

## **CLEAN WATERSHEDS**

Restoration of NPS-impaired waters remains the primary goal of the 319 program; however, only a small percentage of waters in New Hampshire have sufficient data to determine whether or not a water quality impairment exists. As of 2012, about 35% of lakes and 25% of rivers had enough data to be assessed for the Aquatic Life Use designated use, and about 15% of lakes and rivers had enough data to be assessed for the Swimming designated use. With the majority of lakes and rivers unassessed, and therefore without a formal high quality or impairment determination, New Hampshire's nonpoint source program balances funding of both restoration and protection activities.

Using the high priority watersheds identified through the prioritization analysis described in this section, the NPS Program estimates that about 60% of the program's time and funding will be expended on restoring impaired waters versus about 40% spent on protecting and improving threatened waters. There are many factors that affect the actual allocation of program resources to restoration versus protection activities in a given year including, but not limited to partner participation, response to project proposal solicitation, and scheduling.

NH's NPS 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. Specific goals, objectives, and milestones related to clean watershed prioritization are described in Table 7.

## **PRIORITY AREAS FOR NONPOINT SOURCE MANAGEMENT ACTIVITIES**

In 2013, DES completed a priority analysis, using the Recovery Potential Screening Tool (RPST) developed by EPA, to identify geographic areas of the state where the Department should focus limited resources among large numbers of waters in need of restoration or protection.

The RPST uses the ecological, stressor, and social characteristics of each watershed to identify those places with the greatest likelihood for restoring or maintaining water quality. Representative indicator metrics (shown in Tables 2 and 5) were selected by DES and used to calculate a specific recoverability or protection score for each watershed. 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, including the geographic scope, assessment unit and 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: DES Methodology for Prioritizing Water Quality Restoration and Protection Activities using the Recovery Potential Screening Tool*

(RPST) in Appendix A.

Priority watersheds identified in the NPS Plan may also serve as the basis for decision-making with respect to priorities for monitoring, TMDL development and implementation, and potentially SRF funding for NPS projects.

### PRIORITIES FOR RESTORATION ACTIVITIES

In New Hampshire, impairments are made at the assessment unit (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, DES delineated the watershed boundary of each AU, which includes every stream segment, lake, pond, impoundment, or estuary in the state. The recoverability analysis

for restoration activities included all AU watersheds that have one or more nonpoint source-related impairments. DES determined that nonpoint source-related impairments include those parameters listed in Table 2. The recoverability analysis calculated recovery scores based upon the ecological, stressor, and social metrics in Table 3.

### RIVERS

New Hampshire has nearly 17,000 stream and river miles that flow through the state. Priority for restoration activities is given to those river AU watersheds that have completed EPA-approved watershed restoration 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;
2. The waterbody has an established water quality monitoring program; and,
3. The organization has regular interaction with water quality professionals.

The river priority criteria can be met by participating in the NHDES Volunteer River Assessment

Table 2. Nonpoint source-related impairments.

NONPOINT SOURCE IMPAIRMENT NAME
AMMONIA (UN-IONIZED)
BOD, BIOCHEMICAL OXYGEN DEMAND
BENTHIC-MACROINVERTEBRATE BIOASSESSMENTS (STREAMS)
CHLORIDE
CHLOROPHYLL-A
CYANOBACTERIA HEPATOTOXIC MICROCYSTINS
DISSOLVED OXYGEN SATURATION
ENTEROCOCCUS
ESCHERICHIA COLI
EXCESS ALGAL GROWTH
FISHES BIOASSESSMENTS (STREAMS)
HABITAT ASSESSMENT (STREAMS) LOW FLOW ALTERATIONS
AMMONIA (TOTAL)
OTHER FLOW REGIME ALTERATIONS
OXYGEN, DISSOLVED
SEDIMENTATION/SILTATION
FECAL COLIFORM
TOTAL SUSPENDED SOLIDS (TSS)
TURBIDITY
NITROGEN (TOTAL)
PHOSPHORUS (TOTAL)

(VRAP) Program (<http://des.nh.gov/organization/divisions/water/wmb/vrap/index.htm>). See Appendix B for the River Watersheds Recovery Potential Ranking and Appendix D for associated maps.

## LAKES

New Hampshire has over 800 lakes and ponds greater than 10 acres in size. The priority for restoration activities is given to those lake watersheds that have completed EPA-approved watershed restoration 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 an established water quality monitoring program; and,
3. The organization has regular interaction with limnology professionals.

Table 3. Recoverability metrics.

ECOLOGICAL METRICS	STRESSOR METRICS	SOCIAL METRICS
WATERSHED SIZE MAINTENANCE OF % NATURAL COVER STRAHLER STREAM ORDER $\leq 3^*$ WATERSHED %: INSTATE AREA STREAM MILES UNIMPAIRED LAKE ACRES UNIMPAIRED NATURAL COVER FOREST WETLANDS NATURAL SERVICES NETWORK ACTIVE RIVER AREA %: NATURAL COVER FOREST WETLANDS	WATERSHED AQUATIC BARRIERS CORRIDOR ROAD CROSSING DENSITY NUMBER OF 303(D) LISTED CAUSES WATERSHED %: IMPERVIOUS AREA AGRICULTURE PASTURE DEVELOPED INCREASE IN DEVELOPED CLASSES ACTIVE RIVER AREA %: IMPERVIOUS AREA AGRICULTURE PASTURE DEVELOPED	WATERSHED SIZE APPROVED TMDL EXISTENCE WATERSHED-BASED PLAN EXISTENCE JURISDICTIONAL COMPLEXITY WATERSHED POPULATION # DRINKING WATER INTAKES ASSESSMENT UNIT CLASS WATERSHED %: PROTECTED LAND STREAM MILES ASSESSED LAKE ACRES ASSESSED
* STRAHLER STREAM ORDER $\leq 3$ WAS NOT INCLUDED IN THE ECOLOGICAL METRICS FOR THE LAKES RESTORATION PRIORITY ASSESSMENT.		

The lake priority criteria can be met by participating in the NHDES Volunteer Lake Assessment (VLAP) Program (<http://des.nh.gov/organization/divisions/water/wmb/vlap/>) or the University of New Hampshire Lakes Lay Monitoring Program (UNH LLMP) (<http://cfb.unh.edu/programs/LLMP/nhllmp.htm>). See Appendix C for the Priority Lake Watersheds Recovery Potential Ranking and Appendix D for associated maps.

## BEACHES

New Hampshire has nearly 400 freshwater and coastal beaches. Priority for restoration activities

is given to the nearly 150 public bathing beaches with documented allowable bacteria loadings and associated reductions needed to meet water quality standards, as reported in one of the EPA-approved Total Maximum Daily Load (TMDL) studies available on the DES website at <http://des.nh.gov/organization/divisions/water/wmb/tmdl/categories/publications.htm>. The list of priority beaches included in Appendix E. Beach TMDLs include the following:

- *Final Report Total Maximum Daily Load (TMDL) Report for 44 Bacteria Impaired Waters in New Hampshire*. NHDES. September 2013.
- *Final Report Total Maximum Daily Load (TMDL) Report for 58 Bacteria Impaired Waters in New Hampshire*. NHDES. August 2011.
- *Final Report 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.

## **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 Harbor 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, DES has assigned high priority to all of the state's estuaries and their tidal tributaries.

## **DAMS AND BARRIERS**

Under New Hampshire RSA 482:2, II and Env-Wr 101.12, a dam is any artificial barrier that impounds or diverts water and has a height of 6 feet or more, or is located at the outlet of a great pond, or is an artificial barrier which impounds liquid industrial or liquid commercial wastes, or septage or sewage, regardless of height or storage.

New Hampshire has more than 4,800 active and inactive dams in the state and countless unregistered dams and artificial barriers that impede stream flow and fish passage. Many of these barriers no longer provide a valuable function and instead, contribute to water quality or habitat impairments. Selective barrier removal can restore a river to a healthier, free-flowing condition and can remove barrier-related impairments to water quality and habitat.

Priority dams and barriers for removal must meet the following criteria:

1. The structure impounds or diverts water;
2. The waterbody for which it is located must be on New Hampshire's 303(d) list, as impaired for at least one of the following parameters:
  - Chlorophyll-a
  - Dissolved oxygen saturation
  - Dissolved oxygen
  - Cyanobacteria hepatotoxic microcystins; and

Table 4. Priority Dam and Barriers sites.

WATERBODY NAME	WATERBODY AUID	TOWN
EXETER RIVER – GREAT DAM	NHIMP600030805-04	EXETER
OYSTER RIVER – MILL POND DAM	NHIMP600030902-04	DURHAM
BELLAMY RIVER – SAWYERS MILL DAM POND	NHIMP600030903-02	DOVER
SOUHEGAN RIVER – GOLDMAN DAM	NHIMP700060906-07	MILFORD
ASHUELOT RIVER DAM POND	NHIMP802010301-02	KEENE
TAYLOR RIVER REFUGE POND	NHLAK600031003-02	HAMPTON FALLS
HORSESHOE POND	NHLAK802020202-03	FITZWILLIAM
MCQUESTEN POND - DAM #1	NHLAK700060803-03	MANCHESTER
MCQUESTEN POND - DAM #2	NHLAK700060803-03	MANCHESTER
MCQUESTEN BROOK - SOUTH MAIN STREET DAM	NHRIV700060803-16	MANCHESTER

3. The dam or barrier owner has contacted the DES River Restoration Program and expressed their interest in removal.

Currently, the following dams and barriers, listed in Table 4 below, meet the criteria. As DES becomes aware of additional dams or barriers meeting the criteria, this list will be updated.

## PRIORITIES FOR PROTECTION ACTIVITIES

New Hampshire does not have a formal list of high quality waters, and, as noted in the EPA National Water Quality Assessment, tends to have better than average water quality. Therefore, in the absence of a documented impairment, water quality is assumed to be high and eligible for protection activities. In many cases, an AU impaired for one parameter or use is eligible for protection activities due to generally high quality for other parameters or uses. The protection analysis was completed at the hydrologic unit code (HUC) 12 scale. The priority analysis, referred to as the Protection Potential Screening Tool (PPST), adapted by NHDES from EPA's Recovery Potential Screening Tool, calculated protection scores based upon the ecological, stressor, and social metrics in Table 5.

Table 5. Protection metrics.

ECOLOGICAL METRICS	STRESSOR METRICS	SOCIAL METRICS
MAINTENANCE OF % NATURAL COVER STRAHLER STREAM ORDER $\leq$ 3 WATERSHED %: NATURAL COVER FOREST WETLANDS NATURAL SERVICES NETWORK ACTIVE RIVER AREA %: NATURAL COVER FOREST WETLANDS	WATERSHED AQUATIC BARRIERS CORRIDOR ROAD CROSSING DENSITY WATERSHED %: IMPERVIOUS AREA DEVELOPED INCREASE IN DEVELOPED CLASSES ACTIVE RIVER AREA %: IMPERVIOUS AREA DEVELOPED	WATERSHED-BASED PLAN EXISTENCE JURISDICTIONAL COMPLEXITY # DRINKING WATER INTAKES WATERSHED %: PROTECTED LAND AGRICULTURE PASTURE

Priority for protection activities is given to those 17 AU watersheds that fully support both aquatic life and primary contact recreation designated uses in Table 6. In addition, priority for protection activities is given to those watersheds that have completed, EPA-approved watershed based plans, or that ranked medium or high priority in the PPST analysis. See Appendix F for the HUC 12 Protection Potential Ranking.

Table 6. Priority Protection sites that fully support aquatic life and primary contact recreation designated uses.

WATERBODY AUID	PRIMARY TOWN	WATERBODY NAME
NHRIV400010405-02	CLARKSVILLE	S AND W BRANCH AND LITTLE DEAD DIAMOND R - LOST VALLEY BRK - PESKY BRK
NHRIV400010502-01	DIXVILLE	CLEAR STREAM-FLUME BROOK - UNNAMED BROOK - CASCADE BROOK
NHRIV400020101-04	GORHAM	MOOSE RIVER
NHRIV600020106-08	BARTLETT	MEADOW BROOK - SACO RIVER - UNNAMED BROOK - BARTLETT BROOK - STONY BROOK
NHRIV600020302-03	CONWAY	ARTIST BROOK - UNNAMED BROOK
NHRIV700010305-07	GROTON	UNNAMED BROOK - TO BAKER RIVER
NHRIV700010401-06	WATERVILLE VALLEY	SNOWS BROOK
NHRIV700010401-09	WATERVILLE VALLEY	MAD RIVER
NHRIV700010601-01	GROTON	COCKERMOUTH RIVER - ATWELL BROOK - UNNAMED BROOK
NHRIV700010601-02	GROTON	HARDY BROOK
NHRIV700030504-10	HILLSBOROUGH	CONTOOCOOK RIVER - SAND BROOK - UNNAMED BROOK
NHRIV700030507-10	BOSCAWEN	CONTOOCOOK RIVER - LOWER FALLS DAM TO MERRIMACK R
NHRIV700060906-04	MONT VERNON	HARTSHORN BROOK
NHRIV801010201-01	PITTSBURG	MIDDLE BRANCH INDIAN STREAM - UNNAMED BROOK - GREELEY BROOK
NHRIV801030302-01	FRANCONIA	BEAVER BRK - LAFAYETTE BRK - SKOOKUMCHUCK BRK - UNNAMED BRK - JORDAN BRK
NHRIV801030401-01	THOMPSON AND MESERVES PURCHASE	AMMONOOSUC R - JEFFERSON BRK - CLAY BRK - FRANKLIN BRK - MONROE BRK
NHRIV802010302-04	SWANZEY	PERRY BROOK

**TABLE 7. CLEAN WATERSHED (CW) GOALS, OBJECTIVES, AND MILESTONES**

Clean Watershed (CW) Goal. Water quality in priority watersheds is protected and restored.							
Objective	Milestone	Measure of Success	Schedule				
			2015	2016	2017	2018	2019
<b>Objective CW-1</b> Grant funding is awarded to projects with the greatest likelihood for successful restoration or protection activities.	<b>Milestone CW-1.1</b> Annual grant solicitation process utilizes watershed prioritization as the basis for funding projects. <i>Partners: DES</i>	<b>Measure CW-1.1</b> 100% of grants awarded annually are in priority watersheds.					
	<b>Milestone CW-2.1</b> Restoration and protection projects identified in existing watershed-based plans are implemented. <i>Partners: DES, 319 Grantees</i>	<b>Measure CW-2.1</b> Identify and implement 4 new restoration and 2 new protection projects.					
	<b>Milestone CW-2.2</b> New watershed-based plans are developed and existing watershed-based plan are updated, where needed, to comply with EPA's Nine Minimum Elements of Watershed-based Plans, as part of implementation grants. <i>Partners: DES, 319 Grantees</i>	<b>Measure CW-2.2</b> Develop new or updated watershed-based plans for 3 restoration and 1 protection watersheds that meet EPA's Nine Minimum Elements of Watershed-based Plans.					
<b>Objective CW-2</b> Watershed based plans are developed and implemented in priority watersheds.	<b>Milestone CW-2.3</b> Watershed-based plan implementation efforts result in measurable water quality benefits. <i>Partners: DES, 319 Grantees, DES and other monitoring programs</i>	<b>Measure CW-2.3a</b> Estimated annual reductions in nitrogen, phosphorus, sediment, and other project-relevant parameters as reported annually into the Grants Reporting and Tracking Systems (GRTS) and the NPS annual report.					
		<b>Measure CW-2.3b</b> The NPS Program Annual Report includes the number of waterbodies where the concentration of NPS parameters have been reduced.					

**TABLE 7 (CONT.). CLEAN WATERSHED (CW) GOALS, OBJECTIVES, AND MILESTONES**

Objective	Milestone	Measure of Success	Schedule				
			2015	2016	2017	2018	2019
<b>Objective CW-2</b> (cont.)	<b>Milestone CW-2.4</b> Progress toward implementing watershed-based plans is efficiently tracked, including action item implementation, condition and maintenance surveying of best management practices, and other relevant information. <i>Partners: DES, 319 Grantees</i>	<b>Measure CW-2.4a</b> A system of cataloguing watershed-based plans is developed to track implementation activities, follow-up condition and maintenance, and provide status reports.					
		<b>Measure CW-2.4b</b> 20 BMP condition assessments per year to determine general conditions of 319 or State Revolving Loan-funded BMP installations. Annual summary report.					
		<b>Measure CW-2.4c</b> Completed BMP Maintenance Guidance is available to project implementers and supports follow-up maintenance for 319 or State Revolving Loan-funded BMPs to improve performance and life expectancy.					
<b>Objective CW-3</b> Progress toward water quality improvement is quantified.	<b>Milestone CW-3.1</b> Potential assessment unit delisting, partial delisting, and implementation projects are tracked so that success stories may be drafted as soon as possible. <i>Partners: DES, 319 Grantees, EPA, volunteer monitoring groups</i>	<b>Measure CW-3.1a</b> Develop process to review in-progress and recently completed projects to determine potential candidates for success stories.					
		<b>Measure CW-3.1b</b> Confirmation monitoring is completed annually in watersheds where watershed-based plans have been implemented to determine whether delisting of impairments is warranted.					
	<b>Milestone CW-3.2</b> EPA success stories are approved and published on EPA, DES, and other websites to demonstrate program success for pollutant based, non-pollutant based, and partial restoration projects. <i>Partners: DES, 319 Grantees, EPA</i>	<b>Measure CW-3.2</b> Two EPA Success Stories completed by 2019.					