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WR-1

Improve water quality and identify and mitigate pollution sources so that additional estuarine areas meet water quality standards for bacteria for shellfish harvesting

Highest

Cross connections between sanitary sewers and storm sewers allow discharge of untreated waste directly to surface water. This situation creates point sources of bacteria, nutrients, and chemical pollution. Other illegal point discharges from homes and businesses can cause similar sources of contamination to surface waters. Identification and correction of these cross connections have been ongoing for many years, but unrecognized problems still exist in the PREP Watershed area. Correcting these discharges is an important component of minimizing nutrient and bacterial loading to the estuaries.

MS4 communities, those that are required to comply with the USEPA Phase II Municipal stormwater regulations, are required to perform Illicit Discharge Detection and Elimination (IDDE) in order to comply with stormwater permits. Communities not required to comply are encouraged to complete IDDE to reduce these contaminant sources. PREP Action WR-25 is designed to provide assistance to MS4 and non-MS4 communities to comply with these requirements.

Surveys and water quality sampling conducted through NHEP, NHVRAP, MEVRMP, GBCW, MDMR Shellfish Sanitation Program, and other agency programs can provide valuable monitoring data for detecting illicit connections and discharges. These data are also valuable for long term analysis of water quality trends.

ACTIVITIES:

* Inventory NHDES, MDEP, municipalities, and watershed organizations that have completed illicit connection and discharge surveys and prepare brief compilation report.
* Work closely with NH and ME shellfish and beach sampling programs to define contamination sources detected in shoreline surveys, sampling and modeling efforts.1
* Support and refine ongoing training and support for municipal personnel in monitoring storm drainage systems for illicit connections.
* Utilize the most efficient and cost-effective bacterial and microbial source tracking techniques to determine sources of bacterial contamination.
* Increase state and local capacity to identify, map, and repair connections and eliminate point sources of contamination.
* Maintain a GIS layer of wastewater and stormwater drainage systems to assist with monitoring and troubleshooting.
* Provide incentives, such as cost-share funding, to fix or eliminate illegal direct discharges such as grey water pipes and failing septic systems.

MEASURING PROGRESS:

Outputs:

* Inventory of completed IDDE surveys in the Watershed
* Research reports on microbial source tracking
* GIS layer of wastewater and stormwater drainage systems
* Training for municipal staff on IDDE
* IDDE repair projects

Outcomes:

* Improved understanding of untreated sewage sources
* Increased state and local capacity for IDDE projects
* Reduced number of untreated discharges

Implementation Metrics:

* Acre-days of shellfish harvest opportunities in estuarine waters
* Trends in dry-weather bacteria indicator concentrations
* Violations of enterococci standard in estuarine waters

Issues Addressed:

* Bacteria
* Discharges
* Nutrients
* Stormwater
* Water Quality

Leads:

* MDMR
* NHDES

Cooperators:

* Businesses
* GBCW
* MDEP
* MSTP
* Municipalities
* MVRMP
* NHVRAP
* SWA
* UNH-JEL
* Watershed Organizations

Funding:

* Municipalities
* NHDES – Clean Water State Revolving Fund
* PREP

Critical Guidance:

1US Environmental Protection Agency. 2009. National Pollutant Discharge Elimination System (NPDES) Regulations.

WR-2

Collect and monitor shellfish tissue samples as appropriate for toxic contaminants and biotoxins

Highest

Toxic chemicals are monitored in the Piscataqua Watershed through the shellfish monitoring program. This includes sampling for trace metals, PCBs, PAHs, and chlorinated pesticides.

NHDES and PREP also coordinate efforts to sample for biotoxins in blue mussels in three fixed estuarine areas and in two other rotating sites in the Piscataqua Region.

Other important areas for shellfish toxic chemical and biotoxin monitoring are in shellfish beds to determine impacts on harvestable resources and near marinas and oil depots to determine impacts from petroleum contamination.

ACTIVITIES:

* Continue blue mussel toxic contaminant monitoring at Gulf of Maine sites in the Piscataqua Region.
* Assess need for additional analyses to shellfish tissue monitoring program.
* Sample oysters in Great Bay and clams in Hampton-Seabrook Harbor every three years to determine concentrations of toxic chemicals and biotoxins in these species in harvestable areas.
* Add additional biotoxin monitoring on a rotating basis in NH and ME waters.
* Coordinate between NHDES and MDEP on expanded sampling.

MEASURING PROGRESS:

Outputs:

* Reports of shellfish tissue monitoring
* Reports of NHDES and MDEP shellfish biotoxin monitoring

Outcomes:

* Improved understanding of trends in toxin and biotoxin concentrations in shellfish tissues in Piscataqua Region estuaries

Implementation Metrics:

* None

Issues Addressed:

* Critical Species
* Discharges
* Shellfish
* Water Quality

Leads:

* MDMR
* NH Shellfish Program
* PREP

Cooperators:

* ME Shellfish Program
* NHFGD
* UNH-JEL

Funding:

* GOMC
* MDEP – Bureau of Land & Water Quality
* MDMR – Division of Shellfish Management
* NHDES – Healthy Tidal Waters & Shellfish Protection Fund
* NOAA – Center for Coastal Monitoring & Assessment

WR-3

Implement National Shellfish Sanitation Program Guidance to maintain a USFDA-certified shellfish program

High

New Hampshire achieved compliance with the USFDA National Shellfish Sanitation Program (NSSP) in February 2002. This certification allows for commercial harvesting and aquaculture in coastal and estuarine waters. Maine is also USFDA certified for its NSSP through MDMR.

Water quality monitoring for bacterial pollution and shoreline sanitary surveys in NH and ME waters will continue under the supervision of the NHDES and MDMR Shellfish Program as per the certification requirements.

Information on detected sources during shoreline sanitary surveys is passed on to other NHDES and MDEP programs and provided to municipalities for source elimination activities.

ACTIVITIES:

* Continue sanitary surveys of shoreline areas to detect bacterial pollutions sources.
* Continue water quality sampling for bacteria as required for USFDA certification.1
* Work to fill additional shellfish program and watershed assistance staff positions so that source identification and elimination efforts can be reestablished.
* Coordinate with NHFGD and MDMR on shellfish bed contamination issues and enforcement of shellfish bed closures.

MEASURING PROGRESS:

Outputs:

* NHDES and MDEP Shellfish Program Sanitary Survey reports
* NHDES and MDEP Shellfish Program annual reports

Outcomes:

* Continued USFDA certification for commercial shellfish harvesting in NH and ME

Implementation Metrics:

* None

Issues Addressed:

* Bacteria
* Critical Species
* Discharges
* Shellfish
* Water Quality

Leads:

* MDMR
* NH Shellfish Program

Cooperators:

* GBCW
* MDEP
* NextEra Energy
* NHDHHS
* NHFGD
* USFDA

Funding:

* MDMR – Division of Shellfish Management
* NHDES – Healthy Tidal Waters & Shellfish Protection Fund

Critical Guidance:

1US Food & Drug Administration. 2017. National Shellfish Sanitation Program: Guide for the Control of Molluscan Shellfish.

WR-4

Educate and improve outreach to boaters about “No Discharge Area” designations and requirements in NH and ME coastal waters

Moderate

A No Discharge Area (NDA) is a designated body of water where the discharge of treated and untreated boat sewage is prohibited. Unless waters are formally designated as an NDA it is permissible to discharge treated sewage however, under the federal Clean Water Act (CWA) it is still illegal to discharge raw sewage from a vessel in US waters. The No Discharge Areas are approved by the US EPA through an application requesting the federal designation. New Hampshire’s coastal NDA consists of all tidal and estuarine waters, including all bays and rivers to the tidal dams, and all ocean waters within three miles of the New Hampshire shoreline and the Isles of Shoals.

Outreach efforts concerning the NDA continue through the NHDES Clean Vessel Act program, pumpout boat staff, and marina owners. In addition, the US Power Squadron and the US Coast Guard Auxiliary provide non enforcement vessel safety checks at which time they can incorporate information on proper boater sewage disposal.

ACTIVITIES:

* Support outreach to marinas, public landings, and boating facilities about NDA guideline in the Piscataqua Region estuaries.1,2
* Continue use of NH pumpout boats and marina pumpout facilities in both NH and ME waters.
* Continue outreach with the US Power Squadron and USCG Auxiliary on waste discharge as part of safety checks and boater education.
* Reestablish program with NH Marine Patrol and Maine DMR to incorporate “No Discharge” education into outreach materials.

MEASURING PROGRESS:

Outputs:

* Outreach campaign to marinas, public landings, and boating facilities on NDA
* Outreach campaign to US Power Squadron and USCG Auxiliary on NDA
* Outreach campaign to NH Marine Patrol on NDA
* Operation of pumpout facilities in the Piscataqua Region estuaries
* Pumpout facilities and mobile pumpout boat service in the Piscataqua Region estuaries

Outcomes:

* Improved understanding of NDA requirements
* Increased use of sewage pumpout facilities
* Increased use of stationary pumpout facilities and continued use of mobile pumpout service

Implementation Metrics:

* Volume of sewage collected by pumpout boats and dock pumpout facilities in the Piscataqua Region estuaries

Issues Addressed:

* Bacteria
* Discharges
* Nutrients
* Shellfish
* Water Quality

Leads:

* ME Coastal Program
* MDMR
* NH Coastal Program
* NHDES

Cooperators:

* Boaters
* Marine Facilities
* NH Marine Patrol
* US Power Squadron
* USCG Auxiliary

Funding:

* Boaters
* Marinas
* MDEP – Pump Out Program
* NHDES – Clean Vessel Act Program
* USFWS

Critical Guidance:

1New Hampshire Department of Environmental Services - Watershed Management Bureau. 2017. New Hampshire’s Clean Vessel Act Program.

2Maine Department of Environmental Protection. 2019. Pump-out Program.

WR-5

Improve agricultural practices to minimize nutrients, bacteria, and sediment loading

Highest

Across the Region, NRCS and county conservation districts routinely engage in programs to identify and correct agricultural practices that introduce sediments, bacteria, and nutrients into streams, rivers, and wetlands. NRCS now recognizes oyster farmers for USDA programs. In New Hampshire, the New Hampshire Department of Agriculture, Markets, and Food (NHDAMF) publishes a BMP manual for agricultural operations and administers an Agricultural Nutrient Management Grant Program to prevent water quality impairments caused by manure, fertilizer, and compost. Grants also assist with nutrient management education programs. NHDAMF agricultural inspectors respond to complaints and enforcement issues. NHDES Waste Management Division provides solid waste technical assistance for manure management for small farms and is part of the Northeast Recycling Council.

The Maine Department of Agriculture, Conservation, and Forestry (DACF) – Bureau of Agriculture, Food, and Rural Resources has a Natural and Rural Resources Program that houses an Agricultural Compliance Program to respond to complaints and coordinate the use of BMPs on farms, as well as a Nutrient Management Program, authorized by the Nutrient Management Law passed in 1998. This law bans manure spreading between December to March 15 and requires many farms to develop a nutrient management plan. The development and implementation of a plan results in a more efficient use of nutrients on agricultural land, thus reducing nonpoint source pollution associated with agricultural operations and its impact on water quality. Maine farmers can get financial assistance from the Nutrient Management Grant Program and a Loan Program administered by Finance Authority of Maine.

ACTIVITIES:

* Identify and prioritize farms where practices are impacting estuarine resources.
* Develop and implement bacteria, nutrient, and sediment management plans with landowners to improve practices and minimize impacts.1,2,3,4
* Encourage and provide voluntary technical and financial assistance to agricultural producers for corrective action and practice modification.

MEASURING PROGRESS:

Outputs:

* Report on agricultural practices that discharge the most sediments, bacteria, or nutrients
* Inventory of farms where practices are impacting estuarine resources
* Management plans at priority farms to reduce discharges
* Corrective actions at priority farms to reduce discharge

Outcomes:

* Increased understanding of BMPs for farms
* Decreased discharges of sediments, bacteria, and nutrients from farms in the Watershed
* Decreased concentrations of sediments and nutrients due to oyster aquaculture

Implementation Metrics:

* None

Issues Addressed:

* Bacteria
* Nutrients
* Sedimentation
* Water Quality

Leads:

* DACF
* NHDAMF
* NRCS
* RCCD
* SCCD
* YCSWCD

Cooperators:

* Agribusiness
* Local Agricultural Commissions
* MDEP
* NHDES – WMD

Funding:

* Farmers
* Finance Authority of Maine – Nutrient Management Loan Program
* NHDAMF – Nutrient Management Grant Program
* NRCS – Conservation Stewardship Program, Agricultural Management Assistance, & Environmental Quality Incentives Program

Critical Guidance:

1Northeast Recycling Council. 2009. Manure Management Education Information.

2New Hampshire Department of Environmental Services - Watershed Management Bureau. 2017. Solid Waste Technical Assistance Section.

3Agricultural Best Management Practices Task Force & the USDA Natural Resources Conservation Service (NRCS) 2017. Manual of Best Management Practices (BMPs) for Agriculture in New Hampshire.

4Maine Department of Agriculture, Food, & Rural Resources. 2019. Nutrient Management Program.

WR-6

Monitor water quality at tidal beaches for indicators of human and animal wastes and pollution sources

High

The NHDES beaches program and MDEP Healthy Beaches program both sample or coordinate sampling at tidal beaches in the Piscataqua Watershed for enterococci to determine beach safety. NHDES samples 16 coastal beaches during the beach season and MDEP samples three beaches in five locations in Kittery. In the off-season, nonprofit organizations sample water quality at selected surfing beaches. A cooperative program can be established with volunteers to monitor other beaches not currently on the list.

Microbial source tracking has successfully identified potential sources of bacteria and aided in source reduction and will continue to be used for this purpose.

ACTIVITIES:

* Continue monitoring of tidal beaches as part of NHDES and MDEP Beach programs.1,2
* Use monitoring results to assist in illicit discharge identification in accordance with WR-1.
* Coordinate sampling results with watershed organizations to assist with source tracking and optimization of sampling programs.
* Use recommendations from existing watershed management plans to target additional sample collection as needed.

MEASURING PROGRESS:

Outputs:

* Annual reports of monitoring at tidal beaches by NHDES, MDEP, and others
* Compilation of state beach monitoring results to be shared with watershed organizations
* Recommendations for additional monitoring based on watershed management plans

Outcomes:

* Improved understanding of monitoring programs at tidal beaches
* Increased efficiency of tidal beach monitoring

Implementation Metrics:

* None

Issues Addressed:

* Bacteria
* Beaches
* Water Quality

Leads:

* MDEP – Healthy Beaches Program
* NHDES – Beach Inspection Program

Cooperators:

* Blue Ocean Society for Marine Conservation
* ME Stream Teams
* MDMR
* MEVRMP
* Municipalities
* NHDNCR
* NHVRAP
* Surfriders – ME
* Surfriders – NH
* USEPA Beach Program
* Watershed Organizations

Funding:

* MDEP – Healthy Beaches Program
* NHDES – Beach Inspection Program
* USEPA – BEACH Act Funds

Critical Guidance:

1University of Maine Cooperative Extension/Sea Grant, Maine Department of Environmental Protection, Maine municipalities, & US Environmental Protection Agency. 2010. Maine Healthy Beaches Program.

2New Hampshire Department of Environmental Services. 2017. Beach Inspection Program.

WR-7

Develop and implement watershed-based management plans that address pollution in impaired waterbodies

Highest

Pollution issues across the Watershed require targeted planning efforts to help municipalities and managers reduce pollutant loads and meet criteria for clean waters, including efforts needed to remove impaired waters from the 303(d) list. Plans will identify pollutant sources, determine loading reductions needed, and recommend actions to reduce pollutant loads. The results of these plans may also help in identifying other pollutant sources and pathways.

ACTIVITIES:

* Identify pollution sources and severity of pollution in waterways and at tidal beaches. Use modeling and detailed sampling to understand source of contamination to waterbodies and coastal beaches.
* For tidal beach pollution reduction, identify upstream drainage areas and complete bacteria loading studies for all beaches that close due to bacteria pollution.
* Develop and implement bacteria management plans that reduce beach pollution after source identification is complete. These management plans should contain specific recommendations regarding septic systems, pet waste, and other sources depending on the primary cause of the bacteria pollution at the beach.
* Develop research and reports on impaired waters to establish the problem pollutant(s), source(s) of pollutant(s), and BMP's most suitable for addressing the issue(s). Consider use of a TMDL as a tool for addressing pollution in certain waterbodies.
* Assess the strength of our monitoring program for recreational use of waters and recommend improvements if needed.
* Support planning and efforts needed to meet requirements of a general permit for nitrogen loading to the Great Bay Estuary, including PTAP and PRMC.

MEASURING PROGRESS:

Outputs:

* Pollutant studies for waterbodies
* Management plans for addressing pollutant(s) in specific waterbodies
* Bacteria loading studies for tidal beaches that close due to bacteria sources
* Bacteria management plans for tidal beaches
* Corrective actions to reduce pollutant and bacteria loads in waterbodies
* TMDL's or equivalent when needed
* Increased monitoring throughout the Region

Outcomes:

Improved understanding of pollutant loads and bacteria sources in waterbodies

Improved understanding of management actions needed to reduce pollutants and bacteria

Improved water quality in waterbodies and at tidal beaches

Improved monitoring of the Region's waterbodies

Removal of waterbodies from the 303(d) list

Meet regulatory requirements for loading and reduce pollution further when possible

Implementation Metrics:

* Tidal bathing beach postings

Issues Addressed:

* Bacteria
* Beaches
* Pollution Reduction
* Water Quality

Leads:

* MDEP – Healthy Beaches Program
* Municipalities
* NH Coastal Program
* NHDES – Beach Inspection Program

Cooperators:

* MDOC
* PREP
* USEPA
* Watershed Organizations

Funding:

* MDEP – Bureau of Land & Water Quality
* NHDES
* USEPA

WR-8

Research and promote stormwater BMPs that remove nutrients

Highest

Nonpoint source pollution (NPS) is thought to contribute 68% of the nitrogen entering Great Bay. Much of this load is from stormwater. Reducing the volume of stormwater, reducing the nitrogen sources to stormwater (atmospheric deposition, fertilizer, animal and human waste, and trash), and using conveyance and treatment methods that help reduce nitrogen are all important components of a stormwater nutrient reduction program.

Continued research to document existing techniques and practices and development of new practices that maximize nutrient removal is an important component of ongoing nutrient reduction programs.

ACTIVITIES:

* Support research on stormwater management techniques that reduce or remove nitrogen from stormwater.
* Identify stormwater BMPs that most efficiently remove nitrogen.
* Promote adoption of these techniques by municipalities and developers at the state and local level through guidance documents, outreach, and collaborative partnerships.
* Revise BMP’s and other guidance documents as appropriate with new research results.1
* Monitor nitrogen concentrations at selected sites where BMPs are employed and in receiving waters to verify research results and removal efficiency.

MEASURING PROGRESS:

Outputs:

* Research reports on stormwater management techniques that remove nitrogen
* Monitoring results from sites where stormwater management techniques have been installed and in receiving waters
* Outreach campaign for municipal staff and boards and developers on stormwater management techniques that reduce or remove nitrogen from stormwater

Outcomes:

* Improved understanding of stormwater management techniques that remove nitrogen
* Increased use of stormwater management techniques to remove nitrogen
* Decreased nitrogen loading from developed sites
* Improved tracking on long-term trends in NPS nutrient loading

Implementation Metrics:

* Annual load of nitrogen to Great Bay from WWTF and watershed tributaries

Issues Addressed:

* BMPs
* Nutrients
* Stormwater
* Water Quality

Leads:

* MDEP
* NHDES
* UNH-SC

Cooperators:

* Businesses
* Municipalities
* NPDES Permit Holders
* NROC
* PREP
* SWA
* Watershed Organizations

Funding:

* Municipalities
* NPDES Permit Holders
* NROC
* PREP
* Watershed Organizations

Critical Guidance:

1New Hampshire Department of Environmental Services. 2014. New Hampshire Stormwater Manual.

WR-9

Identify and prioritize locations with high stormwater pollutant loads for restoration and retrofit opportunities and implement measures to significantly reduce pollutant loading from source areas

Highest

Assessing stormwater retrofit needs and using BMPs and LID to replace infrastructure will help in long-range planning and measurement of stormwater impacts. Once identified, appropriate corrective actions and stormwater treatment approaches can be implemented. Finally, monitoring the results of corrective action will encourage adaptive management of the stormwater system and provide important data for future corrective actions and retrofits.

ACTIVITIES:

* Utilize existing data collected by state agencies and sources to assist in hotspot analysis, prioritization, restoration, and clean up.
* Conduct a stormwater/combined sewer overflow study in Hampton-Seabrook Estuary to identify pollution point sources.
* Conduct watershed and tributary water quality sampling to further define source areas and to assess the success of retrofit or restoration activity.
* Research the effectiveness and practicality of innovative stormwater treatment technologies and communicate results to developers and communities.
* Identify and secure funding to complete restoration on the identified projects.

MEASURING PROGRESS:

Outputs:

* Research report that prioritizes “hotspots” of stormwater pollution for restoration and retrofit opportunities
* Research report on stormwater management restoration and retrofit techniques
* Database of groundwater quality monitoring data to evaluate nutrient impacts to groundwater
* Outreach campaign to municipal staff and developers on innovative stormwater treatment technologies and resources
* Monitoring results from restored sites

Outcomes:

Improved understanding of priority hotspots of stormwater discharges

Improved understanding of stormwater management restoration and retrofit techniques

Increased use of stormwater management restoration and retrofit techniques

Decreased stormwater discharges of pollutants

Implementation Metrics:

* None

Issues Addressed:

* Stormwater
* Water Quality

Leads:

* MDEP
* NHDES

Cooperators:

* Businesses
* MEVRMP
* MSTP
* Municipalities
* NHVRAP
* PTAP
* SSC
* SWA
* UNH-SC
* Watershed Organizations

Funding:

* MDEP – Bureau of Water Quality
* NHDES – Clean Water State Revolving Loan Fund
* NHDES – Watershed Management Bureau
* NOAA – Coastal Nonpoint Pollution Control Program - Coastal Zone Act Reauthorization Amendments Section 6217
* PREP
* USEPA – Nonpoint Source Management Program – CWA Section 319
* USEPA – Water Pollution Control Program Grants – CWA Section 10

WR-10

Support research to develop a better understanding of nutrient cycling, geochemistry, and nutrient removal in the Piscataqua Watershed

High

Nitrogen cycles through the aquatic and terrestrial environment in multiple forms. Nitrogen from human and animal wastes and fertilizer changes its chemical state due to biogeochemical reactions.

Nitrogen can remain in the terrestrial environment, dissolve and become part of the aquatic environment, or transform to gas and be released into the atmosphere. Understanding the behavior and concentration of nitrogen in soils, streams, rivers, groundwater, and estuaries is essential to controlling excess nitrogen, which ultimately harms estuarine health.

ACTIVITIES:

* Support research on the physical and chemical drivers of nutrient cycling in freshwater and estuarine environments.
* Support research on nitrogen attenuation through watershed and instream processes.
* Support research on the nutrient sources, deposition rates, fate, and transport of atmospheric nitrogen.
* Research the impacts of septic systems on water quality in the estuaries.
* Research the impacts of fertilizers used for agriculture and residential landscaping on water quality in the estuaries.
* Research the sources, fate, and transport of nitrogen in groundwater of the PREP Watershed.
* Study link between water chemistry and phytoplankton type and abundance to growth of oysters and clams.
* Support research on how nitrogen inputs from land are transformed in the water and the resulting effects on estuary health.
* Promote cooperation and collaborative research between state research institutions and among the regulatory community.
* Research and pursue innovative methods for nutrient reduction in Piscataqua estuaries, such as aquaculture of filter feeders and algae production for biofuels.

MEASURING PROGRESS:

Outputs:

* Research reports on nutrient cycling

Outcomes:

* Improved understanding of nutrient cycling in the Watershed
* Improved management decision-making

Implementation Metrics:

* None

Issues Addressed:

* Nutrients
* Water Quality

Leads:

* UME
* UNH

Cooperators:

* Lamprey River Hydrologic Observatory
* MDEP
* NERRS-SC
* NH Water Resources Research Center
* NHDES
* PREP
* USEPA
* USGS

Funding:

* MDEP – Bureau of Land & Water Quality
* NHDES – Watershed Management Bureau
* NOAA – Coastal Nonpoint Pollution Control Program – Coastal Zone Act Reauthorization Amendments Section 6217
* PREP

WR-11

Promote low impact and low nutrient commercial and residential landscaping techniques

High

The Great Bay Nitrogen Point Source Study1 estimates that of the predicted nonpoint source load of nitrogen to the Great Bay Estuary, 15% comes from chemical fertilizers. Fertilizer use on gardens and lawns is the largest component (70%). Fertilizers that are used excessively or applied improperly runs off lawns - rather than being absorbed - wasting money and causing nutrient pollution in our waterbodies. Therefore, continued outreach and education for low impact and low nutrient landscaping techniques should be promoted for all lawns and gardens in the Watershed, especially lawns and gardens in sensitive shoreline areas.

ACTIVITIES:

* Promote low impact landscaping (Landscaping for Water Quality, NH Innovative Land Use Guide, NH Soak Up the Rain) to landscaping contractors, municipal staff, land use boards, and the public through outreach and education.
* Promote training for landscaping contractors for proper use of fertilizers and other landscaping products and practices. Coordinate with de-icing chemical training and certification program.
* Research the types of locations (e.g., shorelands) where application of nitrogen fertilizers is most harmful to aquatic health.
* Implement and support outreach and education efforts in communities to support the proper use of nitrogen fertilizers in sensitive areas.
* Research and identify feasibility and components of regulations regarding nitrogen fertilizers in sensitive areas.
* Promote low impact and low nutrient landscaping techniques in relevant legislative committees.
* Estimate the mass of nitrogen that could be removed from the Estuary if BMPs for landscaping were followed throughout the Watershed.

MEASURING PROGRESS:

Outputs:

* Research report on the most sensitive areas for fertilizer application
* Research report on nitrogen load reductions that could be achieved with low impact landscaping
* Social marketing campaign to public to adopt low impact landscaping practices
* Outreach campaign to municipal departments, staff, and land use boards on landscaping certification programs
* Outreach campaign to legislative committees and land use boards on low impact and low nutrient landscaping techniques

Outcomes:

* Improved understanding of the effects of fertilizers on nitrogen loading
* Improved understanding of low impact landscaping techniques
* Improved understanding of regulatory options to reduce fertilizer use
* Increased use of low impact landscaping techniques
* Reduced nutrient loads to the Estuary

Implementation Metrics:

* Annual load of nitrogen to Great Bay from WWTF and watershed tributaries

Issues Addressed:

* Nutrients
* Stormwater

Leads:

* MDEP
* NHDES
* RPC
* SMPC
* SNHPC
* SRPC

Cooperators:

* Businesses
* Conservation Law Foundation
* GBNERR
* Landscapers
* Lawncare Retailers
* Municipalities
* NH Landscaping Association
* NROC
* PREP
* SWA
* UNH-CE
* WNERR

Funding:

* MDEP – Bureau of Land & Water Quality
* NHDES – Watershed Management Bureau
* USEPA – 320 Funding

Critical Guidance:

1Trowbridge, Wood, Underhill, & Healy. 2014. Great Bay Nitrogen Non-Point Source Study.

WR-12

Provide data and information to improve nutrient removal technology at municipal wastewater treatment facilities in the Piscataqua Region watersheds and support system upgrades and expansions

Highest

Wastewater treatment facilities (WWTFs) represent more than 30% of the total nitrogen load to the Great Bay Estuary. The USEPA is placing nutrient discharge limits on WWTF and other NPDES discharges to reduce nitrogen loading into the Great Bay Estuary. Improved technologies and WWTF upgrades are needed to meet the revised nutrient loading standards. Where feasible, failed septic systems that cannot be remedied with on-site septic technology (See WR-13) should be connected to public sanitary sewer systems. In many areas WWTF upgrades will be required to accommodate new sewer connections.

ACTIVITIES:

* Continue monitoring concentrations of nutrients and other eutrophication parameters in rivers and estuaries to track trends.
* Monitor nutrient loads from WWTFs.
* Support research to determine the appropriate permit limits for WWTFs in the Region.
* Support the addition of nutrient limits to NPDES permits for WWTFs in the Region.
* Research and fund innovative and effective nutrient removal at WWTFs.
* Provide operation and maintenance training to operators to maximize nutrient removal.
* Develop data products which can be used to prioritize WWTF upgrades based on nutrient/bacterial loading.
* Develop data products which can be used to improve biosolids management in the Region.
* Increase funding for public sewer extensions to reduce the number of existing on-site septic systems contributing to water quality problems.
* Incorporate research findings on nitrogen cycling as appropriate (WR-10).

MEASURING PROGRESS:

Outputs:

* Monitoring reports on nutrient concentrations in rivers and the estuary and loads from WWTFs NPDES permits with nutrient discharge limits
* Research reports on nutrient removal technologies for WWTFs
* Training for municipal WWTF operators
* Research reports on WWTF upgrade priorities
* Research reports on biosolids management
* Sewer extension projects

Outcomes:

* Improved understanding of nutrient loads from WWTFs and other sources
* Reduced nutrient loads from WWTFs
* Improved understanding of nutrient removal technologies and operations at WWTFs
* Expanded sewer service areas to reduce septic system loads
* Decreased ecosystem impacts of eutrophication

Implementation Metrics:

* Annual load of nitrogen to Great Bay from WWTF and watershed tributaries

Issues Addressed:

* Bacteria
* Nutrients
* Water Quality
* WWTFs

Leads:

* MDEP
* NHDES
* USEPA

Cooperators:

* NERRS-SC
* PREP
* UME
* UNH
* WWTFs

Funding:

* MDEP – Clean Water State Revolving Loan Fund
* Municipalities
* NHDES – Clean Water State Revolving Loan Fund
* USEPA – Clean Water State Revolving Fund

WR-13

Reduce watershed nutrient loading from septic systems

Highest

Many rural and suburban towns in the Piscataqua Region have on-site septic systems as the primary means of human waste treatment. Some of these systems are failing or operate inefficiently with regard to nutrient removal. Nutrient removal (nitrogen and phosphorus) and attenuation technology for on-site septic systems is available and should be used in new and replacement systems. Additional research to improve on-site septic system designs should continue.

In New Hampshire, the NHDES 319 program funds projects that effectively address nutrient loading from septic systems. The projects include installing permeable reactive barriers, conducting surveys and risk analysis to prioritize compromised septic systems for replacements, and developing cost share programs to promote the installation of replacement technologies. In addition, NPDES Phase II MS4 communities will be addressing septic systems as part of their education and outreach efforts.

In Maine, it is a requirement to inspect septic systems during property transactions in coastal areas. DHHS is updating rules related to septic system inspection standards and inspector training requirements. MDMR also engages in mapping and septic system inspections as part of shoreline survey efforts in some key shellfish watersheds.

ACTIVITIES:

* Research new technologies for on-site septic systems that could be used in the Piscataqua Region Watershed.
* Work with state resource agencies and RPC’s to develop and advocate for more protective septic system requirements for shoreline/riparian systems and wetlands.
* Improve inspection of on-site septic systems by municipal and state officials and strengthen authority for enforcement.
* In sensitive areas consider mandatory inspections by professional inspector to certify septic system operation.
* In areas of closely spaced failed septic systems, require replacement with a community septic system with a licensed operator.
* Develop a financial assistance program (i.e. low interest loans) for qualified homeowners to fund septic system upgrades or replacements.
* Encourage proper care and maintenance of septic systems, including routine inspections and pumping.
* Require inspection and upgrades of septic systems when homes change ownership.

MEASURING PROGRESS:

Outputs:

* Research reports on septic system technologies that remove nutrients
* Advocacy campaign to state regulators and municipal staff and boards to improve septic system regulations associated with shoreline/riparian systems and wetlands
* Research reports on financial assistance programs for qualified homeowners
* Outreach campaign to septic system owners on state septic system maintenance recommendations

Outcomes:

* Improved understanding of septic system technologies
* Improved understanding of regulatory updates for septic systems
* Strengthened septic system regulations for sensitive areas
* Reduced nutrient loads from septic systems
* Improved understanding of septic system maintenance

Implementation Metrics:

* Annual load of nitrogen to Great Bay from WWTF and watershed tributaries
* Concentration of nitrogen and phosphorus in the Great Bay Estuary and tributaries

Issues Addressed:

* Nutrients
* Septic Systems
* Water Quality

Leads:

* MDEP
* MDHHS – Drinking Water Program
* MDMR
* NHDES

Cooperators:

* Conservation Districts
* Homeowners
* Municipalities
* RPC
* SMRPC
* SNHPC
* SRPC
* SWA
* UME
* UNH
* USEPA

Funding:

* MDEP – Bureau of Land & Water Quality
* NERRS – SC Grants
* NHDES – Watershed Management Bureau

WR-14

Support inter-municipal coordination and interstate cooperation to find and implement effective solutions for reducing nutrient or pollutant loads throughout the Great Bay Estuary Watershed

Highest

Individual municipalities and landowners must all work to reduce wastewater and nutrient loading, but a regional approach is required for this regional issue. In New Hampshire, the Great Bay Pollution Tracking and Accounting Project (PTAP) is a regional effort that aims to track and account for pollutant load reductions achieved through various nonpoint source control projects. Additionally, the Southeast Watershed Alliance (SWA) convenes partners to explore regional solutions to wastewater and nutrient control and management.

ACTIVITIES:

* Support and participate in the work of the SWA and the Seacoast Stormwater Coalition (SSC). Use lessons learned from both processes to guide other regional approaches to permitting and water quality issues.
* Facilitate inter-municipal and interstate dialogue and permit coordination through outreach organizations.
* Explore a nitrogen trading program between WWTFs in Maine and New Hampshire and potentially other entities to promote cost-effective nitrogen removal. Coordinate this with other regional nutrient management activities.
* Periodically evaluate and report on the regional nutrient or pollutant reduction activities to all stakeholders.
* Encourage municipal participation in the PTAP for tracking nonpoint source management.

MEASURING PROGRESS:

Outputs:

* Outreach campaign to municipal staff and boards on the benefits of coordinated action to reduce nutrient or pollutant loads on a watershed scale
* Research reports on nutrient reduction activities in the Watershed

Outcomes:

* Improved understanding of intermunicipal cooperation options and benefits
* Improved understanding of nutrient reduction BMPs and effective methods in the Watershed
* Quantification of load reductions achieved through nonpoint source management activities

Implementation Metrics:

* None

Issues Addressed:

* Nutrients
* Water Quality

Leads:

* MDEP
* NHDES
* SSC
* SWA

Cooperators:

* Homeowners
* Local River Advisory Committees
* Municipalities
* NROC
* PREP
* RPC
* SMRPC
* SNHPC
* SRPC
* UNH-SC

Funding:

* MDEP – Bureau of Land & Water Quality
* Municipalities
* NHDES – Watershed Management Bureau
* PREP

WR-15

Improve erosion and sedimentation controls at construction sites in the Piscataqua Region Watershed

High

Development and conversion of land from field and forest to commercial or residential development, damages soil structure, removes ground cover that stabilizes soil and increases the possibility of erosion. Runoff from these sites carries sediment-laden waters to stream, rivers and wetlands. The sediment reduces water clarity, adds silt and sand to bed loads and introduces nitrogen and other chemical constituents previously bound up in the soils.

As the Piscataqua Watershed continues to develop, increasing emphasis on reducing runoff and associated negative impacts from erosion remains an important activity. PREP has initiated a study of existing controls in the Piscataqua Region, status of permit enforcement, barriers to state and local enforcement, and comparisons of successful erosion and sediment programs in other states. This study will enhance understanding and help in developing new approaches to enforcement and sedimentation control.

ACTIVITIES:

* Determine successes and failures of erosion and sediment controls at construction sites in the Region.
* Prioritize problem areas and determine means to address failures.
* Update BMPs as needed.1,2
* Offer training to contractors on rules and regulations, BMPs, and the importance of erosion and sediment control.
* Support enforcement of erosion and sedimentation control at the municipal and regional level. Promote site inspections for development sites as recommended by the NHDES model ordinance.
* Track progress of erosion and sediment control measures at construction sites.

MEASURING PROGRESS:

Outputs:

* Research report on erosion and sedimentation control regulations at the national, state, and local levels
* Outreach campaign for state resource agencies and municipal staff and boards on ways to improve erosion and sedimentation regulation
* Erosion and sedimentation control training for contractors

Outcomes:

* Improved understanding of weaknesses of erosion and sedimentation regulation
* Improved erosion and sedimentation regulations
* Improved compliance with erosion and sedimentation and stormwater regulations
* Increased number of municipalities with adequate site visits
* Reduced erosion and sediment load to rivers, lakes, and estuaries

Implementation Metrics:

* Municipalities require site inspections of development sites for compliance with stormwater/E&S requirements as recommended by the NHDES model ordinance
* Sediment loads from Piscataqua Region watersheds

Issues Addressed:

* Development
* Nutrients
* Sedimentation

Leads:

* MDEP
* NHDES

Cooperators:

* Businesses
* Construction Contractors
* Developers
* MDOT
* Municipalities
* NHDOT
* NROC
* PREP
* UNH-CE
* UNH-SC

Funding:

* MDEP – Bureau of Land & Water Quality
* NHDES – Watershed Management Bureau
* PREP

Critical Guidance:

1New Hampshire Department of Environmental Services. 2014. New Hampshire Stormwater Manual.

2Maine Department of Environmental Protection. 2003. Maine Erosion and Sediment Control BMPs.

WR-16

Research the sources, fate, and transport of sediment in the Great Bay Estuary and Hampton-Seabrook Harbor

High

Monitoring data indicate that estuarine waters might be increasing in terms of suspended sediments. However, it is not clear where the sediments are coming from. Many scientists and managers—for example, the Great Bay Siltation Commission of 2010—have called for a sediment budget that would include sources of sediment, especially hotspots, and areas and rates of deposition.

ACTIVITIES:

* Select representative tributaries and nearshore areas that experience excess sedimentation for sampling and sediment analysis. Determine optimal study period for evaluation.
* Extract sediment cores and evaluate sediment distribution and rate of accumulation. Measure rate of sediment accumulation at each sampling site over the study period.
* Conduct bed load sampling and analysis on several tributaries.
* Conduct fluvial erosion assessments in coastal rivers and streams to identify sediment reduction opportunities, including floodplain access restoration.
* Incorporate recent bathymetric surveys to help with assessing deposition rates.
* Complete evaluation and report on results of sediment analyses.
* Communicate significance of research findings to policy makers.

MEASURING PROGRESS:

Outputs:

* Research report on sediment accumulation rates and sources
* Outreach campaign to policy makers on sediment accumulation rates and sources in Great Bay and Hampton-Seabrook estuaries

Outcomes:

Improved understanding of sediment sources and rates

Implementation Metrics:

* None

Issues Addressed:

* Critical Habitats
* Critical Species
* Development
* Restoration
* Sedimentation

Leads:

* CCOM
* UNH Marine School
* UNH-JEL

Cooperators:

* MDEP
* MDOT
* Municipalities
* NHDES
* NHDOT
* PREP

Funding:

* MDEP – Bureau of Land & Water Quality
* NERRS – SC Grants
* NHDES – Watershed Management Bureau
* NOAA – Coastal Nonpoint Pollution Control Program – Coastal Zone Act Reauthorization Amendments Section 6217

WR-17

Identify sources of toxic contaminants in the coastal watershed

High

Toxic contaminants in Piscataqua estuaries have been sampled in shellfish tissue, sediments, water, and benthic organisms as part of ongoing sampling programs.

Identifying sources of some contaminants could largely be completed through further evaluation of existing data and through modifications to sampling locations and analyses if needed. This knowledge could help with identifying continuing sources, source reduction and cleanup, and reduce toxic chemical buildup in sediments and organisms.

ACTIVITIES:

* Identify toxic contaminants of greatest concern for source identification.
* Use existing data to map contaminant concentrations and trends to determine potential source areas.
* Propose new and modify regular sampling locations, if necessary, to provide additional source delineation.
* Prepare maps and reports describing analysis and results.
* Promote source reduction and cleanup of priority toxic contaminants.
* Communicate significance of maps, data, analysis, and reports to policy makers.

MEASURING PROGRESS:

Outputs:

* Research report on the distribution and potential sources of toxic contaminants
* Outreach campaign for state resource managers on toxic contaminant source reduction and cleanup

Outcomes:

* Improved understanding of sources of toxic contamination
* Improved monitoring design for toxic contaminants
* Reduced toxic contaminant concentrations due to source reduction and cleanup

Implementation Metrics:

* Sediment contamination concentrations relative to NOAA guidelines
* Benthic community impacts due to sediment contamination
* Shellfish tissue concentrations relative to FDA standards
* Trends in shellfish tissue contaminant concentrations

Issues Addressed:

* Sediments
* Toxic Contaminants
* Water Quality

Leads:

* UNH

Cooperators:

* MDEP
* NHDES
* PREP
* USFWS

Funding:

* Gulf of Maine Council
* MDEP – Bureau of Land & Water Quality
* NHDES – Watershed Management Bureau
* NOAA – Center for Coastal Monitoring & Assessment
* USEPA – Water Pollution Control Program Grants – CWA Section 106

WR-18

Promote development and implementation of innovative means to reduce the application of chemical de-icers from surfaces in the Piscataqua Watershed.

High

Road de-icers are generally made up of sand and unrefined salt (NaCl) that impact water quality. Sodium, chloride, and salt impurities can pose health risks while sand increases sedimentation.

Chloride is likely the best indicator of the impact of road de-icing chemicals. Chloride contamination has increased in rivers and streams since the 1940s and is tightly correlated with road and impervious surface density in associated watersheds. Chloride is not assimilated or attenuated in aquatic systems and can accumulate in soils adjacent to treated areas, remaining as a source of runoff contamination. The concentration of chloride in groundwater increases in areas of salt application, leading to more saline groundwater discharge to surface waters. Research suggests that denitrification can be inhibited by increased chloride concentrations. Chloride is toxic to freshwater aquatic species above 230 mg/L and influences aquatic health at lower concentrations. Since chloride is of increasing concern, this parameter or a surrogate (specific conductance) should be tracked in freshwater water quality sampling programs. Improved management of salt during de-icing by municipalities, contractors, and DOT’s will moderate salt increases in waterbodies. Research into other de-icing materials is also needed

ACTIVITIES:

* Continue working with private contractors and DPWs on optimizing application amounts during winter storms. Enforce “reduced salt zones” where designated. Continue to promote reduced salt BMPs.
* Encourage street, parking lot, and roadway sweeping at the end of the winter season to remove excess de-icers.
* Continue outreach to municipalities, homeowners, and business owners on responsible application of chemicals to landscapes and hardscapes.
* Promote a certification program for municipal personnel and private contractors who apply de-icing. Use proceeds from certification to further fund activities.
* Research efficacy and environmental impacts of other de-icing materials with lower chloride content.
* Research the role of chloride in nutrient cycling and denitrification.
* Promote the use of low impact development (LID)and Smart Growth as infrastructure options that require the use of less de-icing agents.
* Track salt use reduction for municipalities.

MEASURING PROGRESS:

Outputs:

* Outreach campaign for municipal staff and boards and NH and ME DOTs on salt application rates and BMPs
* Outreach campaign for public on de-icing options and application
* Outreach campaign for state resource managers on salt applicator certification programs
* Research reports on alternatives to road salt
* Research reports on the effects of chloride on the environment

Outcomes:

* Improved understanding of BMPs for reducing road salt use
* Reduced road salt application rates
* Improved understanding of applicator certification programs
* Improved understanding of road salt alternatives
* Improved understanding of the effects of chloride in the environment

Implementation Metrics:

* Trends in chloride concentrations in watershed streams

Issues Addressed:

* Stormwater
* Water Quality

Leads:

* MDEP
* NHDES
* UNH-SC

Cooperators:

* Businesses
* Lamprey River Hydrologic Observatory
* Landscapers
* Municipalities
* Private Contractors
* Snow & Ice Management Association
* UNH Technology Transfer

Funding:

* MDOT
* Municipalities
* NHDOT – Bureau of the Environment
* Salt Applicators
* USEPA – Nonpoint Source Management Program – CWA Section 319

WR-19

Support the oil spill preparedness and response activities of the Portsmouth Oil Spill Response Workgroup

Moderate

The Portsmouth Oil Spill Response Workgroup (POSRW) works to improve response capabilities, maximize preparedness, and emphasize safe work practices for oil spill response in the New Hampshire and Southern Maine coastal areas by establishing a committee to research and resolve spill response issues and organize spill response exercises and training. Led by the NHDES Bureau of Waste Management, the POSRW has expanded to include a number of cross-sector organizations in planning for and responding to oil spills.

ACTIVITIES:

* Assist with activities of the POSRW as appropriate.
* Participate in oil spill preparedness planning and trainings.
* Educate POSRW on NEP resources as needed, such as providing data from the State of Our Estuaries reports, community engagement, and data dissemination, that could be useful in the event of an oil spill.

MEASURING PROGRESS:

Outputs:

* Training activities
* Exercises

Outcomes:

Improved understanding of oil spill contingency planning

Improvements in oil spill response preparedness

Improved understanding of the ecological resources in the Great Bay Estuary and how to protect them

Implementation Metrics:

* None

Issues Addressed:

* Discharges
* Toxic Contaminants
* Water Quality

Leads:

* MDEP
* NHDES
* POSRW
* USCG

Cooperators:

* Industry Representatives
* Municipalities
* NGO Organizations
* PREP

Funding:

* MDEP – Oil Spill Response Program
* NHDES – Oil Spill Response Program
* NOAA – Emergency Response Program

WR-20

Increase implementation of household hazardous waste and pollution prevention programs in the Piscataqua Region Watershed and include pharmaceutical and personal care product disposal

High

Pharmaceuticals and personal care products (PPCPs) in surface and groundwater can be hazardous to human health and the environment. NHDES coordinates with stakeholders to develop information and tools to help people safely dispose of unused medications. Medical disposal drop boxes are available at law enforcement offices throughout the state and many pharmacies have established drug collection boxes.

A household hazardous waste (HHW) collection program is in place in most Piscataqua communities or is offered regionally. This program is sponsored in part by NHDES or MDEP and by municipalities. It offers guidance on alternatives to hazardous products in households as well as disposal. In New Hampshire, all municipal HHW grant recipients are required to conduct a survey and document materials collected.

In 2009, NHDES began offering a Household Hazardous Waste Special Project Grant Program with the primary goals of reducing the volume or toxicity of household hazardous wastes and creating permanent HHW collection and management infrastructure. Eligible grantees include conservation commissions, solid waste management districts, regional planning commissions, and nonprofit organizations.

ACTIVITIES:

* Evaluate citizen participation in household hazardous waste programs in area towns.
* Support inclusion of pharmaceutical and personal care product disposal as part of the HHW programs.1,2
* Increase outreach to homeowners and foreclosure professionals about pharmaceutical disposal and HHW programs.1,2
* Increase outreach to PPCP retailers on HHW programs.1,2
* Support utilization of NHDES Household Hazardous Waste Special Project Grant Program.

MEASURING PROGRESS:

Outputs:

* Research report on HHW participation rates in PREP watershed towns
* Outreach campaign to state agencies on PPCPs and HHW programs
* Outreach campaign to homeowners and foreclosure professionals on HHW programs
* Outreach campaign to PPCP retailers on HHW programs
* Outreach campaign to eligible grantees on NHDES Household Hazardous Waste Special Project Grant Program

Outcomes:

* Improved understanding of HHW participation rates in towns and BMPs
* Increased capacity for PPCP disposal
* Increased awareness of HHW programs
* Increased use of HHW programs for disposal of HHW and PPCPs

Implementation Metrics:

* Amount of HHW collected in Region towns

Issues Addressed:

* Hazardous Waste
* PPCPs
* Water Quality

Leads:

* MDEP
* Municipalities
* NHDES
* NHDHHS

Cooperators:

* Citizens
* RPC
* SMRPC
* SNHPC
* SRPC
* Departments of Public Works

Funding:

* MDEP – Bureau of Remediation & Waste Management
* Municipalities
* NHDES – Drinking Water & Groundwater Bureau
* NHDES – HHW Program
* NHDES – HHW Special Project Grant Program

Critical Guidance:

1Maine Department of Environmental Protection. 2019. Household Hazardous Waste Information.

2New Hampshire Department of Environmental Services. 2008. Household Hazardous Waste Program.

WR-21

Develop and implement a comprehensive monitoring program for toxic contaminants in the Estuary, surface waters, public drinking water supplies, and wastewater effluent

Moderate

Toxic contaminants can be hazardous to human health and the environment. This includes legacy contaminants such as heavy metals, pesticides, and other organic compounds as well as contaminants of emerging concern (CECs), such as pharmaceuticals and personal care products (PPCPs), microplastics, and per- and polyfluoroalkyl substances (PFAS). Different contaminants enter the Estuary through different means, including via point and nonpoint sources. Monitoring programs should address both loading and concentrations of different contaminants, at front-of-pipe, end-of-pipe, and in the environment. Toxic contaminants monitoring in the Piscataqua Watershed should be guided by the results of recent NH sampling and sampling programs established in other regions of the US.

ACTIVITIES:

* Research accurate and cost-effective monitoring techniques for highest priority contaminants.
* Research objective, risk-based standards for highest priority contaminants in the environment.
* Work with NHDES and MDEP to include high-priority contaminants indicators in WWTF and river monitoring programs.
* Add toxic contaminants monitoring to PREP monitoring program based on WWTF and tributary monitoring results, as needed.
* Track concentrations and loading and report in State of Our Estuaries Reports.
* Communicate significance of data and monitoring program to relevant policy makers.

MEASURING PROGRESS:

Outputs:

* Research report on toxic contaminants monitoring methods
* Research report on risk-based standards for high priority contaminants
* Communication campaign for state resource managers to add high priority contaminants to state monitoring programs
* Data on loading and concentrations of high priority contaminants in environmental media
* Outreach campaign to relevant policy makers on significance of data and monitoring

Outcomes:

Improved understanding of toxic contaminant monitoring methods

Improved understanding of toxic contaminant interpretation methods

Increased data collection for high priority toxic contaminants

Increased understanding of toxic contaminant concentrations and loading in the PREP Watershed

Implementation Metrics:

* None

Issues Addressed:

* Toxic Contaminants
* Water Quality

Leads:

* MDEP
* NHDES
* PREP
* UME
* UNH

Cooperators:

* Municipalities
* Watershed Organizations

Funding:

* MDEP – Bureau of Land & Water Quality
* MDHHS – Drinking Water Program
* NHDES – Drinking Water & Groundwater Bureau
* NHDES – Watershed Management Bureau
* USEPA – Water Quality Cooperative Agreements/Grants – CWA Section 104(b)(3)

WR-22

Identify known point source groundwater contamination sites that threaten surface water quality and aquatic habitat and prioritize for clean up

Moderate

Both NHDES and MDEP maintain databases and GIS layers which identify groundwater contamination from petroleum and hazardous wastes. Cleanup of these sites is coordinated through programs at each department. In order to protect surface water quality and impacts to aquatic ecosystems in the estuaries and tributaries, groundwater contamination sites should be prioritized based on risk of migration to the estuary and toxicity of the contaminant.

ACTIVITIES:

* Query NHDES and MDEP databases to determine what sites have documented discharges to freshwater or estuarine waters.
* Evaluate contaminant levels and contaminants at each identified site and determine relative aquatic impacts using existing data and GIS co-occurrence with wildlife habitat protection, restoration and land protection plans.
* Prioritize sites for further study or cleanup based on evaluations.
* Work with NHDES and MDEP to accelerate cleanup of prioritized sites.

MEASURING PROGRESS:

Outputs:

* Research reports on sites in the Piscataqua Region watersheds with contaminated groundwater
* Outreach campaign for state resource managers on groundwater cleanup projects

Outcomes:

* Improved understanding of priority sites for groundwater cleanup
* Increased rate of groundwater cleanup projects
* Reduced discharges of contaminated groundwater to rivers, lakes, and estuaries

Implementation Metrics:

* None

Issues Addressed:

* Groundwater
* Water Quality

Leads:

* MDEP
* NHDES

Cooperators:

* Land Protection Organizations
* MDIFW
* Municipalities
* NHFGD
* Owners of Contaminated Land

Funding:

* MDEP – Bureau of Remediation & Waste Management
* Municipalities
* NHDES – Waste Management Division
* Owners of Contaminated Land
* USEPA

WR-23

Provide data and information to facilitate watershed-based permitting for NPDES discharges

Moderate

New Hampshire is a non-delegated state for NPDES, which means that permits are issued by USEPA Region 1. NHDES provides relevant data and limits, but USEPA ultimately issues NPDES permits. The USEPA is exploring the use of a total nitrogen (TN) general permit that would cover all New Hampshire facilities in the Great Bay Estuary Watershed.

Continued development of loading data from both point sources and nonpoint sources of pollution are critical, especially since the health of the Watershed is influence by the nutrient inputs. Coordination with existing regional organizations will be important to ensuring effective implementation of a new TN general permit.

Unlike New Hampshire, Maine is delegated for NPDES and issues its own permits. Watershed-based permitting is used in Maine and has been used as the basis for regional water quality actions in the Portland area. Maine will utilize this approach if needed in the Piscataqua Region as well.

ACTIVITIES:

* Develop data products related to watershed-based permitting with participation from regional organizations.
* Build and coordinate support for a USEPA TN general permit from regional organizations.

MEASURING PROGRESS:

Outputs:

* Research reports on watershed-based permitting options and benefits
* Long-term loading data from point and nonpoint sources

Outcomes:

* Increased understanding of watershed-based permitting options and benefits
* Increased understanding of TN throughout the Watershed
* More effective and coordinated permitting process

Implementation Metrics:

* None

Issues Addressed:

* Discharges
* Water Quality

Leads:

* MDEP
* NHDES

Cooperators:

* Municipalities
* SSC
* SWA
* UNH-SC
* USEPA
* Watershed Organizations

Funding:

* MDEP
* NHDES

WR-25

Support municipal implementation of Phase II stormwater requirements for MS4 communities and BMP outreach and education for municipal staff in communities that are not required to comply with Phase II regulations

Highest

MS4 communities are those that are required to maintain a Municipal Separate Storm Sewer System (MS4) General Permit. The permit requires that communities implement the Phase II stormwater regulations. These regulations require communities to implement six minimum control measures:

* Public education and outreach about stormwater quality.
* Public participation and involvement in implementing the stormwater management program.
* Illicit discharge to storm sewers detection and elimination (IDDE).
* Enforcement of erosion and sediment control at construction sites.
* Control of post-construction runoff.
* Pollution prevention and good housekeeping.

Municipalities and watershed organizations will implement measures to meet the MS4 permit requirements. For communities not required to obtain a permit, cooperators will work to implement these measures based on the scale and needs of the community.

ACTIVITIES:

* Track implementation progress of stormwater requirements in MS4 communities.
* Offer technical and financial assistance to communities through UNH-SC, NHDES, and other programs.
* For non-MS4 communities provide outreach, training and technical assistance on IDDE, stormwater BMPs, and LID practices.
* Secure additional grant funding to support stormwater planning at the community level.
* Support the Seacoast Stormwater Coalition (SSC) efforts.

MEASURING PROGRESS:

Outputs:

* Research reports on implementation of MS4 programs by municipalities in the Piscataqua Region
* Outreach campaign for non-MS4 municipal staff and boards on IDDE, stormwater BMPs, and LID practices
* Stormwater planning grants program, if funding is obtained

Outcomes:

* Improved understanding of MS4 implementation and BMPs among communities
* Improved MS4 programs in communities
* Improved stormwater management in non-MS4 communities
* Reduced nonpoint source runoff to rivers, lakes, and estuaries

Implementation Metrics:

* None

Issues Addressed:

* Stormwater
* Water Quality

Leads:

* MDEP
* NHDES

Cooperators:

* Municipalities
* NROC
* PREP
* RPC
* SMRPC
* SNHPC
* SRPC
* SSC
* SWA
* UNH-CE
* UNH-SC

Funding:

* MDEP – Bureau of Land & Water Quality
* NHDES – Watershed Management Bureau
* USEPA – Water Pollution Control Program Grants – CWA Section 106

WR-27

Complete instream flow studies and establish protected instream flow for Piscataqua Watershed designated river reaches in the NH Rivers Management and Protection Program

Highest

NHDES must establish protected instream flows for designated river reaches in the NH Rivers Management and Protection Program. In setting protected instream flows, NHDES considers many factors including the natural flow paradigm of the reach, existing permitted water withdrawals for drinking water or hydropower, and relationships between flow and habitat for aquatic species. In Maine, the Instream Flows and Lake and Pond Water Levels Rule, Chapter 587, establishes river and stream flows and lake and pond levels to protect aquatic life and other designated uses.

ACTIVITIES:

* Promote the completion of protected instream flow studies for all designated river reaches in the NH Rivers Management and Protection Program in the Piscataqua Region Watershed.1,2
* For rivers that are not part of the NH Rivers Management and Protection Program, evaluate water use needs based on the NH Stressed Basins or ME Watersheds at Risk program to identify priority rivers for the NH Rivers Management and Protection Program.
* Promote and assist with the nomination of additional rivers to the NH Rivers Management and Protection Program.
* Support the establishment of protected instream flows for all designated river reaches in the NH Rivers Management and Protection Program in the Piscataqua Region Watershed.

MEASURING PROGRESS:

Outputs:

* Research reports on instream flow and water use needs
* Nominations of river segments to the NH Rivers Management and Protection Program
* Protected instream flows for designated rivers

Outcomes:

Improved understanding of instream flows and water use needs

Increased number of designated rivers

Protection for instream flows in designated rivers

Implementation Metrics:

* None

Issues Addressed:

* Instream Flow
* Water Use

Leads:

* MDEP
* MGS
* NHDES
* NHGS

Cooperators:

* Municipalities
* Permitted Water Users
* USFWS
* Watershed Organizations

Funding:

* NHDES – Watershed Management Bureau
* NOAA
* USEPA

Critical Guidance:

1New Hampshire Department of Environmental Services. 2017. Instream Flow Protection Pilot Program.

2New Hampshire Department of Environmental Services. 2017. Rivers Management and Protection Program.

WR-28

Support the development and implementation of water management plans in subwatersheds to maintain sustainable groundwater and surface water use in the coastal watershed

Highest

Water resources are under increasing pressure due to population increases, increased water use per capita, and changes in temperature and rainfall patterns due to climate change.

Impacts on water resources as a whole are being studied in both NH and ME. The NH Stressed Basins Project being conducted by the New Hampshire Geological Survey develops a water balance index that evaluates total withdrawal to summer streamflow and is being conducted for all geographic units (0.5 square miles) in the State. The Maine Geological Survey is collaborating with USGS on creation of a statewide soil water-balance groundwater recharge model. This model will estimate the amount of water available for groundwater discharge. It may also help evaluate the impact of future climate scenarios on potential groundwater recharge.

Water management plans which estimate surface water needs and evaluate surface water withdrawal limits are being developed by NHDES for designated river reaches on the Soughegan and Lamprey rivers under Env-Wq 1900 in the NH Rivers Management and Protection Program. Plans are also encouraged for source water protection under the NHDES Drinking Water and Groundwater program. A pilot “Consumptive Water Use Capacity Plan” is now being developed by NHDES that jointly assesses surface and groundwater use and sustainability. Coordination of these efforts going forward will protect water resources and maximize resources for protection efforts.

ACTIVITIES:

* Identify priority watersheds for water management plans.1
* Encourage development of water management and water use plans for subwatersheds within the Piscataqua Watershed.
* Encourage integration of water management plans at the state level to maximize efficiency and resources.
* Provide technical assistance on developing water management plans to municipalities and watershed organization through CTAP program.
* Advocate for a coordinated and proactive process for permitting new water withdrawals.
* Coordinate with state programs to assure compatibility of state water management plans with PREP objectives.2

MEASURING PROGRESS:

Outputs:

* Research reports on priority watersheds for water management plans
* CTAP grants to municipalities to develop water management plans
* Water management plans
* Outreach campaign for state resource managers on integrating local water management plans and to achieve PREP objectives
* Advocacy campaign to NHDES and MDEP to create a coordinated and proactive process for permitting new water withdrawals

Outcomes:

Improved understanding on priority watersheds for planning

Increased understanding of planning priorities

Increased number of local water management plans

Coordinated management of water resources at regional and state level

Implementation Metrics:

* None

Issues Addressed:

* Drinking Water
* Instream Flow
* Water Use

Leads:

* MDEP
* NHDES

Cooperators:

* Granite State Rural Water Association
* ME CDC
* ME Rural Water Association
* MGS
* Municipalities
* NHCAW
* NHGS
* NROC
* RPC
* SMRPC
* SNHPC
* SRPC
* UNH-CE
* Water Districts
* Watershed Organizations

Funding:

* MDEP – Bureau of Land & Water Quality
* Municipalities
* NHDES – Watershed Management Bureau
* PREP
* Water Districts

Critical Guidance:

1New Hampshire Geological Survey. 2017. Stressed Basins Project.

2New Hampshire Department of Environmental Services. 2017. Rivers Management and Protection Program.

WR-29

Develop high quality information on the spatial extent of water use for public drinking water systems

Moderate

Credible information on drinking water supplies and use is critical for managing water resources in the Piscataqua Region Watershed. Data on the location of drinking water wells, water withdrawals, water returns, and water transfers is collected by different agencies and programs. This information should be integrated into a geospatial database to provide water resource managers with high quality data on drinking water supplies and use.

Agencies in NH and ME are using GIS and other spatial tools to delineate groundwater and surface water supplies and areas of future water use. In addition, wellhead and source water protection areas are mapped as plans are developed and submitted. In New Hampshire, water withdrawals, returns, and transfers are collected in a separate database which is not linked to the GIS coverages.

Refinement of data collection and mapping that ties water use data to mapped areas would be valuable for water resource planning on a state and local basis.

ACTIVITIES:

* Support programs in NH and ME agencies that develop GIS layers that map water resources and public drinking water supply information.1,2,3
* Support the integration of NH and ME spatial databases through shared metadata (imbedded data information) and data fields.
* Support the integration of water withdrawal data with spatial databases of water resources and drinking water supply information.

MEASURING PROGRESS:

Outputs:

* Integrated spatial databases for water use

Outcomes:

More accurate information for water resource planning

Implementation Metrics:

* None

Issues Addressed:

* Groundwater
* Water Use

Leads:

* ME CDC – Drinking Water Program
* MGS
* NHDES
* NHGS

Cooperators:

* Drinking Water Providers
* GRANIT
* RPC
* SMRPC
* SNHPC
* SRPC
* USGS
* Water Districts

Funding:

* MDHHS – Drinking Water Program
* Municipalities
* NHDES – Drinking Water & Groundwater Bureau
* USEPA – Office of Ground Water & Drinking Water
* Water Districts

Critical Guidance:

1New Hampshire Department of Environmental Services. 2017. Groundwater and Drinking Water Source Protection Program.

2Maine Department of Human Services. 2017. Maine Public Drinking Water Source Water Assessment Program.

3New Hampshire Geological Survey. 2017. Water Well Inventory Program.

WR-30

Establish baseline data and a coordinated monitoring program for groundwater, streamflow, and river geomorphology within the Piscataqua Region Watershed

Moderate

In order to assess water resource needs and flooding potential, accurate hydrologic baseline information is required. Some water level and streamflow data are regularly collected, but a larger network would allow for more accurate predictions and bases for regulations. Specialized information will be needed for protected instream flow studies. Groundwater data will be needed to calibrate and periodically validate a groundwater flow model. River and stream geomorphic assessments have just been initiated on the Exeter River and future assessments area planned.

The baseline hydrologic data must be compiled and reviewed to determine whether the existing monitoring programs are adequate to support future work. Data gaps in the monitoring programs should be identified. Ultimately, a coordinated monitoring program to collect all of the necessary data should be developed.

Evaluation of current data collection and assessment of data needs should be a cooperative effort between federal and state agencies. Engagement of volunteer and research entities in the process will allow for a larger network and best use of limited resources.

ACTIVITIES:

* Assemble existing sources of groundwater, surface water, and geomorphic baseline data.
* Evaluate data needs for groundwater levels, streamflow monitoring, and fluvial geomorphology.
* Prioritize data needs and develop interagency plan for data collection.
* Identify funding sources for data collection programs and advocate for funding from congressional delegation.
* Implement data collection as funding is available. Periodically re-evaluated data needs and redirect funding as needed.

MEASURING PROGRESS:

Outputs:

* Research report on available hydrologic baseline data
* Plan detailing prioritized data collection needs and funding sources
* Data on hydrologic parameters
* Advocacy campaign to congressional delegation to provide federal funding for data collection programs

Outcomes:

* Improved understanding of available hydrologic data and data needs
* Improved understanding of hydrologic processes

Implementation Metrics:

* None

Issues Addressed:

* Flooding
* Groundwater
* Instream Flow
* Stormwater
* Water Use

Leads:

* MDEP
* MGS
* NHDES
* NHGS
* USGS

Cooperators:

* UNH
* Watershed Organizations

Funding:

* FEMA – Pre-Disaster Mitigation Program
* MDEP – Bureau of Land & Water Quality
* MDHHS – Drinking Water Program
* Municipalities
* NHDES – Drinking Water & Groundwater Bureau
* NHDES – Watershed Management Bureau
* USEPA – Office of Ground Water & Drinking Water
* USEPA – Water Pollution Control Program Grants – CWA Section 106
* USEPA – Water Quality Cooperative Agreements/Grants – CWA Section 104(b)(3)
* USGS – Streamflow Monitoring Program
* Water Districts

WR-31

Develop a three-dimensional model of groundwater flow in the Piscataqua Region Watershed

Moderate

Water resource management plans and protected instream flow studies require credible information on water movement and discharges to rivers and estuaries. Surface water movement and discharges are monitored using a network of stream gages and can be modeled using the geospatial tools for the New Hampshire Hydrography Dataset (which covers the whole Piscataqua Region watershed). For groundwater, however, there is little information besides water level monitoring in wells.

The NHGS and USGS worked together to collect data in preparation for the Seacoast Groundwater Availability Study. A groundwater flow model for the smaller seacoast area was developed based on this data compilation. The model simulated flows in overburden and bedrock aquifers and considers changes due to demand from population increases and climate change.

If the model of the smaller seacoast area proves to be a useful tool in understanding more regional water resource issues, a larger model of the Piscataqua Region Watershed should be considered.

ACTIVITIES:

* Evaluate the utility of the existing NH Seacoast Model after it has been available for two to three years.1,2,3
* Support a workshop for NH and ME agencies to develop the conceptual framework for a three-dimensional groundwater model for the Piscataqua Region.
* Gather available data on groundwater levels and flows in the Piscataqua Region watersheds.
* Support integration of groundwater withdrawal data from WR-29 with surface water data from the New Hampshire Hydrography Dataset.
* Support the development of a three-dimensional model of groundwater flow and discharge in the Piscataqua Region Watershed.

MEASURING PROGRESS:

Outputs:

* Research report on utility of existing models
* Workshop to develop the conceptual framework for a three-dimensional groundwater model
* Research report on available groundwater level data in the Piscataqua Region watersheds
* Integrated model of water withdrawals, groundwater flow, and surface water flow networks

Outcomes:

* Improved understanding of changes to existing models
* Improved understanding of available groundwater data
* Improved capacity to model protected instream flows and water management plans

Implementation Metrics:

* None

Issues Addressed:

* Groundwater
* Instream Flow
* Water Use

Leads:

* MGS
* NHGS
* USGS

Cooperators:

* MDEP
* Municipalities
* NHDES
* Water Districts
* Watershed Organizations

Funding:

* MDHHS – Drinking Water Program
* MGS
* Municipalities
* NHDES – Drinking Water & Groundwater Bureau
* NHGS
* USEPA – Office of Ground Water & Drinking Water
* Water Districts

Critical Guidance:

1US Geological Survey. 2009. Groundwater Model: Assessment of Water Resources in the Seacoast Region of New Hampshire by Groundwater-Flow Simulation.

2Horn, Moore, Hayes, & Flanagan. 2008. Methods for and Estimates of 2003 and Projected Water Use in the Seacoast Region, Southeastern New Hampshire.

3Mack. 2009. Assessment of Groundwater Resources in the Seacoast Region of New Hampshire.

WR-32

Update the rainfall model for flood forecasting and stormwater design in the Piscataqua Region Watershed to reflect current rainfall estimates and future estimates under climate change and land use change scenarios

High

Rainfall intensity appears to be increasing based on the repeated flooding in the Piscataqua Region. Climate change projections also predict increased storm activity and intensity in the Northeast Region.

Current stormwater design standards are based on streamflow and rainfall patterns. Rainfall design amounts for the Northeastern US have been updated through the Northeast Regional Climate Center (NRCC) at Cornell University and through the Atlas-14 program at NOAA.

Additionally, state legislation (RSA 483-B:22) requires the New Hampshire Department of Environmental Services (NHDES) to convene a supervisory group to oversee the update of the 2014 State of New Hampshire Science and Technical Advisory Panel (STAP) report every five years. This report, most recently updated in 20191, 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

ACTIVITIES:

* Support updates of rainfall design amounts for the Northeastern US.
* Promote adoption of updated standards by NHDOT and MDOT.
* Promote and support updates to stormwater and infrastructure design guidance on a state and local basis using the revised rainfall estimates.
* Promote research on the role of antecedent conditions - such as soil moisture, snowpack, and frozen ground - to better assess potential of future flooding from extreme participation events.
* Support watershed hydrological modeling.
* Support work to model interactions between storm surge, tides, and freshwater input to Great Bay.

MEASURING PROGRESS:

Outputs:

* Research reports on changes to rainfall design amounts
* Outreach campaign for state resource managers to adopt new rainfall design amounts and revise infrastructure design guidance

Outcomes:

* Improved understanding of expected rainfall frequencies
* Revised infrastructure design standards to accommodate increases streamflow and runoff
* Fewer infrastructure failures due to streamflow and flooding

Implementation Metrics:

* None

Issues Addressed:

* Flooding
* Climate Change
* Stormwater
* Stream Connectivity

Leads:

* ME State Climatologist
* MDOT
* NH State Climate Office
* NHDOT
* NOAA

Cooperators:

* MDEP
* Municipalities
* NHCAW
* NHDES
* Public Engineers
* UNH- SC

Funding:

* FEMA – Pre-Disaster• Mitigation Program & Emergency Management Performance Grant Funds
* Municipalities
* NOAA – National Climatic Data Center
* USGS – Streamflow Monitoring Program
* Water Districts

Critical Guidance:

1Wake, Knott, Lippmann, Stampone, Ballestero, Bjerklie, Burakowski, Glidden, Hosseini-Shakib, & Jacobs. 2019. New Hampshire Coastal Flood Risk Summary – Part I: Science.

WR-33

Assess the geomorphic conditions of all coastal rivers to identify fluvial erosion hazards and encourage the adoption of fluvial erosion hazard ordinances and floodplain protection

Highest

Rivers and streams adjust their shape and flow characteristics based on channel materials, topography and nearby land use. The study of stream patterns and properties is termed fluvial geomorphology. River and stream shapes can be broadly categorized and the tendency for river to change (stability) can be assessed. A river’s shape and stability provide valuable information about flooding potential and extent.

Once the fluvial geomorphology is understood, fluvial erosion hazards can be identified along river segments. The Town of Raymond experienced pronounced flooding on the Lamprey River. It has since evaluated fluvial erosion hazards (FEHs) and identified high hazard areas in close proximity to the Upper Exeter River and Fordway Brook.

The Exeter River also flooded many areas during recent storms and a fluvial geomorphic study has just been completed for this river. FEH zones have been identified. Since increased storm frequency and intensity are predicted with climate change, completion of fluvial geomorphologic and FEH mapping should be a priority for all vulnerable rivers and streams in the Piscataqua Watershed.

ACTIVITIES:

* Promote completion of fluvial geomorphology evaluations and FEH mapping of all rivers in the Piscataqua Watershed.
* Adopt FEH ordinances, regulations, and overlay districts as appropriate based on mapping.
* Include training on fluvial geomorphology, FEH mapping vulnerability, and FEH ordinances in outreach and training.

MEASURING PROGRESS:

Outputs:

* Outreach campaign for state resource managers and municipal staff and boards on FEH mapping
* Research reports on FEH mapping studies
* Local ordinances for FEH zones

Outcomes:

* Improved understanding of FEH methods and regulation
* Delineated FEH zones for local regulation
* Improved land use planning around flood hazard areas
* Fewer impacts from flooding

Implementation Metrics:

* River miles in Piscataqua Region watersheds assessed for fluvial erosion hazards

Issues Addressed:

* Development
* Flooding
* Floodplains

Leads:

* MDEP
* MGS
* NHDES
* NHGS
* RPC
* SMRPC
* SNHPC
* SRPC

Cooperators:

* CTAP
* Environmental Consultants
* Municipalities
* NROC
* UNH-SC
* Watershed Organizations

Funding:

* FEMA – Pre-Disaster Mitigation Program & Emergency Management Performance Grant
* Municipalities

WR-34

Develop a high-resolution digital elevation model and impervious surface data set for the Piscataqua Region Watershed to use for modeling hydrology and land use impacts

High

Hydrologic modeling requires detailed information on topography to predict areas where flooding may occur. A high-quality digital elevation model (DEM) could be used to predict inundation areas during flooding events, stream crossings which are at risk of failure, and geomorphic instabilities in river systems. Investment in high-resolution topography data for the whole Watershed from LiDAR imagery would greatly improve the capacity for hydrologic modeling.

ACTIVITIES:

* Promote investment in LiDAR for the Piscataqua Region Watershed to provide a high-resolution DEM for multiple applications.
* Upgrade impervious surface data with the new DEM.
* Develop a digital elevation model for the Piscataqua Region Watershed using LiDAR data.
* Make data and GIS layers available for public and scientific use through GRANIT.
* Incorporate use of new data in PREP outreach and training.
* Communicate significance of DEM and resulting maps to relevant policy makers.

MEASURING PROGRESS:

Outputs:

* Research reports on LiDAR and DEM data layers
* LiDAR coverage for Piscataqua Region watersheds
* DEM layer for Piscataqua Region watersheds
* DEM layers posted on GRANIT
* Outreach campaign to relevant policy makers on significance of DEM and maps to land use policy

Outcomes:

Improved understanding of methods and options for data layers

Significantly improved hydrologic modeling capabilities

Improved awareness of new data products

Implementation Metrics:

* None

Issues Addressed:

* Development
* Flooding
* Stormwater
* Water Quality

Leads:

* UNH-GRANIT
* USGS

Cooperators:

* MDEP
* MGS
* NHCAW
* NHDES
* NHGS
* PREP
* USFWS

Funding:

* Municipalities
* NERRS – SC Grants
* NOAA – Coastal Services Center

WR-35

Promote adoption of bridge and culvert design guidelines that accommodate aquatic passage, hydrologic connectivity, and increased stormflows due to climate change

Highest

There are thousands of stream crossings in the Piscataqua Region Watershed. Municipalities need information on which crossings are the highest priority for upgrades and what is the best design for new crossings. The New Hampshire and Maine stream crossing design guidelines have been updated to accommodate appropriate design that allows passage of aquatic organisms and stream connectivity, as well as sufficient capacity to prevent catastrophic failures during floods. These stream crossing design guidelines should be periodically updated to reflect new scientific findings on aquatic passage and increased storm frequency and duration due to climate change.

ACTIVITIES:

* Prepare information and outreach materials for distribution on new NH and ME culvert and bridge design standards.
* Work with outreach organizations to promote consistent state and local adoption of these standards.
* Encourage communities to evaluate existing infrastructure and redesign using standards when infrastructure is upgraded. If communities adopt and implement these design standards, FEMA may approve upgrades to failed culverts if a disaster declaration is made.
* Evaluate consistency of current sizing standards with the updated rainfall model.
* Periodically complete resizing guidance based on collected data as needed.
* Update guidelines as needed to reflect new scientific findings.
* Support development of regulatory provisions for tide control devices (e.g., tide gates), including obligations for operations and maintenance as well as mitigation.
* Support development of design standards for culvert replacement.

MEASURING PROGRESS:

Outputs:

* Outreach campaign for municipal staff and boards on culvert and bridge design standards
* Research reports on priority stream crossings for repair or redesign
* Research reports on the effect of increased rainfall design models on culvert and bridge design standards
* Revised culvert and bridge design standards

Outcomes:

* Increased understanding of culvert and bridge design standards
* Increased understanding of priority stream crossings
* Improved culvert and bridge design standards that account for climate change
* Improved culvert and bridge design standards
* Decreased number of stream crossings that do not accommodate aquatic passage, hydrologic connectivity, or increased stormflows

Implementation Metrics:

* None

Issues Addressed:

* Climate Change
* Flooding
* Stormwater

Leads:

* MDEP
* MDIFW
* MDOT
* NH Coastal Program
* NHDES
* NHDOT
* NHFGD
* TNC
* UNH-ERG

Cooperators:

* DPWs
* GBNERR
* Municipalities
* NHCAW
* PREP
* RPC
* SMRPC
* SNHPC
* SRPC
* USFWS
* UNH-CE
* WNERR

Funding:

* FEMA – Pre-Disaster Mitigation Program & Emergency Management Performance Grant funds
* MDOT
* Municipalities
* NH Coastal Program
* NHDOT