	Conway	57.8	40	High
NHRIV600030703-04	Dudley Brook - Unnamed Brook	Raymond, Deerfield, Nottingham	57.8	41	High
NHRIV801010805-05	Otter Brook - Bone Brook - Caleb Brook - Redman Brook - Unnamed Brook	Lancaster, Kilkenny	57.8	42	High
NHRIV801010806-06	Israel River	Jefferson	57.8	43	High
NHRIV802010103-22	Ashuelot River	Gilsum, Marlow, Sullivan	57.8	44	High
NHRIV700010307-13	Unnamed Brook - to Loon Lake	Plymouth, Campton	57.7	45	High
NHRIV600020604-06	Chocorua River	Tamworth, Ossipee	57.7	46	High
NHRIV700060301-11	Turkey River - Unnamed Brook	Concord, Bow	57.7	47	High
NHRIV801060403-12	South Branch Sugar River - Gunnison Brook	Goshen, Newport, Unity	57.7	48	High
NHRIV700060503-16	Bear Brook	Allenstown	57.6	49	High
NHRIV802020202-07	Laurel Lake-Keene Ave Trib	Fitzwilliam	57.5	50	High
NHRIV802010403-20	Ashuelot River – 300 ft US of Hinsdale WWTF to Connecticut R	Hinsdale	57.5	51	High
NHRIV802010403-07	Ashuelot River – 300 ft US of Winchester WWTF to 3000 ft DS of WWTF	Winchester	57.5	52	High

NHRIV802010401-19	Ashuelot River - 3000 ft DS of Swanzey WWTF to Old Winchester Dam	Winchester, Swanzey	57.4	53	High
NHRIV600020804-03	Phillips Brook	Effingham, Ossipee	57.4	54	High
NHRIV802010102-11	Ashuelot River - Unnamed Brook	Marlow, Stoddard	57.4	55	High
NHRIV700030202-06	North Branch - Bailey Brook	Nelson, Stoddard	57.3	56	High
NHRIV802010401-16	Ashuelot River - ~3000 Upstream of Thompson Brdg to 300 ft US of Swanzey WWTF	Swanzey	57.3	57	High
NHRIV801060105-08	Lovejoy Brook - Scales Brook - Unnamed Brook	Hanover, Canaan, Enfield	57.2	58	High
NHRIV802010303-13	South Branch Ashuelot River - Unnamed Brook	Troy	57.2	59	High
NHRIV600030402-04	Jones Brook - Hart Brook	Milton, Middleton	57.2	60	High
NHRIV801060105-11	Mascoma River - Unnamed Brook	Enfield	57.1	61	High
NHRIV700030302-08	Davis Brook	Bradford, Warner	57.1	62	High
NHRIV802010303-12	South Branch Ashuelot River	Troy	57.1	63	High
NHRIV700061001-06	Muddy Brook - Unnamed Brook	Nashua, Hollis	57.1	64	High
NHRIV400010405-05	Dead Diamond River	Second College Grant	57.1	65	High
NHRIV802010403-19	Ashuelot River	Hinsdale	57.1	66	High
NHRIV700060802-14-02	Merrimack River	Hooksett, Manchester	57.0	67	High
NHRIV700060301-13	Turkey River - Bow Brook	Concord, Bow	57.0	68	High
NHRIV801060302-05	Connecticut River	Plainfield, Cornish, Lebanon	56.9	69	High
NHRIV700010303-09-01	Baker River	Wentworth	56.9	70	High
NHRIV600030804-06	Dudley Brook - Unnamed Brook	Brentwood, Exeter, Fremont	56.9	71	High
NHRIV802010201-18	Otter Brook - Spaulding Brook - Meetinghouse Brook - Unnamed Brook	Sullivan, Roxbury	56.9	72	High
NHRIV802010301-04	Ashuelot River - ACOE Dam to Ashuelot River Dam Pond	Keene, Surry	56.9	73	High
NHRIV801070201-08	Cold River - Underwood Brook	Acworth, Lempster	56.8	74	High
NHRIV802010301-09	Ashuelot River - Ashuelot River Dam Pond to Otter Br	Keene	56.8	75	High
NHRIV801030506-10	Ammonoosuc River	Bath	56.7	76	High
NHRIV802020203-05	Tully Brook - Unnamed Brooks	Richmond	56.6	77	High
NHRIV801060105-05	Mascoma River	Canaan, Enfield	56.6	78	High
NHRIV801010806-09	Israel River	Lancaster	56.5	79	High

NHRIV802010201-19	Otter Brook - Hubbard Brook - Unnamed Brook - Wheeler Brook	Sullivan, Keene, Nelson, Roxbury	56.4	80	High
NHRIV700010403-03	Bog Brook	Campton	56.4	81	High
NHRIV801030201-02	Connecticut River	Dalton	56.4	82	High
NHRIV802010303-20	South Branch Ashuelot River	Marlborough, Swanzey, Troy	56.4	83	High
NHRIV802010301-11	Ashuelot River - Otter Br to Keene WWTF	Swanzey, Keene	56.4	84	High
NHRIV801060302-01	Connecticut River	Lebanon	56.4	85	High
NHRIV700010303-12	Baker River	Wentworth	56.4	86	High
NHRIV801010704-04	Phillips Brook - Jodrie Brook - Number Two Brook - Unnamed Brook	Dummer, Millsfield, Odell, Stark	56.3	87	High
NHRIV801010704-03	Phillips Brk - W Branch Phillips - Nelson - Watkinson - Wells Brks - and Tribs	Ervings Location, Columbia, Millsfield, Odell	56.3	88	High
NHRIV802010401-15	Ashuelot River - South Branch to Unnamed Brook 3000' US of Thompson Bridge	Swanzey	56.3	89	High
NHRIV700030107-07	Moose Brook - Unnamed Brook	Hancock	56.3	90	High
NHRIV700030505-05	Contoocook River	Hopkinton	56.3	91	High
NHRIV600030804-11	Little River - Scamen Brook	Exeter	56.2	92	High
NHRIV700020103-08	Weed Brook - Unnamed Brook	Moultonborough, Sandwich	56.2	93	High
NHRIV600020105-07	Ellis River - Unnamed Brook	Bartlett	56.2	94	High
NHRIV801070201-11	Dodge Brook - Unnamed Brook	Lempster	56.1	95	High
NHRIV801060407-16	Sugar River	Claremont	56.1	96	High
NHRIV801010903-02	Connecticut River	Lancaster, Dalton	56.1	97	High
NHRIV801030403-01	Ammonoosuc River - Unnamed Brook	Bethlehem	56.1	98	High
NHRIV802010303-23	South Branch Ashuelot River	Swanzey	56.1	99	High
NHRIV802010303-18	South Branch Ashuelot River	Troy	56.1	100	High
NHRIV802010101-19	Unnamed Brook - to Sand Pond	Marlow	56.0	101	High
NHRIV600030707-02	Howe Brook	Barrington	56.0	102	High
NHRIV801060407-09-02	Sugar River	Claremont	56.0	103	High
NHRIV801070202-04	Cold River - Bowers Brook	Acworth	56.0	104	High
NHRIV802020102-03	Priest Brook	Fitzwilliam	55.9	105	High
NHRIV600030803-07	Little River - Unnamed Brook	Kingston, Brentwood	55.9	106	High
NHRIV600030703-14	Pawtuckaway River - Unnamed Brook	Nottingham, Epping, Raymond	55.9	107	High
NHRIV801060701-05	Chase Brook	Unity	55.9	108	High

NHRIV801010902-02	Connecticut River	Northumberland	55.8	109	High
NHRIV600020104-03	Wildcat Brook	Jackson	55.8	110	High
NHRIV802010202-16	Minnewawa Brook - Robbins Brook - Unnamed Brook	Marlborough, Roxbury	55.8	111	High
NHRIV801070201-09	Unnamed Brook - Dodge Pond North Inlet	Lempster	55.7	112	High
NHRIV700030104-29	Gridley River - Unnamed Brook	Sharon, New Ipswich, Peterborough	55.7	113	High
NHRIV801030403-16	Ammonoosuc River	Littleton, Lisbon	55.7	114	High
NHRIV801070203-09	Cold River	Walpole, Langdon	55.6	115	High
NHRIV801010902-03	Connecticut River - Emery Brook - Sheridan Brook - Unnamed Brook	Lancaster, Northumberland	55.6	116	High
NHRIV700010305-11	Baker River	Rumney, Wentworth	55.5	117	High
NHRIV700010603-01	Cilley Brook - Fretts Brook	Hebron, Plymouth	55.5	118	High
NHRIV801060106-15	Mascoma River	Lebanon	55.5	119	High
NHRIV801030403-11	Ammonoosuc River	Littleton	55.5	120	High
NHRIV801060102-03	Indian River - Unnamed Brook	Canaan, Orange	55.5	121	High
NHRIV801010305-01	Connecticut River	Stewartstown, Clarksville	55.4	122	High
NHRIV801060106-16	Mascoma River	Lebanon	55.4	123	High
NHRIV700010307-11	Baker River	Plymouth, Holderness, Rumney	55.4	124	High
NHRIV600030902-14	Horsehide Brook	Durham	55.3	125	High
NHRIV801060106-17	Mascoma River	Lebanon	55.3	126	High
NHRIV600020702-02	Dan Hole River	Ossipee, Tuftonboro	55.3	127	High
NHRIV801060406-30	Sugar River	Newport, Claremont	55.3	128	High
NHRIV801070203-07	Great Brook - Unnamed Brook - Little Brook - Unnamed Trib to Little Brook	Langdon, Acworth, Charlestown	55.2	129	High
NHRIV801040402-04	Hewes Brook	Lyme, Hanover	55.2	130	High
NHRIV801060404-11	North Branch Sugar River - Perkins Brook	Croydon	55.2	131	High
NHRIV700010702-02	Wild Meadow Brook	Grafton, Alexandria, Danbury	55.2	132	High
NHRIV801060106-19	Mascoma River	Lebanon	55.2	133	High
NHRIV801060106-20	Mascoma River	Lebanon	55.0	134	High
NHRIV400020101-11	Moose Brook	Gorham	55.0	135	High
NHRIV801010603-05	Connecticut River	Stratford, Northumberland	54.9	136	High
NHRIV700010802-07	Salmon Brook - Emerson Brook	Sanbornton	54.9	137	High

NHRIV801070203-04	Cold River - Warren Brook - Unnamed Brook	Alstead, Langdon	54.9	138	High
NHRIV700020103-12	Shannon Brook - Unnamed Brook	Moultonborough	54.9	139	High
NHRIV600030701-09	Lamprey River	Deerfield	54.9	140	High
NHRIV802010303-11	Quarry Brook - Unnamed Brook	Troy, Fitzwilliam	54.9	141	High
NHRIV600030601-02	Cocheco River - Ela River - Unnamed Brook	New Durham, Farmington	54.8	142	High
NHRIV801070503-07	Wases Grove Inlet	Chesterfield	54.8	143	High
NHRIV801010405-03	Connecticut River	Columbia, Stratford	54.8	144	High
NHRIV801010404-02	Connecticut River	Columbia, Colebrook	54.8	145	High
NHRIV700060502-05	Flat Meadow Brook	Northwood, Epsom, Pittsfield	54.7	146	Medium
NHRIV700040301-05	Squannacook River - Walker Brook	Mason, Greenville, New Ipswich	54.7	147	Medium
NHRIV600020703-05	Poland Brook	Ossipee, Wolfeboro	54.7	148	Medium
NHRIV700030304-16	Warner River	Warner	54.6	149	Medium
NHRIV600030903-02	Mallego Brook	Barrington, Madbury	54.6	150	Medium
NHRIV801030701-05	Oliverian Brook - Unnamed Brook - Morris Brook	Haverhill, Piermont	54.6	151	Medium
NHRIV600030608-02	Blackwater Brook-Clark Brook	Rochester, Dover, Somersworth	54.6	152	Medium
NHRIV801060405-27	Sugar River	Newport	54.6	153	Medium
NHRIV400010606-02	Dead River - Jericho Brook - Unnamed Brook	Berlin	54.5	154	Medium
NHRIV600030902-02	Oyster River - Caldwell Brook	Barrington, Lee, Nottingham	54.5	155	Medium
NHRIV801070507-01	West River - Ash Swamp Brook - Lily Pond Brook - Unnamed Brook	Hinsdale, Chesterfield	54.5	156	Medium
NHRIV700060801-05-02	Black Brook	Manchester	54.5	157	Medium
NHRIV400010606-08	Androscoggin River	Berlin	54.4	158	Medium
NHRIV400010606-07	Androscoggin River	Berlin	54.4	159	Medium
NHRIV700030403-17	Blackwater River	Salisbury	54.4	160	Medium
NHRIV700060606-05	South Branch Piscataquog River	New Boston	54.4	161	Medium
NHRIV700030108-23	Contoocook River - 3000 ft DS of Antrim WWTF to North Branch	Deering, Antrim, Bennington, Hillsborough	54.4	162	Medium
NHRIV400010606-09	Androscoggin River	Berlin	54.4	163	Medium
NHRIV600030902-01	Unnamed Tributary - to Wheelwright Pond	Lee, Nottingham	54.3	164	Medium
NHRIV400010606-10	Androscoggin River	Gorham	54.3	165	Medium
NHRIV600030402-06	Branch River	Milton, Wakefield	54.3	166	Medium
NHRIV700060402-05	Suncook River	Gilmanton, Alton, Barnstead	54.3	167	Medium

NHRIV700010601-05	Cockermouth Brook	Hebron, Groton	54.3	168	Medium
NHRIV400020101-12	Androscoggin River	Gorham	54.3	169	Medium
NHRIV600030904-06	Pickering Brook	Portsmouth, Greenland	54.2	170	Medium
NHRIV700010603-08	Black Brook	Bristol	54.2	171	Medium
NHRIV400010605-10	Androscoggin River	Berlin	54.2	172	Medium
NHRIV700060202-09	Shaker Branch	Loudon	54.2	173	Medium
NHRIV400020103-06	Androscoggin River	Shelburne	54.2	174	Medium
NHRIV700060201-09	Gues Meadow Brook	Canterbury, Loudon	54.2	175	Medium
NHRIV400010605-11	Androscoggin River	Berlin	54.1	176	Medium
NHRIV700040401-04	Scab Mill Brook - Unnamed Brook	Brookline, Milford	54.1	177	Medium
NHRIV400010502-01	Clear Stream - Flume Brook - Unnamed Brook - Cascade Brook	Dixville, Millsfield	54.1	178	Medium
NHRIV700030104-02	Gridley River	New Ipswich, Sharon, Temple	54.1	179	Medium
NHRIV600030709-01	Lamprey River	Epping	54.1	180	Medium
NHRIV700060502-11	Gulf Brook - Unnamed Brook	Epsom, Pittsfield	54.1	181	Medium
NHRIV801060405-25	Sugar River	Newport	54.1	182	Medium
NHRIV700020201-16	Jewett Brook	Gilford, Laconia	54.0	183	Medium
NHRIV802010101-20	Unnamed Brook - to Sand Pond	Marlow	54.0	184	Medium
NHRIV700060602-06	Piscataquog River - Center Brook	Weare	54.0	185	Medium
NHRIV700020110-01	Foote Pond Brook - to Pickerel Cove Paugus Bay	Laconia, Meredith	54.0	186	Medium
NHRIV801060405-29	Sugar River	Newport	54.0	187	Medium
NHRIV600030701-13	Lamprey River	Deerfield	54.0	188	Medium
NHRIV700060906-20	Muskrell Brook - to Souhegan River	Merrimack, Amherst	53.9	189	Medium
NHRIV600020303-07	Pequawket Brook	Albany, Madison	53.9	190	Medium
NHRIV600020902-07	South River - to Province Lake	Effingham	53.9	191	Medium
NHRIV700010803-07	Weeks Brook	Sanbornton	53.9	192	Medium
NHRIV600030709-07	Lamprey River	Lee, Epping	53.9	193	Medium
NHRIV600031002-03	Parsons Creek East	Rye	53.9	194	Medium
NHRIV600030707-07	Little River	Lee, Nottingham	53.9	195	Medium
NHRIV700010603-19	Kendall Brook	Hebron	53.8	196	Medium
NHRIV700030108-15	Contoocook River - Monadanock Paper NPDES to US of Antrim WWTF	Bennington, Antrim	53.8	197	Medium

NHRIV801060402-04	Bucklin Brook - To Little Sunapee Lake	New London	53.8	198	Medium
NHRIV600030806-09	Unnamed Brook - To Squamscott River	Newfields	53.8	199	Medium
NHRIV700030104-17	Contoocook River - North Village Dam To US of Peterborough WWTF	Peterborough	53.7	200	Medium
NHRIV600030603-04	Rattlesnake River	Farmington	53.7	201	Medium
NHRIV801070203-08	Great Brook - Ram Brook - Unnamed Brook	Langdon	53.7	202	Medium
NHRIV700061002-05	Nesenkeag Brook	Litchfield, Londonderry	53.7	203	Medium
NHRIV700061403-05	Bartlett Brook - Colby Brook - Unnamed Brook	Danville, Hampstead, Kingston, Sandown	53.7	204	Medium
NHRIV700040301-03	Walker Brook	Greenville, Mason	53.7	205	Medium
NHRIV700030106-08	Contoocook River - Otter Bk to Powder Mill Pond	Peterborough, Greenfield, Hancock	53.6	206	Medium
NHRIV801040204-02	Grant Brook	Lyme	53.6	207	Medium
NHRIV801010805-06	Otter Brook - Unnamed Brook	Lancaster	53.6	208	Medium
NHRIV802010402-06	Mirey Brook - Black Brook	Winchester	53.6	209	Medium
NHRIV700061403-17	Powwow River - Unnamed Brook - Grassy Brook	South Hampton, East Kingston, Kensington, Newton	53.6	210	Medium
NHRIV802010302-07	Pine Inlet A	Swanzey	53.6	211	Medium
NHRIV600030401-02	Pike Brook	Brookfield, Wakefield	53.4	212	Medium
NHRIV600030703-11	Lamprey River	Epping, Raymond	53.4	213	Medium
NHRIV700060607-02	Bog Brook	New Boston, Bedford, Goffstown	53.4	214	Medium
NHRIV700060402-03	Nighthawk Hollow Brook - Varney Brook - Unnamed Brook	Gilmanton	53.4	215	Medium
NHRIV600030601-08	Mad River	Farmington, New Durham	53.4	216	Medium
NHRIV700061002-04	Nesenkeag Brook	Londonderry	53.4	217	Medium
NHRIV600030401-08	Branch River	Wakefield, Brookfield	53.3	218	Medium
NHRIV700060603-07	Piscataquog River	New Boston, Goffstown, Weare	53.3	219	Medium
NHRIV600030601-09	Cocheco River	Farmington	53.3	220	Medium
NHRIV600030706-02	North River	Nottingham, Epping, Lee	53.3	221	Medium
NHRIV700060901-17	Appleton-Gibbs Brook	New Ipswich	53.2	222	Medium
NHRIV600030608-16	Jackson Brook	Dover	53.2	223	Medium
NHRIV801060106-09	Great Brook - Unnamed Brook	Lebanon	53.2	224	Medium
NHRIV700010602-05	Fowler River - Unnamed Brook	Alexandria	53.2	225	Medium
NHRIV600030603-02	Pokamoonshine Brook	Farmington	53.1	226	Medium

NHRIV801060303-04	Wine Brook	Cornish, Plainfield	53.1	227	Medium
NHRIV600030703-18	Lamprey River	Epping	53.1	228	Medium
NHRIV600030605-16	Isinglass River	Strafford, Barrington	53.1	229	Medium
NHRIV600030608-10	Rollins Brook	Rollinsford	53.1	230	Medium
NHRIV801010303-02	Halls Stream	Pittsburg, Stewartstown	53.1	231	Medium
NHRIV700060703-05	Cohas Brook - Long Pond Brook	Manchester, Auburn, Londonderry	53.1	232	Medium
NHRIV700061203-11	Beaver Brook	Derry, Londonderry	53.1	233	Medium
NHRIV600030701-08	Hartford Brook	Deerfield	53.0	234	Medium
NHRIV700030101-11	Contoocook River - Unnamed Brook	Jaffrey	53.0	235	Medium
NHRIV700010404-01	Unnamed Brook Along Meadowview Dr	Holderness	53.0	236	Medium
NHRIV600030607-01	Isinglass River	Barrington, Rochester	52.9	237	Medium
NHRIV801060405-10	Sugar River	Sunapee, Newport	52.9	238	Medium
NHRIV801070503-02	Partridge Brook - Unnamed Brook	Chesterfield, Westmoreland	52.9	239	Medium
NHRIV801070202-09	Crane Brook - Unnamed Brook	Acworth, Alstead, Langdon	52.9	240	Medium
NHRIV700060901-04	Stark Brook	New Ipswich	52.9	241	Medium
NHRIV700060607-22	Piscataquog River	Manchester	52.8	242	Medium
NHRIV700061002-26	Nesenkeag Brook - Unnamed Brook	Londonderry	52.8	243	Medium
NHRIV600030607-03	Ayers Pond Brook	Barrington	52.8	244	Medium
NHRIV700060801-05-01	Black Brook - Hardy Brook	Goffstown, Bow, Dunbarton, Manchester	52.8	245	Medium
NHRIV600030703-15	Lamprey River	Epping	52.8	246	Medium
NHRIV600030903-09	Bellamy River - Unnamed Brook	Dover	52.7	247	Medium
NHRIV600031002-01	Berrys Brook	Portsmouth, Greenland, Rye	52.7	248	Medium
NHRIV700030304-31	Pleasant Pond Brook - to Tom Pond	Warner	52.7	249	Medium
NHRIV700030101-37	Sunset Lane Brook	Jaffrey	52.7	250	Medium
NHRIV600030904-05	Foss Brook	Greenland, Stratham	52.7	251	Medium
NHRIV700060201-10	Gues Meadow Brook	Loudon	52.7	252	Medium
NHRIV700060502-20	Unnamed Brook - to Jenness Pond	Northwood	52.6	253	Medium
NHRIV700061403-09	Powwow River	Kingston	52.6	254	Medium
NHRIV801070503-03	Partridge Brook - Unnamed Brook	Westmoreland, Chesterfield	52.6	255	Medium
NHRIV700060904-13	Souhegan River - Stony Brook	Wilton	52.5	256	Medium
NHRIV801040204-06	Robinson Detention Pond East Inlet	Lyme	52.5	257	Medium

NHRIV700060901-08	Furnace Brook	New Ipswich	52.4	258	Medium
NHRIV600030902-06	Longmarsh Brook - Beaudette Brook	Durham	52.4	259	Medium
NHRIV600030603-10	Willow Brook	Rochester	52.4	260	Medium
NHRIV700060607-15	Harry Brook	Goffstown, Dunbarton	52.4	261	Medium
NHRIV600030803-01	Exeter River	Raymond, Fremont	52.4	262	Medium
NHRIV700030101-15	Contoocook River - Unnamed Brook	Jaffrey	52.4	263	Medium
NHRIV600030703-01	Unnamed Brook - to Onway Lake	Raymond, Candia	52.2	264	Medium
NHRIV700060905-12	Mcquade Brook	Bedford, Goffstown	52.2	265	Medium
NHRIV700060904-07	Purgatory Brook	Mont Vernon, Lyndeborough, Milford	52.2	266	Medium
NHRIV700020109-01	Hawkins Brook - to Prescott Park Dam	Meredith, Center Harbor	52.2	267	Medium
NHRIV600030607-10	Isinglass River	Rochester, Barrington	52.2	268	Medium
NHRIV700060905-17	Baboosic Brook - Mcquade Brook	Bedford, Merrimack	52.2	269	Medium
NHRIV600030902-05	Oyster River - Unnamed Brook	Durham	52.2	270	Medium
NHRIV600030606-06	Berry River - From Long Pond to Isinglass River	Barrington	52.2	271	Medium
NHRIV700010802-10	Salmon Brook	Sanbornton	52.1	272	Medium
NHRIV801060106-04	Blodgett Brook	Lebanon, Hanover	52.1	273	Medium
NHRIV600030608-04	Reyners Brook	Dover	52.1	274	Medium
NHRIV600030608-11	Fresh Creek	Rollinsford, Dover	52.1	275	Medium
NHRIV600030802-10	Towle Brook - to Pandolpin Dam	Chester, Sandown	52.1	276	Medium
NHRIV600030803-05	Exeter River	Brentwood	52.1	277	Medium
NHRIV700060906-01	Beaver Brook	Mont Vernon, Amherst	52.1	278	Medium
NHRIV700060901-05	Souhegan River - West Souhegan River	New Ipswich	52.0	279	Medium
NHRIV600030601-07	Dames Brook	Milton, Farmington, Middleton	52.0	280	Medium
NHRIV600020902-06	Province Lake-Island Inlet	Wakefield	52.0	281	Medium
NHRIV801060303-11	Blow-Me-Down Brook	Cornish	52.0	282	Medium
NHRIV700060904-14	Souhegan River	Milford, Wilton	51.9	283	Medium
NHRIV700060906-13	Souhegan River	Milford	51.9	284	Medium
NHRIV801030703-02	Clark Brook - Unnamed Brook	Haverhill	51.9	285	Medium
NHRIV600030708-07	Piscassic River	Newmarket, Newfields	51.9	286	Medium
NHRIV700060902-13	Souhegan River	Wilton	51.9	287	Medium
NHRIV801070503-08	Camp Spofford Inlet - Unnamed Brook	Chesterfield	51.8	288	Low

NHRIV600030903-08	Bellamy River - Kelly Brook - Knox Marsh Brook	Madbury, Dover	51.8	289	Low
NHRIV600030804-10	Little River	Exeter	51.8	290	Low
NHRIV700061403-14	Powwow River	Kingston	51.8	291	Low
NHRIV600030405-09	Salmon Falls River	Rochester	51.8	292	Low
NHRIV700060906-16	Souhegan River	Amherst, Milford	51.8	293	Low
NHRIV600030608-05	Cocheco River	Dover	51.7	294	Low
NHRIV600030607-16	Scruton Pond Outlet Brook	Barrington	51.7	295	Low
NHRIV801060106-03	Hardy Hill Brook - Unnamed Brook	Lebanon, Hanover	51.7	296	Low
NHRIV600031002-24	Chapel Brook	North Hampton	51.7	297	Low
NHRIV700060102-07	Tannery Brook - Cold Brook	Boscawen, Canterbury	51.7	298	Low
NHRIV700020101-22	North Inlet to Rust Pond	Wolfeboro	51.7	299	Low
NHRIV700010502-08	Squam River	Ashland	51.7	300	Low
NHRIV700030101-16	Contoocook River - Unnamed Brook	Jaffrey	51.6	301	Low
NHRIV700060703-09	Cohas Brook	Manchester	51.6	302	Low
NHRIV700010502-09	Squam River	Ashland, Bridgewater, New Hampton	51.6	303	Low
NHRIV700010602-09	Bog Brook	Alexandria, Bristol	51.6	304	Low
NHRIV600030603-06	Cocheco River	Rochester	51.6	305	Low
NHRIV802010301-05	Black Brook - Dickinson Brook - Unnamed Brook	Keene, Surry, Westmoreland	51.5	306	Low
NHRIV600030607-04	Ayers Pond Brook	Barrington	51.4	307	Low
NHRIV600030405-14	Salmon Falls River - Unnamed Brook	Rochester, Somersworth	51.4	308	Low
NHRIV700060901-09	Souhegan River - Furnace Brook	New Ipswich	51.4	309	Low
NHRIV600031002-23	Trib to Chapel Brook	North Hampton	51.4	310	Low
NHRIV600020802-07	Weetamoe Brook	Ossipee	51.3	311	Low
NHRIV600030806-01	Norris Brook	Exeter	51.3	312	Low
NHRIV600030608-03	Cocheco River - Unnamed Brook	Dover, Rochester	51.3	313	Low
NHRIV700060906-18	Souhegan River	Merrimack, Amherst	51.3	314	Low
NHRIV700020202-18	Northern Inlet to Sawyer Lake	Gilmanton	51.2	315	Low
NHRIV600030406-04	Salmon Falls River	Rollinsford	51.2	316	Low
NHRIV801070503-10	Seamans Inlet	Chesterfield	51.2	317	Low
NHRIV700061401-04	Kelly Brook - Seaver Brook	Plaistow, Atkinson, Hampstead	51.2	318	Low
NHRIV600030902-03	Oyster River	Madbury, Barrington, Lee	51.1	319	Low

NHRIV700020107-08	Unnamed Brook to Sanders Bay	Laconia	51.1	320	Low
NHRIV600030902-13	Johnson Creek - Gerrish Brook	Madbury, Dover, Durham	51.1	321	Low
NHRIV700060902-05	Souhegan River - Tucker Brook	Wilton, Greenville, New Ipswich	51.1	322	Low
NHRIV600030805-04	Great Brook - Brickyard Brook - Hobbs Brook - York Brook	East Kingston, Kensington	51.0	323	Low
NHRIV600030603-08	Cocheco River	Rochester	51.0	324	Low
NHRIV600031001-03	Sagamore Creek	Portsmouth	50.9	325	Low
NHRIV700061001-07	Pennichuck Brook - Witches Brook	Merrimack, Amherst, Hollis, Nashua	50.9	326	Low
NHRIV700060905-18	Riddle Brook	Bedford, Goffstown	50.9	327	Low
NHRIV802010202-23	Beaver Brook - Unnamed Brook	Keene	50.9	328	Low
NHRIV700061001-02	Witches Brook	Hollis, Amherst, Milford	50.8	329	Low
NHRIV600030603-01	Cocheco River	Farmington, Rochester	50.8	330	Low
NHRIV700060902-21	Unnamed Trib. to The Souhegan River	Greenville, New Ipswich	50.8	331	Low
NHRIV700060905-19	Baboosic Brook - Riddle Brook	Merrimack, Bedford	50.8	332	Low
NHRIV700060905-13	Mcquade Brook	Bedford	50.7	333	Low
NHRIV600030406-03	Salmon Falls River	Somersworth, Rollinsford	50.7	334	Low
NHRIV700010603-16	Camp Onaway Brook	Hebron	50.6	335	Low
NHRIV700061403-18	Back River - Unnamed Brook	Newton	50.6	336	Low
NHRIV801060106-05	Blodgett Brook - Unnamed Brook	Lebanon	50.6	337	Low
NHRIV600030902-04	Oyster River - Chelsey Brook	Lee, Durham, Madbury	50.5	338	Low
NHRIV700020202-11	Badger Brook	Gilmanton	50.4	339	Low
NHRIV700060906-12	Great Brook - Ox Brook	Milford	50.4	340	Low
NHRIV802010202-44	Aldridge	Dublin	50.4	341	Low
NHRIV600030903-07	Bellamy River	Barrington, Lee, Madbury	50.4	342	Low
NHRIV600030901-01	Winnicut River - Unnamed Brook - Cornelius Brook	North Hampton, Hampton, Stratham	50.3	343	Low
NHRIV600031002-10	Eel Pond Outlet to Atlantic Ocean	Rye	50.3	344	Low
NHRIV600030903-06	Bellamy River - Unnamed Brook	Barrington	50.2	345	Low
NHRIV700020109-02	Hawkins Brook - to Merideth Bay	Meredith	50.1	346	Low
NHRIV801060402-17	Unnamed Brook - to Herrick Cove Sunapee Lake	New London	50.1	347	Low
NHRIV600030401-10	Unnamed Brook	Wakefield	50.0	348	Low

NHRIV600030902-11	Littlehole Creek	Durham, Madbury	50.0	349	Low
NHRIV700061203-16	Beaver Brook	Londonderry, Derry	50.0	350	Low
NHRIV700061203-22	Beaver Brook	Pelham, Hudson, Windham	49.9	351	Low
NHRIV700061203-09	Beaver Brook	Derry	49.9	352	Low
NHRIV600030901-02	Winnicut River - Barton Brook - Marsh Brook - Thompson Brook	Greenland, North Hampton, Stratham	49.9	353	Low
NHRIV700061101-05	Taylor Brook	Derry	49.8	354	Low
NHRIV700060607-20	Catamount Brook	Goffstown	49.8	355	Low
NHRIV600030902-16	Wendys Brook	Lee	49.7	356	Low
NHRIV600030708-14	Brown Brook - to Piscassic River	Fremont, Brentwood, Epping	49.7	357	Low
NHRIV700061205-01	Beaver Brook - Tonys Brook	Pelham	49.7	358	Low
NHRIV801060402-46	Unnamed Brook	Sunapee	49.6	359	Low
NHRIV700020201-22	Hueber Brook	Belmont	49.5	360	Low
NHRIV600030806-04	Parkman Brook	Stratham, Exeter	49.3	361	Low
NHRIV700040402-03	Flints Brook	Hollis	49.2	362	Low
NHRIV801070502-04	Chickering Farm Brook	Westmoreland	49.0	363	Low
NHRIV600030608-08	Fresh Creek - Twombly Brook	Rollinsford, Somersworth	48.9	364	Low
NHRIV600030904-09	Knight Branch	Newington	48.8	365	Low
NHRIV600030608-06	Indian Brook	Dover	48.5	366	Low
NHRIV600030904-12	Peverly Brook - Pease Air Force Base	Newington	48.4	367	Low
NHRIV600030902-08	Hamel Brook - Longmarsh Brook	Durham	48.3	368	Low
NHRIV600030901-07	Winnicut River - Unnamed Brook	North Hampton, Hampton, Stratham	48.2	369	Low
NHRIV700010603-18	Nuttings Beach Brook	Hebron, Alexandria	48.1	370	Low
NHRIV600030901-03	Haines Brook	Greenland	48.1	371	Low
NHRIV600030903-13	Garrison Brook	Dover	48.0	372	Low
NHRIV700060302-33	Unnamed Brook - To Merrimack River	Concord	47.8	373	Low
NHRIV700060502-30	Lynn Grove Brook	Northwood	47.7	374	Low
NHRIV700060804-05	Little Cohas Brook - Unnamed Brook	Londonderry, Manchester	47.5	375	Low
NHRIV600030901-05	Packer Brook	Greenland	47.4	376	Low
NHRIV600030902-09	College Brook	Durham	47.2	377	Low
NHRIV700061102-21	Unnamed Brook - to Harris Brook	Salem	47.1	378	Low

NHRIV700040402-05	Nashua River	Hollis, Nashua	46.6	379	Low
NHRIV700010402-12	Unnamed Brook - to Beebe River	Campton	46.5	380	Low
NHRIV600020104-04	Thorn Hill Brook	Jackson	46.3	381	Low
NHRIV801060401-33	North Cove West Brook	Enfield, Grantham	46.2	382	Low
NHRIV700060802-07	Peters Brook	Hooksett	45.9	383	Low
NHRIV700060802-09	Messer Brook	Hooksett	45.7	384	Low
NHRIV700040402-09	Nashua River	Nashua	45.6	385	Low
NHRIV700060302-34	Unnamed Brook - to Merrimack River	Concord	45.3	386	Low
NHRIV700040402-08	Nashua River	Nashua	45.3	387	Low
NHRIV700061001-12	Unnamed Brook - Round Pond to Holts Pond	Nashua	45.0	388	Low
NHRIV600030901-06	Norton Brook	Greenland	44.4	389	Low
NHRIV600030902-10	Reservoir Brook	Durham	44.1	390	Low
NHRIV600030904-13	Shaw Brook	Greenland	44.0	391	Low
NHRIV600030903-11	Varney Brook - Canney Brook	Dover	43.9	392	Low
NHRIV700061203-26	Launch Brook	Hudson	43.8	393	Low
NHRIV700061204-06	Connies Brook	Windham	43.6	394	Low
NHRIV600030608-15	Berry Brook	Dover	43.4	395	Low
NHRIV700060803-12	Patten Brook	Bedford	43.3	396	Low
NHRIV600030904-21	Unnamed Brook - to Great Bay	Greenland	43.3	397	Low
NHRIV600031001-01	Pickering Brook -Flagstone Brook	Newington	43.3	398	Low
NHRIV700061204-01	Dinsmore Brook	Windham	43.1	399	Low
NHRIV700060803-16	Mcquesten Brook	Bedford, Manchester	42.5	400	Low
NHRIV801060401-31	Tamari Brook	Grantham	42.0	401	Low
NHRIV600031001-09	Borthwick Ave Tributary	Portsmouth	41.3	402	Low
NHRIV700061102-16	Policy Brook - From Canobie Lake	Salem	40.9	403	Low
NHRIV600030806-14	Stuart Dairy Farm Brook	Stratham	40.8	404	Low
NHRIV700061102-18	Policy Brook - Porcupine Brook	Salem, Windham	40.8	405	Low
NHRIV700030504-14	French Brook	Henniker	40.5	406	Low
NHRIV600031004-09	Folly Mill Brook	Seabrook	39.9	407	Low
NHRIV600031001-06	Grafton Ditch	Portsmouth	39.9	408	Low
NHRIV700061102-23	Unnamed Brook to Western Embayment	Windham	39.9	409	Low
NHRIV700060802-16	Dorrs Pond-E Inlet	Manchester	39.9	410	Low

NHRIV700060607-35	Saint Anselm Brook - to Piscataquog River	Manchester, Goffstown	39.8	411	Low
NHRIV700061102-17	Policy Brook	Salem	39.7	412	Low
NHRIV700061201-05	Salmon Brook - Hassells Brook - Old Maids Brook - Hale Brook	Nashua	39.7	413	Low
NHRIV700060302-55	Sugar Ball Oxbox	Concord	39.4	414	Low
NHRIV700060804-12	South Perimeter Brook	Londonderry, Bedford, Manchester	38.1	415	Low
NHRIV700060802-13	Dorrs Pond Inlet Brook	Manchester, Hooksett	37.9	416	Low
NHRIV700060802-15	Rays Brook	Manchester	37.9	417	Low
NHRIV700061201-07	Salmon Brook	Nashua	37.7	418	Low
NHRIV600031001-10	Newfileds Ditch	Portsmouth	37.4	419	Low
NHRIV700061001-09	Boire Field Brook - to Pennichuck Brook	Nashua	36.6	420	Low
NHRIV600031004-10	Cains Brook - Unnamed Brook	Seabrook	35.9	421	Low
NHRIV600031004-12	Cains Brook	Seabrook	34.7	422	Low
NHRIV700060803-15	Humphrey Brook	Manchester	34.4	423	Low
NHRIV600031004-21	Unnamed Brook - to Cains Mill Pond	Seabrook	33.3	424	Low
NHRIV600031001-05	Upper Hodgson Brook	Portsmouth	33.0	425	Low
NHRIV700060803-08	Baker Brook	Manchester	32.8	426	Low
NHRIV600031001-04	Lower Hodgson Brook	Portsmouth	32.7	427	Low
NHRIV600031001-07	Pauls Brook - Pease Air Force Base	Newington	24.4	428	Low

APPENDIX C: LAKE AND IMPOUNDMENT WATERSHEDS RECOVERY POTENTIAL RANKING LIST

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK801070203-01	Warren Lake	Alstead	59.9	1	High
NHLAK700010401-04	Upper Greeley Pond	Livermore	59.1	2	High
NHLAK600020602-02	Flat Mountain Pond (1&2)	Waterville Valley	58.9	3	High
NHLAK700010205-02	Peaked Hill Pond	Thornton	58.8	4	High
NHLAK700061403-03-01	Country Pond	Kingston, Newton	58.7	5	High
NHLAK801060401-07	Halfmile Pond	Enfield	58.7	6	High
NHLAK700020201-04	Lake Wicwas	Meredith	58.5	7	High
NHIMP700060302-07	Merrimack River - Garvins Falls Dam	Concord, Bow	58.4	8	High
NHLAK700030301-01	Lake Solitude	Newbury	58.4	9	High
NHLAK700010307-01	Loon Lake	Plymouth, Rumney	58.4	10	High
NHLAK700010104-01	Black Pond	Lincoln	58.4	11	High
NHLAK801060402-05-01	Sunapee Lake	Sunapee, New London, Newbury	58.0	12	High
NHLAK802010101-04	Long Pond	Lempster, Washington	58.0	13	High
NHLAK700020106-02-01	Mirror Lake	Tuftonboro, Wolfeboro	57.9	14	High
NHLAK700020108-04	Hawkins Pond	Center Harbor	57.5	15	High
NHLAK600020102-02	Little Sawyer Pond	Livermore	57.4	16	High
NHLAK700030201-02	Halfmoon Pond	Washington	57.2	17	High
NHLAK802010401-01-01	Forest Lake	Winchester	57.2	18	High
NHLAK600020803-01-02	Middle Danforth Pond	Freedom	57.1	19	High
NHLAK700060301-01	Turee Pond	Bow	57.1	20	High
NHLAK700010201-03	Lonesome Lake	Lincoln	57.0	21	High
NHLAK801060103-01	Goose Pond	Canaan, Hanover	56.8	22	High
NHLAK700020108-02-02	Lake Winona	Center Harbor, New Hampton	56.6	23	High
NHLAK801030505-03	Lower Mountain Lake	Haverhill	56.4	24	High
NHLAK700010603-02-01	Newfound Lake	Bristol, Alexandria, Bridgewater, Hebron	56.4	25	High

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK700010203-02	Russell Pond	Woodstock	56.1	26	High
NHLAK700010204-01	East Pond	Livermore	56.0	27	High
NHLAK700061403-07	Greenwood Pond	Kingston	55.8	28	High
NHLAK700010804-02-01	Webster Lake	Franklin	55.8	29	High
NHLAK801040201-03	Lake Tarleton	Piermont	55.7	30	High
NHLAK700020201-07	Railroad Pond	Belmont	55.7	31	High
NHLAK700010402-04	Middle Hall Pond	Sandwich	55.7	32	High
NHLAK801060402-02	Baptist Pond	Springfield	55.6	33	High
NHLAK600020601-01-01	Bearcamp Pond	Sandwich	55.5	34	High
NHLAK700030303-04	Messer Pond	New London	55.3	35	High
NHIMP700061203-01	Harantis Lake - Harantis Lake Dam	Chester	55.3	36	High
NHIMP700060802-04	Merrimack River - Amoskeag Dam	Manchester	55.3	37	High
NHLAK700030201-03	Highland Lake	Stoddard, Washington	55.2	38	High
NHLAK700030108-02-01	Gregg Lake	Antrim	55.2	39	High
NHLAK700010501-05	White Oak Pond	Holderness	55.1	40	High
NHLAK801060105-04-01	Mascoma Lake	Enfield, Lebanon	54.9	41	High
NHLAK700020101-05-01	Lake Wentworth	Wolfeboro	54.9	42	High
NHLAK802020103-08	Pearly Lake	Rindge	54.9	43	High
NHLAK802010201-04	Chapman Pond	Sullivan	54.8	44	High
NHLAK600030601-05-01	Sunrise Lake	Middleton	54.7	45	High
NHIMP802010301-02	Ashuelot River Dam Pond	Keene	54.6	46	High
NHLAK801030202-01	Moore Reservoir	Littleton, Dalton	54.5	47	High
NHLAK801060101-05	Reservoir Pond	Dorchester, Lyme	54.5	48	High
NHIMP801030506-03	Ammonoosuc River - Woodsville Dam	Bath, Haverhill	54.4	49	High
NHLAK700060804-03-01	Sandy Pond - Camp Foster Pond	Bedford	54.4	50	High
NHLAK400010606-01	Jericho Lake	Berlin	54.2	51	High
NHIMP801030506-02	Ammonoosuc River Dam Pond	Bath	54.1	52	High
NHIMP801010305-01	Connecticut River - Canaan Hydro	Stewartstown	54.0	53	High
NHLAK700020201-05-01	Lake Winnisquam	Laconia, Belmont, Meredith, Sanbornton, Tilton	54.0	54	High

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK700060502-09-01	Pleasant Lake	Deerfield, Northwood	54.0	55	High
NHLAK700060302-08	Turtle Pond	Concord	54.0	56	High
NHLAK700030102-01-01	Thorndike Pond	Jaffrey, Dublin	53.9	57	High
NHLAK600030704-02-01	Pawtuckaway Lake	Nottingham	53.9	58	High
NHLAK802010202-07	Russell Reservoir	Harrisville	53.9	59	High
NHLAK700020108-02-01	Lake Waukewan	Meredith, Center Harbor, New Hampton	53.9	60	High
NHLAK700060605-04-01	Haunted Lake	Francestown	53.9	61	High
NHLAK801060401-02	Stocker Pond	Grantham	53.8	62	High
NHIMP801060106-02	Mascoma River - Rivermill	Lebanon	53.8	63	High
NHLAK700060302-15	Horseshoe Pond	Canterbury	53.8	64	High
NHLAK700060401-04	Hills Pond	Alton	53.8	65	High
NHLAK700030402-02-01	Pleasant Lake	New London	53.6	66	High
NHIMP700020102-01-01	Jones Dam Pond	New Durham	53.6	67	High
NHLAK802010201-03	Center Pond	Stoddard	53.6	68	High
NHLAK700060605-01-01	Daniels Lake	Weare	53.5	69	High
NHIMP801060106-04	Mascoma River	Lebanon	53.5	70	High
NHIMP801060406-08	Sugar River	Claremont	53.4	71	High
NHLAK700061203-05	Rainbow Lake	Derry	53.4	72	High
NHLAK700020102-02	Downing Pond	New Durham	53.3	73	High
NHIMP801060106-05	Mascoma River - Glen Road Dam	Lebanon	53.3	74	High
NHIMP400010605-01	Androscoggin River - D. C. Power Dam	Berlin	53.2	75	High
NHLAK801060402-04-01	Little Sunapee Lake	New London, Springfield	53.2	76	High
NHLAK802020103-06	Lake Monomonac	Rindge	53.2	77	High
NHLAK700030202-02-01	Island Pond	Stoddard	53.1	78	High
NHLAK700060601-05-01	Weare Reservoir	Weare	53.1	79	High
NHIMP700030204-05-01	Beards Brook - East Washington Dam	Washington	53.0	80	High
NHLAK600030703-01	Governors Lake	Raymond	53.0	81	High
NHIMP700061403-04	Powwow River - Powwow Pond	Kingston, East Kingston, Newton	52.7	82	Medium
NHLAK801030302-01-01	Echo Lake	Franconia	52.7	83	Medium

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK700060101-02-01	Sondogardy Pond	Northfield	52.6	84	Medium
NHLAK700010304-02	Derby Pond	Orange, Canaan	52.6	85	Medium
NHLAK802010101-06-01	Millen Pond	Washington	52.6	86	Medium
NHIMP400010606-02	Androscoggin River - Cross Power Dam	Berlin	52.5	87	Medium
NHIMP801060405-11	Sugar River - Sugar River Â Mill	Newport	52.5	88	Medium
NHIMP400010606-03	Androscoggin River - Cascade Dam	Berlin, Gorham	52.4	89	Medium
NHIMP400010605-02	Androscoggin River - Riverside Dam	Berlin	52.4	90	Medium
NHIMP400010605-03	Androscoggin River - Smith Dam	Berlin	52.4	91	Medium
NHIMP700020203-01	Knowles Pond - Tr Williams Brook	Northfield	52.4	92	Medium
NHLAK700020103-03	Garland Pond	Moultonborough	52.4	93	Medium
NHLAK801030502-04	Round Pond	Lyman	52.2	94	Medium
NHLAK700030204-03	Island Pond	Washington	52.2	95	Medium
NHLAK600030703-03-01	Onway Lake	Raymond	52.1	96	Medium
NHLAK801030502-01	Dodge Pond	Lyman	52.1	97	Medium
NHLAK802010303-02	Meetinghouse Pond	Marlborough	52.1	98	Medium
NHLAK801030502-03	Partridge Lake	Littleton, Lyman	52.1	99	Medium
NHLAK700030403-01	Adder Pond	Andover	52.0	100	Medium
NHLAK801070503-01-01	Spofford Lake	Chesterfield	52.0	101	Medium
NHLAK700061403-10	Tuxbury Pond	South Hampton	52.0	102	Medium
NHIMP700020102-01-02	Marsh Pond	New Durham, Alton	52.0	103	Medium
NHLAK700060302-05	Hothole Pond	Loudon, Concord	52.0	104	Medium
NHLAK700040401-02-01	Potanipo Pond	Brookline	51.9	105	Medium
NHLAK400010502-06	Dustan Pond	Wentworths Location	51.9	106	Medium
NHLAK700060503-04	Marsh Pond	Chichester	51.8	107	Medium
NHLAK700060702-03	Massabesic Lake	Auburn, Manchester	51.8	108	Medium
NHLAK700030103-01	Beaver Pond	Harrisville	51.7	109	Medium
NHLAK801060402-03	Chalk Pond	Newbury	51.7	110	Medium
NHLAK700060502-05	Harvey Lake	Northwood	51.7	111	Medium
NHLAK600030802-03-01	Phillips Pond	Sandown	51.6	112	Medium
NHLAK700061403-01-01	Angle Pond	Sandown, Hampstead	51.6	113	Medium

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK700061403-06-01	Great Pond	Kingston	51.6	114	Medium
NHLAK700030402-01	Chase Pond	Wilmot	51.6	115	Medium
NHLAK700010304-06	Rocky Pond	Wentworth	51.5	116	Medium
NHLAK700061101-01-01	Island Pond	Derry, Atkinson, Hampstead	51.5	117	Medium
NHLAK700040401-01-01	Melendy Pond	Brookline	51.4	118	Medium
NHLAK700061203-06-01	Robinson Pond	Hudson	51.4	119	Medium
NHIMP600020901-03	Cold Brook - Mill Brook	Freedom	51.4	120	Medium
NHLAK801060401-06	Eastman Pond	Grantham, Enfield	51.4	121	Medium
NHLAK400010403-02	Little Diamond Pond	Stewartstown	51.3	122	Medium
NHLAK700030107-03	Powder Mill Pond	Hancock, Bennington, Greenfield	51.3	123	Medium
NHLAK700060202-03-01	Clough Pond	Loudon, Canterbury	51.3	124	Medium
NHLAK700030304-05	Tom Pond	Warner	51.2	125	Medium
NHLAK700030506-02	Walker Pond	Boscawen, Webster	51.2	126	Medium
NHLAK700061203-03-01	Hoods Pond	Derry	51.1	127	Medium
NHLAK801010706-03	One And Two Trio Ponds	Odell	51.1	128	Medium
NHLAK700061203-02-01	Beaver Lake	Derry	51.0	129	Medium
NHLAK801010706-04	Whitcomb Pond	Odell	51.0	130	Medium
NHIMP700060201-04	Gues Meadow Brook	Loudon	50.9	131	Medium
NHLAK700060502-07	Long Pond	Northwood	50.9	132	Medium
NHIMP700030101-02	Contoocook River Dam	Jaffrey	50.9	133	Medium
NHLAK801010706-01	Little Bog Pond	Odell	50.8	134	Medium
NHLAK700030403-02	Bradley Lake	Andover	50.7	135	Medium
NHLAK700060201-02	Lyford Pond	Canterbury	50.6	136	Medium
NHIMP700030101-03	Contoocook River	Jaffrey	50.6	137	Medium
NHLAK600030802-04	Showell Pond	Sandown	50.6	138	Medium
NHIMP600030708-03	Piscassic River	Newmarket	50.6	139	Medium
NHLAK600030602-01	Baxter Lake	Farmington, Rochester	50.5	140	Medium
NHLAK700061101-04	Arlington Mill Reservoir	Salem	50.5	141	Medium
NHIMP700060904-08	Souhegan River - Pine Valley Mill	Wilton	50.3	142	Medium
NHLAK700060302-06	Kimball Pond	Canterbury	50.3	143	Medium

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK700061403-08	Halfmoon Pond	Kingston	50.3	144	Medium
NHLAK600030802-02	Lily Pond	Sandown	50.3	145	Medium
NHLAK700030303-03-01	Kezar Lake	Sutton	50.2	146	Medium
NHIMP600030405-04	Salmon Falls River - Baxter Mill Dam Pond	Rochester	50.2	147	Medium
NHLAK700060905-01-01	Baboosic Lake	Amherst, Merrimack	50.2	148	Medium
NHLAK801060404-01	Rockybound Pond	Croydon	50.2	149	Medium
NHLAK801060405-03	Perkins Pond	Sunapee	50.2	150	Medium
NHLAK802010303-10	Wilson Pond	Swanzey	50.1	151	Medium
NHLAK700010501-04-01	Squam Lake	Holderness, Center Harbor, Moultonborough, Sandwich	50.1	152	Medium
NHLAK700030101-02	Cheshire Pond	Jaffrey	50.0	153	Medium
NHIMP600030608-04	Cocheco River - Central Ave Dam	Dover	50.0	154	Medium
NHLAK600030804-01	Colcord Pond	Exeter	49.9	155	Medium
NHIMP600030903-02	Bellamy River - Sawyers Mill Dam Pond	Dover	49.8	156	Medium
NHIMP600030603-02	Cocheco River - Hatfield Dam	Rochester	49.8	157	Medium
NHLAK801030102-02	Martin Meadow Pond	Lancaster	49.8	158	Medium
NHLAK600030606-01	Long Pond	Barrington	49.7	159	Medium
NHLAK700060607-02	Namaske Lake	Goffstown, Manchester	49.7	160	Medium
NHLAK700060201-03	New Pond	Canterbury	49.6	161	Medium
NHIMP700010302-03	Ore Hill Mine Pond	Warren	49.5	162	Low
NHLAK700060402-03	Halfmoon Lake	Alton, Barnstead	49.5	163	Low
NHLAK801040402-02-01	Storrs Pond	Hanover	49.5	164	Low
NHIMP600030603-01	Cocheco River - City Dam 1	Rochester	49.5	165	Low
NHIMP700060906-08	Souhegan River - Mclane Dam	Milford	49.4	166	Low
NHLAK801030701-01	Constance Lake	Piermont	49.4	167	Low
NHIMP700060906-07	Souhegan River - Goldman Dam	Milford	49.4	168	Low
NHIMP700020203-07	Winnipesaukee River - Franklin Falls Hydro Dam 2	Franklin	49.2	169	Low
NHLAK600030902-02	Wheelwright Pond	Lee	49.2	170	Low
NHIMP700030503-01-01	Hopkinton Dike Elm Brook	Hopkinton	49.2	171	Low
NHIMP700060902-01	Souhegan River	Greenville	49.1	172	Low

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK600020902-01	Province Lake	Effingham, Wakefield	49.1	173	Low
NHIMP600030406-02	Salmon Falls River - Lower Great Falls Dam	Somersworth	49.1	174	Low
NHLAK700060804-02	Sebbins Pond	Bedford	49.1	175	Low
NHLAK700040402-01	Flints Pond	Hollis	48.9	176	Low
NHIMP600030607-02	Cocheco River - Gonic Dam Pond	Rochester	48.9	177	Low
NHIMP600031003-19	Rice Dam Pond - On Taylor River	Hampton Falls, Hampton	48.9	178	Low
NHLAK700030504-03	Keyser Pond	Henniker	48.8	179	Low
NHLAK700060502-08-01	Northwood Lake	Northwood, Deerfield, Epsom	48.8	180	Low
NHLAK700010502-01-01	Little Squam Lake	Holderness, Ashland	48.7	181	Low
NHLAK801010203-01-01	Back Lake	Pittsburg	48.7	182	Low
NHLAK700030504-02-01	French Pond	Henniker	48.6	183	Low
NHLAK802020103-04	Emerson Pond	Rindge	48.6	184	Low
NHLAK400010602-14	Signal Pond	Errol	48.6	185	Low
NHLAK700060703-04	Pine Island Pond	Manchester	48.5	186	Low
NHIMP600030406-03	Salmon Falls River - Rollinsford Dam	Rollinsford, Somersworth	48.5	187	Low
NHLAK600030608-01	Fresh Creek Pond	Dover, Rollinsford	48.5	188	Low
NHLAK700060201-05	Shellcamp Pond	Gilmanton	48.4	189	Low
NHLAK700061001-06	Holt Pond	Merrimack, Nashua	48.4	190	Low
NHIMP600030406-04	Salmon Falls River - South Berwick Dam	Rollinsford	48.4	191	Low
NHLAK700060502-06	Jenness Pond	Northwood, Pittsfield	48.4	192	Low
NHLAK801030506-01	Lake Gardner	Bath	48.3	193	Low
NHLAK600031002-01	Eel Pond	Rye	48.3	194	Low
NHLAK700010701-05	Waukeena Lake	Danbury	48.2	195	Low
NHLAK400010502-05	Sweat Pond	Errol	48.2	196	Low
NHLAK700061203-04	Kendall Pond	Londonderry	48.2	197	Low
NHLAK700020110-02-01	Paugus Bay	Laconia	48.1	198	Low
NHLAK700061001-04-01	Harris Pond	Nashua, Merrimack	47.9	199	Low
NHLAK700030105-01-01	Zephyr Lake	Greenfield	47.9	200	Low
NHLAK600031003-02	Taylor River Refuge Pond	Hampton, Hampton Falls	47.8	201	Low
NHLAK700061206-02	Otternick Pond	Hudson	47.8	202	Low

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHIMP600030902-04	Oyster River - Mill Pond Dam	Durham	47.5	203	Low
NHIMP600030901-02	Winnicut River Dam Pond	Greenland	47.5	204	Low
NHLAK700030101-12	Pool Pond	Rindge	47.4	205	Low
NHLAK700061002-01-01	Darrah Pond	Litchfield	47.1	206	Low
NHLAK400010502-02	Corser Pond	Errol	47.1	207	Low
NHLAK700061001-02-01	Silver Lake	Hollis	47.0	208	Low
NHIMP700060402-02	Webster Stream - Locke Lake	Barnstead	46.3	209	Low
NHLAK700061204-01-01	Cobbetts Pond	Windham	46.2	210	Low
NHLAK600030705-03	North River Pond	Nottingham, Barrington, Northwood	45.8	211	Low
NHLAK600030708-02	Mitigation Basin 2	Brentwood, Epping	45.7	212	Low
NHLAK700060906-01	Honey Pot Pond	Amherst	45.5	213	Low
NHLAK600030903-03	Swains Lake	Barrington	45.3	214	Low
NHLAK700061102-08	Seavey Pond	Windham	45.3	215	Low
NHLAK700020201-02	Hunkins Pond	Sanbornton	45.1	216	Low
NHLAK700061002-03	Horseshoe Pond	Merrimack	44.9	217	Low
NHLAK700020110-06	Inlet To Paugus Bay Through South Down	Laconia	44.7	218	Low
NHIMP600030902-06	Beards Creek	Durham	43.8	219	Low
NHIMP700040402-02	Nashua River - Mine Falls Dam Pond	Nashua	43.7	220	Low
NHLAK700061204-02	Little Island Pond	Pelham	43.4	221	Low
NHIMP700040402-05	Nashua River - Jackson Plant Dam Pond	Nashua	43.2	222	Low
NHLAK600030405-03	Willand Pond	Somersworth, Dover	42.3	223	Low
NHLAK400010404-01	Four Mile Pond	Dixs Grant	42.2	224	Low
NHLAK700061102-03-01	Captain Pond	Salem	41.5	225	Low
NHLAK700060703-02-01	Crystal Lake	Manchester	40.0	226	Low
NHLAK700061102-02	Canobie Lake	Windham, Salem	39.6	227	Low
NHLAK700020102-04	Mill Pond	Alton	39.3	228	Low
NHLAK400020102-01	Peabody River - Libby Town Pool	Gorham	39.2	229	Low
NHIMP700040402-03	Nashua River - Nashua Canal Dike	Nashua	38.9	230	Low
NHLAK600031001-02	Unknown Pond	New Castle	37.9	231	Low

Stormwater Impaired Watershed ID	Watershed Name	Town(s) (Primary Town is Listed First)	RPI Score	RPI Rank	Recovery Potential Rank
NHLAK700060803-01	Nutt Pond	Manchester	37.6	232	Low
NHLAK700060802-01	Dorrs Pond	Manchester	37.0	233	Low
NHLAK700061205-02-01	Long Pond	Pelham	36.8	234	Low
NHLAK700060803-02	Stevens Pond	Manchester	36.6	235	Low
NHLAK801010902-01	Baker Pond	Lancaster	36.5	236	Low
NHIMP600031004-04	Secord Pond Dam	Seabrook	34.1	237	Low
NHLAK700060302-02	Horseshoe Pond	Concord	34.0	238	Low
NHIMP600030806-08	Clemson Pond	Exeter	33.6	239	Low
NHIMP600031004-05	Cains Brook	Seabrook	32.5	240	Low
NHIMP600031004-06	Cains Brook - Noyes Pond	Seabrook	30.7	241	Low

Appendix D: Priority Restoration List for Beaches in New Hampshire

Watershed AU	Beach Name	Town(s) Primary Town is Listed First	Restoration Priority
NHLAK700060503-02-02	Catamount Pond - Bear Brook State Park Beach	Allenstown	High
NHIMP801070202-01-02	Cold River - Vilas Pool Beach	Alstead	High
NHLAK700020110-02-10	Lake Winnipesaukee - Alton Bay Town Beach	Alton	High
NHLAK700060905-01-02	Baboosic Lake - Town Beach	Amherst	High
NHLAK700060905-01-03	Baboosic Lake - Young Judaea Beach	Amherst	High
NHLAK700060402-10-03	Upper Suncook Lake - Camp Fatima Beach	Barnstead	High
NHIMP700060402-02-05	Locke Lake - Colony Beach	Barnstead	High
NHLAK700060804-02-02	Sebbins Pond - Camp Kettleford Beach	Bedford	High
NHLAK801010701-02-02	York Pond - Barry Conservation Camp Beach	Berlin	High
NHLAK400010606-01-02	Jericho Mountain State Park Beach	Berlin	High
NHLAK700040401-02-02	Lake Potanipo - Town Beach	Brookline	High
NHLAK801060101-01-02	Canaan Street Lake - Town Beach	Canaan	High
NHRIV801030402-07-02	Tuttle Brook - Twin Mtn Rec Area Beach	Carroll	High
NHRIV600020304-10-02	Saco River - Smith Easton Rec Area Beach	Conway	High
NHLAK700060601-01-02	Deering Reservoir - Deering Lake Beach	Deering	High
NHLAK700061101-01-02	Island Pond - Chase's Grove	Derry	High
NHLAK700061203-02-02	Beaver Lake - Gallien's Beach	Derry	High
NHLAK700061203-03-02	Hoods Pond - Town Beach	Derry	High
NHLAK700061203-05-02	Rainbow Lake - Karen-Gena Beach	Derry	High
NHLAK801060105-04-02	Mascoma Lake - Shakoma Beach	Enfield	High
NHLAK801060105-04-04	Mascoma Lake - Dartmouth College Beach	Enfield	High
NHLAK801030302-01-02	Echo Lake - Franconia State Park Beach	Franconia	High
NHLAK700010804-02-02	Webster Lake - Griffin Town Beach	Franklin	High
NHLAK700010804-02-03	Webster Lake - Lagace Town Beach	Franklin	High
NHLAK600020802-04-05	Ossipee Lake - Ossipee Lake Natural Area	Freedom	High
NHLAK700020110-02-12	Lake Winnipesaukee - Elacoya State Park Beach	Gilford	High
NHLAK700020110-02-13	Lake Winnipesaukee - Gilford Town Beach	Gilford	High

Watershed AU	Beach Name	Town(s) Primary Town is Listed First	Restoration Priority
NHLAK700020110-02-39	Lake Winnipesaukee - Ellacoya RV Park Beach	Gilford	High
NHLAK700060401-02-02	Crystal Lake-Town Beach	Gilmanton	High
NHLAK400020102-01	Peabody River - Libby Town Pool	Gorham	High
NHIMP400020101-02-02	Moose Brook - Moose Brook State Park Beach	Gorham	High
NHLAK700030105-01-02	Zephyr Lake - Town Beach	Greenfield	High
NHLAK700030105-02-03	Otter Lake - Greenfield SP Picnic Beach	Greenfield	High
NHLAK700030105-02-04	Otter Lake - Greenfield SP Middle Beach	Greenfield	High
NHLAK700030105-02-05	Otter Lake - Greenfield SP Camping Beach	Greenfield	High
NHLAK700061101-03-02	Wash Pond - Town Beach	Hampstead	High
NHEST600031004-09-06	Hampton/Seabrook Harbor - Hampton Harbor Beach	Hampton	High
NHLAK801040402-02-02	Storrs Pond - Recreation Area Beach	Hanover	High
NHLAK802010202-07-02	Russel Reservoir - Chesham Beach	Harrisville	High
NHLAK700010603-02-13	Newfound Lake - Camp Wi-Co-Su-Ta Beach	Hebron	High
NHLAK700030504-02-02	French Pond - Public Access	Henniker	High
NHLAK700030202-03-02	Jackman Reservoir - Manahan Park Town Beach	Hillsborough	High
NHLAK700030501-01-02	Gould Pond - Eastman Park Beach	Hillsborough	High
NHLAK700030501-01-04	Gould Pond - Emerald Beach	Hillsborough	High
NHRIV700030204-15-02	Beards Brook - Town Beach	Hillsborough	High
NHLAK700061001-02-02	Silver Lake - State Park Beach	Hollis	High
NHIMP700030503-01-02	State Park Beach On Elm Brook	Hopkinton	High
NHLAK700061203-06-02	Robinson Pond - Town Beach	Hudson	High
NHLAK700030102-01-02	Thorndike Pond - Town Beach	Jaffrey	High
NHLAK802010201-06-02	Otter Brook Lake - Otter Brook Pk Beach	Keene	High
NHLAK700061403-03-03	Country Pond - Lone Tree Scout Resv. Beach	Kingston	High
NHLAK700061403-06-02	Great Pond - Kingston State Park Beach	Kingston	High
NHLAK700061403-06-05	Great Pond- Great Pond Park Association Beach	Kingston	High
NHLAK700061403-07-02	Greenwood Pond - Greenwood Pond Beach	Kingston	High
NHLAK700061403-06-04	Great Pond - Camp Lincoln Beach	Kingston	High
NHLAK700020110-02-14	Lake Winnipesaukee - Endicott Park Weirs Beach	Laconia	High
NHLAK700020201-05-03	Lake Winnisquam - Bartletts Beach	Laconia	High

Watershed AU	Beach Name	Town(s) Primary Town is Listed First	Restoration Priority
NHLAK700020201-05-05	Lake Winnisquam - Ahern State Park	Laconia	High
NHLAK700020201-06-03	Opechee Bay - Opechee Point Beach	Laconia	High
NHLAK700020201-06-04	Opechee Bay - Opechee Park Cove Beach	Laconia	High
NHLAK700020201-06-02	Opechee Bay - Bond Beach	Laconia	High
NHLAK600020801-06-02	Silver Lake - Monument Beach	Madison	High
NHLAK600020801-06-05	Silver Lake - Kennett Park Beach	Madison	High
NHLAK700060703-02-02	Crystal Lake-Town Beach	Manchester	High
NHLAK700061002-04-02	Naticook Lake - Wasserman Park Beach	Merrimack	High
NHLAK600030601-05-02	Sunrise Lake - Town Beach	Middleton	High
NHLAK600030404-01-03	Milton Three Ponds - Milton Pond Rec Area Beach	Milton	High
NHOCN000000000-02-02	Atlantic Ocean - New Castle Beach	New Castle	High
NHLAK801060402-05-04	Sunapee Lake - Blodgett's Landing Beach	Newbury	High
NHLAK801060402-05-05	Sunapee Lake - Sunapee State Park Beach	Newbury	High
NHLAK700061403-03-02	Country Pond - Town Beach	Newton	High
NHLAK700061403-03-04	Country Pond - Tasker Day Camp Beach	Newton	High
NHOCN000000000-02-09	Atlantic Ocean - State Beach	North Hampton	High
NHOCN000000000-03-02	Atlantic Ocean - Bass Beach	North Hampton, Rye	High
NHLAK700060101-02-02	Sondogardy Pond - Glines Park Beach	Northfield	High
NHLAK700060502-08-02	Northwood Lake - Town Beach	Northwood	High
NHLAK700060502-08-04	Northwood Lake - Lynn Grove Association Beach	Northwood	High
NHLAK600030704-02-02	Pawtuckaway Lake - Pawtuckaway State Park Beach	Nottingham	High
NHIMP600020702-01-02	Dan Hole River - Mill Pond Town Beach	Ossipee	High
NHLAK600020703-01-02	Duncan Lake - Town Beach	Ossipee	High
NHLAK700061205-02-02	Long Pond - Town Beach	Pelham	High
NHLAK700030103-06-02	MacDowell Reservoir - MacDowell Reservoir Beach	Peterborough	High
NHRIV801040205-02-02	Bean Brook-Town Beach	Piermont	High
NHIMP700060501-03-02	Clarks Pond - Town Beach	Pittsfield	High
NHIMP400020101-01-02	Moose Brook - Town Pool-Ravine Beach	Randolph	High
NHRIV600030703-07-02	Lamprey River - Carroll Lake Beach	Raymond	High
NHLAK802010402-01-02	Sandy Pond - Camp Wiyaka Beach	Richmond	High

Watershed AU	Beach Name	Town(s) Primary Town is Listed First	Restoration Priority
NHLAK802020103-08-02	Pearly Lake-Pearly Lake Beach	Rindge	High
NHLAK802020103-06-02	Lake Monomonac - Camp Monomonac Beach	Rindge	High
NHOCN000000000-02-06	Atlantic Ocean - Sawyer Beach	Rye	High
NHOCN000000000-02-04	Atlantic Ocean - Wallis Sands Beach At Wallis Road	Rye	High
NHLAK700061102-13	Hedgehog Pond - Town Beach	Salem	High
NHLAK700061101-04-02	Arlington Mill Reservoir-Second St Beach	Salem	High
NHLAK700061101-04-03	Arlington Mill Reservoir-Arlington Pond Improvement Association	Salem	High
NHLAK700061102-03-02	Captain Pond - Captain's Beach	Salem	High
NHLAK700061102-03-03	Captain Pond - Camp Otter Swim Area Beach	Salem	High
NHLAK700061102-03-06	Captain Pond - Camp Hadar	Salem	High
NHLAK700061102-06-02	Millville Lake - Town Beach	Salem	High
NHLAK700061102-09-02	Shadow Lake - Shadow Lake Association Beach	Salem	High
NHLAK700010802-03-02	Hermit Lake - Town Beach	Sanbornton	High
NHLAK700020201-05-02	Lake Winnisquam - Sanbornton Town Beach	Sanbornton	High
NHLAK600030802-03-02	Phillips Pond - Seeley Town Beach	Sandown	High
NHEST600031004-09-05	Hampton/Seabrook Harbor - Seabrook Harbor Beach	Seabrook	High
NHLAK700030201-03-02	Highland Lake-Highland Lake Boat Launch	Stoddard, Washington	High
NHLAK801060402-05-03	Sunapee Lake - Dewey (Town) Beach	Sunapee	High
NHLAK802010104-02-02	Surry Mountain Reservoir - Rec Area Beach	Surry	High
NHLAK802010302-01-02	Swanzey Lake - Richardson Park Town Beach	Swanzey	High
NHIMP802010303-04-02	Village Pond Dam - Sand Dam Village Pond Town Beach	Troy	High
NHLAK700020110-02-04	Lake Winnipesaukee - Melvin Village Lake Town Pier Beach	Tuftonboro	High
NHLAK700020110-02-07	Lake Winnipesaukee - Public Beach	Tuftonboro	High
NHLAK700020106-02-02	Mirror Lake - Mirror Lake Beach	Tuftonboro	High
NHIMP700030304-04-02	Silver Brook - Silver Lake Reservoir Beach	Warner	High
NHIMP700030204-05-02	Beards Brook - Mill Pond Town Beach	Washington	High
NHIMP700010401-01-02	Snows Brook - Corcoran Pond Town Beach	Waterville Valley	High
NHLAK700060601-05-02	Weare Reservoir - Chase Park Town Beach	Weare	High
NHLAK700060602-01-02	Everett Lake - Clough State Park Beach	Weare	High
NHLAK700030402-03-02	Tannery Pond - Beach	Wilmot	High

Watershed AU	Beach Name	Town(s) Primary Town is Listed First	Restoration Priority
NHLAK802010401-01-02	Forest Lake - Town Beach	Winchester	High
NHLAK700061204-01-03	Cobbetts Pond - Town Beach	Windham	High
NHLAK700020101-05-02	Lake Wentworth - Albee Beach	Wolfeboro	High
NHLAK700020101-05-03	Lake Wentworth - Wentworth State Park Beach	Wolfeboro	High
NHLAK700020101-05-02	Lake Wentworth - Albee Beach	Wolfeboro	High
NHLAK700020110-02-09	Lake Winnipesaukee - Brewster Beach	Wolfeboro	High

APPENDIX E: WATERSHED (HUC-12) PRIORITY PROTECTION POTENTIAL RANKING

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010801010704	Phillips Brook	71.6	1	High
010801010706	Nash Stream	69.9	2	High
010600020201	Headwaters Swift River	69.3	3	High
010600020202	Oliveran Brook-Swift River	68.8	4	High
010600020101	Headwaters Saco River	68.7	5	High
010801010403	Simms Stream	68.6	6	High
010600030605	Nippo Brook-Isinglass River	68.0	7	High
010600030805	Great Brook-Exeter River	67.7	8	High
010600030802	Watson Brook-Exeter River	66.5	9	High
010801030301	Headwaters Gale River	66.4	10	High
010600020102	Sawyer River	66.1	11	High
010801030401	Headwaters Ammonoosuc River	66.0	12	High
010600020103	Rocky Branch	66.0	13	High
010801030102	Johns River	65.9	14	High
010600020301	East Branch Saco River	65.7	15	High
010600030801	Headwaters Exeter River	65.6	16	High
010700030303	Hopkinton Lake-Contoocook River	65.4	17	High
010400010601	Mollidgewock Brook	65.4	18	High
010801070203	Cold River	65.3	19	High
010801010202	Indian Stream	64.9	20	High
010600020703	Pine River	64.7	21	High
010802010103	Grassy Brook-Ashuelot River	64.6	22	High
010400020201	Wild River	64.6	23	High
010801010602	Bog Brook	64.6	24	High
010600020802	Lovell River	64.5	25	High
010802010402	Mirey Brook	64.4	26	High
010801010103	Perry Stream	64.3	27	High

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010700010301	Headwaters Baker River	64.3	28	High
010801010701	Headwaters Upper Ammonoosuc River	64.3	29	High
010801010702	Higgins Brook-Upper Ammonoosuc River	64.2	30	High
010801010802	Mill Brook-Israel River	64.2	31	High
010600020204	Swift River	64.2	32	High
010801030101	Bog Brook	64.2	33	High
010801030402	Zealand River-Ammonoosuc River	64.2	34	High
010801010707	Upper Ammonoosuc River	63.8	35	High
010600020106	Bartlett Brook-Saco River	63.8	36	High
010600020902	South River	63.8	37	High
010700030108	Great Brook-Contoocook River	63.8	38	High
010700010204	Eastman Brook	63.7	39	High
010700030302	Amey Brook	63.7	40	High
010801010301	Bishop Brook	63.7	41	High
010801010104	Lake Francis	63.7	42	High
010700010101	North Fork East Branch Pemigewasset River	63.7	43	High
010801010705	Mill Brook-Upper Ammonoosuc River	63.6	44	High
010802010102	Abbott Brook-Ashuelot River	63.6	45	High
010700010103	Franconia Branch	63.3	46	High
010400010402	West Branch Dead Diamond River	63.3	47	High
010400010405	Dead Diamond River	63.2	48	High
010600030803	Spruce Swamp-Exeter River	63.2	49	High
010801010703	North Branch Upper Ammonoosuc River	63.2	50	High
010801060101	Canaan Street Lake-Mascoma River	63.1	51	High
010802010101	Ashuelot Pond-Ashuelot River	63.1	52	High
010600030804	Little River-Exeter River	63.0	53	High
010801010101	Second Connecticut Lake	63.0	54	High
010801010804	Garland Brook	63.0	55	High
010801010806	Israel River	62.9	56	High

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010802010104	Surry Mountain Dam-Ashuelot River	62.8	57	High
010801060103	Goose Pond Brook	62.6	58	High
010700061403	Powwow River	62.6	59	High
010400010401	Middle Branch Dead Diamond River	62.6	60	High
010700020103	Inlet Moultonborough Bay	62.5	61	High
010801070201	Headwaters Cold River	62.4	62	High
010700010102	Cedar Brook-East Branch Pemigewasset	62.3	63	High
010801030505	Wild Ammonoosuc River	62.3	64	High
010700060301	Turkey River	62.2	65	High
010700010502	Squam River	62.2	66	High
010400010403	Nathan Pond Brook-Swift Diamond River	62.2	67	High
010600031002	Berrys Brook-Rye Harbor	62.1	68	High
010600030701	Headwaters Lamprey River	62.1	69	High
010700010803	Franklin Falls Dam-Pemigewasset River	62.0	70	High
010801030701	Oliverian Brook	62.0	71	High
010700030105	Otter Brook	62.0	72	High
010801060104	Crystal Lake Brook	61.9	73	High
010802020102	Priest Brook	61.9	74	High
010801010801	Headwaters Israel River	61.9	75	High
010801010805	Otter Brook	61.9	75	High
010801030504	Headwaters Wild Ammonoosuc River	61.8	77	High
010700030202	Shedd Brook	61.8	78	High
010700010202	Moosilauke Brook	61.8	79	High
010700010304	South Branch Baker River	61.7	80	High
010600020603	Swift River-Bearcamp River	61.7	81	High
010700030602	Deer Meadow Brook	61.5	82	High
010801030303	Ham Branch	61.4	83	High
010600020602	Cold River	61.4	84	High
010700060604	Headwaters South Branch Piscataquog River	61.3	85	High

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010600030708	Piscassic River	61.3	86	High
010801030506	Ammonoosuc River	61.3	87	High
010700010104	East Branch Pemigewasset River	61.3	88	High
010802010302	Martin Brook	61.3	89	High
010700010206	West Branch Brook-Pemigewasset River	61.3	90	High
010801010405	Lyman Brook-Connecticut River	61.2	91	High
010801060701	Little Sugar River	61.2	92	High
010802010401	Wheelock Brook-Ashuelot River	61.2	93	High
010600020803	Stony Brook-Ossipee River	61.1	94	High
010801010402	Mohawk River	61.1	95	High
010700010302	Atwell Brook-Baker River	61.1	96	High
010801010803	Stag Hollow Brook-Israel River	61.0	97	High
010700060606	South Branch Piscataquog River	61.0	98	High
010802020202	Lawrence Brook	61.0	99	High
010801010201	Headwaters Indian Stream	61.0	100	High
010400010404	Swift Diamond River	61.0	101	High
010700060601	Weare Reservoir-Piscataquog River	60.9	102	High
010801040202	Jacobs Brook	60.9	103	High
010801060301	Bloods Brook	60.9	104	High
010600030702	North Branch River	60.9	105	High
010400010604	Chickwolnepy Stream-Androscoggin River	60.9	106	High
010801070506	Whetstone Brook	60.8	107	High
010700010305	Stinson Brook	60.8	108	High
010600020401	Charles River	60.8	109	High
010802020101	Whitney Pond-Millers River	60.8	110	High
010700010804	Sucker Brook-Pemigewasset River	60.8	111	High
010802010201	Otter Brook Reservoir-Otter Brook	60.7	112	Medium
010700010702	Smith River	60.7	113	Medium
010600030606	Berrys River	60.7	114	Medium

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010700010401	Mad River	60.7	115	Medium
010801030702	Halls Brook	60.6	116	Medium
010700060101	Punch Brook-Merrimack River	60.6	117	Medium
010700030106	Ferguson Brook-Contoocook River	60.5	118	Medium
010801010401	Headwaters Mohawk River	60.5	119	Medium
010600030601	Headwaters Cocheco River	60.4	120	Medium
010802010403	Ashuelot River	60.4	121	Medium
010400010201	Swift Cambridge River	60.4	122	Medium
010400020101	Moose River-Androscoggin River	60.4	123	Medium
010400010603	Bog Brook-Androscoggin River	60.4	124	Medium
010700010205	Mill Brook-Pemigewasset River	60.3	125	Medium
010700010402	Beebe River-Pemigewasset River	60.3	126	Medium
010400020102	Peabody River	60.3	127	Medium
010400010406	Sturtevant Stream-Magalloway River	60.3	128	Medium
010801030503	Pearl Lake Brook-Ammonoosuc River	60.2	129	Medium
010802020203	Tully River	60.2	130	Medium
010801070202	Vilas Pool-Cold River	60.1	131	Medium
010801030602	Wells River	60.1	132	Medium
010802010303	South Branch Ashuelot River	60.1	133	Medium
010600030901	Winnicut River	60.0	134	Medium
010700030204	North Branch River	60.0	135	Medium
010801030204	Stevens River	60.0	136	Medium
010400010607	Dead River-Androscoggin River	60.0	137	Medium
010700010403	Bog Brook-Pemigewasset River	60.0	138	Medium
010801030201	Miles Stream-Connecticut River	60.0	138	Medium
010600020104	Wildcat Brook	60.0	140	Medium
010700060901	Headwaters Souhegan River	59.9	141	Medium
010400010302	West Branch Magalloway River	59.9	142	Medium
010801030501	Salmon Hole Brook-Ammonoosuc River	59.9	143	Medium

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010801010203	Favreau Brook-Connecticut River	59.9	144	Medium
010700060503	Suncook River	59.8	145	Medium
010600020203	Pequawket Brook	59.7	146	Medium
010700060605	Middle Branch Piscataquog River	59.7	147	Medium
010600020302	Kearsarge Brook-Saco River	59.7	148	Medium
010801060404	North Branch Sugar River	59.6	149	Medium
010700060502	Little Suncook River	59.5	150	Medium
010600020701	Dan Hole River	59.5	151	Medium
010801010903	Mink Brook-Connecticut River	59.5	152	Medium
010600030502	Branch River	59.4	153	Medium
010700010201	Headwaters Pemigewasset River	59.4	154	Medium
010801060105	Mascoma Lake-Mascoma River	59.4	155	Medium
010700030107	Moose Brook-Contoocook River	59.4	156	Medium
010801060102	Indian River	59.3	157	Medium
010801010603	Dennis Pond Brook-Connecticut River	59.3	158	Medium
010700030203	Beards Brook	59.3	159	Medium
010600020105	Ellis River	59.3	160	Medium
010801060303	Blow-me-down Brook	59.1	161	Medium
010801030302	Meadow Brook-Gale River	59.1	162	Medium
010801010305	Willard Stream-Connecticut River	59.0	163	Medium
010600020405	Shepards River	59.0	164	Medium
010801060402	South Branch Sugar River	59.0	165	Medium
010400010501	Millsfield Pond Brook	59.0	166	Medium
010600030707	Little River-Lamprey River	58.9	167	Medium
010400010306	Abbott Brook-Magalloway River	58.9	168	Medium
010600020604	Chocorua River	58.8	169	Medium
010700060902	Blood Brook-Souhegan River	58.8	170	Medium
010801060407	Sugar River	58.8	171	Medium
010801010102	First Connecticut Lake	58.7	172	Medium

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010801070102	Saxtons River	58.7	173	Medium
010600020601	Headwaters Bearcamp River	58.7	174	Medium
010801030502	Ogontz Brook	58.7	174	Medium
010600030703	Pawtuckaway Pond	58.6	176	Medium
010700060102	Tannery Brook-Merrimack River	58.6	177	Medium
010801040201	Eastman Brook	58.6	178	Medium
010700010602	Bog Brook	58.6	179	Medium
010801030403	Baker Brook-Ammonoosuc River	58.5	180	Medium
010700060602	Everett Lake-Piscataquog River	58.5	181	Medium
010801070502	East Putney Brook-Connecticut River	58.4	182	Medium
010400020103	Lary Brook-Androscoggin River	58.4	183	Medium
010801040203	Clay Brook	58.4	184	Medium
010700030503	Mountain Brook-Blackwater River	58.4	185	Medium
010400010304	Little Magalloway River	58.2	186	Medium
010700060603	Gorham Brook-Piscataquog River	58.2	187	Medium
010801030304	Gale River	58.2	188	Medium
010600030806	Squamscott River	58.2	189	Medium
010700030502	Cascade Brook	58.2	190	Medium
010801010404	Clough Brook-Connecticut River	58.1	191	Medium
010700010701	Headwaters Smith River	58.1	192	Medium
010801060406	Quabbinnight Brook-Sugar River	58.1	193	Medium
010700030402	Headwaters Warner River	58.1	194	Medium
010600021002	Rock Haven Lake-Little Ossipee River	58.0	195	Medium
010700030104	Gridley River-Contoocook River	57.8	196	Medium
010600030705	Bean River-North River	57.8	197	Medium
010801060703	Jabes Hackett Brook-Connecticut River	57.8	198	Medium
010700030301	Sand Brook-Contoocook River	57.8	199	Medium
010700010501	Squam Lake	57.7	200	Medium
010700030201	Highland Lake-Shedd Brook	57.7	201	Medium

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010700010306	Halls Brook-Baker River	57.7	202	Medium
010801070505	Catsbane Brook-Connecticut River	57.5	203	Medium
010700020101	Wolfeboro Bay	57.5	204	Medium
010801040204	Grant Brook	57.4	205	Medium
010801060403	Headwaters North Branch Sugar River	57.4	206	Medium
010700060501	Perry Brook-Suncook River	57.3	207	Medium
010700010303	Pond Brook-Baker River	57.2	208	Medium
010700030102	Brush Brook	57.2	209	Medium
010600020605	Bearcamp River	57.2	210	Medium
010600020801	West Branch	57.1	211	Medium
010700030404	Warner River	57.1	212	Medium
010600030904	Great Bay	57.1	213	Medium
010801070503	Partridge Brook	57.0	214	Medium
010600020702	Beech River	57.0	215	Medium
010801060401	Sunapee Lake-Sugar River	57.0	216	Medium
010801010902	Dean Brook-Connecticut River	57.0	217	Medium
010700020102	Alton Bay	57.0	218	Medium
010801030206	Manchester Brook-Connecticut River	57.0	219	Medium
010600020304	Weeks Brook-Swans Falls	57.0	220	Medium
010600030501	Headwaters Branch River	57.0	221	Medium
010801060702	Spencer Brook-Connecticut River	56.9	222	Medium
010802010202	The Branch	56.8	223	Low
010700020104	Moultonborough Bay	56.7	224	Low
010600020406	Lovewell Pond-Pleasant Pond	56.6	225	Low
010801020403	Water Andric-Passumpsic River	56.5	226	Low
010400010605	Stearns Brook	56.5	227	Low
010400010602	Smoky Camp Brook-Androscoggin River	56.5	228	Low
010700040301	Willard Brook	56.5	229	Low
010700010801	Harper Brook-Pemigewasset River	56.4	230	Low

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010700010601	Cockermouth River	56.4	231	Low
010600030602	Axe Handle Brook	56.3	232	Low
010700060904	Purgatory Brook-Souhegan River	56.3	233	Low
010400010502	Clear Stream	56.2	234	Low
010700030401	Andrew Brook	56.2	235	Low
010700030101	Town Farm Brook-Contoocook River	56.2	236	Low
010802010501	Pauchaug Brook-Connecticut River	56.1	237	Low
010600030704	Pawtuckaway River-Lamprey River	56.0	238	Low
010801060603	Williams River	55.9	239	Low
010700020108	Lake Waukewan-Lake Winnipesaukee	55.9	240	Low
010802020103	Torbell Brook-Millers River	55.9	241	Low
010700060701	Sucker Brook	55.9	242	Low
010700010203	Glover Brook-Pemigewasset River	55.8	243	Low
010600020901	Loon Lake-Ossipee River	55.8	244	Low
010801060305	Hubbard Brook-Connecticut River	55.8	245	Low
010600020903	Bickford Pond-Ossipee River	55.6	246	Low
010600020303	Conway Lake-Saco River	55.6	247	Low
010700060401	Suncook Lakes-Suncook River	55.6	248	Low
010600030706	North River	55.5	249	Low
010801030205	McIndoe Falls-Connecticut River	55.5	250	Low
010700060905	Baboosic Brook	55.4	251	Low
010600030709	Lamprey River	55.3	252	Low
010400010303	Parmachenee Lake	55.3	253	Low
010700030603	Contoocook River	55.3	254	Low
010700030501	Frazier Brook-Blackwater River	55.2	255	Low
010700030103	Nubanusit Brook	55.1	256	Low
010700060903	Stony Brook-Souhegan River	55.0	257	Low
010801040104	Waits River	55.0	258	Low
010801070507	Vernon Dam-Connecticut River	55.0	259	Low

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010700010802	Salmon Brook	55.0	260	Low
010700010603	Newfound Lake-Newfound River	54.9	261	Low
010600030607	Isinglass River	54.9	262	Low
010700060201	Headwaters Soucook River	54.9	263	Low
010801040401	Mink Brook	54.8	264	Low
010801030202	Moore Reservoir-Connecticut River	54.6	265	Low
010700030403	Lane River	54.4	266	Low
010801030703	Clark Brook-Connecticut River	54.4	267	Low
010801040402	Blood Brook-Connecticut River	54.3	268	Low
010700040401	Nissitissit River	54.3	269	Low
010801040205	Lake Morey-Connecticut River	54.3	270	Low
010400010203	Umbagog Lake	54.2	271	Low
010700030601	Hopkinton-Everett Reservoir-Contoocook River	54.2	272	Low
010700060801	Black Brook	54.1	273	Low
010700010307	Baker River	54.1	274	Low
010801060405	Long Pond Brook-Sugar River	54.0	275	Low
010700020202	Winnipesaukee River	53.8	276	Low
010700060402	Big River	53.7	277	Low
010801060302	Lulls Brook-Connecticut River	53.3	278	Low
010801010303	Halls Stream	53.1	279	Low
010801070501	Great Brook-Connecticut River	53.1	280	Low
010600021001	Balch Pond-Shapleigh Pond	53.0	281	Low
010600030506	Middle Salmon Falls River	53.0	282	Low
010700060607	Piscataquog River	52.8	283	Low
010400010606	Horne Brook-Androscoggin River	52.7	284	Low
010600030604	Bow Lake Headwaters Isinglass River	52.7	285	Low
010700030504	Blackwater River	52.6	286	Low
010600031003	Taylor River-Hampton River	52.6	287	Low
010700010404	Clay Brook-Pemigewasset River	52.5	288	Low

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010801060106	Mascoma River	52.4	289	Low
010600030504	Upper Salmon Falls River	52.4	290	Low
010700020201	Winnisquam Lake	52.2	291	Low
010700060202	Soucook River	51.8	292	Low
010700020105	Lake Kanasatka-Lake Winnipesaukee	51.7	293	Low
010801030203	Comerford Dam Reservoir-Connecticut River	51.6	294	Low
010600030903	Bellamy River	51.5	295	Low
010802010301	Ash Swamp Brook-Ashuelot River	51.5	296	Low
010400010305	Aziscohos Lake	51.5	297	Low
010600030503	Headwaters Salmon Falls River	51.1	298	Low
010700061001	Pennichuck Brook	50.9	299	Low
010700060302	Bow Bog Brook-Merrimack River	50.8	300	Low
010600031005	Hampton Harbor	50.7	301	Low
010600030603	Pokamoonshine Brook-Cocheco River	50.6	302	Low
010700040302	Witch Brook-Squannacook River	50.5	303	Low
010700020107	Sanders Bay	50.5	304	Low
010600030902	Oyster River	50.5	305	Low
010700061101	Arlington Mill Reservoir-Spickett River	50.0	306	Low
010600030608	Cocheco River	49.8	307	Low
010600020804	Ossipee Lake-Ossipee River	49.8	308	Low
010600030507	Lower Salmon Falls River	49.5	309	Low
010700061204	Golden Brook	49.3	310	Low
010700061404	East Meadow River-Merrimack River	48.5	311	Low
010700061002	Nesenkeag Brook-Merrimack River	48.5	312	Low
010700020106	The Broads	48.0	313	Low
010700061201	Salmon Brook	47.9	314	Low
010700060906	Souhegan River	47.5	315	Low
010700040402	Unkety Brook-Nashua River	46.6	316	Low
010700061401	Little River	46.3	317	Low

Watershed ID (HUC-12)	Watershed Name	Priority Potential Indicator Score	Priority Potential Indicator Rank	Protection Potential Rank
010700020109	Meredith Bay	46.2	318	Low
010700060804	Little Cohas Brook-Merrimack River	46.1	319	Low
010700060702	Massabesic Lake	46.0	320	Low
010600020404	Old Course Saco River-Saco River	45.8	321	Low
010700020110	Paugus Bay	45.4	322	Low
010700061203	Headwaters Beaver Brook	44.4	323	Low
010700060703	Cohas Brook	44.1	324	Low
010600031004	Portsmouth Harbor-Atlantic Ocean	42.9	325	Low
010700061102	Spickett River	40.3	326	Low
010700061205	Lower Beaver Brook	39.2	327	Low
010600031001	Portsmouth Harbor	38.9	328	Low
010700061402	Creek Brook-Merrimack River	38.1	329	Low
010700061207	Fish Brook-Merrimack River	36.2	330	Low
010700060802	Browns Brook-Merrimack River	36.0	331	Low
010700061206	Limit Brook-Merrimack River	35.5	332	Low
010700060803	Bowman Brook-Merrimack River	31.9	333	Low
010600031106	Southern York County-Atlantic Ocean	30.8	334	Low

APPENDIX F: STATEWIDE PRIORITY PROTECTION POTENTIAL FOR NEW HAMPSHIRE WATERSHEDS (HUC-12)