Maine Nonpoint Source Management Program Plan 2015 - 2019

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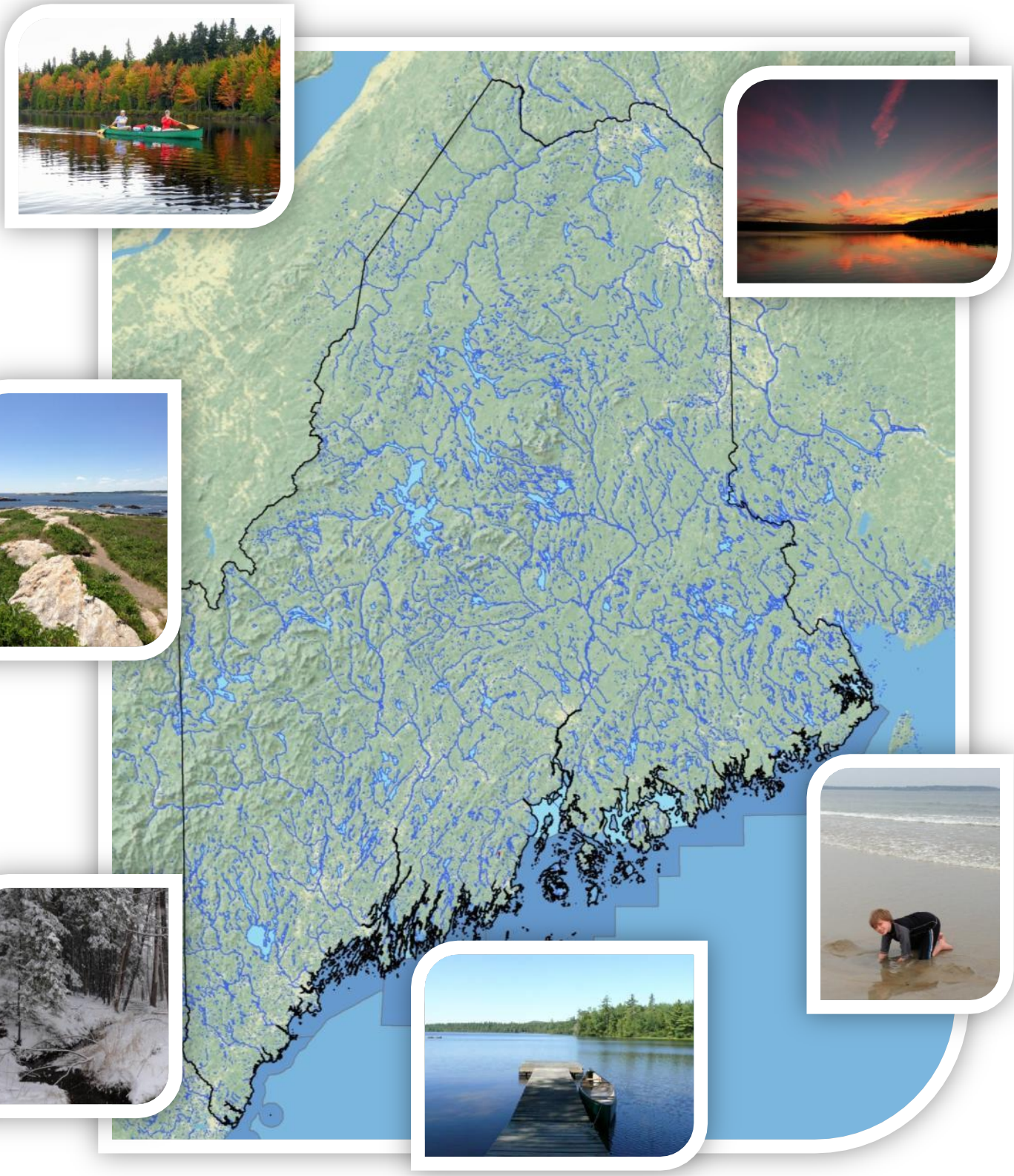


Acronyms Used

Acronym	Definition
ACOE	Army Corps of Engineers
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation
CBEP	Casco Bay Estuary Partnership
CDC	Center for Disease Control
CEO	Code Enforcement Officer
CRP	Conservation Reserve Program
CSO	Combined Sewer Overflow
CWA	Clean Water Act
CWD	Coarse Woody Debris
CWSRF	Clean Water State Revolving Fund
CZARA	Coastal Zone Act Reauthorization Amendments
DACF	Maine Department of Agriculture, Conservation and Forestry
DEP	Maine Department of Environmental Protection
DHHS	Maine Department of Health and Human Services
DMR	Maine Department of Marine Resources
DO	Dissolved oxygen
MaineDOT	Maine Department of Transportation
EGAD	Environmental and Geographic Analysis Database
EQIP	Environmental Quality Incentives Program
ESC	Erosion and Sediment Control
EPA	Environmental Protection Agency
FAME	Finance Authority of Maine
FERC	Federal Energy Regulatory Commission
FSA	Farm Service Agency, USDA
GRTS	Grant Reporting and Tracking System
IC	Impervious Cover
IR	Integrated Report
LOP	Livestock Operation Permit
MCBMP	Maine Clean Boatyards and Marinas Program
MDWP	Maine Drinking Water Program
MFS	Maine Forest Service
MHB	Maine Healthy Beaches
MLS	Maine Lakes Society
MMA	Maine Municipal Association
MMBB	Maine Municipal Bond Bank
MMTA	Maine Marine Trades Association
MNRCP	Maine Natural Resource Conservation Program

MOA	Memorandum of Agreement
MTA	Maine Turnpike Authority
MRS	Maine Revised Statutes
MS4	Municipal Separate Storm Sewer System
MSGP	Multisector Stormwater General Permit
MSZA	Mandatory Shoreland Zoning Act
NEMO	Nonpoint Education for Municipal Officials
NMP	Nutrient Management Plan
NOAA	National Oceanic and Atmospheric Administration
NPS	Nonpoint Source
NPSTRC	Nonpoint Source Training and Resource Center
NRPA	Natural Resources Protection Act
NRCS	Natural Resource Conservation Service, USDA
NWQI	National Water Quality Initiative
PPA	Performance Partnership Agreement
PREP	Piscataqua Region Estuaries Partnership
SFI	Sustainable Forestry Initiative
SIC	State Implementation Committee
SSI	Sustainability Solutions Initiative
SSWD	Subsurface Wastewater Disposal
SWAT	Surface Water Ambient Toxics
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
USDA	United State Department of Agriculture
VLMP	Maine Volunteer Lakes Monitoring Program
VRMP	Volunteer River Monitoring Program
WBP	Watershed-based Plan
WHIP	Wildlife Habitat Incentives Program
WRF	Water Resources Forester
YCC	Youth Conservation Corps

I. Introduction

Nonpoint source pollution (NPS) has a major impact on Maine's lakes, rivers, streams and marine waters. Unlike pollution from point sources, such as industrial and sewage treatment plants, NPS pollution comes from many diffuse sources. It is caused by rainfall or snowmelt moving over and through the ground and picking up natural and human-made pollutants, such as fertilizer, road salt, sediment, oil and bacteria, along the way. Eventually these contaminants end up in waterbodies, where they can threaten drinking water supplies, cause nuisance algal blooms, diminish recreational activities, and endanger aquatic life and habitat.

The Maine Department of Environmental Protection (DEP) coordinates the State of Maine Nonpoint Source Pollution Program (38 MRS 410) to restore and protect waters impaired and threatened[1] by nonpoint source pollution. In this NPS Program Plan, DEP establishes the overall strategy that Maine will use over the next five years (2015-2019) to control and prevent NPS pollution to the state's waters. The Plan identifies:

- Programs, strategies and resources state agencies use to address Maine's most pressing NPS water pollution control problems;
- DEP's approach to strategically focus watershed protection and restoration work in NPS Priority watersheds;
- Funding opportunities and partnerships critical to protecting and improving Maine's lakes, streams, rivers, and marine waters; and
- Five-year objectives, actions and milestones to make progress achieving the long-term goals of Maine's NPS management program.

The U.S. Environmental Protection Agency (EPA) requires states to have an updated NPS Management Plan in place to qualify for federal Section 319 grant awards under the Clean Water Act. In 2013, EPA issued 319 program guidelines describing key components to be included in an effective state NPS management program. Appendix 1 summarizes how these key elements have been incorporated into Maine's Plan.

[1] The use of the term, 'threatened', in this document refers to unimpaired waters that are subject to potential impacts from NPS pollution. The term is not intended to be used as described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

II. Maine NPS Program Mission, Goals and Guiding Principles

Maine's NPS Program is guided by the following mission, goals and guiding principles. Section X of this Plan lists objectives, actions and milestones that will be used to achieve program goals to address Maine's priority NPS problems.

Maine's NPS Program Mission:

Maine's lead NPS agencies (Department of Environmental Protection, Department of Agriculture, Conservation and Forestry, Department of Transportation, Department of Health and Human Services) administer programs to help prevent, control, or abate water pollution caused by nonpoint sources so that waters attain or exceed their classification standards and beneficial uses of water resources are maintained or restored.

Long-term Goals

The long term goals of Maine's NPS program are:

- **Restoration of Waters** - To restore waterbodies that are impaired by nonpoint sources so that they meet water quality standards.
- **Protection of Waters** - To prevent NPS-related impairments of unimpaired water bodies.

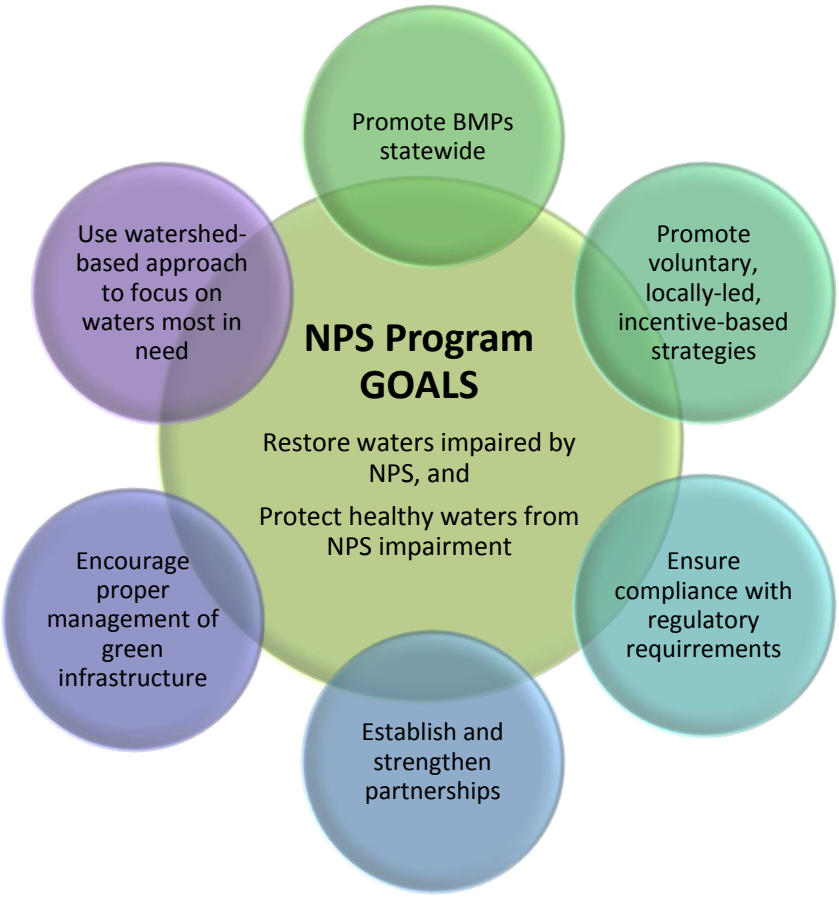
Guiding Principles

Maine's lead NPS agencies will use the following six guiding principles to help implement strategies to achieve NPS management program goals and objectives (Figure 1):

1. Promote the use of state-agency defined "best management practice guidelines" (BMPs) throughout the entire state to control nonpoint sources;
2. Promote voluntary, locally-led, incentive-based strategies to address NPS issues
3. Ensure informed compliance with applicable regulatory requirements;
4. Establish and strengthen partnerships among stakeholders at local, state, and federal levels in the management of NPS pollution sources;
5. Encourage proper management of wetlands, riparian corridors, floodplains, natural areas, and other green infrastructure resources in urban and rural watersheds to help restore or maintain healthy watersheds; and

6. Use a watershed-based management approach as a coordinating framework to organize public and private sector efforts to identify, prioritize, and implement activities to address NPS problems to restore NPS impaired waters or protect waters threatened by NPS pollution.

Figure 1. Maine's NPS Program Goals and Guiding Principles.



III. Maine NPS Management Program Framework

As Maine's lead water quality agency, DEP is responsible for developing and implementing water quality protection and improvement programs required under state and federal laws. DEP manages both regulatory and voluntary programs and collaborates with local, state, and federal agencies to plan and implement strategies to protect Maine's water quality. The following section summarizes key State and Federal laws that guide Maine's NPS program and Maine's overall approach to controlling NPS pollution.

A. Key State and Federal Laws

Three laws helped prompt the establishment and formalization of Maine's NPS program. These laws provide ongoing structure and guidance for the program and identify the agencies involved in program implementation.

Maine's NPS Pollution Program Statute

In 1991, Maine's Nonpoint Source Pollution Program was codified under State statute (38 M.R.S. Chapter 3, Subchapter 1, Article 1-F). The statute directs State agencies to promote the use of State agency-defined "best management practice guidelines" (BMPs) to prevent or reduce water pollution from nonpoint sources. DEP administers the State of Maine NPS program and coordinates their efforts with other state agencies. Under Maine's statute, DEP, the Department of Agriculture, Conservation, and Forestry (DACF), and the Department of Transportation (MaineDOT) are responsible for developing and promoting the use of BMPs in order to reduce and prevent NPS pollution from their associated pollution categories: Development (DEP); Transportation (MaineDOT); Agriculture (DACF) and Forestry (DACF).

Section 319 of the Federal Clean Water Act

Congress enacted Section 319 of the Clean Water Act in 1987 and thereby established a national program to control nonpoint sources of water pollution. Funding appropriated under §319 can be used to implement state NPS programs including, as appropriate, non-regulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer, and demonstration projects to achieve implementation of best management practices and to meet water quality goals. EPA provides grants to states, tribes, and territories to implement programs that control and prevent nonpoint source pollution to waters. To be eligible for §319 funding, states must implement updated NPS Management Programs and follow other program guidelines (EPA, 2013).

Section 6217 of the Federal Coastal Zone Act Reauthorization Amendments (CZARA)

EPA and the National Oceanic and Atmospheric Administration (NOAA) jointly administer a program that establishes management measures designed to control runoff from six main sources: forestry, agriculture, urban areas, marinas, hydrologic modification and riparian areas. These measures are backed by enforceable state policies and actions ("state authorities") that will ensure implementation of the program. All coastal and Great Lakes states and territories

that participate in the Coastal Zone Management Program are required to develop coastal NPS control programs. In 2003 EPA and NOAA jointly approved the Maine Coastal NPS Pollution Control Program, which implements management measures in the whole state including the coastal zone.

B. Statewide and Watershed-based Approaches

Maine's NPS program uses a combination of statewide programs and targeted watershed projects to achieve its long term goals of restoring and protecting waters.

Statewide Approach

Maine's statewide approach targets six major categories of NPS pollution identified in the state. These NPS pollution categories include developed areas, agriculture, transportation, forestry, onsite wastewater disposal systems and hydrologic modification. The State's lead NPS agencies and other cooperating agencies and partners implement an array of regulatory and non-regulatory programs to control pollution from these major NPS categories.

Regulatory programs (e.g., permitting, compliance assistance and enforcement) are administered under several core State of Maine environmental laws including but not limited to the Storm Water Management Law; the Site Location of Development Law; the Erosion and Sedimentation Control Law; the Natural Resources Protection Act (NRPA); the Mandatory Shoreland Zoning Act; the Subsurface Wastewater Disposal Rules; Pesticide Control laws; the Nutrient Management Act; and the Forest Practices Act. These laws limit specific activities (e.g., soil disturbance, timber cutting and pesticide application) and require the use of BMPs to limit pollution transport to waterbodies. A number of these laws, including the Stormwater Management Law and NRPA, also provide enforceable policies of the Maine Coastal Program and are applicable to federal agency actions under the CZMA's consistency provision. Section VII in the Plan outlines how these core state environmental laws may apply to various NPS categories.

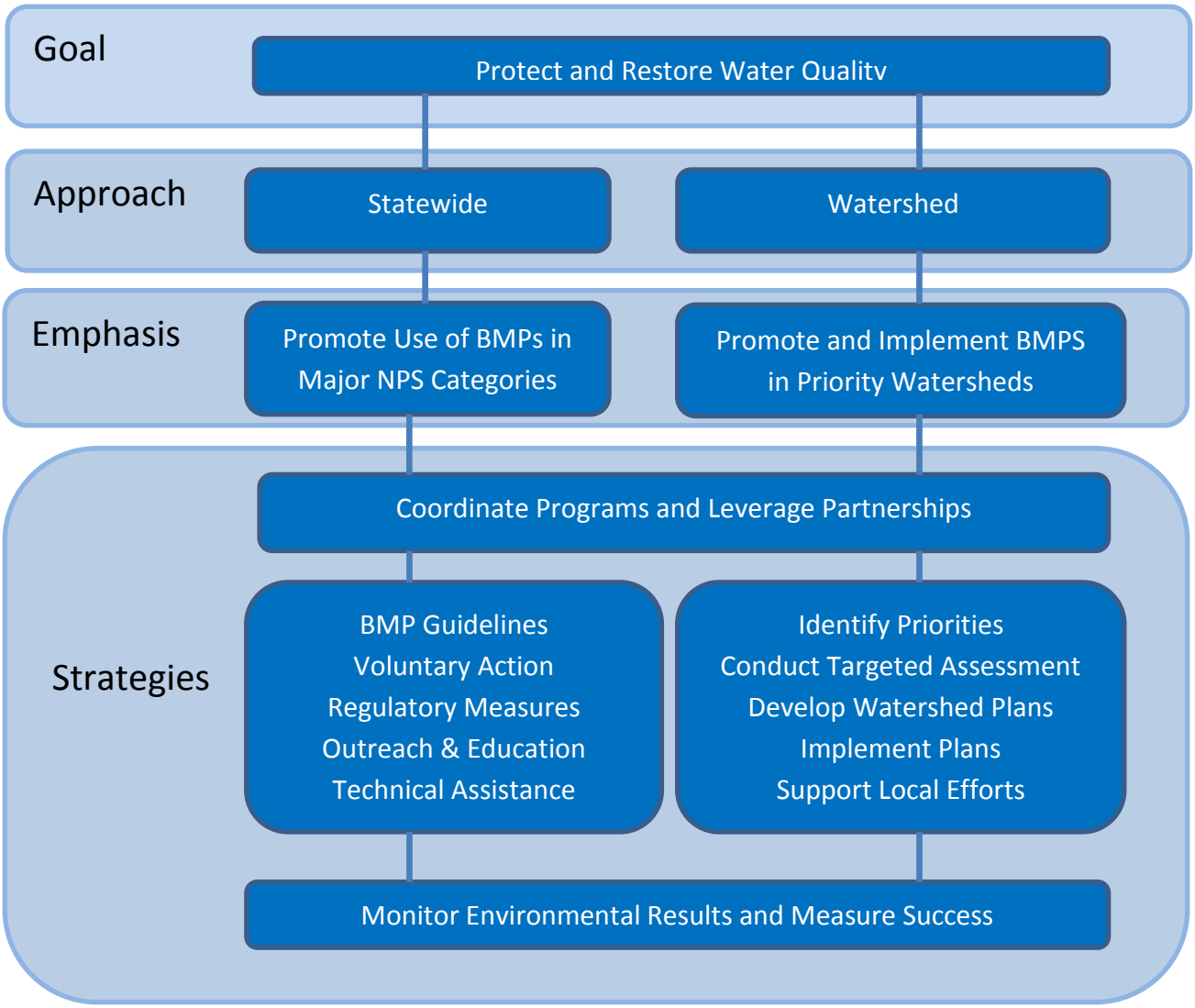
NPS pollution is oftentimes not adequately addressed by existing laws. As such, efforts to encourage more widespread voluntary use of BMPs are a vital component of Maine's NPS Program. Non-regulatory programs often involve providing technical assistance, BMP training, and outreach to municipalities, individuals, businesses, and non-governmental organizations. Recognition programs and demonstration projects are also used to recognize individuals and businesses and highlight projects that implement BMPs to prevent or reduce NPS pollution.

Watershed-based Approach

In addition to statewide programs, Maine also uses a targeted watershed approach to restore and protect waters. Through a priority-setting process, DEP first identifies watersheds that are most in need of improved NPS control efforts and where there is considerable opportunity to make substantial progress restoring or protecting a waterbody. Projects in these NPS Priority Watersheds typically follow four steps as they move towards the restoration or protection goals. Steps include conducting targeted assessment and stressor analysis; developing locally-

supported watershed-based management plans; implementing watershed-based plans; and measuring success and environmental results. Refer to Section VI for a description of Maine's watershed approach.

Figure 2. Statewide and Watershed Approaches - Maine NPS Management Program.



Partnerships and Integration with Other Programs

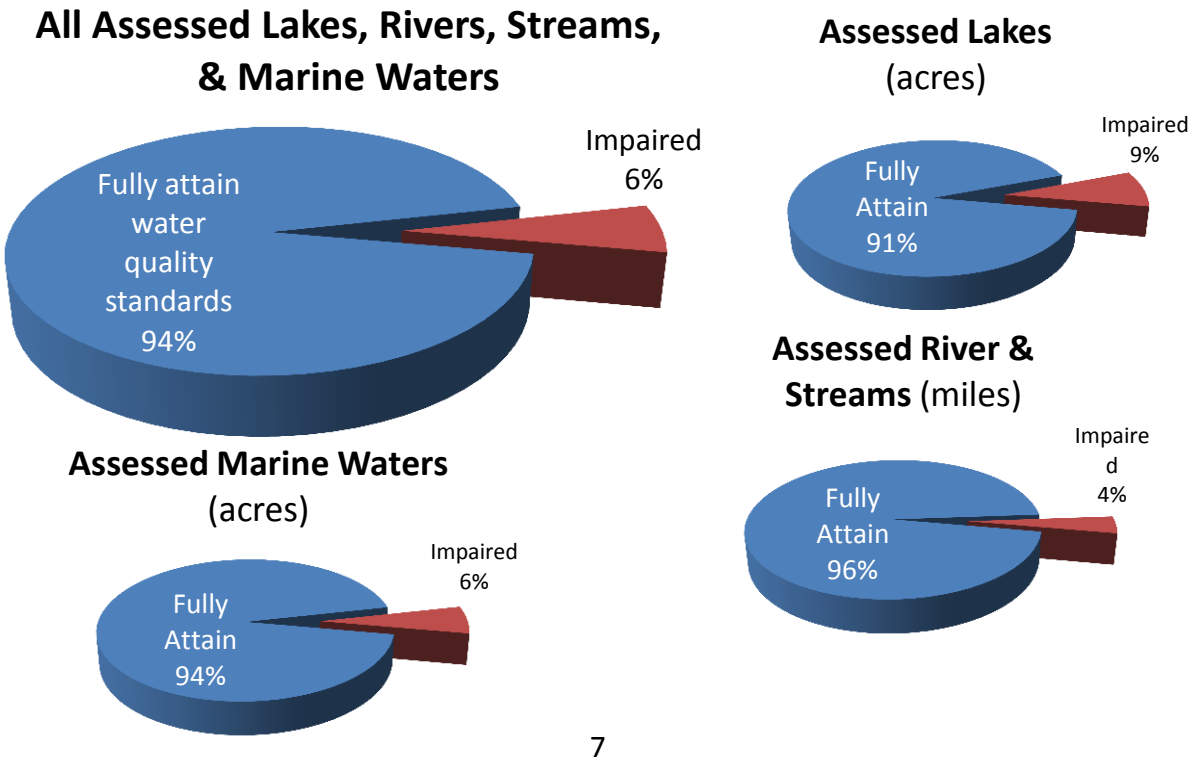
Success of the NPS program depends on maintaining existing and forging new partnerships with state, interstate, tribal, regional and local entities; private sector groups; citizens groups; and federal agencies. These partners and their affiliated programs have goals that align or overlap with the goals of the NPS Program, thus providing mutual benefits. Partnerships strengthen the program by attracting new ideas and input, increasing understanding of NPS problems, and building commitment to implementing solutions. Maine's lead NPS agencies use a variety of formal and informal means to develop and maintain these partnerships. Refer to Section VIII for information about partnerships.

C. Restoring Impaired Waters and Protecting Unimpaired Waters Threatened by NPS

This plan outlines approaches to both restore the relatively small number of waters impaired by NPS pollution and protect the many unimpaired waters threatened by NPS pollution. Maine's 2012 Integrated Report (IR) indicates that state's waters are very clean with 96% of assessed river and stream miles, 94% of marine waters and 91% of lake acres fully attaining water quality standards (Figure 3). Correspondingly, only 4% of assessed river and stream miles, 6% of marine waters and 9% of lake acres were listed as impaired. That said, many of Maine's clean waters that attain standards are threatened due to NPS sources. For example, 24 lakes (3.7% of lake acres) are impaired due to nutrients, but 215 lakes (11% of lake acres) are threatened, primarily by nutrients, by existing developed areas and projected growth rates in their watersheds. These 215 lakes are designated "Most at Risk" under Maine's Storm Water Law.

Given the relatively high proportion of unimpaired waters and relatively low number of impaired waters in Maine, DEP prioritizes and balances the use of available NPS resources to protect and restore lakes, streams and marine waters. Prevention of water pollution is a daunting challenge for watersheds facing increased development pressures. Since prevention is far more feasible and less expensive than restoration of an already impaired waterbody, DEP allocates significant program resources for projects that help communities protect waters considered threatened or most at risk. The NPS Priority Watersheds list (Appendix 2) identifies impaired waters and unimpaired waters threatened by NPS pollution.

Figure 3. Health of Maine's Assessed Waters (Maine DEP, 2012 Integrated Report).



IV. Maine's Water Resources

Maine is the largest state in New England with a total surface area of over 35,000 square miles (Table 1). The state has an abundance of fresh water resources with the larger surface waters occupying nearly 4,500 square miles (Table 2). Maine's 5,780 lakes and ponds cover 986,952 acres, an area larger than the State of Rhode Island. There are over 7,000 perennial brooks, streams, and rivers that extend nearly 55,000 miles. Fresh and saltwater wetlands cover an additional 5,196 square miles. Groundwater is considered plentiful with three basic types of aquifers (stratified drift deposits, till, and fractured bedrock). Stratified drift deposits, which provide large-volume water supply wells cover about 10% of the state, and bedrock aquifers underlie the entire state. Maine's coastline is 2,757 miles long. There is a total area 2,846 square miles of marine waters out to the "three mile" limit, including near shore waters and tidal rivers.

Figure 4. Maine's Landscape (Maine DEP, 2012).

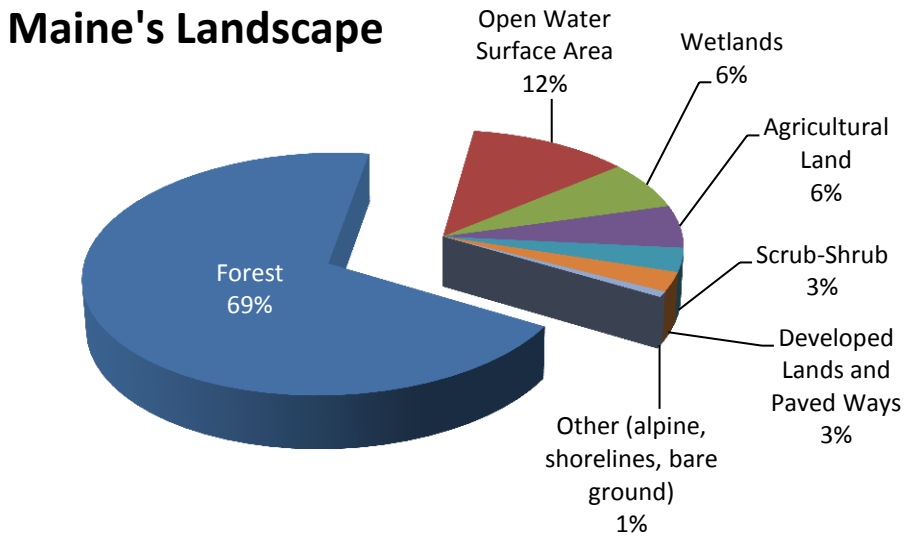


Table 1. Maine's Population and Land Area (Maine DEP, 2012).

State of Maine Basics		
State Population (2010 National Census data)	1,328,361	people
Rural population	552,638	people
Urban population	775,723	people
Land Area	35,236	sq miles

Table 2. Maine's Waters (Maine DEP, 2012).

Maine's Waters		
Lakes, Ponds, and Reservoirs	1,542	sq miles
Number of lakes, ponds, and reservoirs*	5,780	
Lakes greater than 10 acres	1,502	sq miles
Number of lakes greater than 10 acres	2,690	
Rivers and Streams	54,995	miles
Perennial streams	30,894	miles
Intermittent streams	16,375	miles
Rivers	7,726	miles
Coastline (including shorelines of tidal rivers and islands)	2,757	miles
Bays, estuaries, and harbors	2,717	sq miles
Tidal rivers	129	sq miles
Wetlands	5,196	sq miles
Saltwater wetlands	381	sq miles
Freshwater wetlands	4,815	sq miles
Sand and Gravel Aquifers	1,281	sq miles

A. Summary of Waters Impaired by NPS Pollution

Maine's 2012 Integrated Report (IR) lists lakes, rivers, streams and marine waters impaired by point and/or nonpoint pollution sources. The cause of impairment is variable and site specific. All freshwaters in Maine are under a fish consumption advisory due to impairment caused by atmospheric deposition of mercury. Atmospheric deposition is the largest single source of mercury pollution. All marine waters are impaired for polychlorinated biphenyls (PCBs) and dioxins and fall under a statewide lobster tomalley consumption advisory. Also, bacterial contamination is a significant cause of impairment, affecting 159 square miles of marine waters (not including CSO affected waters).

The relative importance of pollution sources in different types of impaired waters varies considerably. Only one lake is impaired by a point source (Figure 5). Most lakes are affected by a mix of rural residential development, agriculture, internal recycling and urban stormwater. In streams, industrial point source discharges, unknown sources and NPS are of almost equal importance, each affecting approximately 400 river miles, and general agricultural NPS sources affect 358 miles (Figure 6). Municipal point source discharges, combined sewer overflows,

overboard discharges and NPS are the primary sources causing impairment s of marine waters (Figure 7). NPS contributes to bacterial impairments of marine waters.

Figure 5. Total Sizes of Impaired Maine Lakes by Source Category (Maine DEP, 2012).[2]

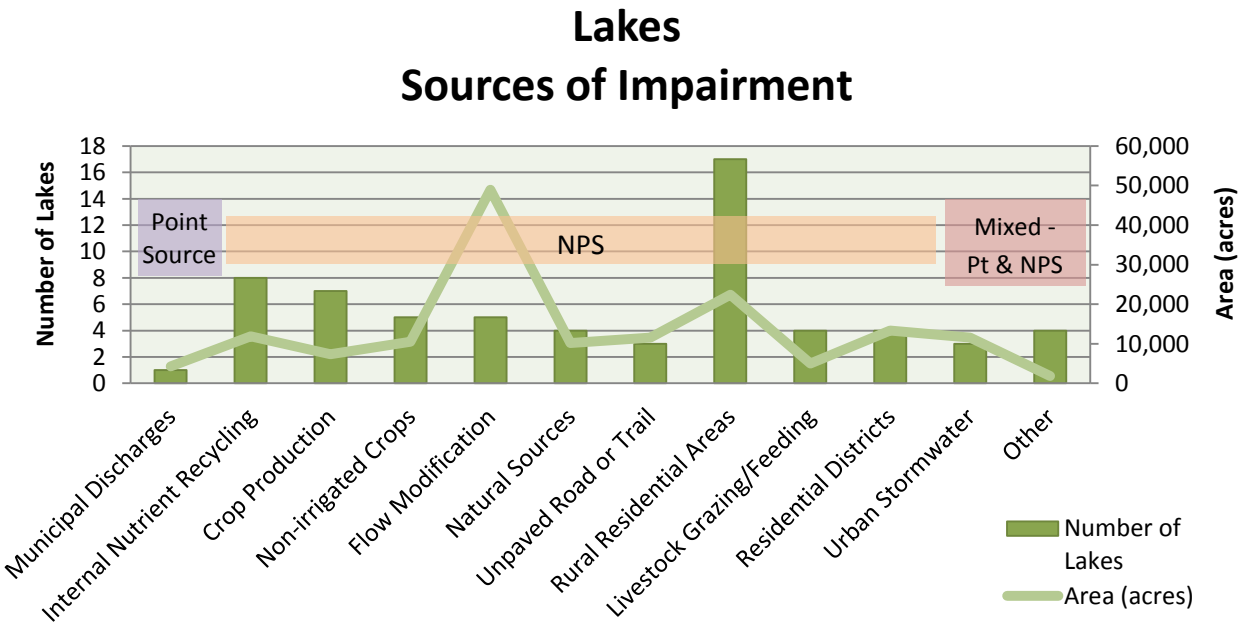


Figure 6. Total Sizes of Impaired Rivers and Streams by Source Category (Maine DEP, 2012).[2]

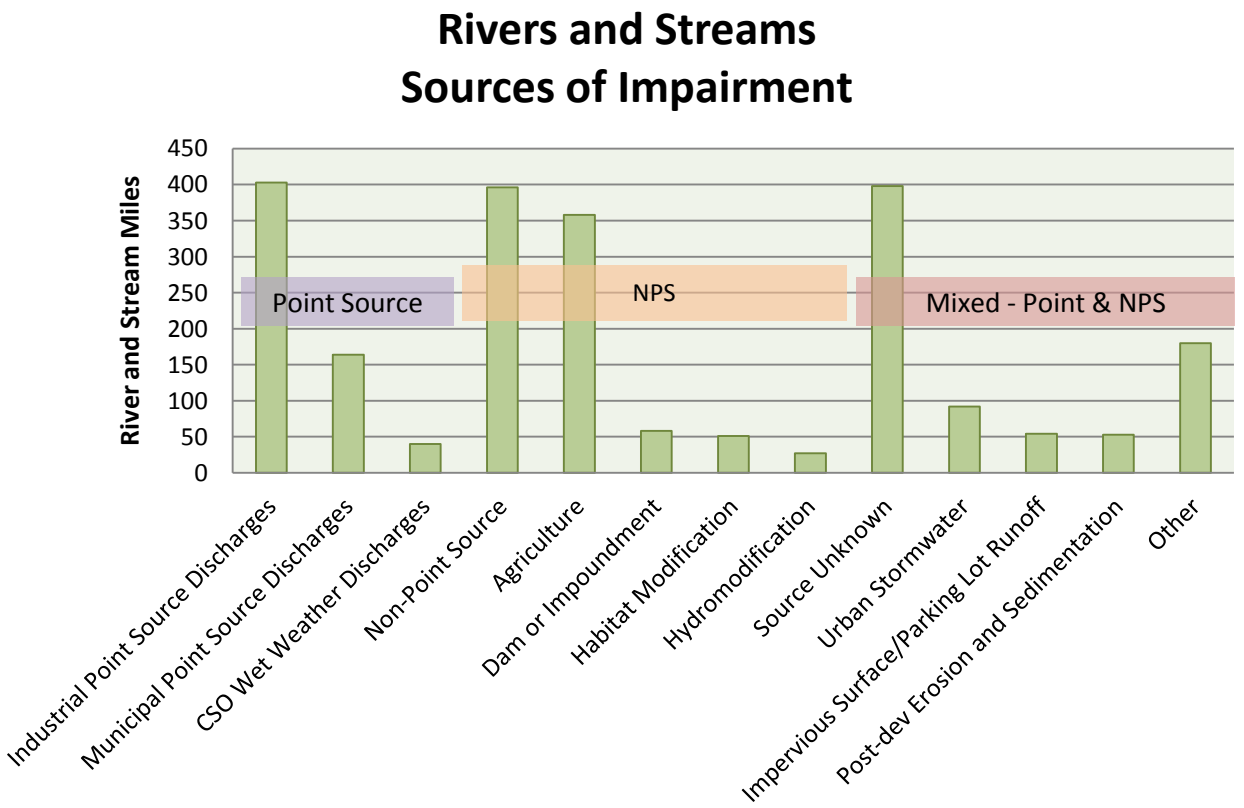
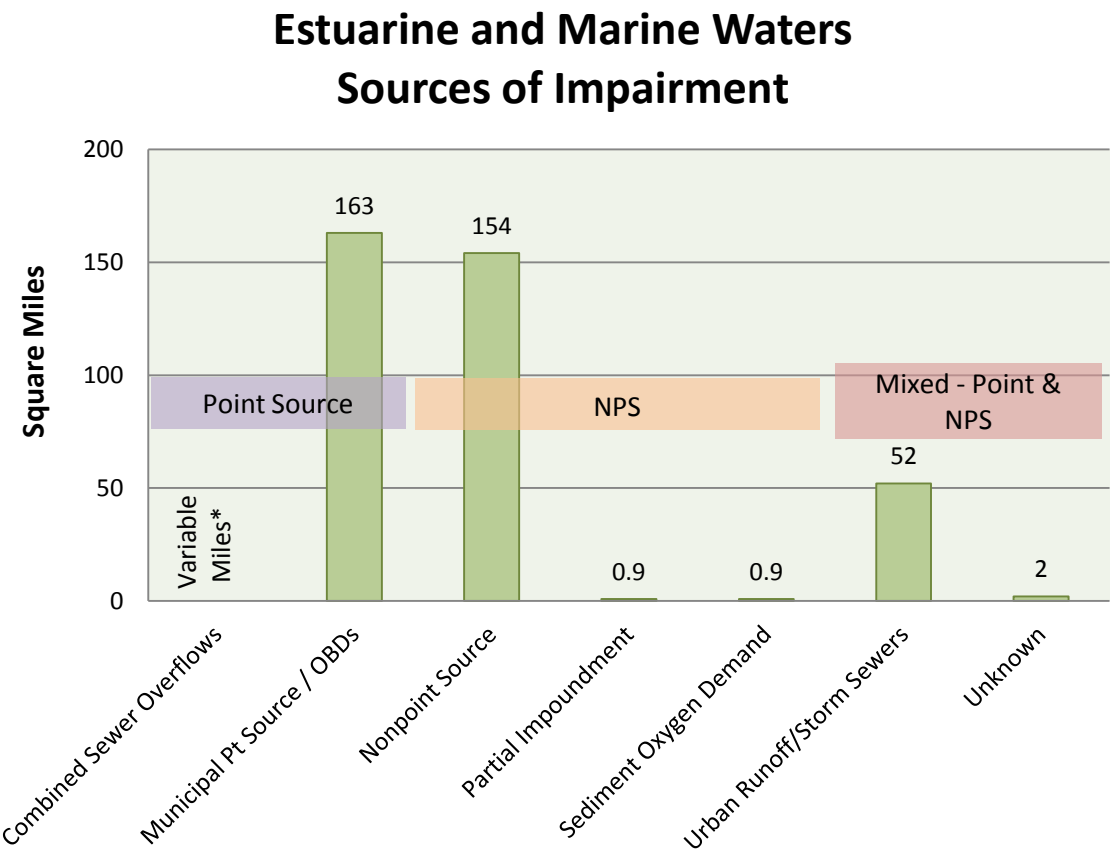


Figure 7. Total Sizes of Impaired Maine Estuarine and Marine Waters by Source Category (Maine DEP, 2012).[2]



*Variable miles from combined sewer overflows (CSO). As of 2012, there were 32 CSO communities with a total of 159 CSO discharge points.

B. Water Quality Standards and Classification

The quality of Maine's waters is described in terms of physical, chemical, and biological characteristics associated with the state's water classification program. As established in Maine statute (38 M.R.S. Sections 464-470), the classification program consists of three components: designated uses (e.g. drinking water supply, recreation in and on the water, habitat for fish and other aquatic life); criteria (e.g. bacteria, dissolved oxygen and biological criteria); and an anti-degradation statement (e.g. natural, free flowing) that specify levels of water quality necessary to maintain the designated uses.

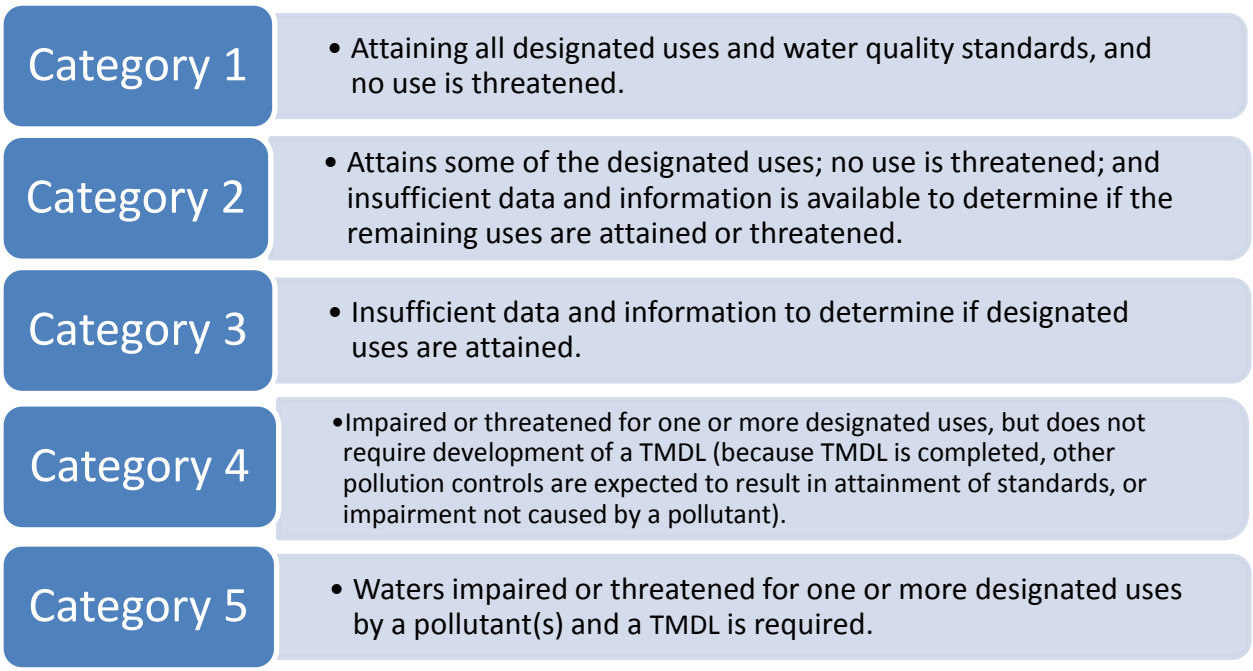
[2]The square miles, miles, or acreage attributed to causes and sources in these figures may be listed more than once if a waterbody is subjected to several different types of disturbance. For example if a waterbody has both agricultural and NPS sources of impairment, the impaired acreage or miles will be listed in both the Agriculture and NPS categories. For more information on source categories, see the Maine Integrated Report.

All State waters have a classification assignment (Lakes: GPA. Rivers and streams: AA, A, B, C. Marine and estuarine: SA, SB, SC). Wetlands are classified the same as their associated surface waters. Wetlands that are part of great ponds or natural lakes and ponds less than 10 acres in size are GPA waters. All freshwater wetlands not classified as GPA waters are class AA, A, B or C under Sections 467 and 468 according to the watershed in which they occur. Coastal wetlands are classified SA, SB or SC according to the provisions of Section 469 (Classification of Estuarine and Marine Waters).

Groundwater is classified by its suitability for drinking water purposes. Under the Maine Water Classification Program Section 465-B, groundwater is classified as either potable (GW-A) or unpotable (GW-B). Water is unpotable when the concentrations of chemical compounds detected exceed either the Maximum Contaminant Levels (MCL) or the Maximum Exposure Guidelines (MEG) as defined in the Rules Relating to Drinking Water administered by the Maine Department of Health and Human Services (DHHS). Although there are localities where groundwater is unpotable and contaminated, no groundwater is currently classified GW-B.

The DEP is responsible for overall assessment of the State's waters. With support from partners, DEP biennially produces the Integrated Water Monitoring and Assessment Report that fulfills Clean Water Act reporting requirements under Section 305(b), Section 303(d) (list of impaired waters) and Section 314 (Clean Lakes Report). This report provides a summary of the current status of the State's waters and identifies impaired waters that are not meeting one or more of their designated uses. The Integrated Report lists waters in one of five categories of attainment (Figure 8).

Figure 8. Maine's Water Quality Categories of Attainment (Maine DEP, 2012).



For more information, go to http:\\www.maine.gov\dep\water\monitoring\305b\index.htm.

C. TMDL Assessment Reports and TMDL Implementation

DEP monitors the water quality conditions of Maine's rivers, lakes, and marine waters to determine if they meet designated uses for recreation, swimming, fishing, shellfish harvesting, and drinking water supply, and if the waters support healthy habitats for fish and wildlife. DEP places degraded waters (i.e. not attaining water quality standards needed to support designated uses) on the list of impaired waters, or the Section 303(d) list. A Total Maximum Daily Load (TMDL) assessment is required for nonattainment waters under state and federal water quality laws to determine the reductions needed from point and nonpoint pollution sources to meet standards. The fundamental goal of a TMDL assessment is to establish water pollution control targets and recommend actions needed for planning and implementation work.

Communities, agencies, and individuals are invited to provide input on the development of TMDLs. After TMDL assessments are completed, local stakeholders often consult TMDLs as they take action to apply conservation practices (BMPs) to eliminate or reduce NPS pollution sources. DEP's staff involved with TMDLs provides limited technical assistance to assist communities to further scope out and identify problems.

Stormwater runoff from both point and nonpoint sources have long been recognized as a significant source of pollutants to surface waters. Historically, individual programs have been developed to address specific aspects of stormwater control. One such aspect is TMDL development. TMDLs typically cover one pollutant at a time and do not take into account the other various programs that may impact stormwater runoff. While there may be several programs focusing on a specific location/waterbody, often coordination of activities is limited.

DEP will improve coordination of all stormwater related programs to make progress restoring waters impaired by point or nonpoint sources through a Watershed Improvement Process (WIP). The WIP is designed to involve and coordinate all programmatic aspects of the DEP that deal with stormwater. Examples of these are the MS4 permitting program, watershed assessments, Site Law requirements (Chap 500), SRF loans, 319 grants, etc. Further, the scope of the WIP is designed to involve other agencies/organizations that have stormwater impacts as well, such as MaineDOT, MTA, DACF, DMR, SWCDs, and NRCS.

DEP will apply the watershed-based approach, described in Section IV, when it is appropriate to help ensure effective coordination of stormwater runoff control activities to restore impaired waters.

V. Statewide Watershed Prioritization

Given Maine's extensive water resources, statewide watershed prioritization is an important part of Maine's NPS program. Maine's first NPS priority watersheds list was developed in 1989 and substantially revised in 1998. The list was updated as part of development of this NPS management plan. NPS impaired or threatened [3]waters with significant regional or statewide value were placed on the list. The list was developed to help prioritize DEP NPS water pollution control efforts and attract local communities to take action to restore or protect waters impaired or threatened by NPS pollution. DEP plans to review and update the NPS Priority Watersheds list on a regular basis, and changes are anticipated as prioritization criteria are refined (e.g., EPA Recovery Potential Screening Tool for streams) and new evaluation techniques (e.g., aluminum content in lake sediment) become available.

In addition to this listing process, DEP staff also conducts an annual review of NPS priority watersheds and identifies a small subset of highest priority waters. This annual review helps DEP direct NPS program funds and services to address compelling needs and opportunities to make progress restoring or protecting waters. Selection criteria and some of the tools available for targeted actions are described later in this section.

A. NPS Priority Watersheds List

The purpose of the NPS priority watersheds list is to encourage NPS abatement work in watersheds most vulnerable to NPS pollution. The list is used to help prioritize DEP NPS water pollution control efforts and attract local communities to take action to restore or protect waters impaired or threatened by NPS pollution. The 1998 NPS priority watersheds list was updated as part of development of this NPS plan. Watersheds were evaluated using several guiding principles. The first principle was NPS priority waters must have NPS pollution as the primary source of impairment or threat. Watersheds with point sources or legacy pollutants as the primary source of pollution were not selected as priorities since the point source or legacy pollutant would have to be addressed for water quality to significantly improve. Second, watersheds were evaluated for the likelihood that NPS grant funds and support could make a difference in the water quality. Third, the number of NPS priority watersheds was kept reasonably focused so that resources can be invested where they are most needed and there is opportunity to effectively restore or protect waters vulnerable to NPS pollution.

Prioritization criteria were developed to make selections as objective as possible, using monitoring data, analysis, and reports. To determine the waterbody-specific prioritization criteria, work groups consisting of DEP water resource professional staff knowledgeable in

[3] The use of the term, 'threatened', in this document refers to unimpaired waters that are subject to potential impacts from NPS pollution. The term is not intended to be used as described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

statewide lake, stream, or marine water quality and management issues reviewed available waterbody data and information. Priority lists and knowledge from partner agencies and regional monitoring organizations were consulted. Waterbody-specific prioritization criteria are summarized below and described in detail in Appendix 2.

In addition to the NPS Priority Watersheds List, there are several other lists that help guide MDEP efforts and regulatory programs. This includes impaired waters, waters with approved TMDLs, Chapter 502 Lakes Most at Risk from New Development, and Urban Impaired Streams. These lists were used to help develop prioritization criteria for NPS Priority Watersheds List.

Lake Watersheds

Algal bloom on impaired lake.

Impaired lakes were assessed as to whether reducing nonpoint sources would be likely to improve water quality over the long term. Lakes meeting water quality standards were assessed on threats to water quality and value of the resource. Threatened lakes included lakes with a significant negative trend in water clarity, sensitivity to additional phosphorus inputs, or recent increased threat to the watershed by development or agriculture. Lakes on the DEP Watch List were also considered threatened[4]. High value lakes included public drinking water supplies, designated priorities by a partner agency, or lakes with outstanding water quality in need of protection. Over 2600 lakes were considered in the evaluation process. **Twenty-one impaired lakes and 147 unimpaired lakes were selected for inclusion on the priority list.**

Stream Watersheds

Stream with turbid water.

A NPS impaired stream watershed was added to the priority list if it had a TMDL, was identified as a priority watershed by a partner agency or organization, or was assessed as having a high risk of future development due to its proximity to a highway exit. An unimpaired stream watershed was added to the priority list if it met any of the criteria listed for the priority impaired streams, if it was on the DEP Watch List, or if recent increased impacts or significant potential threats from agriculture or

[4] The use of the term, 'threatened', in this document refers to unimpaired waters that are subject to potential impacts from NPS pollution. The term is not intended to be used as described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

development were evident. **Seventy one (71) impaired streams and 77 threatened streams were placed on the priority list.**

Marine Watersheds

Impaired and threatened marine waters were assessed by the same criteria. A watershed was added to the priority list if likely NPS sources were known and tied to shellfish harvest area closures. Watersheds were also added to the priority list if partner organizations had documented water quality indicators linked to NPS pollution, or if the waters were threatened by local agriculture, streams, or development that drains to public beaches or protected embayments. Additions to the marine priority list are anticipated as more information becomes available. **Eleven impaired marine waters and 16 threatened marine waters were included on the priority list.**

B. DEP Targeted Watersheds

DEP conducts an annual evaluation that assigns elevated priority to a small subset of waters on the NPS Priority Watersheds List. DEP then identifies ways to focus staff or financial resources on restoration or protection efforts in these watersheds.

Criteria used to select DEP's targeted watersheds include those used to generate the NPS Priority Watersheds List as well as more strategic factors. Targeted watersheds have typically included impaired waters that DEP sees as having a high restoration potential based on water quality monitoring data and watershed needs. Targeted efforts also capitalize on strong local interest and support, leverage other available funding sources, jump-start new watershed efforts, prompt continued momentum on established projects and/or protect against an imminent NPS threat.

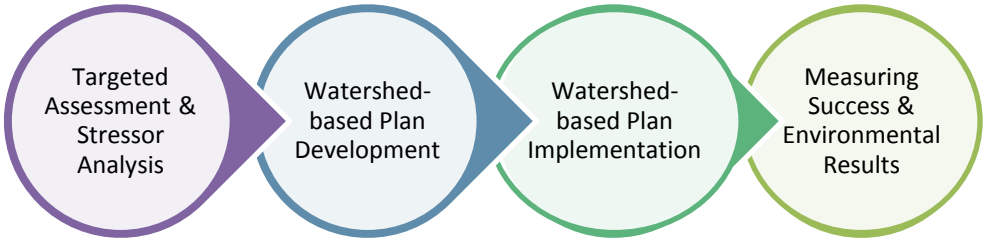
After a subset of priority waters is established, DEP considers and select appropriate tools, such as, NPS grants or staff services to prompt and complete additional protection or restoration work in these targeted watersheds. DEP may use a request for proposals (RFP) process to provide grants for projects in targeted watersheds. In addition, DEP may provide extra staff support in targeted watersheds. For example, DEP staff can conduct water quality monitoring and stormwater catchment mapping in an urban impaired stream to supplement an upcoming watershed-based planning effort in a targeted watershed. This investment of staff time leads to a better understanding of watershed stressors and needs and sets the stage for more effective watershed restoration efforts.

This internal prioritization process has been used on an informal basis for many years. DEP has provided direct-funding and conducted water quality monitoring and catchment mapping in numerous watersheds. Moving ahead, DEP will conduct the evaluation and provide a list of the targeted watersheds to EPA and partners.

VI. Maine Watershed-based Approach

The watershed-based approach is a coordinating framework for identifying, prioritizing, and fixing water quality problems. This approach seeks to organize both public and private sector efforts within a specified geographic area. The watershed-based approach allows the DEP to focus resources on the waterbodies and watersheds most in need and to follow a systematic approach to meet water quality goals. There are four steps to this approach:

Figure 9. Maine DEP's Watershed-based Approach Steps.



- **Targeted Assessment and Stressor Analysis** - Once DEP or local groups focus attention on a priority water, it is critical to gather the information necessary to accurately characterize the NPS impairments and/or threats. Water quality monitoring, watershed surveys and other watershed information should be evaluated to determine the principal stressors and NPS sources that contribute to the impairment or threat.

- **Watershed-based Plan Development** – Stakeholders produce a locally-supported watershed-based plan (WBP) that describes actions needed for NPS mitigation and water quality protection or restoration. To be eligible for Section 319 funding, plans must include specific elements required by EPA and DEP.

- **Watershed-based Plan Implementation** - Plan implementation is usually coordinated by a local entity such as a municipality, Soil and Water Conservation District, or a local watershed group. Implementation usually involves a number of phased projects and is typically funded by a mix of grants and local sources.

- **Measuring Success and Monitoring Environmental Results -** In addition to implementing the NPS pollution reduction measures identified in the plan, implementation will include ongoing or periodic evaluation to assess whether the plan is meeting its goals and objectives.

Abbreviated Watershed Approaches

Local BMP implementation - planting a rain garden.

Some watershed restoration and protection efforts may not incorporate all of the steps outlined in this section. There is usually some element of assessment involved, but the planning process may be largely skipped, often because solutions are straight-forward and local groups plan to implement BMPs independently. Some examples follow:

- The source identification and fixes required to address a localized bacteria impairment may be quite simple, and elimination of the impairment may be accomplished without the development of a plan. Simply bringing the problem to the attention of the local sewer district or code enforcement officer would likely result in fixing the problem.
- Lake watershed surveys are often done informally and funded locally. They provide information to guide local efforts to address sources.
- BMP implementation work is also often done without formal planning. Municipalities may use local revenues or mitigation funds to address obvious pollutant sources. Locally supported Youth Conservation Corps (YCC) often provide the labor to implement BMPs in lake watersheds. Sometimes this is part of watershed based plan implementation, but often it proceeds independently due to local interest in water quality protection.

YCC at work.

A. Targeted Assessment and Stressor Analysis

The success of restoration and protection efforts hinges on understanding the principal environmental stressors connected to the water quality impairment or potential impairment and the watershed conditions associated with those stressors. The types and extent of assessment and stressor identification needed for a given watershed varies depending on the type of waterbody and available existing information. See Appendix 4 for more detailed information about this step.

For most lakes on the NPS Priority Watersheds list, there is a long record of water quality data and an understanding that phosphorus loading is the primary environmental stressor. As a result, this step primarily involves identifying phosphorus sources to the lake and opportunities to reduce these sources. Watershed surveys are the most commonly used tools used to meet these needs. Over 120 surveys have been completed over the past 20 years, and the methodology is documented in the DEP's *Citizen's Guide to Volunteer Lake Watershed Surveys* (2012). During a watershed survey, DEP and other partners train local volunteers to document

phosphorus sources (primarily in the form of soil erosion problems), develop recommendations to mitigate the sources, and rate the cost and priority of the sites. The resulting survey report and prioritized list of watershed problems can then be used to develop watershed-based plans and guide implementation efforts.

Environmental stressors are often more challenging to identify in stream watersheds. This is particularly true in urban streams where there can be several stressors, and they can change throughout the stream network. Stressors in a stream could include chloride, stream channel alterations, nutrient loading, legacy pollutants, poor instream habitat, riparian buffer disturbance and flow problems. Once the stressor(s) are pinpointed, specific sources must then be identified to help mitigate the impacts of the stressors. Targeted assessment usually includes a combination of water quality screening, biological assessments, stream habitat and corridor assessments and watershed assessments.

Bacteria are often the primary concern and stressor in marine waters. However, identification of bacteria sources is often quite challenging. There are several tools available to identify and prioritize potential bacteria sources including water quality monitoring, DMR sanitary surveys, smoke and dye testing, and canine detection of human bacteria sources.

B. Watershed-based Plan Development

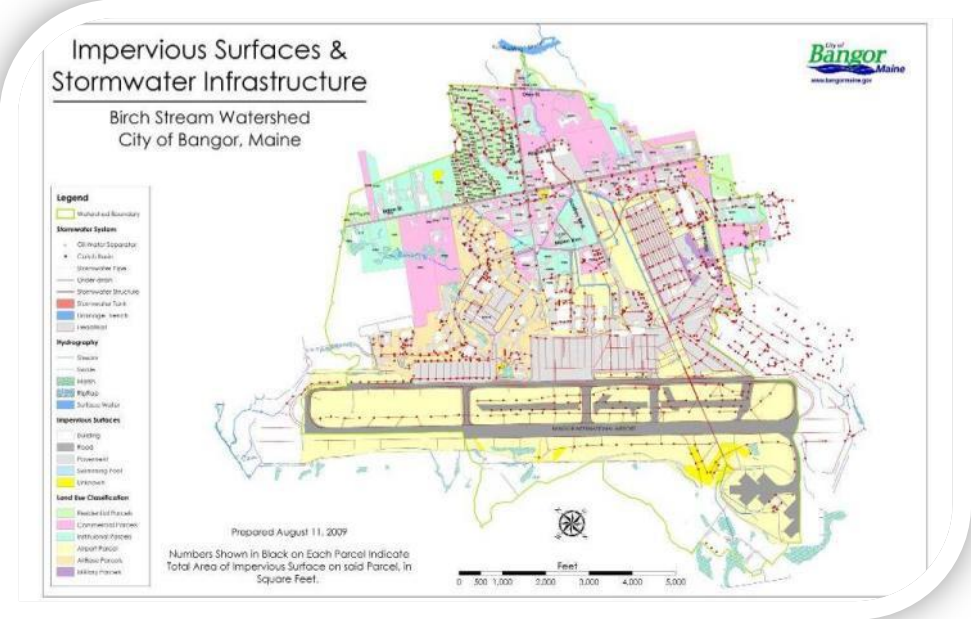
Effective planning is needed to guide successful watershed restoration and protection efforts. In general, a watershed plan describes actions needed to restore a waterbody that is impaired by NPS pollution or to protect unimpaired waters threatened by NPS pollution. An effective plan identifies and prioritizes the structural and non-structural practices necessary to address the environmental stressors and sources of NPS pollution that contribute to or threaten impairment of the water body. It identifies stakeholders and partners who can work on projects; pollutant reduction goals; cost estimates and strategies for funding plan implementation; and ways to measure results and water quality improvements.

Key Components of Successful Plans

Plans should be developed for a geographically-appropriate scale so that the planned implementation efforts can lead to measurable reductions in pollution and the achievement of water quality goals. Plans should reference an area large enough to address all the major sources and causes of impairments and threats to the water body of concern. However, the area should not be so large that chances of successful implementation are not feasible or practical. Several parts of the planning process are particularly important in development of effective watershed-based plans.

- **Stakeholder Involvement -** There will be little support for implementation of a watershed based plan if the planning process does not include as many of those individuals and organizations that will have a role in plan implementation as possible. Every effort should be made to involve key landowners, municipal officials, representatives from relevant state

agencies (e.g. Transportation, Agriculture), local resource and conservation groups, and local experts (e.g. engineering consultants, planners, realtors). An effective way to enhance involvement is by recruiting these people for the planning project steering committee and, in watersheds with complex issues, for the subcommittees (e.g. technical advisory, education and outreach, ordinance development) where most of the decisions are made. Strong local participation leads to local buy-in, which is essential for successful plan implementation.



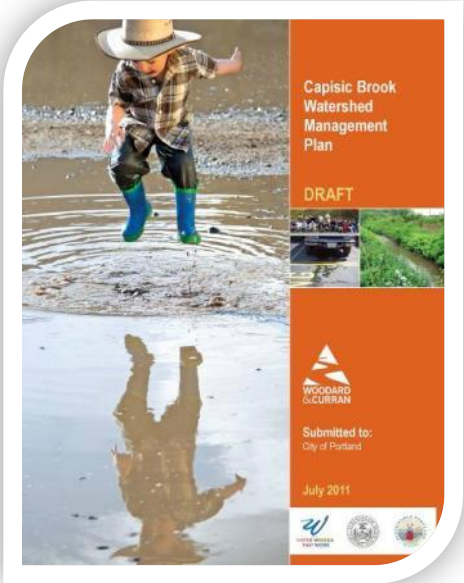
Sample stormwater infrastructure map for urban impaired stream.

- **Clear Definition of Plan Objectives -** Early in the plan development process, the steering committee should come to agreement on the water quality, ecological and community related objectives that the plan will seek to achieve. In some instances, these will be dictated by state water quality standards, but other objectives may also be identified. Failure to come to agreement on the goals of the plan will make the process of plan development inefficient and unnecessarily difficult.

- **Financing -** For some watersheds the pollutant loading and other plan goals might be achieved with installation of a modest number of low-cost BMPs. In these watersheds, existing local resources and available grants might be able to achieve the plan goals in a ten year period. More commonly, plans for impaired waterbodies (e.g., urban streams or highly agricultural watersheds) involve numerous and expensive BMPs that exceed existing funding resources. In such cases, planning projects need to consider other possible funding mechanisms (e.g., stormwater utilities, local bonds). Local involvement in this financial discussion is critical to ensure future public support of selected funding avenues.

EPA Nine-Element Plans

Starting in 2003, EPA required a specific type of plan to guide Section 319-funded work in impaired watersheds. These EPA plans are referred to as watershed-based plans or *'nine-element'* plans because they must address nine key elements:



Capisic Brook Nine-element Plan.

- An **identification of the causes and sources** that will need to be controlled to achieve the load reductions and goals in the plan;
- An **estimate of the load reductions expected** for the management measures in the plan;
- A **description of the NPS management measures** that will need to be implemented to achieve the load reductions estimated and an identification of the critical areas in which those measures will be needed to implemented;
- An estimate of the **amounts of technical and financial assistance needed**, associated costs, and/or the sources and authorities that will be relied upon to implement the plan;
- An **information and education component** that will be used to enhance public understanding of the project;
- A **schedule** for implementing the NPS management measures;
- A description of interim, **measurable milestones** for determining whether NPS management measures or other control actions are being implemented;
- A **set of criteria** that can be used to determine whether loading reductions are being achieved over time and that substantial progress is being made towards water quality standards; and
- A **monitoring component** to evaluate the effectiveness of the implementation efforts

To date the DEP has accepted 30 nine-element plans (Table 3). Of these, 27 plans are for impaired watersheds and three plans for threatened waters. Two of the three unimpaired waters with nine-element plans were listed as impaired when they were developed and have since been restored. There are 16 plans for inland streams; 11 plans are for lakes; and three plans for coastal streams.

Table 3. Nine-Element Watershed-based Plans Accepted by Maine DEP.

Annabessacook Lake (2007)	Ogunquit River (2013)
Birch Stream (2010)	Pearce Brook (2013)
Bond Brook (2009)	Penjajawoc Stream (2008)
Capehart Brook (2011)	Pleasant River (2011)
Cape Neddick River (2014)	Pleasant Pond (Richmond) (2008)
Capisic Brook (2011)	Prestile Stream, Upper (2009)
China Lake (2009)	Red Brook (2011)
Dudley Brook (2009)	Sabattus Pond (2007)
East Pond (2007)	Spruce Creek (2008)
Great East, Horn and Wilson Lakes (2010)	Togus Pond (2008)
Hart Brook (2005)	Unity Pond (2007)
Highland Lake (2008)	Webber, Threemile & Threecornered Ponds (2005)
Highland Lake (2006)	Whitten Brook (2011)
Long Creek (2009)	Wilson Pond (Wayne) (2009)
Long Pond (Belgrade Lakes) (2010)	Trout Brook (2012)

Lake Watershed-based Protection Plans

EPA NPS Program Guidelines (2013) recognized several cases where alternatives to nine-element plans may provide an effective approach toward achieving the water quality goals of Section 319-funded restoration or protection efforts. EPA outlined the elements required in alternative plans and the circumstances under which alternative plans may be accepted, including those pertaining to the protection of high quality and/or unimpaired waters.

DEP used the EPA guidelines as a basis to develop guidance for lake watershed-based protection plans in Maine (*Guidance for Maine Lake Watershed-based Protection Plans* (2013)). Most, if not all, watershed plans for unimpaired waters are expected to follow this guidance, instead of the more intensive nine-element planning guidelines required for impaired waters. A recent NPS watershed survey (or equivalent assessment) must be in place before a lake watershed-based protection plan can be developed. This information is a key component of an alternative plan. If the watershed survey is outdated, there is an increased likelihood that the survey is no longer accurate. As such, lakes with surveys over five years old should not complete alternative plans until the survey data are validated or updated. To date, DEP has accepted seven Lake Watershed-based Protection Plans (Table 4).

Table 4. Lake Watershed-based Protection Plans Accepted by DEP.

Crescent Lake (2013)	Thompson Lake (2013)
Lake Auburn (2013)	Toddy Pond (2013)
Little Sebago Lake (2013)	Woods Pond (2013)
Philips Lake (2014)	

Other Types of Alternative Plans

In addition to alternative plans for high quality or unimpaired waters, the EPA guidelines (2013) list three other situations where alternative plans may be warranted. This includes when the impairment is not specific to a pollutant. Nine-element plans emphasize identifying major NPS pollutant sources and ways to achieve load reduction. However, this is not possible if the impairment is not caused by a pollutant but by a water quality problem such as a dam and concomitant altered flow regimes. EPA may also find an alternative plan acceptable when there is a need to respond to a NPS pollution emergency or urgent NPS public health risk (e.g., to reduce pollution affecting drinking water safety). In Maine no such plans have been developed to date. However, DEP will work with partners and EPA to help guide development of such alternative plans if the need arises.

EPA may also find alternative plans acceptable in cases where a small-scale water quality impairment results from a few sources that are not caused by larger watershed-wide problems and can be fully addressed within one grant period. EPA (2013) stated: "In meeting these conditions, the state will ensure that multiple smaller problems are not dealt with in a piecemeal fashion when they are actually part of a larger water quality problem involving multiple pollution sources in the watershed." In Maine, most NPS impairments occur from multiple sources within a watershed.

C. Watershed-based Plan Implementation

The next step of the watershed-based approach is to implement the watershed based plan (WBP) and actions that ultimately protect and/or restore the waterbody. WBPs are implemented by local entities such as municipalities, Soil and Water Conservation Districts or local associations. Plan implementation consists of a suite of actions described in the watershed-based plans. Actions may include getting ordinances passed, having the public works department install BMPs, retrofitting or installing structural stormwater BMPs, restoring riparian and aquatic habitat and implementing public outreach programs. Plan implementation usually takes place through a series of phased projects over period of ten or more years.

Watershed-based plan implementation - installation of bioretention swale.

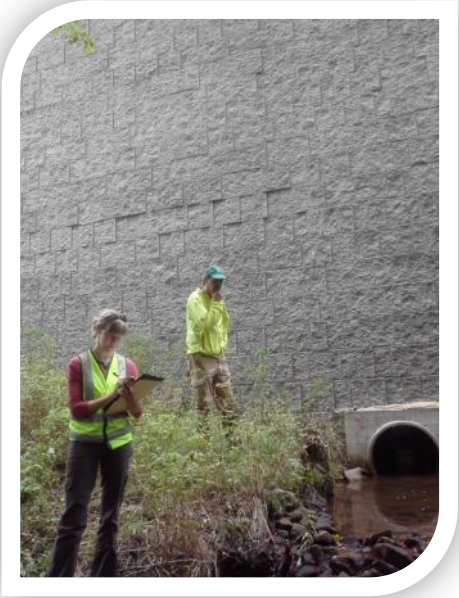
Typical funding sources for implementation are from the municipality, Section 319 and other federal funds, private grants, lake associations, and in certain cases stormwater utilities. In instances where the source reduction and prevention measures are relatively simple, there is community support, and the cost is low, plans may be substantially implemented with financial support from grant programs, most often through EPA Section 319 grants. Plans aimed at protecting threatened lakes often fall into this category. When the measures identified in the plan are more complex and expensive (e.g., restoration of an impaired urban stream), funding

mechanisms will likely need to be more diverse and include some level of local financial support such as a stormwater utility. In either case, plan implementation is likely to involve a number of phased projects. It may also involve the establishment of a local authority such as a watershed management district or a stormwater utility district to implement the plan over an extended period.

Streams

In recent years, most of the NPS implementation work in stream watersheds has focused on impaired streams. This includes rural streams impaired by agricultural sources and urban impaired streams. Restoration work in rural stream watersheds usually includes strong involvement from local farmers, the Soil and Water Conservation District and NRCS and includes construction of agricultural BMPs on a small number of farms. NRCS funding is also often leveraged to stretch resources and get more work done on the ground. Since 2013, the National Water Quality Initiative (NWQI) partnership between DEP, EPA and NRCS has also helped focus resources on three watersheds in Maine. This includes the Unity Pond watershed and portions of the Meduxnekeag River and Sebasticook Lake watersheds.

Restoration work in urban streams tends to include a diverse set of actions and partners. Municipalities typically start plan implementation with 'the low hanging fruit,' such as easy fixes on municipal properties and on outreach efforts. Larger more expensive aspects of the plan (e.g., major structural retrofits, ordinance implementation, and creation of stormwater utilities) are often phased in over time as funding sources and political support are secured. This has been done by reaching out to the planning board and elected officials, and incorporating relevant portions of WBP into the municipality's comprehensive plan. Restoration of urban streams may take decades and up to millions of dollars due to the complexities of multiple pollution sources and fixes.



DEP support assessing an urban impaired stream. (Photo by FBE)

Lakes

Lake WBP implementation is usually less complex than urban stream implementation because phosphorus is often the only pollutant of concern. Implementation usually consist of BMP installations at eroding sites and/or agricultural properties, changes in ordinances, creation of or continued support of a Youth Conservation Corps, and outreach. While municipalities are also involved in lake watershed-based plan, often the local lake association takes a leadership role and provides fuel for political support and action. The time period of implementation can range from five years to decades, depending on the size of the watershed and amount and types of phosphorus

sources. If the lake has an internal phosphorus recycling problem, implementation may also include efforts, such as treatment with aluminum salts to prevent release from the sediments.

Marine Waters

Implementation efforts in marine waters have been limited to a relatively small number of watersheds in recent years. However, interest in coastal NPS work has been increasing, particularly in southern Maine. The Maine Healthy Beaches (MHB) program works with communities to monitor bacteria levels at 29 beach areas. NPS has been identified as a probable pollution source in many of these areas with high bacteria levels. Several coastal communities regulated through the Municipal Separate Storm Sewers Systems (MS4) program have also targeted coastal stream watersheds for the stormwater abatement work required through their MS4 permits. Although implementation work funded through 319 grants cannot be used to complete MS4 permit requirements; it can complement their efforts to address stormwater and bacteria impacts.

DEP Support

DEP promotes and supports implementation of WBPs largely through DEP technical services and EPA Section 319 grants. Forty-four percent ($752,292) of Section 319 funds received by DEP in FFY 2013 ($1,726,692) were used for implementation of WBPs. DEP provides technical assistance to: assist municipalities or watershed groups design and install structural BMPs; share lessons learned from other implementation projects; provide information to planning boards; and provide other resources as needed. Since implementation of WBPs is led by local entities, DEP's support is flexible and responsive to local needs. This assistance may be intensive and short-term, or spread-out over many phases, whichever is more appropriate and supportive of local plan implementation.

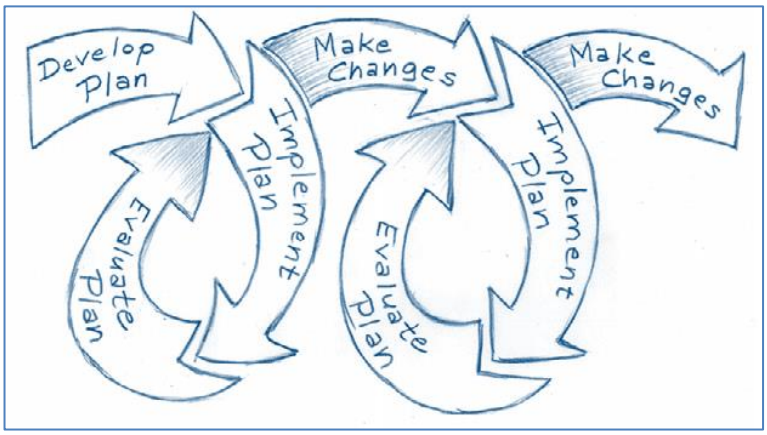
D. Measuring Success and Monitoring Environmental Results

Updating Watershed Plans

Restoration and protection of Maine's waters is an ongoing process (Figure 10). Restoration of impaired waters can take years or even decades, and protection work is never done. As such, watershed plans all become outdated over time. Plans should be periodically evaluated and updated so they remain relevant and useful. DEP has not yet developed a process to prompt partners to update their watershed plans or request updated plans or status reports of progress on plan implementation. This need is addressed NPS Plan's five year objectives.

As a WBP is implemented, new issues may be identified and alternative strategies may become available. The plan will need to be amended to address these new concerns and opportunities. Similarly, progress on the plan needs to be monitored and changes in the timeline and milestones need to be incorporated. The implementing entity should be responsible for amendments and updates to the plan. Since WPBs for urban streams are relatively new, they have not undergone major updates. Updates of lake watershed plans and watershed surveys don't have a set update schedule. Local interest in lake protection and motivation to work on water quality fluctuates, so plans will be updated as local interest in lake protection is renewed.

Figure 10. Watershed Planning Process (EPA, 2008).



Environmental Monitoring

Watershed-based plans include a monitoring component to assess progress toward the plan's restoration or protection goals. This monitoring component typically involves estimating pollutant loading reductions and conducting water quality monitoring to track progress over time. Some of this work can be conducted by local stakeholders, and the resulting information can used to assess incremental progress over time. For example, Trout Brook's monitoring efforts include water quality monitoring to look improvements following the mitigation of a chloride source to the stream. In addition, biomonitoring using kicknet methods are being conducted by local volunteers to determine if the stream's macroinvertebrate population is improving as BMPs are installed in the watershed. Local groups also rely on DEP's monitoring programs to assess water quality conditions and report on the official attainment status. See Section XI for more detailed information on monitoring environmental success.

VII. Statewide NPS Control Strategies by NPS Category

Section 319 of the Clean Water Act requires each state to identify major NPS categories or subcategories and identify BMPs that may be used to reduce pollutant loadings for each. This NPS plan designates and describes six major NPS categories: Agriculture, Developed Areas, Transportation, Forestry, Onsite Wastewater Disposal Systems and Hydrologic Modification. In addition, two other NPS categories (boatyards/marinas and land disposal) addressed primarily through regulatory programs are described later in this section

This section describes the six major NPS categories in the Maine NPS Management Program and provides descriptions of management strategies, core law/regulatory authority, NPS pollution sources, BMP guidelines, and programs and projects. Refer to Section X for tables listing NPS Program five-year objectives, actions and milestones for each major NPS category.

Table 5. Lead Agencies for Nonpoint Source Categories.

Nonpoint Source Category	State of Maine Lead Agency
Developed Areas	Department of Environmental Protection
Agriculture	Department of Agriculture, Conservation & Forestry
Transportation	Department of Transportation
Forestry	Department of Agriculture, Conservation & Forestry
Onsite Wastewater Disposal Systems	Department of Health & Human Services
Hydrologic Modification	Department of Environmental Protection

A. Developed Areas

Lead Agency: Maine Department of Environmental Protection (DEP)

Management Strategies

Encourage use of erosion and sediment controls and stormwater management BMPs through administration of land use laws and promotion of voluntary measures. Strategies include continue to administer the Storm Water Management Law and Site Location of Development Laws; ensure stormwater and ESC BMPs are in place and being maintained on permitted development sites; continue updating the Stormwater BMP Manual to include latest technology options for stormwater treatment; and continue training of town officials, engineers, developers on ways to reduce NPS impacts.

Core Law / Regulatory Authority

DEP is responsible for regulating point sources through the wastewater discharge law (38 M.R.S. Chapter 3, §413), which requires that a license be obtained for the discharge of pollutants to a stream, river, wetland, or lake of the state, or to the ocean. DEP also regulates nonpoint sources associated with development activity through administration of the Erosion & Sedimentation Control Law (38 M.R.S. Chapter 3, §420-C), the Storm Water Management Law (38 M.R.S. §420-D), the Site Location of Development Act (38 M.R.S. Chapter 3, §§481-490), and the Natural Resources Protection Act (38 M.R.S. Article 5-A). A major purpose of these laws is to protect Maine's water resources. This is accomplished by requiring developers to use proper erosion and sedimentation control and storm water treatment measures. In addition, DEP promotes voluntary use of best management practices for safe lawn care practices through signage (required under 38 M.R.S. §419) and other outreach. .

Developed Areas & NPS Pollution Sources

The 2012 Integrated Report indicates developed areas are the primary source of pollution of 21 impaired lakes and 28 urban impaired streams. Pervious natural landscapes like forests, wetlands, and grasslands trap rainwater and snowmelt and allow water to slowly filter into the ground. Runoff tends to reach receiving waters gradually. Impervious urban landscapes like roads, bridges, parking lots, and buildings don't let runoff slowly percolate into the ground. Water remains above the surface, accumulates, and runs off in large amounts. Storm sewer systems quickly channel runoff from roads and other impervious surfaces. Large volumes of quickly flowing runoff erode stream banks, damage streamside vegetation, widen stream channels, increase sediment loads, and raise water temperature impacting fish and other aquatic life.

Unpaved roads or trails were listed in the 2012 Integrated Report as the primary pollution source for three impaired lakes, but it is a significant issue for many surface waters. Camp and other gravel roads contribute a disproportionate amount of sediment deposition into streams and lakes, due to sub-standard construction, maintenance and their proximity to water. Typical problems identified through watershed surveys include: erosion of the road surface, road shoulders, and ditches; unstable and undersized culverts; poor road surface material; and inadequate ditches.

BMP Guidelines
For erosion and sedimentation control:
www.maine.gov/dep/land/erosion/escbmps/index.html
For stormwater management:
http://www.maine.gov/dep/land/stormwater/stormwaterbmps/index.html.
For gravel road maintenance: http://www.maine.gov/dep/land/watershed/camp/road/
For pesticide and fertilizer use on turf:
http://www.maine.gov/dacf/php/pesticides/applicators/best_management_practices.shtml

BMP Types	Areas Addressed by BMPs
Non-Structural (planning)	Site specific erosion and sedimentation control plans, including temporary and permanent erosion control measures; Low Impact Development (Limit areas of clearing and grading, Minimize impervious area, Minimize directly connected impervious area, Manage stormwater at its source); Use contractors certified in ESC; Inspection and maintenance including 5-year certification; Good housekeeping practices, including sweeping, sand and salt management; Yardscaping (lawn care practices and lawn alternatives), including turf BMPs for fertilizer and pesticides.
Structural (groundwork) Provide treatment measures to mitigate for the increased frequency and duration of channel erosive flows; allow for infiltration; provide treatment of pollutants in stormwater and/or mitigate potential temporary impacts	Wetponds ; Vegetated buffers; Infiltration BMPs; Under-drained soil filters; Detention ponds for flood control; Proprietary treatment systems

Program/Project	Description
Administration of laws **Erosion & Sedimentation Control Law**	Maine DEP has regulatory authority over land use activities through five statutes: The Erosion and Sedimentation Control Law is a non-reporting program that applies to all development activity; DEP provides training to developers, consultants and contractors on how to conduct activities in a way that complies with the law's requirement of preventing erosion and sedimentation at property boundaries.

Site Location of Development Law	The Site Location of Development Law applies to larger projects that may have a substantial effect on the environment, and include projects that occupy more than 20 acres or create three acres or more of structure (impervious areas).
Storm Water Management Law	The Storm Water Management Law regulates development activity that disturbs one acre or more of land both during and after construction. Stormwater treatment BMPs are required for projects that involve more than 5 acres disturbance; 20,000 square feet of impervious area in watersheds of most at risk lakes or urban impaired streams; or 1 acre of impervious area in any other watershed. The Site Location of Development Law applies to projects that develop three acres or more of land (not revegetated). DEP adopted Stormwater Rules (Chapter 500) that apply to projects under both the Storm Water and Site Location Laws. These rules specify what types of BMPs must be utilized. The rules require inspection and maintenance of BMPs, including a provision added in 2005 that developers must certify every five years that the required BMPs are in place and being properly maintained.
Mandatory Shoreland Zoning Act	The Mandatory Shoreland Zoning Act (MSZA), administered by municipalities with DEP oversight, requires municipalities to adopt, administer, and enforce local ordinances that regulate land use activities in the shoreland zone. The shoreland zone is comprised of all land areas within 250 feet of the normal high-water line of any great pond or river; upland edge of a coastal wetland; the upland edge of defined freshwater wetlands; and all land areas within 75 feet of the normal high-water line of certain streams. The purposes of MSZA are: to prevent and control water pollution; to protect fish spawning grounds, bird and wildlife habitat; to project buildings and lands from flooding and erosion; to protect archeological and historic resources; to protect fishing and maritime industries; to protect freshwater and coastal wetlands; to control building sites, placement of structures and land uses; to conserve shore cover, and visual as well as actual points of access to inland and marine waters; to conserve natural beauty and open space; and to anticipate & respond to impacts of development in shoreland areas.
Natural Resources Protection Act	The NRPA requires a permit for any activity that is in, on, over, or adjacent to protected natural resources, which include wetlands, rivers, streams, brooks, ponds, significant wildlife habitat, and sand dune systems. Activities regulated under NRPA include: (A) dredging, bulldozing, removing or displacing soil, sand, vegetation or other

	materials; (B) draining or otherwise dewatering; (C) filling, including adding sand or other material to a sand dune; or (D) any construction, repair or alteration of any permanent structure. Protected natural resources include streams, lakes, freshwater and marine wetlands, sand dunes and significant wildlife habitats.
Contractor Certification Program	DEP has had a voluntary certification program for contractors on proper erosion and sedimentation control since 1997. In 2013, the program became mandatory for any contractor doing earth-moving work within 75 feet of streams and within 250 feet of other water bodies. As a result, the number of certified contractors in the state has risen from approximately 600 to over 2,500. A survey in 2004 found that certified contractors have had a much higher compliance rate with the ESC Law (>90%) versus non-certified contractors (50%).
Promotion of safe lawn care practices and alternatives for homeowners	In an effort to reduce the use of fertilizer containing phosphorus in lake watersheds, Maine enacted a law in 2008 pertaining to the sale of fertilizer. The law restricts the sale of fertilizer with phosphorus to locations where signs are placed promoting the use of phosphorus-free fertilizer except for new lawns, or where a soil test indicates a phosphorus deficiency. Maine is also promoting healthier lawn care practices through the Maine Yardscaping Partnership, overseen by the Maine Board of Pesticides Control at the DACF. This program hopes to inspire Maine people to create and maintain healthy landscapes through ecologically based practices that minimize reliance on water, fertilizer and pesticides. http://www.maine.gov/dacf/php/pesticides/yardscaping/index.htm
Salt management	Monitoring of aquatic resources in Maine has shown the presence of chlorides. Elevated levels of chlorides have been found particularly in urban impaired stream watersheds and are attributed to past and present stockpiles of sand and salt and to large commercial parking lots. Roads are also a contributing source. DEP has been partnering with the Maine DOT, municipalities and SWCDs on forums to learn more about best management practices for reducing the use of salt and/or reducing its impact on water resources.
Training for municipal officials, engineers and developers	Communication with towns and the regulated community are vital to ensure compliance with regulatory requirements for erosion control, shoreland zoning, and stormwater management. The DEP provides training for the affected groups through the Nonpoint Source Training and Resource Center, which conducts spring and fall training classes on erosion control, and periodic conferences and workshops on stormwater management, as well as other related topics. In addition, DEP works with municipal officials, including town engineers on latest guidance on the regulatory program. This includes providing information BMP manual updates to towns delegated to administer the state stormwater program.

B. Agriculture

Lead Agency: Department of Agriculture, Conservation and Forestry (DACF)	
Management Strategies Promote widespread use of agricultural BMPs for all agricultural operations through administration of the Nutrient Management Act and the Agricultural Compliance Program. Reduce the impact of agricultural operations on water bodies by promoting the continued implementation of site-specific BMPs. Focus efforts to help ensure that agricultural operations: have Nutrient Management Plans, if required; achieve updates to these Plans prior to expiration; and, obtain or maintain a Livestock Operations Permit, as required by statute. Continue to provide technical assistance to farms when needed, and continue to promote and conduct farmer educational programs related to BMPs and protecting water quality.	
Core Law / Regulatory Authority The NPS Management Program statute (40 M.R.S. Article 1-F) charged DACF with responsibility to develop and promote use of agricultural BMPs to prevent nonpoint source pollution. DACF has developed voluntary and regulatory programs and provided services that help farmers use BMPs. DACF has responsibility to regulate agricultural activity to control nonpoint source pollution through administration of the Right-To-Farm Law, the Nutrient Management Law and other statutes.	
Agriculture & NPS Pollution Sources DEP's 2012 Integrated Report lists agriculture as a source of impaired water quality for six lakes (10,532 acres) and 358 miles of rivers and streams. NPS pollutants of concern associated with agriculture include bacteria, soil, fertilizers and pesticides. According to the USDA 2002-2007 census the number of Maine farms increased by 13 percent to 8,136. The average size of Maine farms decreased, from 187 to 166 acres. Maine has 1.3 million acres of farm land and leads the world in the production of wild blueberries. On a national scale, Maine is 1st in brown egg production, 2nd in maple syrup production and 8th in potato production. Significant livestock agriculture includes cattle (dairy and beef), sheep, goats, hogs, equine and poultry. Given the increase in the number of smaller farms there is a need for increased outreach, education, and technical assistance on the use of BMPs.	
BMP Guidelines "Manual of Best Management Practices for Maine Agriculture" (January 2007) http://www.maine.gov/agriculture/narr/documents/BMP-Manual-Final-January-2007.pdf	
BMP Types	**Areas Addressed by BMPs**
Sediment and Erosion Control BMPs	Contour plowing; row/strip/rotated/cover crops; buffer strips, crop residue, eroded areas, water diversions and stabilization; sediment basins; livestock access and stream crossings; farm equipment crossings.
Manure Management	Application rates/timing; buffers/setbacks; value; non-application areas; restrictions; storage, composting, cover crops and crop rotations, soil erosion; pest control, bedrock outcrops, shallow soils;

	barnyard and feedlot runoff; water access, soil infiltration capacity.
Pest Management	Field selection, disease-free seeds; crop disease resistance; natural pest controls; biological controls; cultural controls; pest scouting; weed control; pesticide application plan; calibrate pesticide equipment; pesticide label directions/safety data; federal/state laws; certified pesticide applicator; mixing/loading/storing/disposing of pesticides; spray drift; crop rotation and pesticides; crops and weeds; mechanical weed control; determining application levels; pesticide application techniques; weather conditions.
Nutrient Management	Application levels and uniformity; background nutrient/organic matter/soil amendment levels; determining yield; split fertilizer application; fertilizer release rate; soil characteristics; equipment calibration; accurate records; irrigation; crop rotation; cover crops; fertilization; plant tissue testing; leachable nutrients; soils to avoid applications; soil erosion; buffer strips; organic matter content; compost excess or spoiled crops.
Irrigation Management	Irrigation water management plan for Irrigation from streams and rivers.
Livestock Management	Housing facilities, waste management structures; environmental factors; livestock fencing; pasture and forage crop management.
Odor Control	Manure storage structures; coordinating with neighbors; cover field-stacked manure; incorporate manure; sod crop applications; weather conditions; injection; spreading activity & rates; minimize spillage; even application; solid manure; composting.
Insect Management	Proper sanitation; spilled feed and spoil piles; dead animals; feed bunks; waterers; animal diet; ventilation; poultry house manure removal; empty poultry houses; droppings boards; natural insect enemies; utilize physical fly removal methods; use pesticides sparingly and properly; use proper pesticide application techniques; pesticide feed additives; cover manure piles; compost; transporting manure; controlling barnyard exercise lots.
Noise Control	Irrigation pumps; farm equipment.
Farm Management	Animal carcass disposal, equipment exiting farm fields; watering livestock, livestock waterway crossings, insect and disease infestations; aesthetics; vermin control; wild animal damage; residual usage; feed storage; milk room waste; silage management; management of spoiled or excess crops; dust control; financial record keeping; soil health management; crop production guides.

Program/Project	Description
Administration of Nutrient Management Law	The law requires that all farms with 50 animal units or more develop and implement a nutrient management plan (NMP). Also, a NMP must be developed for farms that use over 100 tons of manure not generated on the farm, farms that have a manure related complaint, and farms that utilize sludge. The law requires new or existing livestock operations with greater than 300 animal units, that meet the EPA definition of a Concentrated Animal Feeding Operation (CAFO), or that plan on expanding beyond their land base or manure storage capacity, to obtain Livestock Operation Permits (LOP). The law prohibits the spreading of manure between December 1st and March 15th. Nutrient Management Rules establish standards for NMPs, the process for certifying persons to write and approve NMPs; requirements for obtaining a livestock operations permit; and procedures for implementing the law. http://www.maine.gov/agriculture/narr/nutrientmanagement.html
Agricultural Compliance Program	This program handles complaints concerning agricultural activities and assists with inspections required for issuance of LOP and CAFO permits. Investigations determine whether BMPs are being used, works with farmers to develop site specific BMPs, if necessary, to correct the situation, and takes enforcement action if needed. The Compliance Program also provides technical assistance to local communities or DEP related to agricultural problems and BMPs called for in watershed-based management plans.
Nutrient Management Loan Program	The program provides low interest loans for agricultural NPS pollution abatement projects. It is administered by the Finance Authority of Maine, and was developed in cooperation with the Maine Bond Bank, DAFC, DEP and EPA. EPA's Clean Water State Revolving Fund program provides the funding, and Maine DACF determines eligibility for the loans.
Soil & Water Conservation Districts (SWCDs)	SWCD are agencies of the state that help farmers, landowners, municipal officials, and others conserve and utilize their soil, water, forestry and wildlife resources by providing local solutions to local natural resource problems. SWCDs are non-regulatory entities well-known for their ability to resolve issues efficiently at low cost. Districts reach out to local stakeholders in the community to determine priorities and set a course of action to solve natural resource problems. This is done by offering technical assistance and educational programs to these groups. These actions help prevent and reduce polluted runoff to waterbodies from agricultural and urban sites, and protect drinking water sources. Districts collaborate with DEP on many NPS pollution prevention projects to achieve these positive outcomes.

C. Transportation

Lead Agency: Maine Department of Transportation (MaineDOT)

Management Strategies

Promote widespread use of an erosion control plan and the installation of effective erosion control measures with the goal of water quality protection at all transportation projects with soil disturbance through administration of the Stormwater Management Memorandum of Agreement (MOA) under Chapter 500, Stormwater Management Rules. Provide training and promote the Erosion Control Contractors Certification for all state, town, or contracted road crews. Continue working under the Stormwater Management Memorandum of Agreement (MOA) under Chapter 500, Stormwater Management Rules, for the implementation of statewide erosion and sediment control measures usage at new and maintenance soil disturbance projects and for the stormwater management of new developments. Manage hazardous materials and winter road sand/salt to reduce contamination of ground and surface waters.

The Maine Local Roads Center will provide training, technical assistance and information to municipal staff responsible for constructing, maintaining, and managing local roads and bridges.

Core Law / Regulatory Authority

The NPS Management Program statute (38 M.R.S. subsection 410-J) charged MaineDOT with responsibility to develop BMP guidelines for transportation-related activities, encourage all state and federally funded projects to use BMPs, and provide technical assistance to municipalities.

Transportation & NPS Pollution Sources

MaineDOT maintains 8,816 miles of roadway (Interstate highway, principal arterials, and collector roads). Erosion during and after construction of roads, highways, and bridges can contribute sediment and silt to runoff waters, which can adversely impact water quality. Heavy metals, oils, other toxic substances, and debris from construction traffic and spillage can be absorbed by soil at construction sites and carried with runoff water to lakes, rivers, and marine waters. Winter road maintenance, salting and sanding, is a significant source of the total chloride and sediment loading to fresh waters. Inadequate road stream crossings can disrupt stream channel morphology, cause streambank erosion and prevent natural passage of fish and other aquatic life.

BMP Guidelines

Maine Best Management Practices for Erosion and Sediment Control
http://www.maine.gov/mdot/env/envdocs.htm

BMP Types	Areas Addressed by BMPs
Non-Structural (planning)	Clearly define transportation objectives and responsibilities; use sound construction planning and techniques; anticipate general and seasonal site conditions; plan to minimize and stabilize exposed soils

	during construction and for the long term; factor in and protect the integrity of nearby waterbodies; develop and implement a plan to safely handle on-site hazardous materials.
Structural (groundwork)	Ensure proper sizing and installation of bridges and culverts; control water; divert stormwater runoff to proper areas, install timely stabilization measures of disturbed soils. Bridges and Culverts: Replace deficient structures with those that are sized appropriately for long-term flows and stability of the crossing, and in keeping with new science (e.g. revising BMP standards and specifications to accommodate extreme weather events). Wetland Crossings: Protect existing water movement. Park and Rides: Provide stormwater management for quantity and quality of the runoff. Maintenance of Structures: Maintain drainage structures, roadside ditches and cross culverts. Handling of Hazardous Materials: Provide guidance and training. Provide containment for oil/gas/coolants and to avoid leaks & spills.

Program/Project	Description
Program Management & Partnerships	The MaineDOT Environmental Office maintains one full-time engineering position and one environmental specialist to coordinate all stormwater engineering efforts. Seven environmental specialists work in the field to oversee contractors with erosion control management and ground delivery of the program.
MaineDOT Erosion and Sediment Control Manual	MaineDOT revised the Best Management Practices for Erosion and Sediment Control manual in 2008. The manual serves as the basis to promote on-the-ground use of erosion and sediment control BMPs during design, construction and maintenance activities.
Stormwater Management Memorandum of Agreement	MaineDOT has a stormwater memorandum of agreement with DEP wherby an erosion control plan is implemented for all its projects and that stormwater management measures are installed when applicable (Storm Water Management Law, Chapter 500). MaineDOT provides an annual report to the DEP summarizing activities and projects. This program is effective and will continue.
Compliance with Erosion & Sediment Control Law	Since 1997, MaineDOT has promoted to its department workers and contractors the importance of preventing erosion and stabilizing all exposed soils and compliance with the ESC law that directs

	"adequate and timely temporary and permanent stabilization measures will be used to prevent unreasonable erosion and sedimentation". Special Provision 656 of MaineDOT Standard Specifications requires all MaineDOT contractors to include an erosion and sedimentation control plan for projects that have fill or soil disturbance. MaineDOT also partners with the DEP NPS Training Center to promote the Erosion Control Contractor Certification Program and to deliver erosion and sediment control BMP training.
Maine Local Road Center	The Maine Local Roads Center provides training, technical assistance and information to municipal staff responsible for constructing, maintaining, and managing local roads and bridges. Through its newsletter and workshops, town officials and road maintenance crews receive information and guidance about the values (e.g., long term cost avoidance and protection of local water resources) of minimizing erosion and sedimentation from town roads and associated drainage features.
Road winter sand and salt management	MaineDOT management of road sanding practices has exceeded the established goal of 40 percent reduction of sand use since 1999. MaineDOT plans further winter sand reduction while maintaining safe winter driving conditions. Using an anti-icing approach instead of a de-icing approach significantly reduced the use of winter sand. The anti-icing approach uses mostly rock salt, but also includes salt brine, and “Ice-B-Gone” which was recognized by DEP under its Design for the Environment Formulator Program’. MaineDOT will continue to research approaches, methods, and products to maintain safe roads and winter driving conditions with the least environmental impact.
Road winter sand and salt storage	MaineDOT road salt and sand/salt storage systems in all 5 regions comply with DEP regulations to protect ground and surface waters. All outdoor winter sand piles have been eliminated in Region 1, 2 and 4. There are 30 remaining outdoor piles in Region 3 and 5. This represents a reduction of approximately 66 percent. The 30 remaining piles are treated with either hot sand or DT50 products to prevent water infiltration.
Watershed Projects	Recognizing the importance of placing stormwater management systems in areas most needed, MaineDOT has implemented several BMPs to help restore urban impaired streams. Pervious pavement was installed in the Long Creek watershed. The pavement has been placed in an area of high usage and is being cleaned and monitored.

D. Forestry

Lead Agency: Maine Forest Service (MFS)	
Management Strategies Promote widespread use of forestry BMPs and BMP-based programs and projects on all forest harvest and forestry-based operations in Maine, with special emphasis on water quality protection. Improve consistency for the regulated community by working with towns to adopt statewide standards for timber harvesting in shoreland areas.	
Core Law / Regulatory Authority Under Maine's Forest Practices Act (12 M.R.S. §§ 8867-A to 8888) landowners are required to notify the Maine Forest Service (MFS) of planned timber harvest activities (with very limited exemptions for personal use and small acreage). Harvest plans are required for clearcuts over 20 acres. The NPS Management Program statute (38 M.R.S. Article 1-F) charged MFS with responsibility to develop and implement forestry BMPs. Since then MFS has developed programs and provided services that help landowners and wood harvesters use BMPs in accordance with MFS advisory and regulatory programs.	
Forestry and NPS Pollution Sources About 89 percent of Maine is forested, the highest percentage of any state. Forest products are a key part of Maine's economy with roughly 200 forest products businesses employing 17,000 people. Approximately 450,000 acres are harvested annually, via 5,500 to 6,000 harvest operations. Constructing forest roads, trails, landings, and drainage systems can reduce soil absorbency, divert or concentrate water flows, cause soil erosion, increase sediment and nutrients entering streams, and diminish the benefits of vegetation next to water bodies. Harvesting may also reduce shade on the water's surface, reduce the amount of natural woody debris, or eliminate food sources for aquatic life. Timber harvests that remove a significant percentage of trees can increase the water runoff into streams, in some cases increase flooding. Forestry BMPs mimic or protect natural forest functions, absorb or disperse runoff, retain soil nutrients, filter sediment, and help maintain natural water temperature.	
BMP Guidelines Best Management Practices for Forestry: Protecting Maine's Water Quality. http://www.maine.gov/doc/mfs/fpm/water/bmp.html	
BMP Types	**Areas Addressed by BMPs**
Non-Structural (planning)	Clearly define harvest objectives & responsibilities; provide sound pre-harvest planning; anticipate general and seasonal site conditions; planning to control water flow; planning to minimize and stabilize exposed soil, including maintenance; planning to factor in and protect the Integrity of nearby water bodies; planning to safely handle on-site hazardous materials.

Structural (groundwork) Ensure proper sizing/installing bridges and culverts; control water; divert water to proper filter areas)	Stream Crossings (bridges, culverts, fords) Key issues include fish passage, crossing size, and crossing installation. Wetland Crossings Key issues include rutting and water movement. Truck Roads The key issue is water control. Log Landings Key issues include safety, site stability, and public perception. Trails and Harvesting Key issues are water control, soil exposure and proper closure ('putting sites to bed'). Handling of Hazardous Materials Key issues are storage and handling of oil/gas/coolants, avoiding leaks & spills, and accident training.

Programs/Projects	Description
Program Management & Partnerships	The MFS maintains one full time position to coordinate the forestry NPS program. Two MFS district foresters are designated as water resource specialists, to assist the WRF with program development and on-the-ground program delivery. Due to limited staff dedicated to forestry NPS issues, partnerships are important to program delivery. The Maine Sustainable Forestry Initiative (SFI) State Implementation Committee (SIC) includes landowners representing roughly 7 million acres of forest land in Maine and promotes mills that procure wood from practically every timber harvest in the state. Maine's WRF serves on the SIC's active education committee, which identifies relevant education topics and develops/delivers approximately 20-30 trainings per year, reaching 400-500 foresters, loggers and landowners. MFS also partners with several logger certification and professional organizations including the Certified Logging Professional Program, Northeast Master Logger, Qualified Logging Professional Program and the Professional Logging Contractors of Maine to deliver BMP training in conjunction with other scheduled trainings and events. These partnerships allow MFS to reach over 1000 loggers per year with BMP-related training.
Forestry BMPs for Water Quality - Manual & Training	The MFS made minor revisions to the state's forestry BMP manual in 2010. The manual is published in English and French language versions and has proven to be a useful program tool. Trainings are based on establishing a strong understanding of BMP principles to promote better in-the-field applications of specific practices detailed in the manual. The standard BMP training program was revised in 2012.
Training Programs	Specific forestry BMP training topic needs are identified via regular BMP monitoring and interaction with partners and other outside sources. Once needs are identified, MFS works with its partners to either develop training in-house or search for outside experts to deliver or

	assist with training development. MFS has an on-staff adult education expert who assists with all MFS training development. Recent topic-specific training has included designing road stream crossings to allow fish passage, and road grading for road rehabilitation and maintenance.
Forestry BMPs, use and effectiveness Monitoring	MFS has conducted random statewide monitoring of BMPs on timber harvesting operations since March, 2000. The objective is to assess the use and effectiveness of forestry BMPs in Maine. Currently the MFS conducts BMP monitoring on a biennial basis, evaluating approximately 120 harvest sites. This effort has become part of MFS regular operations and is likely to continue as long as resources are available. The BMP protocol project was a cooperative effort of the Forest Service, U.S. Department of Agriculture, and the Northeastern Area Association of State Foresters–Water Resources Committee. Reports and protocol can be found at: http://www.maine.gov/doc/mfs/fpm/water/bmp_monitoring.html Since Maine's BMPs are voluntary and designed to be outcome-based, the protocol focuses on effectiveness and implementation rather than strict BMP compliance. This is done by recording measurable evidence and assessing a suite of BMPs rather than evaluating the installation of individual practices. The protocol evaluates: stream crossings and approaches; riparian buffers; chemical pollution; wetland crossings and approaches; haul roads, log landings, and rutted mineral soil in buffer/filter strips.
MFS Direct-Link Loan Program	Since 2007 the MFS has partnered with the Maine Municipal Bond Bank, DEP, and several participating banks to provided low-interest incentive financing to loggers who purchase equipment capable of implementing BMPs to reduce NPS impacts on timber harvests. This program requires that participants receive BMP training from the MFS and maintain their certification by one of the state's logger certification programs. Participants are also subject to follow-up BMP inspections by the MFS. Since program inception roughly 60 loggers have made equipment purchases with program assistance. Funding is from EPA's Clean Water State Revolving Fund.
Portable Forestry Bridge Loaner Program	The MFS partners with several mills around the state to provide portable bridges to loggers on a loaner basis, free of charge. The program has five sets of steel bridges and many sets of wooden bridges in circulation around the state. These bridges allow loggers to 'try out' this BMP without cost, and several loggers have purchased or constructed their own bridges after using the loaner bridges.
Watershed Projects	Recognizing the importance of placing resources in areas of most need and where they can do the most good, the MFS has invested effort on the Sebago Lake watershed through a major US Forest Service grant. Specifically, this project has provided cost-share assistance to over 15 loggers for the purchase of portable forestry bridges; conducted BMP

	implementation and effectiveness monitoring on every timber harvest over 15 acres conducted in the Sebago Lake watershed over the last 2 years; provided cost-share assistance to woodland owners and towns for the preparation of forest management plans; and provided grants to towns for tree planting projects. MFS expects to replicate this effort in the future.
Coarse Woody Debris Program	The MFS has developed a program to increase the number of coarse woody debris (CWD) addition projects in Maine. In 2012 it worked to simplify the process for implementing CWD projects by writing rules/standards allowing trained licensed foresters to oversee CWD projects without the need for a permit. The MFS in cooperation with the Department of Inland Fisheries and Wildlife has developed and delivered training to foresters who will oversee these projects.
Timber Harvest Inspection/Water Quality Enforcement	Although Maine BMPs are voluntary, there are state laws prohibiting landowners from allowing sediment to enter water bodies. Landowners must notify the MFS of all commercial harvesting activity, which allows Maine's 55 Forest Rangers to inspect the harvests for compliance with timber harvest regulations. Notifications must indicate whether harvests occur near waterbodies, allowing inspections to be prioritized by potential environmental risk. The MFS uses cooperative agreements with DEP and the Land Use Planning Commission whereby MFS rangers inspect harvests for compliance using environmental laws administered by these agencies. The MFS has also recently assumed regulatory jurisdiction of harvesting and related activities in shoreland areas for many areas of the state. This is part of the transition from a dual set of regulations in the unorganized and organized areas of the state, to a consistent set of statewide regulations and a single regulatory authority.
Demonstration Projects	MFS regularly helps organize technology transfer demonstration projects. Most of these projects demonstrate innovative stream crossing installations, particularly those involving designs promoting fish passage, including 'bottomless arch' and box culverts and low-cost bridge installations.
Forest Certification Programs & Initiatives	The MFS supports forest certification by any of the several organizations that certify forest land in Maine. These organizations include the Forest Stewardship Council, the Sustainable Forestry Initiative and the American Tree Farm System. About 9.4 million acres of Maine's forests are certified to one of the three major standards. Use of water quality BMPs is mandatory under all of these systems. Lands certified under these systems undergo third-party audits, offering an added level of scrutiny with regard to the implementation and effectiveness of BMP practices.

E. Onsite Wastewater Disposal Systems

Lead Agency: Department of Health & Human Services, Maine Center For Disease Control, Division of Environmental Health, Subsurface Wastewater Unit

Management Strategies

Work with municipalities to implement the Subsurface Wastewater Disposal (SSWD) Rules. Improve the voluntary training and certification programs for septic system inspectors and installers (Voluntary Onsite Sewage Disposal System (OSDS) Inspection Program). Continue to encourage point-of-sale septic system inspections.

Revise and update the SSWD Rules as needed to address emerging issues and to reflect current technology in subsurface wastewater management and disposal.

Core Law / Regulatory Authority

By Maine statute (22 M.R.S. §42) the Department of Health and Human Services (DHHS) is authorized to adopt rules providing for the inspection of plumbing and subsurface wastewater disposal systems. The rules are known as the Subsurface Wastewater Disposal Rules (10-144 CMR 241). Implementation and enforcement of the rules is the responsibility of municipalities. Municipalities are required to appoint plumbing inspectors to implement the rules.

Onsite Subsurface Wastewater Disposal Systems & NPS Pollution Sources

Onsite SSWDs are utilized for the treatment and disposal of domestic and commercial wastewater in areas that lack centralized municipal wastewater collection and treatment systems. Onsite SSWD systems, if improperly located, designed, or installed are subject to malfunction, which may cause adverse health effects and detrimental environmental impacts to land and water resources from untreated wastewater. Malfunctioning disposal systems can cause bacterial contamination and deliver nutrients to surface waters.

BMP Guidelines

Subsurface wastewater disposal rules govern the siting, design, construction, and inspection of subsurface wastewater disposal systems in order to protect the health, safety, and welfare of the citizens of Maine. Approved procedures, design, and siting requirements, materials, methods, and administrative polices are described in detail. These Rules provide minimum State design criteria for subsurface wastewater disposal to assure environmental sanitation and safety. These Rules are intended to complement municipal planning, zoning, and land use control. http://www.maine.gov/dhhs/mecdc/environmental-health/plumb/rules.htm

Program	Description
Subsurface Waste Water Disposal Rules (CMR 241)	Maintain copies of all plumbing and subsurface waste water permits issued statewide. Approximately 40,000 plumbing permits are processed annually, which generate approximately $275,000 in dedicated revenue. The Program processes approximately 10,000 subsurface waste water permits annually. Provide reviews of engineering plans for compliance with or variance from departmental rules in support of the Division's various program areas. Provide interagency reviews and make recommendations for DEP, Maine Land Use Regulation Commission, Maine Department of Education, and Bureau of Public Improvements, among others. Conduct site inspections to assist site evaluators, local officials, and property owners.
Rules for Appointment and Administration of Local Plumbing Inspectors (CMR 240)	Oversee the appointment and administration of Local Plumbing Inspectors, including the eligibility, application, examination, and re-certification requirements.
Rules for Site Evaluators of Subsurface Wastewater Disposal Systems (CMR 245)	Oversee licensing of site evaluators that perform subsurface wastewater disposal evaluations for the purpose of designing onsite subsurface wastewater disposal systems. This includes the administration, examination and licensing roles.
Voluntary Onsite Sewage Disposal System Inspection Program.	The Department oversees a Voluntary Onsite Sewage Disposal System Inspection Program for inspection of existing systems.
Certification of Subsurface Wastewater Disposal System Installers	The Department oversees a voluntary certification program for SWDS installers. The program involves training programs, review of actual performance and on-going 5-year recertification with continuing education and good performance.
Small Community Grants Program	DEP administers the Small Community Grant Program, which provides grants to towns to help replace malfunctioning septic systems that are polluting a waterbody or causing a public nuisance. Grants can be used to fund from 25% to 100% of the design and construction costs, depending upon the income of the owners of the property, and the property's use. An actual pollution problem must be documented in order to qualify for funding. The highest priority is given to problems that are polluting a public drinking water supply or a shellfishing area.

F. Hydrologic Modification

Lead Agency: Maine Department of Environmental Protection

Management Strategies

Control hydrologic modification of rivers, streams, and lakes through administration of regulatory programs. Coordinate review and permitting of channel dredging with the Army Corps of Engineers (ACOE). Control impacts of hydropower dams through certification of Federal Energy Regulatory Commission (FERC) hydropower permits. Regulate impacts of other dams through state review of water level petitions and subsequent DEP water level orders. Encourage use of erosion and sediment controls and stormwater management BMPs through both administration of land use laws and promotion of voluntary measures by continued administration of the Storm Water Management and Site Location of Development Laws.Adopt new standards for stream crossings (new, repair, replacement, rehabilitation) designed to improve fish passage, hydraulic capacity and resiliency to larger storm events.

Core Law / Regulatory Authority

DEP regulates channel dredging through the NRPA in conjunction with the ACOE under section 404 of the Clean Water Act. Licensing of hydropower dams is regulated by the FERC and conditions required by states under section 401 of the CWA to ensure attainment of State Water Quality Standards. Non-hydropower dams are regulated under the Maine Waterway Development and Conservation Act (38 M.R.S. §§ 630-636, 640), Maine Water Level Act (38 M.R.S. §341-D, §§2), Municipal Regulation of Water Levels and Minimum Flows Act (30-A M.R.S. §4454-4457), and DEP's In-Stream Flows and Lake and Pond Water Levels rule. DEP is responsible for controlling runoff and erosion through the ESC Law, the Storm Water Management Law, the Site Location of Development Act and NRPA.

Hydrologic Modification and NPS Pollution Sources

DEP's 2012 Integrated Report lists hydromodification as the source category for 85 miles of impaired rivers and streams and seven impaired lakes (48,994 acres). Hydrologic modification activities include dams, channelization, channel modification, and streambank and shoreline erosion. Channelization, channel modification, and stream crossings may adversely impact suitability of instream and streamside habitat for fish and wildlife. Several recent watershed-level surveys of existing Maine stream crossings indicate that as many as 90% are barriers to fish passage and as many as 40% are impassable, causing significant loss of aquatic habitat. Hydrologic modification can alter instream water temperature, and sediment erosion, transport and deposition. The siting, construction and operation of dams can adversely impact the hydraulic regime, water levels, surface water quality and habitat of a lake, stream or river. Erosion caused by hydrologic modification can have adverse impacts on riparian habitat. Excessively high sediment loads can smother submerged aquatic vegetation, cover shellfish beds and tidal flats, fill in riffle pools, and increase levels of turbidity and nutrients.

BMP Guidelines

For ESC: http://www.maine.gov/dep/land/erosion/escbmps/index.html
For stormwater management:
http://www.maine.gov/dep/land/stormwater/stormwaterbmps/index.html.

BMP Types	Areas Addressed by BMPs
Non-Structural (planning)	- Conduct planning to avoid adverse impacts on water quality - Site specific erosion and sedimentation control plans, including temporary and permanent erosion control measures - Low Impact Development: • Limit areas of clearing and grading • Minimize impervious area • Minimize directly connected impervious area • Manage stormwater at its source - Use contractors certified in ESC - Inspection and maintenance including five-year certification
Structural (groundwork) Provide treatment measures to mitigate for the increased frequency and duration of channel erosive flows	Wet ponds; Vegetated buffers; Infiltration; Under-drained soil filters; Detention ponds for flood control; Proprietary treatment systems

Program/Project	Description
Maine Waterway Development and Conservation Act, **401 CWA Certification of Hydropower Projects**	DEP reviews applications for 1) construction, re-construction or alteration of hydropower projects which change water level or flow, 2) maintenance and repair of existing hydropower projects involving dredging or filling below normal high water under the Maine Waterway Development and Conservation Act and 3) hydropower license from the FERC under section 401 of the Clean Water Act to ensure that operation of the project will not result in non-attainment of the state's Water Quality Standards. DEP may certify the project with conditions, which FERC then incorporates into the project permit.
Maine Water Level Act Establishment of water levels **Municipal Regulation of Water Levels,** **Minimum Flows Municipal regulation**	The DEP commissioner may on the commissioner's own motion and shall at the request of the owner, lessee or person in control of a dam, the Commissioner of Inland Fisheries and Wildlife, or the Commissioner of Marine Resources, or upon receipt of petitions from the lesser of at least 25 percent or 50 of the littoral or riparian proprietors or from a water utility having the right to withdraw water from the body of water for which the water level regime is sought, conduct an adjudicatory hearing for the purpose of establishing a water level regime and, if applicable, minimum flow requirements for the body of water impounded by any dam that does not have a license for hydropower generation from FERC or other water level order from another entity. Municipalities may petition DEP for jurisdiction over

	water levels and minimum flows pending adoption of an appropriate ordinance.
In-stream Flows and Lakes and Ponds Water Levels **DEP Rule 06-096 CMR Ch. 587**	This Chapter establishes river and stream flows and lake and pond water levels to protect natural aquatic life and other designated uses in Maine's waters. Instream flow requirements for Class AA, A, B, and C waters are based on natural flows that occur in Maine waters, and the uses and characteristics assigned by the water quality classification program (38 M.R.S. Sections 464, 465) with attention given to protecting the outstanding natural resources associated with Class AA waters. Flow is managed to provide natural variation of flow described by seasonal aquatic base flows, or other seasonally variable flows, shown to protect aquatic life resources and water quality standards. Water level requirements for Class GPA waters take into account natural variation of water levels that occur in Maine lakes and ponds, and the uses and characteristics assigned by the water quality classification program (38 MRS Sections 464, 465-A). Water level is managed to provide variation that takes into account expected seasonal levels shown to protect aquatic resources and other water quality standards of Class GPA and downstream waters. Instream flows and water levels may be established by 3 methods: (1) standard allowable alteration, (2) by a site-specific flow designation developed through an Alternative Water Flow or Alternative Water Level, or (3) as part of a new or existing regulatory permit. A water use which fails to comply with the requirements of these rules is subject to penalties pursuant to Title 38, Section 349.
Develop new standards for stream crossings (new, repair, or replacement) designed to improve fish passage, hydraulic capacity and resiliency to larger storm events	New stream crossings, as well as the maintenance, repair, rehabilitation and replacement of existing crossings, are regulated under the Natural Resources Protection Act. Several watershed-level surveys of existing crossings revealed surprisingly consistent results indicating that as many as 90 percent are barriers to fish passage and as many as 40 percent are impassable. In an effort to reestablish the connectivity of Maine's stream systems, the Legislature directed the Department, in concert with the Department of Transportation and other state natural resource agencies to develop an Aquatic Resource Management Strategy. A major stakeholder group has been working on this issue since late 2011. By 2015, it is anticipated that new standards will be adopted for new and replacement crossings designed to improve fish passage, hydraulic capacity and resiliency to larger storm events. Efforts are also underway to identify funding mechanisms, develop training programs and to assess and prioritize watersheds where removing passage impediments will result in the greatest connectivity of fisheries habitats.

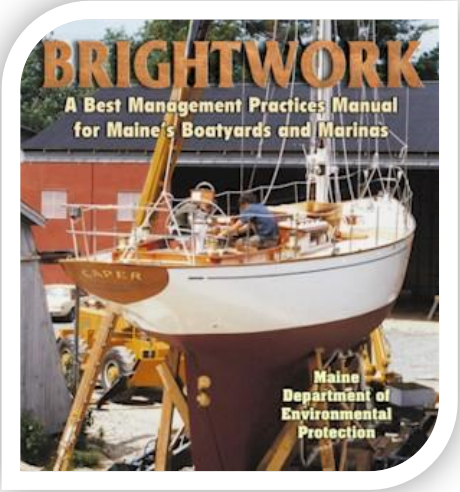
G. Other NPS Sources

The preceding sections describe six major NPS categories in Maine. Boatyards and Marinas and Land Disposal are no longer major sources of NPS pollution. Regulatory programs have reduced the water quality threat from these 2 NPS categories.

Boatyards and Marinas

Because of their proximity to water, marine facilities including boat repair yards, marinas, commercial piers, and boat ramps can adversely affect water quality. Many types of pollutants including fuels, oils, grease, antifreeze, cleaning materials, fish waste and solid waste can get into nearby waters. In large part, marine facilities are regulated by the MEPDES program, through both the Industrial Multi-Sector General Permit and the Waste Discharge Program. In addition, marine facilities may be subject to regulation for fuel storage, hazardous, solid or sanitary waste, and air discharges. Commercial piers and municipal or state boat ramps are potential sources that are not regulated.

DEP plays the lead role in carrying out these regulatory programs and providing technical assistance and outreach efforts for boatyards and marinas. The DEP manual, *Brightwork: Best Management Practices for Maine's Boatyards and Marina* (2004) provides guidance on the various BMPs such as fish waste and bait management, boat cleaning, fuel spill prevention, solid waste management and sediment and erosion controls.



The Maine Marine Trade Association (MMTA) leads a voluntary, beyond compliance initiative helping boatyards and marinas operators meet and exceed environmental standards. The Maine Clean Boatyards and Marinas Program is a collaborative partnership among industry, state and federal agencies and environmental organizations dedicated to promoting BMPs in boatyards and marinas. The program helps protect and improve clean water by helping boatyards and marinas reduce pollution beyond the regulatory requirements. DEP will continue working with the MMTA on the Maine Clean Boatyards and Marinas Program.

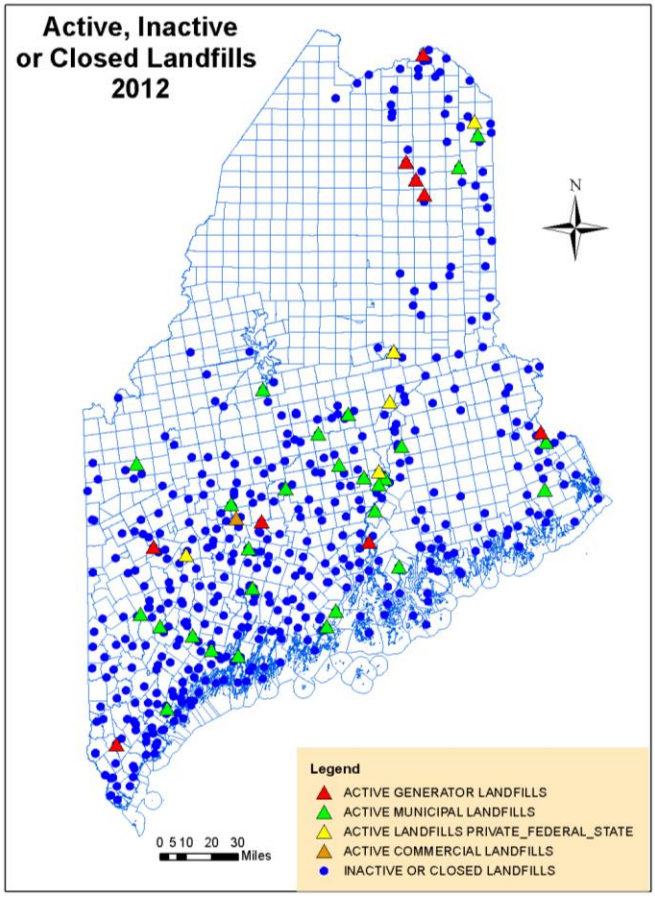
Land Disposal

Waste disposal was historically a significant NPS problem in Maine. Waste and leachate delivered toxics and nutrients to surface and ground waters. Fortunately, several laws have been enacted over the past several decades, and waste disposal activities are now highly regulated and monitored. In fact, most of Maine's landfills are currently inactive or have been closed (Figure 11). There are now only a small number of highly regulated landfills, including 27 municipal operations.

The State of Maine supports an integrated approach to waste management. This includes programs to reduce the amount and toxicity of waste generated, promote reuse and recycling of waste, and compost and process waste to create safe and useful products. Disposal through incineration and landfilling is the least preferred option.

DEP's solid waste programs include solid waste facilities management, sludge and residuals management, scrap tire management, electronic waste and mercury product management, and the non-hazardous waste transporter program. These programs provide education and technical assistance and carry out regulatory activities including licensing, compliance and enforcement of the State's Solid waste laws.

Figure 11. Status of Maine Landfills



VIII. NPS Programs and Partnerships

A. DEP NPS Programs

DEP conducts focused work on NPS issues through the NPS Grants Program, NPS Technical Assistance Services and NPS Outreach. The following section describes these program areas and identified management strategies associated with each.

NPS Grants Program

DEP administers a pass-through grants program that awards and monitors sub-grants of EPA Section 319 & 604b funds (Clean Water Act) for watershed projects to help restore or protect lakes, streams, rivers, or marine waters from NPS pollution. These grants help communities identify nonpoint water pollution sources, prepare watershed-based management plans, and take action to reduce or prevent NPS pollution. DEP Agreement Administrators are assigned to each NPS project to monitor grantee progress in implementing the project and provide technical support to help grantees successfully carry out projects. DEP provides opportunity for two types of grants to help communities:

Sample 319 grant project: eroding lake shoreline before BMP implementation.

- **Develop a watershed-based plan (WBP)** - A WBP provides assessment and management information and describes actions needed over a five to 15 year period to restore NPS-impaired water bodies, or to protect water bodies threatened by NPS pollution. The extent of the planning area (watershed) needs to be a geographically-appropriate size so that implementing actions can lead to measurable reductions in pollution and achievement of water quality goals.

- **Implement a watershed-based plan. -** Grants are available to help partners make progress carrying out NPS management measures (actions) described in the plan. A WBP accepted by the DEP is a prerequisite to be eligible to apply for NPS grant funds to help implement the plan.

DEP administers Section 319 grant award received from EPA in accordance with the national EPA guidance for state NPS management programs and the EPA-DEP Performance Partnership Agreement (PPA). EPA guidelines designate the annual 319 award into two categories – "NPS program funds" and "watershed project funds". States may use 50 percent of their Section 319 grant allocation (NPS program funds) to support any eligible NPS activities in the State NPS management plan. States are required to use at least 50 percent of funding (watershed project

funds) to implement on-the-ground watershed projects guided by a watershed based plan. Watershed project funds are for restoring impaired waters through the implementation of a WBP or to implement alternative plans approved by EPA, such as protecting unimpaired waters designated as a priority in a State NPS Plan. Project funds may not be used for planning activities such as WBP or TMDL development

Sample 319 grant project: Installation of a covered manure storage facility, heavy use area and vegetated runoff treatment system at a dairy farm to minimize and treat phosphorus runoff to nearby lake.

In Maine, Section 319 "NPS program funds" will be used primarily to support DEP staff performing NPS program services, training programs through the NPS Training and Resources Center, and assessment of water quality trend for lakes where there has been NPS pollution control activities through the Maine Volunteer Lake Monitoring Program. DEP expects to use a limited amount of program funds to help develop new WBPs. Section 319 "Watershed project funds" will be used primarily for implementation of WBPs to help restore NPS impaired waters or alternative plans to protect unimpaired waters that are considered threatened. DEP plans to use up to 50 percent of watershed project funds for implementation of WBPs to help communities protect unimpaired waters that are considered threatened or most at risk.

Sample 319 grant project: Undersized round culvert replaced with a much larger arch culvert; road no longer washes out during storm events.

Technical Assistance Services

In addition to the support provided to active 319 projects, DEP invests considerable staff resources to provide technical support to watershed groups, municipalities and other partners. Some of the main areas of support are described below.

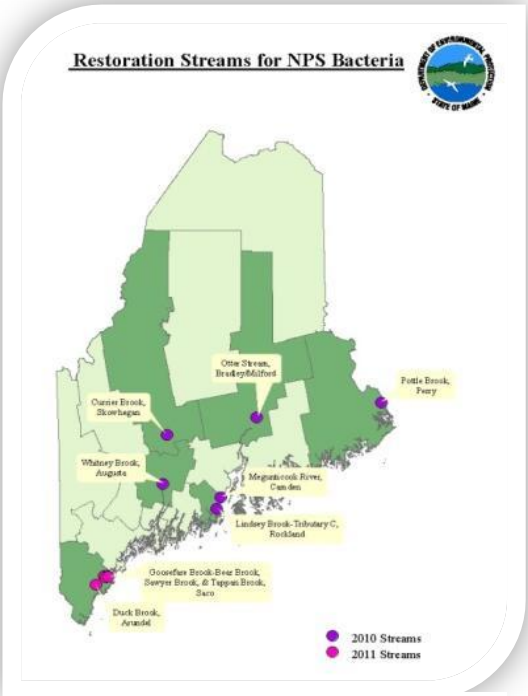
- **Watershed Association Support** – DEP staff support the work of lake and watershed associations through presentations, meetings and other technical assistance. DEP provides information to help groups understand their watershed's NPS issues and evaluate available options for further assessment and remediation. Staff also promotes the use and adoption of the NPS Site Tracker, which helps groups manage information on erosion sites in their watersheds. The tool allows prioritization of erosion sites, tracking of sites as they are fixed, and listing of new sites as they are discovered.
- **Watershed Surveys** – Watershed Surveys find, document, and prioritize NPS pollution sources in a watershed and recommend BMPs needed at specific NPS sites. Many of these surveys are funded in part through the NPS Grants Program. In addition, DEP provides technical assistance and project oversight to smaller watershed survey projects that are conducted with local funding.

Volunteers for a lake watershed survey.

- **Watershed Roundtable** – DEP hosts an annual Watershed Roundtable for watershed managers from state agencies, municipalities, watershed organizations, SWCDs, and the private sector. This informal, day-long event provides an opportunity for networking, sharing lessons learned, and discussing common problems in both rural and urban watersheds across the state.
- **Youth Conservation Corps (YCC)** – The DEP provides technical assistance and training to the State's nine YCC programs. These YCC programs hire high school students to install buffers, erosion control measures, and other conservation practices in lake and river watersheds. Most of these programs originally started as part of 319 grant projects, but communities then secured local funding to continue the programs after the grants ended.

YCC crew members taking a break.

- **Municipal Comprehensive Plan Reviews** – DEP provides maps and waterbody information to municipalities working on comprehensive plans, which are required under the Comprehensive Growth Management Act (30-A MRS § 4311). After plans are submitted to the state, DEP reviews the water resources sections of municipal comprehensive plans for consistency with agency goals, programs, and policies. Suggestions are also provided for possible strategies to address NPS threats and problems.
- **Bacteria TMDL Follow-Up** – Since 2010, DEP has conducted follow-up monitoring related to the Statewide Bacteria TMDL, which was approved in 2009. The objective is to identify specific sources of bacteria through sampling for E. coli and sanitary surveys; eliminate these problems; and remove the impaired stream segment from the 303d list. Sampling areas are selected from the TMDL list based on high restoration potential; adverse impact on downstream beaches; follow-up on previous sampling efforts; and to characterize natural levels of bacteria at clean sites. Samples are collected using a diagnostic approach that helps narrow down NPS inputs to specific subwatersheds and identifies manageable areas for sanitary surveys.



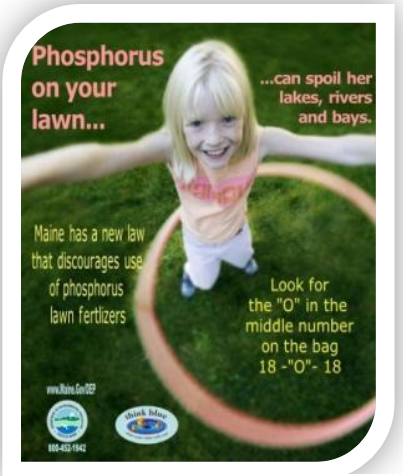
Excerpt from Maine Statewide Bacteria TMDL (2009).

NPS Outreach

NPS pollution is the result of a myriad of individual actions throughout a watershed. While many important polluted runoff sources can be controlled through administration of local ordinances or state regulations, outreach promoting voluntary use of BMPs can effectively prompt more widespread use of BMPs. DEP carries out several programs that promote voluntary adoption and use of BMPs to address NPS pollution. Some of the main outreach activities are described below:

- **Nonpoint Source Training and Resource Center (NPSTRC) –** The NPSTRC provides training to various groups throughout the state to help them prevent NPS pollution. Training topics include erosion and sediment control; stormwater management; and septic system installation, design, and inspection. The NPS Training Center coordinates the Contractor Certification Program, which is required for contractors that disturb soil in the shoreland zone. The Center also coordinates conferences; develops and maintains various publications and a video lending library; and acts as a clearinghouse for NPS and BMP information.

- **Phosphorus-Free Fertilizer Effort** – Maine law (38 MRS 419) requires stores that sell fertilizer to post DEP-approved signs explaining when it is appropriate to use fertilizers with phosphorus. DEP help coordinate the implementation of this law by providing retailers signs and other supporting materials about fertilizer use.



DEP-approved phosphorus-free sign posted at retailers.

- **Outreach to Municipal Officials** – DEP offers NPS training for municipal officials to help provide services formerly provided by the non-profit program, Nonpoint Education for Municipal Officials (NEMO), which was discontinued in 2013. DEP plans on using Adobe Presenter to produce 20 minute educational programs and on-line resources on topics such as NPS pollution prevention and low impact development. These will be marketed though the Maine Municipal Association and DEP's municipal newsletter. Limited assistance will also be provided to municipalities that view the modules and would like additional information (e.g., ordinances changes).

- **Target Audience Analysis** - Effective outreach segments audiences into discrete groups of people with common characteristics and then facilitates a more effectively targeted outreach effort. DEP's NPS Outreach Program aims to understand key target audiences and then use this knowledge to effectively influence BMP use. DEP has funded and supported research efforts such as phone surveys, focus groups, and intercept surveys to gather information on current behavior, beliefs, values, and barriers to behavior adoption. DEP then provides this information to partners who are working to promote water quality efforts.

Municipal officials learn about BMPs.

- **NPS Outreach Assistance to 319 Grant Projects** – DEP provides outreach assistance to partners developing and implementing watershed based plans to make sure that outreach efforts are as effective and targeted as possible. The guidance document, *Outreach Guidance for NPS Watershed Implementation Projects* (DEP, 2008), has been developed for grantees. DEP also provides staff support to help identify the target audiences that are key to advancing water quality improvement and protection. Once the audience is identified, projects can tap into existing programs or, if needed, design new ones based on the fundamentals of effective behavior change science.

- **NPS Outreach Assistance to Partners** - The most effective way to promote voluntary use of BMPs is through one on one contact and local outreach. Since DEP doesn't have the staffing

or local reach to effectively accomplish voluntary BMP adoption on a statewide basis, DEP partners with and supports local organizations. These organizations and programs deliver local behavior change efforts through technical assistance, educational opportunities, and cost-sharing. The organizations include statewide organizations with a local presence such as Maine Lakes Society's LakeSmart program and the Maine Board of Pesticide Control's YardScaping program.

DEP has identified a number of important target audiences who in one form or another can have a significant impact on the quality or quantity of stormwater runoff. These audiences typically need encouragement to voluntarily implement BMPs. BMP promotional efforts and programs for several target audiences are described below.

Table 6. Key NPS Target Audiences and Current BMP Promotional Efforts.

Target Audience/Activity	Prominent Organizations (Outreach Efforts)
Agriculture	USDA NRCS (voluntary technical assistance & funding for conservation practices/BMPs through EQIP, USDA Farm Services Agency (voluntary technical assistance & funding through CRP), and DACF (Maine nutrient management law administration)
Developers	DEP Nonpoint Source Training and Resource Center (NPSTRC) (limited outreach through occasional conferences)
Earthwork contractors	DEP NPSTRC (contractor certification program & courses)
Homeowners and residents	Think Blue Maine partnership (website, trainings, outreach materials), DEP (P-Free fertilizer effort, 319 project support), Maine Board of Pesticide Control (Yardscaping Program)
Local Public Road Maintenance	Maine Local Roads Center (training and technical assistance), NPSTRC (indirectly through Erosion & Sediment Control courses)
Municipal officials and employees	Nonpoint Source Education for Municipal Officials (limited workshops and presentations), NPSTRC (training for CEOs and planners on low impact development)
Shorefront property owners	***Lakes*** – Maine Lake Society (LakeSmart Program), Maine Volunteer Lakes Monitoring Program (trainings, website), Regional groups; ***Streams/Rivers*** – Regional groups, Long Creek Restoration Project; ***Marine*** – Regional groups, Casco Bay Estuary Partnership, Piscataqua Region Estuaries Partnership
Winter snow/deicing contractors	Statewide Salt Task Force (policy development, partner outreach), NPSTRC (conference, trainings)
Forestry	Maine Forest Service (Certified Loggers program, BMP site inspections) and, USDA NRCS (voluntary technical assistance and funding for forestry management practices, Forestry plans and water quality conservation practices through EQIP).

B. Integration with Other Government Programs that Protect Water Quality

In addition to the DEP programs mentioned in the previous section, , there are many other DEP, state, federal and municipal programs that help protect and restore water quality. The most prominent NPS-related programs are described below.

Environmental Protection Agency

The U.S. EPA provides annual funding to help DEP carry out NPS Programs through Section 319 of the Clean Water Act. EPA personnel also provide extensive program guidance and technical assistance for the NPS Grants Program to ensure compliance with EPA guidelines and reporting requirements. In 2014 the annual 319 program grant to Maine was $1,766,269. In addition to 319 funding, EPA provides other funds for water quality related programs and activities including Section 604(b) funds for water quality planning, the Maine Healthy Beaches Program and the National Estuary Program. EPA and DEP performance objectives, priorities and commitments are detailed in an annual Performance Partnership Agreement.

FMI - http://www.maine.gov/dep/about/planning.html

Maine Coastal Program

In 1978, the federal National Oceanic and Atmospheric Administration approved the Maine Coastal Program (MCP) as the State's coastal zone management plan in accordance with the federal Coastal Zone Management Act (CZMA) (15 U.S.C. § , *et seq.*). The MCP works to improve the environmental and economic health of Maine's coastal areas in accordance with the CZMA and the general policies stated in the state's Coastal Management Policies Act (38 MRS § 1801). The Department of Agriculture Conservation and Forestry's Bureau of Geology, Natural Areas, and Coastal Resources is the lead agency for administration of the MCP. Several state agencies, primarily DEP and DMR, play key roles in implementing Maine's networked program. The MCP's activities center on the designated state "coastal area", which is comprised of the land area of all municipalities on tidally-influenced waters and coastal waters and the all islands within them seaward to the three-mile limit of state ownership.

The MCP's NPS-related efforts focus primarily on planning related to the interaction of land uses and coastal water quality. Watersheds of shellfish growing areas are a major focus; as required by NOAA, MCP has a newly- instituted goal and indicator program to track progress in opening shellfish growing areas for harvesting. While ME DMR administers the shellfish classification program, MCP provides technical support to municipalities to develop municipal plans, policies and ordinances that address coastal pollution in shellfish growing area watersheds. MCP administers a competitive grant program for municipalities and regional organizations that may fund NPS-related projects such as water quality monitoring, pollution source surveys, and habitat restoration; and assists coastal organizations applying for CWA

Section 319 funds. MCP also provides limited funding to Regional Planning Councils in nine coastal regions that may assist coastal municipalities with NPS-related issues, among others. MCP's Community Planning and Assistance Program, which supports smart growth strategies, low impact development, and other land use planning, and the MCP's outreach program, which educates the public about coastal issues and promotes good stewardship, also contribute to the state's approach to NPS management.

FMI - http://www.maine.gov/dacf/municipalplanning/index.shtml

Maine DEP Stormwater Program (Maine Pollutant Discharge Elimination System)

Since 1987, EPA has had authority under the federal Clean Water Act to regulate certain stormwater discharges as point source discharges through the National Pollution Discharge Elimination System. EPA developed specific stormwater requirements for construction sites, industrial activities and for discharges from municipal separate stormwater sewer systems (MS4s). In 2001, EPA delegated authority to DEP to administer this program (now referred to as MEPDES).

- **Construction General Permits -** In 2003, DEP issued general permits for point source stormwater discharges from construction activity. This general permit applies solely to construction activity and not to ongoing stormwater management following construction. The permit sets standards for managing stormwater that may pick up pollutants, including soil and discharge them to waters of the State such as lakes, streams, and wetlands. The requirement for a permit is triggered by the amount of disturbed area created during construction, and whether the site will directly discharge to surface waters of the state.

  FMI - http://www.maine.gov/dep/land/stormwater/construction.html

- **Municipal Separate Storm Sewer Systems (MS4) -** In 2003, DEP also issued general permits for discharges from MS4s in certain regulated communities. In 2013, there were 40 entities regulated through this program, including 30 municipalities, eight State or Federal-Owned facilities and two transportation agencies. Regulated entities are required to develop and implement a stormwater program management plan that addresses the following six Minimum Control Measures: public education and outreach on stormwater impacts; public involvement and participation; illicit discharge detection and elimination; construction site stormwater runoff control; post-construction stormwater management in new development and redevelopment; and pollution prevention/good housekeeping for municipal operations.

  FMI - http://www.maine.gov/dep/land/stormwater/MS4.html

- **Industrial Multi-Sector General Permit -** In 2005, Maine's Multi-Sector General Permit, was issued for point source stormwater discharges associated with industrial activity. Regulated entities are required to develop and implement a Stormwater Pollution Prevention Plan, which includes general guidelines as well as specific standards for each listed industrial activity. The Industrial Stormwater Unit provides technical assistance, training, outreach and support to help the Maine business community meet permit requirements.

  FMI - http://www.maine.gov/dep/land/stormwater/multisector.html

- **Long Creek Watershed -** In 2009, DEP issued a MEPDES general permit for post-construction discharges of stormwater from properties with one acre or more of impervious area in the Long Creek watershed, an urban impaired stream located in the municipalities of South Portland, Westbrook, Portland, and Scarborough. Operators of properties that have a designated discharge are required to obtain an Individual Waste Discharge License from the Department or file for coverage under the Long Creek General Permit which requires permittees to participate in and comply with implementation of the Long Creek Watershed Management Plan, which is being carried out by the Long Creek Watershed Management District.

  FMI - http://www.maine.gov/dep/water/wd/long_creek/index.html

Maine Department of Marine Resources (DMR)

DMR was established to conserve and develop marine and estuarine resources through scientific research, promotion of the coastal fishing industry, and implementation of laws and regulations. DMR's Shellfish Growing Area Program determines shellfish growing area classifications in all shellfish harvesting areas to ensure that only pollution-free areas are open to harvesting. Classifications are set through sanitary surveys that include a shoreline survey to identify pollution sources that may impact water quality; marine water sampling to determine fecal coliform bacterial levels in the marine water; and analysis of how weather conditions, tides, currents, and other factors may affect the distribution of pollutants in the area. Water samples are collected monthly from January through December, to determine bacteria levels. DMR sanitary surveys have identified NPS pollution as the likely sources of bacteria in numerous shellfish harvesting areas in the state. This information, in turn, has been used by DEP to help identify NPS Priority Watersheds.

FMI - http://www.maine.gov/dmr/rm/public_health/shellfishgrowingarea.htm

Maine Climate Change Adaptation

The report, *People and Nature Adapting to a Changing Climate: Charting Maine's Course* (DEP, 2010) contains more than 60 recommendations for action to plan for changes to Maine's climate. The report emphasized the need for planning and action at the local level, and recognized that creation of an actionable state-level climate adaptation plan requires years of work and significant expenditure of resources to assure widespread acceptance and implementation. Many of the recommendations in the 2010 report are being implemented,

such as providing climate change awareness education to municipalities and local planning organizations, evaluating and revising regulations, mapping areas of vulnerability, and estimating cost impacts of no-action alternatives for capital improvements.

FMI - http://www.maine.gov/tools/whatsnew/attach.php?id=369026&an=1

Maine Drinking Water Program (DWP)

The Maine Drinking Water Program, which is part of the Center for Disease Control, implements the Safe Drinking Water Act. The program uses EPA's multiple barrier approach to help keep water safe and secure. Source protection is the program's primary focus since poorly planned and managed development represents the greatest risk to water quality and quantity. Key DWP partners include Public Water Systems (PWSs) and Maine Rural Water Association. None of these groups have authority to manage land use. However, the DWP, PWSs and DEP collaborate on projects in a number of drinking water watersheds. The DWP also provides input on state-wide priorities for 319 projects and provides PWSs with financial resources that can be used to enhance NPS projects. The DWP is also a key partner in the Salmon Falls Watershed Collaborative, which is an inter-state effort to protect drinking water supplies for over 47,000 residents in Maine and New Hampshire.

FMI - http://www.maine.gov/dhhs/mecdc/environmental-health/water/

Maine Healthy Beaches Program (MHB) Program

The MHB program was established to ensure that Maine's salt-water beaches remain safe and clean. The program brings together communities to perform standardized monitoring of beach water quality, notify the public if bacteria levels threaten human health, and educate both residents and visitors on ways to keep Maine's beaches healthy. The MHB program is funded by EPA under the Federal Beaches Environmental Assessment and Coastal Health Act; administered by DEP; and carried out in partnership with University of Maine Cooperative Extension. There are 29 beach management entities in the MHB program. While the focus of the program is to monitor bacteria levels at beaches, entities finding high bacteria levels at beaches often expand testing into feeder streams to help determine bacterial sources.

FMI - http://www.mainehealthybeaches.org/index.html

Municipalities

Maine includes 488 organized municipalities that provide a wide range of services and responsibilities associated with self-government. Municipal roles related to NPS include road construction and maintenance, comprehensive planning, and growth management. Most municipalities have planning boards that carry out laws and ordinances related to comprehensive planning and growth management functions. The Municipal Subdivision Law (30-A MRS § 4401) requires planning boards to review subdivisions using the criteria set out in

the statute. The Comprehensive Growth Management Act (30-A MRS § 4311) encourages municipalities to identify tools and resources to effectively plan for and manage future development within their jurisdictions. The Mandatory Shoreland Zoning Act (38 MRS § 435) requires the adoption of local shoreland zoning ordinances that regulate lands within 250 feet of normal high water of certain water bodies and wetlands.

Since Maine is a 'home rule' state, municipalities have broad authority to adopt additional local land use ordinances. Site Plan Review Ordinances have been adopted by numerous municipalities under the authority of home rule to regulate developments which normally cannot be reviewed as subdivisions. A smaller number of municipalities have also adopted ordinances limiting phosphorus export from single-lot development, promoting low impact development practices or creating set-backs along small headwater streams. In addition to local ordinance work, 30 municipalities are part of the MS4 program, which addresses NPS issues from municipal stormwater systems. The Maine Municipal Association (MMA) is a non-profit organization that provides services advocacy, education and information, professional legal and personnel advisory services, and group insurance self-funded programs for member municipalities. Numerous municipalities have also become involved in and provided support for 319 grant projects and other community efforts to protect and restore local water quality.

FMI - http://www.memun.org/

Municipal Planning Assistance Program

This program, which is housed in the Maine DACF helps municipalities manage growth to enhance economic development and natural resource protection. MPAP works with towns throughout the state's organized area. The MCP funds planning staff whose efforts focus on coastal communities and coastal issues. In In addition to administering Maine's Growth Management Act, program staff regularly provide technical assistance to local and regional planners, other municipal officials and volunteer boards on the development of land-use ordinances, interpretation of state land use laws, the local comprehensive planning process, and numerous other matters. The program also collaborates with other state agencies on the development of policies, rulemaking, comprehensive resource assessments, and other strategic state-level matters.

FMI - http://www.maine.gov/dacf/municipalplanning/index.shtml

Natural Resources Conservation Service (NRCS), USDA

The NRCS administers multiple federal Farm Bill programs that provide technical and financial assistance for implementation of water quality practices. The 2008 Farm Bill provided added opportunities for leveraging funding and other resources to improve water quality affected by agricultural and silvicultural NPS pollution. The Environmental Quality Incentives Program (EQIP) now states that "reducing NPS pollution, such as nutrients, sediment, pesticides, or excess salinity in impaired watersheds consistent with TMDLs where available" is a national priority to guide the allocation of resources. The National Water Quality Initiative (NWQI) is a

new national priority beginning in 2012 as a collaborative program between NRCS and EPA to help improve water quality where there is a critical concern. EPA, NRCS, and the state of Maine will continue to implement the NWQI to encourage and facilitate program coordination in watersheds enrolled in the program. NRCS will coordinate with DEP on the selection, implementation and monitoring of NWQI watershed projects.

FMI - http://www.nrcs.usda.gov/wps/portal/nrcs/site/me/home/

Soil and Water Conservation Districts (SWCDs)

Maine's 16 SWCDs provide local conservation leadership, teach the value of natural resources, encourage conservation efforts and help plan and implement voluntary programs. Districts are governmental subdivisions of the state that are governed by a Board of Supervisors and funded in part by the DACF and their respective counties. Districts are part of the non-profit organization, the Maine Association of Conservation Districts, which helps coordinate and publicize District activities. Districts are heavily involved in DEP's 319 grant program because of the close tie-in with their mission to NPS abatement and their close ties with the local community.

FMI - https://www.maine.gov/dacf/about/commissioners/soil_water/index.shtml

State Universities

The University of Maine System supports NPS-related work through several programs. The George Mitchell Center's Water Institute and Sustainability Solutions Initiative (SSI) conduct water-related research and promote sustainable policies and solutions through conferences, publications and local outreach. The University of Maine's Margaret Chase Smith Policy Center convened a wide range of stakeholders to examine winter salt issues and authored a comprehensive report that spurred the formation of the Winter Salt Task Force. In addition, professors and students at several campuses provide assistance with water quality monitoring and technical assistance on local projects. Outside of Maine, the University of New Hampshire's Stormwater Center conducts research and outreach related to stormwater BMPs in cold climates.

FMI – SSI - http://www.umaine.edu/sustainabilitysolutions/about/index.htm
UNH Stormwater Center - http://www.unh.edu/unhsc/

Table 7. Programs, Partners, and Roles.

Program and Partner Names	Education & Outreach	Financial Assistance	Technical Assistance	Technology Transfer	Monitoring	Regulatory Enforcement	Policy & Planning
Maine Coastal Program		X	X	X			X
Maine DEP Stormwater Program (MEPDES)			X			X	
Maine Department of Marine Resources					X		
Maine Drinking Water Program		X					X
Maine Healthy Beaches	X		X		X		
Municipal Planning Assistance Program							X
Municipalities	X	X				X	X
Natural Resources Conservation Service		X	X	X			
Soil and Water Conservation Districts	X		X	X	X		
State Universities	X		X	X	X		X
Tribal Governments	X		X		X		
US EPA	X	X	X	X	X	X	X

Tribal Governments

Five federally-recognized Native American tribes are located within the State of Maine. These include the Houlton Band of Maliseet Indians; the Penobscot Indian Nation; the Passamaquoddy Tribe of Indians at Pleasant Point Reservation; the Passamaquoddy Tribe of Indians at Indian Township Reservation; and the Aroostook Band of Micmacs. The Houlton Band of Maliseets and Penobscot Nation have water quality and NPS programs. The Meduxnekeag River is an integral part of the Maliseet tribal culture. The tribe conducts regular water quality monitoring in the rivers and its tributaries, carried out an EPA Targeted Watershed Initiative project and is currently partnering with local organizations including the Southern Aroostook Soil and Water Conservation District to carry out NPS mitigation work in the watershed. The Penobscot Nation's Water Resources Program is focused on the Penobscot River, water quality monitoring and partnerships to address NPS problems.

FMI – Houlton Band of Maliseets - http://www.maliseets.com/natural_resources.htm
Penobscot Nation - http://www.penobscotnation.org/DNR/Water/wrhome.html

C. Partnerships with Non-Governmental Organizations

DEP relies on local non-governmental organizations to carry out NPS assessment and remediation work at the local level. These groups provide local knowledge and expertise, carry out monitoring and stewardship, and provide in-kind support or direct funding to get work done. The most successful NPS projects typically are initiated and implemented by a dedicated local organization with support from other local, regional, or statewide groups. Although there are too many organizations to list each individually, the key non-governmental organizations and types of groups are described below.

Casco Bay Estuary Partnership (CBEP)

CBEP is part of the National Estuary Program established by EPA. CBEP works with partners to protect and restore the water quality and fish and wildlife habitat of the Casco Bay ecosystem, while ensuring compatible human uses. CBEP's work is guided by the following five goals in the Casco Bay Plan: support projects to conserve and restore habitat, manage stormwater, monitor water quality, reduce toxic contamination, and promote active stewardship in the Casco Bay. CBEP's focus area is the Casco Bay watershed, which covers 986 square miles and includes 42 municipalities. CBEP provides financial support, collects scientific data, catalyzes project development and implementation, provides technical assistance, and promotes citizens involvement and awareness.

FMI - http://www.cascobay.usm.maine.edu/index.html

Maine Lakes Society (MLS)

MLS, formerly known as Maine Congress of Lake Associations, was formed in 1970 as a non-profit, charitable organization focused on protecting water quality and promoting sound land-use practices for the protection and preservation of Maine's lakes. MLS serves as an information clearinghouse and conducts education to lake associations through its website, annual conference, newsletter, floating classroom program, and other avenues. MLS also conducts legislative advocacy related to lake management issues. In 2012 the LakeSmart program was transferred from DEP to MLS. LakeSmart was established in 2002 to recognize lake-friendly properties and promote a new norm for lakefront development.

FMI - www.mainecola.org

Maine Marine Trades Association (MMTA)

MMTA is a not-for-profit trade association with over 200 members that promotes Maine's marine industry and assists in the development of best practices with a focus on the environment, and health and safety. MMTA sponsors the Clean Marinas and Boatyards Program in partnership with DEP, MCP and other partners. The program provides technical assistance, resources to help marinas and boatyards reduce pollution, and recognition to facilities that meet program standards.

FMI - http://www.mainemarinetrades.com/

Piscataqua Region Estuaries Partnership (PREP)

PREP is part of EPA's National Estuary Program. PREP's mission is to carry out the Comprehensive Conservation and Management Plan, which outlines 98 Action Items to improve water quality in the Great Bay Estuary and the Hampton-Seabrook Estuary. PREP provides financial assistance to partners and projects, conducts water quality and environmental monitoring, and conducts education and outreach programs. In 2007 the PREP Management Committee expanded PREP's focus area to the entire Great Bay Estuary watershed, including the 24 percent of the watershed in Maine. In total, the watersheds include 42 municipalities in New Hampshire and 10 municipalities in Maine. PREP receives its funding from the EPA and is administered by the University of New Hampshire.

FMI - http://www.prep.unh.edu/

Maine Volunteer Lake Monitoring Program (VLMP)

VLMP is a nonprofit organization that trains, certifies, and provides technical support to over 1,000 volunteers who monitor a wide range of indicators of water quality, assess watershed health and function, and screen over 500 lakes for invasive aquatic plants and animals. VLMP volunteers monitor assigned lakes twice a month from April through September, and the resulting data is used by DEP to help determine lake health and attainment status. VLMP also conducts outreach about water quality issues and watershed stewardship through its annual meeting, website, trainings, newsletters, and annual report.

FMI - http://www.mainevlmp.org/

Watershed Organizations

Local watershed organizations are key partners in NPS work including water quality monitoring, outreach, and watershed stewardship. Several regional groups focused on water resource protection include Friends of Casco Bay, Lakes Environmental Association, Belgrade Region Conservation Alliance, Cobbossee Watershed District, 30 Mile River Watershed Association, Raymond Waterways Protective Association, Acton Wakefield Watersheds Alliance, China Region Lakes Alliance, and Friends of the Cobbossee Watershed. These organizations tend to have some paid staff and often serve as resources for smaller organizations. In addition to these larger groups, there over 200 lake associations that focus on individual lakes, and a smaller number of groups focused on rivers, streams, and marine areas.

Wells National Estuarine Reserve

Wells Reserve is one of 28 national estuarine reserves that partners with the National Oceanic and Atmospheric Administration to study and protect vital marine and estuarine resources. Wells Reserve conducts marine research and water quality monitoring and coordinates the volunteer monitoring efforts of the Mousam and Kennebunk River Alliance. They also conduct education through school programs, decision-maker training, and work with partners to promote watershed protection in coastal watersheds in Southern Maine.

FMI - http://www.wellsreserve.org/

Table 8. Partner Organizations and Roles.

Partner Organizations and Roles	Education & Outreach	Financial Assistance	Technical Assistance	Technology Transfer	Monitoring	Policy & Planning
Casco Bay Estuary Partnership	X	X	X	X	X	
Maine Lakes Society	X					X
Maine Marine Trade Association	X		X			
Piscataqua Region Estuaries Partnership	X	X				
Volunteer Lakes Monitoring Program	X		X		X	
Watershed Organizations	X		X		X	
Wells National Estuarine Research Reserve	X			X	X	

D. Program and Partnership Strategies

Technical Assistance Programs

DEP will provide technical assistance to support watershed groups, municipalities and others with local efforts to identify and fix NPS sources in their communities. This support will be provided through ongoing work including:

- Assist with volunteer training and provide technical assistance for locally-funded watershed surveys, planning and implementation.
- Provide information to municipalities working on Comprehensive Plans and review plans for consistency and completeness.
- Promote long-term, ongoing watershed stewardship through the use of the NPS Site Tracker and help partners and local groups use the tool.
- Provide technical manuals, information about grant opportunities and other available resources.

NPS Outreach Programs

DEP will build public awareness of NPS issues and promote positive actions through communication of the issues and solutions. In addition, DEP aims to provide partners and citizens with skills and expertise to implement BMPs to reduce NPS pollution. Actions include:

- Provide services and technical support for successful implementation of outreach efforts identified in WBPs, 319-funded efforts and key partner efforts.
- Work with partners to promote effective outreach strategies based on principles outlined in EPA's *Getting In Step: A Guide for Conducting Watershed Outreach Campaigns* (2010).

- Serve as a catalyst for more effective behavior change and BMP promotional outreach efforts.
- Provide technical transfer, training opportunities and certification programs to key audiences utilizing the NPS Training and Resource Center.
- Develop and promote DEP online training modules to serve municipal NPS education and assistance needs.

Partnerships

Maine's NPS program will build and strengthen partnerships at the program and project level to maximize effectiveness and efficiency of NPS mitigation efforts. These partnerships will be fostered through numerous actions including:

- Establish a NPS Lead Agency workgroup that will meet twice a year to report on progress with implementation of the Maine NPS Management Plan and seize opportunities for further collaboration.
- Continue to work with EPA and NRCS to carry out the National Water Quality Initiative in Maine. DEP will select a watershed and develop an assessment plan that collects data to evaluate the success of the work in the watershed in addressing the lake or stream's impairment.
- Continue to conduct the annual Watershed Roundtable to bring together watershed professionals to share information, network and collaborate.
- Continue to work with other government agencies to address and improve areas of environmental concern (e.g., impaired waters, compliance with instream flow and water level rules, fragile waters in need of protection, and a watershed approach).

319 Grant Administration Strategies

DEP will administer the Section 319 grant funds to comply with EPA program requirements and help ensure success of statewide NPS programs and NPS watershed projects.

- Carry out priorities and commitments outlined in the EPA-DEP Performance Partnership Agreement (e.g., GRTS reporting, annual reports, annual work plan).
- Conduct sub-recipient monitoring according to program standard operation procedures.
- Administer the NPS grants program to meet fiscal management guidelines.
- Ensure that at least 50 percent of the annual Section 319 award is allocated to implement accepted WBPs and the other funds are allocated for eligible NPS program activities.
- Complete and close out all active grant projects within the contract period.

IX. Funding

Many sources of funding are available to conduct NPS assessment and mitigation work. These include grants, loan programs, direct funding, and in-kind contributions. Many of these sources are highly competitive and have specific purposes and requirements. As a result, it is a significant challenge to garner the resources needed to restore and protect Maine's vast water resources. Successful NPS mitigation efforts often leverage multiple funding sources and also work to raise ongoing funding from the local community. Some of the main NPS funding sources are described in the following section.

A. Funding Sources

Clean Water Act, Section 319 and 604(b) Grants

DEP administers a competitive grants program using Section 319 and 604(b) funding from EPA to help communities identify NPS sources, prepare WBPs, and take action to reduce or prevent NPS pollution. Maine public organizations such as state agencies, Soil and Water Conservation Districts, regional planning agencies, watershed districts, municipalities, and nonprofit (501c3) organizations are eligible to receive grants. An annual RFP process offers grants for developing watershed plans and implementing projects identified in the plans. Local project sponsors are required to provide a minimum of a 40 percent match to the grant funds. Projects are typically conducted over a two-year period.

FMI - http://www.maine.gov/dep/water/grants/319.html

Clean Water State Revolving Fund

As noted by EPA, the CWSRF under Title VI of the Federal Water Pollution Control Act is the largest water quality financing source in the nation. Through the CWSRF program, each state and Puerto Rico maintain revolving loan funds to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize the CWSRF programs are provided through federal government grants and state matching funds (equal to 20 percent of federal government grants). States may choose from a variety of assistance options, including loans, refinancing, purchasing, or guaranteeing local debt and purchasing bond insurance. States can also set specific loan terms, including interest rates from zero percent to market rate, and repayment periods up to 30 years or the useful life of the project, whichever is less. States have the flexibility to target resources to their particular environmental needs, including polluted runoff from urban and agricultural areas, wetlands restoration, groundwater protection, brownfields remediation, estuary management, and wastewater treatment. Additional information on the CWSRF program is available at http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm

In Maine, CWSRF funds nonpoint source projects through three different loan mechanisms; direct loans, pass-through loans, and a linked-deposit loans. In an effort to provide additional funding for private nonpoint source projects, DEP expanded the traditional CWSRF direct loan

program into the other two loan programs. DEP and the Maine Municipal Bond Bank (MMBB) jointly administer the CWSRF. DEP administers the technical aspects of the program and project eligibility; the Maine Municipal Bond Bank (MMB) is the financial manager of the fund.

- **Direct Loans** - Through direct loans from the CWSRF to municipal and quasi-municipal entities, low interest funding is provided for NPS abatement projects. The DEP funds NPS projects for stormwater (e.g. tree gardens, infiltration basins, green roofs, bio-swales, and bio-retention cells); the capping and other water-quality related closure activities for non-discharging municipal landfills; and the covering of contaminated sand/salt storage areas.

- **Pass-Through Loans -** Maine's CWSRF has two pass-through loan programs that provide low interest funding for private nonpoint source pollution controls. Under these programs the Maine's CWSRF provides funding to other state agencies that in turn make low interest loans to private individuals for the projects.

  The DEP in partnership with the MMBB, the Finance Authority of Maine (FAME), and DACF, implemented the Nutrient Management Loan Program (NMLP) for the construction of containment and handling facilities for manure and milk room waste. The NLMP program was recently expanded to fund NPS abatement projects that reduce or treat agricultural runoff, conserve irrigation water use, and reduce the impact of agricultural irrigation water withdrawals to stream flows and aquatic life by constructing irrigation reservoirs. The eligible projects now approved for funding align with agricultural NPS BMPs and projects need to comply with the Department's Chapter 587: In-Stream Flows and Lake and Pond Water Levels rule. Under this arrangement, the DACF will review the projects for program eligibility and ensure that the projects are completed in accordance with USDA Natural Resources Conservation Service's (NRCS) design criteria. FAME provides the low interest loans to the borrowers.

  In partnership with the MMBB and the Maine State Housing Authority, the DEP implemented the Septic System Replacement and Overboard Discharge Removal Loan Program to abate pollution from NPS decentralized wastewater treatment systems. Under this arrangement the Housing Authority provides the low interest loans to the borrowers.

- **Linked Deposit Loans –** To provide these low interest CWSRF loans, the MMBB works with a private lending institution to fund the NPS control by accepting a reduced rate on a certificate of deposit (CD) investment and the lending institution agrees to provide a loan to the borrower at a similarly reduced rate. The Maine Forestry Direct Link Loan Program provides incentive financing to loggers that reduce NPS pollution risk on timber harvests. This program, which works in partnership with the MMBB and the Maine Forest Service, provides low interest loans for silviculture best management practices. Recent changes in this program have expanded the pool of eligible borrowers and increased the loan limit in an effort to provide funding for more NPS controls.

  FMI - http://www.maine.gov/dep/water/grants/srfparag.html

Casco Bay Estuary Partnership Grant Programs

CBEP carries out two grant programs focused on NPS and water quality in the Casco Bay watershed. Non-profit conservation groups, towns, and state and federal conservation programs are eligible to apply for funds. The Casco Bay Water Quality Monitoring Equipment Loaner Program provides partners with CBEP water-quality monitoring equipment to collect water quality data during the May through October field season. The Casco Bay Community Based Habitat Enhancement Program supports local, community-based, projects that combine habitat enhancement activities with strong education and stewardship components.

FMI - http://www.cascobay.usm.maine.edu/grants.html

Farm Service Agency (FSA) Conservation Reserve Program

The FSA carries out the Conservation Reserve Program, a voluntary program that provides funding for conservation practices on sensitive lands addressing water quality and wildlife management concerns. NRCS provides the technical assistance for the program.

FMI - http://www.nrcs.usda.gov/wps/portal/nrcs/main/me/programs/financial/

Lake Stormwater Phosphorus Compensation Fee Program

Under the Maine Storm Water Management Law, projects located in eligible lake watersheds may satisfy permit requirements for phosphorus reduction by paying a compensation fee into a Lakes Stormwater Phosphorus Compensation Fund for that same eligible lake watershed. The development project needs to be designed to provide at least 60 percent reduction in off-site export of phosphorus required by the permit. The fee rate is $25,000 per pound of phosphorus. Compensation fund monies are used to implement Stormwater Compensation Projects to reduce phosphorus export from existing high phosphorus export land uses in the lake watershed. DEP staff works annually with seven partner organizations to identify and implement phosphorus mitigation projects in these watersheds.

FMI - http://www.maine.gov/dep/water/grants/stormwatercomp/

Local Funding

Local funding is key to fixing NPS problems and is often the source of match required by grant programs. Since grant funding is limited, it can also be the sole source of funding for projects that are important to local community but that don't fit in well with grant programs. Local funding can be in the form of in-kind services or directed funding, and come from municipalities, local organizations, private businesses, and individual citizens. Given the high costs associated with some restoration projects, certain communities are also exploring and pursuing stormwater utilities and other ways to raise dedicated funds for watershed restoration work.

Maine Coastal Program Grants

Towns and regional organizations in Maine's coastal zone are eligible to apply for small grants through the Maine Coastal Program. The Coastal Communities Grant Program provides funds to towns and regional organizations for projects designed to improve water quality, increase resiliency and adaptation to erosion and flooding, conserve coastal habitat, promote

sustainable development, and enhance the coastal-dependent economy while preserving natural coastal resources. In Fiscal Year 2013, $143,000 was awarded through this program. Grantees are required to provide at least 25 percent non-federal match. Education Grants provide up to $10,000 to educational efforts relating to Maine coastal issues and projects that relate to greater ocean literacy.

FMI - http://www.maine.gov/doc/commissioner/landuse/financial/index.shtml

Maine Natural Resource Conservation Program

The MNRCP was created to manage the allocation of funds collected through DEP's In Lieu Fee Compensation Program. This voluntary program allows entities that are impacting natural resources, primarily wetlands, to make a payment directly to the DEP as an alternative to the traditional mitigation process. Fees collected by DEP are deposited in a Natural Resource Conservation Fund administered by The Nature Conservancy. Public agencies, non-profit conservation organizations, and private entities can apply through a competitive process, for funds to restore, enhance, preserve, and create high quality natural resources throughout the State of Maine. Funding is available for land acquisition, habitat enhancement and restoration, and projects that restore watershed health.

FMI - http://www.maine.gov/dep/land/nrpa/ILF_and_NRCP/MNRCP/

Maine Small Community Grants Program

The program provides grants to towns to help replace malfunctioning septic systems that are polluting a waterbody or causing a public nuisance. Grants can be used to fund from 25 to 100 percent of the design and construction costs, depending upon the income of the owners of the property, and the property's use. An actual pollution problem must be documented in order to qualify for funding. The highest priority is given to problems that are polluting a public drinking water supply or a shellfishing area.

FMI - http://www.maine.gov/dep/water/grants/scgpara2.html

Natural Resource Conservation Service Programs

The NRCS carries out several programs that provide funding for conservation practices on agricultural lands. This includes the Wildlife Habitat Incentive Program (WHIP) the Regional Conservation Partnership Program (RCPP) and Environmental Quality Incentive Program (EQIP). The EQIP program aligns especially well with NPS mitigation. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air, and related resources. Projects located in watersheds selected through USDA and EPA's National Water Quality Initiative are designated as high EQIP funding priorities. The NWQI is a national program started in 2012 that provides targeted EQIP funding to help farmers install practices to reduce water quality impacts in priority watersheds. States work with NRCS to identify focus areas and conduct assessment to track restoration progress.
FMI –
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelprdb1047761

Piscataqua Region Estuaries Partnership Grant Programs

PREP offers several grant programs to municipalities, community groups, watershed associations, and other organizations that conduct conservation work in PREP's coastal watershed. The annual Local Grants Program must relate to at least one Action Item from PREP's Management Plan. Eligible activity areas include water quality, land use and habitat protection, shellfish resources, habitat restoration, and public outreach. A request for proposals is issued each fall. The Community Technical Assistance Program provides assistance to communities on a wide range of regulatory and non-regulatory approaches to natural resources protection. The program is intended to be simple for communities; PREP pays for the assistance and manages the contract agreement with the Technical Assistance Providers.

FMI - http://www.prep.unh.edu/programs/grant-programs.htm

State General Fund

The State of Maine provides funding for two staff positions in the DEP's NPS Program. Funding is provided through the State's General Fund and fulfills part of the State's requirement to match EPA 319 funding.

X. NPS Program Five-year Objectives, Actions, and Annual Milestones

This section provides the five-year objectives, actions, and milestones for Maine's NPS program for the years 2015 through 2019. Table 9 focuses on DEP's watershed approach to improve and protect water quality. Tables 10 to 15 list objectives for Maine's statewide approach to address six major NPS pollution categories: developed areas, agriculture, transportation, forestry, subsurface wastewater disposal, and hydrologic modification. Table 16 lists objectives for partnerships, funding and NPS program administration.

Table 9. Watershed Approach Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Prioritization: Complete revisions to the evaluation criteria and the methodology used for prioritizing lakes, streams and marine waters (NPS Priority Watersheds list) Partners: DACF, DMR	• For lakes, evaluate use of aluminum sediment core data in the lake vulnerability index when data is available. Update priority watersheds list incorporating results, if appropriate. • For streams, evaluate use of Recovery Potential Screening tool (EPA) to assist with prioritization of impaired and threatened streams. Update priority watersheds list incorporating model results, if appropriate. • For marine waters, work with DMR, Healthy Beaches Program and other partners to investigate ways to improve the prioritization as new data or methods becomes available. • Improve methodology to assign priority among NPS priority watersheds to progressively address protecting or restoring NPS priority watersheds.	1. Revised NPS priority watersheds list evaluation criteria and methodology			X		
2. Prioritization: Evaluate NPS priority lists annually as new information becomes available.	• Annually evaluate NPS priority watersheds lists. Announce public opportunity to submit requests and support for waterbodies to be added to the priority lists. • Update priority lists as needed - add or remove individual waterbodies as new information becomes available.	2. Updated NPS priority watershed list	X	X	X	X	X

Table 9. Watershed Approach Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
3. Planning: Approve 5 nine element watershed based plans (WBP) for restoration of impaired waters.	• Provide to decision makers the information needed to develop sound WBPs including data necessary to determine the dominant stressors contributing to the impairment and sufficient watershed and stream corridor information to identify and prioritize specific implementation activities needed to restore the waterbody. • Provide technical support, guidance and when available funding for development of effective WBPs.	3. Nine element WBPs	2	1	1		1
4. Planning: Approve 10 alternative WBPs for protection of unimpaired waters.	Working with partners, provide technical assistance and funding for watershed surveys to support the development of lake watershed-based protection plans. Coordinate to secure EPA approval of alternative WBPs.	4. Alternative WBPs	2	2	2	2	2
5. Planning: Approve updates of 3 existing nine element WBPs.	Working with partners, provide technical assistance to support updates of nine-element WBPs.	5. Updated nine-element WBPs			1	1	1
6. Planning: Develop guidance document to identify stream stressors.	Develop a guidance document to help partners identify stream stressors and develop WBPs for urban impaired streams.	6. Stream stressors guidance document		X			
7. Planning: Develop guidance document to update WBPs.	Develop guidance for updating WBPs that will be more than ten years old between 2015 and 2019 and share with groups associated with these plans.	7. Guidance document for updating WBPs		X			

Table 9. Watershed Approach Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
8. Restoration: Fully or partially restore 2 NPS impaired waterbodies; Prepare NPS Success Stories that document the restorations.	• Provide technical support and funding through NPS Section 319 grant program to support implementation of WBPs for waters with high potential to be restored. • Work with local municipalities and interest groups to resolve pathogen contamination problems on bacteria-impaired waterbodies (includes marine and freshwaters). • Collect targeted water quality and biological health information to determine the effectiveness of implementation efforts and guide modifications to the WBP. • Evaluate available data to determine if water classification standards have been met or if there has been substantial incremental improvement in water quality and/or ecological condition.	8. NPS success stories about partially or fully restored waterbodies (WQ-10)					2
9. Restoration: Collaborate with EPA and NRCS in the NWQI program to make progress restoring impaired waters.	• Coordinate with EPA and NRCS to select watersheds for the National Water Quality Initiative program (NWQI). • Conduct ambient water quality monitoring of Oliver Brook, within the Nickerson Lake - Meduxnekeag River subwatershed selected under the NRCS NWQI	9. Water quality monitoring results for Oliver Brook.		X	X	X	X
10. Target efforts to maintain open shellfish harvesting areas or restore closed shellfish harvesting areas.	• MCP, DMR and DEP will identify priority target watersheds. MCP, DMR and DEP will help municipal and watershed groups adopt regulatory or non-regulatory measures, complete targeted projects, or implement recognized BMPs to reduce impacts to coastal water quality in target watersheds of priority shellfish growing areas. • This work will be conducted to make progress opening closed shellfish growing areas.	10. Number of municipalities that adopt: new plans and policies; regulatory or non-regulatory measures; complete targeted projects or implement BMPs	X	X	X	X	X

Table 9. Watershed Approach Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
11. Substantial Improvement: Demonstrate substantial Improvement in water quality and/or ecological condition in 3 NPS impaired waterbodies.	• Provide technical support and funding through NPS Section 319 grant program to support implementation of WBPs for waters with high potential to be restored. • Work with local municipalities and interest groups to resolve pathogen contamination problems on bacteria-impaired waterbodies (includes marine and freshwaters). • Collect targeted water quality and biological health information to determine the effectiveness of implementation efforts and guide modifications to the WBP. • Evaluate data to determine if water classification standards have been met or if there has been substantial incremental improvement in water quality and/or ecological condition.	11. NPS success stories that show progress toward achieving water quality goals or about ecological restoration		1		1	1
12. Protection: Develop 2 guidance documents to estimate effectiveness of watershed protection efforts.	Develop metrics and methods to evaluate effectiveness of efforts to protect unimpaired threatened waters. • 2015 For lake watersheds • 2016 for stream and marine watersheds	12. Demonstrating protection guidance documents	X	X			
13. Protection: Demonstrate effective protection of 8 unimpaired threatened waters.	• Provide technical support and funding through NPS Section 319 grant program to support implementation of WBPs. • Evaluate the effectiveness of the protection projects.	13. Watershed protection success stories		2	2	2	2
14. Provide technical support to help watershed groups conduct NPS watershed surveys.	Provide training and technical assistance for NPS watershed surveys to help protect or restore NPS priority watersheds.	14. Completed NPS watershed surveys	3	3	3	3	3

Table 10. Statewide Approach - Developed Areas Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Incorporate additional low impact development (LID) design practices into Maine's stormwater statutes and rules.	• Review Chapter 500 Stormwater Management Rules and proposed changes to Chapter 500 for opportunities to encourage or incentivize use of LID strategies and design practices.	1. By 2015, issue proposed revised Chapter 500 rules	X				
2. Regularly update the Maine Stormwater Best Management Practices (BMP) manual to reflect the current best management practices.	• Solicit input annually from consulting community and other interested parties. • Evaluate proposals for new or modified BMPs (including proprietary systems) for approval for use under Chapter 500 Stormwater Rules. • When reviewing the effectiveness of current BMP practice standards and specifications, consider the impacts of more frequent extreme wet weather events. • Propose updates to manual as warranted, solicit input through public comment.	2. Update manual as new or modified BMPs are approved	X	X	X	X	X
3. Maintain the number of Contractors Certified In Erosion & Sediment Control BMPs.	DEP NPS Training and Resource Center will continue to administer the Erosion and Sediment Control Contractor Certification Program and track the number of certified contractors (increased from 1,630 in 2012 to 2,700 in 2014).	3. Number of Contractors Certified In Erosion & Sediment Control BMPs	X	X	X	X	X
4. Provide municipalities with NPS training and resources to prompt and improve local water resource protection.	DEP NPS Training and Resource Center will use Adobe Connect to produce 20-minute educational programs and on-line resources for NPS training for municipal officials on topics such as NPS pollution prevention and low impact development.	4. Adobe Connect educational programs completed		2		2	

Table 10. Statewide Approach - Developed Areas Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
5. Document chloride salt impacts on streams.	Prepare a report summarizing DEP findings about how excessive chloride salt use in developed areas has adversely impacted aquatic life of some streams in Maine. Chloride salts degrade water quality, soil quality, and ecosystems. Specific effects vary by location.	5. Chloride salt impact on streams (document)			X		
6. Provide municipalities with technical assistance on protection and restoration of local waterbodies.	Provide information to municipalities working on Comprehensive Plans and review plans for consistency and completeness.	6. Comprehensive Plan reviews completed	4	4	4	4	4
7. Prevent and mitigate NPS impacts from unpaved camp roads.	The NPSTRC will provide training workshops and/or online resources.	7. Number of participants receiving training	X	X	X	X	X

Table 11. Statewide Approach - Agriculture Lead Agency: Maine DACF			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Monitor agricultural operations to ensure compliance with the requirement to implement approved nutrient management plans (NMP).	• Evaluate agricultural operations (AOs) to determine if they need to develop and implement an approved NMP. • Track existing AOs with an approved NMP to ensure that their NMP is up-to-date. • Provide guidance for initial development of a NMP or for facilitating updates as needed. • Continue to identify AOs that need an NMP and help AOs comply with the obligation to operate according to a NMP.	1. Each year report: The number of AOs that maintain and implement an approved NMP; An estimate of the number of AOs that need a NMP.	X	X	X	X	X
2. Monitor agricultural operations to ensure compliance with requirement to operate according to a Livestock Operations Permit (LOP).	• Evaluate new or expanded agricultural operations (AOs) to determine their requirement for obtaining a LOP. • Continue to identify AOs that need a LOP and help AOs comply with the obligation to operate according to a LOP. • Evaluate farms to determine if they are considered a CAFO as defined by state or federal regulations. • Initiate steps for appropriate permitting of these entities as needed. • Conduct annual inspections of CAFOs to determine compliance with terms of the LOP. •	2. Each year report: The number of AOs that operate according to a LOP; and An estimate of the number of AOs that need an LOP.	X	X	X	X	X
3. Update the Nutrient Management Program Rules	• Evaluate soil test time frame validity, evaluate NMP variance operational timeline; • Incorporate Maine Phosphorous Index criteria if feasible; • Address carcass disposal issues; Incorporate Compost Management Plan criteria; • Update certification requirements for planners; • Address livestock access to waterbodies	3. By 2015, complete draft of rules; by 2016 hold public hearing; and by 2017 adopt the revised rules.	X	X	X		

Table 11. Statewide Approach - Agriculture Lead Agency: Maine DACF			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
4. Continue to implement the Agricultural Compliance Program to resolve water quality related complaints.	• Investigate complaints concerning farm operations that involve threats to human or animal health and safety, and to the environment. • Prescribe new or modified site-specific best management practices where needed to resolve the issue, particularly water-quality-related matters. • Develop and maintain a database or spreadsheet to track and categorize agriculture complaints received and resolutions • Prepare a concise annual summary of water quality related complaints received, investigated and resolved.	4. Annual summary of water quality related complaints received, investigated and resolved	X	X	X	X	X
5. Develop a brochure for farmers outlining NPS pollution BMPs for farming operations.	• Consider Maine agricultural BMP guidelines, select ten or more of the most significant BMPs and develop an informative quick-read brochure for farmers. • Promote adoption of the BMPs by distributing the brochure at trade shows, meetings, educational events and direct contact with farmers.	6. NPS BMPs brochure for farmers			X		

Table 12. Statewide Approach - Transportation Lead Agency: MaineDOT			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Continue using Erosion and Sedimentation Control BMPs on applicable MaineDOT projects.	• Continue to implement and enforce MaineDOT Standard Specification 656. • Continue ongoing ESC training for MaineDOT staff and contractors. • Report on summary of MaineDOT activities as required by the Stormwater MOA between DEP and MaineDOT	1. Annual Stormwater MOA report to MDEP	X	X	X	X	X
2. Regularly update the MaineDOT Erosion and Sedimentation Control BMPs manual to reflect the current BMPs.	• Receive input annually from vendors, contractors, and professionals as appropriate. • Evaluate proposals for new or modified BMPs (including proprietary systems) for approval for use. • When reviewing the effectiveness of current BMP practice standards and specifications, consider the impacts of more frequent extreme wet weather events. • Propose updates to manual as warranted.	2. Update BMPs manual as new or modified BMPs are approved by MaineDOT	X	X	X	X	X
3. Promote chloride salt reduction BMPs to protect water quality while maintaining safe roads for travelling public.	• Continue Maine Local Roads Center (MLRC) training and BMP Task Force to promote snow and ice control BMPs to municipal PWs. • MaineDOT will continue to investigate new products, technologies, or efficiencies to reduce the use of chlorides.	3. MLRC will track number of towns that received training. MaineDOT will document its research or use of new products or technologies for winter maintenance on its Winter Maintenance Research Reports web page.	X	X	X	X	X
4. Promote reduction in the number of outdoor sand/salt piles.	• MaineDOT will reduce the number of outdoor sand/salt piles. • MLRC will continue technical assistance to towns regarding town salt storage facilities, and will continue its funding for improvement of salt storage facilities until 2016.	4. MaineDOT will reduce the number of outdoor sand/salt piles from 30 to 22 (25%).					X

Table 13. Statewide Approach - Forestry Lead Agency: Maine Forest Service			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Increase overall effective BMP application on harvests from 83% to 90% or greater. Effective BMPs include all appropriately applied BMP practices, effective planning and avoiding waterbody crossings.	• Offer BMP training programs, with partners including the Maine Sustainable Forestry Initiative, Certified Logging Professional, Qualified Logging professional program and Northeast Master logger. • Deliver existing or develop new and topic specific trainings as needed to address problem areas when identified by monitoring, compliance inspections and industry consultation. • Work with DEP and Maine Municipal Bond Bank and EPA to maintain CWSRF funding and promote the Maine Forestry Direct Link Loan Program financing to reduce NPS risk at timber harvest sites. • Apply northeast regional forestry BMP monitoring protocol on a biennial basis to assess use & effectiveness of forestry BMPs.	1. Maine Forestry BMPs Use and Effectiveness report that documents the achievement of the objective by 2018 (and interim progress by 2016)		X		X	
2. Maintain the Forest Ranger-approved water quality inspections of timber harvest sites at over 90%.	• Forest rangers will continue routine inspections of timber harvests for environmental compliance. • MFS field foresters will continue to provide technical assistance to prevent problems from occurring and quickly fix problems encountered during inspections.	2. Percentage of approved water quality inspections & number of inspections referred for enforcement action	X	X	X	X	X
3. By 2018, improve consistency for the regulated community by increasing the number of critical mass municipalities that have adopted statewide standards for timber harvesting in shoreland areas from 182 to 252.	• Work with DEP to make significant progress toward adoption of statewide standards for timber harvesting in shoreland areas. Focus on the list of municipalities with the highest average timber harvest acreage. When critical mass is met, statewide standards will take effect in the unorganized areas. • Provide outreach to municipalities that have not yet adopted statewide standards for timber harvesting in shoreland areas. • Encourage DEP to adopt ordinances for towns that do not act by 2017.	3. By January 2016, 35 new municipalities adopt statewide timber harvesting standards, or DEP adopts ordinances for them. By January 2017, an additional 35 new municipalities adopt statewide timber harvesting standards or DEP adopts ordinances for them.		X	X		

Table 14. Statewide Approach - Subsurface Wastewater Disposal Lead Agency: Maine DHHS, Environmental Health			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Ensure municipalities properly implement Subsurface Wastewater Disposal (SSWD) rules.	• Conduct at least one municipal review of subsurface wastewater disposal activities for each municipality over the 5-year period ending 2019. There are 490 municipalities in Maine. About 100 reviews per year will be completed. • Respond to requests for assistance from municipalities. • Assist in the training and licensing of Local Plumbing Inspectors.	1. Number of municipal reviews completed in the year and number of municipal reviews found satisfactory	X	X	X	X	X
2. Improve the State's Voluntary Onsite Sewage Disposal System (OSDS) Inspection Program.	• Evaluate the current voluntary OSDS inspection program and certification process. Propose ways to strengthen the voluntary OSDS inspection program. These could take the form of statutory changes to make certification mandatory or through rule changes to clarify what must be included as part of an inspection. • Update Inspection Form to reflect changes implemented. • Modify training program to incorporate results of review and changes	2a. Feasibility report completed by 12/31/2016 2b. Proposed Statutory/Regulatory changes by 12/31/2017 2c. Revise Inspection Criteria by 6/30/2019		X	X		X

Table 15. Statewide Approach - Hydrologic Modification Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Adopt new standards for stream crossings (new, repair, replacement) designed to improve fish passage, hydraulic capacity and resiliency to larger storm events.	• DEP will continue to participate, along with DOT, other state natural resource agencies, and private sector groups, in the development of an Aquatic Resource Management Strategy to reestablish the connectivity of stream systems. DEP will propose new standards for stream crossings under the Natural Resources Protection Act. • Identify funding mechanisms, develop training programs and to assess/prioritize watersheds where removing passage impediments will result in the greatest connectivity of fisheries habitats.	1a. By 2016, draft standards for public comment. 1b. By 2017, complete aquatic resource management strategy. 1c. By 2017, adopt new standards for stream crossings.		X	X X		

Table 16. DEP Programs, Partnerships and Funding Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
1. Partnerships: Build and strengthen partnerships of the lead state agencies to coordinate efforts and effectively implement the Maine NPS Management Plan implementation.	Establish a NPS Lead Agency workgroup that will meet twice a year to report on progress with implementation of the Maine NPS Management Plan and seize opportunities for further collaboration.	1. NPS lead agency workgroup established	X				
2. Partnerships: Build and strengthen partnerships at the program and project level to maximize effectiveness and efficiency of NPS mitigation efforts.	• Conduct the annual Watershed Roundtable to bring together watershed professionals to share information, network and collaboration. • Coordinate and improve the watershed managers' listserve to efficiently distribute and promote sharing of information and resources between partners.	2. Annual NPS Watershed Roundtable	X	X	X	X	X
3. Funding: Facilitate CWSRF funding for NPS projects by exploring new funding avenues and publicizing funding opportunities.	• Look for opportunities to expand the eligibility of NPS controls that can be funded through the Clean Water State Revolving Fund (CWSRF) and mechanisms that can deliver that funding. • Determine if there are barriers to prioritization of NPS projects, and if so, develop recommendations and coordinate with the CWSRF program to encourage approval of NPS projects. • Track CWSRF projects and funding awarded to NPS projects and produce an annual summary report. • Publicize funding opportunities on the watershed managers' listserve.	3. Provide a summary of CWSRF funding on NPS projects in the annual NPS Program Report.	X	X	X	X	X

Table 16. DEP Programs, Partnerships and Funding Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	**Actions**	**Milestones**	2015	2016	2017	2018	2019
4. NPS Management Program Administration Continue to manage and implement the NPS program to meet program goals and work towards addressing the state's water quality problems as effectively and expeditiously as possible.	• DEP employs appropriate programmatic and financial systems that ensure section 319 dollars are used efficiently and consistent with fiscal and legal obligations (Section 319 grant program guidelines, EPA-DEP Performance Partnership Agreement). • In keeping with Clean Water Act Section 319 (h)(8) and (11), provide EPA with sufficient information, reports and data about Maine's 319 program to determine whether the state's progress for the previous fiscal year was satisfactory.	4. Maine's NPS Program continues to achieve satisfactory progress	X	X	X	X	X
5. NPS Program Administration: Update the Maine NPS management program plan by 2019.	Consult lead agencies and gather public input to update the Maine NPS management program for the next cycle (including milestones for 2020-2024).	5. EPA approved Maine NPS Management Program Plan by 10/1/19.					X

XI. Measuring Progress and Evaluating Maine's NPS Program

A. Measuring Environmental Success

The long term goals of Maine's NPS program are:

- **Restoration of Waters** - To restore the waterbodies which are impaired by nonpoint sources so that they meet water quality standards.
- **Protection of Waters** - To prevent nonpoint source related impairments of unimpaired waterbodies.

Evaluation of the effectiveness of Maine's NPS program must be based on assessments that quantify the progress the program has made in restoring and protecting waters. Discussion of evaluation strategies associated with the two long term goals follows.

Restoring Waters

DEP's ambient water quality monitoring programs for lakes, rivers and streams, wetlands, and marine waters provide the data necessary to evaluate success in restoring impaired waters. The Integrated Report reports the findings of monitoring and assessment programs.

- **Lakes -** The large majority of lake impairments are due to violations of the lake trophic standards which state that lakes must be free of culturally induced blue green algal blooms and must have either stable or decreasing trophic states. The Maine Volunteer Lake Monitoring Program (VLMP) in combination with the DEP's annual targeted baseline monitoring provide a strong data set for evaluating compliance with these standards. The combination of the VLMP's bimonthly secchi disk readings and baseline sampling chlorophyll and phosphorus concentrations are very effective in detecting blue green algal blooms. This monitoring also provides a long term data set that can be used to monitor trends in a lake's trophic state. Lakes that have been impaired due to the presence of blue green algal blooms are considered restored if they are free of blooms for at least five years out of the most recent ten year period. Additionally, trend analysis can show that even though a lake may still support occasional blooms, the water quality is improving because the frequency and duration of blooms is decreasing. Lakes that have never supported algal blooms but are impaired due to a documented trend of increasing trophic state are considered restored when the long term data set shows a reversal of the trend.

- **Rivers and Streams -** The most critical impairments of rivers and streams are violations of the aquatic life criteria. With the exception of the bacteria standards, all other water quality criteria have the goal of supporting aquatic life. The DEP's Biomonitoring Program assesses rivers and streams on a five year rotating schedule, and determines their status in

terms of compliance with the aquatic life criteria. This evaluation indicates not only whether the river or stream segment in question meets the appropriate criteria for the segment's class, but also what class's criteria it does meet, if any. An impaired stream is considered restored if it meets its class's criteria and is considered improved if it meets a higher class's criteria than it had previously met. For instance, if a Class B stream segment historically had failed to meet even Class C criteria, but now consistently meets Class C criteria, it would be considered substantially improved. Assessment of impairments due to violations of the bacteria standards are treated similarly. If long term monitoring indicates that the standard is being met, the segment is considered restored. If the frequency and magnitude of the violations is significantly reduced, it is considered improved.

- **Wetlands** - The wetland monitoring program is relatively new, so the number of documented impairments is limited. Wetlands are also evaluated by the Biomonitoring Program and the means of determining restoration and/or improvement is parallel.

- **Marine waters** - The most widespread impairment of marine waters are violations of bacterial standards for shellfish harvesting. Bacterial monitoring is done by several agencies including Department of Marine Resources to determine shellfish closures, Cooperative Extension (Maine Healthy Beaches program) and DEP.

Protecting Waters

The same data sets discussed above can be used to evaluate whether DEP is successful in preventing unimpaired waterbodies from becoming impaired. Simply stated, if no new waterbodies, particularly waterbodies that have historical records of meeting water quality standards, are added to the list of impaired waters, the State has succeeded in meeting this goal. If new waterbodies are added to the NPS impaired list, as will likely happen since many are considered threatened, evaluation of the success of protection efforts is more challenging. Program success must be based on an evaluation of how many waterbodies would have become impaired if preventative measures had not been taken. Evaluation of the success of protection efforts therefore requires not only documentation that degradation has not occurred, but also the more challenging quantification of the threat and the relative mitigation value of the protection measures that are taken. The mitigation value of protection measures can often be quantified through pollutant load reduction models and similar metrics. It is much more difficult, if not impossible, to project the changes that would have happened in the receiving water, and particularly in its biological community, if for example, the pollutant loads had not been reduced or the stream corridor had not been protected. One of this Plan's objectives is to develop metrics and methods to evaluate the effectiveness of protection measures.

Defining Success

As stated above, the long term goals of Maine's NPS Program are to restore NPS impaired waterbodies so that they meet applicable water quality standards and to prevent nonpoint source related impairments of unimpaired waterbodies. In most cases, attainment of the restoration goal is feasible, though in many instances it may take a long time and require

commitment of a large amount of resources. The following discusses some of the particular challenges associated with restoring some lakes and urban streams, and the need to recognize not only the value of full restoration, but also the value of interim improvements in water quality and ecological condition.

The potential for restoration of impaired waters in Maine is influenced by a number of factors which must be considered when establishing realistic objectives. First, Maine's Water Classification system is a goal oriented system that establishes high water quality standards. While the State aims to have its water meet those standards, it may not always be feasible to do so, especially in the short term. For example, the trophic state standard for lakes requires that lakes have stable or decreasing trophic states and that they be free of culturally-induced algal blooms that reduce water clarity below two meters. Meeting the first part of this standard, reversing a trend of increasing trophic state, is almost always feasible and can be accomplished with a combination of BMP implementation for existing phosphorus sources in the watershed and the adoption of a program that minimizes the phosphorus inputs from new development in the watershed. However, the second part of the standard, elimination of algal blooms, is not always feasible. This is because some algal blooms are fed not by phosphorus from the watershed, but by recycling of accumulated phosphorus in the lake's sediments. While in these cases addressing NPS sources in the watershed can result in reduction in the intensity and duration of the algal blooms, it often cannot eliminate the blooms without measures being taken to directly control the recycling of phosphorus from the bottom sediments. Such measures include treatment of the sediments with aluminum salts and enhanced seasonal flushing of the epilimnion during the peak of the algal bloom. These measures can be prohibitively expensive, and though aluminum treatments nearly always result in dramatic reductions in the intensity and duration of blooms, they may not always completely eliminate blooms.

The aquatic life standard for streams presents some different limitations, particularly for urban streams. When streams and rivers were originally classified in the 1970s and 1980s, the larger rivers with point discharges, for which much data had been collected, were classified with realistic goals. However, most smaller streams were given the default classification of B, unless they were located in pristine areas, in which case they were designated Class A or AA. This was appropriate in most cases, but in some urban and agricultural areas it may be unrealistic to expect the stream to be able to meet such a high aquatic life standard. If the only reason for the aquatic life impairment is the contribution of stormwater pollutants from the watershed, then attaining Class B standards is likely achievable through BMP retrofits, though it may be quite expensive. As is often the case, if the stream and its corridor have been significantly altered through physical manipulations (e.g., straightening and widening, channel hardening, and filling of flood plains) or simply as a result of the greatly increased storm flows that the stream must pass, the habitat may be so compromised that even when the pollutant loads are attenuated, the stream may not be able to meet Class B standards. Fixing stream channel and corridor issues may not be technically feasible or may be prohibitively expensive.

In both of the cases cited above – lakes with internal recycling of phosphorus and urban and agricultural streams with serious alteration of the channel and corridor – it is always feasible to make the waterbody much healthier than it was. Even if algal blooms cannot be completely eliminated, their intensity and duration can be greatly reduced, and the people who use and enjoy these lakes greatly appreciate the change. Pollutant load reductions, storm flow attenuation, and simple habitat restoration measures can result in significant improvements in the composition and structure of the biological community in urban streams, even though the community may not fully meet aquatic life standards. Though the goal is to have these waters meet standards, it is important that the measures of success for the State's NPS program not only recognize the value of restoring an impaired waterbody to fully meeting standards, but also appreciate the value of making significant improvements in an impaired water that enhance its ecological integrity and its value to the public when full restoration is not feasible, at least in the short term.

It is at least equally important to recognize the value of protecting threatened healthy waters so that they are not degraded to the point of violating water quality standards. However, since the goal of protection is to *maintain* current good water and habitat quality, it is more difficult to document success of protection efforts. One cannot document that watershed protection efforts have been effective because a waterbody has not been degraded without assuming that changes occurring in the watershed would have resulted in degradation if the watershed protection measures had not been taken. Evaluation of the success of protection efforts therefore requires not only documentation that degradation has not occurred, but also the more challenging quantification of the threat and the relative mitigation value of the implemented protection measures. The mitigation value of protection measures can often be quantified through pollutant load reduction models and similar metrics. It is much more difficult, if not impossible, to project the changes that would have happened in the receiving water, and particularly in its biological community, if, for example, the pollutant loads had not been reduced or the stream corridor had not been protected.

It is essential that the difficulties in documenting the success of protection efforts do not become a reason for lowering the priority that is given to protection. Many of the impaired streams in the State are in areas that have been urbanized relatively recently and were healthy resources two or three decades ago. There is no doubt that if protective measures had been taken as these watersheds were developed that much of the degradation could have been avoided. The same pressures for urbanization are still in play, in other watersheds, so it is crucial that protection efforts be given highest priority or we will replace restored waters with newly impaired ones. The effort required to restore a waterbody is always much greater than that required to avoid impairment.

B. NPS Program Evaluation

In addition to tracking progress with water quality restoration and protection goals, DEP will conduct other program evaluation on an ongoing basis as required by EPA's 319 guidance (EPA, 2013). The following reporting requirements will help EPA measure Maine's progress in meeting annual milestones and NPS Plan success.

- **Milestone Tracking Database** – DEP will set up a database similar to one used by DEP for the PPG and use this database to track milestone progress and completion. Reports will be submitted to EPA on an annual basis.

- **Annual Report –** Since 2004, DEP has completed an annual NPS Program Report to report on NPS program activities, successes and completed grant projects. The report will be tailored to report on completed goals, objectives and measurable milestones from this Plan. Past annual reports are available at http://www.maine.gov/dep/water/grants/319-documents/reports/.

- **Grant Reporting and Tracking System (GRTS) –** DEP will continue to enter program information into EPA's GRTS database. Pollutant load reduction estimates resulting from project activities will be entered on an annual basis.

- **Federal Financial and Performance Reports –** Annual financial and performance reports will be completed annually as required by 40 CFR 31.40(b)(1) and 31.41(b).

- **Sub-recipient Monitoring** - DEP will continue to monitor grantees using established Standard Operating Practices including annual Office Visits and site visits to a subset of construction projects.

- **Satisfactory Progress Determination –** DEP will provide information EPA needs to conduct its annual progress and performance review under Section 319(h)(8).

- **NPS Plan Updates –** Maine's NPS Management Plan will be updated at least every five years. The next update will be prepared for 2020-2024.

References

Casco Bay Estuary Partnership. 2012. *Expanding and Sustaining the Shellfisheries of Casco Bay.*

Maine Department of Environmental Protection. 2013. *Guidance for Maine Lake Watershed-based Protection Plans.* http://www.maine.gov/dep/water/grants/319-documents/guidance_lake_watershed-based_protection%20_plans.pdf

Maine Department of Environmental Protection. 2012. *Integrated Water Quality Monitoring and Assessment Report*. http://www.maine.gov/dep/water/monitoring/305b/2012/report-final.pdf

Maine Department of Environmental Protection. 2011. *Citizen's Guide to Volunteer Lake Watershed Surveys*. http://www.maine.gov/dep/land/watershed/materials/lakewsurveyguide.pdf

Maine Department of Environmental Protection. 2010. *People and Nature: Adapting to a Changing Climate – Charting Maine's Course*. http://www.maine.gov/tools/whatsnew/attach.php?id=369026&an=1

Maine Department of Environmental Protection. 2008. *Outreach Guidance for NPS Watershed Implementation Projects* http://www.maine.gov/dep/water/grants/319-documents/outreach_guidance.pdf

Maine Department of Environmental Protection. 2004. *Brightwork: Best Management Practices for Maine's Boatyards and Marinas*. http://www.maine.gov/dep/land/watershed/marina/bmp.htm

U.S. Environmental Protection Agency. 2013. *Nonpoint Source Program and Grants Guidelines for States and Territories*. http://water.epa.gov/polwaste/nps/cwact.cfm

U.S. Environmental Protection Agency. 2012. *Section 319 Program Guidance: Key Components of an Effective State Nonpoint Source Management Program* http://water.epa.gov/polwaste/nps/upload/key_components_2012.pdf

U.S. Environmental Protection Agency. 2008. *Handbook for Developing Watershed Plans to Restore and Protect Our Waters.* http://water.epa.gov/polwaste/nps/handbook_index.cfm.

U.S. Environmental Protection Agency. 2010. *Getting In Step: A Guide for Conducting Watershed Outreach Campaigns*. http://www.epa.gov/owow/watershed/outreach/documents/getnstep.pdf

Appendix 1. EPA's Key Components of an Effective State NPS Management Program

Key Program Components	Maine NPS Plan Location
1. The state program contains explicit short- and long-term **goals, objectives and strategies** to restore and protect surface water and ground water, as appropriate.	Sections II, VII and X
2. The state strengthens its working **partnerships** and linkages to appropriate state, interstate, tribal, regional, and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.	Section VIII
3. The state uses a combination of **statewide programs and on-the-ground projects** to achieve water quality benefits; efforts are well-integrated with other relevant state and federal programs.	Sections VI, VII and VIII
4. The state program describes how resources will be **allocated between** (a) **abating known water quality impairments** from NPS pollution and (b) **protecting threatened and high quality waters** from significant threats caused by present and future NPS impacts.	Section III
5. The state program identifies waters and watersheds impaired by NPS pollution as well as priority unimpaired waters for protection. The state establishes a **process to assign priority and to progressively address identified watersheds** by conducting more detailed watershed assessments, developing watershed-based plans and implementing the plans.	Section IV and V Appendix 2
6. The state implements all program components required by section 319(b) of the Clean Water Act, and establishes strategic approaches and adaptive management to achieve and maintain water quality standards as expeditiously as practicable. The state **reviews and upgrades program** components as appropriate. The state program includes a **mix of regulatory, nonregulatory, financial and technical assistance**, as needed.	Sections III, VI, VII and XI
7. The state **manages and implements its NPS management program efficiently and effectively**, including necessary financial management.	Section X and XI
8. The state **reviews and evaluates its NPS management program** using environmental and functional measures of success, and revises its NPS management program at least every five years.	Section XI

Appendix 2 - NPS Watershed Prioritization and NPS Priority Lists

Maine's first NPS priority watersheds list was developed in 1989 and revised substantially in 1998. The list was updated as part of development of this NPS management plan. NPS impaired or threatened [5]waters with significant regional or statewide value were placed on the list. The list was developed to help prioritize DEP NPS water pollution control efforts and attract local communities to take action to restore or protect waters impaired or threatened by NPS pollution. Since then, DEP has provided Section 319 grant funds for NPS water pollution control projects with preference for projects in NPS priority watersheds. Most of the NPS projects proposed and selected under the annual competitive RFP have funded work to help restore or protect NPS priority watersheds.

In addition to the NPS Priority Watersheds List, there are several other lists that help guide MDEP efforts and regulatory programs. This includes the list of waterbodies with approved TMDLs, listed as impaired on the 303d list, listed in Chapter 502 Lakes Most at Risk from New Development, and Urban Impaired Streams. These lists will continue to be used for their respective purposes, and used to assist with the development of the prioritization criteria for NPS Priority List.

A. Guiding Principles for Selection of NPS Priority Watersheds

The purpose of the priority list is to guide 319 NPS grant funds and assistance, and to encourage NPS abatement work in these watersheds. The 1998 NPS Priority Watersheds List was updated as part of this NPS Management Plan. Watersheds were evaluated using several guiding principles. As such, the first overall requirement is that NPS priority waters must have NPS pollution as the primary source of impairment or threat. Watersheds with point sources or legacy pollutants as the primary source of pollution were not selected as priorities since the point source or legacy pollutant would have to be addressed for water quality to significantly improve. Second, watersheds were evaluated for the likelihood that NPS grant funds and support could make a difference in the water quality. Another principle was to keep the extent of NPS priority watersheds reasonably focused so that the resources available to devote to control NPS pollution resources are invested where they are most needed and there is opportunity to effectively improve or protect waters vulnerable to NPS pollution.

The goal of developing the prioritization criteria was to make the selection as objective as possible, using monitoring data, analysis, and reports. The priority lists of partner agencies and

[5] The use of the term, 'threatened', in this document refers to unimpaired waters that are subject to potential impacts from NPS pollution. The term is not intended to be used as described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

organizations were used to assist with the prioritization process. There was also an effort to keep the NPS Priority Lists as focused as possible so that limited resources would not be spread too thin and there would be the best opportunity for restoring and protecting the highest priorities.

To determine the specific criteria to guide the evaluation of which watersheds should be prioritized, work groups consisting of DEP water resource professional staff. Staff are knowledgeable in statewide lake, stream, or marine water quality and management issues and they reviewed available waterbody data and information. Partner agencies and regional monitoring organizations were also consulted in some cases. Specific criteria were determined by waterbody type, and are listed in the table below and described in the following waterbody-specific sections.

Table 17. NPS Priority Watershed Selection Criteria Summary.

Waterbody Type	Selection Criteria	Exclusion Criteria
Impaired Lakes	• Category 4A and 5A	• Category 4C • Limited existing development • Legacy nutrient accumulations • Naturally eutrophic
Threatened Lakes	• DEP Watch List • Public water system • Negative water clarity trend • Sensitive to additional phosphorus inputs • Priority watershed of partners • Outstanding water quality with watershed threats • Recent increased impacts or threats from agriculture or development	• Negative water clarity trend not indicative of water quality shift • Watershed protected • Small lakes (≤50 acres) with limited development

Impaired Streams	• Impaired (Categories 4A, 5A, and 5B) due to NPS, and:
	• Has TMDL report:
	  ○ Individual TMDL
	  ○ IC TMDL or NPS TMDL
	  ○ Bacteria TMDL and had only source of impairment as bacteria
	• Priority watershed of partners
	• High growth area
	• High risk for development due to proximity to highway access
		• Categories 4B, 4C, 5C, 5D
		• Impaired due to natural reasons
		• Legacy pollutant accumulations
		• Impaired due to point sources
		• Large rivers

Threatened Streams	• Watch List (Category 3) • Recent increased impacts or threats from agriculture or development • Priority watershed of partners • High risk for development due to proximity to highway access	• Wastewater discharges • Large rivers
Impaired and Threatened Marine Waters	• Priority NPS-impacted watersheds of partners: ○ Maine Department of Marine Resources (DMR) ○ Maine Healthy Beaches (MHB) ○ Casco Bay Estuary Partnership (CBEP) ○ Maine Municipal Separate Storm Sewer Program (MS4) • Documented negative water quality indicators	• Impaired due to natural reasons • Legacy pollutant accumulations • Large or exposed areas with high flushing • Point sources such as wastewater discharges • Small watersheds with just a few failing septics or overboard discharges • Sources not clearly NPS

B. Updating the Priority Watersheds List

DEP-Driven Updates

DEP plans to evaluate ways to further improve the prioritization criteria as new evaluation techniques become available. For lakes, DEP plans to investigate incorporating sediment aluminum content into the lake vulnerability model. These data have not historically been available, but sediment samples have recently been collected from 250 lakes to analyze the aluminum content. When these data are available, DEP will investigate its use to further determine which lakes are threatened from further phosphorus input due to the low amount of aluminum in the sediment. For streams, DEP plans evaluations using the EPA Recovery Potential Screening Tool to assist with prioritization of impaired and threatened streams. For marine waters, DEP will continue to investigate ways to improve the prioritization method as new data or methods becomes available. Additionally, DEP will add or remove waterbodies as new information becomes available, following the timeline for the annual public opportunity.

Annual Public Input Opportunity

There will be an opportunity annually for organizations and individuals to submit requests and supporting documentation for waterbodies to be added or removed from the priority lists. An annual timeline will be developed and announced.

C. Lake Watersheds Prioritization

Impaired Lakes

As a starting point, all lakes on the 2012 Integrated Water Quality Monitoring and Assessment Report Impaired List (Categories 4A: Impaired Use other than Mercury, TMDL Completed; & 5A: Needing TMDLs) due to nonpoint source pollution were considered for inclusion on the priority list. Lakes on 2012 Integrated Water Quality Monitoring and Assessment Report Impaired List due to hydrologic reasons (Category 4C: Impairment not Caused by a Pollutant) were excluded from the priority list. These lakes are impaired primarily due to hydrologic reasons, such as a major dam, and the hydrologic impairment. Lakes falling under this category are: Aziscohos Lake, Brassua Lake, Flagstaff Lake, Graham Lake, and Scopan Lake.

Several lakes were then removed from the priority list if they are believed to have a **low feasibility** for restoration due to having limited existing watershed development or legacy nutrient accumulations in sediments. Lakes removed from the list for this reason are Arnold Brook Lake in Presque Isle, Lovejoy Pond in Albion, and Sewall Pond in Arrowsic.

Table 18. Impaired Lakes Priority List (21 lakes).

Lake	Town
Annabessacook Lake	Winthrop
China Lake	China
Christina Reservoir	Ft Fairfield
Cochnewagon Lake	Monmouth
Cross Lake	T17 R5 Wels
Daigle Pond	New Canada
East Pond	Smithfield
Great Pond	Belgrade & Rome
Lilly Pond	Rockport
Long Pond	Rome & Belgrade
Monson Pond	Fort Fairfield
Pleasant Pond	Richmond
Sabattus Pond	Greene
Sebasticook Lake	Newport
Threemile Pond	Windsor
Togus Pond	Augusta
Toothaker Pond	Phillips
Trafton Lake	Limestone
Unity Pond	Unity
Webber Pond	Vassalboro
Wilson Pond	Wayne

Threatened Lakes

Unimpaired lakes were assessed based on threats to water quality and value of the resource. Threatened lakes include lakes on the DEP Watch List, lakes having a recent or long-term significant negative trend in water clarity, lakes determined as being sensitive to additional phosphorus inputs, and lakes having a recent increased threat to the watershed by development or agriculture. Lake value was designated as 'high' if a drinking water supply, if designated a priority water body by a partner agency, or if determined to have outstanding water quality and being in need of protection. Lakes which had either a significant threat to water quality and/or significant value were added to the priority list. The details of these selection criteria are below.

Unimpaired lakes were determined to have priority threatened lake watersheds if they met one of the following criteria:

- Listed on the DEP's **watch list**. Lakes are included on the watch list if they were recently impaired and therefore still sensitive, or data suggests their water quality is near the impairment threshold.
- Licensed by the Maine CDC Drinking Water Program as a **public water system** with a lake a pond as the surface water source.
- Has a strong long or short-term **negative water clarity trend**. This was determined by running the lake water clarity trend analysis model for lakes with secchi disk transparency readings for a significant number of years. The model was run for the whole dataset for each lake to determine the long-term trend, and for the past 10 years for the short-term trend. Data was needed for eight years or more to run the short term trend model. Results of -0.5 or lower were deemed to be a significant negative trend. Lakes with a significant negative trend were then further analyzed to determine if the negative trend was likely the result of a natural cycle or an overall shift in water quality. See the section below for a description of what was not included.
- Are **sensitive** to additional phosphorus inputs due to the lake's hydrology and threats in the watershed. A lake was determined to be sensitive if DEP's vulnerability modeling predicts the number of years for the lake's phosphorus concentration to increase by 1 ppb is 25 years or less. The vulnerability model predicts changes in lake phosphorus concentration using watershed growth projections to estimate changes in phosphorus loading and the 1976 version of Vollenweider's lake model to convert load to concentration. The model compensates for the influence of upstream lakes. If these sensitive lakes were determined to have watershed threats, they were then added to the priority list.
- Identified as a **priority watershed** by the Maine Natural Resources Conservation Service Environmental Quality Incentives Program (**EQIP**) National Water Quality Incentive or by Maine Municipal Separate Storm Sewer System (**MS4**) community plans.
- Having **outstanding water quality** in need of protection from threats in the watershed. The list of lakes with outstanding water quality was determined from review of long term water quality data. Lakes with outstanding water quality were added to the priority list if they

were on 1998 NPS Priority List or their watershed was known to have a significant threat of development.

- Have recent increased impacts or significant potential threats from **agriculture** or **development**. This was determined through use of best professional judgment of the impact or significant threat of impact due to recent activities in the watershed. The sensitivity of the lake to more phosphorus inputs, extent and location of the agriculture or development, and cumulative effect of other watershed activities were considered in this determination. The Lakes added due to these criteria have had significant DEP involvement with the lake and the associated agriculture or development.
- Some lakes were not included on the priority list even if they met some of the above criteria due to the following reasons:
- The water quality data for some lakes with a significant negative water clarity trend (-0.5 or lower) indicated it was **not indicative of a water quality shift**. Each lake that had a long- or short-term significant negative water clarity trend was analyzed to determine if the negative trend was likely an overall negative shift in water quality or not. This was determined by analyzing any available water quality history data, including water clarity, phosphorus, chlorophyll, and dissolved oxygen readings. Lakes having a short-term negative trend as a result of water clarity returning to a stable state after drought conditions in the early 2000's resulted in artificially 'improved' water quality, were not put on the priority list. Lakes whose negative trend were based on insufficient data or included multiple Secchi readings which hit the lake bottom were not put on the priority list.
- Lakes having a significant portion of their watershed **protected** either by being part of Acadia National Park or by having other watershed protection were also not included on the priority list, since there did not seem to be a significant threat.
- **Small lakes** (less than or equal to 50 acres) with limited existing watershed development were not included on the priority list, unless there was a compelling reason to add it to the list. Compelling reasons were if it is a public water supply, or has outstanding water quality and is in need of protection from threats in the watershed.

Table 19. Threatened Lakes Priority List (147 lakes).

Lake	Town	Priority List Reasoning
Abrams Pond	Eastbrook	Watch List
Adams Pond	Boothbay	Public Water System, Sensitive
Alamoosook Lake	Orland	Agriculture (Aquaculture) Threat
Allen Pond	Greene	Sensitive
Anasagunticook Lake	Canton	Public Water System
Androscoggin Lake	Leeds	Watch List
Battle Ave Ponds	Castine	Public Water System
Bauneg Beg Pond	Sanford	Sensitive
Bay Of Naples/Brandy	Naples	Public Water System, Sensitive

Lake	Town	Priority List Reasoning
Beaver Pond	Bridgton	Sensitive
Beech Hill Pond	Otis	Outstanding Water Quality
Berry Pond	Winthrop	Sensitive
Big Wood Pond	Jackman	Public Water System
Bonny Eagle Lake	Buxton	Sensitive
Boyden Lake Stream Imp	Perry	Public Water System
Branch Lake	Ellsworth	Public Water System
Branch Pond	China	Sensitive
Brettuns Pond	Livermore	Sensitive
Buker Pond	Litchfield	Sensitive
Bunganut Pond	Lyman	Sensitive
Burnt Land Pond	Stonington	Public Water System
Carlton Pond	Winthrop	Public Water System
Chases Pond	York	Public Water System
Chickawaukie Pond	Rockport	Sensitive
Clary Lake	Whitefield	Negative clarity trend
Cobbossecontee Lake	Winthrop	Watch List, Sensitive
Coffee Pond	Casco	Sensitive
Cold Stream Pond	Enfield	Outstanding Water Quality
Crawford Pond	Warren	Sensitive
Crescent Pond	Raymond	Sensitive
Crystal Lake	Gray	Sensitive
Damariscotta Lake	Nobleboro	Sensitive
Dexter Pond	Winthrop	Sensitive
Dodge Pond	Rangeley	Sensitive
Duckpuddle Pond	Waldoboro	Watch List
Eagle Lake	Bar Harbor	Outstanding Water Quality, Public Water System
Echo Lake	Presque Isle	Watch List
Estes Lake	Sanford	Watch List, Sensitive
Ferguson Lake	Millinocket	Public Water System
Floods Pond	Otis	Public Water System
Folly Pond	Vinalhaven	Public Water System
Forest Lake	Windham	Sensitive
Fresh Pond	North Haven	Public Water System
Georges Pond	Franklin	Watch List
Granny Kent Pond	Shapleigh	Negative clarity trend
Grassy Pond	Rockport	Public Water System, Sensitive
Great East Lake	Acton	Outstanding Water Quality, Development Threat
Hall Pond	Paris	Public Water System

Lake	Town	Priority List Reasoning
Hancock Pond	Embden	Public Water System
Harriman Pond	Dedham	Outstanding Water Quality, Development Threat
Hatcase Pond	Dedham	Public Water System
Highland Lake	Bridgton	Watch List
Highland Lake	Windham	MS4 Priority Water, Watch List, Sensitive
Hogan Pond	Oxford	Sensitive
Holland Pond	Limerick	Sensitive
Horne Pond	Limington	Sensitive
Hosmer Pond	Camden	Sensitive
Ingalls Pond	Bridgton	Sensitive
Island Pond	Waterford	Sensitive
Jimmie (Jamies) P	Manchester	Sensitive
Kennebunk Pond	Lyman	Sensitive
Knickerbocker Pond	Boothbay	Public Water System
Lake Auburn	Auburn	Negative clarity trend, Watch List, Public Water System
Little Cobbossee	Winthrop	Watch List, Sensitive
Little Ossipee	Waterboro	Sensitive
Little Pond	Damariscotta	Public Water System
Little Sebago Lake	Windham	Sensitive
Little Wilson Pond	Turner	Sensitive
Long Lake	Bridgton	Watch List
Long Lake	T17 R4 Wels	Watch List, Agriculture Threat
Long Pond	Parsonsfield	Negative clarity trend
Long Pond	Bucksport	Sensitive
Long Pond	Sullivan	Public Water System
Lower And Upper Ponds	Skowhegan	Public Water System
Lower Hadlock Pond	Mt Desert	Public Water System
Lower Narrows Pond	Winthrop	Sensitive
Lower Range Pond	Poland	Sensitive
Madawaska Lake	Westmanland	Watch List
Maranacook Lake	Winthrop	Sensitive
Mcgrath Pond	Oakland	Sensitive
Meduxnekeag Lake	Oakfield	Development Threat
Megunticook Lake	Lincolnville	Sensitive
Messalonskee Lake	Sidney & Belgrade	Watch List
Middle Range Pond	Poland	Sensitive
Mirror Lake	Rockport	Public Water System
Moose Hill Pond	Livermore Falls	Public Water System
Moose Pond	Bridgton	Development Threat

Lake	Town	Priority List Reasoning
Mousam Lake	Shapleigh	Watch List
Nequasset Pond	Woolwich	Public Water System, Sensitive
Nickerson Lake	New Limerick	EQIP Priority Water
No Name Pond	Lewiston	Sensitive
Nokomis Pond	Newport	Public Water System
North Pond	Norway	Sensitive
North Pond	Sumner	Public Water System
North Pond	Smithfield	Agriculture Threat
Norton Pond	Lincolnville	Sensitive
Notched Pond	Raymond	Sensitive
Otter Pond	Bridgton	Sensitive
Panther Pond	Raymond	Sensitive
Papoose Pond	Waterford	Watch List
Paradise Pond	Damariscotta	Negative clarity trend
Parker Pond	Casco	Sensitive
Parker Pond	Jay	Public Water System
Pattee Pond	Winslow	Sensitive
Pemaquid Pond	Waldoboro	Sensitive
Pennesseewassee	Norway	Sensitive
Pleasant Lake	Otisfield	Outstanding Water Quality
Pleasant Pond	Turner	Sensitive
Pleasant Pond	T4 R3 Wels	Outstanding Water Quality
Province Lake	Parsonsfield, S. Effingham, NH	Development Threat (Listed as Impaired by New Hampshire DES)
Pushaw Lake	Orono	Development & Agriculture Threat
Quimby Pond	Rangeley	Sensitive
Raymond Pond	Raymond	Sensitive
Roberts Wadley Pond	Lyman	Sensitive
Round Pond	Rangeley	Sensitive
Round Pond	Vinalhaven	Public Water System
Roxbury Pond	Roxbury	Watch List
Sabbathday Lake	New Gloucester	Sensitive
Salmon L (Ellis P)	Belgrade	Watch List
Salmon Stream Pond	Guilford	Public Water System
Sand Pond	Monmouth	Sensitive
Sawyer Pond	Greenville	Negative clarity trend
Sebago Lake (including Crooked River)	Sebago	Outstanding Water Quality, Public Water System
Shaker Pond	Alfred	Sensitive
Silver Lake	Bucksport	Public Water System
Spectacle Pond	Vassalboro	Sensitive

Lake	Town	Priority List Reasoning
Square Lake	T16 R5 Wels	Watch List, Development Threat
St George Lake	Liberty	Outstanding Water Quality
Swan Pond	Lyman	Sensitive
Taylor Pond	Auburn	Sensitive
Thomas Pond	Casco	Sensitive
Thompson Lake	Oxford	Outstanding Water Quality, Sensitive
Threecornered Pond	Augusta	Watch List, Sensitive
Torsey (Greeley) Pond	Mount Vernon	Agriculture Threat
Trickey Pond	Naples	Outstanding Water Quality, Sensitive
Tripp Pond	Poland	Sensitive
Upper Narrows Pond	Winthrop	Public Water System, Watch List, Sensitive
Upper Range Pond	Poland	Sensitive
Varnum Pond	Wilton	Public Water System
Ward Pond	Sidney	Sensitive
Wassookeag Lake	Dexter	Negative clarity trend, Public Water System
Watchic Pond	Standish	Sensitive
Whetstone Pond	Kingsbury Twp	Negative clarity trend
Whitney Pond	Oxford	Sensitive
Wood Pond	Bridgton	Sensitive
Woodbury Pond	Monmouth	Sensitive
Youngs Lake	Westfield	Public Water System

D. Stream Watershed Prioritization

Impaired Streams

As a starting point, all rivers and streams on the 2012 Integrated Water Quality Monitoring and Assessment Report Impaired List due to nonpoint source pollution (Categories 4-A: Rivers and Streams with Impaired Use, TMDL Completed; 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required); & 5-B: Rivers and Streams Impaired for Bacteria Only, TMDL Required) were considered for inclusion on the priority list. To determine if a stream or river was impaired primarily due to NPS sources, the DEP water quality monitoring database (EGAD) was queried as to what were the major sources of the impairments. A stream was considered impaired primarily by NPS if the sources were listed as NPS, agriculture, stormwater, impervious surfaces, habitat modification, post-development erosion and sedimentation, or source unknown.

Streams on 2012 Integrated Water Quality Monitoring and Assessment Report Impaired List which are expected to result in attainment (Category 4-B: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment) were not included on the priority list. These streams are believed to be impaired primarily due to non-NPS reasons, and are being addressed by regulatory programs and remediation work.

Streams on the 2012 Integrated Water Quality Monitoring and Assessment Report Impaired List due to hydrologic reasons (Category 4-C: Rivers and Streams with Impairment not Caused by a Pollutant), mercury (Category 5-C: Waters Impaired by Atmospheric Deposition of Mercury), or legacy pollutants (Category 5-D: Rivers and Streams Impaired by Legacy Pollutants), were not included on the priority list. These streams are believed to be impaired primarily due to sources beyond the scope of the 319 NPS program.

Once the streams impaired by NPS were identified, they were determined to be priority stream watersheds if they met one of the following criteria:

- Had a Total Maximum Daily Load (**TMDL**) report completed or in development. This includes streams with an individual NPS-based TMDL and those included in the Maine Impervious Cover TMDL or Maine Statewide NPS TMDL (currently under development). These streams are impaired primarily due to NPS pollution and the TMDLs provide an analysis of the causes of the impairment, and therefore a first step in determining what needs to be done to improve the water quality. For streams included in the Maine Statewide Bacteria TMDL, only those whose impairment was only due to bacteria that was not caused by a point source were listed as priority streams.
- Identified as a priority watershed by the Maine Natural Resources Conservation Service Environmental Quality Incentives Program (**EQIP**) National Water Quality Incentive, by Maine Municipal Separate Storm Sewer System (**MS4**) community plans, or by the Maine Healthy Beaches (**MHB**) program.

- High risk of future development in watershed due to its location **near a highway exit**. These streams were determined by completing a risk assessment of the likelihood of development near each Maine Turnpike, Interstate 95, and Route 295 exit that had stream watersheds within a one mile radius. Streams were categorized as having a high, medium, or low risk of development in their watershed due to Access-related development. Streams with a high risk of development were added to the priority list.
- Some streams were not included on the priority list even if they met some of the above criteria due to the following reasons:
    - Believed to be impaired due to **'natural' reasons** such as being a backwater stream or having wetland effects which cause the stream to not meet its class.
    - Streams or rivers impaired mostly due to **legacy pollutants**, particularly legacy toxins. It is believed that the legacy pollutants would have to be addressed in order for the stream to meet class, so addressing the NPS sources would not be sufficient to have it meet class and therefore the stream is not added to the NPS priority list.
    - **Large rivers** (e.g. Kennebec River, Androscoggin River, Presumpscot River) were not included as priorities since the large size of their watershed makes measureable improvement in water quality due to implementation of NPS watershed based plans very unlikely. Instead, tributaries to these larger watersheds were considered for the priority list based both on their own characteristics and their impact on the larger impaired watersheds.
    - Rivers whose impairment is primarily due to **point sources** such as combined sewer overflows or wastewater discharges were also not included on the priority list. It is believed that the point sources would need to be addressed for the water quality of these rivers to be improved significantly.

Table 20. Impaired Streams Priority List (71 streams).

Stream	Town	Priority List Reasoning
Adams Brook	Berwick	TMDL
Arctic Brook	Bangor	TMDL, Highway Access-related Development Threat
Barberry Creek	South Portland	TMDL
Birch Stream	Bangor	TMDL, MS4 Priority Water
Black Brook	Windham	TMDL
Bond Brook	Augusta	Highway Access-related Development Threat, Development Threat
Brackett Brook	Palmyra	TMDL
Burnham Brook	Garland	TMDL
Capehart Brook	Bangor	TMDL
Capisic Brook	Portland	TMDL, MS4 Priority Water

Stream	Town	Priority List Reasoning
Card Brook	Ellsworth	TMDL
Chamberlain Brook	Whitefield	TMDL
Chandler River including East Branch	Pownal	TMDL
Cold Stream	Skowhegan	High Growth Area
Colley Wright Brook	Windham	TMDL
Coloney Brook	Fort Fairfield	TMDL
Concord Gully	Freeport	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Crooked Brook	Corinth	TMDL
Dole Brook	Portland	TMDL
Duck Brook	Arundel	Bacteria TMDL
Dudley Brook	Chapman	TMDL
Dyer River	Newcastle	Bacteria TMDL
Everett Brook	Fort Fairfield	TMDL
Fish Brook	Fairfield	TMDL
French Stream	Exeter	TMDL
Frost Gully Brook	Freeport	TMDL
Goodall Brook	Sanford	TMDL
Goosefare Brook	Saco	TMDL, Bacteria TMDL, Highway Access-related Development Threat
Hart (Dill) Brook	Lewiston	TMDL, MS4 Priority Water
Hobbs Brook	Cumberland	TMDL
Inkhorn Brook	Westbrook	TMDL
Jock Stream	Wales	TMDL
Kennebunk River	Arundel, Kennebunk	Bacteria TMDL, MHB Priority Water
Kennedy Brook	Augusta	TMDL
Kennedy Brook	Presque Isle	High Growth Area
Kimball Brook	South Portland	TMDL
Logan Brook	Auburn	TMDL, MS4 Priority Water
Long Creek	South Portland	Highway Access-related Development Threat, Development Threat
Mere Brook	Brunswick	TMDL
Meadow Brook	Bangor	Highway Access-related Development Threat
Meduxnekeag River	Houlton	EQIP Priority Water
Merrit Brook	Presque Isle	TMDL
Mill Stream	Albion	TMDL

Stream	Town	Priority List Reasoning
Mosher Brook	Gorham	TMDL
Nasons Brook	Portland, Westbrook	TMDL
No Name Brook	Lewiston	TMDL
Otter Brook	Windham	TMDL
Otter Stream	Milford, Bradley	Bacteria TMDL, MS4 Priority Water
Penjajawoc Stream	Bangor	Highway Access-related Development Threat, MS4 Priority Water
Penley Brook	Auburn	TMDL
Phillips Brook	Scarborough	TMDL
Pleasant River	Windham	TMDL
Prestile Stream (Upper)	Mars Hill	TMDL
Red Brook	Scarborough, South Portland	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Shaw Brook	Bangor, Hampden	TMDL, Highway Access-related Development Threat
Stetson Brook	Lewiston	High Growth Area
Sucker Brook	Hampden	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Thatcher Brook	Biddeford	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Thayer Brook	Gray	TMDL, Highway Access-related Development Threat
Topsham Fair Mall Stream	Topsham	TMDL, Highway Access-related Development Threat
Topsham Fairgrounds Stream	Topsham	TMDL, Highway Access-related Development Threat
Trout Brook	South Portland	TMDL, MS4 Priority Water
Unnamed Stream (Rte 196)	Lisbon Falls	TMDL, MS4 Priority Water
Unnamed Trib to Androscoggin River (near Jordan Ave)	Brunswick	TMDL
Unnamed Trib to Androscoggin River (near River Rd)	Brunswick	TMDL

Stream	Town	Priority List Reasoning
Unnamed Trib to Androscoggin River (near Water St)	Brunswick	TMDL
Unnamed Trib to Bond Brook (entering below I-95)	Augusta	TMDL, Highway Access-related Development Threat
Warren Brook	Belfast	TMDL
West Brook	North Berwick	TMDL
Whitney Brook	Augusta	TMDL
Whitten Brook	Skowhegan	TMDL

Threatened Streams

Non-impaired streams were assessed as to whether they are being significantly impacted or have the threat of significant impact from NPS pollution and whether the use of NPS 319 funds was likely to improve or protect water quality over the long term.

Non-impaired streams were determined to be priority threatened stream watersheds if they met one of the following criteria:

- Streams listed on the 2012 Integrated Water Quality Monitoring and Assessment Report **'Watch List'** Category 3 (Waters with Insufficient Data or Information to Determine if Designated Uses are Attained) for NPS issues. For streams, Category 3 is used as a 'Watch List' for streams of concern. Included on this list are streams that were recently impaired, and are therefore still sensitive, or if data shows it will likely be impaired in the future.
- Have recent increased impacts or significant potential threats from **agriculture** or **development**. This was determined through use of best professional judgment of the impact or significant threat of impact due to recent activities in the watershed. The sensitivity of the stream, extent and location of the agriculture or development, and cumulative effect of other watershed activities were considered in this determination.
- Identified as a priority watershed by partner organizations, such as the Maine Natural Resources Conservation Service Environmental Quality Incentives Program (**EQIP**) National Water Quality Incentive, by Maine Municipal Separate Storm Sewer System (**MS4**) community plans, or by the Maine Healthy Beaches (**MHB**) program.
- High risk of future development in watershed due to location **near a highway exit**. These streams were determined by doing a risk assessment of the likelihood of development near each Maine Turnpike, Interstate 95, and Route 295 exit that had stream watersheds within a one mile radius. Streams were categorized as having a high, medium, or low risk of development in their watershed due to Access-related development. Streams with a high risk of development were added to the priority list.

- Even if streams or rivers met some of the above criteria, they were not included on the priority list if they are **large rivers** and/or the impairment is due to **wastewater discharges**. For these streams or rivers it is believed that larger scale and/or point source-related work is necessary and smaller tributary work is a better fit with the current NPS program.

Table 21. Threatened Streams Priority List (77 streams).

Stream	Town	Priority List Reasoning
Abagadasset River Tribs	Gardiner	Highway Access-related Development Threat
Alder Stream	Corinna	EQIP Priority Water
Amsden Brook	Ft. Fairfield	Agriculture Threat
Beaver Brook	Scarborough	Highway Access-related Development Threat
Birch Brook	Presque Isle	Agriculture Threat
Blacksmith Brook	Wells	Highway Access-related Development Threat
Bobbin Mill Brook	Auburn	Watch List
Cape Neddick River	York	MS4 Priority Water
Caribou Stream	Caribou	Watch List
Cemetery Brook (unnamed trib to Penjajwoc/Meadow)	Veazie	MS4 Priority Water
Chenery Brook	Falmouth	Highway Access-related Development Threat
Chickering Creek	Kittery	Highway Access-related Development Threat
Currier Brook	Skowhegan	Bacteria TMDL
Deep Brook	Saco	Highway Access-related Development Threat
Depot Stream	Wells	Highway Access-related Development Threat
Duck Stream	Waterville	Development Threat
East Branch Piscataqua	Falmouth	Watch List, MS4 Priority Water
Factory Brook	Caribou	Agriculture Threat
Farnham Brook	Pittsfield	Watch List
Felts Brook	Brewer	MS4 Priority Water
Great Works River	South Berwick	MS4 Priority Water
Grey Brook	Ft. Fairfield	Agriculture Threat
Hacker Brook	Ft. Fairfield	Agriculture Threat
Hardwood Brook	Caribou	Agriculture Threat
Hockenhull Brook	Ft. Fairfield	Agriculture Threat
Libby Brook	Ft. Fairfield	Agriculture Threat
Little River	York	Highway Access-related

Stream	Town	Priority List Reasoning
		Development Threat
Maxwell Brook	Sabattus	Highway Access-related Development Threat
McDonald Brook	Ft. Fairfield	Agriculture Threat
Meader Brook	Falmouth	Highway Access-related Development Threat
Meadow Brook	Gray	Highway Access-related Development Threat
Medomak River	Waldoboro	Agriculture Threat
Merrill Brook	Freeport	Highway Access-related Development Threat
Mill Brook	Westbrook	MS4 Priority Water
Mill Creek	Falmouth	Highway Access-related Development Threat, MS4 Priority Water
Moose Brook	Auburn	Highway Access-related Development Threat
Moulton Brook	York	Highway Access-related Development Threat
Nichols Brook	Caribou	Agriculture Threat
North Branch McLean Brook	St Agatha	Watch List
Norton Brook	Falmouth	Watch List, Highway Access-related Development Threat
Ogunquit River	Ogunquit	MHB Priority Water
Oliver Brook	Houlton	EQIP Priority Water
Pattie Brook	Ft. Fairfield	Agriculture Threat
Pearce Brook	Houlton	Agriculture Threat, Development Threat
Perley Brook	Fort Kent	Watch List
Piscataqua River (Falmouth)	Falmouth	Watch List
Prestile Brook	Caribou	Agriculture Threat
Richardson Brook	Presque Isle	Agriculture Threat
Riggs Brook	Augusta	Watch List
Rockwood Brook	Augusta	Highway Access-related Development Threat
Rocky Brook	Mars Hill	Watch List
Rolling Dam Brook	Gardiner	Highway Access-related Development Threat
Salmon Brook	Washburn	Watch List
Scitterygusset Creek	Falmouth	Highway Access-related Development Threat

Stream	Town	Priority List Reasoning
Spinney Creek	Eliot	MS4 Priority Water
Spring Brook	Caribou	Agriculture Threat
Spruce Creek	Kittery	MS4 Priority Water
Spurwink River	Cape Elizabeth	MHB Priority Water
Stone Brook	Augusta	Highway Access-related Development Threat
Stroudwater River	Portland, Westbrook	Watch List
Sunday River	Newry, Bethel	Watch List
Swan Pond Brook Tributary	Dayton, Biddeford	Watch List
Tannery Brook	Gorham	Watch List, MS4 Priority Water
Tanning Brook	Manchester	Watch List
Unnamed Stream at I-95 Exit 2, tributary to Spruce Creek	Kittery	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 7, tributary to Moulton Brook	York	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 19, tributary to Webhannet River	Wells	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 75, tributary to Androscoggin River	Auburn	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 75, tributary to Moose Brook	Auburn	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 113, tributary to Kennebec River	Augusta	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 150, northwestern tributary to Farnham Brook	Pittsfield	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 150, northern tributary to Farnham Brook	Pittsfield, Palmyra	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 150, downtown tributary to Farnham Brook	Pittsfield	Highway Access-related Development Threat
Unnamed Trib below Merrit	Presque Isle	Agriculture Threat
Unnamed Tribs to Long Lake near golf course	Madawaska	Agriculture Threat
Violette Stream	Van Buren	Development Threat
Willowdale Brook	Scarborough	Highway Access-related Development Threat

E. Marine Waters Watershed Prioritization Description

Marine areas were assessed on the impact or threat of NPS pollution, and the likelihood that NPS abatement work or support could make a short- or long-term improvement to water quality. The impact or threat was determined by whether there were impacted shellfish harvest areas of interest, beach closures, or documented negative water quality indicators. It was considered likely that NPS abatement work or support could be effective if the primary pollutant sources were nonpoint and non-natural, and if the watershed likely had a significant water quality impact due to a low degree of flushing.

Impaired and Threatened Marine Waters[6]

Unlike the lake and stream prioritization, the marine waters listed as impaired waters on the 2012 Integrated Report were not used as a starting point for the NPS Priority list. Marine waters have fewer numeric criteria and rely more on narrative criteria (i.e. best professional judgment). The 2012 Integrated Report impaired marine waterbodies list does not align geographically with the DMR shellfish harvest closure lists and it does not clearly distinguish between NPS and point source contributions. To keep prioritization criteria objective, the work group instead focused on data associated with bacterial closures and relied on data, knowledge, and priorities from other organizations. This resulted in a more exclusive and smaller list for marine waters than for lakes and streams. Additions to the marine priority list are anticipated as more information becomes available.

Marine watersheds were added to the priority list if they met at least one of the following criteria:

- Marine waters or beaches that **Maine Healthy Beaches (MHB)** has identified as likely areas with NPS sources of bacteria at levels that are concerning for primary contact recreation.
- Marine waters that the **Casco Bay Estuary Partnership (CBEP)** has identified with high/moderate value shellfish beds, high/moderate harvester interest, and associated NPS sources documented in the CBEP report, *Expanding and Sustaining the Shellfisheries of Casco Bay 2011* (2012).
- Marine waters associated with a **Maine Municipal Separate Storm Sewer Program (MS4)** priority watershed.
- Nearshore waters and intertidal clam flats where partners (e.g., CBEP, Friends of Casco Bay, Marine Environmental Research Institute, Wells Reserve) have documented **water quality indicators** with suspected links to NPS pollution. Indicators included documented eelgrass loss (only limited availability) or recurring macroalgae blooms, chronically high nitrogen

[6] The use of the term, 'threatened', in this document refers to unimpaired waters that are facing potential impacts from NPS pollution. The term is not intended to be used in the way described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

relative to comparable ambient conditions and/or chronically low dissolved oxygen (<5 mg/l).

- Marine waters that the **Maine Department of Marine Resources (DMR)** has identified as having shellfish harvest closures related primarily to NPS threat, and that are protected embayments with limited assimilative capacity. Information available from sanitary surveys, watershed surveys, and local research and knowledge were used to determine if NPS threats were the dominant contributors to documented impairment or anticipated future impairment.

Some marine waters were not included on the priority list even if they met one or more of the above criteria due to the following reasons.

- Believed to have negative water quality indicators for **'natural' reasons**, such as high bacteria from wildlife, or having low dissolved oxygen as a result of high sediment oxygen demand in shallow, productive, low flushing coves.
- Believed to be impaired by **legacy pollutants**, particularly legacy toxics. If legacy pollutants would have to be addressed in order for the waterbody to meet class, then reducing NPS sources would not be sufficient for attainment of standards.
- **Large or exposed estuaries, coastal embayments, or coastal shorelines** with relatively high degree of flushing likely. The large scale of the area and influence of tides and surface currents make measureable improvement in water quality due to implementation of NPS watershed based plans very unlikely.
- Source of pollution is tied primarily to **wastewater discharges,** a small number of failing **septic systems** or **overboard discharges**, or other **point sources**. While failing septic systems and overboard discharges are in the realm of NPS, NPS grant program does not fund replacing sewage systems, so small watersheds with just a few septic issues are a better fit to be addressed by the town.
- Sources of pollution are **not clearly of nonpoint origin**. More information on probable sources is needed in order for prioritization for NPS.

Table 22. Impaired Marine Waters Priority List (11 marine waters).

Marine Water	Town	Priority List Reasoning
Cape Neddick River	York	MS4 Priority Water
Goosefare Bay	Kennebunkport	MHB Priority Water, MS4 Priority Water
Kennebunk River	Kennebunk	MHB Priority Water
Maquoit Bay	Brunswick	CBEP Priority Water
Medomak River Estuary	Waldoboro	DMR/NPS Threat
Ogunquit River Estuary	Ogunquit	MHB Priority Water, DMR/NPS Threat
Salt Pond	Blue Hill/Sedgwick	DMR/NPS Threat, MERI

Marine Water	Town	Priority List Reasoning
Scarborough River Estuary	Scarborough	DMR/NPS Threat
Spurwink River	Scarborough	MHB Priority Water, DMR/NPS Threat
St. George River Estuary from Rte 1 crossing to head of tide	Warren, Thomaston	DMR/NPS Threat, Negative Water Quality Indicators
Weskeag River	S. Thomaston	DMR/NPS Threat

Table 23. Threatened* Marine Waters Priority List (16 marine waters).

Marine Water	Town	Priority List Reasoning
Anthoine Creek	South Portland	Negative Water Quality Indicators (FOCB)
Biddeford Pool	Biddeford	Negative Water Quality Indicators
Bunganuc Creek	Brunswick	CBEP Priority Water
Churches Rock	So. Thomaston	DMR/NPS Threat
Harpswell Cove	Brunswick	CBEP Priority Water
Harraseeket River	Freeport	DMR/NPS Threat
Hyler Cove	Cushing	DMR/NPS Threat
Little River and Bay	Freeport	CBEP Priority Water
Mill Pond/Parker Head	Phippsburg	DMR/NPS Threat
Mussell Cove	Falmouth	CBEP Priority Water, DMR/NPS Threat
North Fogg Point	Freeport	CBEP Priority Water
Northeast Creek	Bar Harbor	DMR/NPS Threat
Oakhurst Island	Harpswell	CBEP Priority Water
Spinney Creek	Eliot	MS4 Priority Water, Negative Water Quality Indicators
Spruce Creek	Kittery	MS4 Priority Water, Negative Water Quality Indicators
Willard Beach	South Portland	MHB Priority Water

** Note: A subset of these marine waters are impaired due to shellfish harvest closures but are not listed as impaired in the DEP 2012 Integrated Report. Marine waters with shellfish harvest closures will be listed as impaired in the DEP 2014 Integrated Report and the NPS Marine Waters Priority List will then be adjusted accordingly.*

Appendix 3. Water Resource Monitoring and Assessment Strategies and Partners

A. Types of Water Quality Monitoring and Assessment

Monitoring and assessment work by DEP is conducted for a variety of purposes (Table 23). Much of DEP's monitoring and assessment work is conducted to determine if the State's waterbodies meet their designated classification. Other types of monitoring are also integral to the NPS program. Water quality problem identification and assessment of conditions is needed to target NPS program efforts. The methods, scale and the expertise needed to carry out monitoring and assessment depends on the objective, such as ambient water quality monitoring, development of a new assessment tool, stressor analysis, or determining the sources of pollution,.

Water Quality Monitoring:

The repeated sampling of environmental conditions at predetermined locations in order to provide a set of data to conduct assessments.

Water Quality Assessment:

The overall process of evaluating the physical, chemical, and/or biological nature of water in relation to natural quality, human effects, and intended uses.

Table 24. Monitoring and Assessment Activities.

Activity	Purpose	Monitoring/Assessment Methods	Scale	Activity Initiator
Ambient Water Quality Monitoring	• Identify water quality problems • Evaluate waters of the State to determine if water quality standards are being met	• In-situ water quality monitoring • Data assessment	• Statewide-may be done on rotating basis • Watershed	• DEP • All Partners
Trends Analyses	• Determine if water quality changing positively or negatively due to land use changes, natural conditions or restoration activities	• Statistical Analyses	• Statewide • Waterbody	• DEP

Activity	Purpose	Monitoring/Assessment Methods	Scale	Activity Initiator
TMDL Development	• Develop TMDL for impaired waters • Define impairment, causes and sources of pollution, loading and reductions needed to restore waterbody		• Targeted Waterbodies	• DEP • EPA • Consultants
Water Quality Monitoring Tools and Assessment Methods	• Develop new or refine existing monitoring methods used to determine if water quality standards are being met • Develop new water quality criteria	• In-situ water quality monitoring • Statistical methods and models	• Statewide • Regional	• DEP/EPA • Universities
NPS Project Effectiveness	• Monitor and/or evaluate the effectiveness of NPS projects	• Watershed evaluation to track BMPs implemented and/or calculate pollutant load reductions • In-situ water quality monitoring • Trend Analyses	• Watershed	• DEP and partners for watershed evaluation • DEP for water quality monitoring
Watershed Assessment	• Determine specific sources of pollution or stressors in order to develop management plans and implementation projects	• Watershed or Stream Corridor Surveys that identify sources of pollution • Waterbody specific monitoring	• Watershed and waterbody	• DEP and partners for surveys • DEP and consultants for monitoring
Research	• Provide answers to specific theories, problems and questions	• Research methods	• Statewide • Regional • Watershed • Waterbody	• DEP • Universities • Consultants

B. Monitoring and Assessment for Different Types of Waters

Rivers and Streams

The DEP assesses the water quality of rivers and streams primarily through its Biomonitoring Program on a 5-year rotating basin schedule. The Program has had a macroinvertebrate biomonitoring program for 30 years and more recently began an algal biomonitoring program. Stream macroinvertebrate communities are assessed using a statistical model that predicts the likelihood of a waterbody attaining the aquatic life criteria of its assigned class of AA/A, B, or C. Numeric biocriteria that describe the macroinvertebrate classification decision process were adopted into rule (Chapter 579) in 2003. Biological assessment methods and statistical model for algal communities have been completed, but not yet implemented. The algal data is however being interpreted to determine narrative aquatic life criteria for the integrated report.

The primary causes of impairment for rivers and streams are toxic contamination, non-attainment of aquatic life criteria, oxygen depletion, nutrients and pathogens. Toxic contamination, which includes legacy pollutants such as DDT, dioxin and PCBs accounts for the greatest number of impaired miles. Non-attainment of aquatic life criteria impairs 408 miles, oxygen depletion 464 miles, and pathogens 175 miles.

The impairment sources are about equally divided between industrial point source discharges, unknown sources, and non-point sources with each affecting approximately 400 river miles. The primary non-point sources are agricultural affecting 358 river miles and development and urban stormwater affecting 199 river miles. (Source: 2012 Integrated Water Quality Monitoring and Assessment Report)

The Volunteer River Monitoring Program (VRMP) provides technical support and resources to a network of volunteer groups. Currently there are nine watershed groups throughout the State that are part of the VRMP Program. In 2012 monitors covered an area of over 1,000 square miles of watershed, monitored 82 sites and completed 478 sampling events. Data collected included temperature, dissolved oxygen, conductivity, bacteria, turbidity and total suspended solids.

Wetlands

DEP's Biological Monitoring Program is primarily responsible for monitoring and assessing wetlands. In 1998, DEP began developing a biomonitoring program for wetlands which focuses on emergent and aquatic bed wetland habitat, including freshwater lacustrine and riverine fringe wetlands. Monitoring includes biological monitoring for macroinvertebrates, algae, and phytoplankton. In addition, ecological conditions are documented and a rapid assessment of stressors completed. A model that assesses freshwater wetland macroinvertebrate communities to predict attainment of tiered aquatic life use criteria in Maine's water quality standards has been completed, but not implemented. The data are being interpreted to determine narrative aquatic life criteria for the Integrated Report.

The primary causes of wetlands impairment are toxic contamination and benthic macroinvertebrate bioassessments accounting for 761 and 273 impaired acres respectively.

Sources of impairment are point and nonpoint sources (primarily agriculture, development and urban stormwater).

Lakes

Monitoring and assessment of lakes is achieved primarily through the Maine Volunteer Lake Monitoring Program. Most of the water quality data is collected by volunteers and associated lake organizations/regional entities as described in the previous "Monitoring and Assessment Partners" section. The DEP Lakes Assessment Unit staff also undertake targeted and probability- based monitoring on a statewide basis annually.

The causes of impairment are dissolved oxygen, total phosphorus, secchi disk transparency, habitat assessment, and turbidity. The sources of impairment are mostly nonpoint sources. This includes agricultural sources affecting 16 lakes and development/urban stormwater affecting 27 lakes. Other sources of impairment include flow alterations and regulation, land treatment, landfills, internal recycling, and natural sources.

Estuaries/Marine Waters

Monitoring and assessment data for marine waters comes from a variety of sources to include DEP, other government agencies, academic institutions, non-profit organizations, and municipalities. DEP monitoring of toxic contamination is assessed using data collected through the DEP Surface Water Ambient Toxics (SWAT) program and the Gulf of Maine Council on the Maine Environment's Gulfwatch project. The SWAT program analyzes blue mussel, softshell clam, and American lobster tissue as indicators of toxic contamination affecting human and ecological health. DEP also contributes to the Gulfwatch Contaminants Monitoring Program which is part of the Gulf of Maine Council on the Marine Environment. Mussels collected through this program are analyzed for heavy metals, mercury, polycyclic aromatic hydrocarbons (PAHs), PCB cogeners, and organochlorinated pesticides. Bacterial monitoring is done by several agencies including DEP for TMDL monitoring, DEP-Cooperative Extension (Maine Healthy Beaches program) for swimming beach quality, and Department of Marine Resources to determine shellfish closures.

Causes of impairment include bacteria, low dissolved oxygen, nutrients, and other biological indicators of eutrophication and toxics. Bacterial contamination is a significant cause of impairment, affecting 159 square miles of estuarine waters (not including CSO affected waters). Toxics is also a primary cause of impairment (lobster tomalley consumption advisory). Sources of toxic contamination include industrial loads for dioxin, and for some harbor areas past activities have left dioxins, pesticides, metals, and PCBs. More recent toxic contamination originates from several sources. These sources include urban development (PAHs and metals), boat-related activities, combined sewer overflows, and atmospheric deposition.

Groundwater

The DEP, DHHS Division of Environmental Health, DACF Maine Geological Survey, and the U.S Geological Survey share responsibility for the protection and assessment of groundwater. Groundwater monitoring consists of two types of monitoring, site-specific or generalized. Most groundwater data is site-specific and is gathered as part of permit conditions, enforcement, or

impact assessments. General ambient monitoring is done by the Maine Geological Survey and U.S. Geological Survey. These two agencies monitor changes in water quality and quantity through a network of observation wells. DHHS also maintains a database of public water supply well water quality data.

Maine's groundwater efforts emphasize resource protection through three efforts. These are coordination of groundwater programs, assessment of protection problems that include enhancement of the Environmental and Geographic Analysis Database (EGAD), and increased groundwater protection and risk reduction.

Assessment of groundwater impairment is not currently done as part of the DEP "Integrated Report" assessment. Contamination however likely threatens a significant area of Maine's groundwater in developed areas of the State. Nonpoint source pollution is responsible for most groundwater pollution. Primary sources are agriculture, hazardous substance sites, spills, landfills, leaking underground storage tanks, septic systems, and shallow well injection.

C. Collaborators and Partners

Much of the water quality data that is collected and assessed for the integrated report is collected through DEP monitoring programs. However, data are also provided from numerous other agencies, organizations and volunteer monitoring groups. Data collected by volunteer monitoring groups or conservation organizations must meet quality assurance/quality control requirements to be accepted by DEP. Volunteer groups that are part of the Maine Lake Volunteer Monitoring Program or Volunteer River Monitoring Program work under a Quality Assurance Project Plan and their data is directly managed by DEP. Conservation groups not under the umbrella of one of these programs must have an EPA approved QAPP or Department approved sampling plan.

Rivers and Streams

DEP generates much of the State's river and stream water quality data through its Biomonitoring Program, Surface Water Ambient Toxics (SWAT) Monitoring Program, Atlantic Salmon Recovery Plan as well as specific studies done for waste load allocations and TMDLs. Monitoring partners include the following:

- State agencies: Department of Inland Fisheries and Wildlife, Department of Health and Human Services, University of Maine
- Federal agencies: U.S. Environmental Protection Agency, U.S. Geological Survey, National Park Service
- Other governmental agencies: Saco River Corridor Commission, St. Croix International Waterway Commission
- Tribes: Penobscot Indian Nation, Houlton Band of Maliseet Indians
- Volunteer and watershed groups working under the Volunteer River Monitoring Program
- Conservation organizations: Watershed Councils of the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap and Sheepscot Rivers; Sheepscot Valley Conservation Association, Royal River Conservation Trust, Nature Conservancy

Lakes

Lake monitoring and assessment is done by the DEP Lakes Program. However, most data is generated from the Maine Lake Volunteer Monitoring Program. DEP partners with this nonprofit organization providing quality assurance/quality control oversight and data management. Monitoring partners providing lake/pond data include the following:

- Local lake associations
- Regional entities: Cobbossee Watershed District, Lakes Environmental Association, St. Croix International Waterway Commission, Allagash Wilderness Waterway, Portland Water District, Auburn Water District, Rangeley Lakes Heritage Trust
- State agencies: Department of Inland Fisheries and Wildlife, University of Maine
- Federal agencies: U.S. Environmental Protection Agency, Acadia National Park
- Tribes: Penobscot Indian Nation
- Academic institutions: Colby College, Unity College
- Private consultants: as part of regulatory requirements
  Water Utilities

Marine and Estuarine Waters

The DEP Marine Program generates data from its own environmental and toxics monitoring programs-Surface Water Ambient Toxics and Gulf of Maine Council on the Marine Environment's Gulfwatch project. Most of the data, however, is provided by a variety of partners including:

- State agencies: Department of Marine Resources, New Hampshire Department of Environmental Services, University of Maine
- Maine Healthy Beaches Program, Casco Bay Estuary Partnership
- Nonprofits: Biodiversity Research Institute, Kennebec Estuary Land Trust, Maine Environmental Research Institute, Mount Desert Island Biological Laboratory, Wells National Estuarine Research Reserve
- Volunteer and watershed groups working under the Volunteer River Monitoring Program
- Other volunteer and watershed groups: Friends of Blue Hill Bay, Friends of Casco Bay, Georges River Tidewater Association, Spruce Creek Association

For wetlands, DEP provides most of the data through its Biological Monitoring Program.

Appendix 4. Targeted Assessment and Stressor Analysis

The success of restoration and protection efforts hinges on understanding the environmental stressors that are causing or could cause the impairment, and the watershed conditions that are generating those stressors. The purpose of this step is to inform the development of an effective watershed based plan by identifying and characterizing the relevant stressors and watershed conditions. The information required to accomplish this varies with the waterbody type and in many instances, whether or not the waterbody is impaired.

A. Lake Watersheds

The water quality standard that is most likely to be violated in lakes and ponds is the trophic standard, which states that lakes and ponds (a) shall have a stable or decreasing trophic state, subject only to natural fluctuations; and (b) shall be free of culturally induced algal blooms which impair their use and enjoyment. Since the limiting factor for algal production in Maine lakes is the concentration of phosphorus in the water, the stressor of most concern for lakes is phosphorus loading. Hence, assessment efforts are focused on evaluating the lake's trophic state; characterizing important current and potential phosphorus sources to the lake from both the lake's watershed and its bottom sediments; and, as specifically as possible, identifying opportunities to reduce phosphorus loading to the lake.

- **Water Quality** - Each year DEP's Lake Assessment Section, in combination with volunteers in Maine's Volunteer Lake Monitoring Program, collect information on the trophic state of many of the State's developed lakes. The data are used to evaluate the stability of trophic state in each lake; the incidence of algal blooms; and, especially in cases of lakes with increasing trophic state or algal blooms, the amount of phosphorus being recycled into the water column from the lake's bottom sediments.

- **Watershed Surveys -** The method most often used to identify watershed phosphorus sources is the Lake Watershed Survey, in which volunteers, under the guidance of professionals, canvas the watershed to find specific, usually stormwater-related sources of phosphorus (e.g. unstable roads, eroding ditches, agricultural operations). The identified sources are then evaluated by professionals for the severity of the problem and the probable cost of repair, creating a very specific prioritized list of opportunities to reduce phosphorus loading to the lake.

- **Internal Recycling Evaluation -** Ongoing evaluation of the lake's trophic state and a watershed survey that identifies opportunities to reduce phosphorus load to the lake are likely the only assessment efforts that will be used if the lake currently meets trophic standards. If the lake does not meet standards, assessment is likely to include intensive monitoring of the phosphorus mass in the water column over the period from May through September, and also the phosphorus, iron and aluminum content in the bottom sediments.

The purpose of this monitoring is to quantify the amount of internal recycling of phosphorus from the lake's bottom sediments.

B. Stream Watersheds

Stream watersheds typically present more complex challenges than lakes, especially if they are in urban settings and the aquatic life standard is violated or threatened. In Maine, each Class of river and stream has an aquatic life standard that describes the health of the biotic community that the stream must achieve. For Class AA and A streams, the community must be as naturally occurs; for Class B streams, the stream must support all indigenous aquatic species without detrimental change to the resident biological community; and for Class C streams, the stream must support all indigenous species of fish and the structure and function of the biological community must be maintained. There are many stressors that can cause or contribute to violation of this standard, so effective restoration and/or protection requires identification of which stressors are most important, or could become important, for any given stream situation. Given this, the suite of water quality, biological condition, habitat, stream corridor and watershed assessment tools employed varies depending on the condition of the stream and its watershed, and which stressors are most likely to contribute to impairment of the community.

Stream Restoration

Several different assessment tools are utilized when the stream in question is impaired, and particularly when the stream fails to meet its aquatic life standard. In most cases the assessment work is performed by several entities, with some elements done by DEP staff and others by the municipality, their consultants, or other local partners.

- **Water Quality** - Water quality is always monitored to some degree, and usually includes a mix of base flow and storm event monitoring at several stations. Typical parameters include temperature, dissolved oxygen (DO), specific conductance, chloride, phosphorus, heavy metals and hydrocarbons. Rising stage samplers are often used during storm events, and data sondes routinely used to obtain continuous measurements of temperature, DO and specific conductance. In order to focus in on discrete sources, conductivity screening, where many measurements are taken along the stream, may also be used.

- **Biological Assessment** - As part of the DEP's ambient water quality assessment program, biological assessments of the macroinvertebrate and the periphyton communities are made to define the impairment. There is often a signature in the community composition that indicates which stressors are in play and this can influence the direction in which other assessment efforts are focused. Biological assessments usually continue at regular intervals throughout the restoration process to assess effectiveness.

- **Stream Habitat and Corridor Assessment** - In-stream habitat and the condition of the stream corridor are also usually evaluated. Various habitat assessment and riparian corridor assessment tools are used and often volunteers assist in these assessments. This helps local citizens become familiar with the issues affecting their stream. Habitat condition

is characterized and areas where habitat is damaged are identified. Bank stability, flood plain integrity and the condition of riparian vegetation is also assessed. In cases where the stream receives excess storm flow from impervious surfaces in the watershed or where historic alterations have affected habitat integrity or flow regime, a fluvial geomorphological assessment is performed. This assessment describes the processes that are dominant in each reach of the stream channel, identifies and characterizes areas of channel instability, provides direction for watershed storm flow management and identifies opportunities for in stream habitat improvement projects.

- **Watershed Assessment** - Targeted assessment always includes some level of watershed assessment. It is important to understand where the water in various reaches of the stream comes from and what it comes into contact with on its way to the stream. In urban settings, it is often necessary to map the drainage infrastructure in order to accurately map the boundaries of the watershed, as well as the boundaries of catchments that drain to each stormwater outfall. Analysis of land use, particularly imperviousness, in each outfall catchment is helpful when identifying and prioritizing BMP retrofit opportunities in the watershed. In addition to watershed mapping, watershed surveys are often employed, sometimes using volunteers. The types of sources surveyed will vary depending on the dominant land uses in the watershed and which stressors are likely contributing to the impairment. In a rural impaired watershed, agricultural hotspots might be the focus of the survey, while in an urban setting hotspots such as road intersections, gas stations, and high-turnover parking areas may be the focus.

Stream Protection

When the stream in question is threatened but not yet impaired, the assessment regime is usually limited and aimed at (a) ongoing evaluation of the biological community to insure it continues to meet appropriate aquatic life standards and (2) identifying the stressors most likely to become issues in the watershed. The latter is often accomplished with conductivity screening and continuous measurement of temperature, dissolved oxygen and specific conductance with data sondes and loggers. Stream corridor and habitat assessments may also be performed, with particular emphasis on identifying areas critical for riparian protection. A limited watershed survey may be performed to identify opportunities for retrofits of existing sources, but the main focus of assessment is often to guide development of local policies, ordinances, practices, and infrastructure improvement strategies that can be incorporated into an effective watershed protection plan.

C. Marine Watersheds

Coastal watersheds demonstrate considerable diversity in physical, chemical, and biological characteristics as they encompass estuarine waters ranging from barely measurable salinity to fully saline seawater in marine areas. Marine waters are influenced to varying degrees by freshwater inflows from rivers and streams as well as marine waters during flood tides and periods of offshore wind. Urban settings and large watersheds provide different sources, types, concentrations, and mechanisms of pollutant loading than do rural settings or small

watersheds. Additionally, characteristics of biological communities in marine waters differ based on tolerance to the physical and chemical environment. Because of this diversity, and also the variety of standards that may apply in certain situations, assessment strategies for marine waters will vary depending on the nature of the impairment or threat.

- **Shellfish closures** - The Maine Department of Marine Resources' Shellfish Growing Area Program determines shellfish growing area classifications in all shellfish harvesting areas to ensure that only pollution-free areas are open to harvesting. Classifications are set through sanitary surveys that include a shoreline survey to identify pollution sources that may impact water quality; marine water sampling to determine fecal coliform bacterial levels in the marine water; and analysis of how weather conditions, tides, currents, and other factors may affect the distribution of pollutants in the area. Water samples are collected monthly from January through December. DMR sanitary surveys have identified NPS pollution as the likely sources of bacterial contamination in numerous shellfish harvesting areas in the state. DMR's assessments are supported and complimented by a number of other organizations including the Casco Bay Estuary Partnership, the Friends of Casco Bay, the Marine Environmental Research Institute, the Wells Reserve, the Maine Clammers Association and many of the coastal municipalities.

- **Contact Recreation** - The Maine Healthy Beaches Program is a partnership between the University of Maine Cooperative Extension/Sea Grant, DEP, and local municipalities that brings together communities to perform standardized monitoring of beach water quality and notifies the public if health risks are detected. In cases where repeated. Each year the program selects a few beaches with chronic bacterial contamination do supplemental assessments to identify the source of the contamination. These "special projects" incorporate several assessment tools including circulation studies, bracket sampling for bacteria and whiteners, and in rare cases, microbial source tracking.

- **Algal Blooms** - In recent years there have been an increasing number of localized blooms of the macroalgae, *Ulva* (formerly *Enteromorpha.spp*, on coastal mudflats. These blooms can be detrimental to the native biological community. In some instances the blooms are fed by land-based nutrient sources from the watershed that drains to the flats. Assessments similar to the lake watershed survey can be effective in identifying the likely sources of nitrogen and/or phosphorus that are driving the blooms.

- **Other Impairments of the Biological Community** - As with rivers and streams, each class of estuarine and marine waters has narrative biological criteria. The criteria are the same for the marine Classes SA, SB and SC as they are for the riverine Classes A, B and C respectively. There are many different stressors that can cause a biological impairment so assessment strategies must be aimed first at identifying the stressors responsible for the impairment and next, at identifying the watershed conditions that are contributing to the impairment. When the marine waterbody in question is impaired, threatened, or in need of protection, many different assessment tools and methods may be employed. These include water

quality monitoring, biological assessments habitat assessments and source identification. Additionally, comparisons with historical data may indicate meaningful changes over time, and local knowledge of landowners, municipal officials and fishermen can inform site selection and focused study. Furthermore, knowledge of waterbody characteristics can help to identify comparable waterbodies for use as reference.

- **Water Quality -** Monitoring efforts generally consists of measurement of temperature, salinity, D.O., pH, turbidity, chlorophyll a throughout the water column, water clarity, inorganic and total nitrogen, and phosphorus in the surface water. In the water column, light attenuation and organic nutrients, including carbon, can also be monitored to address specific research questions. Studies of sediments may include chemistry of pore water. Data sondes and sensors used discretely or unattended, permit acquisition of the above data types, and chemistry is completed with grab samples analyzed by qualified labs.

- **Biological Assessments** - Assessments of benthic floral and faunal communities assist in characterization of the impact on the resident biological community and can demonstrate communities where invasive species could dominate. Biological community assessments can include inventorying the distribution, abundance, and density of individuals as well as species and higher order level diversity of marine macrophytes (seagrasses, macroalgae), epifauna, and infauna. Presence and proliferation of particular organisms, especially those in areas of chronic or temporal high temperature, low pH, hypoxia or anoxia, and persistent nutrient or pollutant loading can indicate biological responses to stressors that support impairment of numeric or narrative criteria. The absence or low abundance and diversity of particular species can similarly indicate the influence of stressors.

- **Habitat Assessments** - Habitat assessments assist in determining suitability of water or sediment for the native biological community. Characterization of habitats can include chemical analysis of water or sediment pore water, particle size analysis, habitat complexity, and in-water structure including man-made (e.g. docks, anchors and mooring buoys) and natural features (e.g. cobble and boulders, macrophyte substrate). Mapping of habitat types relative to watershed characteristics and point and NPS influences can also explain sensitivity of habitats to change based on suspected anthropogenic influences. Degraded habitat is often identified by hypoxic or anoxic and acidic waters, surface sediments with high sulfide concentrations and corresponding bacterial community, scarring from dragging or erosion, fragmented macrophyte distribution with a high occurrence of invasive species, or the absence of life.

- **Pollution Source Evaluation** - Targeted assessment also includes some evaluation of watershed, offshore, and atmospheric influences to determine relative contributions of pollution sources. Watershed influences consider location and intensity of adjacent and upstream land use, change over time in land uses, minimization of impacts and use of BMPs, seasonal and year-round population, and proximity of point source discharges and their effluent quality and quantity. In-water influences consider extent of tidal magnitude and associated flows, and size and type of inflows, whether regulated or naturally flowing.

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