State of Maine

Department of Environmental Protection

2004 Integrated Water Quality Monitoring and Assessment Report

Document Number DEPLW0665

Table of Contents

Index of Figures

Index of Tables

Notice to Readers: Anti-SPAM Measure

It is no secret that recent trends in junk e-mail (a.k.a. SPAM) indicate that these nuisance solicitations are finding their way into e-mail accounts with ever increasing frequency. Studies indicate that one of the leading ways spammers obtain legitimate e-mail addresses is through the use of "spam-bots", which are specialized computer programs that automatically search, ferret out, harvest and amass e-mail addresses from web pages and other documents that are posted online (just like this report). Once a valid e-mail address has been located, generally it will be added to a spammer's list and/or sold to other spammers, which is sure to dramatically increase the amount of spam received by that e-mail address.

With this report, a measure has been taken to help protect those individuals whose e-mail addresses are listed inside from having their legitimate e-mail addresses discovered and automatically spammed. Basically, the text "SPAM-ZAP" (without quotation marks) will be inserted directly after the "@" symbol in each e-mail address found in this report – an example of this format follows: steve.harmon@SPAM-ZAPmaine.gov. Inserting this "SPAM-ZAP" text creates a bogus e-mail address that will cause any automatically generated SPAM e-mail to be sent to the bogus, invalid address instead of to the real e-mail address. Ultimately, any e-mail messages that are sent to that bogus address will not make it through to the intended recipient – this is true of both legitimate messages as well as SPAM.

Instructions for readers who wish to e-mail a contributor to this report:

1) Click on the desired e-mail address or copy the address into a new message inside your e-mail client.

2) Remove the capitalized words "SPAM-ZAP" (there will be no quotation marks) from the e-mail address.

3) Write your message and send it out as you normally would.

Thank you for your understanding of this issue and for your willingness to work with any minor inconveniences associated with our use of this anti-spam method. We hope that readers will support our efforts towards eliminating this document as an inadvertent source of e-mail addresses that could be used by spammers, while still providing a means by which to contact individual contributors to this report.

Sincerely,

Steve Harmon

Chapter 1 INTRODUCTION

Contact: Steve Harmon, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-4971 email: Steve.Harmon@SPAM-ZAPmaine.gov

The following report is submitted to simultaneously fulfill requirements of the Clean Water Act (CWA) particularly the Section 305(b) Report, Section 303(d) List, and information requested under Section 314, and, also to serve as a biennial report to the Maine Legislature as required under 38 MRSA Section 464.3.A. The Maine Department of Environmental Protection (DEP) assembles these reports with input from many sources and recognizes that the Section 305(b) Report and Section 303(d) List are important ways of regularly communicating information on the health, current status and trends of the State's waters. Prior versions of the 305(b) Report and 303(d) List (compiled and published before 2002) were submitted as separate documents. However, Maine's 2002 CWA/MRSA submission was a significant departure from that earlier format, in that the various requirements from Sections 305(b), 303(d) and 314 were combined into a single document and submitted as an integrated report. Another change in the 2002 report format resulted in the removal of much of the narrative sections on specific program areas and/or recent projects. Likewise, the format of this 2004 integrated report is also somewhat different from either style of previous submissions, in that this current report utilizes the integrated format from the 2002 report, but it also includes updated narrative sections that are similar to those found in pre-2002 305(b) Reports.

Specifically, this 2004 Integrated Report provides:

- Delineation of water quality assessment units (AUs) based on the National Hydrography Dataset (NHD), identified by their 10-digit HUC (Hydrologic Unit Code),
- Water quality attainment status for every Assessment Unit,
- Status of and progress toward achieving comprehensive assessment of all waters,
- Basis for the water quality standard attainment determinations for each Assessment Unit,
- Schedules for additional monitoring planned for certain Assessment Units,
- Identification of Assessment Units requiring Total maximum Daily Load (TMDL) determinations and establishes a schedule (priority) for those waters,
- An updated narrative on many of the state's water-related programs areas. The narrative includes a consolidated public health section along with many revised descriptions (e.g. the state atlas, watershed management for stormwater programs and landfills),
- New sections on invasive aquatic organisms, finished waters, the DEP quality management system, among others.

As in 2002, a vital feature of this report is the continued utilization of the five main assessment categories that were first established in the 2002 report (see the section on listing methods for details). These new assessment categories required attainment determinations that were different from previous reports and thus may not be readily comparable to pre-2002 reports. In particular, impaired waters that were previously combined into a single 303d list are now separated into a number of lists and sub-lists under categories 4 and 5 in the 2002 and 2004 integrated reports. Although a few of the sub-categories have changed slightly, it is still the case that only those waters that are currently listed under category 5 will require development and submission of Total Maximum Daily Load (TMDL) assessment reports.

Assessment information contained in this report will also be submitted to the USEPA for inclusion into their Assessment Database (ADB). The ADB contains information on Assessment Unit and segment descriptions (dimensions, designated uses, etc.), assessment date, monitoring dates, types of information used in the assessment, and if use impairment is determined, the probable causes and sources. However, the current ADB version does not list the assessment category that is provided in the appendices of this report. When fully functional, the ADB will allow for the construction a number of 'reports' that summarize information contained in the database. Although, these 'reports' provide the basis for a number of the summary tables that are in the different chapters, the tables in this report were created from DEP-generated or DEP-acquired datasets.

One result of the ongoing conversion to the ADB, the adoption of Assessment Units based on the 10 digit HUC, and a general transition to higher quality data with better spatial resolution (e.g. the 1:24,000 scale NHD) is an apparent instability in the totals of assessed waters from report to report. An example of this phenomenon is that river and stream mile totals used in this report deviates slightly from those used in previous reports (31,199 miles in 2004, 31,171 miles in 2002 and 31,672 miles in 2000 and before). In addition to changes in the total numbers of assessed miles, some individual segment lengths have also changed slightly based on the improved coverage. Another example of slightly shifting totals for assessed waters would be the numbers of lakes and lake acres. Changes to these lake figures are contained in this report (e.g. 5,782 currently vs. 5,785 assessed lakes in 2002). Staff in the DEP Lakes Unit expects to see additional refinements in the 2006 report, as the Department completes its migration from a purely tabular database into a spatially oriented database via updated GIS layers. These new GIS datasets will allow for improved management of both locational information and morphometric data, and should greatly assist in stabilizing lake-related spatial calculations.

Current guidance for the Integrated Report does not require that the State to provide information on ground water or wetland resources, as has been the case in previous years. However, Maine has included information on assessment of these resources for many years in previous reports using the 1998 305b guidance document (see Parts V and VI). Updates on progress made towards developing improved assessments of these resources have been included wherever available.

Section 1-1 Data Sources and Acknowledgements

Sources of River and Stream Assessment Data

The Department generates much of the data for the assessment through the various monitoring programs it conducts, notably the Biomonitoring Program, Surface Water Ambient Toxics Monitoring Program, the Dioxin Monitoring Program, and the Atlantic Salmon Recovery Plan. Additionally, data is provided from a variety of professional and volunteer monitoring groups. These include other state agencies and resources (Department of Inland Fisheries and Wildlife, Atlantic Salmon Commission, Department of Human Services, University of Maine System), 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 Maliseets) and a number of volunteer watershed groups / conservation organizations that are working cooperatively with DEP staff and that employ approved monitoring practices (Watershed councils of the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap and Sheepscot Rivers, Presumpscot River Watch, Friends of the Royal River, Sheepscot Valley Conservation Association, The Nature Conservancy).

Sources of Lake Assessment Data

The Department's Lake Assessment Section manages much of the data collected from lakes within the state. A strong partnership with the Maine Volunteer Lakes Monitoring Program (VLMP, Inc.) assures the quality and comparability of the data collected through numerous regional entities and local lake associations. Regional entities include Cobbossee Watershed District, Lakes Environmental Association, St. Croix International Waterway Commission, Allagash Wilderness Waterway, Penobscot Indian Nation, Portland Water District, Auburn Water District, Acadia National Park, and Rangeley Lakes Heritage Trust. Data has also been acquired from private consultants (such as Lake and Watershed Resource Management Assoc., Biodiversity Research Institute, Florida Power and Light as part of regulatory requirements) and water utilities that belong to the Maine Association of Water Districts. Additional data is acquired through the Maine Department of Inland Fisheries & Wildlife (DIF&W) and through cooperative projects with the University of Maine System, Colby College, Unity College, Soil and Water Conservation Districts and similar entities.

Sources of Marine Assessment Data

The Maine Department of Environmental Protection (DEP), the Department of Marine Resources (DMR), the Casco Bay Estuary Project (CBEP) and a variety of volunteer monitoring groups monitor Maine's coastal waters. DMR monitors for indicators of human pathogens (fecal coliforms) and biotoxins (Paralytic Shellfish Poisoning). The purpose of the DMR monitoring is to protect human health by managing shellfish harvest areas. DEP monitors toxic contaminants in tissues and assesses water quality using data collected by DEP, especially the Surface Water Ambient Toxics program, and others. DEP participates in the Gulf of Maine Council's Gulfwatch Project that surveys toxic contamination in mussel tissue in the Gulf of Maine. The Maine State Planning Office, the University of Maine Cooperative Extension / Sea Grant, DMR and DEP collaborate in the Maine Shore Stewards Program to provide training, community support, information, grants and education for volunteer groups. The University of Maine Cooperative Extension runs the Clean Water/Partners in Monitoring program, the Marine Phytoplankton Monitoring Program and, with the participating state agencies, the marine Healthy Beaches program. DMR runs the Shellfish Sanitation Program Water Quality Volunteers program that is specifically focused on shellfish growing areas. Friends of Casco Bay monitors water quality in Casco Bay. The Casco Bay Estuary Project (CBEP), funded by EPA's National Estuary Program, also monitors and supports monitoring in Casco Bay and coordinates the National Coastal Assessment for the entire Maine coast.

Chapter 2 EXECUTIVE SUMMARY AND RESPONSE TO COMMENTS

Section 2-1 EXECUTIVE SUMMARY

Surface Waters

This report continues to base assessments of streams & rivers, lakes & ponds, and marine & estuarine waters on the five main listing categories that were initially established for these waters in the 2002 305b Report. These five main assessment categories are as follows:

Category 1: Attaining all designated uses and water quality standards, and no use is threatened.

Category 2: Attains some of the designated uses; no use is threatened; and insufficient data or no data and information is available to determine if the remaining uses are attained or threatened (with presumption that all uses are attained).

Category 3: Insufficient data and information to determine if designated uses are attained (with presumption that one or more uses may be impaired).

Category 4: Impaired or threatened for one or more designated uses, but does not require development of a TMDL (Total Maximum Daily Load) report.

Category 5: Waters impaired or threatened for one or more designated uses by a pollutant(s), and a TMDL report is required.

> (Please look to Section 4-1 on Assessment Methodology to find more detailed information on the listing categories and sub-categories.)

Because waters in these new assessment categories were determined based on attainment requirements that are different from pre-2002 305b Reports, they cannot be readily compared to results from those earlier reports. However, the results from the 2002 and 2004 reports can be compared directly in order to observe changes in the amounts of waters in each category. This is precisely the information that is displayed in Table 2-1.

Table 2-1 indicates that most of the change over this reporting period for rivers and streams came from reassigning the water quality with 3,256 miles of these waters (most of the total change) going from category 2 into category 1. This period also saw small gains in category 3 and 4 waters along with a slight reduction in the number of miles of rivers / streams in category 5, which is the category with most documented impairments.

This table also reveals that the lakes and ponds of Maine were relatively stable (as a percent of total assessed waters) with respect to their listing categories during the 2002 to 2004 time frame. This period saw reductions in categories 3, 4 and 5 and an increase in category 2 waters – overall these waters look to be improving.

Marine and estuarine waters showed the most volatility. These changes were due in large part to more thorough and extensive data collection from the Department of Marine Resources. This improved dataset allowed the DEP to more accurately assign coastal waters into the five listing categories. Overall, this table reinforces the idea that monitoring of these marine waters shows large areas of attainment and that uncertainty of the data created the previous Category 3 listing. Most of the waters were moved from category 3 into category 2. However, a significant fraction of these waters have been moved into category 5, where they will require additional resources to attain better water quality.

Table 2-1 Summary of Changes to Surface Water Assessment Categories - 2002 to 2004

Rivers and Streams						
31,171 = Total Miles Assessed in 2002						
31,199 = Total Miles Assessed in 2004						
	2002 Miles in Category	% of Total 2002 Assessed Miles	2004 Miles in Category	% of Total 2004 Assessed Miles	% Change '04 - '02	Change in Miles '04 - '02
Category 1	1,072	3.44	4,328	13.87	10.43	3,256
Category 2	28,686	92.03	25,414	81.46	-10.57	-3,272
Category 3	250	0.80	269	0.86	0.06	19
Category 4	420	1.35	440	1.41	0.06	20
Category 5	741	2.38	737	2.36	-0.01	-4
Lakes						
987,172 = Total Acres Assessed in 2002						
987,172 = Total Acres Assessed in 2004						
	2002 Acres in Category	% of Total 2002 Assessed Acres	2004 Acres in Category	% of Total 2004 Assessed Acres	% Change '04 - '02	Change in Acres '04 - '02
Category 1	285,023	28.87	285,023	28.87	0.00	0
Category 2	556,277	56.35	569,540	57.69	1.34	13,263
Category 3	32,610	3.30	26,788	2.71	-0.59	-5,822
Category 4	90,344	9.15	89,102	9.02	-0.14	-1,242
Category 5	22,918	2.32	16,719	1.69	-0.63	-6,199
Marine Waters (Acres)						
1,821,433.6 = Total Acres Assessed in 2002						
1,821,433.6 = Total Acres Assessed in 2004						
	2002 Acres in Category	% of Total 2002 Assessed Acres	2004 Acres in Category	% of Total 2004 Assessed Acres	% Change '04 - '02	Change in Acres '04 - '02
Category 1	0.00	0.00	0.00	0.00	0.00	0.00
Category 2	1,502,336.00	82.48	1,722,079.30	94.55	12.06	219,743.30
Category 3	305,664.00	16.78	3,986.00	0.22	-16.56	-301,678.00
Category 4	10,745.60	0.59	697.00	0.04	-0.55	-10,048.60
Category 5	2,688.00	0.15	94,671.30	5.20	5.05	91,983.30
Marine Waters (Square Miles)						
2,846.0 = Total Square Miles Assessed in 2002						
2,846.0 = Total Square Miles Assessed in 2004						
	2002 Square Miles in Category	% of Total 2002 Assessed Square Miles	2004 Square Miles in Category	% of Total 2004 Assessed Square Miles	% Change '04 - '02	Change in Square Miles '04 - '02
Category 1	0.00	0.00	0.0	0.00	0.00	0.00
Category 2	2,347.40	82.48	2,690.75	94.55	12.06	343.35
Category 3	477.60	16.78	6.23	0.22	-16.56	-471.37
Category 4	16.80	0.59	1.09	0.04	-0.55	-15.70
Category 5	4.20	0.15	147.92	5.20	5.05	143.72

Two important listing changes should be noted in this 2004 report. Waters that are listed in non-attainment, caused solely by Combined Sewer Overflows (CSOs), have been moved from Category 5 to Category 4. The CSO Master Plans and associated enforcement controls provide the same mechanisms for control that could be gained through a Total Maximum Daily Load (TMDL) assessment and these waters are thus more appropriately listed in Category 4. Secondly, waters previously listed in Category 5 for non-attainment due to mercury have been moved to Category 4. The State has already taken aggressive action, as cited in the report, to reduce sources of mercury within the State's jurisdiction. Further mercury reductions will be required from sources outside the State's boundaries to provide the desired reduction of mercury in Maine's waters. Such reductions cannot be achieved through a state-directed TMDL process.

Wetlands

Maine DEP began development of a biological monitoring and assessment program for freshwater wetlands in 1998 as part of the biomonitoring program. The Biological Monitoring Program provides water quality information for a wide array of programs, and includes ambient monitoring, evaluation of water quality classification attainment, and assessment of risks and impacts.

The wetlands initiative currently focuses on aquatic macroinvertebrates as indicators of wetland ecological integrity, and plans to build capacity to assess multiple biological assemblages including algae (needed for development of nutrient criteria) and plant communities. Key wetland related activities include (1) ambient monitoring and assessment of wetland condition, (2) development of biological criteria for wetlands, (3) inclusion of wetlands in comprehensive State water quality monitoring strategy, (4) development of Internet Mapping Project to provide public access to biomonitoring data, and (5) development of landscape-level assessment tool to predict threats to wetlands.

Ground Water

Responsibility for groundwater resource assessment and protection is shared among the Department of Environmental Protection, the Department of Human Services' Division of Health Engineering, and the Maine Geological Survey in the Department of Conservation. Several other agencies, particularly the Department of Transportation, Department of Agriculture, and State Planning Office may investigate groundwater contamination problems in certain areas and they also contribute to groundwater protection through development of ordinances and management practices that are designed to reduce the risk of impacting groundwater quality.

A significant portion of Maine's groundwater may be threatened by contamination, particularly in unforested areas, which comprise approximately 11% of the State. Drinking water quality, including private and public well supplies, is an issue that carries significant public concern. Public interest in groundwater is primarily focused on its use as a drinking water supply (provides 60% of all human demand and 75% of livestock demand statewide) and on its use as a source of process water for industry. Numerous wells in Maine have been made unpotable by pollution from specific point sources and also from nonpoint source pollution. Important sources of groundwater contamination in Maine include disposal activities such as landfills and septic systems, leaking storage facilities, agriculture, and at sites contaminated with spilled hazardous materials or by previously unregulated activities.

Major impediments to effective ground water protection in Maine include; the absence of a complete ground water quality database to assess the extent of degradation, the lack of data to quantify the impact of some nonpoint pollution sources, and general public unfamiliarity with key ground water concepts and issues. Public misconception about ground water is probably the major factor contributing to degradation of this resource. Recent development of a comprehensive and accessible database for groundwater data (EGAD) will increase public understanding of the state's resource and improve operations at the agencies responsible for groundwater protection and assessment. Principle uses of this database are to (1) help design clean-up strategies in areas of known contamination; (2) plan future development that better provides for protection of public health and safety; (3) assist in prioritizing protection of sensitive ground water and surface water bodies, wetlands, and other resources; (4) enhance understanding of the spatial relationships between water resources and population as they relate to potential or known pollution sources; and (5) assess the flow and transport interrelationships between surface and ground water quality, in order to evaluate groundwater impacts on surface water bodies and on groundwater-dependent habitat.

Section 2-2 Response to Comments

Process to Solicit Public Comments

The following subsections detail the actions taken by the Department of Environmental Protection to promote the public's knowledge of the existence and availability of the draft version of the 2004 Integrated Water Quality Monitoring and Assessment Report (commonly known as the 305b Report). This process was undertaken in order to gain comments from the public on the contents and conclusions of the draft report. The official period of time that the Report was available for public comment was from Wednesday, June 23rd to the close of business on Monday, July 26th, 2004.

In addition to the public comment process outlined below, the draft version of the 2004 305b Report was reviewed internally by Department staff as well as by Federal EPA staff in order to produce the final version of the Report. Comments and edits from these sources all helped to produce this, the final version of the document.

Report Posting on the Department's Website:

On June 22nd, 2004 the Department posted the draft 2004 305b Report as three digital files in the popular Adobe® Portable Document Format (PDF) on the public comments section of its Bureau of Land and Water Quality website. Hardcopies of the draft report would be made available to anyone who requested the Report in that format.

Postal Mailing to the Agency Rulemaking Subscription Service List:

The Department offers a subscription service that provides notification of both rulemaking changes and rule adoption for all department rules. Subscribers to this service include both individual citizens and representatives of organizations that wish to be contacted when the DEP releases rulemaking information. During the week of June 20th, 2004 the Department mailed out approximately 150 letters to people and entities on the Agency Rulemaking Subscription Service List, including all other natural resource agencies within state government. The text of that letter follows and is italicized in order to differentiate it from other text contained in this Report.

Maine's 2004 Integrated Water Quality Monitoring and Assessment Report

Available for Public Comment until July 26, 2004

The Department of Environmental Protection has prepared a draft 2004 Integrated Water Quality Monitoring and Assessment Report for submission to the U.S. Environmental Protection Agency as required of Sections 305(b) and 303(d) of the Clean Water Act, and in fulfillment of the reporting requirements of 38 M.R.S.A. Section 464.3.A of the State of Maine's Water Classification Program.

This report is available for public comment until July 26, 2004. Reviewers of the document should pay particular attention to the categories and listing methods required by the USEPA for the surface water assessments in this report. These methods are described in Chapter 4. Specific surface waterbody attainment and impairment assignments can be found in the Appendices. The appendices are broken into three waterbody types: rivers/streams, lakes, and estuarine/marine waters. Categories 1-3 are for waters that are not impaired, categories 4 and 5 are for water segments that are impaired for one or more use.

In addition to the attainment/impairment listings, please take note of two recommended proposals on the exclusion of Total Maximum Daily Load (TMDL) requirements for certain impaired waters by listing them in Category 4-B of the report. The Department, following the work of a regional innovation seminar facilitated by Region 1 EPA, is proposing to move two types of impaired waterbodies from Category 5 to Category 4-B. These two types are waterbodies impaired by bacteria from municipal combined sewer overflows (CSOs), and all freshwaters that are only impaired as a result of mercury. Category 4-B is reserved for waters impaired or threatened for one or more designated uses, but does not require the development of a TMDL because other pollution control requirements are reasonably expected to result in attainment of water quality standards.

The department's work with municipalities to create CSO master plans with specific and enforceable deadlines will eliminate sub-standard bacterial discharges to these waters. A TMDL is not a better tool to meet standards than these master plans, which have already been completed and approved.

Similarly, the region's work to significantly reduce mercury emissions in the last six years has shown that there are existing statutory and regulatory controls in place that will reduce Maine and New England's local sources to very low levels. Controlling out-of-state sources of mercury deposition is the remaining task to remove our fish advisories. A state-directed TMDL will not accomplish that, but further action on national mercury policy by Maine and the Region can.

See Chapter 4, section 4-1 (Relisting Impaired Waters Categories) for the detailed justification of the CSO 4-B proposal and the mercury 4-B proposal. The Department is confident that these two proposals will allow us to best focus resources on work that will produce direct environmental benefits.

The draft documents (pdf files) can be found on the Department's website at:
http://www.state.me.us/dep/blwq/comment.htm

We encourage you to review the document and provide comment on this year's report. Comments should be sent to:

David Courtemanch
Maine Department of Environmental Protection
State House #17
Augusta, ME 04333

by fax: 207-287-7191
by email: Dave.L.Courtemanch@maine.gov

Legal Notice:

During the week of June 20th, 2004 the Department prepared a legal notice that ran in four daily newspapers located around the state. Those newspapers (and current weekday circulations) were as follows: The Bangor Daily News (62,730), The Kennebec Journal (14,877), The Lewiston Sun Journal (34,278), and The Portland Press Herald (75,577). The text of that legal notice follows and is italicized in order to differentiate it from other text contained in this Report.

Legal Notice

Maine Department of Environmental Protection

Notice of Public Comment for the "2004 Integrated Water Quality Monitoring and Assessment Report"

The Department of Environmental Protection has prepared the "2004 Integrated Water Quality Monitoring and Assessment Report" for submission to the U.S. Environmental Protection Agency as required of Sections 303(d) and 305(b) of the Clean Water Act, and in fulfillment of the reporting requirements of 38 M.R.S.A. Section 464.3.A of the State of Maine's Water Classification Program. This report is available for public comment until close of business July 26, 2004. Reviewers of the document should pay particular attention to the listing methods required by the USEPA for surface water assessments for this report. These methods are described in Chapter 4 of the document. Specific waterbody attainment and impairment assignments can be found in the Appendices. The report (pdf files) may be found on the Department's website at: http://www.state me.us/dep/blwq/comment.htm

Comments should be sent to:
David Courtemanch
Maine Department of Environmental Protection
State House #17
Augusta, ME 04333

by fax: 207-287-7191
by email: Dave.L.Courtemanch@maine.gov

Press Release:

On July 8th, 2004 the Department of Environmental Protection issued a press release designed to inform the public of the availability of the draft 2004 305b Report. This release also described how the DEP was seeking public comment on water quality listings in the Report. Between fifteen and eighteen radio, television and print outlets around the state would have received the press release and it was also linked to a news headline on the Department's homepage. The release also went to the Associated Press, which places the release on its "wire" for other media outlets to pick up on and run, if they so choose. The text of that press release follows and is italicized in order to differentiate it from other text contained in this Report.

July 8, 2004 *Contact: David Courtemanch*
(207) 287-3901

REPORT CARD ASSESSES STATE WATER QUALITY;
DEP SEEKS PUBLIC COMMENT FOR FUTURE IMPROVEMENTS

*(AUGUSTA)—The State wants feedback on its latest review of the health of Maine's lakes, streams, rivers, estuaries and coastal waters. The ratings contained in the final version of the 2004 Integrated Water Quality Monitoring and Assessment Report will determine planning and funding priorities for water quality improvements. DEP is asking the public to comment on the draft now posted on the web (*www.maine.gov/dep/blwq/comment.htm*). The comment deadline is July 26.*

"Feedback from the public on the accuracy of our evaluations is important to this process, " says Dr. David Courtemanch, director of the DEP's Division of Environmental Assessment. "Because these assessments drive decisions as to how particular public waters will be managed into the future, we encourage citizens to review the ratings."

The report (also known as the "305b Report", a requirement of the federal Clean Water Act) is a water quality snapshot. Because it is prepared every two years, the public can look back to see if and how the assessment of their favorite lake or stream has changed. One section of particular note to many is a listing of waters considered to be "impaired".

"An 'impaired' listing can set into motion specific management activities designed to bring a water body back into full-use compliance," notes Courtemanch. "Those activities can range from more vigilant monitoring to complete abatement of a pollutant."

Courtemanch offers examples to illustrate his point:

"Kennedy Brook was on the state's 2002 impaired waters list, prompting action to treat urban runoff. A stormwater diversion project completed by the Augusta Sanitary District has paid off, and we have been able to take Kennedy Brook off the list."

(more)

Similarly, Estes Lake in York County has improved. Recent upgrades to a municipal wastewater treatment in Sanford resulted in a decrease of the algae blooms that had caused the lake to be on the impaired list in years past.

At the same time, says Courtemanch, new impairments have been discovered.
These include Sewall Pond in Arrowsic, which is listed in 2004 because of increasing nutrients and algae.

The 2004 Integrated Water Quality Monitoring and Assessment Report is based on information gathered by the DEP along with other state, federal, tribal and local agencies, non-government organizations and volunteer monitoring groups. DEP analyzes the data to assess the capacity of Maine waters to support drinking, fishing, recreation (such as swimming) and the ability to sustain aquatic life as defined in Maine's water classification laws. The report also provides extensive information on the status of Maine's ground water and wetland resources.

###########

Summary of Public Comments and Responses

The Department received public comments from New England Organics, Stephen R. Sutter, FPL Energy Maine Hydro LLC, Kennebunk Sewer District, and the Natural Resources Council of Maine. Issues raised by comments from these organizations or individuals are either quoted or paraphrased and are presented in italic typeface. The DEP response to that comment will follow the comment and may address how the issue was dealt with in the final draft of the report (if the text does not indicate that any changes were made to the body of report, then none were made).

New England Organics

The following section contains DEPs response to a July 26th, 2004 letter from Mr. James W. Ecker, General Manager of New England Organics.

NEO: *"New England Organics has been involved in an investigation of groundwater impacts at our Hawk Ridge Facility site for many years…[f]rom these investigations it is clear that nitrate exceeding state standards existed in the groundwater prior to our facility being built, and was likely due to the property's previous life as an active dairy farm…"*

DEP: This comment addresses draft text that has been edited out of the final version of this report.

NEO: *NEO has requested that "the bullet point referencing the groundwater nitrate at Hawk Ridge Compost Facility be removed from the 305b report…In the event that you decide not to remove this paragraph, we have prepared a revision that we believe more accurately describes the groundwater study at Hawk Ridge Compost Facility, and provides at least minimal context for the single data point that the Department chose to highlight…At the Hawk Ridge Compost Facility, Unity Township, a recently installed monitoring well (supplementing the existing network of monitoring wells) has shown a single groundwater nitrate level in excess of 200 ppm, at one location, as a result of an apparent leak from the biofilter. Although the exact source of nitrate has not been determined, the biofilter leak has been repaired to address that potential source. Historically, groundwater nitrate levels at this site, which was previously an active dairy and poultry farm for over 75 years, have fluctuated, but currently range from 1 to 50 ppm. No other significant groundwater issues have been observed."*

DEP: This comment addresses draft text that has been edited out of the final version of this report.

NEO: *The Leeds project is a demonstration project done in concert with a DEP approved monitoring program to determine the actual costs, benefits and extent of impacts associated with an [sic] one time reclamation program. The applicants of this demonstration project have expended a tremendous amount of resources, including extensive background monitoring work, to assess the impacts from this experimental study. There has been nitrate detected in a downgradient monitoring well that exceeds the state standards. However, the impact has been extremely limited, both in magnitude and distance.*

DEP: This comment addresses draft text that has been edited out of the final version of this report.

Mr. Stephen R. Sutter

The following section contains DEPs response to a July 8th, 2004 e-mail from Mr. Stephen R. Sutter (Mr. Sutter works for the University of California Cooperative

Extension as an Area Personnel Management Farm Advisor for Fresno, Kings, Madera, and Tulare Counties).

SUTTER: *"Please consider mentioning that 258 mining operations were licensed (1970-93) under the Site Law. I feel this would give the reader a somewhat better perspective on how much mining is going on. (And makes at least one reader wonder if the post-1993 program is in any way more stringent.)"*

DEP: Mr. Sutter's comments refer to a section of the 305b report on gravel pits, which has been revised in response to his suggestions. Specifically, Department staff added language to clarify the number of pits licensed under the Performance Standards and the Site Location Law. In addition to the above clarification, overall compliance rates were also included in the narrative. With these changes in place, DEP staff believes that Mr. Sutter's comment has been addressed.

FPL Energy Maine Hydro LLC

The following section contains DEP's response to a July 26, 2004 letter from Mr. F. Alan Wiley, Director, Business and Regulatory Affairs for FPL Energy Maine Hydro LLC.

FPL: *FPL objects to the use of DEP Chapter 581 as a reference to criteria used to assess wetted habitat and attainment of aquatic life use.*

DEP: The department agrees in part with this comment. Chapter 581 is specific to rivers and streams and is deleted from reference for lakes and ponds in this draft. In as much as the rule is intended to provide zone of passage limits caused by pollutants (quality limitations), the desired outcome of that rule is to provide an adequate corridor of passage for aquatic organisms and thus the department also requires provision for sufficient quantity of water for passage as well. Both conditions need to be provided for use attainment to be protected. The department uses the 75% criteria when determining if a sufficient quantity of cross-sectional and areal habitat is available.

FPL: *FPL objects to the use of "hydromodification" as a source category for impairment for lakes (Table 4-11) and that this term creates an inconsistency since hydropower is a designated use for many Maine waters.*

DEP: The "hydromodification" source category comes from the USEPA (Category 7000 found in Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates, USEPA, 1997). The DEP finds that the listed lakes have impairment of aquatic life use, and that management of these lakes for hydroelectric purposes is the source of that impairment. While hydroelectric generation is a designated use for Maine lakes and ponds, management for the benefit of one use cannot cause another designated use to be impaired.

FPL: *FPL objects to Category 4 non-attainment aquatic life use designation due to hydromodification.*

DEP: Maine statute (38 M.R.S.A. Sections 464.9 and 465-A) clearly establishes aquatic life as a designated use for Class GPA waters and establishes applicable standards by which aquatic life use can be evaluated, including standards specific to "hydropower impoundments managed as great ponds". Where no pollutant is involved with the listings that are affected by hydromodification, it is appropriate that these waters be included in Category 4.

Kennebunk Sewer District

The following section contains DEPs response to a July 26th, 2004 letter from Mr. Willis T. Emmons, District Manager for the Kennebunk Sewer District.

KSD: *Appendix III, Category 5-A, page 88 - The KSD feels that the table is inaccurate because the source was listed as solely a "Municipal Point Source". The KSD noted that the low dissolved oxygen is due to a number of sources including years of industrial use upstream from the KSD facility.*

DEP: The table was amended to include nonpoint source pollution and sediment oxygen demand as sources. The waterfall and riffles upstream of KSD's outfall indicate that there is adequate dissolved oxygen to meet water quality standards in that segment of the river. (Note: Appendix III as referred to in KSDs comment is now Appendix IV in this revised draft.)

KSD: *Appendix III, Category 5-B-1, page 89 - KSD feels that the table is misleading.*

DEP: This line in the table has been combined with Category 5-A (above) and no longer appears in Category 5-B-1. The Department of Marine Resources (DMR) has sampled the estuary at the Route 9 bridge and found elevated counts of fecal coliform bacteria. The source(s) of fecal coliform bacteria in the estuary remains undetermined. Upstream of the Route 9 bridge is an extensive marsh that is a wildlife preserve and there is also one overboard discharge upstream of the bridge that is inspected by DEP. Fecal coliform bacteria data are available from the DMR and they are the agency that determines sampling locations and compliance. However, even if fecal coliform bacteria counts are not elevated, the DMR may choose to close areas that it feels might be influenced by a sewage treatment plant discharge. (Note: Appendix III as referred to in KSDs comment is now Appendix IV in this revised draft.)

Natural Resources Council of Maine

The following section contains DEP’s response to a July 26, 2004 e-mail from Mr. Nick Bennett, Staff Scientist, for the Natural Resources Council of Maine.

NRCM: *NRCM expresses concern that Category 4 (requiring no TMDL) creates an opportunity for impaired waters to be exempted from a TMDL requirement.*

DEP: Categories 4 and 5 are used to assign impaired waters, the difference being that those listed in Category 5 are required to have the state prepare a TMDL analysis. Waters are placed in Category 4 when a TMDL is not needed (e.g. other regulatory mechanisms are already in place such as specific legislation addressing the problem with appropriate timetables for attainment, new licenses, or other actions expected to bring a waterbody into attainment; or where pollutant loads are not the source of non-attainment). It is important that the DEP does not overburden its resources for TMDL work by assigning all impaired waters to Category 5 where it can be shown that the TMDL process is either an unnecessary, inappropriate or inefficient management tool, and would delay the process of bringing a waterbody back into attainment. The DEP is fully committed to bringing all impaired waters into attainment using the most efficient means, but finds that it is important for states to be able to discriminate how they manage their impaired waters by employing the TMDL approach where it is most suited. The DEP presently does not list waters, in either Category 4 or 5, that do not meet water quality criteria solely due to natural conditions (38 M.R.S.A. Section 464.4.C). Therefore it is not possible for a discharger to avoid a TMDL by arguing that attainment is due entirely to background conditions. It is possible that a TMDL analysis will determine that a discharger has an inconsequential effect on non-attainment conditions (Togus Stream is an example of this situation), but it did not preclude the TMDL process from being conducted.

NRCM: *NRCM disagrees with the listing proposal for mercury to Category 4 (requiring no state TMDL) and requests clarity of what is meant by a "regional TMDL".*

DEP: Further elaboration is made in the final draft document supporting the "off-ramp" of mercury-only listings to Category 4 (see Section 4-1). In brief, the DEP's recommendation is that non-attainment listings that solely involve mercury cannot be resolved by a TMDL conducted by Maine and that other approaches be used (e.g. the so-called Alternative Regulatory Pathway proposal recommended by MA DEP). Sources of mercury are varied and diffuse and, to a very great extent, occur outside the state. What Maine has accomplished in recent years is to pass comprehensive legislation and rules that remove or control all significant sources within the State (cited in the text). The department concludes that these actions constitute the requirements by the USEPA for enforceable controls on sources that allow a listing to be moved from Category 5 to Category 4. The Maine DEP, along with several other states, recommends that any TMDL approach be conducted at a much larger scale than state boundaries. This recommendation is supported by the Environmental Committee of the Conference of New England Governors and Eastern Canadian Premiers, the Association of State and Interstate Water Pollution Control Administrators, and the New England Interstate Water Pollution Control Commission.

NRCM: *NRCM disagrees with the use of the proposed above-below test for dioxin.*

DEP: The decision to use a "preponderance of evidence" approach (POE) for the above-below dioxin test was made by the DEP using an independent peer review body to guide the department's decision, and also considering comments from the Surface Water Ambient Toxics (SWAT) advisory committee of which Mr. Bennett is a member. Arguments can be made for the selection of either the POE approach or an "independent applicability" approach that was favored by NRCM. In selecting a final test, the department weighed information about each of the tests that were tried. The department considered all the same information provided in NRCM's e-mail in reaching its decision.

NRCM: *NRCM disagrees that there is no "identifiable and controllable load for dioxin" related to lobster advisories.*

DEP: While sources of dioxin can be readily identified in Maine's inland waters, it is the DEP's assessment that dioxin contamination in marine organisms cannot be linked directly to these sources. In the marine environment, these sources become blended with each other, with other sources in the Gulf of Maine outside the state, with nonpoint sources, and with atmospheric sources. The migratory nature of the organism further obscures any link between contamination and source. It should be noted that while Maine has tracked a decline in dioxin discharge from the primary sources (pulp and paper industry), and a decline of dioxin in freshwater fish associated with these discharges, there has been no comparable decline in dioxin found in Maine lobster tomalley that would link the contamination in these organisms with known sources. Data does indicate higher concentrations in estuaries with known upstream sources, however, dioxin discharge from these sources is already controlled by statute (38 M.R.S.A. Section 420), the same regulatory provision that allows freshwater rivers contaminated by dioxin to be listed in Category 4.

NRCM: *NRCM disagrees that impoundments cause the non-attainment problems on the Androscoggin and Sebasticook rivers.*

DEP: The DEP will correct the report to reflect that impairment on these waters is caused by pollution loads. Impaired listings for these waters (ME0103000309 and ME0104000208) in the Appendix identify pollutant loads as sources.

Chapter 3 BACKGROUND

Section 3-1 STATE ATLAS AND WATER QUALITY STANDARDS

Contact: Steve Harmon, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-4971 email: Steve.Harmon@SPAM-ZAPmaine.gov

The introduction to this report referenced the fact that many state agencies and other organizations are in the (ongoing) process of acquiring spatial data with much better resolutions than was previously available. This is a time of rapid change in GIS-compatible datasets, not only in the resolutions and types of spatial data that are becoming available, but also of a great reduction in the relative costs and speed of data acquisition, particularly in the areas of digital aerial photography and satellite imagery. The introduction also pointed out that these improving sources of data do cause slight changes and shifts in figures that are reported for the lengths or areas of total waters that are assessed during a reporting cycle. This is likely to continue and perhaps accelerate at times into the foreseeable future.

The reader should be aware that although available sources of spatial data used to construct this atlas are improving, none of them are completely accurate at every location. For example, the 2004 Report Atlas (Table 3-1) land cover category areas were determined from a Maine GAP (Gap Analysis Program) Land Cover and Vegetation Dataset primarily derived in the early 1990s (for more information on GAP visit www.gap.uidaho.edu). The smallest unit area used in this dataset covers 900 square meters (or a 30-meter square). This means a unit area that contains many different types of land cover (e.g. roughly half water and half land) could be misclassified as one or the other cover type rather than both. In the spring of 2005, the state will receive similar land cover type dataset with a unit area of 25 square meters (a square five meters to a side), based on data collected as recently as 2004. In this case, changes between these datasets will come from a difference in the resolution of the data and from the fact that these data were collected over ten years apart from one another, reflecting human-induced changes in land use. So while the following figures are useful in visualizing the composition of the State of Maine, these values should only be considered approximations. The atlas (Table 3-2) from the 2000 305(b) has been reproduced in this report to allow the reader to directly compare some of the changing figures described above and below.

The State of Maine has a total surface area of over 35,000 square miles – with dry land comprising almost 31,000 square miles and the larger surface waters occupying the remaining 4,500 square miles. With an estimated population of approximately 1.3 million people, Maine is the largest but least densely populated state in New England. However, since most of the population is concentrated in the southern and coastal portions of the State and into a broad band on either side of Interstate 95, regional population densities may vary considerably from the state's average population density.

From elsewhere in the report, Maine's 5,782 lakes and ponds cover 987,172 acres, an area that is somewhat larger than the State of Rhode Island. There are over 7,000 perennial brooks, streams and rivers in Maine, ranging in length from less than two miles to nearly 200 miles, with an estimated total length of 31,199 miles. These water resources are reported in slightly varying numbers in the 2004 atlas.

Recently there has been increasing interest in both international and state borders. The St. Croix, St. John, St. Francis, Southwest Branch of the St. John and other rivers, lakes and coastal waters make up almost half (~279 miles) of the ~609 mile-long U.S./Canada boundary. Also, the Salmon Falls, Piscataqua and other rivers, lakes and coastal waters lie on the Maine/New Hampshire line and account for nearly one-third (~60 miles) of the ~189 mile long boundary.

Although there are definitely no complete inventories of inland and coastal wetlands and marshes in Maine, the conservative estimates in this year's atlas approach a total area of almost 3,200,000 acres. This number does not include over 7,500 smaller, but known wetlands that are less than 3 acres in size (individually). Also noteworthy, is that at least 1,241 square miles of the state are underlain by significant sand and gravel aquifers.

When queried, the current version of the Geographic Information System (GIS) boundary data layer returns a value of 5,261 miles of coastline. As with many of the other data sets, this value differs slightly from earlier reports. The year 2000 atlas reported 5,296 coastal miles of shoreline (also based on 1:24,000 USGS maps data provided by the Maine Office of Geographic Information Services (MeGIS). This year's estimate was still higher, yet slightly closer to the number of coastline miles (5,249 miles) that were reported in the 1998 305b report.

Over 400 river and stream systems, ranging in size from a few hundred acres to over 1,850 square miles, empty into Maine's estuarine and near shore waters. For most reporting purposes, Maine is divided into 6 major drainage basins. Two of these (the Western Coastal Basin and Eastern Coastal Basin) are, in fact, made up of dozens of smaller basins that empty into the Atlantic Ocean. Large portions of 4 river basins extend out beyond Maine and are located in New Hampshire, Quebec and New Brunswick.

Please note: As was described to in both the Introduction and earlier in this section of the report, sources of data used in developing this report are currently and almost constantly evolving. The number of lakes, reservoirs and ponds, and the acres of lakes, reservoirs and ponds used in this report are taken from the Maine Department of Inland Fisheries and Wildlife (DIFW) Lake Index file rather than from USEPA RF3/DLG estimates. The Maine DEP believes that the DIFW Lake Index file (determined from 15' USGS topographic maps; 1:62,500 scale) provides a more accurate estimate of lake numbers and acres than the USEPA RF3/DLG estimates (based on maps having 1:100,000 scale). In addition, all of our lake data is referenced by a lake identification number, as is the DIFW database containing lake acreages. It would be a substantial task to link the USEPA RF3/DLG acreage estimates to our database, and this could potentially introduce error due to map scale differences. (However, the base data used to generate lake figures is currently undergoing a change from the DIFW Lake Index to a GIS-based system – DEP Lakes Unit staff utilized only DIFW data for the 2004 report, but expects to be completely transitioned to the new dataset by the 2006 reporting cycle.)

Table 3-1 The 2004 305(b) Report State of Maine Atlas

Population or Natural Resource Category	Value	Percent
State Population (July 1, 2003 Estimate) *	**1,305,728.0**	**100%**
Total State Surface Area (square miles) *	**35,384.7**	**100%**
State Area – Dry Land (square miles) * [1]	30,861.6	87%
State Area – Surface Water (square miles) * [2]	4,523.1	13%
Total State Area (square miles) [3]	**29,699.2**	**100.0%**
Total Fields (square miles) [3]	**2,297.9**	**7.7%**
Abandoned Field	72.7	0.2%
Blueberry Field	50.7	0.2%
Grasslands (hayfield, pastures)	1,768.9	6.0%
Crops/Ground (includes plowed ground)	405.5	1.4%
Total Forest (square miles) [3]	**26,519.8**	**89.3%**
Clear-cut	448.7	1.5%
Early Regeneration	2,017.6	6.8%
Late Regeneration	1,114.1	3.8%
Light Partial Cut	430.0	1.4%
Heavy Partial Cut	577.5	1.9%
Deciduous Forest	4,934.4	16.6%
Deciduous/coniferous Forest	5,139.9	17.3%
Coniferous/deciduous Forest	6,783.7	22.8%
Coniferous Forest	2,960.1	10.0%
Deciduous Forested	392.5	1.3%
Coniferous Forested	1,706.4	5.7%
Dead-forest	14.8	0.0%
Total Scrub-Shrub (square miles) [3]	**725.4**	**2.4%**
Deciduous Scrub-shrub	653.3	2.2%
Coniferous Scrub-shrub	71.7	0.2%
Dead Scrub-shrub	0.4	0.0%
Total Freshwater Wetlands (square miles) [3]	**600.2**	**2.0%**
Fresh Aquatic Bed	0.6	0.0%
Fresh Emergent	326.9	1.1%
Peatland	191.4	0.6%
Wet Meadow	81.2	0.3%
Total Saltwater Wetlands (square miles) [3]	**116.4**	**0.4%**
Salt Aquatic Bed	82.9	0.3%
Salt Emergent	33.5	0.1%
Total Earth-Material Shorelines (square miles) [3]	**152.0**	**0.5%**
Mudflat	93.2	0.3%
Sand Shore	12.6	0.0%
Gravel Shore	17.0	0.1%
Rock Shore	29.2	0.1%
Total Freshwater Surface Area (square miles) [3]	**1,849.6**	**6.2%**
Shallow Water	89.7	0.3%
Open Water	1,759.9	5.9%
Total Saltwater Surface Area (square miles) [3]	**2,273.4**	**7.7%**

Total Residential/Urban/Industrial/Paved Ways (square miles) [3]	**404.4**	**1.4%**
Sparse Residential	261.2	0.9%
Dense Residential	134.5	0.5%
Urban/Industrial	5.7	0.0%
Highways/Runways	3.0	0.0%
Total Alpine Tundra (square miles) [3]	**8.0**	**0.0%**
Total Exposed Rock / Talus (square miles) [3]	**17.2**	**0.1%**
Total Miles of Coastline (including tidal rivers & shorelines of islands) [4]	**5261.0**	N/A
Total Miles of Border Coast, Lakes & Rivers Shared with CA and NH [4]	**338.9**	**100%**
Maine – Canadian Border (coastal water miles out to the "3 mile" limit)	39.4	12%
Maine – Canadian Border (lake miles)	33.0	10%
Maine – Canadian Border (river miles)	206.2	61%
Maine – Canadian Border (total water miles) [4]	**278.6**	**82%**
Maine – Canadian Border (total land and water miles)	*608.7*	*N/A*
Maine – New Hampshire Border (coastal water miles out to the "3 mile" limit)	17.3	5%
Maine – New Hampshire Border (lake miles)	17.7	5%
Maine – New Hampshire Border (river miles)	25.4	7%
Maine – New Hampshire Border (total water miles) [4]	**60.3**	**18%**
Maine – New Hampshire Border (total land and water miles)	*188.8*	*N/A*
Total Miles of Rivers and Streams in Maine [4]	**45,149.0**	**100%**
Miles of perennial streams (subset)	25,617.1	57%
Miles of intermittent [nonperennial] streams (subset)	13,461.3	30%
Miles of rivers (subset)	6,070.6	13%

Miles of Rivers, Streams and Wetland Flowpaths by Stream Order [5]						
Stream Order	*Flowing*	*Intermittent*	*Perennial*	*Wetland Flowpath*	*Total*	*N/A*
1	24,779.08	11,291.27	13,009.22	546.79	27,965.8	100%
2	9,838.34	1,823.24	7,828.66	212.58	12,285.8	44%
3	4,338.84	355.31	3,928.60	65.23	6,986.1	25%
4	1,059.94	68.87	975.64	16.44	3,722.5	13%
5	154.89	12.11	141.55	1.30	1,882.8	7%
6	15.87	2.22	13.70	0.02	1,010.6	4%
7	0.76	0.00	0.76	0.00	246.2	1%
8	0.00	0.00	0.00	0.00	34.1	< 1%
Totals:	*40,187.72*	*13,553.02*	*25,898.13*	*842.36*	*54,133.9*	*N/A*

Miles of Rivers and Streams by Water Class [4]						
Water Class	*Streams*	*(% of Stream Miles)*	*Rivers*	*(% of River Miles)*	*Class Totals*	*N/A*
Class AA	1,369	3.47%	1,274	20.99%	2,643.0	6%
Class A	17,549	44.44%	2,540	41.85%	20,089.0	44%
Class B	20,026	50.72%	1,782	29.36%	21,808.0	48%
Class C	542	1.37%	474	7.81%	1,016.0	2%
Totals	*39,486*	*100%*	*6,070*	*100%*	**45,556.0**	**100%**

Number of Lake, Pond and Reservoir Features in DEP's GIS Datalayer [4]	33,065	100%
Number of Above Waterbodies assigned a MIDAS ID Number (subset) [4]	6,027	18%
Number of Significant Publicly Owned Waterbodies (subset) [4]	2,314	7%

Total Areas of the Waterbodies Described Below:	Square Miles	Acres
Lake, Pond & Reservoir Features the Maine DEP's GIS Datalayer [4]	1,563.3	1,000,527.2
Lakes, Ponds & Reservoirs with an assigned MIDAS Number (subset) [4]	1,518.6	971,885.6
Significant Publicly Owned Lakes, Ponds & Reservoirs (subset) [4]	1,477.4	945,506.2
Total Area of Bays, Estuaries, Harbors and Tidal Rivers [4]	**2,846.1**	**1,821,473.9**
Total Area of Bays, Estuaries and Harbors	2,717.3	1,739,051.0
Total Area of Tidal Rivers	128.8	82,422.9
Total Area of Bays, Estuaries, Harbors and Tidal Rivers by Water Class [4]	Square Miles	Acres
SeaClass A	211.0	135,009.0
SeaClass B	2,606.3	1,668,047.8
SeaClass C	28.8	18,417.1
Total Area of Wetlands [6]	**4,972.8**	**3,182,563.4**
Estuarine	239.8	153,462.2
Marine	164.5	105,277.1
Total Area of Saltwater Wetlands [6]	**404.3**	**258,739.3**
Lacustrine	1,466.6	938,621.7
Palustrine	2,954.0	1,890,553.6
Riverine	147.9	94,648.8
Total Area of Freshwater Wetlands [6]	**4,568.5**	**2,923,824.1**
Total Area of Mapped Sand and Gravel Aquifers [4]	**1,241.6**	**794,624.0**

* These figures were obtained from 2000 census data, unless otherwise noted.

1. Dry land and land temporarily or partially covered by water, such as marshland, swamps, etc.; streams and canals under one-eighth statute mile wide; and lakes, reservoirs, and ponds under 40 acres.

2. Permanent inland water surface, such as lakes, reservoirs, and ponds having an area of 40 acres or more; streams, sloughs, estuaries, and canals one-eighth statute mile or more in width; deeply indented embayments and sounds, and other coastal waters behind or sheltered by headlands or islands separated by less than 1 nautical mile of water, and islands under 40 acres in area. Excludes areas of oceans, bays, sounds, etc. lying within U.S. jurisdiction but not defined as inland water.

3. As derived from the Maine GAP Landcover Analysis Dataset.

4. As derived from MeDEP's GIS hydrography, geology and state boundary related datasets (Source: Digitized 1:24,000 USGS 7.5" Quadrangle Sheets and Digital Raster Graphics).

5. Draft stream order dataset - as derived from the Maine Office of GIS (MeGIS) 1:24,000 National Hydrography Dataset (NHD).

6. As derived from the National Wetland Inventory (NWI) dataset – based on polygon features only, figures do not include the NWI point dataset that indicates the location of small wetlands.

Table 3-2 The 2000 305(b) Report State of Maine Atlas

State of Maine: Population and Natural Resource Statistics

Population (Mid-1990 estimate)	**1,227,928**		
State Surface Area	**33,265**	**Mi^2**	**100.00%**
Forested Upland	21,262	Mi^2	63.92%
Forested Wetland	4,688	Mi^2	14.09%
Other Fresh Wetland	3,190	Mi^2	9.59%
Brackish/Saline Wetland	246	Mi^2	0.74%
Cropland	924	Mi^2	2.78%
Pasture	216	Mi^2	0.65%
All Lakes and Ponds (5,788 / 987,283 acres)	1,543	Mi^2	4.64%
Significant Lakes and Ponds (2,314 / 959,193 acres)			
Other land	1,499	Mi^2	4.51%
Area Underlain by Significant Sand/Gravel Aquifers	**1,315**	**Mi^2**	
Total Area of Estuarine/Marine Waters	**2,851.6**	**Mi^2**	
Linear miles of Ocean Coast	**5,296**	**Mi^2**	
Number of Major Drainage Basins	**6**		
Total lengths of rivers, streams, etc.	**31,672**	**Miles**	
Total length of rivers	3,704	Miles	
Total length of streams	3,909	Miles	
Total length of brooks	22,829	Miles	
Total length of creeks, etc.	1,230	Miles	
Names and mileages of inland border waters (total miles = 272)			
Monument Brook (U.S. - Canada)	11	Miles	
Saint Croix R. (U.S. - Canada)	52	Miles	
Saint Francis R. (U.S. - Canada)	27	Miles	
Saint John R. (U.S. - Canada)	45	Miles	
SW. Branch of the St. John R. (U.S. - Canada)	50	Miles	
Salmon Falls R. (ME - NH)	30	Miles	
North Lake, Grand Lake, Mud Lake, Spruce Mountain Lake, Spednik Lake, Grand Falls Flowage and Woodland Lake (U.S. - Canada)	42	Miles	
Umbagog Lake, Lower Kimball Pond, Province Lake, Stump Pond, Balch Pond, Great East Lake, Horn Pond, Northeast Pond, Milton Pond and Spaulding Pond (ME - NH)	15	Miles	

Water Quality Standards Program

Contact: David Courtemanch, DEP, BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Dave.L.Courtemanch@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docmonitoring/classification/index.htm

The water quality of Maine is described in terms of physical, chemical and biological characteristics associated with the state's water classification program. As established in Maine statute (38 MRSA Sections 464-470), the classification program consists of 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 aquatic life), and characteristics (e.g. natural, free flowing) that specify levels of water quality necessary to maintain the designated uses. All State waters have a classification assignment (Lakes: GPA. Rivers and streams: AA, A, B, C. Marine and estuarine: SA, SB, SC).

In some cases, specific limitations are established on certain activities that can occur within a classification, such as types of discharges. Maine's classification system is goal based, that is, it may not necessarily reflect current water quality conditions but rather establishes the level of quality directed by the State to achieve. Maine's classification system should be characterized as more risk-based than quality-based. In a risk-based classification system the difference in water quality between the various classes is not large, however, different restrictions placed on activities associated with each class establishes varying levels of risk that water quality could be degraded and designated uses threatened by allowed activities.

In addition to the Maine water quality classification system, the requirements of the Federal Clean Water Act (CWA) establish national goals (designated uses) and interim goals of swimmable-fishable ("wherever attainable ... of ... the protection and propagation of fish, shellfish and wildlife ... [and] recreation in and on the water"). All waters that attain State standards also attain the interim goals of the Clean Water Act.

The assessment listing provided in this report gives the attainment status of the water quality goals established in the classification program. Thus, some waters may be listed as impaired even though they have relatively good water quality. Such waters do not attain the quality goals established for their class (e.g. a Class A river may be listed because it does not fully attain the standards of that class but may be of sufficiently good quality to attain Class B or C, and Clean Water Act goals).

The classification program is reviewed every three years by the Department and the Board of Environmental Protection (Board). The Board may, after opportunity for public review and hearing, make recommendations to the Legislature for changes in standards or reclassification of selected waters. The most recent revisions to the classification program were completed in 2002-2003 when changes were made to the provisions for measurement of dissolved oxygen in impoundments. The Legislature also made classification upgrades to 75 river, stream and coastal segments totaling over 800 miles of waters. The Board also completed promulgation of a rule (Chapter 579) that establishes numerical biological criteria for the assessment of rivers and streams. Some of these program changes are discussed in subsequent sections of the report.

Section 3-2 EFFECTIVENESS OF POINT SOURCE POLLUTION CONTROL PROGRAMS

Contact: Brian Kavanah, DEP BLWQ, Division of Water Resource Regulation (DWRR)

Tel: (207) 287-7700 email: Brian.W.Kavanah@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/wastepage.htm

Maine uses multiple approaches to ensure that point source discharges of wastes receive adequate treatment prior to their release to waters of the State. Maine law prohibits any discharge of wastes to waters of the State without a license, and to receive a license an applicant has to demonstrate the ability to provide the appropriate level of treatment. All of the larger municipal and commercial sources of wastewater in the state are licensed and treated, or conveyed to licensed facilities for treatment. A number of financial assistance programs support new facility construction, as well as upgrades or additions to existing facilities.

Many communities in Maine are characterized by low population densities and depend on individual subsurface disposal systems to provide sewage treatment. For areas not served by community collection systems, the Maine Subsurface Wastewater Disposal Rules require that property owners provide adequate means of treating their own wastewater, in accordance with specifications established by the rules. The rules are enforced at the municipal level and administered at the State level by the Department of Human Services.

Most sources of all types of wastewater in Maine, including communities, industrial or commercial businesses, and residences either have installed treatment facilities or discharge their wastes to facilities managed by other owners. The traditional regulatory approach with dischargers is license compliance inspections coupled with technical assistance in operations and maintenance, enforcement where necessary, and periodic re-licensing.

Pollution Prevention Assistance Program

Contact: Don Albert, DEP BLWQ, Division of Engineering, Compliance and Technical Assistance (DECTA)

Tel: (207) 287-7767 email: Don.J.Albert@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/engin.htm

Industrial Pollution Prevention:

The Maine Water Pollution Prevention program (MWPP) provides technical assistance to pulp and paper mills. Over the years the unit has helped mills reduce their biochemical oxygen demand (BOD) discharge, use of ammonia, phosphoric acid, and the emission of chloroform.

Municipal Pollution Prevention:

Results from annual self-assessments of wastewater treatment facilities conducted under the MWPP program provided DEP and municipal officials with information about effluent quality trends, facility design capabilities, chemical and energy use, and the financial condition of those facilities. The objective of the program is to assist in long-term planning and to reduce the potential for effluent violations. The MWPP program helped target technical assistance, establish benchmarks and measure municipal pollution prevention efforts.

Construction of Wastewater Treatment Facilities

Contact: Steve McLaughlin, DEP BLWQ, Division of Engineering, Compliance and Technical Assistance (DECTA)

Tel: (207) 287-7768 email: Steve.A.Mclaughlin@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/grants.htm

Since the passage of the Clean Water Act, considerable amounts of grant and loan money have supported a very successful effort to clean up Maine's surface waters. Despite this success, there are still significant needs for continued clean-up efforts. These efforts are directed toward upgrading existing treatment facilities, control of combined sewer overflows, and construction of individual on-site treatment facilities. To coordinate activities in each of these areas, the DEP administers multiple programs through its Division of Engineering, Compliance, and Technical Assistance.

In some communities, existing treatment facilities are not adequately treating sewage, due to age of the facility, design deficiencies or operational problems. Excess ground water or surface water entering sewage collection systems causes sewer overflows, ineffective treatment and/or unnecessary treatment and maintenance costs.

Although most of the larger communities in Maine are served by publicly owned sewage treatment facilities, there are still some areas where domestic sewage is inadequately treated or not treated at all. Such areas may include entire towns, as well as homes, businesses and seasonal dwellings. These communities may also have areas with malfunctioning septic systems and untreated straight-pipe discharges.

State Revolving Loan Program: Federal and State funds for the construction of municipally-owned sewage treatment facilities are administered in conjunction with the Maine Municipal Bond Bank in accordance with the requirements of the Federal Clean Water Act and State law, Title 38 MRSA, Sections 411 and 412. The program is designed to distribute loan funds to communities with sewage treatment problems.

State Revolving Fund: SRF program monies are used to provide low-interest loans (2% below market rates) to communities and sanitary districts to upgrade treatment facilities. The program depends on a yearly Federal Capitalization Grant which must be matched with a 20% State Grant. In 2001, voters approved $2.5 million as the State match for SRF funds. Thirty-two SRF projects were initiated during FY2000 and FY2001 by borrowing over $56 million from these funding sources.

The DEP Municipal Priority Point System: This system is the mechanism used to rate individual projects. The system incorporates five priority categories listed in descending order of relative priority as follows:

1) water supply protection,

2) lakes protection,

3) shell-fishery protection,

4) water quality concerns, and

5) other facility needs

Within each of these priority categories, points are assigned depending on whether the severity of the overall problem is assessed as low, medium or high. The DEP Municipal Priority Point System is described in more detail in the "State of Maine Municipal Wastewater Construction Program," published annually by the Division of Engineering, Compliance and Technical Assistance. In addition to describing the administrative aspects of the Municipal Wastewater Facilities Construction Program, the above-mentioned document includes the "Multi-year SRF Project list" and the "Additional Needs Project list." The Multi-year SRF Project list includes all projects likely to need upgrades, whether major or minor. The Additional Needs Project list is primarily for areas that presently do not have treatment facilities.

Maine still has a need to make state grants to communities that would have an unusually high annual user charge even with the subsidized interest rate offered through the SRF program. These projects may also receive grants and loan funds from United States Department of Agriculture Rural Development program as well as grants from the Maine State Department of Economic and Community Development. The bond issues that provided the State match for Federal revolving fund capitalization included additional grant funds dedicated for various projects. These projects included funds for new wastewater treatment facilities in the towns of Corinna, Vinalhaven, and Van Buren.

Maine Combined Sewer Overflow Program

Contact: John True, DEP BLWQ, Division of Engineering, Compliance, and Technical Assistance (DECTA)

Tel: (207) 287-7808 email: John.N.True@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/grants.htm

Forty-two Maine communities are served by combined sewer systems, which convey a combination of sanitary and storm water flows to wastewater treatment facilities. During dry weather, all of the sewage in a combined system is conveyed to the treatment plant for adequate treatment. However, during rainstorms or snow-melt periods, stormwater mixes with the sanitary sewage, causing flows that exceed the capacity of the sewer system. This results in combined sewer overflows (CSOs), which vary extensively in pollutant types, concentrations and loads, as well as in volume of overflow and severity of impact to the receiving waterbodies.

Maine has established an aggressive program, coordinated with EPA's CSO program, to assist communities in evaluating the design, condition, activity and effects of combined sewer systems and overflows. As of September 2003, the Combined Sewer Overflow (CSO) Program has provided 25% grants totaling $4,703,297 to support development of forty-two CSO Master Plans or sewer system studies. This represents a total CSO planning effort to date of approximately $18,813,188.

Through these CSO Master Plans, communities conduct studies to determine:

1) the quantity and pollutant loads of CSOs,

2) the impact of CSOs on receiving waters,

3) sensitive areas, where uses are of higher priority, and

4) analysis and recommendation of technologies that will provide a high level of CSO control at a cost those communities can afford

However, it has become clear that the level of CSO control necessary for full attainment of current water quality standards will be very expensive and lengthy to complete. Indeed, several Maine communities have determined through studies of their sewer systems that complete CSO control would cause significant social and economic hardship. Also, most CSO control programs will require terms of up to 15-20 years to complete. Even if a community's recommended plan was to eventually eliminate all CSO problems, water quality standards and designated uses would continue to be violated until the program was complete. This would place the CSO communities in a dilemma. They would be doing all they were financially capable of doing, yet still be violating current water quality requirements. This would leave them open to potential lawsuits by people not in agreement with the recommended CSO Master Plans. Finally, communities need a clear sense of direction and assurance that the actions they take are appropriate and are in full compliance with the law.

EPA has recognized that most States with CSOs have water quality standards that do not adequately address wet weather impacts to the CSO systems and on the receiving waters. EPA's CSO Control Policy of April, 1994, recommends "review and revision, as appropriate, of water quality standards and their implementation procedures when developing CSO control plans to reflect the site-specific wet weather impacts of CSOs".

In response, the Maine DEP proposed changes to Maine's water quality standards and designated uses to allow Maine CSO communities to request from the Board of Environmental Protection temporary CSO subcategories. The new wet weather standards language was signed into law in June of 1995 and became effective in October of 1995. These site-specific CSO subcategories will remove designated uses for short periods of time after rainstorms and snow melt in areas affected by existing CSOs. This will allow communities to continue to make progress in solving the CSO pollution problems without undue financial hardship, and meet state water quality standards. Regulations allowing the implementation of this law became effective on February 5, 2000.

In this report, Maine is proposing to change the listing of CSO-only affected waters from Category 5 to Category 4. See discussion in listing Methodology Section.

Small Community Facilities Program

Contact: Richard Green, DEP BLWQ, Division of Engineering, Compliance, and Technical Assistance (DECTA)

Tel: (207) 287-7765 email: Richard.A.Green@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/grants.htm

In 1981, the Maine Legislature enacted a law designed to allow the State to help finance small wastewater treatment projects. The law authorizes the Department of Environmental Protection to award grants to help fund the construction of small wastewater treatment facilities, including individual septic systems. In the case of individual septic systems, DEP can pay from 25% to 100% of the construction costs. The maximum project cost funded by the program is $100,000 per year for each town. Projects are reviewed for their priority under a system very similar to the Municipal Priority List and then selected from the resulting list in descending numerical order. Funds for this program are usually provided from bond issues approved by Maine voters. The Small Community Facilities Program was last funded for the 2004 construction season by a $500,000 bond issue that was approved in November, 2003.

This program fills a need which is largely unmet by the State Revolving Fund Program. It allows the Department to clean up scattered small-scale problems by funding installation of individual or cluster treatment systems in a very cost-effective manner. During the twenty four year period the Small Community Facilities Program has been in existence, grants totaling $23 million have been authorized for funding under this program, allowing the replacement of systems in over 300 communities. As a result of these efforts, significant benefits have accrued, including the elimination of public health threats and the reopening of a number of shellfish growing areas to harvest.

Licensing of Wastewater Discharges

Contact: Brian Kavanah, DEP BLWQ, Division of Water Resource Regulation (DWRR)

Tel: (207) 287-7700 email: Brian.W.Kavanah@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/wastepage.htm

The Division of Water Resource Regulation is responsible for the licensing and re-licensing of all surface wastewater discharges, whether industrial, commercial, municipal or residential. In Maine, the vast majority of wastewater discharge sources have previously been licensed. Therefore, the licensing program is focused largely upon renewal of existing licenses, rather than development of new licenses. As of 12/31/03 there are 202 non-POTW (Publicly Owed Treatment Works) licensees (includes industrial, commercial, cooling water and misc. sources), 169 POTW licensees, and 1,658 Overboard Discharge licenses or conditional permits for sanitary discharges from residential and commercial sources.

As described below under *New Program Areas: NPDES Authorization and Emerging Issues,* Maine was authorized to implement the NPDES program in January of 2001 and has made tremendous progress in issuing permits.

Wastewater discharge limits in the State are based upon two criteria: 1) a standard of performance of technology or level of treatment provided for a specific wastewater or pollutant, or, 2) the level of treatment required to provide protection for the water quality standards of the receiving water. When developing license limits, the more stringent of these criteria is used in the license. Most effluent standards and criteria are the same as those under the Clean Water Act (CWA).

The Clean Water Act established national "standards of performance" for the control of pollutant discharges from all sources. Section 301 of the CWA required that, by 1977, all point source discharges of "conventional" pollutants be treated by the application of best practicable control technology. The Code of Federal Regulations, in Title 40, establishes these technology-based effluent limitations, which serve as the minimum licensing standards for point source discharges.

Municipal and industrial dischargers of wastewater containing toxic or hazardous pollutants are required to apply "best available control technology" in order to achieve effluent limitations established pursuant to Sections 301 and 307 of the CWA. The EPA Administrator publishes additional guidance as effluent limitations and standards of treatment efficiency for the control of specific pollutants from various source categories. Effluent limitations for toxic and hazardous pollutants are included in

Maine Pollutant Discharge Elimination System (MEPDES) permits for industrial or municipal dischargers as needed. In early 1995, the Department began implementing the requirements of Maine's Surface Waters Toxics Control Program, which requires effluent testing for whole effluent toxicity (WET) and priority pollutants from many industrial and municipal treatment plants. The program is set forth in Chapter 530.5 of Departmental Rules, which may be accessed at the following URL: www.maine.gov/sos/cec/rcn/apa/06/chaps06.htm

Municipal Wastewater Treatment: The CWA requires that discharges from municipal treatment systems receive secondary treatment (providing 85% removal of conventional pollutants), except where water quality concerns require more stringent limits. The only exception to this requirement is a variance under Section 301(h) of the CWA, allowing primary treatment where the dilution ratio and depth of the water allows rapid mixing of the effluent into the receiving water. Maine has twelve municipal facilities discharging under primary variances; all discharge into the ocean or into waters with high-volume tidal flows.

Municipal licenses include requirements to disinfect at least seasonally due to the possibility of discharging pathogenic micro-organisms. Because most municipal dischargers use chlorine in some form to disinfect, limits for total residual chlorine are included in many municipal licenses. Municipal licenses also include requirements to monitor CSO activity and to develop plans for control of these overflows. Many municipalities accept wastewater from industrial or commercial facilities either with or without pre-treatment. Appropriate pretreatment requirements are included in the municipal license where an industrial source contributes 10 percent of the flow to the municipal facility and discharges a pollutant that has a categorical standard.

Industrial Wastewater Treatment: A wide variety of industries in Maine use processes that result in the generation of contaminated wastewater. The chemical and biological constituents of wastewater from Maine's industrial point sources are as varied as the industries themselves and include everything from wood fiber to shrimp wastes to metallic compounds.

Industrial dischargers in Maine are regulated in two ways: 1) the industry discharges to a municipal sewage collection system, or 2) the industry discharges directly to a receiving waterbody. Industries which discharge wastewater to publicly-owned sewage treatment facilities are required to pre-treat wastes which would otherwise interfere with the operation of those treatment facilities, or which would not be adequately treated by the municipal treatment process. The pretreatment program is administered by the DEP, which conducts pretreatment inspections and provides assistance to municipalities in understanding pretreatment issues and in developing local limits on wastes to be discharged.

Elimination of Licensed Overboard Discharges

Contact: Richard Green, DEP BLWQ, Division of Engineering, Compliance, and Technical Assistance (DECTA)

Tel: (207) 287-7765 email: Richard.A.Green@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/grants.htm

From the inception of its wastewater discharge licensing program, Maine has issued licenses to individual homeowners or businesses, or to small cluster-type treatment systems, where existing lots were unsuitable for subsurface disposal and no municipal system was available. This ultimately led a large number of licensees (more than 2900 in 1987), which made it impossible for DEP to adequately monitor compliance or evaluate re-licensing applications. Also, the large number of small overboard discharges (OBDs) eventually led to closures of a significant number of shellfish growing and harvesting areas.

Due to concern over the effects of the burgeoning number of licensed small point source discharges, the Maine Legislature passed an act (the "Overboard Discharge Law") in 1987, which prohibited new discharges of non-municipal sanitary wastewater. In 1989, substantial changes were made to the Overboard Discharge Law. These changes prohibited new discharges and expansions of existing, licensed discharges, required DEP to inspect all OBDs each year, established an inspection fee to fund the inspection effort, and established the OBD Removal Grant Program. The priorities of the grant program are to eliminate discharges that either causes the closure of shellfishing areas or that cause a public nuisance.

The Overboard Discharge Laws were amended again in 2003. These new changes require the removal of all overboard discharges if a technologically proven alternative can be found. The grant funding mechanism was also changed to allow grants of 25% to 100% of system costs, with the grant percentage dependent on income. Newer technologies have made it possible to install non-discharging systems on difficult sites, and it is anticipated that ultimately 50 percent of the approximately 1,658 licensed overboard discharges in the state (at the end of calendar year 2003) will eventually be removed.

The OBD grant program has helped open over 16,000 acres of closed coastal waters since 1991 by removing over 300 discharges at a cost of under $6 million. These opened areas contain fish and shellfish with a potential retail value estimated to be $40 million, if they were fully utilized. This figure comes only from these potential harvests of fish and shellfish and does not take into account the many other benefits of cleaner, healthier waters.

Compliance Evaluation

Contact: Don Albert, DEP BLWQ, Division of Engineering, Compliance and Technical Assistance (DECTA)

Tel: (207) 287-7767 email: Don.J.Albert@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/wastepage.htm

The Department uses a three-part program to evaluate the compliance of wastewater treatment facilities. The compliance evaluation program involves on-site inspections of wastewater treatment facilities, occasional sampling of their effluent quality on a selective basis, and monthly evaluation of the licensees' self-monitoring reports. Discharge licenses also require immediate reporting of any major malfunctions, bypasses or exceedences of license limits to DEP inspectors.

The intent of the inspection program is to foster voluntary self-compliance and to encourage licensees to be aggressive in attaining optimal operation and maintenance of their treatment facilities. During a NPDES compliance inspection that utilizes EPA Form 3560-3 (known within DEP as a "3560 inspection") or other types of thorough inspections, all major areas of the treatment facility are inspected to ensure proper operation and maintenance, including treatment equipment, pumping systems, self-monitoring records, process control and laboratory testing procedures. In addition, several routine state inspections are done between the more thorough "3560" type inspections to insure that proper operation is continuing. These state inspections are usually less intense than the "3560" type of inspection and focus on specific plant problems, operator assistance projects and other compliance follow-up activities. Unlike the "3560" type of inspection, these routine state inspections are usually not announced so that a better idea of a plant's normal day-to-day operation can be ascertained. Effluent samples are sometimes collected for analysis by the DEP to ensure that the self-monitoring efforts by the licensees, accurately represents the typical condition of the effluent.

An important part of the inspection and compliance program is monthly Non-Compliance Review (NCR) meetings held by the DWRR. At these meetings, representatives of all regional DEP offices, the licensing section, the enforcement section and DECTA discuss specific compliance problems at licensed treatment facilities and decide upon specific courses of action. Possible responses to compliance problems range from monitoring the situation to providing technical assistance, providing engineering design reviews, funding upgrades to treatment facilities, up to formal enforcement action. The NCR process has improved consistency in addressing compliance problems, has helped foster voluntary compliance, and has facilitated the referral of appropriate violations to the enforcement section. In addition to monthly NCR meetings, Quarterly Noncompliance Review (QNCR) meetings are held with EPA to discuss and coordinate actions regarding waste water treatment problems.

The Department provides an inspector to serve as a Pretreatment Coordinator. The pretreatment program is administered by the DEP, which conducts pretreatment inspections and provides assistance to municipalities in understanding pretreatment issues and in developing local limits on the wastes to be discharged.

The DEP also provides inspector coordination and laboratory problem resolution for the annual EPA Discharge Monitoring Report (DMR) Quality Assurance Studies. In these studies licensed facilities are required to analyze QA control samples for their discharge parameters to determine if their ongoing self-monitoring testing data reported on their Discharge Monitoring Reports is accurate. Inspectors work with the licensees or their contract labs to correct any unacceptable results.

Technical assistance is also provided to the operators of wastewater treatment facilities. In addition to responding to requests for assistance with specific problems such as sludge bulking and odor control, programs are conducted which take a more systematic approach to improving wastewater treatment operations by examining all aspects of treatment plant design and operation.

Operations Management Evaluations (OMEs) are done to diagnose license compliance problems and to provide on-site operator training. OMEs are focused on operation and maintenance problems including process control, personnel and financial management. OMEs result in recommendations for procedural changes as well as follow-up operator training targeted towards improving wastewater treatment. DEP conducts six OMEs per year on a "worst-first" priority basis.

Maine requires that chief wastewater treatment plant operators be certified by the DEP through a certification process that consists of qualifying examinations for five levels of certification for biological facilities and three levels of certification for physical/chemical facilities. The smaller municipal facilities can have a Grade I operator in responsible charge, while the larger and/or more complex facilities must have a Grade V operator in responsible charge.

Investigation of Citizen Complaints: During the past two years, the DEP Bureau of Land and Water Quality have investigated numerous citizen complaints concerning discharges to the waters of the State. Many of these cases required field investigations and extensive follow-up work to achieve eventual compliance with discharge laws. A number of these complaint investigations have led to enforcement actions.

Enforcement of Water Quality Laws

Contact: Dennis Merrill, DEP BLWQ, Division of Water Resource Regulation (DWRR)

Tel: (207) 287-7788 email: Dennis.L.Merrill@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/enforcement.htm

The general philosophy of the DEP, Bureau of Land and Water Quality (BLWQ) is to gain compliance and resolve problems at the least formal level that is appropriate, and to maximize the spirit of cooperation between the DEP and the regulated community. By fostering voluntary compliance with Maine's water pollution control laws, the overall effectiveness of the enforcement program is maximized and unnecessary litigation is avoided.

Formal enforcement actions become necessary when violations of environmental laws are severe enough to warrant action regardless of the remediation effort, or when the violator is not responsive in preventing violations or refuses to cooperate with the DEP. Formal enforcement actions originate both from license or permit violations, and from detection of unlicensed activities through complaint investigation or other fieldwork. The Department's enforcement priorities have generally been based on the size of the violations, the potential for environmental harm, the recurrence of violations and the precedents involved.

The Division of Water Resource Regulation is responsible for all formal enforcement actions regarding wastewater discharges that are taken by the Bureau of Land and Water Quality. The divisions of Water Resources Regulation and Land Resource Regulation in the BLWQ share enforcement of nonpoint source pollution regulations. Other agencies such as the Land Use Regulation Commission in the Department of Conservation and local code enforcement officers also are able to address land use problems which lead to nonpoint source pollution. Time is also dedicated to sanitary surveys and remedial actions needed to identify and remove discharge sources that are contributing to the closure of shellfish harvesting areas or that are otherwise impairing water quality. Finally, considerable effort is put into assuring that compliance schedules and programs resulting from enforcement actions are properly implemented.

New Program Areas: NPDES Authorization and Emerging Issues

Contact: Brian Kavanah, DEP BLWQ, Division of Water Resource Regulation (DWRR)

Tel: (207) 287-7700 email: Brian.W.Kavanah@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/wastepage.htm

NPDES Authorization: On January 12, 2001, Maine received partial authorization from the Environmental Protection Agency (EPA) to implement the National Pollutant Discharge Elimination System (NPDES) Program. EPA withheld its decision on contested areas of the state in the upper Penobscot River watershed and certain areas in the St. Croix River watershed. On October 31, 2003, EPA granted authorization in these contested areas with the exception of two tribal facilities with discharges. EPA will retain the authority for the NPDES permits for these facilities. With this limited exception, the Department is now the primary authority for administering the Clean Water Act in Maine. It is noted that this final EPA decision has been appealed by both the Maine Tribes and the Maine Office of the Attorney General. The program is referred to as the Maine Pollutant Discharge Elimination System (MEPDES) program.

As part of the authorization process, Maine adopted rules (Chapters 520-529) that became effective upon authorization of the NPDES program. These rules cover all aspects of the permitting program and are available at the following URL: www.maine.gov/sos/cec/rcn/apa/06/chaps06.htm

Due to historic understaffing in the Department's waste discharge licensing program, a backlog of expired license applications developed, resulting in numerous dischargers operating under expired discharge licenses. As part of the NPDES authorization process, licensing staff was increased (current number of staff is 4). An aggressive schedule was established in 2000 to eliminate the expired license backlog. In calendar year 2003, the Department completed 101 licensing actions that reduced the expired license backlog to 16 % of all licensed facilities. The current goal is to reduce the expired license backlog to no more that 5 % of all licensed dischargers by the end of calendar year 2004.

Emerging Issues: Since NPDES authorization in January of 2001, the water permits program has been involved in a number of emerging issues including development of a General Permit, site specific permits, a permit for eradication of invasive plants and a compliance program for finfish aquaculture facilities. The permit program expects that in the near future it will be involved in the following emerging issues: calcium enhancement of Downeast Rivers for Atlantic Salmon restoration, West Nile virus control, radionuclides in drinking water plant effluent, and increased inclusion of nutrient limits (N and P) in permits due to the development of ambient nutrient criteria.

Section 3-3 NATURE & EXTENT OF NONPOINT SOURCES OF POLLUTANTS AND PROGRAM RECOMMENDATIONS

The Maine NPS Water Pollution Control Program

Contact: Norm Marcotte, DEP BLWQ, Division of Watershed Management (DWM)

Tel: (207) 287-7727 email: Norm.G.Marcotte@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docwatershed/npscontrol.htm

In 1991, the Maine Legislature enacted a Nonpoint Source (NPS) Water Pollution Management Program statute (38 M.R.S.A. §410-I) to help restore and protect water resources from NPS pollution. The basic objective of the NPS program is to promote the use of State Agency-defined "best management practice guidelines" (BMPs) to prevent water pollution.

The DEP administers the Maine NPS Program in coordination with other state, federal, and local governmental agencies as well as non-governmental stakeholder organizations. State agencies that share responsibility for coordinating and implementing NPS programs include: the Department of Agriculture; Department of Conservation, Maine Forest Service; Department of Transportation; Economic and Community Development; Department of Human Services, Division of Health Engineering; Department of Marine Resources, and the State Planning Office.

In 1999, the DEP and the State Planning Office (SPO) coordinated development of a strategic plan for the NPS Program that was entitled, "Maine NPS Control Program: Program Upgrade and 15 Year Strategy."

The overall aims of the NPS Water Pollution Control Program are:

(1) Clean Water

Prevent, control, or abate water pollution caused by nonpoint sources so that beneficial uses of water resources are maintained or restored and so those waters meet or exceed their classification standards.

(2) Using Best Management Practices

Ensure that Best Management Practices are widely used in all of Maine's watersheds to minimize transport of pollutants or excessive runoff from surrounding land into surface or ground waters.

(3) Locally Supported Watershed Stewardship

Local community awareness results in commitment to maintaining or improving the condition of local water resources through citizen action. Watershed stewardship meets community needs and maintains beneficial uses of local water resources.

(4) Compliance with Applicable Laws

Confirm that regulated activities are in compliance with existing State and Federal laws and rules that relate to nonpoint source pollution abatement.

Maine's lead NPS agencies have the responsibility to conduct programs that:

(1) Implement a variety of enforceable authorities (State laws, rules and municipal ordinances, governing specific land use activities or locations that require people to comply with certain performance standards that protect water quality), and

(2) Encourage the voluntary implementation and utilization of BMPs

These lead NPS agencies in State government have formal and informal working arrangements with other State and federal agencies, municipalities, non-governmental organizations, and business sector associations that address the abatement of nonpoint sources of water pollution.

DEP and other State and regional agencies deliver a wide array of NPS-related services. These services include regulatory (permitting, compliance assistance and enforcement), technical assistance, financial assistance, NPS technology transfer, and NPS pollution awareness outreach. All of these either promote or require usage of appropriate BMPs to prevent or minimize nonpoint sources of pollutants or water resource degradation.

Statewide regulatory programs that operate to implement laws controlling potential sources of NPS pollution, include: the Stormwater Management Law, the Site Location of Development Law, Subdivision Laws, Erosion and Sedimentation Control Law, the State Subsurface Wastewater Disposal Rules, the Natural Resources Protection Act, Land Use Regulation in Unorganized Territories, Pesticide Control laws, the Mandatory Shoreland Zoning Law, The Nutrient Management Act, and Forest Practices Act.

The State's lead NPS agencies also encourage voluntary actions by government, organizations, industry, and individuals that prevent or minimize the discharge of NPS pollutants. Program resources were assigned to support efforts either statewide and in specific watersheds that improve and protect waters that are either threatened by, or impaired due to, NPS pollution. These lead NPS agencies provide direct technical assistance and information about BMPs to agencies, municipalities, businesses, and individuals. The NPS Training and Resource Center at DEP provides information and technical training on usage of BMPs. DEP also administers an NPS Grants program to help fund NPS Pollution Control Projects that are designed to prevent, control or abate water pollution caused by nonpoint sources, so that water resources are maintained or restored. Grant funding for this program is derived from Section 319(h) of the Clean Water Act.

The Maine NPS Program has developed and will continue to develop Best Management Practice guidance manuals in order to provide information on practical methods to help protect Maine's streams, lakes, coastal waters and ground water. The following is a partial list of guidance manuals developed by the NPS Program.

"Strategy for Managing Nonpoint Source Pollution from Agricultural Sources and Best Management System Guidelines," Maine Dept of Agriculture, Food and Rural Resources, October, 1991. (This BMP is currently out of print.)

"Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development", MDEP, revised 1992.

"Maine Best Management Practices for Storm Water Quality and Quantity Control", MDEP, November, 1995.

"Best Management Practices for Erosion and Sediment Control", Maine Department of Transportation, September, 1997. +

"BMPs for Marinas and Boatyards: Controlling Nonpoint Pollution in Maine, an Environmental Guide for Marinas & Boatyards", MDEP/ SPO, March, 1999.

"Camp Road Maintenance Manual: A Guide for Landowners", MDEP and the Kennebec County Soil & Water District, 2nd edition, 2000. *

"BMPs for the Handling of Wastes & Hazardous Materials at Construction Sites", MDEP November, 2001.

"Maine Erosion & Sediment Control Best Management Practices", MDEP, March, 2003. *

"Best Management Practices for Forestry: Protecting Maine's Water Quality," Maine Forest Service, Maine Department of Conservation, 2004. **

+ A revised version of this BMP guidance manual is available from the following URL: www.maine.gov/mdot/environmental-office-homepage/surface-water-resources.php

* Online versions of these BMP guidance manuals can be obtained at the following URL: www.maine.gov/dep/blwq/docstand/lwpubbmp.htm

** An online version of this BMP guidance manual can be obtained at the following URL: www.state.me.us/doc/mfs/pubs.htm

Traditional hardcopies of many of these BMPs are available from the Nonpoint Source Training and Resource Center. Contact Bill Laflamme at (207) 287-7726 or at William.N.Laflamme@SPAM-ZAPmaine.gov to request publications.

Priority Waterbodies

Tables 3-3 through 3-5 presents lists of "priority waterbodies", as amended in 1998, for marine waters, rivers/streams and lakes (respectively) for which the Department will focus the Nonpoint Source Program (Source: Maine Nonpoint Source Management Plan). Priority waters are selected based on NPS impairment or threat status, value of the waters, and feasibility for success of restoration or protection efforts. The NPS Management Plan and the list of priority waters provide a basis for structuring 319 implementation projects and other NPS projects that help turn BMP planning and development ideas into effective on-the-ground pollution controls.

Table 3-3 Maine NPS Priority Waters List - Marine Waters

(17 total; listed geographically, west to east)

Piscataqua estuary	Royal River estuary	St. George River estuary
Spruce Creek	Cousins River estuary	Weskeag River
York River	Harraseeket River estuary	Rockland Harbor
Ogunquit River estuary	Maquoit Bay	Union River estuary
Webhannet River estuary	New Meadows River estuary	Machias River estuary
Scarborough River estuary	Medomak River estuary	

Note: The above list is duplicated in the Estuarine / Ocean Section (4.6) of this chapter, under the subsection title of: "Coastal Nonpoint Source Priority Watersheds". That section also includes a list of salmon river watersheds that are given a priority status under the Clean Water Act, Section 319-funded Nonpoint Source Program and the Shore Stewards Program.

Table 3-4 Maine NPS Priority Waters List – Rivers and Streams

(55 total; listed alphabetically by waterway and county; boldfaced entries are highest priority)

Allagash River, Aroostook	**Fish Brook, Somerset**	**Piscataqua River, Cumberland**
Bond Brook, Kennebec	**Frost Gully Stream, Cumberland**	Pleasant River, Cumberland
Branch Brook, York*	**Great Works River, York**	**Pleasant River, Washington**
Capisic Brook, Cumberland	**Kenduskeag Stream, Penobscot**	**Presque Isle Stream. (includes North Brook), Aroostook***
Caribou Stream, Aroostook	Kennebunk River, York	**Prestile Stream, Aroostook**
Carrabassett River, Franklin	Limestone Stream, Aroostook*	**Presumpscot River, Cumberland**
Chandler Brook, Cumberland	Little Androscoggin River, Oxford	Royal River, Cumberland
Chapman Brook, Oxford*	Little Ossipee River, York	Salmon Brook, Aroostook
Cobboseecontee Stream, Kennebec	**Little Madawaska River, Aroostook***	Salmon Falls River, York*
Cold River, Oxford	**Long Creek, Cumberland**	**Sebasticook River, Somerset**
Collyer Brook, Cumberland	**Machias River, Washington**	**Sheepscot River (includes West Branch), Lincoln**
Crooked River, Oxford	Medomak River, Lincoln	Soudabscook Stream, Penobscot
Daigle Brook, Aroostook	**Meduxnekeag River, Aroostook**	St. George River, Knox
Denny's River, Washington	Mousam River, York	Stroudwater River, Cumberland
Dickey Brook, Aroostook	**Narraguagus River, Washington**	**Sunday River, Oxford**
Ducktrap River, Waldo	Nezinscot River, Oxford	Togus Stream, Kennebec
East Machias River, Washington	Nonesuch River, Cumberland	Union River, Hancock
East Branch Piscataqua River, Cumberland	Ossipee River, Cumberland	**Wesserunsett Stream, Somerset**
	Perley Brook, Aroostook	

* denotes community public drinking water supply

Table 3-5 Maine NPS Priority Waters List - Lakes

(181 total; listed alphabetically; boldfaced entries are highest priority; town names are included only to identify general pond locations)

- **Adams Pond, Boothbay***
- Alamoosook Lake, Orland
- Alford Lake, Hope
- Allen Pond, Greene
- Anasagunticook Lake, Canton*
- **Androscoggin Lake, Leeds**
- **Annabessacook Lake, Winthrop**
- **Bauneg Beg Pond, Sanford**
- Bay of Naples, Naples
- Beach Hill Pond, Otis
- Bear Pond, Hartford
- Bear Pond, Waterford
- Beaver Pond, Bridgton
- Berry Pond, Winthrop
- Big Indian Pond, St. Albans
- Big Wood Pond, Jackman*
- Biscay Pond, Damariscotta
- Bonny Eagle Lake, Buxton
- Boulter Pond, York*
- Branch Lake, Ellsworth*
- Branch Pond, China
- Brettuns Pond, Livermore
- Buker Pond, Litchfield
- Bunganut Pond, Lyman
- Caribou, Egg, Long Pd, Lincoln
- Carlton Pond, Winthrop*
- Center Pond, Lincoln
- Chases Pond, York*
- Chickawaukie Pond, Rockport
- **China Lake, China***
- Clary Lake, Whitefield
- **Cobbosseecontee Lake, Winthrop***
- Cochnewagon Lake, Monmouth
- Coffee Pond, Casco
- **Cold Stream Pond, Enfield**
- Coleman Pond, Lincolnville
- Crawford Pond, Warren
- Crescent Pond, Raymond
- Crooked Pond, Lincoln
- **Cross Lake, T17R5**
- Crystal Lake, Gray
- **Damariscotta Lake, Jefferson***
- Dexter Pond, Winthrop
- Dodge Pond, Rangeley
- Duckpuddle Pond, Waldoboro
- Dyer Long Pond, Jefferson
- East Pond, Smithfield
- Echo Lake, Presque Isle
- Echo Lake, Readfield
- Ellis Pond, Roxbury
- Estes Lake, Sanford
- Flying Pond, Vienna
- Folly Pond, Kittery*
- Folly Pond, Vinalhaven*
- Forest Lake, Windham
- Fresh Pond, North Haven*
- Grassy Pond, Rockport*
- Great Moose Lake, Hartland
- Great Pond, Belgrade
- Green Lake, Ellsworth
- Haley Pond, Rangeley
- Halls Pond, Hebron*
- Hancock Pond, Embden*
- Hancock Pond, Denmark
- Hermon Pond, Hermon
- Highland Lake, Windham
- Highland Lake, Bridgton
- Hogan Pond, Oxford
- Holland Pond, Limerick
- Horne Pond, Limington
- Hosmer Pond, Camden
- Ingalls Pond, Bridgton
- Island Pond, Waterford
- Kennebunk Pond, Lyman
- Keoka Lake, Waterford
- Knickerbocker Pond, Boothbay
- Lake Auburn, Auburn*
- Little Cobbosseecontee Lake Winthrop
- Little Ossipee, Waterboro
- Little Pennesseewassee, Norway
- Little Pond, Damariscotta*
- Little Sebago, Windham
- Little Wilson Pond, Turner
- Long Lake, Bridgton
- Long Lake, T17 R4 WELS
- Long Pond, Belgrade & Rome
- Long Pond, Bucksport
- Long Pond, Southwest Harbor*
- Long Pond, Waterford
- Lovejoy Pond, Wayne
- Lower Narrows Pond, Winthrop
- **Lower Range Pond, Poland**
- **Madawaska Lake, Westmanland**
- **Maranacook Lake, Winthrop**
- Mattanawcook Pond, Lincoln
- McGrath Pond, Oakland
- Meduxnekeag Lake, Oakfield
- **Megunticook Lake, Lincolnville**
- **Messalonskee Lake, Sidney**
- Middle Pond, Kittery*
- **Middle Range Pond, Poland**
- Mirror Lake, Rockport*
- Moose Hill Pd., Livermore Falls*
- Moose Pond, Sweden
- Mount Blue Pond, Avon*
- **Mousam Lake, Shapleigh**
- **Nequasset Lake, Woolwich***
- Nokomis Pond, Newport*
- No Name Pond, Lewiston
- North Pond, Norway
- North Pond, Smithfield
- North Pond, Sumner*
- North Pond, Warren
- Norton Pond, Lincolnville
- Notched Pond, Raymond
- Otter Pond, Bridgton
- Panther Pond, Raymond
- Paradise Pond, Damariscotta
- Parker Pond, Casco
- Parker Pond, Vienna
- Parker Pond, Jay*
- Pattee Pond, Winslow
- Peabody Pond, Sebago
- Pemaquid Pond, Waldoboro
- **Pennesseewassee Lake, Norway**
- Phillips Lake, Dedham
- Pleasant Lake, Otisfield
- **Pleasant Pond, Richmond**
- Pleasant Pond, Turner
- Pleasant Pond, T4 R3 WELS
- Pocasset Lake, Wayne
- **Pushaw Lake, Orono**
- Quimby Pond, Rangeley
- Raymond Pond, Raymond
- Roberts Wadley Pond, Lyman
- Round Pond (Little), Lincoln
- **Sabattus Pond, Sabattus**
- **Sabbathday L, New Gloucester**
- Saint Froid Lake, Eagle Lake*
- Saint George Lake, Liberty
- Salmon Lake, Belgrade
- Salmon Pond, Dover-Foxcroft*
- Sand Pond, Monmouth
- Sand Pond, Denmark
- **Sebago Lake, Sebago***
- **Sebasticook Lake, Newport**
- Sennebec Pond, Union
- Seven Tree Pond, Warren
- Shaker Pond, Alfred
- Silver Lake, Bucksport*

Table 3-5 Maine NPS Priority Waters List - Lakes (continued)

South Pond, Warren	Togus Pond, Augusta	Watchic Pond, Standish
Spectacle Pond, Vassalboro	Torsey Pond, Mt. Vernon & Readfield	**Webber Pond, Vassalboro**
Square Pond, Acton	**Trickey Pond, Naples**	West Harbor Pond, Boothbay Harbor
Starbird Pond, Hartland*	Tripp Pond, Poland	Whitney Pond, Oxford
Swan Lake, Swanville	**Unity Pond, Unity**	Wilson Lake, Acton
Swan Pond, Lyman	**Upper Narrows Pd, Winthrop***	Wilson Pond, Wilton
Taylor Pond, Auburn	**Upper Range Pond, Poland**	Wilson Pond, Wayne
Thomas Pond, Casco	Varnum Pond, Wilton*	Wood Pond, Bridgton
Thompson Lake, Oxford	Ward Pond, Sidney	Woodbury Pond, Monmouth
Threecornered Pond, Augusta	Wassookeag Lake, Dexter*	Young Lake, Mars Hill*
Threemile Pond, Windsor		

* denotes a community public drinking water supply

Watershed Management for Stormwater Programs

Contact: Don Witherill, DEP BLWQ, Division of Watershed Management (DWM)

Tel: (207) 287-7725 email: Donald.T.Witherill@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/stormwater/index.htm

Stormwater management has become a topic of increasing concern in Maine, both environmentally and politically. As progress has been made in cleaning up our State's waters from "end-of-pipe" wastewater discharges, the DEP is now finding that some of the most significant remaining water quality problems are not from these discharges, but from the cumulative effect of a number of activities ranging from agriculture to development to household management. Pollutants from these activities include toxins, bacteria, sediment and nutrients, which are often conveyed to lakes, rivers, streams and coastal waters via stormwater runoff.

The Department has been working on stormwater management issues for many years. Much has been learned about the effectiveness of different stormwater treatment practices, known as Best Management Practices (BMPs), through both in-state and national studies. This field continues to expand and the Department continues to support research through its Nonpoint Source (NPS) Program, funded through Section 319 of the Federal Clean Water Act. The NPS Program has also allowed the Department to invest in the identification and elimination of pollution sources, as well as to conduct education and outreach activities.

The Department has also been managing stormwater through regulatory programs. Controlling erosion and sedimentation from land use activities as well as control of stormwater have all been provisions of the Site Location Law since the early 1970's. However, standards to treat the quality of stormwater, not just the quantity, did not exist until the passage of the Stormwater Management Law in 1996, and the subsequent rules were adopted in 1997.

The Stormwater Management Law requires the Department to "establish by rule a list of watersheds of bodies of water most at risk from new development." This law also obligates the Department to develop a list of sensitive or threatened regions or watersheds that include "the watersheds of surface waters that are susceptible to degradation of water quality or fisheries because of the cumulative effect of reasonably foreseeable levels of development activity within the watershed of the affected surface waters." The Department must also adopt rules specifying quantity and quality standards for stormwater to apply in those watersheds.

In 1997, the Department did develop lists of "most at risk" lakes, coastal waters and streams with public water supplies, and sensitive or threatened watersheds for lakes, and rivers with public water supplies. Quantity and quality standards were also established. However complete lists of "most at risk" and "sensitive or threatened" rivers and streams were not established due to lack of needed data to support which waters should be included on the lists. Although suitable data became available in 2002, the Department held off on rulemaking because of the desire from many interested parties to have the Department's proposal reviewed through a stakeholder process.

In addition to the State Stormwater Law, in 2003, new federal requirements went into effect under the Maine Pollutant Discharge Elimination System (MEPDES) stormwater program. The Department issued general permits to regulate construction activities disturbing one acre or more of land, and to regulate municipal separate storm sewer systems (MS4s) that are in 28 municipalities or in 10 "nested" state or federal MS4 entities.

The Department's experience administering the Stormwater Law, coupled with the added responsibility of administering the federal program requirements, has led Department staff to conclude that changes are needed to improve both the effectiveness and the efficiency of Maine's stormwater program. In the winter of 2004, following an extensive stakeholder process, the Department issued a report to the Maine Legislature, which included recommended changes to the Maine Stormwater Law in order to:

- align it better with the MEPDES program by using a 1 acre disturbance threshold,
- allow the Department to apply stormwater quality standards to all jurisdictional activities, and
- allow the Department to designate "significant existing sources" of stormwater pollution

The Department has developed draft rules which would replace existing quantity and quality standards with a new set of standards designed to provide both quantity and quality protection. Under the proposal, the new standards would apply to all watersheds, except where a more restrictive phosphorus standard would still apply in "most at risk" lake watersheds (the "most at risk" and "sensitive or threatened" designations would no longer be used outside of lake watersheds). Additional standards would also apply to projects in stream watersheds impaired due to urban runoff. To minimize confusion, these "impaired streams" do not appear as a separate listing or category; these stream watersheds are a subset of those streams on the 303(d) list where urban runoff has been identified as a principal source of pollution. Developers in these watersheds would be required to either pay a compensation fee or provide additional mitigation.

The Department is also encouraging municipalities to collectively address stormwater from existing sources through the development of watershed management plans. Where such plans are being implemented, the proposed additional regulatory requirements for new development in impaired watersheds would be reduced or even eliminated.

The Maine Legislature deferred action on the proposed statutory changes in 2004, but gave the DEP authority to proceed with rule making in 2004. The Department is required to report back to the Legislature on January 2^{nd}, 2005 with provisionally adopted rules and recommended changes to the statute.

Land Use and Growth Management

Contact: Jeff Madore, DEP BLWQ, Division of Land Resource Regulation (DLRR)

Tel: (207) 287-7848 email: Jeff.G.Madore@SPAM-ZAPmaine.gov

Related Websites: Site Law www.maine.gov/dep/blwq/docstand/sitelawpage.htm

NRPA www.maine.gov/dep/blwq/docstand/nrpapage.htm

Shoreland Zoning Act www.maine.gov/dep/blwq/docstand/szpage.htm

It has long been recognized that land use practices have direct impacts on water quality. The State of Maine has several programs in place to regulate land use activities that have potentially adverse environmental effects. The Site Location of Development Law (Site Law) requires developers of large projects to obtain permits from the Department of Environmental Protection before beginning construction. Under the Natural Resources Protection Act (NRPA), a permit from the DEP is required for any activity in, on or adjacent to a protected natural resource, including rivers, streams, brooks, great ponds, coastal wetlands, freshwater wetlands, sand dunes and fragile mountain areas.

The Mandatory Shoreland Zoning Act requires towns to control building sites, land uses, and placement of structures within their shoreland areas in order to protect water quality, habitat and fishing industries, and to conserve shore cover, public access, natural beauty and open space. Also important to environmental protection is the Growth Management Act, which was enacted in 1988. The foundations for this program are based on comprehensive planning and greater cooperation between state and local governments.

Section 3-4 EDUCATION AND OUTREACH

Contact: Barbara Welch, DEP BLWQ, Division of Program Services (DPS)

Tel: (207) 287-7682 email: Barb.Welch@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/education/index.htm

Since much of the degradation to the environment comes from individual actions, public education is vital to the mission of the Maine DEP. The Department has a responsibility to educate the public about the environment, requirements of environmental laws, and how to protect Maine's natural resources. To accomplish these goals, the DEP must encourage behaviors and social norms that reduce human impact on water quality. In short, the Department must help to foster and encourage greater stewardship. This responsibility is shared among many different components of the Department, all with the common vision of conducting outreach that covers the many different types of water resources, particularly lakes, rivers, streams, wetlands, and ground water.

Each year the DEP is engaged in many different outreach efforts. In order to be more effective, some program areas are adopting social marketing principles including: focusing on behavior change, gathering research data on target audiences, and assessing the effectiveness of campaigns. In particular, social marketing strategies have been included in the Stormwater Phase II Program, the LakeSmart Campaign, the Invasive Prevention Program, and the Soil Erosion Prevention Campaign. In addition, starting with the 2005 RFP cycle, grant proposals to be funded with CWA Section 319 monies will be required to start applying basic social marketing principles to any proposed outreach efforts.

Finally, the Department is also focused on partnering with other agencies and organizations wherever possible to create synergy through combined efforts towards accomplishing a common goal. For example, the DEP is embarking on a statewide mass media Stormwater Awareness Campaign in concert with the 38 regulated MS4 (Municipal Separate Storm Sewer System) entities.

Section 3-5 The Environmental Impact and Economic & Social Costs/Benefits of Effective Water Quality Programs

Contact: Steve Harmon, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-4971 email: Steve.Harmon@SPAM-ZAPmaine.gov

The environmental impact of effective water quality programs should be clear. By definition, effective programs should have a positive impact on the quality of waters that they protect as well as on the larger ecosystem that contains those improved waters. However, assessment of the many types of costs and benefits associated with water quality changes is typically a very difficult task. Although often complex, calculating the direct economic cost of environmental regulation is largely possible by determining financial outlays and using those figures as a "cost-proxy." Quite the opposite is often true when the benefits of these water quality programs are studied. While it is usually possible to determine that an improvement has been gained and to show quantitatively the benefits, usually there is no easy way to directly correlate these improvements as positive impacts in terms of human health or the environment.

When the indirect economic and social costs/benefits of water quality protection, such as jobs lost or gained, positive or negative effects on competitiveness, worker productivity and satisfaction, etc., are considered and included in an analysis, the layers of complexity that they bring to the computations can be overwhelming. When they are addressed, these indirect costs and benefits of environmental improvements are often based on assumptions, subjective evaluations and qualitative data that are not easily distinguished (unequivocally) from other economic and social costs/benefits.

The different classes and categories of benefits of water quality protection are often difficult to compare with economic costs and are essentially impossible to compare with the extremely vague category of social costs. Figures in dollar values cannot be assigned to many of the benefits, so water quality and the environment would nearly always loose if the cost versus benefit comparison were limited to only economic aspects and the social aspects were ignored. In fact, such a superficial analysis of water quality protection efforts would undoubtedly have deterred much of the environmental progress Maine has made since the early 1970's. Consider this: tourism is an important component of Maine's economy; water quality undeniably is one component of Maine's attraction to tourists, but what part of Maine's economic increase has resulted from the efforts to protect and improve the state's waters? This is not a question that is answered easily.

Despite the fact that calculating benefits is a difficult task, waterbodies that were once heavily and visibly polluted are now supporting their designated uses of swimming, fishing, wildlife habitat, and recreation. One common example of a direct benefit that has been cited in the past, are the results from construction of wastewater treatment plants for industrial and municipal facilities. In this example, these benefits are not either economic or social; they are both. This inseparability of economic and social costs and benefits is probably true in most cases, although in some scenarios one type of benefit may be in the clear majority. In another example, more and more Maine towns are currently charging premium taxes for riverfront properties that, only 25 years ago, no one wanted. Again, this provides both economic benefits from an increased tax base along with the many social benefits associated with clean rivers that all who choose to use them for recreation may enjoy them.

Another stage in environmental management is emerging, wherever cleaning up the severe pollution (much from point sources) has been very successful. Now the focus is shifting to sources and contaminants that are not as easy to clearly identify and that were previously masked by the severe and large-scale problems. In many areas of environmental study, methods and tools have already been developed to deal with past issues - these methods provide a guide or framework in which to tackle emerging issues. For many of the reasons stated in the above paragraphs, the economic tools that would be so useful in helping to estimate the costs and benefits of improvement in water quality have never been fully developed. As future environmental problems grow in complexity (and in cost) and as public budgets tighten into the foreseeable future, justifying the expense or demonstrating the true benefit of water quality related programs are likely to be one of the main causes for delay of support for continued improvement of water resources. The time to begin developing basic economic tools for environmental projects has already passed; the time when more sophisticated economic methods will be an essential part of "doing business" is rapidly approaching.

Costs of the State Water Quality Program

Contact: Paul Dutram, DEP BLWQ, Division of Program Services (DPS)

Tel: (207) 287-7696 email: Paul.W.Dutram@SPAM-ZAPmaine.gov

Due to changes in the format of the 2002 305(b) Report, many of the narrative sections were dropped from that reporting cycle – including program cost information. So, as was reported in the year 2000 305(b) report "In 2000, the cost to administer water-related programs [in the Department's Bureau of Land and Water Quality (DEP BLWQ)] was approximately 11.1 million dollars." For the 2004 reporting cycle, the Bureau will report on program costs for state fiscal years (which run from July 1st to June 30th) 2001 through 2003. The briefest possible summary of DEP BLWQ program administration costs is the following; in 2001 these costs were approximately 10.8 million dollars, in 2002; approximately 13.5 million dollars and in 2003; approximately 16.4 million dollars. The following subsections and graphs will describe program costs in further detail and will also include a few specific program area highlights. In Figure 3-1, the above annual figures from fiscal year 2001 to 2003 are broken down by the funding source (federal, state or dedicated).

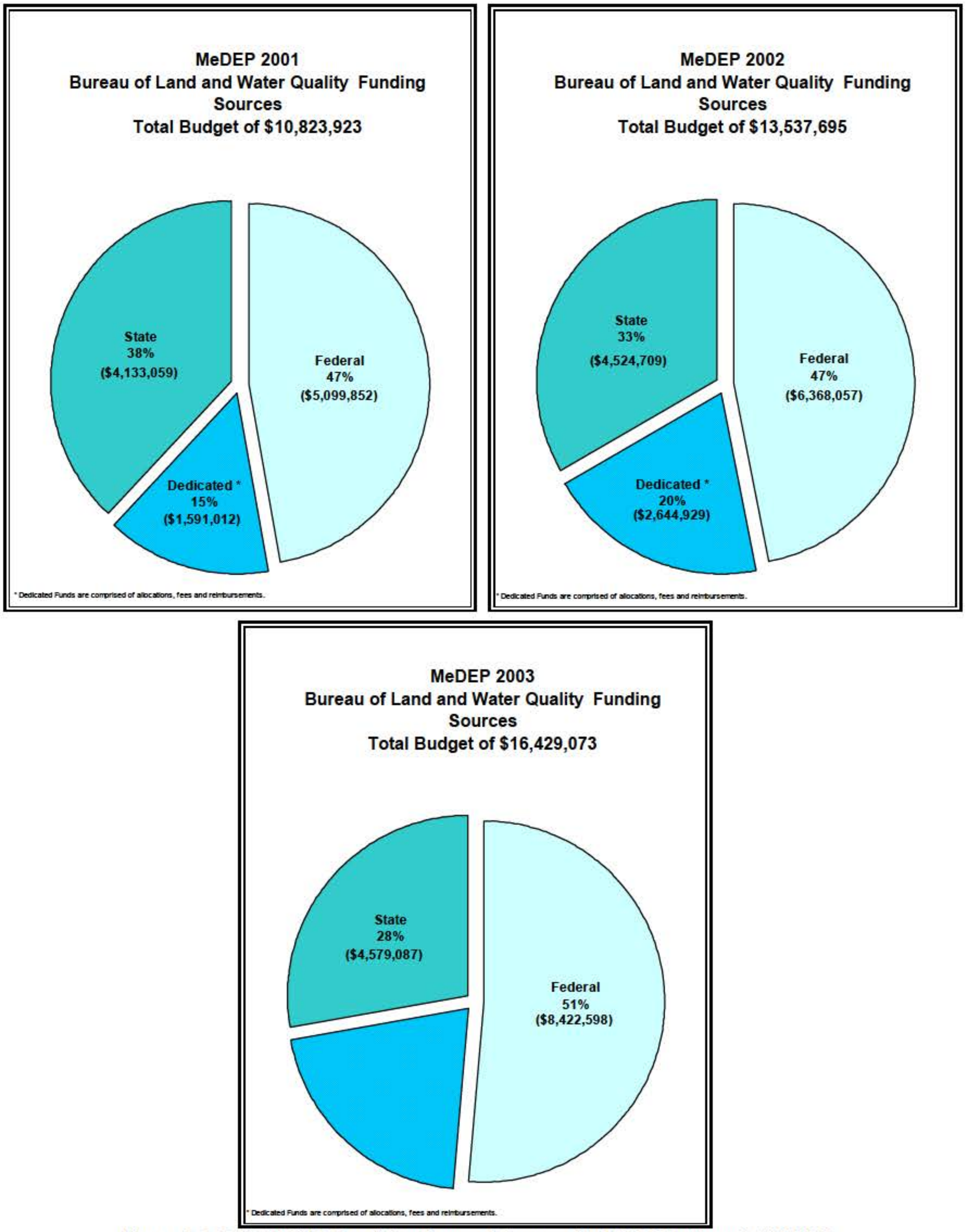
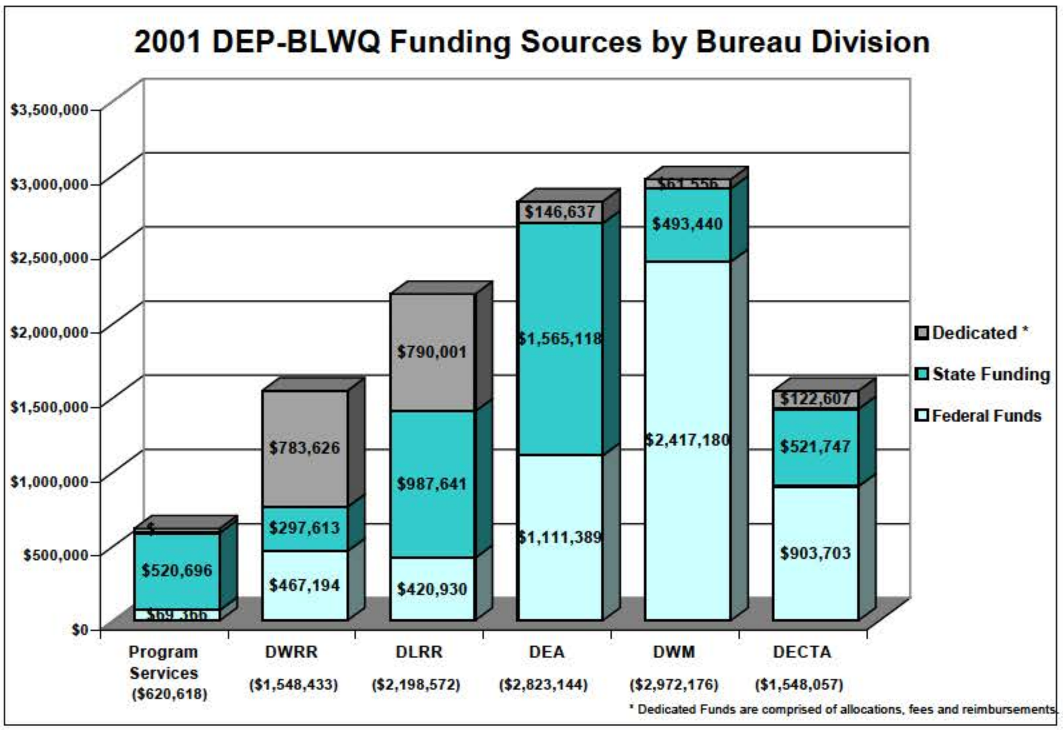
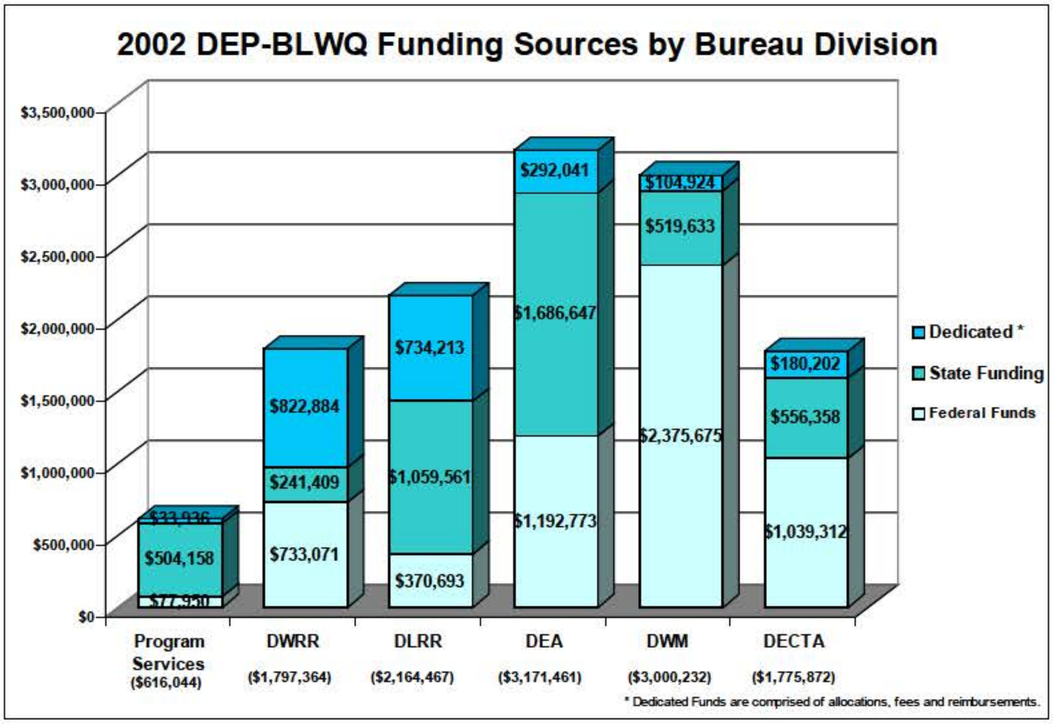


Figure 3-1 DEP BLWQ Total Funding and Sources for FY 2001 through FY 2003.

Functional program areas within the Bureau of Land and Water Quality include licensing, compliance, enforcement, technical assistance, pollution prevention, wastewater engineering, environmental assessment, lake restoration, nonpoint source control and ground water protection. It should be noted that the total annual costs cited above do include positions that are focused primarily on land use regulation. However, team members in these positions are frequently involved with issues related to water quality and it could be argued that the majority of their land use activities will ultimately have a positive impact upon the quality of adjacent and downstream waters.

Organizationally, the DEP Bureau of Land and Water Quality is comprised of five divisions and one section devoted to program services that performs administrative functions for the various divisions. A web page that details how these entities are organized can be viewed at this URL: www.maine.gov/dep/blwq/organiza.htm. The divisions are as follows: Water Resource Regulation (DWRR), Land Resource Regulation (DLRR), Environmental Assessment (DEA), Watershed Management (DWM) and Engineering, Compliance & Technical Assistance (DECTA). Figure 3-2 depicts total annual funding by division for fiscal years 2001 through 2003 and also breaks down the total funding by source (federal, state or dedicated).





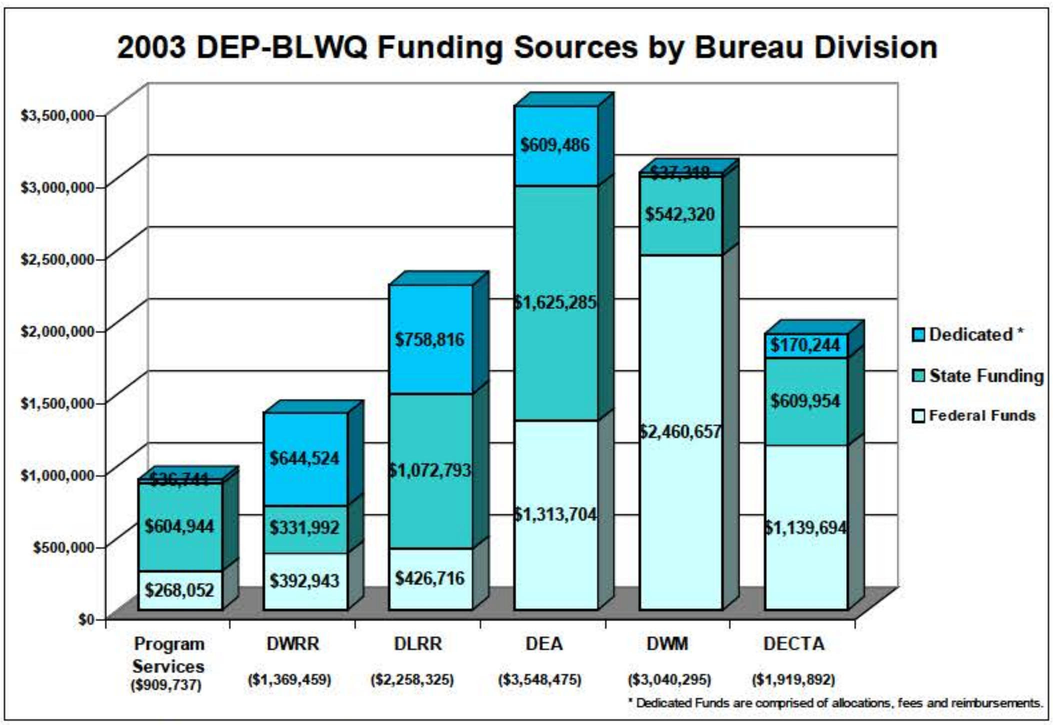


Figure 3-2 DEP BLWQ Division Funding and Sources for FY 2001 through FY 2003

The reader should be cautioned that the above figures do not provide enough detail to avoid misinterpreting the relative amounts of funding. For example, the DWM appears to receive almost double the amount of federal funding when compared to other divisions. However, the Section 319 - nonpoint source monies are the largest federal funding subcategory for this division, and it provided $2,165,571, $2,136,459 and $2,180,443 in FY 2001 through 2003, respectively. What is not explained on these graphs is the fact that, by law, at least 40 percent of these funds must be in the form of pass-through grants to other entities (such as groups conducting watershed surveys) and is not truly utilized within the Division of Watershed Management. This would bring the actual use of these funds inside the division down to a respective maximum of $1,299,342, $1,281,875 and $1,308,265 in FY 2001 through 2003, which is similar to the level of federal funding received by other divisions.

Another subject that is not adequately defined in the above graphs and discussion is the amount of funding that is directed towards completing Total Maximum Daily Load (TMDL) studies. Teasing out the actual amount of money spent on TMDLs each year is a bit more difficult because these studies span all of the waterbody types and therefore utilize monies contained in multiple funding categories. The figures in Table 3-6 do not account for 100 percent of the costs of completing these studies and producing TMDL reports; they do include such expenditures as staff salaries and benefits, data collection and analysis, model creation, validation and various forms of contract support. So, these figures are a very close approximation of the real numbers and should provide at least a realistic sense of the level of resources that are committed to producing some of the fundamental information that is crucial to the 305(b) reporting process.

Table 3-6 Approximate TMDL Expenditures – Annual Totals and by Waterbody Type.

TMDL Expenditures				
Year	Waterbody Type			Total
	Lakes	Rivers	Streams	
2001	$202,243	$211,499	$91,140	$504,882
2002	$276,993	$216,499	$102,669	$596,161
2003	$255,243	$216,499	$117,440	$589,182

There are numerous other state programs within and outside of the DEP that control impacts to water quality (many of which are described in other sections of this report). Examples of some outside programs include; the Department of Human Service's Subsurface Waste Disposal Rules and Drinking Water Program, the Department of Agriculture's Pesticide Control Board and Manure Handling Compliance Program, the Department of Marine Resource's Shellfish Program and the Department of Conservation's Natural Areas Program, to name only a few. Currently there is no comprehensive system or effort in place to catalog all of the water quality-related State administrative costs. Beyond state-level agencies there exists a multitude of federal, county, local, volunteer and private organizations that all contribute funds towards the protection and improvement of the State's waters. Again, there is no known, recent endeavor to undertake a comprehensive listing of these organizations with the goal of estimating how many millions of dollars they spend annually to mitigate the effects of pollution in Maine's waters.

Wastewater Facility Construction

Contact: Stephen McLaughlin, DEP BLWQ, Division of Engineering, Compliance and Technical Assistance (DECTA)

Tel: (207) 287-7768 email: Steve.A.McLaughlin@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/grants.htm

In State Fiscal Years 2002 and 2003, the Maine DEP Construction Grants Program and the State Revolving Fund (SRF) funded 63 projects, some with assistance from the United States Department of Agriculture (USDA) Rural Development program grants/loans and Community Development Block Grant (CDBG) grant money. These projects included new facilities, upgrades, additions, modifications, abatement of combined sewer overflows and refinancing for a total cost of approximately $85,000,000 in State grants and SRF loans.

Small Community Grant Program

Contact: Richard Green, DEP BLWQ, Division of Engineering, Compliance and Technical Assistance (DECTA)

Tel: (207) 287-7765 email: Richard.A.Green@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/grants.htm

From its inception in 1982, the Small Community Grant Program (SCGP) has disbursed 22 million dollars in grant monies. Although state bond issues usually fund this grant program, in the past it has also received some funding directly from state appropriations. These funds have been used to assist municipalities with the construction of individual or cluster-type wastewater treatment systems that were designed to eliminate heavily polluted discharges from either already malfunctioning systems or non-existing system ("straight pipes"). This amount of funding has resulted in the construction of new wastewater treatment facilities in over 300 communities throughout the state. Currently, the total estimated value of the facilities built with Small Community Grants is approximately 26 million dollars. Table 3-7 provides a summary of information about the program on a year-by-year basis.

Table 3-7 Yearly Summary of SCGP Activities.

Small Community Grant Program: Year-by-Year Summary				
Year	Grant Amount Disbursed	Total Facility Value	Systems Installed	Wastewater Treated (Gal/Day)*
1982	$334,738	$403,299	115	31,050
1983	$945,758	$1,139,467	255	68,850
1984	$718,764	$865,981	156	42,120
1985	$1,185,070	$1,427,795	256	69,120
1986	$729,090	$878,422	177	47,790
1987	$865,771	$1,043,098	151	40,770
1988	$754,444	$908,969	111	29,970
1989	$921,980	$1,110,819	172	46,440
1990	$993,969	$1,197,553	183	49,410
1991	$1,376,411	$1,658,327	250	67,500
1992	$920,000	$1,108,434	277	74,790
1993	$944,785	$1,138,295	196	52,920
1994	$1,608,903	$1,938,437	335	90,450
1995	$1,099,043	$1,324,148	247	66,690
1996	$894,036	$1,077,152	195	52,650
1997	$910,692	$1,097,219	209	56,430
1998	$1,145,088	$1,379,624	187	50,490
1999	$769,086	$926,610	122	32,940
2000	$1,370,528	$1,651,238	251	67,770
2001	$1,142,009	$1,375,914	167	45,090
2002	$1,354,130	$1,631,482	208	56,160
2003	$1,086,265	$1,308,753	183	49,410
Totals:	**$22,070,560**	**$26,591,036**	**4,403**	**1,188,810**

* These figures are based on calculations derived from the Maine Plumbing Code.

Although very informative, the above table does not illustrate the fact that so many communities are interested in the SCGP, that their requests far outweigh available funding. For example, in 2002, 111 communities requested funds totaling approximately 2.3 million dollars and the entire 1.4 million dollars allocated for that year were awarded. Again in 2003, the 1.1 million dollars that were allocated for that year were completely expended to fund only a portion of the approximately 2.3 million dollars applied for by 131 towns. However, the success of this program is not measured by the fact that towns compete for more funds than are available. Success is measured by the fact that, from its inception, the Small Community Grants Program is estimated to have cumulatively eliminated the discharge of 1.2 million gallons of untreated wastewater every day.

Overboard Discharge Grant Program

Contact: Richard Green, DEP BLWQ, Division of Engineering, Compliance and Technical Assistance (DECTA)

Tel: (207) 287-7765 email: Richard.A.Green@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/grants.htm

The Overboard Discharge Grant Program (ODGP) commenced in 1990. At first, the program sought to license all known overboard discharge systems (OBDs), then the focus shifted towards grant funding the eventual removal of many OBDs (where technically feasible). The reason for wanting to remove as many of these systems as possible is very simple. Even though these systems do treat wastewater; it is not possible to monitor them as closely as a large, traditional municipal or industrial treatment facility, so if an OBD treatment system malfunctions, the problem may not be caught quickly enough to prevent the system from contaminating nearby waters, beaches, clam flats, etc.

For any unfamiliar with the term, an overboard discharge is the discharge of wastewater from residential, commercial, and publicly owned facilities into streams, rivers, lakes and the ocean. A licensed OBD is one that is known, regulated and required to provide treatment of wastewater before it is discharged into a receiving water. Wastewater is treated by the system before it travels from homes, buildings and other facilities into a receiving waterbody. An illicit, or unlicensed, ODB may be a "straight pipe" where wastes and wastewater still travel directly from a building into a receiving waterbody without any treatment. (These are not common, but may still exist in a few locations and should be reported immediately upon discovery.) An OBD with a treatment system is typically installed in locations where "straight pipes" had historically existed, but where poor soils or small parcel sizes prevented the installation of a traditional septic system and where connections to public wastewater systems were simply not available. It should be noted that because OBD replacement systems are usually built on sites with very limited area for disposal fields, the construction costs could be much higher that systems built under good conditions. Despite the increased expense, the value recovered is still much higher than the costs, as is detailed in the next paragraph.

To date, the Overboard Discharge Grant Program has been funded with 7 million dollars from bond issues. From 1991 through the end of 2002, 206 grants totaling 6 million dollars were made to both towns and individuals. Since the beginning of the program, approximately 4.9 million dollars have been spent in the process of removing 446 systems. A total of 78 OBD systems were removed in 2001-2002 and during this same period, 840 acres of shellfish habitat were re-opened to shellfish harvesting. As detailed in Table 3-8, the total acreage opened to shellfish harvesting since the start of the OBD Grant Program is over 16,000 acres. According to the Department of Marine Resources (DMR), opening and fully utilizing this much shellfish harvesting area has the potential to release a harvest with a retail value of over 40 million dollars.

Table 3-8 Shellfish Areas Opened from 1991 to 2003

Town	Name of Shellfish Area	1991-1998 Acres Opened	1999 Acres Opened	2000 Acres Opened	2001 Acres Opened	2002 Acres Opened	2003 Acres Opened
Addison	Cape Split Hrbr, Eastern Hrbr	82	53				
Bar Harbor	Indian Point	49					
Beals	Black Duck Cove, Flying Place	68	39				
Blue Hill	Bragdon Brook Cove			198			
Bremen	Greenland Cove			100			
Brooklin	Naskeag Point	10					
Brooksville	Seal Cove, Weir Cove, Orcutt Hrbr	1,468	81				
Cushing	Pleasant Point				189		
Deer Isle	Sylvester Cove, Dunham Point		241				
Eastport	Carrying Place Cove	400					
Freeport	Cousins River	87					
Friendship	Hatchet Cove		86				
Gouldsboro	Prospect Harbor		1,076				
Hancock	Jellison Cove, Hancock Point	749					
Harpswell	Quahog Bay		1,627				
Isle au Haut	Thorofare	240					
Kittery	Spruce Creek				478		
Milbridge	Pigeon Hill Bay, Back bay	9	434				
Mount Desert	Indian Pt., Mill Cove, Somes Sound	240	50	1,893			
Ogunquit	Oarweed Cove					120	
Owls Head	Otter Point	50					
Scarborough	Plummers Island			4			
Searsport	Stockton Springs		51				
Sedgwick	Billings Cove		9				
S. Thomaston	Waterman's Beach				59		
Steuben	Pigeon Hill Bay, Pinkham Bay	174	170				
Sullivan	Sullivan River	167					
Swans Island	Round Island, Mackerel Cove	44	55				
Tremont	Moose Island	965					
Trenton	MDI Narrows		69				
Vinalhaven	Arey Cove, Seal Cove	7	1,171	2,278			
W. Bath & Phippsburg	Bringham's Cove (New Meadows)						1,020
Yarmouth	Cousins River	7					
York	York River			141			
Total Acreage Opened		**4,816**	**5,212**	**4,614**	**726**	**120**	**1,020**
Cumulative Totals		**4,816**	**10,028**	**14,642**	**15,368**	**15,488**	**16,508**

Nonpoint Source Management

Contact: Norm Marcotte, DEP BLWQ, Division of Watershed Management (DWM)

Tel: (207) 287-7727 email: Norm.G.Marcotte@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docwatershed/npscontrol.htm

Table 3-9 summarizes costs for NPS programs involving Federal grants under section 319 of the Clean Water Act in addition to non-federal matching funds. This summary does not include other State agency funding of personnel or programs conducting NPS control activities, so the following table is a summary of Section 319(h) Clean Water Act Grant Awards to Maine DEP. These figures are from the Department's Nonpoint Source Program and reflect totals for Federal Fiscal Years (FFY) 2000 through 2003.

Table 3-9 Summary of DEP Nonpoint Source Grant Totals

Grant Year (FFY)	Federal 319 Award	Base	Incremental	Non-Federal Match	Total
2000	$2,256,413	$1,110,205	$1,146,208	$1,404,276	$3,660,689
2001	$2,647,731	$1,487,139	$1,160,592	$1,765,154	$4,412,885
2002	$2,739,543	$1,489,950	$1,164,593	$1,826,362	$4,565,905
2003	$2,740,732	$1,572,554	$1,168,178	$1,827,155	$4,567,887

Pollution Prevention and Cost Benefit Information

Contact: Steve Harmon, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-4971 email: Steve.Harmon@SPAM-ZAPmaine.gov

The Clean Water Act and subsequent guidance documents developed by EPA contain an enormous amount of information on how to construct an integrated report on surface water quality. As expected, these guidance documents also describe what information should be included in a standard 305(b) Report. An outline of the 2004 report format contained language very similar to this sample topic title (and the title of this very report section): 'Economic & Social Costs and Economic & Social Benefits of Effective Water Programs.' This title suggests that the EPA and Congress still desire to obtain information about the costs and benefits of water quality programs, particularly those programs where they provide at least partial funding. It is quite understandable that those who are providing monies for a purpose would like to have some means of learning how those funds are benefiting, in this case, improved water quality.

When the cost-benefit type of analysis (CBA) was introduced as a component of the 305(b) Report, it probably seemed like a logical and straightforward approach to measuring both the cost and benefits of many of the water quality-related programs. The EPA deserves credit for tenaciously pursuing and requesting information on the benefits of these programs, because it is unclear if they (in most cases) have ever received good, complete qualitative figures and if they have gotten reliable numbers on a regular basis (in all cases). A quick review and analysis of past 305(b) reports would likely find that most of these submissions did not adequately provide information on cost-benefit and related analyses.

Typically (as will be the case this year for Maine) the cost-benefit section of the report provides specific information on the costs of those programs that either affect, or that are affected by, water quality. These figures on costs are accompanied with very general, if any, information on benefits provided by these very same programs. The reason for this disparity is that while it is often fairly easy to provide information on costs as spending from agency budgets, it is usually very difficult to provide an accurate dollar amount figure for something as abstract as an improvement to the quality of any given water. As is commonly known, many environmental factors fall into those areas in the economic fabric of a society where the results of market forces provide “value” as an intangible, qualitative “notion” rather than as a quantitative “figure” that can be directly derived or measured from other data. This, along with other issues, such as defining a “social benefit,” makes calculating either the quantitative or the qualitative benefits of environmental improvements into a very daunting series of tasks.

As a counterpoint to this section’s introduction, it does not seem as though enough information in the form of useful methods and tools to calculate benefits has been provided to the states. Based on past reporting, it would appear as though the states are ill equipped to grapple with the problem of calculating or even accurately estimating even the basic benefits of their water quality programs. Consequently, this portion of the 305(b) report has been historically neglected and not well understood.

Finally, it appears that if components of the federal government are truly interested in obtaining better and more complete assessments of the environmental benefits being derived from their funds, then they need to lead in the development of methods and tools to estimate the benefits of cleaner waters. It seems likely that the EPA, as the nation's clearinghouse of environmental studies, reports and datasets, may already have much of the information that would be needed as a foundation to build on in order to get this effort underway. For example, the study done in Maine (and reported in a previous 305(b) report) on water clarity and property values may, in concert with studies from other states, provide a completely functional tool (or a piece of a future tool) if these disparate puzzle pieces could be assembled. Or, if complete, working tools and methods do already exist, then the states may need to be made more aware of them and then shown how to implement, utilize and incorporate them almost “seamlessly” into both their accounting practices and program areas for them to be successful and sustainable.

The next subsection will introduce a program at the Maine DEP that is probably one of the most focused in the Department on providing real-world estimates of the benefits derived from it projects. The text that follows will describe the relative amount of success that this program has had in obtaining and providing that type of information.

The Pollution Prevention (P2) Program:

This program is one of the three major program areas that fall under the Department’s Office of Innovation and Assistance (OIA). The two other main programs in the OIA are the Small Business Technical Assistance Program (SBTAP) and the Toxics and Hazardous Waste Reduction Program (THWRP). The following table summarizes the various ways that the Office tracks its level of service to customers and indicates that the OIA is an expanding program that is enjoying greater interaction both with businesses and with individual citizens.

Table 3-10 Office of Innovation and Assistance – Technical Assistance Efforts

Service Tracking Category	2001	2002
Hotline Calls / e-mail Inquiries	11,489	17,846
Staff Onsite Visits	445	513
Training Activity Participants	3,820	N/A
Workshop Participants	N/A	830
Individual Pieces of Mail Sent	3,680	4,855
OIA Home Page Visits	N/T	14,536
Teleconference (attendees)	124	6,346
Permits Issued	212	237

N/A means "Not Available" and N/T means "Not Tracked"

It must be noted that the above figures are totals from all program areas that make up the OIA, and that since these programs often work in close concert with each other, it can be difficult to separate out the actual contribution made by an individual program. However, to the extent possible, the balance of this section will focus on the P2 Program as a separate entity.

The Pollution Prevention (P2) Program is based on the practical notion that it is far more protective of the environment (in addition to being far more cost-effective) to eliminate or reduce pollution at its source rather than to clean up pollution that has already been released into an ecosystem. The P2 Program engages in a proactive approach that utilizes the common ideals of increased efficiency, conservation of resources, reduced waste (and costs), etc. to identify those points in a process that generate pollution. Once identified, the P2 Program also utilizes many approaches like forming good habits, purchasing new products and implementing new technologies to analyze, zero in on and help to correct those portions of a process that generate preventable pollution. Then the Program uses some or all of these tools to reduce or eliminate that source of pollution.

The P2 Program has two distinct areas where it directs its outreach efforts and consequently, has two areas where it conducts the majority of its business: these areas are "Household and Citizen Assistance" and "Business and Industry Assistance." Although significant resources and help is available for and utilized by households and citizens, due to the potential for sheer number of individual contacts, the P2 Program is really best able to attempt to track the potential economic impact of its efforts in the area of assisting business and industry. Documenting how the Program has helped other businesses in the past is a crucial part of building future relationships by being able to demonstrate how assistance from the program could benefit a business' budget in addition to it's compliance with environmental regulations. This means that gathering basic cost-benefit data is more likely to be considered a priority and to occur within the P2 Program when compared to other areas of the DEP.

Given these circumstances, along with repeated exposure to how much value is thought to be placed upon the bottom line by private business, one might expect to find a high incidence of figures indicating benefits of past projects. Analyzing only the

P2 Program's forty-three published case studies from 2000 (11 entries), 2001 (18 entries) and 2002 (14 entries) shows the following statistics:

- In 32 of the 43 case studies (74%), project expenses were not estimated or not reported by the business.
- Of the 11 remaining cases, 9 did report real dollar amounts, while the other two either reported a cost per unit or an estimated cost of "several million dollars."
- In 29 of the 43 case studies (67%), benefits of the project were not estimated (or not reported to P2 Program staff).
- Of the 14 remaining cases, only one failed to estimate a fairly concrete figure for the project's benefit, but it did provide a reason – variations in annual business cycles would affect the total value of savings.
- As far as non-monetary benefits are concerned, only 8 of the 43 case studies (19%) failed to either estimate or describe benefits in quantifiable terms of either a % reduction or a reduction in amount / time (e.g. lbs/year) of a pollutant, waste stream, etc.
- Finally, there were only 3 studies (7%) where the benefits were described in purely qualitative terms.

(see Table 3-11 for a complete list of summary information on the case studies used to generate these figures)

The above figures seem to support the idea that even under the best of circumstances (i.e. government agency and private business working cooperatively together); water quality programs are not likely (or sometimes able) to collect information on the benefits that they are providing to society. Once we consider other factors, for example, the occasionally contentious relationships that exist between agency and business, the chances for successfully engaging all parties and exchanging information on true costs and benefits of improving waters are reduced significantly. As far as the private sector influence is concerned on the above statistics, even the same business with different projects in different years produced variations – a business might calculate a cost and not the benefits with the opposite categories being calculated on another project. No one factor seemed to be driving consistency in reporting results.

Clearly moving the process of estimating cost and benefits from a single program up in scale to an agency, department or an entire state with multiple departments involved, non-government organizations, volunteer groups, non-profits, etc. would add layers of complexity to any proposed method of calculation. The question to answer is a seemingly very basic one "what benefits are all of these organization's activities adding to improving the environment?" The question that must be addressed first is "what tools can these organizations use to figure out and estimate the environment benefits that their activities create?" Both questions are important – neither has an easy answer.

For more information on the Maine Department of Environmental Protection P2 Program:

Contact: Peter Cooke, P2 Program Manager, DEP Commissioner's Office, Office of Innovation and Assistance (OIA)

Tel: (207) 287-7100 email: Peter.Cooke@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/oia/p2/index.htm

Table 3-11 Summary Information on P2 Program Case Studies

Year	Name	Estimated Expense ($)	Estimated Benefit ($)	Estimated Resource Savings
2000	Bangor Water District	N/E	N/E	N/E
2000	Bath Iron Works	$9,789	N/E	11,590 lbs/year of photographic waste eliminated
2000	Cattail Press	$0	N/E	N/E
2000	Friends of Casco Bay	N/E	+/- $100,000	8,600 gal/year raw sewage diverted from the bay
2000	Goodkind Pen Co	N/E	Variable - $1,000's / year	18% of packaging reused or recycled
2000	Hawk Ridge Composting	$4,500,000	N/E	N/E
2000	International Paper	over $20,000	N/E	43.2 tons/year reduction in emissions
2000	Maine Dry Cleaners	N/E	$10,000 / year	Reductions of 2,113 lbs/year (waste) and 600 gal/year (solvent)
2000	Mount Desert Island Water Quality Coalition	N/E	N/E	Reopening of clam flats, conservation of shellfish beds and the removal of a fecal-coliform source
2000	OSRAM-Sylvania	$42,850	N/E	Elimination of both hazardous cleaning chemicals and of air emissions
2000	Town of Portage	$33,000	N/E	25-77% reduction in phosphorus entering lake and a reduction of e-coli contamination at the source
2001	Auburn Educational Services	N/E	N/E	N/E
2001	Bio-Hazard Materials Working Group	N/E	N/E	Elimination of hospital-distributed mercury thermometers and a reduction in hospital waste streams
2001	Goodkind Pen Co	N/E	N/E	Multi-faceted project to acquire additional manufacturing space in the most environmental friendly way possible
2001	Guilford of Maine	N/E	N/E	Reduced total energy consumption by 10% and reduce antimony released in wastewater by 25%
2001	International Paper – Bucksport	$103,000,000	N/E	Reduced steam generation emissions by 50% (2,500 tons/year), reduced ash emissions by 45% (6,750 tons/year) and reduced SARA 313 steam generation emissions by 50% (132 tons/year) - now generates 120 - 175 mW of electricity with out increasing air emissions
2001	Maine Environmental Policy Institute	N/E	N/E	N/E
2001	OSRAM-Sylvania	N/E	$9,375 / year	Reduced the generation of waste isopropyl alcohol by 50%
2001	Portland water District	32,515	N/E	Internal/external mercury awareness/reduction campaign and sponsored a mercury collection day
2001	Z-F Lemforder	$1,580	N/E	Resold 28 tons of plastic material and recycled 3 tons of plastic bags instead of landfilling, now conserves propane at the rate of 25 gal/day
2001	Dead River Company	$0.60 / thermostat	N/E	Eliminated the sale and installation of 500 mercury thermostats per year
2001	Lincoln Pulp & Paper	Several million dollars	bleaching costs reduced, but N/E	Development of the "*enviroO_2*™" bleaching process - elimination of detectable dioxin, phenolics, and furan from bleach plant effluent and of elemental chlorine from production process, 50% reduction in chloroform emission and a 15% reduction in the aggregate amount of toxic chemicals used to manufacture pulp

Chapter 4 SURFACE WATER MONITORING & ASSESSMENTS

Section 4-1 ASSESSMENT METHODOLOGY

Contact: David Courtemanch, DEP, BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Dave.L.Courtemanch@SPAM-ZAPmaine.gov

Listing Methodology for the 2004 305b/303d Integrated List

Determination of attainment is based on a water meeting all standards and criteria established for a water's classification (38 MRSA Section 465, 465-A, 465-B). Waters are listed by Assessment Unit (HUC) and/or waterbody segment in one of five categories of attainment (see description below). The listing does not consider fish consumption advisories due to mercury or for lobster tomalley. (Note: All freshwaters are listed by narrative in Category 5-C for mercury (see explanation in Section 4-1) as well as in one other category. All marine waters are listed by narrative in Category 5-D for legacy pollutants (see explanation in Section 4-1) as well as in one other category.) Each listing provides the Assessment Unit, Waterbody Number, Name, Size, Classification, Monitored Date*, and depending on assessment determination, information on impairment, notes on previous listings, or other information. Listings for all surface waters are found in the Appendices.

* The "Monitored Date" shown in the assessment tables (Appendices) indicates the year of the most recent data acquisition. The term "Evaluated" is used when the data used to make the assessment is greater than five years old or where qualitative information is used.

Listing Categories (1-5)

Category 1:

Attaining all designated uses and water quality standards, and no use is threatened.

Highest level of attainment, waters in the assessment unit attains all applicable standards. Assessment is based on combined evaluation of the following information.

1. Current data (collected within five years) indicates attainment, with no trend toward expected non-attainment within the listing period.

2. Old data (greater than five years) indicates attainment and no change in any associated conditions.

3. Water quality models predict attainment under current loading, with no projected change in loading that would predict non-attainment.

4. Qualitative data or information from professional sources indicating attainment of standards and showing no identifiable sources (e.g. detectable points of entry of either licensed or unlicensed wastes) of pollution, low impact land use (e.g. intact riparian buffers, >90% forested watershed, little impervious surface), watershed within state or federal reserve land, park, wilderness area or similar conservation protection, essentially unaltered habitat, and absence of other potential stressors.

5. Determination that the direct drainage area has a human population of <0.1 per square mile according to U.S. Census data obtained in 2000 and watershed

conditions as described in item 4, above. For lakes, determinations are based on census data at the town level and consider all towns in the direct drainage of larger (referred to in previous 305(b) reports as "significant") lakes. Populations for the remaining lakes (generally less than ten acres) are determined for the town listed as the point-of-record for the water according to the Department of Inland Fisheries and Wildlife Lake Index database.

Category 2:

Attains some of the designated uses; no use is threatened; and insufficient data or no data and information is available to determine if the remaining uses are attained or threatened (with presumption that all uses are attained).

Assessment is based on combined evaluation of the following information.

1. Current data (collected within five years) for some standards indicating attainment, with no trend toward expected non-attainment within the listing period, or an inadequate density of data to evaluate a trend.

2. Old data (greater than five years) for some standards indicating attainment, and no change in associated conditions.

3. Water quality models that predict attainment under current loading for some standards, with no projected change in loading that would predict non-attainment.

4. (For lakes) Probabilistic-based monitoring that indicates a high expectation of use attainment for certain classes of waters based on random monitoring of that class of waters.

5. Insufficient data for some standards, but qualitative data/information from professional sources indicate a low likelihood of impairment from any potential sources (e.g. high dilution, intermittent/seasonal effects, low intensity land use).

Category 3:

Insufficient data and information to determine if designated uses are attained (with presumption that one or more uses may be impaired).

Assessment is based on combined evaluation of the following information. Monitoring schedules are assigned to these waters.

1. Insufficient or conflicting data that does not confirm either attainment or non-attainment of designated uses.

2. Qualitative data or information from professional sources showing the potential presence of stressors that may cause impairment of one or more uses; however, no quantitative water quality information confirms the presence of impairment-causing stressors.

3. Old data, with:

   a. low reliability, no repeat measurements (e.g. one-time synoptic data),

   b. a change of conditions without subsequent re-measurement; or

   c. no evidence of human causes or sources of pollution to account for observed water quality condition (natural conditions that do not attain water quality standards are allowed by 38 M.R.S.A. Section 464.4.C).

4. (For lakes) Current data indicates a return to (or a trend towards) attainment standards over the past few years but requires confirmation; or conversely, that trophic or dissolved oxygen profile evaluation suggests deteriorating conditions requiring further study and verification. (Since lakes respond over a longer period of time and can be highly influenced by weather attributes, it is appropriate to recommend additional monitoring before attainment is determined.)

Category 4:

Impaired or threatened for one or more designated uses, but does not require development of a TMDL.

A water body is listed in category 4 when impairment is not caused by a pollutant; or, if impairment is caused by a pollutant, where a TMDL has already been completed or other enforceable controls are in place. An impaired waterbody will be listed in category 5 if both a pollutant and a non-pollutant are involved that would independently cause an impaired or threatened condition. Waters are listed in one of the following Category 4 sub-lists when:

1. Current or old data for a standard indicates either impaired use, or a trend toward expected non-attainment within the listing period, but also where enforceable management changes are expected to correct the condition,

2. Water quality models that predicted impaired use under loading for some standard, also predict attainment when required controls are in place, or,

3. Quantitative or qualitative data/information from professional sources indicates that the cause of impaired use is not from a pollutant(s) (e.g. habitat modification).

4-A: TMDL is completed. A TMDL is complete but insufficient new data to determine that attainment has been achieved.

4-B: Other pollution control requirements are reasonably expected to result in attainment of standards in the near future.

4-B-1: Waterbodies impaired but with enforceable controls. Waterbodies where enforceable controls have a reasonable expectation of attaining standards, but where no new data are available to determine that attainment has been achieved. (Enforceable controls may include: new wastewater discharge licenses issued without preparation of a TMDL, other regulatory orders, contracts for nonpoint source implementation projects, regulatory orders or contracts for hazardous waste remediation projects).

4-C: Impairment is not caused by a pollutant. Waters impaired by habitat modification. Waters that show impairment due to natural phenomena are listed in Categories 1 through 3 (natural conditions that do not attain water quality standards and criteria are allowed by 38 M.R.S.A. Section 464.4.C).

Category 5:

Waters impaired or threatened for one or more designated uses by a pollutant(s) and a TMDL is required.

Waters are listed in one of the Category 5 sub-lists when:

1. Current data (collected within five years) for a standard either indicates impaired use, or a trend toward expected impairment within the listing period, and where quantitative or qualitative data/information from professional sources indicates that the cause of impaired use is from a pollutant(s),

2. Water quality models predict impaired use under current loading for a standard, and where quantitative or qualitative data/information from professional sources indicates that the cause of impaired use is from a pollutant(s), or,

3. Those waters have been previously listed on the State's 303(d) list of impaired waters, based on current or old data that indicated the involvement of a pollutant(s), and where there has been no change in management or conditions that would indicate attainment of use.

5-A: Impairment caused by pollutants (other than those listed in 5-B through 5-D). A TMDL is required and will be conducted by the State of Maine. A projected schedule for TMDL completion is included.

5-B: Impairment is caused solely by bacteria contamination. A TMDL is required. Certain waters impaired only by bacteria contamination may be high priority resources, such as shellfish areas, but a low priority for TMDL development if other actions are already in progress that will correct the problem in advance of TMDL development (e.g. better compliance). Certain small streams that are impaired solely by bacteria contamination but where recreation (swimming) is impractical because of their small size are listed in 5-B. A projected schedule of TMDL completion is included where applicable.

5-B-2: Waterbodies impaired only by Combined Sewer Overflows. Waterbodies impaired only by Combined Sewer Overflows where current CSO Master Plans (Long-Term Control Plan) are in place. These waters will be monitored to demonstrate that water quality standards will be attained and provisions are in place for both funding and compliance timetables.

5-C: Impairment caused by atmospheric deposition of mercury and a regional-scale TMDL is required. Maine has a fish consumption advisory for fish taken from all freshwaters due to mercury. Many waters, and many fish from any given water, do not exceed the action level for mercury. However, because it is impossible for someone consuming a fish to know whether the mercury level exceeds the action level, the Maine Department of Human Services decided to establish a statewide advisory for all freshwater fish that recommends limits on consumption. Maine has already instituted statewide programs for removal and reduction of mercury sources. The State of Maine is participating in the development of regional scale TMDLs for the control of mercury.

5-D: Impairment caused by a "legacy" pollutant. This sub-category includes:

1. waters impaired only by PCBs, DDT or other substances already banned from production or use. It includes waters impaired by contaminated sediments where

there is no additional extrinsic load occurring. This is a low priority for TMDL development since there is no controllable load.

2. coastal waters that have a consumption advisory for the tomalley (hepato-pancreas organ) of lobsters due to the presence of persistent bioaccumulating toxics found in that organ. This is a low priority for TMDL development since there is no identifiable and controllable load.

Delisting from an Impaired to an Unimpaired Category.

Because there are a number of listing options available in the integrated list, some waterbodies may be removed from the previous 303(d) list, however, only under certain circumstances. The State must provide new information, to EPA's satisfaction, as a basis for not listing a specific water that had been previously included on a 303(d) list. Acceptable reasons for not listing a previously listed water as provided in 40 CFR 130.7(b) may include situations where:

- The assessment and interpretation of more recent or more accurate data demonstrates that the applicable water quality standard(s) is being met (list in Category 1, 2, (3 for lakes).
- The results of more refined water quality modeling demonstrate that the applicable water quality standard(s) is being met (list in Category 1 or 2).
- It can be demonstrated that errors or insufficiencies in the original data and information led to the water being incorrectly listed (list in Category 3).
- It can be documented that there are changes in the conditions or criteria that originally caused the water to be impaired and therefore originally led to the listing. For example, new control equipment has been installed, a discharge has been eliminated, or new criteria adopted (list in Category 1, 2, 3, or 4-B).
- The State has demonstrated pursuant to 40 CFR 130.7(b)(1)(ii), that there are effluent limitations required by State or local authority, which are more stringent than technology-based effluent limitations, required by the Clean Water Act, and that these more stringent effluent limitations will result in the attainment of water quality standards for the pollutant causing the impairment within a reasonable time (list in Category 4-B).
- The State has demonstrated pursuant to 40 CFR 130.7(b)(1)(iii), that there are other pollution control requirements required by State, local, or federal authority that will result in attainment of water quality standards for a specific pollutant(s) within a reasonable time (list in Category 4-B).
- The State included on a previous Section 303(d) list some Water Quality Limited Segments beyond those that are required by EPA regulations, e.g., waters where there is no pollutant associated with the impairment (list in Category 4-C).
- A TMDL has been approved or established by EPA since the last 303(d) list (list in Category 4-A).

Section 4-2 Assessment Criteria

The following tables provide the designated use categories and the criteria (with references) used to assess a water's attainment of the use. A determination of non-attainment is only made when there is documented evidence (e.g. monitoring data) indicating that one or more criteria are not attained. Such data are also weighed against evidence that there are plausible human-caused factors that may contribute to the violation of criteria (38 MRSA Section 464.4.C).

Rivers and Streams

Designated Use	Criteria for Attainment
Drinking water supply after disinfection / treatment	• Ambient Water Quality Criteria (Maine DEP Chapter 530.5) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Aquatic life use support	• Biomonitoring criteria (Maine DEP Chapter 579) • Dissolved oxygen (38 MRSA Section 464.13, 465.1-4) • Ambient Water Quality Criteria (Maine DEP Chapter 530.5) • Support of indigenous species • Wetted habitat (Maine DEP Chapter 581) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Fishing	• Support of indigenous fish species • No consumption advisory (established by Maine DHS) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Recreation in and on the water	• *E. coli* bacteria (38 MRSA Section 465, geometric mean) • Water color (38 MRSA Section 414-C) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Navigation, hydropower, agriculture / industrial supply	• General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)

Lakes and Ponds

Designated Use	Criteria for Attainment
Drinking water supply after disinfection / treatment	• Ambient Water Quality Criteria (Maine DEP Chapter 530.5) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Aquatic life use support	• Trophic state (38 MRSA Section 465-A, DEP Chapter 581) • Ambient Water Quality Criteria (Maine DEP Chapter 530.5) • Aquatic life (38 MRSA Section 465-A, 464.9) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Fishing	• Support of indigenous fish species • No consumption advisory (established by Maine DHS) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Recreation in and on the water	• *E. coli* bacteria (38 MRSA Section 465-A, geometric mean) • Trophic state (38 MRSA Section 465-A, DEP Chapter 581) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Navigation, hydropower, agriculture / industrial supply	• General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)

Estuarine and Marine Waters

Designated Use	Criteria for Attainment
Marine life use support	• Ambient Water Quality Criteria (Maine DEP Chapter 530.5) • Dissolved oxygen (38 MRSA Section 465-B) • Narrative biological standards (38 MRSA Section 465-B) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Shellfish propagation and harvest	• National Shellfish Sanitation Program (as assessed by DMR) • No consumption advisory (Maine DHS) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Aquaculture	• General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Fishing	• Support of indigenous fish species • No consumption advisory (Maine DHS) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Recreation in and on the water	• Enterococcus bacteria (38 MRSA Section 465-B, geometric mean) • General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)
Navigation, hydropower, industrial supply	• General provisions: floating/settleable solids, pH, radioactive substances, (38 MRSA Section 464.4.A)

Data Interpretation

It is not common to have complete and consistent water quality data; therefore, some interpretation of data is required in making a final assessment. Data from unique events such as a spill, an accident, a short-duration license exceedance, or a flood are not used in an assessment determination. The following general principles for each criteria type are used in making an assessment:

Biomonitoring Criteria: Assessment based on probability results of the biocriteria models, attainment >0.6. Professional judgement may be used in accordance with the procedures in Maine DEP Chapter 579.

Lake Trophic State: Assessment is based on measures of transparency, chlorophyll a, total phosphorus and color (see Table 4-5). When lakes lack this information, a trophic determination made by DIF&W is used, if available. Their determination is more subjective and generally applies to the lake system as a whole including adjacent wetlands and fisheries productivity. Trophic determination is tracked by source (DEP or DIF&W) in the assessment database.

Table 4-1 Lake Trophic State Parameters and Guidelines

Numerical Guidelines for Evaluation of Trophic Status in Maine *			
(Note: Dystrophy is not often evaluated as a trophic category separately from categories below.)			
	Trophic Status		
Parameter[1]	Oligotrophic	Mesotrophic[2]	Eutrophic
SDT[3]	> 8 meters	4-8 meters	< 4 meters
CHL a	< 1.5 ppb	1.5 – 7 ppb	> 7 ppb
Total Phosphorus[3]	< 4.5 ppb	4.5 – 20 ppb	>20 ppb
TSI[3,4]	0-25	25-60	>60 and/or repeated algal blooms

[1] SDT, CHL a, and Total Phosphorus based on long-term means.
[2] No repeated nuisance algal blooms.
[3] If color is > 30 Standard Platinum Units (SPU) or not known, chlorophyll a concentration (CHL a), dissolved oxygen and best professional judgment used to assign trophic category.
[4] TSI = Trophic State Indices are calculated when adequate data exists and color is at or below 30 SPU.
* This table is a duplicate of Table 4-23 in the Lakes Section of this Chapter (appears twice for convenience).

Support of Indigenous Species: Assessment based on the known absence of a species that previously was documented as indigenous to a waterbody (ME Department of Inland Fisheries and Wildlife records).

Dissolved Oxygen: Assessment is based on the results of repeated measurements. Single excursions below the criteria or excursions within the range of sampling or instrument error (as established in a Quality Assurance Project Plan) are generally disregarded. Assessment may also be based on the use of water quality models (e.g. QUAL2E) based on present or expected loadings. New legislation provides that dissolved oxygen in the thermocline and deeper waters of a riverine impoundment will not be used for measurement of water quality attainment.

Ambient Water Quality Criteria: Assessment is based on repeated measurements. Single excursions above the criteria or excursions within the range of sampling or instrument error (as established in a Quality Assurance Project Plan) are generally disregarded. Assessment may also be based on the use of water quality models (e.g. dilution models) based on present or expected loadings.

Bacteria: Assessment is based on repeated measurements to establish an annual geometric mean. Instantaneous (single sample) criteria are not used for water quality assessment due to the high variability associated with a single measurement. There must be a plausible human source of the bacteria for an impairment determination to be made (38 M.R.S.A Section 465, 465-A, 465-B)

Water Color: Assessment based on repeated measurements of discharge performance data (pulp and paper discharges only).

General Provisions: pH based on repeated measurement (between 6.0 and 8.5 for freshwaters; 7.0 and 8.5 for marine waters), however, certain naturally occurring waterbody types (e.g. bogs, aquifer lakes, high elevation lakes) or events may naturally have low pH and affect downstream waters. Use impairment from solids is subjectively determined. Radioactivity is not presently monitored.

Section 4-3 INTEGRATED REPORT LISTS OF CATEGORIES 1 THROUGH 5

Table 4-2 Summary of State Waters Attaining and Not Attaining Standards

Waterbody Type	Total Assessed for Attaining of WQ Standards – Assessed for Designated Uses	Total with Insufficient Data for Assessment – Not Assessed for Any Designated Uses (Category 3)	Total Attaining All WQ Standards - Supporting All Designated Uses (Category 1)	Total Attaining At Least One Standard – Supporting at Least One Use, But Not All Standards Assessed (Category 2)	Total Not Attaining One or More WQ Standards – Not Supporting One or More Uses – But Not Needing a TMDL (Category 4)	Total Not Attaining One or More WQ Standards – Not Supporting One or More Uses – and TMDL is Needed (Category 5)
River & Stream Miles	31,199.0	269.2	4,328.3	25,414.1	421.6	765.8 *
Number of Lakes/Ponds	5,782	20 **	2,854	2,866	21	21 *
Lake & Pond Acres	987,172	26,788 **	285,023	569,540	89,102	16,719 *
Estuarine/Ocean Square Miles	2,845.99	6.23	0.00	2,690.75	1.09	147.92 ‡
Estuarine/Ocean (Acres)	1,821,433.6	3,986.0	0.0	1,722,079.3	697.0	94,671.3 ‡
Freshwater/Tidal Wetland Acres	N/A [1]	N/A [1]	N/A [1]	N/A [1]	N/A [1]	N/A [1]

* These figures do not include those rivers and lakes listed under Category 5-C for atmospheric deposition of Mercury.
** Not conclusively assessed.
‡ These figures do not include estuarine and marine waters listed in Category 5-D for legacy pollutants.
[1] "N/A" means "Not Assessed".

Table 4-3 Individual Designated Use Support Summary for Rivers and Streams

CWA Goals	Designated Use	Size Fully Supporting – Attaining WQ Standards (miles)	Size Not Fully Supporting – Not Attaining WQ Standards (miles)	Size Not Attainable – UAA Performed (miles)
Protect & Enhance Ecosystems	Aquatic Life	30,661.4	537.6	0
Protect & Enhance Public Health	Fish Consumption*(Mercury)	0	(31,199)	0
	Fish Consumption (other)	30,582.6	616.4	0
	Swimming (primary and Secondary contact)	31,054.2	144.8	0
	Drinking Water Source	31,195	4.0	0
Social & Economic	Agricultural (designated use provisionally assigned)	31,199	0	0
	Industrial Supply Water	31,199	0	0
	Hydropower	31,199	0	0
	Navigation	31,194.8	4.2	0

* All freshwaters are listed for a consumption advisory due to mercury (Category 5-C). The fish consumption (other) listing is for consumption advisories other than that caused by mercury (these waters also have a mercury advisory).

Table 4-4 Individual Designated Use Support Summary for Maine Lakes

CWA Goals	Designated Use	Size Fully Supporting – Attaining WQ Standards (Acres)	Size Not Supporting – Not Attaining WQ Standards (Acres)	Size Not Attainable – UAA Performed
Protect & Enhance Ecosystems	Aquatic Life Support	881,351	105,821	
Protect & Enhance Public Health	Fish Consumption (Hg) Swimming Secondary Contact Drinking Water Source Water	0 955,264 987,172 987,172	987,172 31,908 0 0	
Social & Economic	Agricultural Industrial Cultural or Ceremonial State Defined: 1. Hydropower & Navigation	987,172 987,172 987,172 987,172	0 0 0 0	

Table 4-5 Individual Designated Use Support Summary for Estuarine and Marine Waters

CWA Goals	Designated Use	Size Fully Supporting – Attaining WQ Standards (square miles)	Size Not Supporting – Not Attaining WQ Standards (square miles)	Size Not Attainable – UAA Performed (square miles)
Protect & Enhance Ecosystems	Aquatic Life	2,842.83	3.16	0
Protect & Enhance Public Health	Fish Consumption[1] Shellfish Consumption[2] (excluding lobster tomalley) Shellfish Consumption[3] (lobster tomalley) Swimming (primary and secondary contact)	0 2,701.22 0 2,845.97	2,845.99 144.77 2,845.99 0.02	0 0 0 0
Social & Economic	Aquaculture Navigation Industrial supply water Hydropower	2,845.99 2,845.99 2,845.99 2,845.99	0 0 0 0	0 0 0 0

[1] Based on a statewide fish/shellfish consumption advisory
[2] Does not include statewide advisories for mercury in fish or dioxin in lobster tomalley.
[3] Based on a statewide consumption advisory for lobster tomalley.

Table 4-6 Total Sizes of Category 4 and 5 Impaired Rivers and Streams by Causes/Stressors

Cause/Stressor Type	Size Impaired (square miles)
Bacteria	144.8
Bacteria (CSO-source)	Variable
Dissolved Oxygen	391.6
Toxics	-
Priority Organics	4.0
Pesticides (DDT)	222.1
Dioxins/PCBs	394.3
Metals	10.4
PH	1.0
Nutrients	87.8
Aquatic Life Criteria (integrated effects)	274.5
Habitat	17.2

Table 4-7 Total Sizes of Waters Impaired by Causes/Stressors for Maine Lakes

Cause/Stressor Type	Size Impaired (acres)
Flow Alteration	65,832
Methyl Mercury (fish tissue)	987,172
Nutrients: Phosphorus	32,687
Organic Enrichment	35,254
Siltation	31,414
Taste	3,845
Turbidity	7,865

(From Table 4-4, page 4-15 of 1997 305(b) Guidance)

Table 4-8 Total Sizes of Waters Impaired by Causes/Stressors for Maine Lakes by Listing Category and Magnitude

Listing Category	Cause/Stressor Type	High Magnitude		Med-Low Magnitude		Totals	
		Size (acres)	Number	Size (acres)	Number	Size (acres)	Number
4A	Nutrients: Phosphorus	0	0	22,636	11	22,636	11
	Organic Enrichment	634	1	22,636	11	23,270	12
	Siltation	0	0	15,088	8	15,088	8
	Taste and Odor	0	0	3,845	1	3,845	1
4C	Flow Alteration	65,832	9	0	0	65,832	9
	Siltation	0	0	7,865	1	7,865	1
	Turbidity	0	0	7,865	1	7,865	1
4D	Methyl Mercury (fish tissue)	987,172	5,782	0	0	987,172	5,782
5A	Nutrients: Phosphorus	85	1	9,966	17	10,051	18
	Organic Enrichment	6,268	2	5,716	15	11,984	17
	Siltation	0	0	8,461	11	8,461	11

Table 4-9 Total Sizes of Category 4 and 5 Impaired Estuarine and Marine Waters by Causes/Stressors

Cause/Stressor Type	Size Impaired (square miles)
Bacteria	144.79
Bacteria (CSOs)	Variable
Dissolved Oxygen	1.06
Sediment Oxygen Demand	1.06
Toxics	-
Metals-copper	0.9
PAHs	0.5
PCBs	2,845.99
Dioxins	2,845.99
Aquatic Life	3.16

Table 4-10 Total Sizes of Category 4 and 5 Waters Impaired by Source for Rivers and Streams

Source Category	Size Impaired (miles)
Industrial Point Sources	338.8
Municipal Point Sources	163.3
Combined Sewer Overflows	Variable
Aquaculture Point Sources	11.5
Resource extraction (mining)	4.3
Hazardous waste (Superfund sites, etc.)	46.6
Waste (solid) disposal	11.1
Nonpoint Sources	-
Agriculture NPS	134.6
Industrial site NPS	13.2
Urban NPS/Stormwater	83.2
General development NPS	63.7
NPS (unspecified)	137.8
Habitat alteration	46.2
Impoundment	56.2
Flow modification/withdrawal	49.6
Eutrophic (impaired) Lake Source	37.0
Atmospheric Deposition (mercury deposition)	(31,199)
Unknown Source	26.7

Table 4-11 Total Sizes of Waters Impaired by Sources for Maine Lakes

Source Category	Size Impaired (acres)
Municipal Point Sources	4,288
Agricultural Runoff	30,561
Atmospheric Deposition	987,172
Hydromodification	65,832
Internal Nutrient Cycling	11,444
Landfill	1,849
Stormwater	39,101
Unknown Source	1,869

Table 4-12 Total Sizes of Waters Impaired by Sources for Maine Lakes by Listing Category and Magnitude

Listing Category	Source	High Magnitude		Med-Low Magnitude		Totals	
		Size (acres)	Number	Size (acres)	Number	Size (acres)	Number
4A	Municipal Point Source – Major	0	0	4,288	1	4,288	1
	Agriculture	746	1	20,808	8	21,554	9
	Internal Nutrient Cycling	0	0	10,754	4	10,754	4
	Landfill	0	0	1,420	1	1,420	1
	Stormwater	1,534	2	21,736	10	23,270	12
	Unknown	0	0	1,823	1	1,823	1
4C	Hydromodification	65,832	9	0	0	65,832	9
4D	Atmospheric Deposition	987,172	5,782	0	0	987,172	5,782
5A	Agriculture	5,687	7	3,320	6	9,007	13
	Internal Nutrient Cycling	30	1	660	1	690	2
	Landfill	429	2	0	0	429	2
	Stormwater	6,547	3	9,284	12	15,831	15
	Unknown	46	1	0	0	46	1

Table 4-13 Total Sizes of Waters Impaired by Sources for Estuarine and Marine Waters

Source Category (examples)	Size Impaired (square miles)
Industrial Point Sources	2,845.99
Municipal Point Sources / Overboard Discharge	143.95
Combined Sewer Overflows	Variable
Urban Runoff/Storm Sewers	51.70
Sediment Oxygen Demand	1.06
Nonpoint Source	144.77

Section 4-4 RIVERS / STREAMS

Water Classification Program

Contact: David Courtemanch, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: 207-287-7789 email: Dave.L.Courtemanch@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docmonitoring/classification/index.htm

Maine has four water quality classes of rivers and streams: AA, A, B, and C (38 M.R.S.A. Section 465). Each classification assigns designated uses, water quality criteria (narrative and numeric), and may place specific restrictions on certain activities (Table 4-18). Definitions of terms used in the classification are provided in 38 M.R.S.A. Section 466.

Class AA waters are managed for their outstanding natural ecological, recreational, social, and scenic qualities. Direct discharge of wastewater, dams, and other significant human disturbances are prohibited.

Class A waters are managed for high quality with limited human disturbance allowed. Direct discharges are allowed but highly restricted.

Class B waters are general-purpose water and are managed to attain good quality water. Well-treated discharges with ample dilution are allowed.

Class C waters are managed to attain at least the swimmable-fishable goals of the federal Clean Water Act and to maintain the structure and function of the biological community.

Table 4-14 Maine Water Quality Criteria for Classification of Fresh Surface Waters (38 MRSA §465)

	Dissolved Oxygen Numeric Criteria	**Bacteria (*E. coli*) Numeric Criteria**	**Habitat Narrative Criteria**	**Aquatic Life (Biological) Narrative Criteria**
Class AA	as naturally occurs	as naturally occurs	Free flowing and natural	No direct discharge of pollutants; ***as naturally occurs***
Class A	7 ppm; 75% saturation	as naturally occurs	Natural	***as naturally occurs***
Class B	7 ppm; 75% saturation	64/100 ml (g.m.*) or 427/100 ml (inst.*)	Unimpaired	Discharges ***shall not cause adverse impact*** to aquatic life in that the receiving waters shall be of sufficient quality to ***support all aquatic species indigenous to the receiving water without detrimental changes to the resident biological community.***
Class C	5 ppm; 60% saturation	142/100 ml (g.m.*) or 949/100 ml (inst.*)	Habitat for fish and other aquatic life	Discharges ***may cause some changes*** to aquatic life, provided that the receiving waters shall be of sufficient quality to ***support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community.***

* "g.m." means geometric mean and "inst." means instantaneous level

Maine law requires that at least once every three years, the Department review the classification system and make recommendations to the Board of Environmental Protection for changes. In 2002-03, the Department conducted statewide workshops and the Board held hearings that resulted in recommendations to the Maine Legislature for the upgrade of part or all of 75 rivers and streams of which 61 were passed by the Legislature (P.L. 2003 Chapter 317). The 14 remaining segments are being reconsidered in a later session. The current distribution of these four water quality classes is summarized in Table 4-19:

Table 4-15 Percent Distribution of River/Stream Water Classes

Class	Percent of Total Miles
AA	5.8 %
A	44.1 %
B	47.9 %
C	2.2 %

Summary of Statewide River and Stream Attainment Status

Contact: David Courtemanch, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: 207-287-7789 email: Dave.L.Courtemanch@SPAM-ZAPmaine.gov

This Integrated Assessment report requires the assignment of each Assessment Unit into one of five categories (see the Assessment Methodology Section). A water is determined to be impaired if it does not attain one or more of the uses assigned by its classification as determined by the criteria assigned to that water class. The overall use attainment summary is provided in Table 4-7. This use attainment assessment reports on 31,199 miles of rivers and streams provided in the ADB (see discussion of extent of state's waters in Chapter 3).

Category 1. The 2004 assessment assigned 4,328 miles (13.9%) of rivers and streams to Category 1 (fully attaining*). This is an increase of 3,256 miles from the 2002 assessment. The Department has determined through monitoring and evaluation that large areas of the state should be included in this category where there is significant protection afforded by either state or private conservation efforts. Maine is fortunate to have entire Assessment Units where there is no human habitation, few roads and only minimal disturbance (typically a well managed forestry operation that are well buffered to protect water quality).

Category 2. The 2004 assessment assigned 25,414 (81.5%) miles of rivers and streams to Category 2 (fully attaining*). This is a decrease of 3,272 miles from the 2002 assessment. Most of these miles have been moved to Category 1. Eight segments, previously listed as impaired (Category 4 or 5) are now found to be in attainment and have been assigned to Category 2. (see Table 8-1).

Category 3. The 2004 assessment assigned 269 (0.9%) miles of rivers and streams to Category 3 (attainment undetermined*). This is an increase of 19 miles (2 segments) from the 2002 assessment.

Category 4. The 2004 assessment assigned 440 (1.4%) miles of rivers and streams to Category 4 (impaired for one or more uses*). This is an increase of 20 miles from the 2002 assessment, waters that have had a TMDL completed or other enforceable controls applied. Category 4 impaired waters do not require the development of a Total Maximum Daily Load (TMDL) determination. Waters in Category 4 are placed into one of three subcategories: 4-A for waters that already have a TMDL (2 segments added from 2002 Category 5), 4-B-1 for waters where there is already an enforceable mechanism in place to bring the water into attainment (e.g. new wastewater discharge license) (1 segment added from 2002 Category 5), 4-C for waters where there is no pollutant involved in the impairment problem (3 segments removed from 2002 list to Category 2, I segment added from 2002 Category 5).

Category 5. The 2004 assessment assigned 737 miles (2.4%) of rivers and streams to Category 5 (impaired for one or more uses*). This is a net increase of only 15 miles (10 segments were added; 8 segments were removed from 2002 list, see Table 8-1) from the 2002 assessment. Additionally, 6 waters (31.7 miles) have draft TMDLs that will be completed for FY03. Category 5 impaired waters require the development of a Total Maximum Daily Load (TMDL) determination. Waters in Category 5 are placed into one of four subcategories: 5-A for waters impaired by pollutants, 5-B for waters impaired by bacteria from CSOs and non-point sources, 5-C for waters impaired by atmopsheric deposition of mercury**, and 5-D for waters impaired by the residuals of "legacy" activities.

** All freshwaters in Maine have an advisory for the consumption of fish due to the presence of mercury presumed to be from atmospheric deposition. The advisory is based on probability data that a stream, river, or lake may contain some fish that exceed the advisory action level (Maine uses a lower action level of 0.2 mg/kg (edible portion) than that established by the USEPA). Any freshwater may contain both contaminated and uncontaminated fish depending on size, age, and species occurrence in that water. The advisory applies to all freshwaters because it may be impossible for someone eating a fish to be able to tell where the fish originated and whether or not it has a high level of mercury. This Integrated Water Quality Monitoring and Assessment Report does not consider this statewide advisory in establishing other category listings.

As with any assessment of this kind, the identification of impaired waters cannot be considered complete but rather is a reflection of the findings, to date, relative to the level of effort expended by the agency and other cooperating contributors. While new and expanded monitoring has identified many additional miles of impaired waters, this should not be interpreted as an indication that Maine's waters are under some new or increasing threat. Rather, the State has been better able to assess its waters with improved monitoring tools and increased participation from cooperators. All of the new impaired listings appear to be due to conditions that have probably been in place for many years.

Causes and Sources of Impairment

Cause and stress type information is provided in Table 4-10. Sources of impairment are provided in Table 4-14.

The greatest number of impaired miles (631) is due to toxic contamination with dioxins, pesticides and PCBs accounting for most of those impaired miles (see the sections on Dioxin Monitoring and Surface Water Ambient Toxics programs). There has been no appreciable change in the impaired mileage assigned to each general cause (a small increase in bacteria-impaired and aquatic life-impaired waters, along with a small decrease in habitat-impaired waters).

Industrial point sources are the largest contributing source category and it should be noted that some industrial loads that are treated through municipal point sources are regarded as additional sources. These industrial sources account for all of the fish consumption listed waters where dioxins are the primary contaminant. There has been a combined reduction of about 50 miles in NPS-impaired waters (55-mile reduction attributed to agriculture). This is due in part to the removal of some NPS waters from Category 4 and 5, but are also due in part to updating the reassignment of potential sources for some waterbodies.

Main Stems of Major Rivers

Most of the mainstem rivers are in good condition and are attaining their classification (mostly Class B or C quality, although significant segments of the St. John, Allagash, East and West Branches of the Penobscot, St. Croix, and Kennebec Rivers are Class AA and A). The primary impairment issue on the larger rivers is fish consumption, with segments of the Androscoggin, Kennebec, Penobscot, Salmon Falls and Sebasticook Rivers listed in either Category 4 or 5. Tissue monitoring studies have found a progressive decline of dioxin and furan concentrations in fish tissue for some of these waters following process changes at many of the industrial facilities responsible for the contamination. There is an expectation that some of these waters may have their fish consumption advisories (for those compounds) relaxed or removed in future years (see the Dioxin Monitoring Program section). Impoundments on major rivers continue to create water quality problems, when in association with pollution loads that have yet to be resolved including the Androscoggin, Sebasticook, and Presumpscot Rivers. Recent legislation has relaxed dissolved oxygen requirements for deeper impoundments allowing some waters to be declared in attainment (e.g. Dolby Flowage on the West Branch Penobscot). Recent changes to flow management as a result of re-licensing of hydropower facilities also brought impaired downstream segments into attainment (e.g. Kennebec River at Bingham). Dam removals, along with improved wastewater management have allowed an upgrade of classification of the lower Kennebec River to Class B, and the prospect for a similar upgrade to the lower Presumpscot River exists.

Small Streams

Most of the new listings in Category 5 are small urban streams. In recent years, the Department has emphasized the monitoring of these waters and, not surprisingly, the number of these types of waters has increased in the Category 5 list. Conversely, the Department has spent more effort to complete TMDL evaluations and otherwise take actions to remove larger waters with point sources of impairment from the list. That trend is now shifting as few point source problems remain. The greater part of TMDL activity is now being directed toward smaller waters with identified nonpoint source problems. Goosefare Brook in Saco is the first small, nonpoint source affected water with a completed TMDL report. Several TMDLs for such waters are in draft form and the greater expenditure of resources for the coming years is being directed at these waters (Table 3-3). One notable recovery has been Kennedy Brook in Augusta. This is a small urban stream and was previously listed for aquatic life impairment due to stormwater loading and the effects of development in its watershed. Stormwater interception has been completed in the watershed, aquatic life in the stream has responded, and it has now been moved from the Category 5 list to Category 2. It is encouraging to document improved water quality conditions and benefits as a direct response to these improved management strategies.

Toxics

Dioxin Monitoring Program

Contact: Barry Mower, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Barry.F.Mower@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/dioxin/

In 1997 the Maine legislature enacted LD 1633 "An Act to Make Fish in Maine Rivers Safe to Eat and Reduce Color Pollution", the Dioxin/Color law [38 MRSA section 420(2)(I)]. The key requirement is that a (bleach kraft pulp) mill may not discharge dioxin into its receiving waters after December 31, 2002. To determine compliance, there are interim tests and a final test. Two interim tests of effluent from the bleach plant, require that 1) TCDD (2378-tetrachlorodibenzo-p-dioxin, the most toxic of the 17 toxic dioxins and furans) must be below 10 ppq, parts per quadrillion or picograms per gram, pg/g by July 31, 1998 and 2) TCDF (2378-tetrachlorodibenzofuran) must be below the same detection limit by December 31, 1999. All of the mills passed both interim tests by the respective deadlines.

As the final test to confirm that there is no discharge by December 31, 2002, fish (or surrogate) below a bleached kraft pulp mill must have no more dioxin than fish (or surrogate) above the mill, the so-called "above/below (A/B) fish test". Since the development of the Above/Below (A/B) test began in 1997, the Department conducted more than 78 tests of different matrices, species, tissues, and sample types. No one test has been consistently the most sensitive, but in general, tests with fish filets were as sensitive or more so, than the other tests. In a report to the Maine legislature entitled 'Monitoring Dioxin in Maine, Overview, Update, Next Steps, dated March 31, 2003, DEP established that the A/B test would be done with bass and suckers for 2003. Above and below 2 mills, additional tests with caged mussels and semi-permeable membrane devices (SPMDs) were continued to determine their utility.

After evaluation of the 2003 results, DEP amended the A/B test in 2004 as follows:

- The test will utilize 3 separate tests: a) bass, b) suckers, and c) caged mussels.
- A preponderance of evidence (POE) approach will be used where passage of 2 of the 3 tests will be used to indicate no discharge.
- Because none of the tests are very sensitive, a mill must show no evidence of a discharge for 2 consecutive years before being deemed in compliance. Periodic testing is subsequent years will also be necessary to assure continued compliance.

Additional details may be found in at the website identified above.

Findings of the 2002-2003 Dioxin Monitoring Program and 2003 A/B test:

- There is some evidence that all 5 bleached kraft pulp and paper mills may have continuing discharges of dioxin. At each mill at least one test found increased dioxin below the mill.
- A preponderance of evidence (POE) approach, however, initially suggests that there is no discharge from the International Paper mill in Jay or the SAPPI-Somerset mill in Skowhegan.
- Since only fish tests were conducted at the other 3 mills in 2003, no initial determination can be made at this time based on a POE approach.

The Above/Below (A/B) test will need to be continued in future years, as specified in statute, to determine final compliance of all 5 mills with the 'no discharge of dioxin' provision of the 1997 Dioxin/color law.

Surface Water Ambient Toxics (SWAT) Monitoring Program

Contact: Barry Mower, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Barry.F.Mower@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docmonitoring/swat/index.htm

Maine's Surface Water Ambient Toxics (SWAT) monitoring program was established by the Maine legislature in 1994 (38 MRSA 420-B) "in order to determine the nature, scope and severity of toxic contamination in the surface waters and fisheries of the State". Advised by a Technical Advisory Group, DEP must prepare 5-year plans and annual work plans for implementation of the program.

The first 5-year plan, from 1994-1998, consisted of a screening survey of all major watersheds in the state. The results were a finding of significant contamination in fish, shellfish, macroinvertebrates and sediments from many parts of the state. One consequence of the survey was the expansion of the statewide fish consumption advisory for lakes (due to mercury), to all freshwaters in the state.

The second 5-year plan, from 1999-2003, focused on providing more definitive studies of issues identified in the initial statewide survey, along with exploration of newly emerging issues. One result was confirmation of residual high levels of DDE in fish from Aroostook County and subsequent fish consumption advisories. Some other studies include mercury in rainfall, and fish, development of a wildlife criterion value for mercury based on loons and fish-eating mammals, PCBs in wild and hatchery fish, endocrine disruption in blueberry sprays, contaminants in marine mussels and fish and seals, antibiotics in lobsters, and continued studies of freshwater macroinvertebrates. In 2003, due to state budget shortfalls, the program's total budget was reduced by 20%.

This year, 2004, will be the beginning of a new 5-year plan, which will be developed by DEP in consultation with the Technical Advisory Group and other state agencies. The budget is expected to be similar to that of 2003. It is anticipated that many of the same issues from the past few years will still need to be studied, in addition to some potential new issues, including a look at pharmaceuticals and flame retardants.

Aquatic Life Monitoring

Biological Monitoring of Rivers, Streams and Brooks

Contact: Susan Davies, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Susan.P.Davies@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docmonitoring/biomonitoring/index.htm

Adoption of the Numeric Biocriteria Rule

On April 17, 2003 the Maine Department of Environmental Protection (MDEP) adopted numeric freshwater biocriteria in rule. The biocriteria rule describes the process that the MDEP uses to make decisions about attainment of aquatic life uses in rivers and streams. The rule describes protocols for biological sampling of benthic macroinvertebrates, laboratory analyses, modeling analysis of laboratory data, and selective use of expert judgment. Adoption of this rule quantitatively interprets Maine's existing narrative 'aquatic life' standards for each riverine water quality classification.

The Biological Monitoring Program

The Biological Monitoring Program of the Maine Department of Environmental Protection (MDEP) assesses the health of rivers and streams by evaluating the composition of resident biological communities. The program has been sampling locations throughout Maine since 1983, and by late summer of 2003 had established more than 724 monitoring stations on approximately 232 rivers and streams (see Figure 4-3 – next page). More than 1,300 macroinvertebrate samples are stored in an Oracle database and all stations are geo-referenced in the Department's GIS. Data collected in accordance with Maine's biocriteria protocol are analyzed using statistical models, whose results estimate the association of a sample to the four water quality classes defined by Maine's Water Classification Program. Findings of the Biological Monitoring Program are used to document existing conditions, identify problems, set water management goals, assess the progress of water resource management measures, and trigger needed remedial actions.

An algal monitoring program was begun in 1999. Nearly 200 samples have been collected from about 100 stations throughout the state. The purpose of this program is to provide information from a second biological assemblage in order to strengthen the interpretation of ecological condition. The algal monitoring program will also assist the Department in the development of river and stream nutrient criteria.

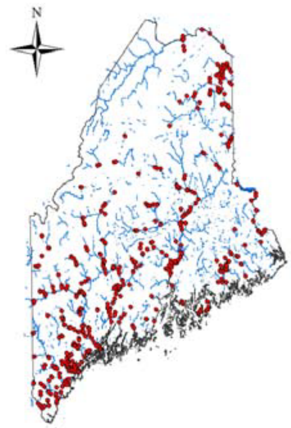


Figure 4-1 Biological Monitoring Stations in Maine

The Numeric Biocriteria Statistical Models

In the late 1980's, the MDEP quantified the narrative aquatic life goals for each water quality class by developing a probability-based statistical model to serve as an expert system. The model quantified the expert judgement of biologists. Biologists used agreed-upon decision rules to assign an aquatic life attainment classification (A, B, C, or non-attainment) for 144 samples of benthic data, based on the degree to which the sampled community conformed to one of the narrative aquatic life standards in Maine's statute. The samples evaluated represented 300 distinct taxonomic units and 70,000 organisms collected from rivers, streams, and riverine impoundments. Those data and their classification assignments were used as the baseline for construction of the expert system to evaluate future macroinvertebrate samples for water quality classification attainment. The original model was used from 1992 through 1999 when the model was recalibrated with an additional 229 sampling events. The recalibration resulted in relatively minor changes to the structure of the original model, involving simplification of the structure of two of the sub-models, the elimination of two poorly performing variables, and changes in model coefficients to account for the new data.

Maine's Tiered Aquatic Life Uses and the Biological Condition Gradient

Maine's aquatic life standards specify different levels (tiers) of water quality necessary to maintain designated aquatic life uses (Table 4-18). Maine's numeric criteria for aquatic life classes A, B, C and non-attainment are interpreted against the Biological Condition Gradient shown in Figure 4-4.

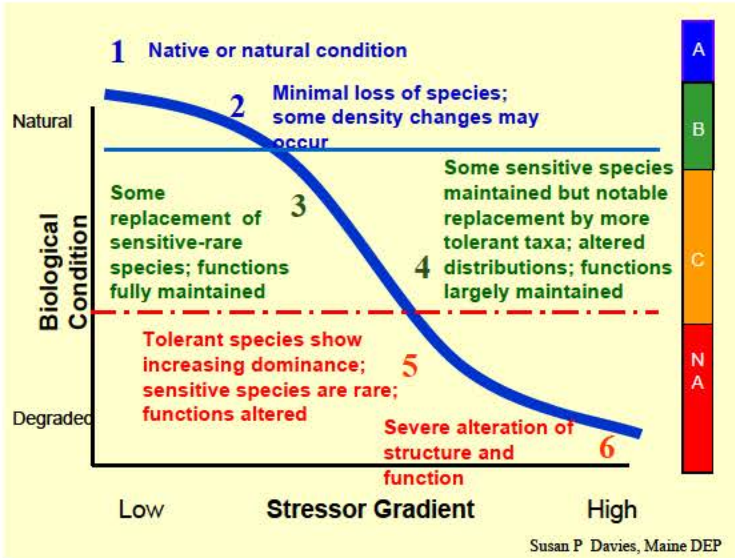


Figure 4-2 Position of Maine's tiered aquatic life uses on the Biological Condition Gradient

How does the MDEP decide what waterbodies and locations to monitor?

For purposes of biological monitoring, the MDEP divided the state into five major river basins, which are sampled on a 5-year rotational schedule (see Figure 4-5):

- Androscoggin,
- Kennebec and Mid-Coast,
- Penobscot, St. Croix and North Coastal Rivers,
- Piscataqua, Saco, and Southern Coast,
- St. John and Presumpscot

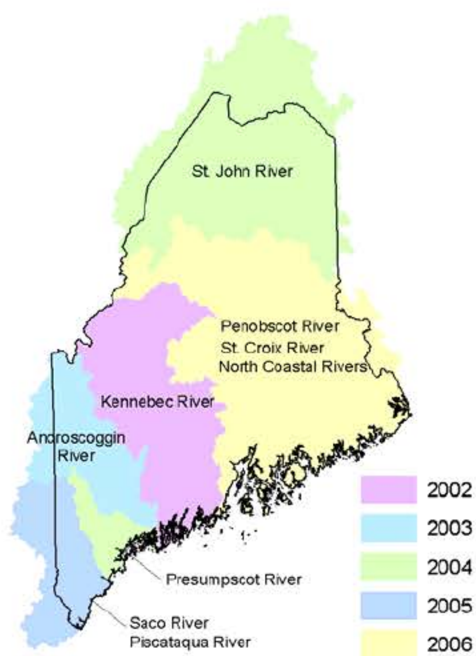


Figure 4-3 Rotating Basin Sampling Schedule

The decision to monitor specific locations on a waterbody can be based on a variety of factors such as:

- prior knowledge of existing activities that could have a detrimental effect on a waterbody: sampling seeks to detect actual impacts on biological communities,
- knowledge of future potential threats to a waterbody: sampling can be done to collect baseline data before, for example, development occurs or a discharge is licensed; follow-up sampling can determine the effect, if any, on the biological community by said development or discharge,
- requirement/desire to monitor the effects of remediation activities or water quality management changes,
- desire to expand coverage of the monitoring program and to more fully document natural variability.

What happens if a waterbody is found to be below its assigned statutory class?

If the sample is found to be appropriate for analysis and if BPJ (best professional judgement) does not indicate that the model outcome may need to be adjusted, the stream reach will be determined to be in non-attainment of its statutory class. In some cases this decision is clear cut, while in other cases it may be deemed prudent to repeat the sampling the following season to confirm the outcome. Once the decision of non-attainment is made, a number of actions are required:

- other programs within the MDEP such as Licensing or Land Use Regulation are notified that water quality management changes are needed,
- the stream reach is listed on the federally required 303d list of impaired waterbodies,
- a TMDL (total maximum daily load) plan for certain pollutants must be developed.

What happens if a waterbody is found to attain a classification higher than its assigned statutory class?

A sampling outcome that attains an aquatic life classification higher than the classification assigned to the waterbody is subject to the statutory provisions for anti-degradation, meaning if the finding is confirmed under critical (worst-case) water quality conditions, those higher aquatic life conditions must be maintained. The MDEP will:

- confirm the finding by re-sampling,
- confirm that the higher aquatic life quality exists even at maximum allowed pollutant loads and worst case conditions: if so, those higher aquatic life conditions must be maintained,
- if other standards (dissolved oxygen, bacteria, habitat) are also attaining the next higher class, the MDEP may propose the waterbody for a classification upgrade at the next triennial water quality standards review.

Reports of Fish Kills

Contact: David Courtemanch, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: 207-287-7789 email: Dave.L.Courtemanch@SPAM-ZAPmaine.gov

The Department of Environmental Protection documents all pollution-caused fish kills. For this 2002-2003 reporting period, there were two documented fish kills although neither resulted in loss of fish within the State's waters.

- In September 2002, a black liquor spill at an industrial facility on the St. Croix River resulted in the loss of fish (Atlantic salmon parr) at a hatchery in New Brunswick, Canada that draws water from the river. An investigation found no dead fish within the St. Croix River itself.
- In July 2003, dead fish (~200 minnows) were reported from a private pond connected to a tributary of Daigle Brook (a Category 5 listed water in New Canada). The brook drains extensive crop and pastureland, a potential source of pollutant, however, no dead fish were observed in the brook. No cause for the fish kill was ever determined, although eutrophic conditions in the private pond may have contributed to the kill.

Maine Aquatic Biodiversity Project

Contact: David Courtemanch, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: 207-287-7789 email: Dave.L.Courtemanch@SPAM-ZAPmaine.gov

Related Websites: www.mainebiodiversity.org and www.pearl.spatial.maine.edu

The Department of Environmental Protection has conducted a collaborative project with the Department of Inland Fisheries and Wildlife and The Nature Conservancy to document existing information on freshwater biodiversity, assess the information base including identification of key gaps, develop an ecological synthesis of the data (such as the examination of regional patterns and risks) and to disseminate this information to researchers, resource managers or other interested groups. This project has compiled information on the occurrence of aquatic organisms, reports and related data sources that are available. Results of a pilot study of the downeast area may be found on the Maine biodiversity website above. The entire database is planned to be accessible through the PEARL website in the future. A final report that will summarize the biodiversity of Maine's fresh waters, threats, needs for conservation and protection will be published in 2005.

Section 4-5 Lakes / Ponds

Contact: Linda Bacon, DEP BLWQ, Division of Environmental Assessment (DEA), Lake Assessment Section

Tel: (207) 287-7749 email: Linda.C.Bacon@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/lake.htm

Physical Extent

The total area of Maine's 5,782 Lakes and Ponds that have been assigned an identification number is estimated as 987,172 acres or approximately 5% of the state's surface area.[1] The Bureau of Land and Water Quality is in the process of finalizing a GIS-based spatial dataset that should be ready to use for the 2006 assessment cycle. These spatial features were originally digitized as displayed on USGS 7.5-minute topographic maps; some features have been added or updated based on aerial photography in the form of USGS digital ortho quadrangles (DOQs). Lake and pond features were placed in a layer containing 33,065 polygons (1,000,526 acres). Lake identification numbers have been entered into the attribute table for approximately 6,000 of these polygons (971,884 acres). The total acreage of the 27,038 pond polygons without lake identification numbers is 28,642 acres, thus most are less than 1 acre in area. Some larger impoundments that are assigned a lake identification number are not included in this layer because they occur in the 'rivers' polygon layer. This is an example of an issue that needs resolution before deriving statistics for lakes from this GIS system. Nevertheless, we have a high degree of confidence that the lakes defined in past assessments as 'significant' will continue to be defined as such in future assessments.

For more information on the GIS lakes data development project:

Contact Steve Harmon, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-4971 email: Steve.Harmon@SPAM-ZAPmaine.gov

Economic Contribution

Contact: Roy Bouchard, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-7798 email: Roy.Bouchard@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/doclake/research.htm

In addition to providing valuable natural habitat for fish and wildlife communities, Maine lakes are an integral part of Maine's economy. Lake use contributes more than $1.8 billion into the State's economy each year. In fact, lakes support over 52,000 jobs statewide. The total net economic value of Maine's Great Ponds (lakes and ponds 10 or more acres in surface area) is at least $6.7 billion dollars annually (July 1996 dollars). Surveys show that water clarity, quality of swimming, and scenic beauty are important to most people when they choose which lake to visit or where to buy property. A noticeable gain or loss in water quality could change statewide use rates by up to 13% (1.6 million user-days) each year. If water clarity declines, the potential loss in property value could be as much as $36,000 per property. These dramatic estimates make lake protection a priority for the entire state.

Lake Classification and Designated Use Attainment Status

Statutory Classification

Maine statute (38 M.R.S.A. Section 465-A) has designated one standard (GPA) for the classification of great ponds and natural lakes less than 10 acres in size. Specifically, Class GPA waters:

[1] Number and surface area obtained from Maine Department of Inland Fisheries and Wildlife's Lake Index file, which is being converted to a GIS dataset. Entire surface of border waters is included. The Maine DEP believes that the DIFW Lake Index file (determined from 15' USGS topographic maps; 1:62,500 scale) provides a more accurate estimate of lake numbers and acres than the USEPA RF3/DLG estimates (based on maps having 1:100,000 scale).

A.) Class GPA waters shall be of such quality that they are suitable for the designated uses of drinking water after disinfection, recreation in and on the water, fishing, industrial process and cooling water supply, hydroelectric power generation and navigation and as habitat for fish and other aquatic life. The habitat shall be characterized as natural.

B.) Class GPA waters shall be described by their trophic state based on measures of the chlorophyll "a" content, Secchi disk transparency, total phosphorus content and other appropriate criteria. Class GPA waters shall have a stable or decreasing trophic state, subject only to natural fluctuations and shall be free of culturally induced algal blooms which impair their use and enjoyment. The number of Escherichia coli bacteria of human origin in these waters may not exceed a geometric mean of 29 per 100 milliliters or an instantaneous level of 194 per 100 milliliters.

C.) There may be no new direct discharge of pollutants into Class GPA waters. Aquatic pesticide treatments or chemical treatments for the purpose of restoring water quality approved by the department and storm water discharges that are in compliance with state and local requirements are exempt from the no discharge provision. Discharges into these waters licensed prior to January 1, 1986, are allowed to continue only until practical alternatives exist. No materials may be placed on or removed from the shores or banks of a Class GPA water body in such a manner that materials may fall or be washed into the water or that contaminated drainage therefrom may flow or leach into those waters, except as permitted pursuant to section 480-C. No change of land use in the watershed of a Class GPA water body may, by itself or in combination with other activities, cause water quality degradation that would impair the characteristics and designated uses of downstream GPA waters or cause an increase in the trophic state of those GPA waters.

Attainment of Classification

Maine lakes exhibit a great amount of diversity, as does the state's topography and population. Maine's 5,782 lakes that are listed on DIFWs (Department of Inland Fisheries and Wildlife) Lake Index span a range in size of 1 acre to 74,890 acres (Moosehead Lake). Of these, 804 lakes are currently listed as 1 acre in size and only 11 are greater than 10,000 acres. Similarly, Maine lakes range from approximately 1 foot in depth to 316 feet deep (Sebago Lake). However, these 5,782 listed lakes include many waters that are small and/or shallow and are therefore not at all representative of a true Maine lake but are more representative of transition waters or open water in a wetland. With respect to designated uses, Class GPA does not expect more from a small, shallow lake than it can be reasonably expected to attain, given its physical limitations.

The Department is highly confident that some of the GPA designated uses are attained by all lake waters in Maine. This high level of confidence is based on a classification approach that includes realistically attainable uses. These uses include industrial process and cooling water supply, hydroelectric power generation, and navigation. There is no credible reason to believe that these uses are impaired in any of Maine's lake waters. Thus, these uses are not designated as 'assessed' uses in the same manner as the more critical uses: drinking water, fish consumption, recreation in/on (primary contact or swimming), and aquatic life support.

Municipal populations range from 1 to approximately 65,000 persons according to the 2000 U.S. Census data (~422 municipalities) with an additional 383 unorganized townships having no population. Municipalities having the highest populations are generally located along the larger rivers or in coastal areas. Development corridors typically fall around the major roadways in the state (e.g., Interstate 95). Much of Maine's land area has considerable relief (change in elevation) or is considered remote (having no distributed utilities such as electricity or phone lines). Such a wide range in lake water types and geographic settings make it necessary to focus lake assessment efforts in areas most likely to have lake waters that do not attain Class GPA.

For management purposes, the state designated a subset of the total population of lake as 'Significant Lakes' as requested by EPA under Section 314 in the early 1990s. Significant Lakes are defined as publicly owned lakes for which bathymetric / morphometric surveys exist, vulnerability modeling has been performed, or for which some trophic data has been gathered. These are generally the lakes that the state is most actively engaged in managing or assessing. Lakes that are not considered 'significant' are tiny and/or shallow waters that are not managed like a 'typical' lake water. Table 4-20 summarizes information on both the lakes ('all lakes') that are listed in DIFWs Lake Index and on State designated 'significant lakes'.

Table 4-16 "All" and "Significant" Lake Category Information

Maine Lake Population Summary		
	Number	Acres
All Lakes	5,782 (100%)	987,172 (100%)
Significant Lakes	2,314 (40%)	959,193 (97%)

Attainment Evaluation Criteria

This section includes specific guidelines for determining whether or not a lake is in attainment of each designated use.

Designated Use: Aquatic Life Support

Attainment: *Lakes exhibiting stable or decreasing (improving) trends in trophic state, natural water-level fluctuations and consistency in dominant species composition.*

Non-attainment: *Lakes that experience a deteriorating trend, extreme artificial water level fluctuations, severe turbidity, or shift in dominant species composition.*

Such lakes may exhibit a deteriorating trend in trophic state as indicated by statistically valid analysis of transparency data, or, a combination of data examination (dissolved oxygen, chlorophyll, and total phosphorus in addition to transparency) and best professional judgement. Lakes may exhibit extreme water level fluctuations due to water level management regimes associated with hydropower generation and may also have high turbidity. Lakes may experience a shift in algal composition to the 'blue-green' species typical of lakes that experience regular, nuisance algal blooms.

Designated Use: Fish Consumption

Attainment: *No fish consumption advisories in effect.*

Non-attainment: *"Restricted Consumption" fish advisory or ban in effect during the reporting period for the general population or a subpopulation that could be at potentially greater risk (e.g., pregnant women, children).* Restricted consumption is defined as limits on the number of fish of one or more species consumed per unit time.

The limit on number consumed often varies with fish size. All Maine lakes are considered to be in non-attainment of fish consumption due to mercury contamination from atmospheric sources.

Designated Use: Recreation In/On (swimming)

Attainment: *Lakes that do not exhibit regular, nuisance algal blooms during the summer (high use) period.*

Non-attainment: *Lakes in which swimming is chronically (more than 5 of the past ten years) impaired during part of the recreational season due to culturally induced nuisance algal blooms.* Bloom conditions are defined as Secchi Disk Transparency measurements of less than 2 meters in lakes having color less than 30 Standard Platinum Units (SPU). Lakes having color of 30 SPU or greater are considered impaired if other trophic data or professional judgment indicates that transparency is restricted due to high algal productivity and that the elevated productivity is due to anthropogenic alterations.

Designated Use: Drinking Water Supply (after disinfection/treatment)

Attainment: *Lakes for which information / data suggests that the water is suitable for drinking after reasonable treatment.*

Non-attainment: *Lakes designated as a water supply, for which information / data suggests that the water is no longer suitable for drinking with reasonable treatment using current technology.*

Attainment Status and Listing Categories

The 2004 Integrated Report presents the Maine DEP's evaluation of lake attainment status according to guidelines established for the 2002 Integrated Report. EPA established Listing Categories 1 through 5 in which lake waters are placed depending on the Department's confidence in whether the water is 'In Attainment' or is 'Impaired'. Lakes falling into Category 1 are lakes that 'Fully Attain All Designated Uses'. Category 5 lakes are at the opposite end of the spectrum or are in 'Non-attainment' (impaired) status and thus require the development of a TMDL. Lakes in Category 3 have insufficient data or information to make attainment determinations. Table 4-21 summarizes specific categories and subcategories used in the 2004 assessment of Maine lakes.

Table 4-17 Summary of Listing Categories and Subcategories used in the 2004 Assessment of Maine lakes.

Listing Category	Category Summary
1	Attaining all standards
2	Attaining some standards; assumed to attain others
3	Attaining some standards; Insufficient / no data / info to determine if standard(s) are met for use that may be impaired
4a	TMDL complete
4b	Expected to meet standards
4c	Not impaired by a pollutant
5a	TMDL needed
5c	Regional TMDL needed due to airborne Hg deposition

It is important to recognize that the use of the term 'Threatened' has changed since the 2000 assessment. EPA guidelines issued in 2002 restricted use of this designation to waters expected to be in non-attainment by the next assessment cycle. In past assessments, the term 'Threatened' was applied to lakes predicted to have a change in trophic state over a 25-50 year period using water quality modeling, and/or to lakes from which data indicated that one algal bloom had occurred in the recent past. No lakes were listed as 'Threatened' in the 2002 assessment nor are any listed in the 2004. The term 'watch list' is used for a subset of Category 3 lakes for which additional data and time is needed to determine attainment status.

Category 1: Lake waters attaining all designated uses and water quality standards, and no use is threatened.

For the purposes of this assessment, lakes having no population in their direct watersheds have been listed in 'Category 1, Attaining all standards', with the exception of four lakes. Four of these exceptions are listed in category 4c, in non-attainment of the Aquatic Life Use (habitat) due to non-pollutant (hydrologic modification).

Direct watershed populations were determined using the 2000 Census data for Maine municipalities and a database containing the areas of various towns that occur in over 2,700 lake direct drainages. These 2,700 or so lakes are the largest, most significant lake waters in the state. Towns associated with the lake in Inland Fisheries and Wildlife's Lake Index was used to determine populations in direct watersheds of the remaining smaller lake waters (less likely to have watersheds spanning multiple towns). Since non-attainment of Class GPA focuses on lakes that deviate from natural conditions particularly, those induced by human activity, lakes having no population in their direct watershed have a very high degree of certainty of attaining all standards. The number of lakes listed in Category 1 is 2,854, totaling 285,023 acres. Of these, 1,016 (270,550 acres) are considered 'Significant' and 1,838 (14,473 acres) are not. Waters are combined to the 10 digit HUC (Hydrologic Unit Code) within which they are located (Appendix III, Category 1). Lakes having population density estimates greater than 0.00 persons per square mile are listed in one of the other categories.

Category 2: Lake waters attaining some of the designated use(s), no use is threatened, and insufficient data or no data and information is available to determine if the remaining uses are attained or threatened (with presumption that all uses are attained).

The Department is highly confident that these waters attain the following designated uses: drinking water (after disinfection / treatment), recreation in/on the water, fishing (excluding fish consumption), and as habitat for fish and other aquatic life. Category 2 contains 2,866 lakes or 569,540 lake acres. Of these, 1,236 (556,034 acres) are considered 'Significant' and 1,630 (13,506 acres) are not. Waters are combined to the 10 digit HUC within which they are located (Appendix III, Category 2). Fitzgerald Pond, previously listed in Category 3 (2002), has recovered from a discharge failure and is listed in Category 2 for 2004.

The 'recreation in' (swimming) and 'aquatic life support' uses are functionally linked with the subsequent GPA requirement that lakes 'shall be free of culturally induced algal blooms'. Of this list, 'recreation in' would be one use for which some question might arise if it were not for a probability-based study the results of which suggest that most of the lakes in non-attainment due to nuisance algal blooms have been identified. Specifically, the REMAP (Regional Environmental Monitoring and Assessment Program) study results from the mid-1990s indicated that 4% of that lake sub-population (2.5% of the lake acreage) as being in non-attainment due to algal blooms. Those statistics can be used to evaluate how successful Maine's lake assessment program has been at identifying specific lakes that support nuisance algal blooms. Examination of current assessment information from the overall population from which the REMAP lakes were selected reveals that 25 of 1,903 lakes or 1.26% support nuisance blooms (30,253 of 926,092 acres or 3.27 % of lake surface area). The percentages compare quite closely to what one might expect given predictions based on the REMAP data results.

Category 3: Lake waters with insufficient data and information to determine if designated uses are attained (with presumption that one or more uses may be impaired).

There are currently 20 lakes covering 26,788 acres listed in Category 3 (Appendix III, Category 3) all of which are designated as 'Significant'. These lakes may or may not be in attainment of 'aquatic life' and/or 'recreation in'. The Department has data suggesting that these waters are meeting some designated use criteria but has evidence that suggests the lakes are 'borderline' with respect to another use. These lakes are the highest priority for data collection over the next few years.

Fifteen lakes were removed from the Category 3 list since the 2002 assessment. Sewall Pond was moved to Category 5a (TMDL needed). Fourteen were moved to Category 2 because new data revealed that all assessed uses were currently (or presumed to be) in attainment. Estes Lake was added to Category 3 from Category 4b because data suggests that it is in attainment of designated uses due to a treatment plant upgrade. Technically, it could be moved to Category 2, but the Department would like additional data to verify attainment.

Category 4: Lake waters that are impaired or threatened for one or more designated uses, but do not require development of a TMDL.

There are currently 21 lakes covering 89,102 acres listed in Category 4, all of which are designated as 'Significant'. These lakes fall into two subcategories: waters on which TMDLs have been completed (4a) and waters with impairments not caused by a pollutant (4c).

Category 4a contains 12 lakes totaling 23,270 acres. This represents the addition of 7 lakes for which TMDLs have been completed since the 2002 305(b) Report: Webber Pond, Threemile Pond, Threecornered Pond, Highland (Duck) Lake, Mousam Lake, Pleasant (Mud) Pond and Annabessacook Lake. Completed TMDL documents for these waters are posted on the DEP website at the following URL: www.maine.gov/dep/blwq/docmonitoring/tmdl2.htm

Estes Lake (387 acres) was the only Category 4b lake in 2002. Recent data revealed that it does appear to meet designated uses, thus it has been moved to Category 3. Estes is one of the few lakes in Maine having a point-source discharge from a municipal wastewater treatment facility. The treatment plant was upgraded in the mid-

1990s and since then, the frequency of nuisance algal blooms has decreased as the lake responds and equilibrates to the nutrient load reduction. Estes could have been moved to Category 2, but the Department would like additional data to verify continued attainment.

Nine lakes (65,832 acres) are listed in Category 4c, lake water impairment not caused by a pollutant. All of these lakes are in non-attainment of aquatic life (habitat) standards due to hydromodification (drawdown). Richardson Lake was moved to Category 2 since 2002 because a new water level has been established, the results of which should greatly reduce impacts on aquatic life and habitat.

Category 5: Lake waters that are impaired or threatened for one or more designated uses by a pollutant(s), TMDL development is required.

Four sub categories have been designated under Category 5; however lakes have been listed in only two (5a and 5c). Category 5a includes 21 lakes (16,719 acres) all of which are designated as 'Significant' (lakes impaired by pollutants, and require a TMDL to be conducted by the State of Maine). These totals reflect the movement of 7 lakes to Category 4a and the addition of one lake, Sewell Pond, from Category 3. Appendix III, Category 5a lists these lakes, indicates target dates for TMDL completion and indicates development priority. Table 4-22 summarizes individual use support for lakes in Category 5a.

Table 4-18 Individual Use Support Summary for Lakes & Ponds (acres) in Category 5a (TMDL Needed)

Designated Use	Non-Attainment	Attainment
Drinking Water Supply (after disinfection/treatment)	0	16,719
Aquatic Life use Support	16,719	0
Fishing	0	16,719
Recreation In/On	10,172	6,547
Navigation, Hydropower, Agriculture & Industrial Supply	0	16,719

Causes or Stressors resulting in non-attainment and Sources are summarized for all impaired waters in Tables 4-7 and 4-11 in Section 4-3 of this document. Tables 4-8 and 4-12 present additional details by listing Causes and Sources by Listing Category.

For more information on Lake TMDL projects:

Contact: Dave Halliwell, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-2901 email: David.Halliwell@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docmonitoring/tmdl2.htm

All Maine lakes are listed in Category 5c; "Lakes Impaired by Atmospheric Deposition of Mercury", resulting in a statewide fish consumption advisory. (For more information, please see the discussion in the Listing Methodology section.)

Information Requested Under CWA Section 314

(and tables presented on corresponding pages of the 1997 305(b) guidelines)

Trophic Status of Significant Publicly Owned Lakes

Lakes can be classified in many ways. For example, they may be classified according to their depth, size, conductivity, hardness, or according to the type of fish assemblages they support. The classification of a lake according to its productivity is known as *trophic* classification. Trophic status can be directly related to water column nutrient levels, algal populations and the resulting transparency.

A lake is considered productive or ***eutrophic*** when nutrient levels are high enough to support high levels of algal growth. Conversely, an unproductive or ***oligotrophic*** lake is low in nutrients and thus does not support high algal populations. Algal populations interfere with the transparency of the water, so eutrophic lakes generally have lower transparencies than oligotrophic lakes. Lakes with intermediate levels of nutrients and algae are considered ***mesotrophic***. ***Hypereutrophic*** lakes are characterized by an overabundance of nutrients and may support nuisance algal blooms during most of the open-water season. Lakes having a color resembling weak tea are stained with humic acids and can also be classified as ***dystrophic***. In this report, many dystrophic lakes fall under one of the other classifications (eutrophic, mesotrophic or oligotrophic).

The Maine Department of Environmental Protection determines the trophic state of a lake by using a combination of Secchi Disk Transparency (SDT), Chlorophyll a (CHL a), Total Phosphorus concentrations and best professional judgement. When adequate data exists, Trophic State Indices (TSIs) calculated from each of the previously mentioned parameters will range from 1 to approximately 120. An overall TSI, calculated from the average of 2-3 parameter TSIs, provides the most reliable trophic estimate. Relatively few lakes, however, have enough data to allow this calculation. Table 4-23 illustrates how TSI values compare to trophic parameters in the determination of trophic state. Note: because no Maine lakes support nuisance algal blooms during the entire open-water season, hypereutrophic status is not included in this table.

Table 4-19 Lake Trophic State Parameters and Guidelines

Numerical Guidelines for Evaluation of Trophic Status in Maine *			
(Note: Dystrophy is not often evaluated as a trophic category separately from categories below.)			
	Trophic Status		
Parameter[1]	**Oligotrophic**	**Mesotrophic**[2]	**Eutrophic**
SDT[3]	> 8 meters	4-8 meters	< 4 meters
CHL a	< 1.5 ppb	1.5 – 7 ppb	> 7 ppb
Total Phosphorus[3]	< 4.5 ppb	4.5 – 20 ppb	>20 ppb
TSI[3,4]	0-25	25-60	>60 and/or repeated algal blooms

[1] SDT, CHL a, and Total Phosphorus based on long-term means.
[2] No repeated nuisance algal blooms.
[3] If color is > 30 Standard Platinum Units (SPU) or not known, chlorophyll a concentration (CHL a), dissolved oxygen and best professional judgment used to assign trophic category.
[4] TSI = Trophic State Indices are calculated when adequate data exists and color is at or below 30 SPU.
* This table is a duplicate of Table 4-5 in the Assessment Methodology Section of this report (appears twice for the reader's convenience).

Section 314 requires a summary of trophic classification for Maine's 'Significant' lakes. This summary is compiled using the numerical criteria in Table 4-24. When little or no standard trophic data are available, a trophic assignment is made using the best professional judgement of Maine Department of Inland Fisheries and Wildlife (DIFW) fisheries biologists. DIFW trophic assignments are used with the understanding that they reflect the productivity of the whole ecosystem rather than just the water. Table 4-24 summarizes the trophic status of Maine lakes. Few lakes have been assigned to the "dystrophic" category; dystrophy is defined as color >50 Standard Platinum Units (SPU) due to humic acids, often accompanied by depressed dissolved oxygen levels, a definition not truly exclusive of other trophic categories. For example, Threecornered Pond in Augusta is classified in this report as eutrophic but could also be classified as dystrophic.

Table 4-20 Trophic Status of Maine Lakes

Trophic Category	Significant Lakes		All Lakes	
	Number	Acres	Number	Acres
Assessed	1,740	927,170	1,911	928,491
Dystrophic	2	34	2	34
Eutrophic	590	150,922	660	151,354
Mesotrophic	1,023	664,714	1,120	665,556
Oligotrophic	125	111,500	129	111,547
Unknown	574	32,023	3,871	58,681

Lake Rehabilitation Techniques

Section 314 of the Clean Water Act required states to present information related to Section 314 Phase I, II and III Lake Restoration Grants. Section 314 has not been funded for more than a decade thus no additional projects have been added to the list presented in the 2000 Water Quality Assessment Report. Some comparable projects have been implemented under the Section 319, Nonpoint Source Program, which addresses nonpoint sources in watersheds for all water types. However, no central system is in place to track specific techniques employed in lake watersheds using 319 funds. This information can be gleaned from the 319 final reports that are on file at the DEP office in Augusta, Maine (Contacts: Norm Marcotte or Tony St. Peter, (207) 287-3901) or on file with Sandy Fancieullo at EPA Region 1 headquarters in Boston, Massachusetts (617) 918-1566).

Lake watershed implementation projects conducted under the 319 program in Maine generally fall into one of three categories. Nonpoint source staff estimates that the majority (65-75%) of such projects are installation of Best Management Practices (BMPs) to address siltation and sedimentation associated with eroding sources along public and private roadways. Shoreline stabilization projects are the second most common types of BMPs implemented. Such BMP implementations primarily focus on mitigating the effects of stormwater runoff. An educational component is also often included in 319 projects since changing the behavior of people is most likely to provide long-term solutions for the prevention of nonpoint source pollution. Table 4-25 summarizes these techniques.

Table 4-21 Lake Rehabilitation Technique Summary (Section 319 Projects)

Rehabilitation Technique
Watershed Treatments
BMPs associated with Public & Private Road Management
BMPs associated with Shoreline Erosion Control/Bank Stabilization
Other Lake Protection/Restoration Controls
Public Information/Education Program/Activities

Qualifying projects in non-attainment lake watersheds, either having a completed TMDL (Category 4a) or on the TMDL list (Category 5a) are given preference in the 319 grant selection process. Section 319 lake projects generally fall into one of three categories: Watershed Surveys, Watershed Management Plans or Watershed Implementation Projects. New in 2003/2004, is discussion regarding funding an in-lake evaluation of trophic stability in East Pond (Category 4a, TMDL completed in 2001) to investigate the possibility that a 'trophic cascade' has occurred that is contributing to the now persistent nuisance summer algal blooms. A biomanipulation project consisting of fish removal may be considered if results indicate an imbalance between trophic levels.

For more information on the East Pond Biomanipulation project,

Contact: Dave Halliwell, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-7649 email: David.Halliwell@SPAM-ZAPmaine.gov

or Melissa Evers, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-2838 email: Melissa.Evers@SPAM-ZAPmaine.gov

Acid Effects on Lakes

Although all monitored Maine surface waters are inferred to have elevated non-marine sulfate concentrations resulting from acidic deposition over the past 50 to 100 years, only a portion of known acidic lakes can be considered as having been predominantly affected by atmospheric deposition. Since the late 1970s, the effects of acidic deposition have been the focus of numerous projects conducted by EPA, DEP and the University of Maine. The 1984 EPA Eastern Lake Survey (ELS) population (225 lakes) was chosen such that statistical inferences about the extent of acidic deposition effects could be made for lakes throughout the state. ELS projected that between 8 and 21 Great Ponds were acidic in the State of Maine. Estimates place the number of non-dystrophic Maine lakes which are currently acidic (Acid Neutralizing Capacity or ANC < 0 micro equivalents/L) at around 100.

Researchers at the University of Maine have evaluated lake populations potentially susceptible to the effects of acidic precipitation in conjunction with DEP. Approximately 90 high elevation lakes in chemically resistant bedrock were assessed in the High Elevation Lakes Monitoring (HELM) projects during 1986-1987 and 1997-2003. A population of 150 seepage lakes in or associated with mapped aquifers was assessed in the Aquifer Lakes Pilot Survey (ALPS) projects during 1986-1987 and 1998-2002. Data have also been collected quarterly since 1982 from the EPA Regional Long Term Monitoring (RLTM) sites in Maine. Additional data also exist from numerous University of Maine projects. In addition, the DEP has evaluated alkalinity data on 761 lakes as part of routine sampling to assess trophic status. The

Department has not made any effort to enumerate lakes vulnerable to acidity other than focusing the HELM and ALPS studies on lake populations at high risk. It is likely; however, that all lakes situated in areas of bedrock and surficial geology having low to no acid neutralizing capacity would be categorized as being vulnerable to acidity.

Approximately 1,150 lakes (797,000 acres - approximately 80% of lake surface area) have been assessed for acidity, predominantly by using measures of pH and ANC. There are about 65 acidic lakes (ANC < 0) comprising a total surface area of approximately 750 acres (1.0% of the lakes and 0.08% of the lake surface area). Approximately 20 of the roughly 65 acidic lakes are ten acres or greater in size and considered 'significant'; the remainder are at least 1 acre in size. Extrapolation of Eastern Lake Survey results predicts that there are probably only a few unidentified acidic lakes greater than ten acres in size. There are likely some (probably less than 50) additional non-dystrophic acidic drainage and seepage lakes in the 1 to 10 acre size range. Table 4-26 provides a summary of acidity assessment efforts in Maine lakes.

Table 4-22 Acid Effects on Maine Lakes

	Number of Lakes *	Acreage of Lakes *	%Acreage *
Assessed for Acidity	~1,150	~797,000	~80%
Impacted by High Acidity	~65	~750	~0.08%
Vulnerable to Acidity	Unknown	Unknown	Unknown

*Totals include all lakes in the state, not only 'significant' lakes

Sources of acidity include acidic deposition, naturally occurring organic acids and a combination thereof, as determined by an assessment of dissolved organic carbon (DOC) and non-marine sulfate concentrations. Acidic low-DOC (< 5 mg/L) drainage and seepage lakes are acidic largely due to acidic deposition. Acidic high-DOC drainage lakes are acidic due to a combination of naturally occurring organic acids and acidic deposition. Acidic high-DOC seepage lakes are acidic primarily due to naturally occurring organic acids. No low-DOC lakes are known to have a pH less than 4.9; this suggests that organic acidity is necessary to depress pH to values less than 5.0. Table 4-27 summarizes source estimates for high acidity in Maine lakes.

Table 4-23 General Sources of Acidity in Acidic Maine Lakes

Source of Acidity	Percent of Acidic Lakes	Percent of All Maine Lakes*
Acid Deposition	60%	0.62%
Natural Sources	30%	0.31%
Combination of Acid Deposition & Natural Sources	10%	0.1%
Total	**100%**	**1.3%**

* Includes all lakes in the state, not only 'significant' lakes

Historical data on fisheries are limited for all but a handful of the acidic lakes. Temporal shifts in fish populations have been observed in some lakes, but there is no clear association between these shifts and acidic deposition. Although a number of these acidic lakes are fishless, none have been shown to have lost their fish due to acidification. Thus all are considered to be fully supporting their designated uses. However, it should be noted that many of the fishless lakes are small and isolated, or exist at high elevations and contain poor breeding habitat.

The extent of aluminum mobilization due to increased acidity is dependent on the presence or absence of substances which bind aluminum such as DOC and fluorine. Greatest aluminum toxicity has been observed between a pH of 5 and 6; however only a few of the numerous ionic species are biologically toxic. Table 4-28 presents the general distribution of lakes among four ranges of aluminum concentration. No consideration is given to the form of aluminum, thus a significantly lesser amount would be considered biologically available. Since 40% of the acidic lakes have high levels of DOC, it can be inferred that biologically available aluminum is less likely to attain toxic levels in those lakes. Recent data from long term studies (HELM and RLTM) indicate that toxic aluminum concentrations have decreased in some of these lakes.

Table 4-24 Aluminum Distribution in Acidic Lakes in Maine

Total Aluminum (ug/l)	Approximate Percent Acidic Lakes
< 100	~ 67 %
100 – 200	~ 7 %
200 – 300	~ 9 %
> 300	~ 17 %

No attempt has been made to mitigate the effects of acidic deposition or potential toxic mobilization in lakes for the following reasons:

1) only a small percentage of surface water has been acidified by acidic deposition,

2) lakes affected by acidic deposition are typically small in surface area,

3) paleolimnological evidence suggests that those lakes with depressed pH attributable to acidic deposition were historically low in pH (and Ca) as a result of inherent watershed characteristics,

4) no alteration of fish populations in lakes can be attributed to acidic deposition at this time, and

5) since a significant number of the acidic lakes are dominated by organic acidity, alteration of the buffering system (e.g., by the addition of lime) would drastically change the natural ecosystem.

Evaluation of long-term pollution reductions reveals that sulfate concentrations in Maine lakes have declined by 12-22% since 1982. It was expected that trends in acidity would exhibit a parallel reduction however, the data reveal otherwise. A simultaneous decline in base cation concentration (calcium and magnesium, important for reduction in acidity) accounts for the lack of recovery. A number of interacting factors may be influencing the latter including continued high levels of nitrogen deposition, a lag in response time, and/or climatic influences on watershed response.

The Senator George C. Mitchell Center for Environmental and Watershed Research at the University of Maine, Orono, continues to be the leader in atmospheric deposition research in Maine. Researchers at the Center are currently studying a set of lakes from Maine to Pennsylvania, first sampled by the U.S. Environmental Protection Agency (EPA) in 1984, to evaluate 20-year changes in lake chemistry for the purposes of understanding changes due to acid rain, and potential recovery in biological populations. Additional information on related research can be obtained through their website, located at the following URL: www.umaine.edu/WaterResearch

Toxics

Contact: Barry Mower, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-7777 email: Barry.F.Mower@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/ehu/fish/

Fish, water and sediment samples were collected from 125 Maine lakes and ponds (108,423 acres) in 1993 and 1994 as part of the EPA funded Regional Environmental Monitoring and Assessment Program (REMAP). The study lakes were selected from a population of about 1,800 surveyed lakes and ponds with significant sport fisheries using EPA's National EMAP (Environmental Monitoring and Assessment Program) protocol. Significant levels of mercury were found in both warm and cold water fish. The average concentration was 0.45 ppm. Fish from several lakes exceeded the 1994 Federal action level of 1.0 ppm and 65% of the lakes yielded fish that exceeded the 1994 State action level of 0.43 ppm. Since that time, Maine’s level of concern has since been reduced from 0.43 ppm to 0.2 ppm.

In 1994, the Maine Department of Human Service's Bureau of Health issued Maine’s first mercury advisory. Further refinements were made to the advisory in 1997 and again in 2000. The advisory currently says:

"Warning: Mercury in Maine freshwater fish may harm the babies of pregnant and nursing mothers, and young children. Pregnant and nursing women, women who may get pregnant and children under age 8 SHOULD NOT EAT any freshwater fish from Maine's inland waters. Except, for brook trout and landlocked salmon, 1 meal per month is safe. All other adults and children older than 8 CAN EAT 2 freshwater fish meals per month. For brook trout and landlocked salmon, the limit is 1 meal per week."

Trends in Lakes

In the past, statistical trend analysis has been conducted using a long-term transparency dataset that DEP has actively acquired and administered since 1970. Data had been analyzed using the non-parametric Kendall-Tau test in SYSTAT. This analysis has not been repeated since the 2000 assessment because of the elimination of one lake assessment staff position at DEP.

Some general insight into water quality that has been gained in recent years is likely due to the drought that Maine has been experiencing. Many lakes have achieved the deepest transparency readings ever. In 2003, 64% of lakes monitored by DEP and volunteers in the Maine Volunteer Lake Monitoring Program had an average transparency greater than their long term average, 14% had an average transparency the same as their long term average, and only 21% had an average transparency less than their long term average. Lakes with better transparencies are likely to be those most sensitive to phosphorus inputs due to stormwater runoff. Lakes with worse transparencies appear to be those that already have high internal phosphorus loads. Additional information on recent lake transparency trends may be found in the Maine Volunteer Lake Monitoring Program's (VLMP) 2003 and 2002 Annual Reports. VLMP annual reports may be accessed through the "Publications" link on their website at this URL: www.mainevolunteerlakemonitors.org/index2.htm

Invasive Aquatic Plants

Contact: John McPhedran, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-6110 email: John.McPhedran@SPAM-ZAPmaine.gov

or Milfoil@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/topic/invasives/index.htm

Invasive aquatic plants are cited by lake biologists as one of today's leading threats to the quality of New England's inland surface waters. This problem also translates into social and economic burdens associated with lost recreation, degraded real estate values and escalating vegetation "control" costs. These "control" costs amount to millions of dollars spent in Maine's neighboring states that collectively face at least five established, aggressive, nuisance plant species.

The mission of the DEP Invasive Species Program is to reduce risks of introduction and further spread of these species in Maine's 6,000-plus ponds and lakes. Now entering the third year of these efforts, the program has sustained a high degree of public awareness of this issue and continues to enlist significant numbers of volunteer efforts to monitor lakes, inspect boats and offer local outreach.

Two legislative mandates charge the Maine DEP in this program area: "An Act to Prevent the Spread of Invasive Aquatic Plants" (Chapter 722) and "An Act to Prevent Infestation of Invasive Aquatic Plants and to Control Other Invasive Species" (Chapter 434).

Chapter 722, enacted in 2000, prohibits the transport of 11 invasive aquatic plants and entrusts the DEP with education / outreach efforts and authorizes staff to investigate and document detection of invasive plants and control their spread, if feasible.

Chapter 434 was enacted the following year and provided more sweeping authorities while stipulating additional program and planning requirements. Among these requirements are

- a boat sticker program to raise funds and public awareness for the prevention, detection and control of invasive species,
- an inspection and education program, and
- emergency authority to regulate surface use in plant-infested waters

In addition, the law directed the governor to appoint an interagency task force on invasive aquatic plants and nuisance species to oversee efforts and offer recommendations for comprehensive planning and management of all invasive aquatic plants and nuisance species in the state.

As of this writing, Maine is contending with two invasive aquatic plants - variable-leaf water milfoil (Myriophyllum hetrophyllum) and hydrilla (Hydrilla verticillata). In 2003 one previously undocumented pond, Shagg Pond in Woodstock, was added to a list of 15 ponds or lakes infested with variable milfoil. Only one pond, Pickerel Pond in Limerick, is known to contain hydrilla. A detection of a third invasive species, curly-leaved pondweed (Potamogeton crispus), was reported in West Pond, Parsonfield, during mid summer 2003; however, the degree of its establishment cannot be determined until the spring of 2004.

Dedicated monies from the aforementioned Boat Sticker Program fund were applied in 2002 and 2003 as indicated by the following charts:

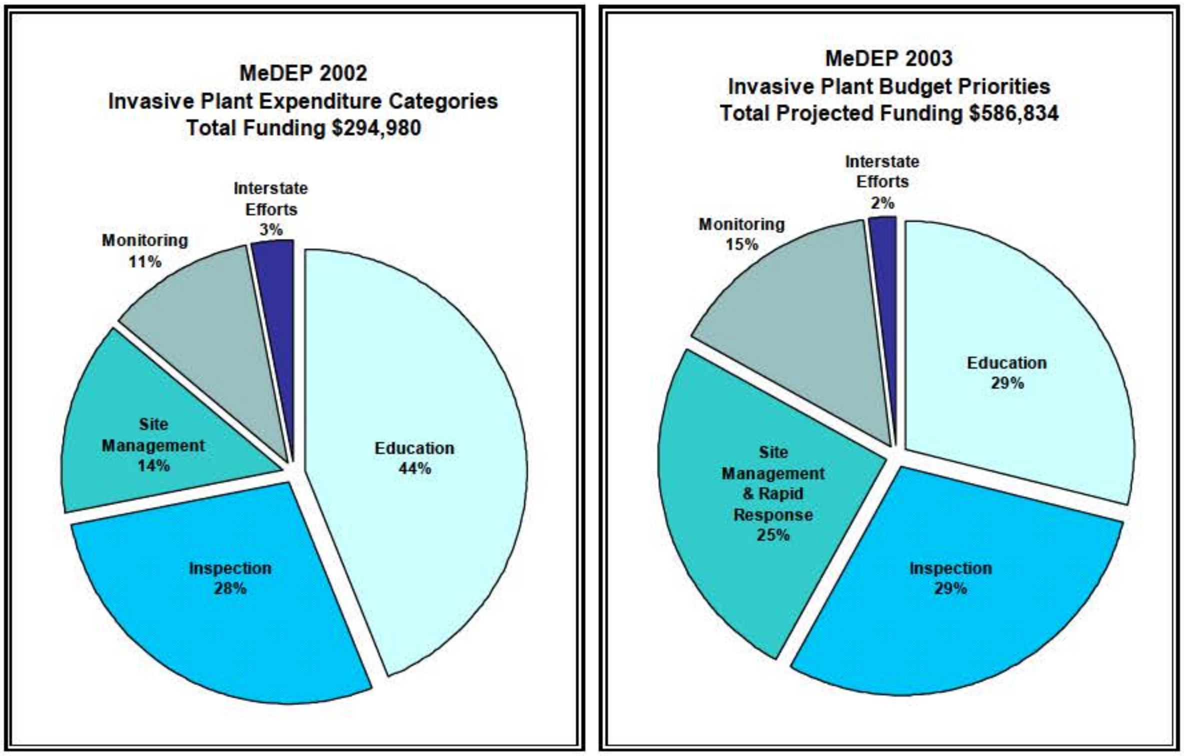


Figure 4-4 Invasive Plant Program - 2002 and 2003 Budget Expenditures & Priorities.

The Invasive Species Program continues to meet the needs outlined above, while addressing new issues. Among them are increased requests from residents and users of lakes seeking assistance in managing established invasive plant problems. While providing increased support to respond to these requests, it is incumbent upon DEP to also apply proportionately greater resources to prevent plant invasions--an option far more cost effective in the long term than mitigating established invasions.

Section 4-6 ESTUARIES / OCEAN

Contact: Lee Doggett, Director, Marine Environmental Monitoring Program, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 e-mail: Lee.Doggett@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/coastal.htm

Background

Maine has three classes for the management of estuarine and marine waters: SA, SB, and SC. SA waters are managed for high water quality with limited human interference allowed. No direct discharges of pollutants, including those from finfish aquaculture, are allowed in SA waters. SB waters are general-purpose waters and are managed to attain good quality water. Well-treated discharges of pollutants that have ample dilution are allowed. SC waters are managed for the lowest water quality, but they must be fishable and swimmable as well as maintain the structure and function of the biological community. Well-treated discharges of pollutants are allowed in SC waters. Each class is managed for designated uses and each has dissolved oxygen, bacteria and aquatic life standards (see Table 4-29 below).

Table 4-25 Maine's Estuarine and Coastal Waters Classification Standards

Class	Designated Use	Dissolved Oxygen	Bacteria	Aquatic Life
SA	Habitat for fish and estuarine and marine life Recreation in and on the water Fishing Aquaculture (not finfish) Propagation and harvesting shellfish Navigation	As naturally occurs	As naturally occurs	As naturally occurs
SB	Habitat for fish and estuarine and marine life Recreation in and on the water Fishing Aquaculture Propagation and harvesting shellfish Navigation Industrial process and cooling water supply Hydroelectric power generation	Not less than 85% of saturation	Enterococcus not higher than geometric mean 8/100ml or instantaneous of 54/100ml from 5/15 to 9/30 Not exceed criteria of National Shellfish Sanitation Program for shellfish harvesting	Support all indigenous estuarine and marine species Discharge not to cause closure of shellfish beds
SC	Habitat for fish and estuarine and marine life Recreation in and on the water Fishing Aquaculture Propagation and restricted shellfish harvesting Navigation Industrial process and cooling water supply Hydroelectric power generation	Not less than 70% of saturation	Enterococcus not higher than geometric mean 14/100ml or instantaneous of 94/100ml from 5/15 to 9/30 Not exceed criteria of National Shellfish Sanitation Program for restricted shellfish harvesting	Maintain structure and function of the resident biological community

The areal distribution of the three marine classes is shown in Table 4-30 and Figure 4-7 below:

Table 4-26 Acres and Percentage of Marine and Estuarine Waters in Each Classification

Class	Acres	Percentage
SA	135,006.07	7.41 %
SB	1,668,011.47	91.58 %
SC	18,416.71	1.01 %
Total	1,821,434.24	100.00 %

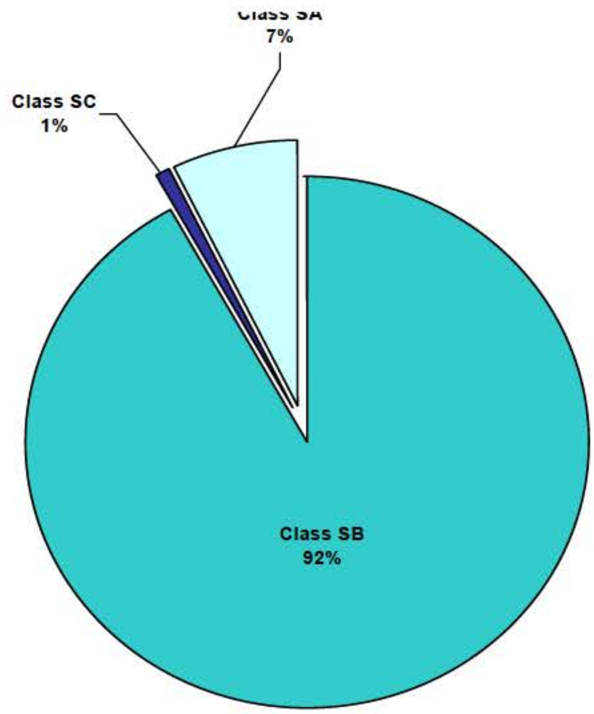


Figure 4-5 Percentage of Estuarine and Marine Waters in Each Classification

This chapter provides an assessment of the degree to which water quality supports the designated use defined by the State of Maine Statutes for the protection of aquatic life. Designated uses in this chapter and in Chapter 7 (Public Health – Related Assessments) are divided into two broad use categories: protection of human health and protection of aquatic life. The protection of these uses will result in the protection of other uses (e.g. navigation, industrial process and cooling supply). Applicable monitoring results and attainment assessments are summarized within each of these two categories in this chapter as well as in Chapter 7.

Summary of Statewide Status

Contact: Lee Doggett, Director, Marine Environmental Monitoring Program, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 e-mail: Lee.Doggett@SPAM-ZAPmaine.gov

This Integrated Assessment report requires the assignment of each Assessment Unit into one of five categories (see Methodology). Specific waters are determined to be impaired if they do not attain one or more of the uses assigned by their classification (as determined by the criteria assigned to that classification). Overall use attainment summary is provided in Table 4-9.

Category 1: The 2004 assessment assigned no estuarine and marine waters to Category 1 because there were no waters where all Classification Standards were monitored adequately in a waterbody segment to determine if standards were being met.

Category 2: The 2004 assessment assigned 2,690.75 (94.55 %) square miles of estuarine and marine waters to Category 2 (fully attaining*). This is an increase of 343.35 square miles from the 2002 assessment. Most of these segments were moved from Category 3 (Insufficient Data to make a determination) and are areas that pass DMRs water quality tests but remain closed because of the presence of OBDs, sewage treatment plant outfalls, boats, presumed toxic contamination, potential sources of NPS pollution, etc.

Category 3: The 2004 assessment assigned 6.23 (0.22%) square miles of estuarine and marine waters to Category 3 (attainment undetermined*). This is a decrease of 471.37 square miles from the 2002 assessment. For the 2004 report, DMR provided DEP with the data to determine if the designated uses were being attained in most cases. Almost all of the segments were moved to either Category 2 or Category 5-B-1.

Category 4: The 2004 assessment assigned 1.09 (0.04%) square miles of estuarine and marine waters to Category 4 (impaired for one or more uses*). This is a decrease of 15.70 square miles from the 2002 assessment.

Category 5: The 2004 assessment assigned 147.92 (5.17%) square miles of estuarine or marine waters to Category 5 (impaired for one or more uses*). This is an increase of 143.72 square miles from the 2002 assessment. Category 5 impaired waters require the development of a Total Maximum Daily Load (TMDL) determination. Waters are placed in one of three subcategories: 5-A for waters impaired by pollutants, 5-B for waters impaired by bacteria from CSOs and non-point sources, and 5-D for waters impaired by the residuals of "legacy" activities**.

** All estuarine and marine waters in Maine have an advisory for the consumption of fish and shellfish (lobster tomalley) due to the presence of PCBs and dioxins presumed to be from atmospheric deposition and historic discharges. The advisory is based on probability data that fish or shellfish inhabiting estuarine or marine waters may contain some fish or shellfish that exceed the advisory action level. This Integrated Water Quality Monitoring and Assessment Report does not consider this statewide advisory in establishing other category listings.

As with any assessment of this kind, the identification of impaired waters cannot be considered complete but rather is a reflection of the findings (to date) relative to the level of effort expended by the agency and other cooperating contributors. While new and expanded monitoring has identified many additional square miles of impaired waters this should not be interpreted as an indication that Maine's waters are under some new or increasing threat. Rather, the State has been better able to assess its waters with improved monitoring tools and increased participation from cooperators. All of the new impaired listings appear to be due to conditions that have probably been in place for many years.

Causes and Sources of Impairment in Categories 4 and 5

Cause and stress type information is provided in Table 4-13, while information on sources of impairment is provided in Table 4-17.

The general category of "toxics" is by far the cause/stressor that impairs the largest area of marine and estuarine waters in the State. In fact, the "toxics" subcategories of PCBs and dioxins impaired all 2,845.99 square miles of marine/estuarine waters that were assessed in 2004. (See the section on Toxics later in this Estuarine and Marine Waters section). After toxics, the second greatest impaired area (144.79 square miles) of estuarine/marine waters is due to bacterial contamination. By comparsion, each of the other remaining general causes are responsible for impairing areas of a few square miles or less.

Industrial point sources are the largest contributing source category. Some industrial loads that are treated through municipal point sources are additional sources although pretreatment is required in most cases. These industrial sources account for all of the shellfish (lobster tomalley) consumption listed waters where dioxins are the primary contaminant.

Sources of Monitoring Data

The Maine Department of Environmental Protection (DEP), the National Coastal Assessment/University of Southern Maine, the Department of Marine Resources (DMR), the Casco Bay Estuary Project (CBEP), the Wells Estuarine Research Preserve and a variety of volunteer monitoring groups monitor Maine's coastal waters.

DMR monitors for indicators of human pathogens (e.g., fecal coliforms) and biotoxins (e.g., Paralytic Shellfish Poisoning). The purpose of DMR monitoring is to protect human health by managing shellfish harvest areas (see Chapter 7 of this report). DMR runs a Shellfish Sanitation Program Water Quality Volunteers program that is specifically focused on shellfish growing areas.

DEP monitors toxic contaminants in tissues and assesses water quality using data collected by DEP and other organizations. DEP also participates in the Gulf of Maine Council's Gulfwatch Project that surveys toxic contamination in mussel tissue in the Gulf of Maine.

The Maine State Planning Office, the University of Maine Cooperative Extension, Sea Grant, DMR and DEP collaborate in the Maine Shore Stewards Program to provide training, community support, information, grants and education for volunteer groups. The University of Maine Cooperative Extension/Sea Grant coordinates the Maine Healthy Beaches Program (see Chapter 7 of this report), the Clean Water/Partners in Monitoring program, and the Marine Phytoplankton Monitoring Program.

The Casco Bay Estuary Project (CBEP), funded by EPA's National Estuary Program, monitors and also supports other monitoring efforts in the Bay, through Friends of Casco Bay (FOCB) and other entities and coordinates the National Coastal Assessment for the entire Maine coast.

The GoMOOS (Gulf of Maine Ocean Observation System) program provides data on the gulf that is collected from buoys, satellites and radar; however, since all the buoys are located in offshore waters (with the possible exception of a future buoy to be located in the New Meadows River Estuary), they only monitor that ocean environment. DEP would advocate the placement of some new buoys closer to land in order to better monitor and understand near shore waters and land/water interactions.

Results from these various monitoring sources provide the basis for determining attainment of classification and designated uses. One of the biggest challenges ahead is to get all the data that is collected into a central location and into useable, universally-translatable formats.

National Coastal Assessment (Probability-Based Monitoring)

Contact: Lee Doggett, Director, Marine Environmental Monitoring Program, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 e-mail: Lee.Doggett@SPAM-ZAPmaine.gov

Related Website: www.epa.gov/emap/nca/

The purpose of the National Coastal Assessment (NCA) is to estimate the current status of the condition of the nation's coastal resources on a regional and national basis using ecological indicators. The partnership between EPA and Maine in the National Coastal Assessment may help Maine determine:

- the attainment status of all coastal Assessment Units for 305(b) reporting,
- the appropriate biocriteria metrics to support the water quality standards described in Maine's revised Water Classification law (38 MRSA, Section 465-B) of July 2001,
- the estimated area of degraded conditions because of toxic contamination in Maine's coastal waters,
- the toxics of concern, and
- if the "triad" (benthic animals, amphipod bioassay and sediment contamination) approach for assessing toxics is useful to Maine.

The National Coastal Assessment, Northeast Coastal Condition is based on data from samples taken from July through September of 2000 for coastal states from Maine to Virginia. The U.S. Environmental Protection Agency's (EPA) assessment estimates that ecological conditions in the Northeast are poor, with 25% of estuarine area being rated as impaired for aquatic life (poor condition) and 32% as impaired for human use. The Northeast is the most densely populated coastal region of the United States and includes the coastal waters from Maine to Virginia. However, Maine is the least densely populated coastal region of these states.

The Northeast contains diverse landscapes, from the mountains, forests and rocky coastal headlands of Maine to the coastal plain systems of the Mid-Atlantic. These differences are important when considering management options (i.e., one size does not fit all, especially north of Cape Elizabeth, Maine). In the Northeast, the ratio of watershed drainage area to estuary water area is relatively small when compared to the Southeast and Gulf of Mexico. The byproducts of past and current human activities in northeastern watersheds are washed to the sea, affecting coastal conditions in the region, including Maine. The old phrase, "dilution is the solution to pollution" does not work with toxic pollutants. The highest levels of sediment contamination are found in depositional environments near urban centers (e.g., Portland and Rockland Maine, Portsmouth New Hampshire), reflecting current discharges and the legacy of past industrial practices "dirty history" (e.g., the Dirty History study of the Fore River funded by the Casco Bay Estuary Project). These pollutants build up in sediments, get reworked by animals that live in the sediments and eventually get buried unless they are re-exposed (e.g., by dredging, dragging, etc.).

Excess nutrients delivered to coastal waters come from a variety of sources. In New England, nutrient inputs from land based agricultural activity is relatively small. Much of the nutrient delivery to the coast in the non-urban areas of northern Maine results from atmospheric deposition onto watersheds. The Casco Bay Estuary Project assessed atmospheric deposition, as it relates to nitrogen, mercury and fine particulate matter in Casco Bay, by collecting samples at a site in Freeport, Maine. For more information, please link to the following URL:

www.cascobay.usm.maine.edu/toxics.html#Air%20Deposition

According to the National Coastal Assessment, in urbanized coastal settings, from Casco Bay, Maine to Long Island Sound, wastewater treatment facilities that discharge directly into coastal waters are a major source of anthropogenic nitrogen input. In "Downeast" Maine, finfish aquaculture is a major source of nitrogen input, but the impact of these nutrients is undetermined at this time. Much of the impact depends on physical/oceanographic conditions such as tides, currents (e.g., the Maine Coastal Current), winds (especially the prevailing summer winds), temperature (i.e., stratification or layering of the water column in the warmer months), input of nitrogen from the Gulf of Maine and further offshore, tidal restrictions, and riverine sources, especially during snowmelt and after major runoff events.

The National Coastal Assessment is based on an average of five separate scores for: eutrophication, wetlands loss, sediment condition, benthic condition and contaminants in fish (when measured). Of course, the data for Maine are combined with data in areas that are much more degraded. In the future, when enough data are available, Maine will be assessed separately.

The National Coastal Assessment is based on a probability-based, stratified sampling design. This means stations were selected randomly to represent strata (regions) of similar characteristics e.g., Casco Bay, Long Island Sound, etc. Conclusions based on data from such programs are statistically valid for the strata, but are not necessarily representative of conditions at a particular station. Also, stations were sampled once in 2000 during the summer index period. Since water column conditions change constantly, the sampling only reflects a single snapshot of a three-month index sampling period. Another weakness in sediment sampling is the lack of replication. As is often the case, the cost often limits the amount of replication that is possible to undertake.

Due to the fact that there is little existing data for much of Maine's waters, early in 2000, the State of Maine requested that some bays (Casco, Penobscot, Blue Hill and Cobscook Bays) have a greater level of sampling intensity than others. During 2000 and 2001, the entire coast was monitored. However, this experience proved that attempting to monitor the entire coast of Maine, logistically, turned out to be a very difficult task. So, Maine's long coast was divided into three regions. Approximately 50 stations along the coast of Maine are sampled between early July and mid-September on a rotating schedule. The first year (2002) "Downeast" areas were sampled with an emphasis on Blue Hill Bay and a lesser emphasis on Cobscook Bay. The second year (2003) the mid-coast was sampled with an emphasis on Penobscot Bay and the third year (2004) southern Maine will be sampled with an emphasis on Casco Bay. This sampling scheme will provide more extensive information on Maine's larger systems, while still allowing for a statewide assessment to be made at the end of the three-year sampling period. The information obtained from the intensively sampled systems will provide a baseline against which future impacts can be measured.

The National Coastal Assessment will provide complementary information on toxic contamination to Maine's on-going toxics monitoring programs in Casco Bay and along the entire coast. Maine's Surface Water Ambient Toxics Monitoring Program (SWAT) has monitored toxic contaminants in mussels, lobster tomalley and meat and cormorant blood and feathers. The Gulfwatch Monitoring Program for the Gulf of Maine Council also monitors toxics in mussels along the Maine coast. The Casco Bay Estuary Project monitors toxics in mussels, sediment and lobster tomalley and meat. Sediments sampled by the Casco Bay Estuary Project in 2000, 2001, 2002 are being analyzed through a contract with Texas A&M. The results will be compared to samples taken in 1991 and 1994 by CBEP. Also, the recent samples will be compared to the National Coastal Assessment results for sediment contamination and sediment toxicity.

The "core" indicators monitored for the National Coastal Assessment are included in Table 4-31:

Table 4-27 Core Indicators for the National Coastal Assessment

Water Quality	Sediment Quality	Biota
Dissolved oxygen	Grain size	Benthic community structure
Salinity, temperature, depth, light attenuation, pH	Total organic carbon	Lobster meat and tomalley tissue analysis (starting 2004)
Nutrients	Benthic Community Structure	
Chlorophyll	Sediment toxicity	

These indicators will be measured using methods developed by EMAP during the past 10 years. The protocols for sampling are described in the following documents:

The Coastal 2000 Field Operations Manual, Northeast Component www.epa.gov/emap/nca/html/docs/c2knefm.html prepared by Charles J. Strobel of the Atlantic Ecology Division, U.S. EPA, Narragansett, RI

The National Coastal Assessment Field Manual www.epa.gov/emap/nca/html/docs/c2kfm.html

The National Costal Assessment Coastal 2000, Quality Assurance Project Plan – 2000 www.epa.gov/emap/nca/html/docs/qaprojplan.htm

GoMOOS (Fixed-Station Monitoring)

Contact: Josie Quintrell, Director of Policy & Planning, Gulf of Maine Ocean Observing System (GoMOOS)

Tel: (207) 773-0423 email: josie@SPAM-ZAPgomoos.org

Related Websites: (State-specific) www.gomoos.org (National) www.ocean.us

In 2001, GoMOOS deployed the first ten buoys to track the following types of information above and below the ocean surface.

- Measurements at the surface include wind, waves, temperature, and fog.
- GoMOOS provides hourly measurements of currents, temperature, salinity, color, turbidity, dissolved oxygen, and more.
- Satellites produce images showing ocean temperature, color and surface winds. These images help to fill information gaps that exist between buoys.
- CODAR (Coastal Ocean Dynamics Application Radar) is a new system of land-based stations that will use radio waves to produce hourly maps of ocean currents throughout the Gulf of Maine.

The Maine Department of Environmental Protection (DEP) is not on the GoMOOS Board and has not been very active in the discussions about the placement of buoys, the parameters monitored and the way that data are handled or communicated. However, the Maine State Planning Office and the Maine Department of Marine Resources are dues paying members of the Board and are able to provide feedback on issues of importance to the state in general and their agencies in particular.

This is an extremely beneficial program, both nationally and internationally, and has the goal of forecasting marine conditions, monitoring in real-time and providing a distributed database. The Maine Department of Environmental Protection and the Casco Bay Estuary Project (CBEP) should be invited to be more active participants in the GoMOOS program. Much greater communication is needed at the local level in order to maximize the potential benefits of this important program, the DEP believes that the inclusion of itself, along with a few other organizations into GoMOOS would be a great first step towards opening up these crucial, local lines of communication.

Casco Bay Estuary Project

Contact: Karen Young, Director, Casco Bay Estuary Project (CBEP)

Tel: (207) 780-4820 e-mail: cbep@SPAM-ZAPusm.maine.edu

Related Website: www.cascobay.usm.maine.edu

The Casco Bay Estuary Project work focuses in five priority areas: habitat protection, toxic pollution, stewardship, clam flat and swimming beach health, and stormwater pollution. Two water quality projects are highlighted.

Presumpscot River Management Plan: Stakeholders Plan the Future of a Recovering River

In 2000, the Casco Bay Estuary Project (CBEP) convened a diverse group of stakeholders to develop a management plan for the Presumpscot River. At that time, major changes were taking place (i.e., the removal of the lowest dam on the river and the cessation of pulp mill discharges) and the river began making a dramatic recovery. The need for a management plan to address both the new opportunities and environmental challenges that resulted was apparent. For three and a half years, CBEP facilitated and funded technical support for the stakeholder group to develop the scientific foundation that formed the foundation of a management plan titled; *A Plan for the Future of the Presumpscot River*. The plan, which focuses on three areas: fisheries, open space, and cumulative impacts, was finalized in the fall of 2003 and a new coalition, the Presumpscot River Watershed Coalition (PRWC), which grew out of the original planning committee has already begun to implement the plan.

Casco Bay Inter-local Stormwater Working Group: A Case Study in Regionalism

The Casco Bay Estuary Project (CBEP), in partnership with the Cumberland County Soil and Water Conservation District (CCSWCD) and Cumberland County Emergency Management Agency (CCEMA), facilitated the regional collaboration of eleven municipalities facing new stormwater regulations in the Casco Bay watershed (Portland, South Portland, Falmouth, Yarmouth, Freeport, Windham, Westbrook, Cape Elizabeth, Gorham, Scarborough, and Cumberland). The communities signed an inter-local agreement and have developed a regional plan to manage stormwater runoff. This inter-local group, the Casco Bay Inter-local Stormwater Working Group, has formed a strong working relationship and is now working together on a statewide stormwater education campaign as well as other aspects of their plan to reduce stormwater pollution.

Coastal Nonpoint Source Priority Watersheds

Contact: Lee Doggett, Director, Marine Environmental Monitoring Program, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 e-mail: Lee.Doggett@SPAM-ZAPmaine.gov

One approach the State of Maine is using to attain or maintain water quality standards is through designating nonpoint source priority watersheds for preferential treatment by state agencies. Two programs, the 319 program and the Shore Stewards Program, award grants based on the priority watersheds, Salmon River Watersheds (see below) and those waters scheduled for a TMDL (Total Maximum Daily Load) analysis. Listed waterbodies have both significant value from a regional or statewide perspective, and water quality that is either impaired, or threatened to some degree due to nonpoint source water pollution from land use activities in the watershed. Table 4-32 gives the water quality problem or threat as was determined by a Maine Watershed Management Committee in the early 1990's. While Table 4-33 lists watersheds of salmon rivers that are given a priority and/or special treatment with regard to projects conducted within their boundaries. Volunteer monitoring groups have formed in many of these watersheds to monitor and assess the condition of these estuaries (see the following Case Study on the New Meadows River Estuary Project).

Table 4-28 Priority Coastal Waters with Threatened or Impaired Water Quality from Nonpoint Source Pollution

Coastal Water *	Water Quality Problem or Threat		
	Bacteria	Dissolved Oxygen	Toxic Contamination
Piscataqua River estuary			X
Spruce Creek	X	X	X
York River estuary		X	
Ogunquit River estuary	X	X	
Webhannet River estuary	X	X	
Scarborough River estuary	X		X
Royal River estuary	X		
Cousins River estuary	X		
Harraseeket River estuary	X		
Maquoit Bay	X		
New Meadows River estuary	X	X	X
Medomak River estuary	X	X	
St. George River estuary	X	X	
Weskeag River	X	X	
Rockland Harbor	X		X
Union River estuary	X		
Machias River estuary	X		

*some of these estuaries are on the 2000 Non-attainment List (see Appendix)

Table 4-29 Salmon River Watersheds

Salmon River Watersheds	
Denny's River	Machias River
East Machias River	Narraguagus River
Pleasant River	Ducktrap River
Sheepscot River	Cove Brook *

* not included as a priority in the 319 program because it was added as a salmon river after the 319 list was developed

New Meadows Estuary Watershed Project

Contact: Steve Walker, Natural Resources Planner, Town of Brunswick, Maine

Tel: (207) 725-6639 email: swalker@SPAM-ZAPbrunswickme.org

Related Website: http://academic.bowdoin.edu/new_meadows/

Figure 4-6 New Meadows River Watershed and the Towns that are in the Watershed

(Source: the following is from the Executive Summary of the State of the New Meadows River Estuary report and the New Meadows River Watershed Project Website)

The New Meadows River is a Category 4-C listed estuary. The New Meadows River Watershed Project (NMRWP) is a collaborative effort of the municipalities of Brunswick, West Bath, Harpswell, Phippsburg, and Bath, the Maine State Planning Office, the Maine Departments of Marine Resources and Environmental Protection, the U.S. Environmental Protection Agency, Casco Bay Estuary Project, Friends of Casco Bay, New Meadows Lake Association, Bowdoin College and MER Assessment Corporation.

The population of the watershed has increased steadily as more and more people have sought to exploit the area's natural resources, both terrestrial and marine, and more recently, to enjoy its natural beauty, way-of-life, and the recreational opportunities the river offers. The population has grown over 12-fold since the late-eighteenth century, and has more than doubled just within the past fifty years. As along much of the coast of Maine, this population expansion has caused a shift in land use from agriculture and resource exploitation to industrial-commercial and residential uses, particularly over the past ten to twenty years. This trend is expected to continue for the foreseeable future and will undoubtedly have some degree of impact on the New Meadows River.

Fortunately, the New Meadows River appears generally to have suffered little as a result of development along its shores and within its watershed. Water quality testing results indicate that the New Meadows River functions more as an embayment than a true estuary, since there is no substantial surface freshwater input other than local run-off. However, subsurface ground water discharge from the bottom and Kennebec River flow from the south around Small Point may have a significant influence on the river's circulation and rate of exchange.

Dissolved oxygen and nutrient levels show water quality to be good to excellent throughout most of river. Similarly, toxic metals and chemicals testing of lobsters, mussels, and sediments also show that, with only a few exceptions, levels of these contaminants in the New Meadows River are generally low, similar to other areas of Casco Bay, and are not a matter of immediate concern.

Despite these generally good conditions, there are certain areas of the river that have proven susceptible to low oxygen events. Testing in the upper reaches of the river and in the New Meadows Lakes has shown that these areas occasionally experience low dissolved oxygen episodes during warmer months, a condition that can be exacerbated by, and perhaps even cause, periodic fish kills such as the “pogie” (Atlantic Menhaden) kills of the early 1990's.

Nutrient levels in these areas, particularly in the Lakes, are also higher than normal and are likely the cause of the extensive algal blooms experienced annually in this section of the river. Testing results have revealed a possible internal source of nutrient generation, specifically in a deep hole in the Lower Lake, the bottom of which routinely becomes totally oxygen depleted during summer months.

Testing by the Maine Department of Marine Resources reveals much of the river and its shellfish growing areas to be clean and safe for shellfish harvesting and consumption. However, actual and potential sources of bacterial contamination are currently causing a substantial portion of the shoreline to be closed to the harvesting of shellfish. These closures are a matter of considerable concern, for the New Meadows River supports a significant soft-shell clam resource that, in turn, is the base of a shellfish industry important to the local economies of the surrounding communities. Although the New Meadows River shellfish growing areas represent a relatively small portion of Maine's total shellfish growing area, production from its shellfish flats over the past four years has accounted for an estimated 7.5% of Maine's total soft-shell clam production, indicating the exceptional productivity of the this area. In 2000 it was estimated that the 2001 New Meadows River harvest of soft-shell clams could be as high as 16,735 bushels resulting in direct income to the harvesters of approximately $1.3 million and extended economic activity in the order of $3-$4 million. Substantial effort has therefore been made to identify and correct the existing sources of contamination to insure continued access to the resource, but much remains to be done.

One area of concern is the impact of discharges from recreational vessels at anchor overnight and weekends (e.g., “The Basin”). This activity may lead to the closure of adjacent shellfish harvesting areas. At present, the nearest pumpout is at the very head of the New Meadows River estuary, at the New Meadows Marina. While this facility is a great asset to boaters on the River, larger vessels cannot easily access it.

The New Meadows River Watershed Project is exploring various options for assisting towns with the installations of pump-out facilities further down the River.

A 200-foot long barrier between Dingley Island and the Harpswell mainland both separated the north and south sections of the waterway and divided one of the town's richest clamflats. The structure had been accumulating sediments since its constructions in 1946 and the New Meadows River Watershed Project actively supported the replacement of the causeway with a small bridge in order to reestablish water flow and restore a portion of the original habitat. Construction of the bridge began in May 2003 and was completed in August 2003. The U.S. Navy provided labor for the bridge construction through its Innovative Readiness Training program. Funding for the project came from NOAAs community based habitat restoration program, the Gulf of Maine program on the Marine Environment, the Maine Corporate Wetlands Restoration Partnership, cash donations from Harpswell residents and in-kind match from a variety of sources. Elsa Martz of Harpswell developed the project and because of her tireless work over the course of seven years, through numerous steps and obstacles, she accomplished the finished product that is described above.

Numerous Service Learning Projects have been set up to involve college students in ongoing research and monitoring on the New Meadows River and lakes. Students in some Bowdoin College Geology and Environmental Studies courses have worked with various local groups and organizations and contributed valuable information on various aspects of the river.

OBD Removal

As of the summer of 2002, the town of Brunswick successfully removed all overboard discharges within its jurisdiction. The town of Harpswell has also succeeded in opening numerous shellfish harvesting areas.

Brigham's Cove Reopening

On March 14, 2003 over 1,500 acres of shellfish flats in Brigham's Cove and Round Cove were opened to clamming for the first time since the 1970's. Originally closed due to poor water quality caused by malfunctioning septic systems, gray water discharges, and licensed overboard discharge systems (OBDs), the opening was the result of five years of work by local watershed groups, state and municipal officials, property owners, and local volunteers to remove the seventeen sources of pollution affecting the flats. The Casco Bay Estuary Project coordinated the efforts of the Maine Department of Environmental Protection's Overboard Discharge Removal Program, the Towns of West Bath and Phippsburg, and property owners to successfully remove the OBDs. Once the OBDs were replaced, the New Meadows River Watershed Project brought together Maine Department of Marine Resources (DMR) staff with municipal officials from West Bath and Phippsburg to push for the removal of the remaining pollution sources. In October 2002, the clean-up was completed and local volunteers working in conjunction with the DMR conducted the necessary shoreline surveys that confirmed the area was pollution-free.

To minimize future environmental impacts to the river, the New Meadows River Watershed Project is beginning to work on the development of a watershed management plan for the New Meadows River that would involve all five municipalities located within the watershed. However, before such a plan can be prepared, the New Meadows River Watershed Project (NMRWP) is working on completing and implementing the NMRWP strategic plan. This strategic plan includes activities related to improving the ecological and economic resources, education, and expanding public involvement.

Four activities identified in the strategic plan that the New Meadows River Watershed Project intends to undertake within the next year include:

- Conducting a 24-hour nutrient flux study (nutrient concentration and water flow) in spring and fall between the lakes and the upper river.
- Developing a water quality index for the New Meadows Lake and River (example parameters: dissolved inorganic nitrogen, particulate nitrogen, temperature, salinity, dissolved oxygen, light penetration, pH, chlorophyll).
- Assessing the feasibility of increasing tidal exchange in the lakes.
- Increasing volunteer monitoring in the New Meadows River to weekly samples in the summer, evaluating the number of sites to be monitored, adding parameters as needed, and conferring with the local communities.

Protection of Aquatic Life

(Designated use: Habitat for fish and estuarine / marine life)

Attainment of Dissolved Oxygen Standards

The Mousam River estuary and the Royal River estuary are on the 2004 Category 5 impaired waters list because sections of these estuaries do not meet state standards for dissolved oxygen. The reasons for non-attainment are varied and include natural factors such as benthic respiration and physical circulation factors. The Piscataqua River estuary has a completed TMDL, but its implementation has not begun. The upper New Meadows estuary and “Lake” (estuarine salinities) also do not meet standards for dissolved oxygen. The assumed primary cause of non-attainment at this location is the partial impoundment on Old Route 1 at the Brunswick-West Bath town line. Additional monitoring and studies in this area are planned to better understand the cause(s) and to assist in finding solutions.

Generally, data from various studies and volunteer monitoring groups show oxygen levels along the Maine coast are adequate for the protection of aquatic life. Although some estuaries contain oxygen levels that do not meet the dissolved oxygen standards of their assigned classification, it was concluded that many of the lower levels measured were a result of natural processes. Preliminary data from the 2000 National Coastal Assessment for 29 stations randomly distributed along the Maine coast shows that 17% of the surface water samples did not meet SB class standards of 85% saturation even though all samples were above 6 mg/L. At depth, 45% did not meet SB standards although only one measurement was below 6 mg/L (5.73 mg/L). DEP reviewed the appropriateness of statutory dissolved oxygen standards for estuarine and marine waters during a two-year stake holder process and made a proposal to the legislature. The legislature chose to keep the statute as it currently exists with 85% saturation for SB waters and 70% saturation for SC waters.

Eutrophication

Although there are estuaries that do not meet state water quality dissolved oxygen standards (see previous section), incidences of hypoxia (>0 to $\leq$2 mg/L dissolved oxygen) or anoxia appear to be episodic. New Meadows "Lake" (salinity over 20 ppt) has anoxic conditions in the deep hole each summer. Causes of these anoxic events have ranged from influxes of large schools of fish, algae blooms being blown into a small bay to unknown causes. While toxic algae blooms occur periodically in the spring and summer, the blooms are showing no trends and are not considered to be related to nutrient enrichment from anthropogenic sources. No nuisance blooms (e.g. Phaeocystis) have been reported recently. Trends in macroalgal abundance of green algae (e.g. Enteromorpha) are unknown but the abundance appears to be increasing in some areas and is of concern to some of the coastal volunteer groups. However, the presence of Enteromorpha does not automatically indicate pollution.

In a statistical analysis conducted for the 1996 dissolved oxygen study for 16 estuaries along the coast of Maine (Dissolved Oxygen in Maine Estuaries and Embayments: 1996 Results and Analyses by John Kelly; Aug. 30, 1997; DEPW97-23), the results suggested land-derived nitrogen loading source. In many areas, particularly those from eastern Maine to offshore Penobscot Bay, a major nutrient source appears to be from offshore waters. Overall, the high tidal range, the relatively low river flows (except the Penobscot and the Kennebec), the relatively low population densities in most areas and limited agricultural nutrient runoff results in limited anthropogenic impacts at this time. Small, poorly flushed bays that have watersheds with growing populations are where signs of eutrophication such as nuisance macroalgae, occasional phytoplankton blooms in the summer and lowered dissolved oxygen levels have started to emerge. At this time the impaired use is principally from the toxic algae blooms. The Department of Marine Resources with the help of volunteers (see below) closes shellfish harvesting areas to protect public health when toxic algae blooms ("red tide") occur. Closures because of toxic algae blooms extended later into the fall in 2003 than in previous years.

Maine Phytoplankton Monitoring Program

Contact: Sarah Gladu, Coordinator, UMCE / Maine Sea Grant

Tel: (207) 832-0343 e-mail: sgladu@SPAM-ZAPumext.maine.edu

Related Website: www.seagrant.umaine.edu

In 1996 the United States Food and Drug Administration, the Maine Department of Marine Resources (DMR), and the University of Maine Cooperative Extension/Maine Sea Grant developed the Maine Phytoplankton Monitoring Program for the coast of Maine. For the success of Maine's shellfish resources, this active monitoring program picks out and observes toxic phytoplankton. This is a citizen volunteer program in which community members and students use plankton nets and field microscopes to monitor for phytoplankton that have the potential to cause harmful algal blooms (HABs also known as "red tides"). This volunteer program was designed to act as an early warning system for HABs, which may cause shellfish bed closures due to biotoxins. The volunteers use data sheets to report the relative abundance of target species such as *Alexandrium* spp., *Dinophysis* spp., *Prorocentrum lima*, and *Pseudonitzschia* spp. to the DMR in real-time. These types of phytoplankton may "bloom" in a given area when conditions are right, and an active monitoring project can be extremely effective in promoting shellfish safety to the public by identifying these organisms and determining when they are present. This information is then used by the DMR biotoxin monitoring program to assist in prioritizing the need for testing shellfish meat for biotoxins. Approximately 75 volunteers monitor 40 sites coast-wide on a weekly basis April through October (or later if conditions warrant).

If shellfish ingest the toxic phytoplankton they are not infected, but do carry the marine biotoxin. If a human ingests the shellfish carrying the toxin, it may result in sickness and, (depending on the toxin involved) in some cases death for the human.

In Maine, monitoring for marine biotoxins is conducted by the Maine Department of Maine Resources (DMR), who monitor for Paralytic Shellfish Poisoning (PSP) which is caused by *Alexandrium* spp*.* There are other toxic algae that could potentially be present in Maine waters, for which monitoring is not generally conducted. These algae include *Pseudonitzschia* spp., which causes Amnesiac Shellfish Poisoning (ASP), and *Dinophysis* spp., which causes Diarrhetic Shellfish Poisoning (DSP). Volunteer based monitoring efforts are an integral part in providing information on toxic algae blooms that aid the DMR in the methods currently used for quantifying marine biotoxins.

Program Achievements:

Trained volunteers reliably notify the Maine Department of Marine Resources when there are increases in potentially toxic phytoplankton cells present along the coast of Maine.

- Education on harmful algae blooms is provided in 40 coastal communities annually.
- Over 3,500 recorded observations of phytoplankton species have been entered into a database.
- Citizen participants range in age and background from high school students to retired scientists.
- In the fall of 1999, a methodology for counting phytoplankton cells was developed and is being utilized by one of the volunteer groups to provide information about phytoplankton populations to finfish aquaculturists.
- In 1997-8, using information on the large Dinophysis populations from the volunteer monitoring effort, a NOAA biotoxin team was assembled to determine if diarrhetic shellfish poisoning (DSP) occurs along the coast of Maine. This was the first study demonstrating the possibility of DSP on the Maine coast. Since okadaic acid (Dinophysis toxin-1) was detected in the dinoflagellate *Prorocentrum lima*, a protocol for volunteer monitors to identify *P. lima* has been developed and the protocol, after further field testing, will be implemented in the future.

New and On-Going Projects

- Creation of "Field Guide to Phytoplankton in the Gulf of Maine" with color images from a light microscope and field notes.
- Incorporating aquaculturists to determine if the monitoring data is useful in developing management strategies.

Attainment of Aquatic Life Standards

Contact: Lee Doggett, Director, Marine Environmental Monitoring Program, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 e-mail: Lee.Doggett@SPAM-ZAPmaine.gov

General

Much of Maine's inter-tidal zone habitat supports marine life (plants and animals) as naturally occurs and meets Class SA standards. However, much of Maine's subtidal habitat is altered by "dragging" techniques that are used to harvest certain species. Therefore, it is hard to assess which areas meet classification standards without examining site-specific information on the bottom dwelling (invertebrate) community at a particular time. Examples of Maine's inter-tidal habitats include:

High Wave Energy Rocky Shore

Maine has more miles of inter-tidal bedrock than the rest of the entire East Coast of the United States. The diversity of marine plants and animals in this habitat is unusually rich, particularly in locations where there are tidepools, cracks and crevices in the lower inter-tidal zone for the animals to take shelter. Also, some plants and animals (e.g., kelp holdfasts, mussel mats and sponges) provide habitat for other animals. Boulder beaches in some high wave energy areas have a more diverse animal community than the bedrock shores. The abundance and diversity of plants and animals at boulder beaches vary depending on the shape and spacing of the boulders and the wave exposure. Juvenile lobsters are often found in this habitat.

Over one hundred species of plants and animals live on Maine's high wave energy rocky shores. Threats to high energy rocky shores can come from over-collecting of inter-tidal marine animals (although there is no evidence of this in Maine to date), harvesting of seaweed and physical habitat alterations (e.g., docks, piers, etc.)

Inter-tidal Flats

Maine has 93.2 square miles of inter-tidal flats. These flats are predominantly muddy and generally harbor a more diverse community of animals than high wave energy rocky shores. Numerous factors (e.g., sediment grain size, sediment deposition rates, salinity, temperature ranges, etc.) determine the diversity and abundance of animals living in a particular flat. Inter-tidal flats are habitat for three important commercial species: soft-shell clams, bloodworms, and clamworms. Threats to inter-tidal flats can come from over-harvesting, physical habitat disturbance (e.g., harvesting, docks, piers, etc.), changes in stormwater runoff patterns, runoff frequency and runoff volume, sawdust deposits, over enrichment by nutrients, and toxic contamination.

Low Wave Energy Coastal Habitat

In areas where there is low wave energy, the typical Maine coastal habitat includes a mixture of habitat types (e.g., rocky shore, mudflats, sandflats, flats mixed with gravel, cobble and/or boulders, high salt marsh (Spartina patens), and/or low salt marsh (Spartina alterniflora). The plant and animal community inhabiting the area depends on the specific habitat present. Low wave energy rocky shores are usually dominated by Ascophyllum (knotted wrack or seaweed) and have far fewer plant and animal species than either the high energy rocky shores or inter-tidal flats (both described above). Marshes harbor mudflat species as well as species that are especially adapted to live in salt marshes (e.g., the shrimp-like amphipod, Orchestia ulheri; the salt marsh snail, Melampus bidentatus).

Areas containing gravel and cobble tend to have the lowest diversity of animals and usually have few, if any plants (because these materials move back and forth with the waves and during storms). The abundance and diversity of plants and animals at boulder beaches vary depending on the characteristics of the boulders and the wave exposure, among other factors.

As is the case for flats, numerous factors (e.g., sediment grain size, sediment deposition rates, salinity, temperature ranges, etc.) determine the diversity and abundance of animals living in a particular habitat. Threats to low wave energy coastal habitats can come from over-harvesting (including taking “pet” rocks from gravel or cobble beaches), physical habitat disturbance (e.g., harvesting, docks, piers, etc.), changes in stormwater runoff patterns, runoff frequency and runoff volume, sawdust deposits, over enrichment by nutrients, and toxic contamination. Riparian zone disturbance also can impact the functions of marsh habitat.

Sand Beaches

Maine has 12.6 square miles of sand shore habitat. Maine sand beaches harbor species that are specialized for existence in sands that constantly shift in response to the constant battering and movement by waves. Species that are typically found on sand flats are also known to exist in some of the more protected sandy beach environments. Numerous factors (e.g., sediment grain size, exposure, salinity, temperature ranges, etc.) determine the diversity and abundance of animals living in a particular sand beach. Threats to sand beaches can come from physical habitat disturbances (e.g., buildings, piers, walkways, beach scraping, etc.) of the beach or the dune system, changes in stormwater runoff patterns, runoff frequency and runoff volume, over enrichment by nutrients, and toxic contamination.

Habitats Where Aquatic Life Standards are Threatened

Fringing Marsh

Small pockets of inter-tidal salt marsh or fringing marsh are an important and threatened habitat in Maine. The ribbed mussel (*Modiolus demissus*) is dependent upon inter-tidal salt marsh environments for its survival. They inhabit areas of the marshes that are associated with plants by burying half to three-quarters of their shells among the root systems.

Case Study: Ecological Functions and Values of Fringing Salt Marshes in Casco Bay

Contacts: Dr. Pamela Morgan, Assistant Professor of Environmental Studies, University of New England (UNE)

Tel: (207) 283-0170 X 2227 email: pmorgan@SPAM-ZAPune.edu

or Dr. Michele Dionne, Research Director, Wells National Estuarine Research Reserve (NERR)

Tel: (207) 646-1555 X 136 email: dionne@SPAM-ZAPwellsnerr.org

Related Website: www.wellsreserve.org/index.htm

Nine fringing salt marsh sites in Casco Bay were studied. The primary objective was to gather baseline information about important fringing marsh functions that could be used by resource managers in marsh recovery and settlement efforts following an oil spill. The project intended to clarify the value of fringing salt marshes in Casco Bay to invertebrate and finfish production, to vegetation production and diversity, and as buffers against sea level rise and coastal erosion.

The study found that fish using the nine marsh sites were the same species that are typically found in larger, meadow salt marshes. These fish included resident fish (mummichog, silversides, sticklebacks), juvenile marine fish (winter flounder, hake), migratory species (rainbow smelt, tomcod, American eel, alewife), and marine transient fish (Atlantic herring, striped bass, mullet). Crustaceans (green crab, Jonah crab, sand shrimp, hermit crab) were also caught in the fishing nets. Green crabs, which are an invasive species, were found in high abundances at most sites. Further research will clarify the role of these crabs in the marsh environment, especially their effect on mummichogs, a common and important salt marsh fish (Figure 4-9).

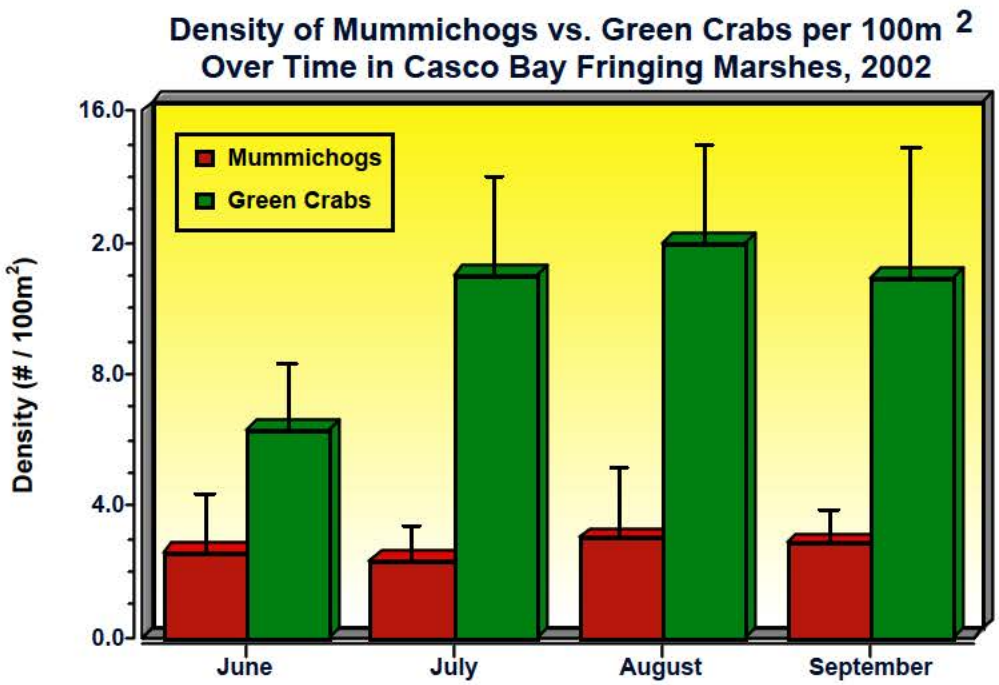


Figure 4-7 Density of Mummichogs vs. Green Crabs in Casco Bay

Invertebrates found in the upper five centimeters of marsh soil included wormlike animals: nematodes, oligochaetes, and polychaetes. These worms are an important food source to fish as they are soft bodied, easy to digest, and readily available. Densities of these worms were high, ranging from 3,000 to 10,000 per m^2. Tiny shrimp-like animals (tanaid crustaceans), another important food source for fish, were also found in high densities. Periwinkles, clams, green crabs and several fly larvae occurred in lower numbers.

Primary productivity of marsh grasses varied widely from site to site (35-309 g/m^2) (Figure 4-10), as did the amount of sediment deposited on the marsh surface over short periods of time (2.2-9.8 $g/m^2/day$) (Figure 4-11).

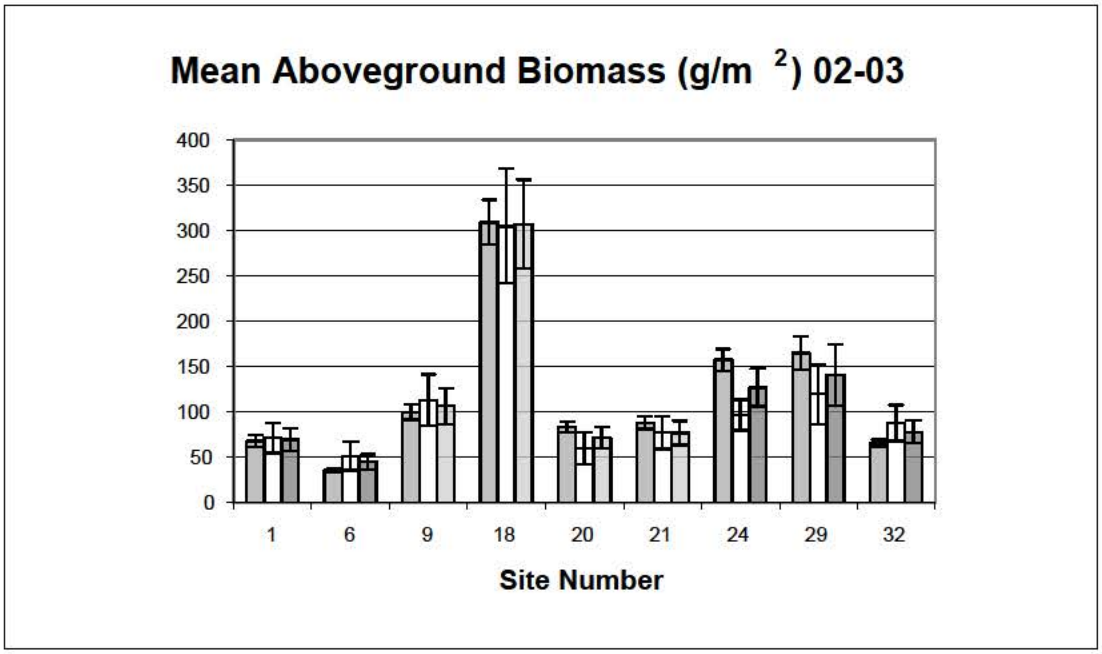


Figure 4-8 Primary productivity of fringing marsh sites in Casco Bay
(Measured by end-of-season standing biomass in 2002 and 2003)

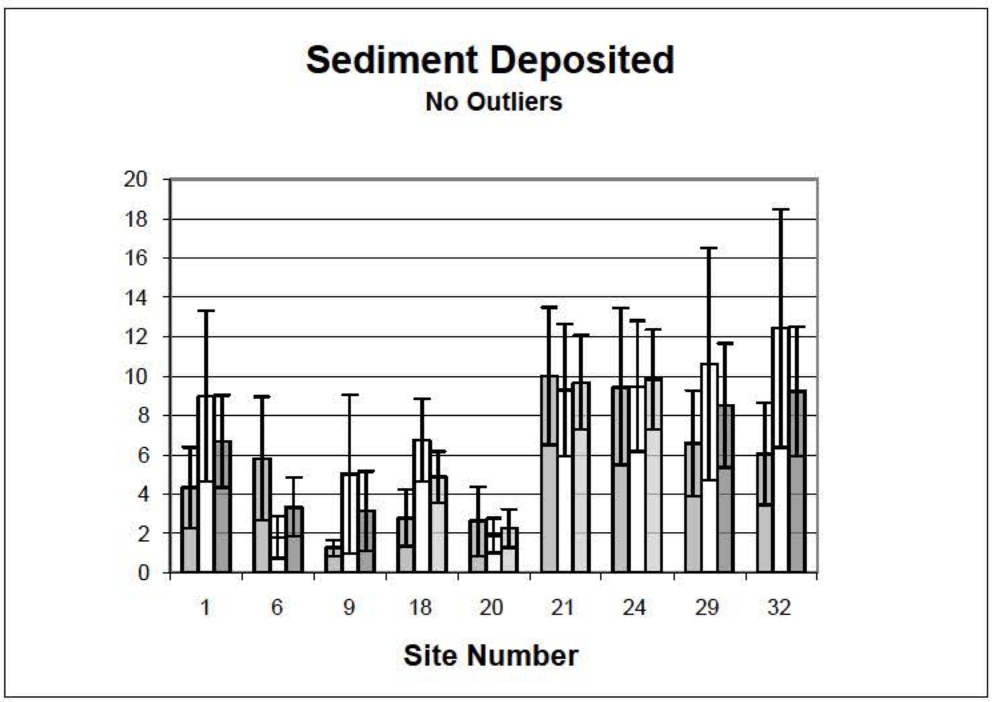


Figure 4-9 Sediment deposited on the surface of fringing marsh sites in Casco Bay
(Values are means of two-week periods in June and July, standardized to g/m2/day)

Sediment deposited over a longer time span (15 months) also varied from site to site, ranging from 0-0.74 cm (Figure 4-12). There is not enough information from this preliminary study to determine how well these sites are keeping up with local sea level rise.

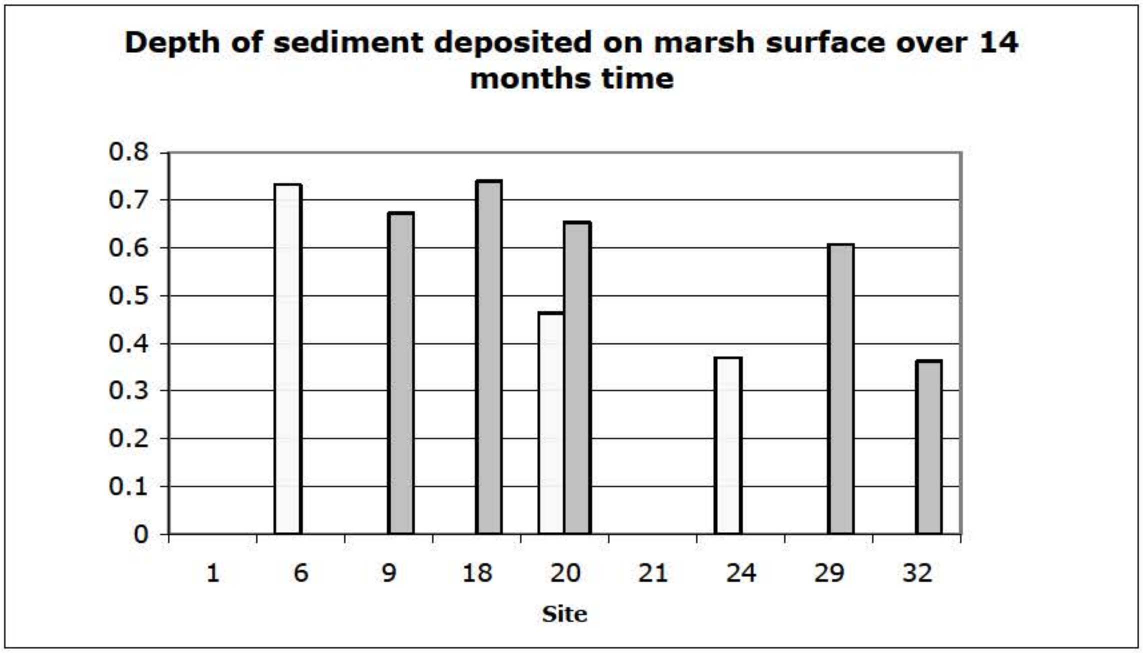


Figure 4-10 Depth of sediment deposited on fringing marsh surfaces

(Accumulated over 14 months' time - nd = no data)

Many marshes were observed to have well-developed high marsh plant (*Spartina patens)* communities, although one site had only a low marsh zone dominated by *Spartina alterniflora* (Figure 4-13). The number of plant species identified at sites ranged from 10-20, and diversity (as measured by the Shannon Index [H]) varied from 0.187 to 0.696.

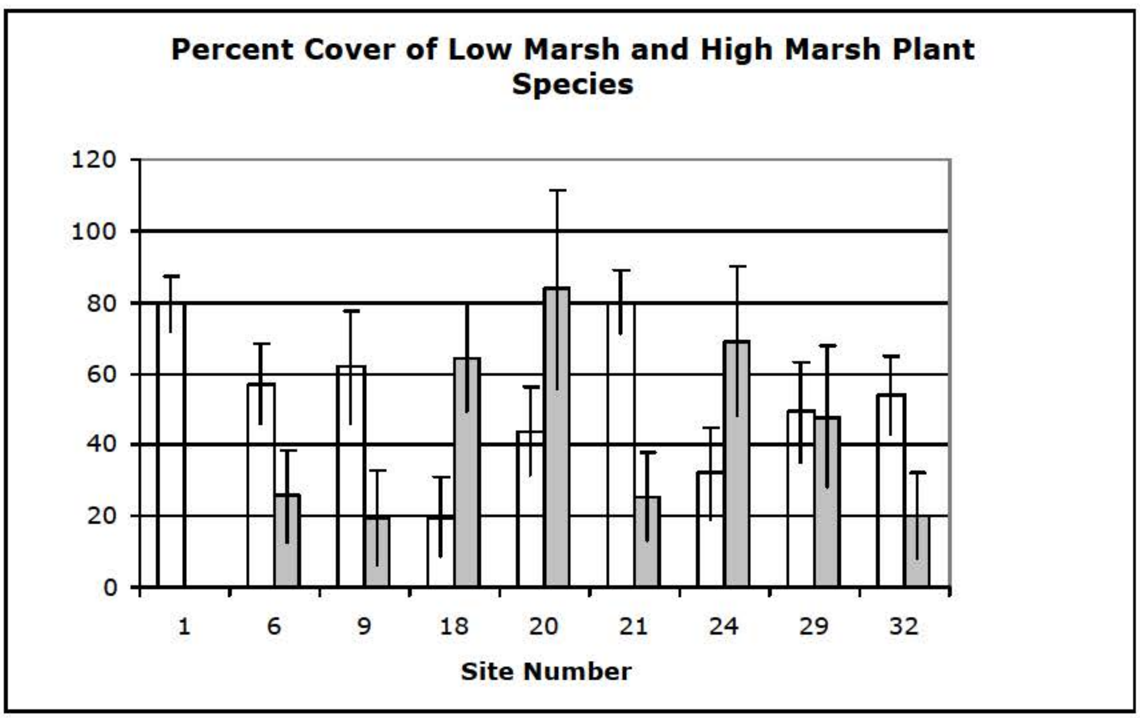


Figure 4-11 Percent cover of low and high marsh plant species on fringing marsh sites in Casco Bay

Results from this study demonstrate that fringing salt marshes are playing an important role in the ecology of Casco Bay, especially in estuarine food web support and in the maintenance of plant and animal biodiversity.

The results also highlight the high levels of variability that exist between these marshes. However the sample size of nine marsh sites allows us to begin to understand this variability, and to provide baseline information to resource managers about the marsh functions we investigated. This baseline information will be helpful in assessing future impacts to fringing salt marshes in Casco Bay.

Eelgrass

Eelgrass Distribution

Contact: Seth Barker, DMR BRM, Ecology Division

Tel: (207) 633-9507 e-mail: Seth.Barker@SPAM-ZAPmaine.gov

Coast-wide mapping of eelgrass beds based on 1:12,000 scale color photography has been an on-going effort of the Maine Department of Marine Resources (DMR) since 1993. The first coast-wide mapping of this feature was completed in 1997. Combined with the work of Dr Fredrick Short of UNH and Salmon Falls Consulting for MDOT in 1993, these studies represent a uniform benchmark of eelgrass distribution. DMR began a new mapping effort in 2001, with the objective of systematically revising mapped distribution and documenting change in eelgrass distribution.

Eelgrass forms the basis of an important habitat along the Maine coast. Though it has not been studied as intensively north of Cape Cod as in locations to the south, there is a fair amount known about distribution and biology of eelgrass in the region. As in other locations, eelgrass can form dense meadows in shallow subtidal and, to a lesser extent, inter-tidal locations. It serves many of the same functions as eelgrass beds elsewhere, in that it is a dominant primary producer, provides habitat for many organisms, and serves to stabilize near shore sediments.

The extent of area covered is shown in Figure 4-14. Work reported here represents the first locations on the coast that have been revisited since the project was initiated in 1993. Additional details on methods used to conduct this analysis are available from DMR.

Eelgrass beds were mapped in shallow waters between Biddeford Pool, Saco Bay and Small Point, Casco Bay. Similar methods were used in the re-mapping efforts as were used in the original mapping. Field verification was added because of improved technology, which included benthic mapping equipment and an underwater video system.

Total area of all cover categories in the recent survey was 8,655 acres and is shown in Table 4-34. This is a 19% increase since the original survey, when the total was 7,270 acres. Eelgrass beds that were present in 1993-95 were, in most cases, also found in the present study. A total of 5,449 acres had eelgrass in both the 1993-95 and 2001-02 periods. There were a total of 3,206 acres of new eelgrass beds and 1,744 acres where eelgrass cover was lost, for a net increase of 1,462 acres.

The increase in coverage of eelgrass beds confirms a trend noted in the study of impacts of mussel dragging on Maquoit Bay (Barker, 2003). Based on photography from 1993, 1999, 2000, 2001, and 2002, there appears to be a continued increase in coverage of eelgrass in Maquoit Bay. This was not the case throughout Saco and Casco Bays, where there were large areas of decreased coverage in Broad Cove, north of Cousins Island, west of upper Great Chebeague Island, and in the vicinity of Upper and Lower Goose Islands.

It is not apparent in other locations what factors might be responsible for the decline. Aside from the immediate impacts of mussel dragging and propeller wash, which it is assumed could cause localized impacts, decreased water quality or disease may be responsible for more widespread changes. The importance of light penetration as well as the detrimental effects of high nutrient loading has long been known (Short, et al, 1993). Another factor known to be responsible for major declines of eelgrass is the eelgrass pathogen, Labyrinthula.

Literature Cited:

Barker, 2003: Effects of Commercial Fishing on Eelgrass in New England: Characterization of Impacts and Measurements of Regrowth - Results of High Altitude Photography. Report to USGS Eastern Regional Office - State Partnership Project. 21 pp.

Table 4-30 Change in Eelgrass Cover by Category.

Sum of Acres	**Percent Cover**						
Old	**None**	**0 to 10 %**	**10 to 40 %**	**40 to 70 %**	**70 to 100%**	**Grand Total**	
None		164.098	798.704	486.827	1,757.361	3206.99	
0 to 10 %	286.776	53.028	249.043	69.089	255.555	913.491	
10 to 40 %	327.862	21.711	207.153	91.018	608.237	1,255.981	
40 to 70 %	439.16	28.258	204.761	234.613	562.601	1,469.393	
70 to 100%	690.792	43.133	408.058	184.813	2227.47	3,554.266	**2001- 02 Total**
Grand Total	**1,744.59**	**310.228**	**1,867.719**	**1,066.36**	**5,411.224**	**10,400.121**	**8,655 acres**

1993-95 Total
7,193 acres

Cover Change Category		**Area (Acres)**
Unchanged		**5,449**
Increase	**(New)**	**3,207**
Decrease	**(Loss)**	**1,745**

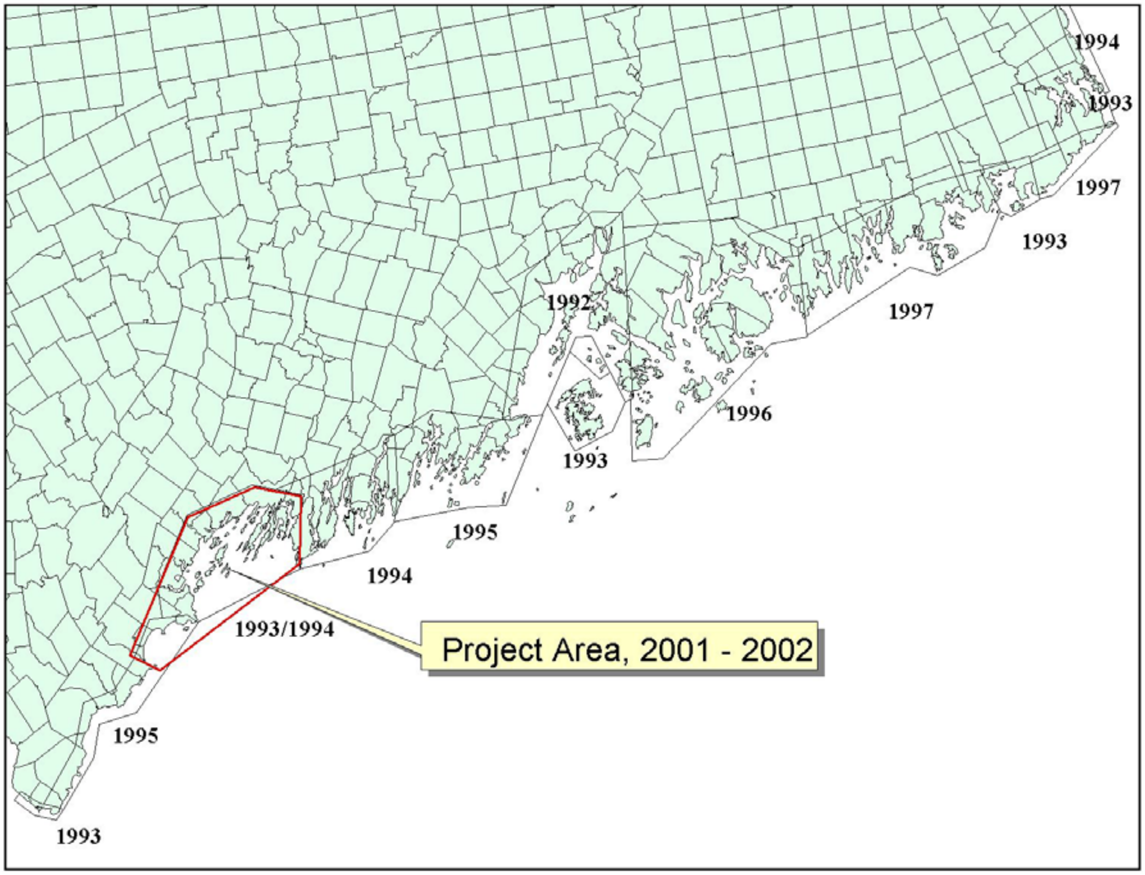


Figure 4-12 Area of Interest, 2001/2002, and Dates of Initial Mapping

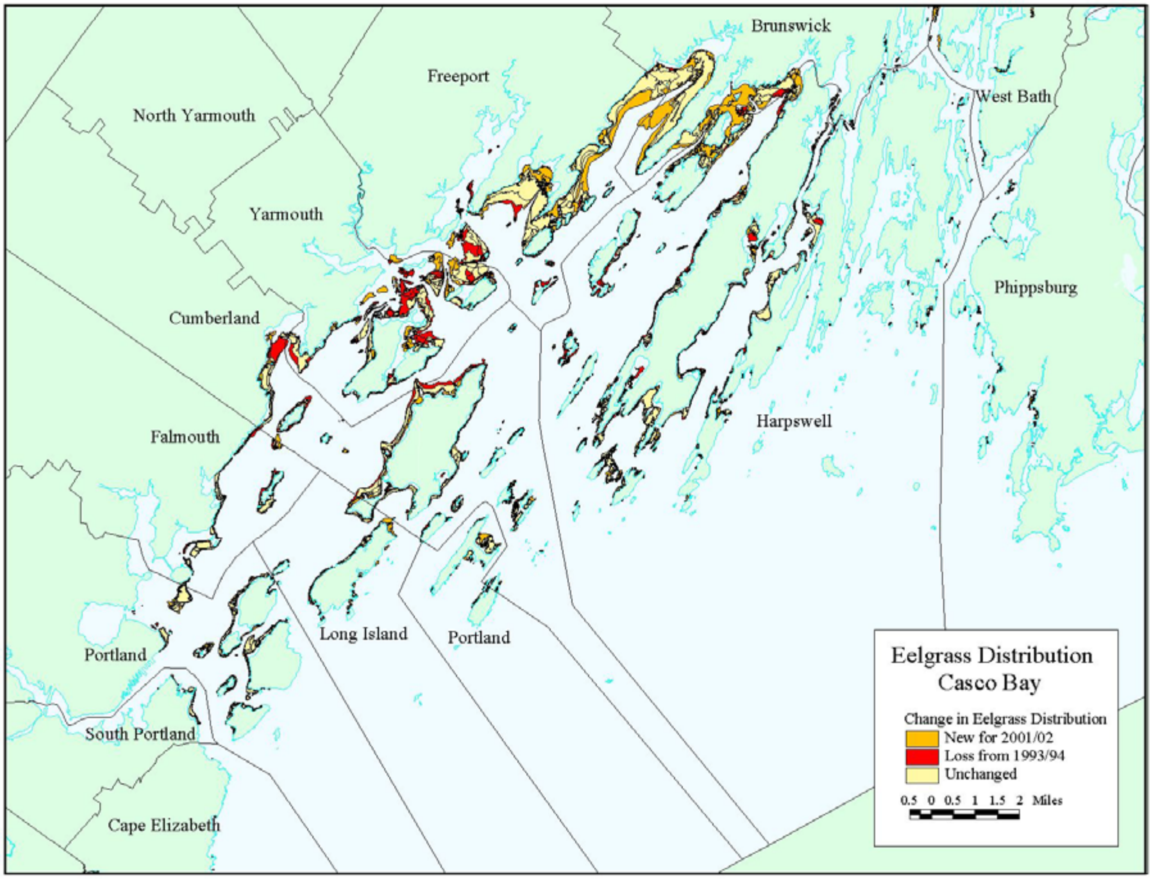


Figure 4-13 Change in Eelgrass Distribution

Habitats Where Aquatic Life Standards are in Non-attainment

The Fore River estuary is listed in Category 5-A (Waterbody # 804-7; see Appendix IV Category 5-A) because of non-attainment of aquatic life standards, toxics and bacteria. The inner Fore River estuary between the Casco Bay Bridge and the Veteran's Memorial Bridge does not meet aquatic life standards. The structure and function of the bottom dwelling (benthic) animal (invertebrate) community has been altered because of multiple point and nonpoint sources of pollution in this area.

A significant source of pollution is the former Gasworks plant (upstream of the bridge on the Portland side) where buried coal tar oozes out of the site during hot weather. The inter-tidal zone in the area is "paved" with coal tar and when the coal tar reaches the water, oil slicks result. The sediments in the channel contained coal tar when they were sampled in 1989. Since that time, the channel has been dredged so the sediments that were in the channel in 1989 are at the Portland Disposal site or in the bumpers for the Casco Bay Bridge. However, since then, coal tar has continued to seep into the Fore River estuary. After a long process that included DEP and several Federal agencies, the responsible party is participating in a voluntary clean-up of the site. Remediation of the site is scheduled to begin in 2004.

Other areas of non-attainment of aquatic life standards are in the vicinity of a few finfish aquaculture sites. These operations are licensed by DEP and appropriate actions (e.g., fallowing, additional monitoring, etc.) will be required in order to allow the sites to recover (usually one or two years).

Areas that are dredged and areas where the dredged materials are deposited at sea are in temporary non-attainment for approximately one or two years after the disturbance. Disposal of dredged material at sea is becoming more of a problem as the designated sites become filled (especially the Cape Arundel site in southern Maine). Also, there are no properly designated sites in Downeast Maine east of the Rockland disposal site. Historic disposal sites have been and are being used. However, the environmental assessment prior to disposal is limited. If a site were properly designated, it would require an Environmental Assessment or an Environmental Impact Statement.

Toxic Contamination

Contact: Lee Doggett, Director, Marine Environmental Monitoring Program, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 e-mail: Lee.Doggett@SPAM-ZAPmaine.gov

Several programs have monitored toxic contaminants along Maine's coast in 2001, 2002, and 2003 including: the National Coastal Assessment Program, the Surface Water Ambient Toxics Monitoring Program, the Gulfwatch Program of the Gulf of Maine Council, and the Casco Bay Estuary Project. Toxic contaminants were monitored both in surficial sediments and in blue mussel tissue. In previous years, lobster tissues and tomalley along with cormorant feathers and blood have been monitored for toxics. Sediments also have been analyzed for various dredging projects (e.g., in the towns of Camden, Rockland, and Millbridge).

Sediments

Generally, fine-grained sediments are found in waters that are downstream/down current of areas with high human densities, such as the mouths of major rivers and ports, and contain higher levels of toxic contaminants. Polycyclic aromatic hydrocarbons (PAHs) are especially high in areas where petroleum is routinely handled, such as: marine terminals, marinas, and urban areas. In Casco Bay, tributyl tin (TBT) from antifouling paints was highest in concentration near areas of boating activity in the inner Bay near Portland, Falmouth Foreside and the Anchorage on the inner part of Hussey Sound. Polychlorinated biphenyls (PCBs), and DDT, though not sold for 20 years, continue to be present in sediments along the whole coast, although they are more pronounced near centers of commerce and industry.

Mussels

Blue mussel soft tissue has been analyzed periodically from approximately 65 sites along the Maine coast over a period of 17 years. The Marine Environmental Monitoring Program established normal baseline reference concentrations for different contaminants for metals in mussels, with the exception of arsenic. Arsenic was compared to the NOAA-defined elevated levels (referenced below). When compared to these reference concentrations, some sites had contaminant levels above the Maine coastal norm. Most, however, did not. Those tissue samples that were elevated generally were in the most heavily developed ports and harbors or were in the mouths of major industrial rivers. Organics (PAHs or polycyclic aromatic hydrocarbons, pesticides, PCB or polychlorinated biphenyls) are compared to elevated levels reported in the National Oceanic and Atmospheric Administration (NOAA) 1998 (on-line) "Chemical Contaminants in Oysters and Mussels" by Tom O'Conner. NOAAs State of the Coast Report. Silver Spring, MD: NOAA

In 2001, areas that had metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, silver and mercury) that were above the Maine coastal norm are presented in table 4-35. The text below compares those results to previous samples taken in the late 1980s. The samples from the late 1980s consisted of a single sample while the 2001 results are based on four replicate samples. Aluminum and iron were not included in the analysis and are reported as elevated in the table to give an indication of the amount of sediment in the gut of the mussel. PAHs were tested for; however, the results of these analyses indicate that they were not elevated at any of the sampling sites.

Table 4-31 Elevated Metals (X) in Mussels Sampled in 2001

	Al	As	Cd	Cr	Cu	Fe	Ni	Pb	Zn	Ag	Hg
Castine – Brooksville			X		X			X	X		
Clough Point, Sheepscot River Estuary	X					X					X
Roque Bluffs, Englishman's Bay	X										
Great Diamond Island, Casco Bay	X	X				X		X		X	
Goose Ledge, Damariscotta River estuary							X				
Kittery, Pepperell Cove	X	X		X	X	X		X			X
Machiasport, Little Kennebec Bay	X					X				X	
Long Island, Casco Bay							X				
Medomak River estuary							X*			X	
Sandy Point – Stockton Springs, Penobscot River estuary	X										X
Sears Island, Searsport							X				

* without outlier, not elevated

Mercury was elevated in the Sheepscot River at Clough Point, at Pepperell Cove in the town of Kittery and at the mouth of the Penobscot River at Sandy Point, Stockton Springs. The one previous sample that was taken at Sandy Point in 1989 had elevated cadmium, chromium and slightly elevated levels of nickel, as well as elevated mercury. By comparison, levels of cadmium and chromium are now in the high end of the normal range and nickel is normal at over one-third less than it was previously.

The one sample that was collected previously in 1989 at the Sheepscot River at Clough Cove had slightly elevated cadmium as well as elevated mercury levels. In the 2001 sample, cadmium was in the high end of the normal range and mercury was still elevated.

At Pepperell Cove near the naval base in Kittery, the one sample taken in 1987 had elevated chromium, lead and mercury, while zinc, cadmium, and copper were in the high normal range. In 2001, mercury, chromium, copper, lead and arsenic were elevated (arsenic was not measured in 1987). Cadmium and zinc were in the high normal range in 2001 but they were slightly lower than the levels found in 1987.

Metals in Englishman's Bay were in the normal range in both 2001 and 1987.

Metals in the Medomak River estuary were in the normal range except for elevated silver, (which had varied results between the replicate samples). There was an outlier in one of the nickel replicates and it was not considered in the results. Cadmium was elevated in the one sample taken in 1989, but it was not elevated in the 2001 sample.

Goose Ledge in the Damariscotta River estuary, Sears Island in Penobscot Bay and Long Island in Casco Bay are in the normal range with the exception of elevated nickel. Although the levels of nickel are higher in 2001 than the one sample taken during 1989 in the Damariscotta River, the results of replicates were highly variable. Two replicates were in the elevated range while two were in the normal range for nickel. At Sears Island, the levels of silver and cadmium are greatly reduced from the one sample taken in 1989, but the level of nickel is higher in the 2001 sample. Levels of cadmium, lead and zinc are reduced from the one sample taken in 1989 at Long Island, while the level of nickel has increased.

In Little Kennebec Bay, the metals are in the normal range with the exception of silver (which was not measured in 1987). Also, the lead levels that were in the high end of the normal range in the one 1987 sample are reduced in 2001.

Diamond Cove on Great Diamond Island in Casco Bay had elevated arsenic, silver, and lead levels in 2001. In the one sample taken in 1988, all metals analyzed were in the normal range. Silver and arsenic were not analyzed in 1988. Lead was in the upper part of the normal range in the 1988 sample and now lead is almost twice as high as it was in 1988.

On Cape Rosier in Penobscot Bay, near an abandoned mine, cadmium, copper, lead and zinc were elevated in 2001. In the one sample taken in 1989, cadmium, lead and zinc were also elevated. Levels of cadmium and lead are lower, while levels of copper and zinc are higher in 2001 – when compared to the 1989 sample.

In summary, levels of mercury were elevated in the Sheepscot River estuary, Pepperell Cove in Kittery and at the mouth of the Penobscot River both in 2001 and in the late 1980s. The latter two sites have potential local sources of mercury, while the Sheepscot River estuary is presumably elevated because of historic sources. Levels of other metals were lower in 2001 than in the late 1980s at many sites, including the Sheepscot and the Penobscot. Pepperell Cove near the naval base in Kittery had elevated or high normal range metals during both sampling periods. At the mouth of an abandoned mine in Cape Rosier, a number of metals were elevated in the 1989 and 2001 samplings. One area of concern is Diamond Cove, on Great Diamond Island in Casco Bay where levels of lead are much higher than in 1989.

Other locations had lower levels of metals or normal levels at both samplings with some exceptions. Nickel was elevated in some of the 2001 samples, but the individual replicates had variable results. Silver was elevated at two locations and also had variable results for individual replicates.

In 2001, the Casco Bay Estuary Project sampled mussels at East End Beach, Portland; Spring Point, South Portland; Mill Creek, Falmouth; and Upper New Meadows, Brunswick and West Bath. Metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, silver and mercury) were in the normal range at Upper New

Meadows and were elevated at the other locations of East End Beach, Spring Point, and Mill Creek. These three locations had elevated lead, although less so at Spring Point than the other two locations (probably due to less urban runoff). East End Beach had elevated zinc levels and zinc was also slightly elevated at Spring Point. When compared to the single replicate samples taken in 1988 at East End Beach, Mill Creek and Spring Point, lead and zinc at East End Beach remains elevated and lead remains elevated and zinc slightly elevated at Spring Point. The only noticeable change from the 1988 sampling was at Mill Creek, where levels of lead went from the normal range (2.90 ppm for a single replicate) to elevated (an average of 5.51 ppm for four replicates). There has been a lot more commercial development in the Mill Creek watershed since 1988 and the development of the Mill Creek watershed has continued beyond the time of sampling in 2001. The Upper New Meadows River was not sampled previously, so there was no basis for a trends comparison. Aluminum and iron were not included directly in the analysis. PAHs, PCBs and pesticides were in the normal range at all sites; however, there are some quality assurance issues with these results that should add caution this statement.

The following sites were sampled in 2002: the former Navy Pier, Harpswell Neck, Casco Bay; inner Fore River, upstream of the I-295 Bridge, Casco Bay; Maquoit Bay, Brunswick, Casco Bay; mouth of Harpswell Cove (off Mare Brook), Casco Bay; Seal Cove, Mount Desert Island; Western Passage, St. Croix River. Each of the above samples consisted of four replicates.

Metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, silver and mercury) were in the normal range in all locations except the inner Fore River. Aluminum and iron were not included directly in the analysis. Mare Brook and the inner Fore River had elevated levels of aluminum and iron and Maquoit Bay and the St. Croix Bay had elevated levels of aluminum. These elevated levels give an indication of the amount of sediment in the gut of the mussel.

The inner Fore River had elevated levels of lead. Also, zinc was at the high end of the Maine coastal norm and mercury was over the high concentration level reported in the National Oceanic and Atmospheric Administration (NOAA) 1998 (on-line) “Chemical Contaminants in Oysters and Mussels” by Tom O’Conner. NOAAs State of the Coast Report. Silver Spring, MD: NOAA. In the one sample taken in 1988, zinc was elevated when compared to the 2002 sample. Lead concentration has more than doubled in the 2002 sample, while mercury is in a range similar range to what it was in 1988.

Mare Brook, Maquoit Bay and the St. Croix River have never been sampled before. Metals at the former Navy Pier, Harpswell Neck were in the normal range in 2002 and 1988. Metals at Mount Desert Island were also in the normal range in 2002 and 1991.

PAHs were highly elevated at the inner Fore River site and slightly elevated at the St. Croix site. PAHs were approaching elevated levels at the Maquoit Bay site. PAHs, PCBs and pesticides were in the normal range at all other sites except for PCBs at the Fore River site, which were approaching elevated levels.

Summary

Elevated levels of toxic contaminants tend to be present in harbors, commercial ports, mouths of river watersheds and locations adjacent to population centers. Areas that have a “dirty history” (i.e., manufacturing or some other past activity) may still be a source of toxic substances. However, the geographic extent of toxic contamination tends to be localized. Most areas that are away from human activity, past and present, contain natural background concentrations of toxic contaminants. Based on the above sediment and tissue analyses, areas of concern include six areas of Maine's coast, which are summarized in Table 4-36.

Table 4-32 Marine and Estuarine Areas of Concern for Toxic Contamination

Location	Area [1]
Piscataqua River Estuary	2,560 acres
Fore River	1,230 acres
Back Cove	460 acres
Presumpscot River Estuary	620 acres
Boothbay Harbor	410 acres
Cape Rosier	80 acres

[1] Acreage based on professional judgement. Empirical evidence to conclude non-attainment or adverse impact is lacking. Biological standards must be developed to assess attainment and monitoring must be conducted to assess impact.

Seals

Contact: Susan D. Shaw, Dr. P.H., Executive Director, Marine Environmental Research Institute (MERI)

Tel: (207) 374-2135 email: sshaw@SPAM-ZAPdowneast.net

Related Website: www.meriresearch.org

Harbor seals (*Phoca vitulina concolor*) are widely distributed in the temperate nearshore waters of the Gulf of Maine and are useful sentinels of food chain contamination because they occupy a high trophic level, are long-lived, and accumulate high concentrations of persistent organic pollutants (POPs) and heavy metals including mercury.

A large body of data suggests that environmental contaminants, particularly PCBs, have adversely affected reproduction, endocrine function, and immune function in seals inhabiting industrial coastal regions. The sensitivity of harbor seals to the effects of contaminants first gained widespread attention in 1988 when chemical immune suppression by PCBs was implicated in the virus-related deaths of 20,000 harbor seals in northwestern Europe. In 1979-80, an outbreak of type A influenza virus resulted in the deaths of more than 500 harbor seals along the US Atlantic coast. A possible role of environmental chemicals (*e.g.*, PCBs) in the outbreak was not investigated, although data from the 1970s indicated that PCBs and DDT levels in these seals were approaching the 100 ppm range.

Summary of Findings 2001-2003

MERI generated two years of data on levels and effects of environmental contaminants in harbor seals from the Gulf of Maine and along the US Atlantic coast. Tissues obtained from wild (free-ranging) and stranded seals were analyzed for POPs (PCBs, dioxins, furans, pesticides) and heavy metals including mercury.

- Free-ranging Gulf of Maine harbor seals exhibited high plasma levels of dioxin-like compounds (PCBs, dioxins and furans); levels in the adult seals were associated with significant changes in immune function.

- PCB levels in blubber of stranded Gulf of Maine harbor seals were also relatively high. In both free-ranging and stranded seals, the PCB-dioxin levels exceeded the proposed threshold levels in blubber for adverse effects on immune function in the species.
- DDT and chlordanes were moderately elevated in blubber of stranded harbor seals.
- Lead levels were elevated (mean 34 µg/g dry weight) in hair samples of free-ranging seals off Cape Cod, and copper levels were elevated in seals from Penobscot Bay, Maine, possibly reflecting local point-source inputs.
- Mercury levels in the livers of stranded adult harbor seals were extremely high (mean 93 µg/g, wet weight) and exceeded international action levels for liver injury in mammals. Mercury levels in seal hair were in the same concentration range as the 1973 levels reported in harbor seals from eastern Canada, suggesting continuing inputs of mercury in the food chain.

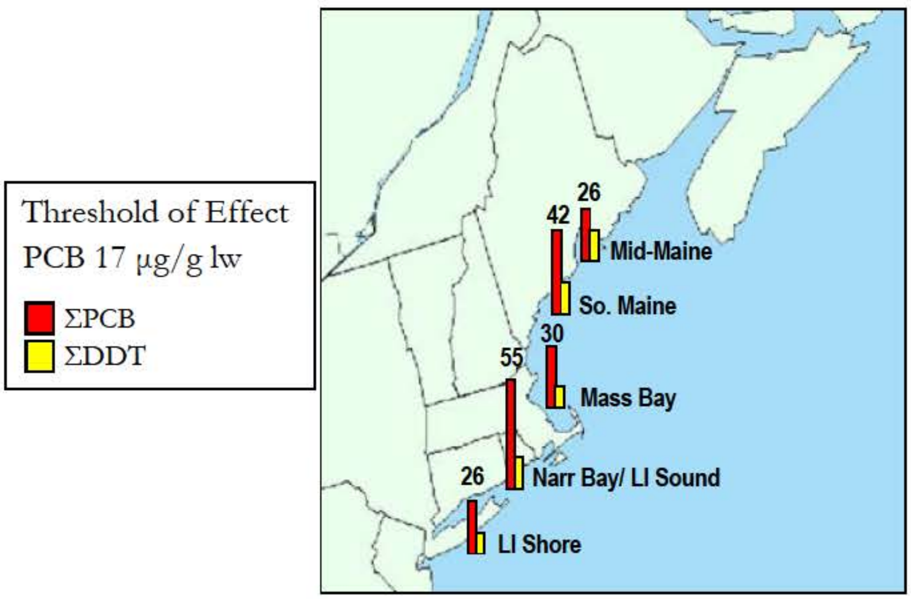


Figure 4-14 PCB and DDT concentrations in blubber of harbor seals
(*u*g/g, lw)

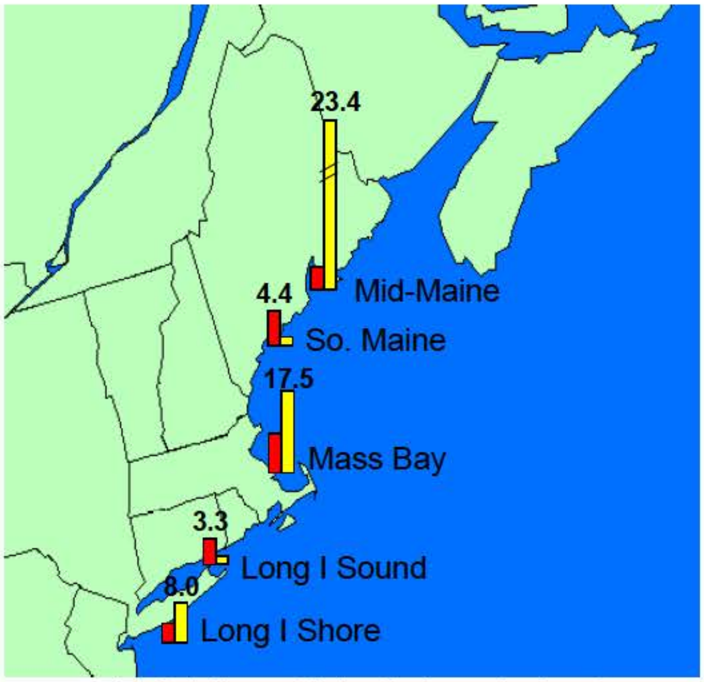


Figure 4-15 Mercury levels in liver and hair of harbor seals along the US Atlantic coast

(liver: *u*g/g, ww - symbolized in yellow and hair: *ug/g* dw - symbolized in red)

These data suggest that harbor seals in the Gulf of Maine accumulate relatively high levels of environmental contaminants, levels that may place them at risk for adverse health effects. While preliminary, these are the first extensive data reported on persistent organic pollutants and heavy metals in Gulf of Maine seals in 25 years. Because of their high trophic status, harbor seals ultimately provide information on chemicals that present the greatest risk to consumers at the top of the food chain, including humans.

Aquatic Nuisance Species

Aquatic Nuisance Species (ANS) are aquatic species that have been introduced into ecosystems in the United States and the world and are having harmful impacts on the natural resources in these ecosystems. There is much interest recently in ANS but care should be taken to keep this interest in perspective. The DEP Marine Program will analyze the issue of ANS in context of the standards for classification of estuarine and marine waters (MSRA Title 38 Article 4-A).

There are a number of categories that the ANS species fit into:

1 - Old Time Invaders: These species were introduced years ago and have been integrated into the community for some time. Most of these species would not be considered ANS by DEP.

Green crab, Carcinus maenas, unknown north of Cape Cod in the 19th century, now the most common shore crab.

Common periwinkle, Littorina littorea, the most common periwinkle on rocks and pilings along Maine's coast.

European oyster, Ostrea edulis, introduced to the Boothbay Harbor region of Maine by what is now National Marine Fisheries Service in the 1950's. There is a limited population in that area as well as Casco Bay.

2 - Species that are difficult to identify have been largely ignored: tunicates, bryozoans, cnidaria (anenomes), porifera (sponges). Most of these species probably would not be ANS and are only considered new because little information exists on their historic distributions.

Membranipora - scattered among 4 or more families. DEP has many records for this and related families dating back to the late 1800's for Casco Bay. Membranipora membranacea was one of the "introduced" species identified in a recent (2003) rapid assessment survey in Casco Bay.

In the same survey, the list included two scale worms that can be found in almost every high energy rocky shore tide pool along the coast of Maine. Other cryptogenics listed in the same survey are from category 2 above (hard to identify and largely ignored).

3 - Periodic Drifters:

Shipworms, Teredo spp. Mostly found south of Maine but are carried into Maine on driftwood, a menace to pilings and wooden boats particularly in warm waters.

4 – Exotics:

Japanese shore crab, Hemigrapsis sanguineus, established in Delaware Bay in the 1980's and has now moved into Maine. This species would be considered an ANS because of the way it functions in the community that it invades.

Another species is being closely watched. There was one record of this wormlike species in Maine previously and now it is turning up in more places. It is premature to determine if this species would be considered in the ANS category. Also, it is unlikely that it is causing any real functional community damage.

5 - Other nuisance aquatics that may not be introduced but can cause economic damage:

Gribbles, Limnoria spp., small wood boring isopods found in pilings and driftwood in the lower inter-tidal and subtidal areas from Rhode Island north. There was a problem with gribbles in Eastport within the last ten years. Gribbles feed on a wood-dwelling fungus rather than the wood itself.

Chapter 5 WETLANDS

Contact: Jeanne DiFranco, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 822-6359 email: Jeanne.L.DiFranco@SPAM-ZAPmaine.gov

Section 5-1 BACKGROUND

Related Website: www.maine.gov/dep/blwq/wetlands/index.htm

Wetlands are among Maine's most diverse and valuable natural resources, comprising fully 25 percent of the State's surface area. There are over 5 million acres of freshwater wetlands in Maine, including forested and shrub swamps, bogs, freshwater meadows, marshes and floodplains. Tidal wetlands, such as flats, salt and brackish marshes, aquatic beds, bars and reefs make up about 157,500 acres. Wetlands perform numerous functions that are essential to both human society and the ecological balance of the natural world. Wetlands serve as natural water storage areas that help to decrease flood impacts by absorbing flows and reducing water velocity. They also play a vital role in maintaining lake, river and stream levels, and serve as hydrologic links between surface water and ground water aquifers. By trapping sediments and associated pollutants, wetlands often help to protect water quality, and also stabilize shoreline areas that would otherwise be vulnerable to erosion from wave action and currents. Wetlands support a vast array of fish and wildlife, including many endangered and commercially important species. In addition, Maine residents and visitors, through various recreational activities (such as sport fishing, hunting, canoeing, hiking and wildlife viewing), enjoy the aesthetic values of wetlands.

Federal Regulatory Framework

EPA Contact: Jeanne Voorhees, EPA Region I, Office of Ecosystem Protection

Tel: (617) 918-1686 email: voorhees.jeanne@SPAM-ZAPepa.gov

Related Website: (EPA) www.epa.gov/owow/wetlands/regs/

ACE Contact: Ruth Ladd, ACE New England Region, Regulatory Division

Tel: (978) 318-8818 email: ruth.m.ladd@SPAM-ZAPusace.army.mil

Related Website: (ACE) www.usace.army.mil/inet/functions/cw/cecwo/reg/index.htm

Lead Agencies: EPA Region I and the U.S. Army Corp of Engineers (ACE) – Maine Project Office

Under the Clean Water Act, wetlands are regulated as surface waters. The Clean Water Act provides for wetland protection and regulation through a number of federal programs, most of which are administered by EPA. The exception is the Section 404 regulatory program, which is jointly administered by EPA and the U.S. Army Corps of Engineers. The following sections of the Clean Water Act encompass key elements of the federal wetland protection framework:

- Section 303: Requires states to adopt water quality standards for all waters of the U.S. within their boundaries, including wetlands.
- Section 305: Requires States to assess the condition of all waters of the U.S. within their boundaries, including wetlands, and to report to EPA every two years regarding attainment of State water quality standards.
- Section 319: Establishes a non-regulatory federal program that provides funding to states and tribes for the development and implementation of programs to reduce nonpoint sources of pollution, including nonpoint sources impacting wetlands.
- Section 401: Requires that prior to issuing a license or permit, federal agencies must obtain a written certification that an activity will not violate applicable State water quality standards, including wetland standards.
- Section 402: Establishes the National Pollutant Discharge Elimination System (NPDES) program that regulates point source discharges to waters of the U.S. including wetlands.
- Section 404: Authorizes a program to regulate the placement of dredged or fill materials into wetlands and other waters of the U.S. The 404 permit program is administered jointly by EPA and the U.S. Army Corps of Engineers. The Corps is responsible for issuing permits and for jurisdictional determinations. The Corps and EPA have shared responsibility for compliance and enforcement, and both may issue guidelines and policies.

Wetlands Regulatory Program in Organized Towns

Contact: Jeff Madore, DEP BLWQ, Division of Land Resource Regulation (DLRR)

Tel: (207) 287-7848 email: Jeff.G.Madore@SPAM-ZAPmaine.gov

Related Website: (NRPA) www.maine.gov/dep/blwq/docstand/nrpapage.htm

Maine DEP regulates wetland alterations in the organized townships under the Natural Resources Protection Act 38 M.R.S.A., Section 480-A et seq. (NRPA) and Chapter 310 Wetlands and Waterbodies Protection Rules. The NRPA applies to regulated activities in, on or over any protected natural resource, including wetlands, and activities performed adjacent to certain resources that may cause soil or other material to wash into them. Under Section 480-C(2), activities requiring a permit include dredging, bulldozing, removing or displacing soil or vegetation, draining or dewatering, filling, and construction, repair or alteration of any permanent structure. The NRPA also contains a number of exemptions for activities listed in Section 480-Q. The Department uses a 3-tier review process to assess applications for wetland alterations, based on the size of the proposed alteration and the type of wetland involved.

Effective September 29, 1995, changes in the NRPA made it more consistent with the Federal Section 404 wetlands regulatory program. Chapter 310 rules were also amended accordingly, and became effective July 4, 1996. Concurrent with the revisions to the NRPA, the Army Corps of Engineers (ACE) instituted a Programmatic General Permit (PGP) for activities requiring Section 404 wetland alteration permits, with review thresholds comparable to those of the State's program. Maine DEP and ACE adopted a joint permit application form which is submitted to DEP to obtain both State and Federal permits, including Section 401 Water Quality Certification. While ACE issues a separate permit, DEP staff coordinate with the federal agencies on reviewing applications. Section 401 Water Quality Certification is issued concurrently with permits approved under the NRPA by DEP.

Wetlands Regulatory Program in Unorganized Territories

Contact: Marcia Spencer-Famous, Senior Planner, DOC LURC, Planning & Administration Division

Tel: (207) 287-4933 email: Marcia.Spencer-Famous@SPAM-ZAPmaine.gov

The Maine Land Use Regulation Commission (LURC) utilizes a land use planning approach to regulate wetlands in unorganized portions of the State, in accordance with the provisions of Title 12, Sections 681-689 (Use Regulation) and Chapter 10 of LURC rules (Land Use Districts and Standards). Wetland alterations are often handled within the context of a building, development, shoreland alterations, or other type of permit. All areas within the jurisdiction are zoned as management, development or protection sub-districts. The Wetlands Protection Sub-district (P-WL) is used to regulate activities within wetlands. There are three different types of P-WL:

1) P-WL1 includes open water such as great ponds and rivers as well as other Wetlands of Special Significance;

2) P-WL2 includes scrub shrub and other non-forested freshwater wetlands, excluding those covered under P-WL1; and

3) P-WL3 includes forested freshwater wetlands, excluding those covered under P-WL1 and P-WL2

LURC regulates mapped wetlands based on the National Wetlands Inventory. In general, all mapped wetlands are regulated, and unmapped wetlands are not regulated unless wetland delineation is required. The exceptions to this are:

- Streams draining 50 square miles or less (some are mapped, some are not, but all are regulated), and
- Projects disturbing more than one acre of land (either wetland or upland) require all wetlands in the project area to be delineated, with all identified wetlands becoming jurisdictional

Section 10.16(K)(3) of Chapter 10 Rules provides details on uses requiring a permit, and prohibits all uses not expressly allowed under this section. Permitting is based on a three-tiered system similar to the Natural Resources Protection Act. The thresholds for the level of tier review are tied to the size of the wetland impact and the type of wetland.

Section 5-2 Development of Wetland Water Quality Standards

Contact: Jeanne DiFranco, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 822-6359 email: Jeanne.L.DiFranco@SPAM-ZAPmaine.gov

Federal Requirements

Related Websites: (EPA)

(Wetland Water Quality) www.epa.gov/owow/wetlands/regs/quality.html

(General Water Quality Standards) www.epa.gov/ost/standards/

Under Section 303(c) of the Clean Water Act, States are required to develop water quality standards for all "waters of the U.S.", including wetlands. In 1990, EPA published national guidance for implementing wetland water quality standards[2] that addresses the following elements:

- Include wetlands in the definition of "State Waters",
- Designate uses for all wetlands that protect wetland structure and function,
- Adopt aesthetic narrative criteria and numeric criteria to protect wetland-designated uses,
- Adopt narrative biological criteria for wetlands, and
- Apply the State's anti-degradation policy and implementation methods to wetlands

Similar to other water bodies, designated uses for wetlands must, at a minimum, provide for the protection of fish, shellfish, wildlife, and recreation. Effective in 1987, Section 303(c)(2)(B) requires States to adopt numeric criteria for toxic pollutants for which EPA has published criteria. This section further requires that, where numeric criteria are not available, States should adopt criteria based on biological monitoring and assessment methods. States must also adopt nutrient criteria for all waters, including wetlands.

Status of Wetland Water Quality Standards in Maine

Contact: Jeanne DiFranco, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 822-6359 email: Jeanne.L.DiFranco@SPAM-ZAPmaine.gov

Inclusion of Wetlands as State Waters

Wetlands are encompassed in the following definition under the Protection and Improvement of Waters Act, 38 M.R.S.A. Section 361-A(7):

> *"Waters of the State" means any and all surface and subsurface waters that are contained within, flow through, or under or border upon this State or any portion of the State, including the marginal and high seas, except such waters as are confined and retained completely upon the property of one person and do not drain into or connect with any other waters of the State, but not excluding waters susceptible to use in interstate or foreign commerce, or whose use, degradation or destruction would affect interstate or foreign commerce.*

[2] U.S. EPA. 1990. Water Quality Standards for Wetlands: National Guidance. Office of Water, Regulations and Standards, U.S. Environmental Protection Agency, Washington D.C. EPA 440/S-90-011.

Wetland Designated Uses and Criteria

Maine does not have wetland-specific designated uses or criteria. To implement water quality standards for wetlands, wetland management classes must be defined, and associated uses and criteria applied. Where appropriate, existing water quality standards for fresh surface waters and estuarine and marine waters (described in Maine's Water Classification Law) may be applied to wetlands. Existing standards, including designated uses and narrative criteria are largely applicable to wetlands, provided wetland-specific assessment methods are used to determine attainment status. The Maine Water Classification Law provides for flexibility where specific uses or criteria may not be suitable.

Biological criteria are expected to be especially useful for evaluating wetland condition. A major goal of the Maine DEP Biological Monitoring Program is to develop wetland-specific biological criteria and incorporate them into State water quality standards. Development of biological criteria for wetlands is a priority in DEP's Performance Partnership Agreement with EPA, and is also addressed in the Maine Wetland Conservation Plan.

In response to EPA's requirement to develop nutrient criteria for all waters, Maine DEP has completed a Nutrient Criteria Adoption Plan which includes wetlands. Maine plans to develop nutrient criteria based on biological response indicators. Approaches being considered include the use of algal and vegetative indicators of wetland nutrient enrichment. DEP will also explore the use of nutrient concentration thresholds as appropriate for specific wetland classes.

Development of wetland-specific criteria requires collecting additional data statewide to establish reference conditions and biological impairment thresholds for multiple biological assemblages and wetland types. To date, there has been little or no standardized biological monitoring of wetlands in many regions of the State. Although DEP has made significant progress by establishing a wetland biological monitoring program, developing comprehensive numeric biocriteria for wetlands will require a substantial investment of time, staff and other resources.

Application of Maine's Anti-degradation Policy to Wetlands

Section 464(4)(F) of Maine's Water Classification Program (Title 38, Section 464 et seq.) describes the State's anti-degradation policy. According to EPA's water quality standards guidance, the anti-degradation policy should automatically apply to wetlands since they are defined as waters of the State.

Section 5-3 INTEGRITY OF WETLAND RESOURCES

Contact: Jeanne DiFranco, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 822-6359 email: Jeanne.L.DiFranco@SPAM-ZAPmaine.gov

Incorporating Wetlands into Maine's Biological Monitoring Program

Related Website: www.maine.gov/dep/blwq/wetlands/monitoring.htm

The Maine DEP Biological Monitoring Program is part of the Division of Environmental Assessment. The program was formally established in 1983, and has extensive experience in water quality monitoring and assessment, data management and biocriteria development. The Biological Monitoring Program provides water quality information for a wide array of programs and initiatives including ambient monitoring and trend analysis, evaluation of water quality classification attainment, and assessment of impacts from point discharges, nonpoint sources, land use practices, toxic contamination and hydropower activities. In 1998, Maine DEP began development of biological monitoring and assessment methods for freshwater wetlands. DEP initially conducted a pilot study in the Casco Bay watershed, located in southern Maine. Beginning in 2001, DEP expanded wetland monitoring to additional major watersheds in the state, and plans to extend monitoring to remaining regions over the next several years.

The Maine wetland biomonitoring initiative has been incorporated into DEP's Biological Monitoring Program. This has been an efficient way to pool limited resources in areas such as staff support, equipment purchases, and contract management. This strategy has also allowed DEP to build on the experience of Maine's river and stream biomonitoring program. Wetlands, rivers and streams in the same watershed are usually hydrologically and/or ecologically connected, and causes of biological degradation are often the same for different waterbody types. The Maine Biological Monitoring Program has established a goal to move toward a comprehensive watershed perspective in collecting and interpreting wetland and stream data. Wetland biomonitoring is currently coordinated with the State's river and stream biomonitoring using the following 5-year rotating basin schedule:

DEP Five Year Basin Monitoring Schedule Rotation

St. John Watershed	2004
Presumpscot, Saco, Southern Coastal Watersheds	2005
Penobscot, Downeast Watersheds	2006
Kennebec, Mid-Coast Watersheds	2007
Androscoggin Watershed	2008

Locations of the major drainage basins are shown in Figure 5-1 along with wetland monitoring stations where biomonitoring data have previously been collected.

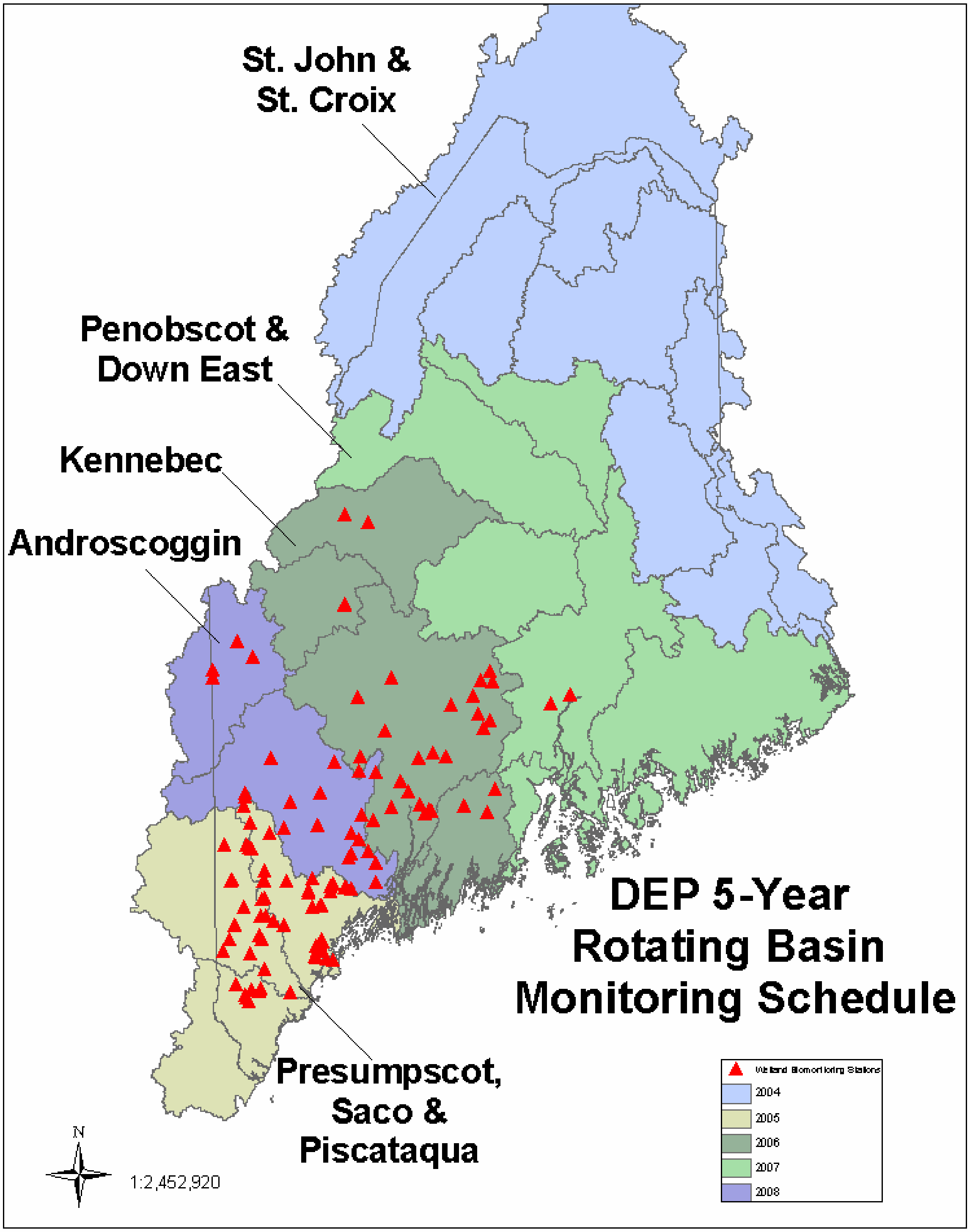


Figure 5-1 DEP 5-Year Basin Monitoring Schedule and Wetland Biomonitoring Stations

The DEP Biomonitoring Program currently focuses on semi-permanently or permanently inundated wetlands (i.e. sites having standing water most of the time except during unusually dry periods). These include palustrine, riverine fringe and lacustrine wetlands, many of which are closely associated with other surface water bodies. Wetlands are targeted on a watershed basis to encompass a range of human disturbance, from known poor-quality sites to potential reference (minimally-disturbed) wetlands. This approach was selected to facilitate testing and refinement of biological metrics throughout the state. Additional sites may be targeted to address specific regulatory or management concerns.

DEP assesses aquatic macroinvertebrates as the primary taxonomic indicator group for wetlands. The Biomonitoring Program also plans to develop algal and vegetative indicators of wetland condition, as resources to do so become available. To successfully implement a comprehensive biological monitoring program for wetlands, DEP needs to build the capacity to assess multiple biological assemblages. This is necessary because various groups of organisms differ in their sensitivity as indicators, depending on the type of wetland and the environmental stressors involved. The ability to assess additional assemblages will allow DEP to monitor different wetland types and evaluate impacts from a wider range of human activities. It will also help the Biomonitoring Program to address increasing requests from other wetland-related programs for technical support and guidance related to wetland impact assessment and water quality criteria.

Overall program goals for wetland monitoring and assessment include:

- To evaluate the ecological integrity of wetlands in the State and identify significant trends in wetland condition
- To enhance the State's ability to predict and assess risks to wetlands from human activities
- To improve management and regulatory strategies to protect and restore wetland ecological integrity
- To heighten public awareness about the ecological importance of wetlands, the threats to wetland health and protection measures

Recent Biomonitoring Program activities which support these goals for wetlands include:

- Development of Microsoft Access wetland assessment database (uploadable to EPA's STORET database)
- Completion of nutrient criteria adoption plan including wetlands
- Development of wetlands web pages on the Maine DEP web site
- Development of an Internet Mapping Project to provide public access to biomonitoring program data for wetlands, rivers and streams (in progress)
- Incorporation of wetlands into DEP's water quality monitoring strategy (in progress)
- Implementation of STORET database for State wetland biomonitoring data (in progress)
- Development of landscape-level assessment tool to predict threats to wetlands and other waters (in progress)
- Ongoing participation in wetland assessment and policy work groups (Maine Wetland Interagency Team, EPA National Wetland Monitoring and Assessment Work Group, the New England Biological Assessment of Wetlands Work Group, and the New England Interstate Water Pollution Control Commission wetlands work group).
- Ongoing participation in professional organizations related to wetlands, including presentations at scientific and technical meetings (Maine Association of Wetland Scientists, New England Association of Environmental Biologists, Association of State Wetland Managers, Society of Wetland Scientists, North American Benthological Society).

Biological Criteria Development Using Macroinvertebrate Indicators

To date, DEP has conducted wetland biomonitoring at 112 different sites throughout the southern half of the state (Figure 5-2). Results for macroinvertebrate samples, water samples, field measurements and information related to habitat and human impacts are entered into an ACCESS database. The database has the capability to automatically calculate over 100 invertebrate community attributes that have been tested for use as metrics/indicators of wetland condition. Candidate metrics are selected based on their response to human disturbances that may adversely affect wetland health, and include measures of taxa richness, relative abundance, tolerant/intolerant taxa, dominant taxa, diversity and trophic structure. Examples of candidate metrics plotted in relation to human disturbance appear in Figures 5-2 and 5-3.

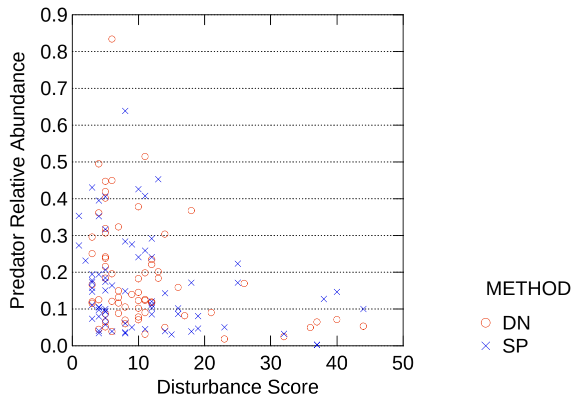


Figure 5-2 Relative Abundance of Predator Taxa in Relation to Human Disturbance

"Method" denotes invertebrate sample collection method, i.e. D-frame net (DN) or stovepipe sampler (SP).
Disturbance score increases with the amount of human alteration in the wetland or surrounding watershed.

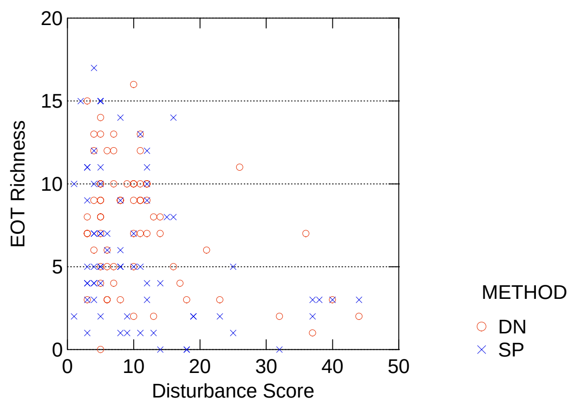


Figure 5-3 Taxa Richness for Mayflies, Dragonflies and Caddisflies in Relation to Human Disturbance

"EOT" denotes total Ephemeroptera (Mayfly), Odonata (Dragonfly/Damselfly) and Trichoptera (Caddisfly) taxa.
"Method" denotes invertebrate sample collection method, i.e. D-frame net (DN) or stovepipe sampler (SP).
Disturbance score increases with the amount of human alteration in the wetland or surrounding watershed.

The Biomonitoring Program is developing thresholds to describe incremental levels of wetland impairment for aquatic macroinvertebrate communities. This is necessary to enable the State to use biological monitoring data in regulatory and management decisions, develop wetland-specific biological criteria, and report on wetland condition with respect to water quality criteria. As part of this process, candidate reference sites were selected to document the range of natural conditions expected to occur in unimpaired wetland communities. Figure 5-4 illustrates comparisons of reference wetlands and highly disturbed sites for selected invertebrate metrics.

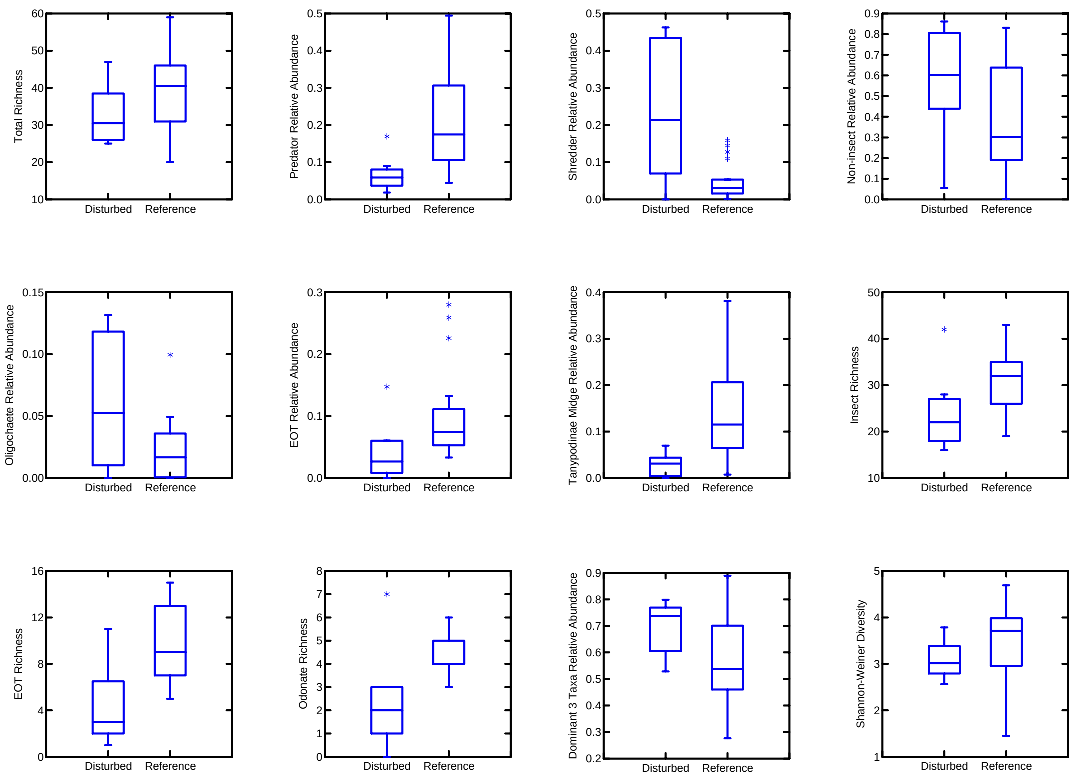


Figure 5-4 Comparison of Selected Wetland Invertebrate Metrics for Reference and Disturbed Sites (D-frame Net Samples)

"EOT" denotes total Ephemeroptera (Mayfly), Odonata (Dragonfly/Damselfly) and Trichoptera (Caddisfly) taxa.

The Biomonitoring Program will continue to refine candidate metrics and reference criteria to incorporate new data and identify modifications that may be needed to address habitat and classification issues. During 2004, the Biomonitoring Program plans to establish draft criteria for designating biologically impaired wetlands using a tiered approach which may be linked to aquatic life uses.

Section 5-4 EXTENT OF WETLAND RESOURCES

Wetland Loss Tracking in Maine's Organized Towns

Contact: Mike Mullen, DEP BLWQ, Division of Land Resource Regulation (DLRR)

Tel: (207) 287-4728 email: Mike.Mullen@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/wetlands/threats.htm

With the implementation of the changes to the Natural Resources Protection Act (NRPA), Maine DEP is now tracking permitted wetland losses and mitigation in the organized townships through an application tracking system. When applications for freshwater wetland alterations are logged in, the amount of fill or area to be altered is also entered and tracked by wetland type and geographical location. This system will enable the Department to monitor and report on annual wetland losses. Wetland mitigation and DEP permitted impacts for 2002 and 2003 are summarized in Tables 5-1 and 5-2 below.

Table 5-1 Wetland Mitigation Totals in the Organized Towns

Source: Maine DEP Wetland Loss Tracking System

Area of Mitigation (Acres) – 2002 (1/1/2002-12/31/2002)					
Wetland Type	**Creation**	**Enhancement**	**Preservation**	**Restoration**	**Total**
Forested	0.34	0	15.2	0.75	**16.29**
Other/Mixed	1.28	0.52	26.26	0.13	**28.19**
Emergent	0.25	0.86	0	0	**1.11**
Scrub-shrub	0.19	0.5	5.58	0	**6.27**
Open water	0.08	0	0.05	0	**0.13**
Riverine	0	0.06	0	0	**0.06**
Wet Meadow	0	0	0	10.0	**10.0**
Upland	0	0.14	160.01	0	**160.15**
Inter-tidal (other)	0	0	0.2	0	**0.02**
Subtidal (other)	0	0	0	0.93	**0.93**
Total	**2.14**	**2.07**	**207.3**	**11.82**	**223.33**

Area of Mitigation (Acres) – 2003 (1/1/2003-12/31/2003)					
Wetland Type	**Creation**	**Enhancement**	**Preservation**	**Restoration**	**Total**
Forested	1.89	11.65	210.62	1.08	**225.24**
Other/Mixed	0	0	0	0	**0.0**
Scrub-shrub	9.1	0.98	27.44	2.75	**40.27**
Open water	0	0	0	0	**0.0**
Riverine	0	0	1.73	0	**1.73**
Wet Meadow	0	1.0	0	0.4	**1.4**
Upland	0	0	0	0	**0.0**
Inter-tidal (other)	0	0.07	0	0	**0.07**
Subtidal (other)	0	0.06	0	0	**0.06**
Total	**10.99**	**13.77**	**239.78**	**4.23**	**268.77**

Table 5-2 Permitted Wetland Impacts in the Organized Towns

Source: Maine DEP Wetland Loss Tracking System

Area Impacted (Acres) – 2002 (1/1/2002-12/31/2002)										
Wetland Type	**Cranberry Permit**		**Full NRPA Permit**		**Tier I**		**Tier II**		**Total**	
	Filled	**Altered**	**Filled**	**Altered**	**Filled**	**Altered**	**Filled**	**Altered**	**Filled**	**Altered**
Emergent	0	0	5.82	0	0.22	0.28	0.32	0	**6.37**	**0.28**
Forested	0	0	5.84	0	10.26	1.27	2.37	0.84	**18.47**	**2.11**
Great Pond	X	X	0	0.02	X	X	X	X	**0.0**	**0.02**
Inter-tidal (mudflat)	X	X	0.01	0.04	X	X	X	X	**0.01**	**0.04**
Inter-tidal (other)	X	X	0.19	0.31	X	X	X	X	**0.19**	**0.31**
Inter-tidal (vegetated)	X	X	0.02	0	X	X	X	X	**0.02**	**0.0**
Open Water	0	0	0.01	7.9	0.21	0	0	0	**0.22**	**7.9**
Other/Mixed	0	0	0.13	0.13	3.21	0.06	3.59	0	**6.93**	**0.19**
Peatland	0	0	0	0	0	0	0	0	**0.0**	**0.0**
Riverine	X	X	0.68	0.02	0.06	0	0	0	**0.68**	**0.02**
Scrub-shrub	0	0	3.03	0.7	2.73	0.13	1.71	0	**7.47**	**0.84**
Subtidal (aquatic bed)	X	X	0	1.4	X	X	X	X	**0.0**	**1.4**
Subtidal (other)	X	X	16.0*	71.96	X	X	X	X	**16.0**	**71.96**
Wet Meadow	0	0	0	0	3.08	0	0.63	0	**3.71**	**0.0**
Upland	0	0	0.07	0	0	0	0	0	**0.07**	**0.0**
Total	**0.0**	**0.0**	**31.81**	**82.49**	**19.71**	**1.74**	**8.63**	**0.84**	**60.15**	**85.07**

X = Tier review not available for projects located in these resources

* area impacted by dredge spoils disposal

Table 5-2 Permitted Wetland Impacts in the Organized Towns (continued)

Area Impacted (Acres) – 2003 (1/1/2003-12/31/2003)										
Wetland Type	**Cranberry permit**		**Full NRPA permit**		**Tier I**		**Tier II**		**Total**	
	Filled	**Altered**	**Filled**	**Altered**	**Filled**	**Altered**	**Filled**	**Altered**	**Filled**	**Altered**
Emergent	0	0	0.96	0	0.35	0	0	0	**1.31**	**0.0**
Forested	0	0	11.56	15.7	11.7	0.59	3.78	0	**27.06**	**16.3**
Great Pond	X	X	0.01	0	X	X	X	x	**0.01**	**0.0**
Inter-tidal (mudflat)	X	X	0.01	0.01	X	X	X	x	**0.01**	**0.01**
Inter-tidal (other)	X	X	0.43	0.61	X	X	X	x	**0.43**	**0.61**
Inter-tidal (vegetated)	X	X	0.05	0.2	X	X	X	x	**0.05**	**0.2**
Open water	0	0	0	0.07	0	0	0	0	**0.00**	**0.07**
Other/Mixed	0	0	0.53	0.29	2.3	0	0	0	**2.83**	**0.29**
Riverine	X	X	1.5	0.11	0	0	0	0	**1.5**	**0.11**
Scrub-shrub	0	0	0.98	0.74	3.63	0.27	1.67	0	**6.28**	**1.01**
Subtidal (aquatic bed)	X	X	0	0.55	X	X	X	x	**0.0**	**0.55**
Subtidal (other)	X	X	0.04	0.35	X	X	X	x	**0.04**	**0.35**
Wet Meadow	0	0	1.39	5.63	1.61	0	1.25	0	**4.24**	**5.63**
Upland	0	0	0.01	0	0	0	0	0.45	**0.01**	**0.45**
Total	**0.0**	**0.0**	**17.47**	**24.26**	**19.6**	**0.87**	**6.7**	**0.45**	**43.77**	**25.58**

X = Tier review not available for projects located in these resources

Wetland Loss Tracking in Maine's Unorganized Territories

Contact: Marcia Spencer-Famous, Senior Planner, DOC LURC, Planning & Administration Division

Tel: (207) 287-4933 email: Marcia.Spencer-Famous@SPAM-ZAPmaine.gov

On January 5, 2004, the Maine Land Use Regulation Commission's (LURC) new Geographically Oriented Action Tracker (GOAT) system went on-line. This new database is much more powerful that our previous system, and has allowed the incorporation of our wetlands loss tracking database into LURCs overall data tracking system. Previously, wetland loss data were kept in a separate database. This change will facilitate two improvements. First, in addition to the wetlands loss data that have previously been gathered, such as wetland type, size of area lost, etc, GOAT will now allow the wetland loss to be tied to the tax lot using GIS. Second, it will increase data collection consistency because it is now a part of LURCs larger permit tracking system rather than being a separate database. Because of staff and management attrition and budget cuts, wetlands loss tracking up until now has been inconsistent, making reporting of losses for 2003 less than complete. LURC now anticipates in coming years to be able to generate realistic reports on wetland losses in the State's unorganized townships and territories.

Section 5-5 ADDITIONAL WETLAND PROTECTION ACTIVITIES

Support for the following activities was provided by a federal Clean Water Act Section 104(b)(3) Wetland Program Development Grant, which was awarded to Maine DEP through its Performance Partnership Agreement with EPA Region I:

Beginning with Habitat: An Approach to Conserving Open Space

Contact: Molly Docherty, DOC BGNA, Natural Areas Program (MNAP)

Tel: (207) 287-8045 email: Molly.Docherty@SPAM-ZAPmaine.gov

Related Website: www.beginningwithhabitat.org

Lead Agencies: Maine Natural Areas Program (MNAP), Maine Department of Inland Fisheries & Wildlife (MDIFW), and The Maine Audubon Society (funded in FY02 and FY03)

This project is a cooperative effort bringing together State, federal and private non-profit sectors to assist communities with land use planning for natural resource conservation. The project goal is to conserve high value wildlife habitat by incorporating the best available natural resource information into local planning efforts. The project uses a landscape-based approach that integrates data on shoreland zones, wetlands, habitats of special management concern, and a fragmentation analysis of the landscape. These data come from a U.S. Fish and Wildlife Service predictive habitat model, MDIFW rare species inventories, MNAP rare plant and natural communities' inventories, a wetland characterization model developed by the State Planning office, and remote sensing data.

A map set is individually tailored for and provided to each town, along with technical assistance materials to help with land use, comprehensive and open space planning efforts. The Beginning with Habitat project presents these materials to town planners in public forums, along with an educational presentation developed by the Maine Audubon Society on the effects of development on wildlife habitat loss and fragmentation. During 2002 and 2003, maps with associated educational materials and digital data were made available to 58 towns, and presentations were made in 42 towns. An improved website for the project is under development, which will provide an efficient delivery system for maps and other planning information to towns and the general public.

An Ecological Assessment of Aroostook Hills and Lowlands

Contact: Molly Docherty, DOC BGNA, Natural Areas Program (MNAP)

Tel: (207) 287-8045 email: Molly.Docherty@SPAM-ZAPmaine.gov

Related Website:

www.maine.gov/doc/nrimc/mnap/programs/inventories.html#Aroostook

Lead Agency: Maine Natural Areas Program (MNAP) (funded in FY02 and FY03)

The goal of this project is to identify undocumented ecologically significant sites within a 2.5 million-acre area in the northeastern corner of the State, including most of eastern Aroostook County and the northern third of Penobscot county. The project will also update and collect data on known sites that may be poorly documented or out of date. The Maine Natural Areas Program administers surveys for rare plants and exemplary natural communities, and the Maine Department of Inland Fisheries and Wildlife administers surveys for rare animals. During the 2002 and 2003 field seasons, MNAP staff surveyed 43 sites. Preliminary results include the identification of 31 new natural community/ecosystem occurrences, and 28 new rare plant populations. Plans for the completion of the project include a final field season in 2004, to be followed by data compilation, landowner follow up and completion of a final report in March 2005.

Wetlands Characterization

Contact: Elizabeth Hertz, State Planning Office, Coastal Program

Tel: (207) 287-8935 email: Elizabeth.Hertz@SPAM-ZAPmaine.gov

Related Website (mapping): http://megisims.state.me.us/website/spowetc/viewer.htm

Lead Agency: Maine State Planning Office (SPO) (funded in FY03)

The Wetlands Characterization was developed as a rapid, flexible method to describe wetland functions in a landscape context useful for a variety of planning applications. The development of the Characterization resulted from recommendations made by the State Wetlands Conservation Task Force and identified in the State Wetlands Conservation Plan. The goal of this project was to investigate the inclusion of additional data layers and queries, and rerun the Characterization based upon updated data to insure that it reflects the most accurate assessment of wetlands at the State level. The results of the analysis will be made available to towns, land trusts, and watershed associations through the Beginning with Habitat Program, MeGIS, and an interactive mapping service.

The Wetlands Characterization will help provide full protection for Maine's priority wetland systems, increase the knowledge base about Maine's wetlands for use at all levels of protection, and promote the appreciation, stewardship, and voluntary protection of Maine's wetland resources by private landowners, towns, and non-governmental entities.

Statewide Atlas and Conservation Assessment of Maine's Damselflies and Dragonflies

Contact: Philip deMaynadier, IF&W BRM, Endangered Species Group

Tel: (207) 941-4239 email: Phillip.deMaynadier@SPAM-ZAPmaine.gov

Related Website: http://mdds.umf.maine.edu/

Lead Agency: Maine Department of Inland Fisheries and Wildlife (MDIFW) (funded in FY03)

Section 104(b)(3) funding was provided to complete MDIFWs Maine Damselfly and Dragonfly Survey, and to publish a statewide atlas and conservation assessment of Maine's diverse damselfly and dragonfly fauna. This project will help to prioritize protection efforts by disseminating information on the distribution and wetland-type preferences of the state's rarest odonates. Potential users include state agencies, environmental consultants, landowners, land trusts, environmental groups, and the general public. This publication will summarize seven years of data collection and life history study on Maine's 163 species of damselflies and dragonflies.

Invasive Plant Awareness Campaign

Contact: Molly Docherty, DOC BGNA, Natural Areas Program (MNAP)

Tel: (207) 287-8045 email: Molly.Docherty@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/doc/nrimc/mnap/programs/invasives.html

Lead Agency: Maine Natural Areas Program (MNAP) (funded in FY03)

Invasive species continue to spread into Maine's wetlands and waterways. The ramifications for our wetland systems are habitat degradation and loss of native species diversity. Some of Maine's wetlands have already been degraded by invasive plants, but many aggressive invaders have not yet reached Maine. Preventing the arrival of some of these species will depend on increasing public awareness of the invasive species problem.

Goals of the invasive plant awareness campaign are to: 1) Raise the profile of the invasive species problem through presentations and displays at garden shows and state fairs; 2) Create educational materials or programs on invasive plant species suitable for use in schools, parks, nature centers, camps and other educational settings; 3) Provide presentations and materials on the threat of invasive plants to watershed groups; and 4) Develop a display promoting the value of native aquatic plants for use at annual milfoil summits and aquatic invasive events.

Local Conservation of Significant Vernal Pools

Contact: Sally Stockwell, Director of Conservation, Maine Audubon Society

Tel: (207) 781-2330 email: sstockwell@SPAM-ZAPmaineaudubon.org

Related Website: www.maineaudubon.org/resource/index.shtml

Lead Organization: Maine Audubon Society (funded in FY02)

This project will increase the protection of significant vernal pools in southern Maine that have been identified as the most likely to become victims of urban sprawl. Maine Audubon will apply Best Development and Planning Practices by working with at least two towns to inventory pools, assess their relative conservation values, and develop vernal pool conservation plans. This project is designed to build on work conducted by a University of Maine Ph.D. student on vernal pool landscape issues in Kennebunkport, North Berwick and Biddeford.

The Town of Falmouth has completed an inventory of vernal pools with assistance from Maine Audubon and the University of Maine. Potential vernal pools were identified using aerial photographs, and 98 pools were surveyed by volunteers. Each vernal pool was then ranked for its conservation value. Work on a vernal pool conservation plan for Falmouth is currently underway. The Town of Kennebunkport also plans to begin work on a vernal pool survey for 2004.

The Maine Audubon Society is offering a new 2004 publication entitled "Forestry Habitat Management Guidelines (HMGs) for Vernal Pool Wildlife," which provides guidance to landowners and forest managers interested in conserving vernal pool wildlife in managed forests of the Northeast. The HMGs are intended to serve as a companion to a related document, published in 2002, entitled "Best Development Practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern U.S." Together, these publications provide techniques and recommendations designed to help maintain functioning vernal pool landscapes throughout the glaciated Northeast.

Copies of these two documents are available from The Maine Audubon Society. For more information on requesting these publications – please visit the following URL: www.maineaudubon.org/news/c040504.shtml or contact Becca Wilson of The Maine Audubon Society at (207) 781-2330 ext. 222.

Chapter 6 GROUND WATER MONITORING & ASSESSMENTS

Contact: Marianne DuBois, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-2115 email: Marianne.S.DuBois@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/gw.htm

Section 6-1 OVERVIEW

Public interest in ground water focuses primarily on its use as a drinking water supply for humans and livestock and as a source of process water for industry. More than 60% of Maine households draw their drinking water from ground water supplied by private or public wells, or springs. Ground water is the source of approximately 90% of all the water used by households with individual supplies. In addition, nearly 75% of the water needed for Maine livestock is provided by ground water. Over 80% of the ground water withdrawn from aquifers in the state is used for private or public drinking water. In contrast, ground water used for industrial purposes is only 11% of the total volume withdrawn for all purposes. Federal requirements for surface water treatment are a driving force behind the shift to ground water use for public water supplies.

Generally, the ground water supply in Maine is adequate. The total withdrawal of ground water by all water users is less than one percent of the annual ground water recharge each year. The remaining annual ground water recharge is lost through evapotranspiration or discharges to ponds, lakes, rivers, and streams. Seasonal variations in water tables can lead to local ground water shortages. The Maine Drought Task Force (convened by the Maine Emergency Management Agency) publishes information on Maine ground water and surface water levels at the following website: www.maine.gov/mema/drought

Ground water is withdrawn from three basic types of aquifers in Maine: unconsolidated glaciofluvial deposits (stratified drift or sand and gravel aquifers), till, and fractured bedrock. The stratified drift deposits are the most favorable for development of large volume water supply wells, but these deposits are limited in size and distribution (less than about 10% of the state). The largest ground water withdrawals were in the Lower Kennebec, Lower Penobscot, Presumpscot, and Lower Androscoggin River basins (USGS 1995 figures). These areas contain major sand and gravel aquifers, and water demand is high due to the heaviest concentration of people and businesses. Discontinuous bedrock aquifers underlie the entire state and are used for domestic, commercial, industrial and agricultural purposes, and for small public supplies such as schools, restaurants, and summer camps. Wells in till do not generally yield large quantities of water and are most often used for individual domestic water supplies.

A significant portion of Maine's ground water may be threatened by contamination, particularly in unforested areas (approximately 11% of the State). Numerous wells in Maine have been made unpotable by pollution from specific point sources and also nonpoint source pollution. As public concern about ground water quality increases, more widespread monitoring and detection of contamination is expected. The Maine Environmental Priorities Project identified drinking water quality, including private and public well supplies, as a high risk issue ("Report from the Steering Committee, Consensus Ranking of Environmental Risks Facing Maine", January, 1996). Because of slow ground water flow rates and low biological activity, ground water contaminants are extremely persistent. Centuries may be required for natural processes to restore some contaminated ground water to potable standards.

Major impediments to effective ground water protection in Maine are (1) absence of a complete ground water quality database to assess the extent of degradation, (2) lack of data to quantify the impact of some nonpoint pollution sources, (3) inadequate State and Federal funding for ground water research and protection programs and (4) general public unfamiliarity with key ground water concepts and issues. Public misconception about ground water is probably the major factor contributing to degradation of this resource. Maine will continue to work with the USEPA to address these issues through Maine's Source Water Protection Program and other initiatives.

Section 6-2 Assessment of Ground Water Quality

In Maine, ground water is classified by its suitability for drinking water purposes. Under the Maine Water Classification Program, ground water 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 Human Services (DHS). Although there are many localities where ground water is unpotable and highly contaminated, no ground water is currently classified GW-B. The state is not currently attempting to designate non-attainment areas.

Detailed quantitative estimates of the statewide extent of ground water contamination are not currently available. In addition, current information about ground water contamination in Maine does not necessarily portray the situation accurately. This information reflects contaminants that have been looked for, where they have been looked for, and where they have been found. Further, the number of wells contaminated by a specific pollution activity does not necessarily reflect its overall ground water pollution potential since some activities (e.g. agriculture) occur in sparsely populated areas with few available wells to monitor.

Ground Water Monitoring

Monitoring of ground water in Maine is either site-specific or generalized. Monitoring at a particular site is typically done to gather data on water quality impacts of particular activities, and may or may not be research-related. Most of the ground water data collected in Maine is the result of permit conditions, enforcement agreements or impact assessments. Sources of this information are scattered in a number of state agencies including: the DEP Bureau of Land and Water Quality and DEP Bureau of Remediation and Waste Management; the Department of Transportation (DOT), Water Resources and Hazardous Waste Section; the Department of Human Services (DHS), Division of Health Engineering - Drinking Water Program, the DHS Environmental Health Unit, the DHS Health and Environmental Testing Laboratory; and the Department of Agriculture (Office of Agriculture, Food and Rural Resources, Board of Pesticide Control (BPC)). Other information is collected by the Department of Conservation, the Maine Geological Survey (MGS) and the U. S. Geological Survey (USGS). These datasets are stored on paper or in digital computer files. With the advent of the Environmental Groundwater Analysis Database (EGAD), many of these digital datasets that have been collected by or stored at the DEP are now readily available to the public or other agencies in either report or map form. The creation of new EGAD "backend" functions have also allowed users to easily link specific site information to associated water test results. This effort has greatly enhanced the DEP's ability to communicate and report ground water data to the EPA and other state and federal agencies.

Ambient monitoring refers to large area, long-term monitoring conducted to obtain trend information on ground water quality or quantity. The MGS and the USGS carry out these types of monitoring projects under several cooperative agreements. The USGS and MGS maintain a statewide network of ground water observation wells to track changes in water quality and quantity. The datasets thus derived are incorporated into both maps and reports and have proven invaluable to local planning boards and to State efforts such as the registration of underground oil storage tanks and site reviews of various land use proposals. For the purpose of this report, data derived from the DHS Public Water Supply Monitoring Program are used as ambient ground water quality data. These water tests are from single-source untreated public water supply wells.

Within the DEP, site-specific ground water monitoring data are obtained either by Department staff, permit-holders, or as a result of enforcement agreements. Ground water samples are generally tested in commercial laboratories according to EPA or DEP standard methods. The Bureau of Land and Water Quality requires ground water monitoring at project sites that are subject to its jurisdiction when an existing or proposed activity either poses a risk to ground water quality or quantity or an adverse impact has already occurred.

Activities that are considered a risk to ground water quality or quantity include: quarries, borrow pits, metallic mineral mines, fuel storage/handling areas (both wood wastes and petroleum), golf courses, infiltration basins and wastewater treatment lagoon/spray irrigation areas. Also of concern are subdivisions utilizing large-volume or community subsurface wastewater disposal systems, or nitrate-reduction (e.g. peat-matrix) systems. Areas with shallow-to-bedrock soils that are within sensitive lake watersheds are also generally required to monitor ground water.

Consistent monitoring requirements for sites engaged in the same type of activity have been developed, based on similarities in the site usage and wastewater quality generated. The facilities covered under this program are limited to those using land-application of wastewater as a means of disposal. The facility types include small wastewater generators, principally seasonal campgrounds, municipal sanitary wastewater facilities, and blueberry processors. Required parameters and monitoring frequencies are generally field parameters (water elevation, temperature, pH, and specific conductance, indicators of nitrogen loading and speciation for sites treating sanitary wastewater (nitrate and TKN), and indications of organic-matter loading (COD) and dissolved oxygen). Additional monitoring requirements might apply to any facility receiving wastewater with characteristics substantially different from those assumed in the standard monitoring requirements. Monitoring requirements for industrial and commercial facilities other than blueberry processors will continue to be considered on a case-by-case basis, depending on the pollutants, pollutant concentration, and volume of wastewater generated.

Development of a database including analyte data from these and other facilities is ongoing, and discussed further in the section on the EGAD ground water database.

Similarly, the DEP Bureau of Remediation and Waste Management (BRWM) requires periodic sampling and/or reports from hazardous waste storage facilities and generators. Additional sampling may also be required under the terms of enforcement agreements. BRWM field staff sample ground water to determine ground water quality impacts associated with uncontrolled hazardous waste sites, oil or fuel spills from stationary or mobile sources and from approved hazardous waste or hazardous material storage facilities. BRWM requires ground water monitoring at all licensed landfills where the monitoring of upgradient and downgradient wells for detection parameters is required, at a minimum. Detection parameters are considered reliable indicators of potential effects of the landfill on ground water. Facilities are required to monitor for an extensive list of compliance parameters whenever detection monitoring indicates a significant trend of change in ground water quality. Other BRWM ground water monitoring is intended to help locate new water supplies to replace those polluted by leaking underground storage tanks (LUSTs).

In early 1998, several incidents of MTBE contamination arising from gasoline spills focused the attention of the public and policy makers on the potential threat to ground water posed by MTBE. The Governor directed state health (DHS) and environmental (DEP, MGS) agencies to study the occurrence and concentrations of MTBE in the State's drinking water supplies. The study is summarized in the "Public Health and Environmental Concerns" section of this report.

Sand and gravel aquifers are geologic settings that are particularly susceptible to adverse ground water impacts and they are significant sources of drinking water. MGS sand and gravel aquifer maps are useful in defining aquifer boundaries. Since these boundaries are mapped in a GIS (geographic information system), they can be combined with the DHS water supply data and the contaminant site and land use data available in DEP databases. This type of spatial analysis allows current and future threats to the ground water contained in aquifers to be better understood and remediated or avoided altogether.

Aquifer Characterization Activities

Contact: Marc Loiselle, DOC BGNA, Maine Geological Survey, Applied Geology Division, Hydrogeology Section

Tel: (207) 287-2801 email: Marc.Loiselle@SPAM-ZAPmaine.gov

Related Websites:

(Aquifer Fact Sheet) www.maine.gov/doc/nrimc/pubedinf/factsht/hydro/hydfact.htm

(Aquifer Mapping) www.maine.gov/doc/nrimc/pubedinf/factsht/hydro/aquifmap.htm

As far as characterizing the physical and chemical attributes of the State's stratified drift aquifers, the Maine Geological Survey (MGS) is at the "average characteristics" stage. While site specific data do exist for some aquifers (primarily in the vicinity of ground water resource evaluation projects and contamination sites), complete physical pictures of most aquifer systems do not exist. Hard data on the exact natural chemical processes controlling ground water chemical evolution that occur along a flow path in sand and gravel aquifers are also lacking. MGS has some ambient water quality data but has not yet fully characterized any particular aquifer system.

MGS has developed a program to annually collect ambient bedrock ground water samples for background quality from different geographic and geologic settings in the state; Camden, Rockland, Rockport area (2000), northeastern Maine in the Presque Isle area (2001), and west central Maine in the Weld area (2002). This program was suspended in year 2003 due to budget constraints, but it will be continued in 2004 on the east side of Penobscot Bay. Ongoing studies of arsenic in Maine ground water wells are being conducted through cooperative efforts between MGS, the University of Maine, and the USGS. A program to collect basic data on bedrock aquifer characteristics from well drillers is ongoing. Finally, the stratified drift aquifer mapping program is continuing, with an effort to complete mapping of such aquifers at a 1:24,000 scale. This mapping program is focused in the same region as the bedrock ground water quality studies.

Overview of Ground Water Contamination Sources

Most ground water contamination in Maine originates from nonpoint source pollution rather than point source pollution. Table 6-1 lists the contaminant sources that are the greatest threats to ground water quality.

Table 6-1 Major Sources of Ground Water Contamination

Contaminant Source	Ten Highest Priority Sources (X)	Factors Considered in Selecting a Contaminant Source	Contaminants
Agricultural Activities			
Agricultural chemical facilities			
Animal feedlots			
Drainage wells			
Fertilizer applications	X	BCDE	EA
Irrigation practices			
Pesticide applications	X	AFGBE	ABD
Storage and Treatment Activities			
Land application			
Material stockpiles			
Storage tanks (above ground)	X	ACDE	DEC
Storage tanks (underground)	X	ADEC	DEC
Surface impoundments			
Waste piles			
Waste tailings			
Disposal Activities			
Deep injection wells			
Landfills	X	ACDE	EGHC
Septic systems	X	ABDC	EJCKL
Shallow injection wells	X	DC	CDH
Other			
Hazardous waste generators			
Hazardous waste sites	X	ABCDEF	CDHABM – non-halogenated solvents
Industrial facilities			
Material transfer operations			
Mining and mine drainage			
Pipelines and sewer lines			
Salt storage and road salting	X	ABCDFE	GH
Salt water intrusion			
Spills	X	ACDEFGH	ABCD
Transportation of materials			
Urban runoff			
Other sources			

Key 6-1 for the Factors and Contaminants Listed in Table 6-1 "Major Sources of Ground Water Contamination"

Factors Considered in Selecting a Contaminant Source		Contaminants Associated With the Source	
A	Human health and/or environmental risk (toxicity)	A	Inorganic pesticides
B	Size of population at risk	B	Organic pesticides
C	Location of sources relative to drinking water sources	C	Halogenated solvents
D	Number and/or size of contaminant sources	D	Petroleum compounds
E	Hydrogeologic sensitivity	E	Nitrate
F	State findings, other findings	F	Fluoride
G	Documented from mandatory reporting	G	Salinity/brine
H	Geographic distribution/occurrence	H	Metals
I	Other criteria, specified	I	Radionuclides
		J	Bacteria
		K	Protozoa
		L	Viruses
		M	Other, specified

The following discussion focuses primarily on nonpoint contamination sources that appear to be responsible for most ground water contamination in the State: agriculture, hazardous substance sites, spill sites, landfills, leaking underground and above-ground storage tanks, road-salt storage and application, septic systems, shallow well injection, saltwater intrusion, and waste lagoons. In addition to these major sources, diverse land uses such as sludge, septage and residual land applications, metallic mines, borrow pits and quarries, golf courses, dry cleaners, automobile service stations, cemeteries, and burned buildings are also potential threats to ground water.

Petroleum Product Spills and Leaking Underground Storage Tanks

Underground Tanks

Contact: Bruce Hunter, DEP BRWM, Division of Technical Services

Tel: (207) 287-7672 email: Bruce.E.Hunter@SPAM-ZAPmaine.gov

Related Websites: (General Information) www.maine.gov/dep/rwm/ustast/index.htm

(Latest Rules for UST Facilities) www.maine.gov/sos/cec/rcn/apa/06/096/096c691.doc

Studies Lead to New Rules

The previous 305(b) report from 2002 discussed two studies undertaken to see how effective the Underground Storage Tank (UST) laws were in the field. These two studies along with a third, additional, study led to changes in the UST rules. The source of funding for these studies is the Maine Groundwater Oil Clean-up Fund, which derives its funds from a fee placed on all oil and gasoline imported into the state. These three studies are summarized below:

1) Study of Underground Storage System Annual Inspection Reports, July 2000

Maine UST regulations do require annual inspections of all UST facilities. However, these regulations do not require the results of the inspections to be sent in to the DEP, instead the inspection results are to be kept on-site at the facility. The objectives of the study were to determine how many facilities were actually inspected, what problems were found, and once identified, which problems were corrected.

As a result of the study, many facilities were found not to be conducting an annual inspection, and many of the problems found during annual inspections were not being corrected. Following the publication of the report, legislation was passed requiring the results of the annual inspections to be sent to the DEP. A detailed annual inspection form was designed that among other things, requires the inspector to view and test nearly every component of an underground storage facility. This resulted in the creation of an entirely new class of skilled technician. Before, DEP- licensed Certified Tank Installers were allowed to inspect tanks. Now, the newly created class of Certified Tank Inspector can also perform these annual inspections. To become a licensed Certified Tank Inspector one must pass a rigorous, written test administered by the Board of Underground Storage Tank Installers.

The annual inspection requirement affects almost 3,200 facilities. The first deadline under this new rule was July of 2003. As of January 2004:

- 77% of the facilities had passed the annual inspection,
- 12% failed the annual inspection and have yet to report back on the status of the corrections to the DEP, and
- 11% failed to have their USTs inspected (or have not yet delivered the report to the DEP)

The new rules allow streamlined procedures for prohibiting delivery to tanks that have not passed the annual inspection. The full report can be viewed at:

www.maine.gov/dep/rwm/ustast/ustinspectionreportintro.htm

2) Study of Cathodically Protected Underground Storage Systems, January 2001

Maine UST regulations require annual monitoring of cathodically protected storage system components. The objective of the study was to determine what percentage of cathodically protected tanks and components meet established criteria. As a result of the study, rules governing USTs now require three passing voltmeter readings spaced along the centerline of the cathodically protected tank up from one passing reading as was previously allowed. These new rules will become effective in the spring of 2004. The full report can be viewed at: www.maine.gov/dep/rwm/publications/cpreport.htm

3) Dispenser and Submersible Pump Study, October 2003

The main objective of this study was to quantify the frequency and estimate the severity of leakage from motor fuel dispensers and submersible pumps associated with USTs. During the course of the study 99 facilities, 253 dispensers, and 107 submersible pumps were visited and inspected. The inspections found:

- 46% of the dispensers without sumps had soil contamination in excess of DEP's standard, which is 100 ppm total petroleum hydrocarbons (100 ppm TPH).
- 63% of the submersible pumps without sumps had soil contamination in excess of DEP's standard, 100 ppm TPH.
- 10% of the sumps (dispenser pans under a dispenser or the submersible pump sump on the top of a UST) contained enough product to be considered "evidence of a possible leak" by the DEP. (UST owners must report each incident of "evidence of a possible leak" to the DEP.)
- 47% of the facilities visited had "evidence of a possible leak". Note that one facility can have many dispensers and submersible pumps.

The results of this study led to the following changes in Maine's UST rules:

- Dispenser sumps and sensors are required on all new dispensers.

Previously, facilities were allowed to assume that if there was a leak underneath the dispenser, product would fill the bottom of the dispenser, rise to the level of the secondary containment piping, exit the dispenser sump and flow downhill through the secondary containment piping, fill the sump on top of the UST, and trigger the alarm (sensor) located there. This method is not reliable because the connection between the dispenser sump and the secondary containment piping is often not leak-proof. Placing sensors in each sump underneath a dispenser will signal a leak much more quickly and reliably than the previous method.

- New dispenser sumps must have an opening large enough to catch all product dripping from the dispenser or flowing into the dispenser.

The study noted that the throat of the sump beneath many dispensers was very narrow when compared to the footprint of the dispenser. This allows leaking product from the dispenser to drip on the outside of the sump. Inevitably, this flow of product into the soil around the dispenser will cause contamination.

These new rules will become effective in the spring of 2004. The full report can be viewed at: www.maine.gov/dep/rwm/ustast/pdf/sumpstudyreport.pdf

Maine's New Underground Storage Tank Siting Law

Effective September 30, 2001, it is prohibited to install new motor fuel, waste oil, and marketing and distribution underground storage tank (UST) facilities within 300 feet of a private drinking water supply well, within 1000 feet of a public drinking water supply well, or on the "source water protection area" of a public water supply (as mapped by the DHS Bureau of Health). A process to allow for variances is included in the regulations.

Effective August 1, 2002 the installation of new motor fuel, waste oil, and marketing and distribution UST facilities over significant sand and gravel aquifers is restricted, although not prohibited. The reason for this restriction is that many of these significant sand and gravel aquifers are likely future sources of water supplies for cities and towns.

During this initial period of enactment (with the first part of this siting law in effect for over two years and the second part in effect for over one year) the law appears to be working as designed. To date, the DEP knows of only four UST installations affected by this regulation. This number seems small, but it is possible that knowledgeable builders and developers are aware of the siting restrictions and are avoiding the placement of facilities in areas restricted by this regulation.

The four known cases that were affected by this regulation are described in the following paragraphs.

Case 1 - A storeowner with a small lot at a crowded intersection wished to install a new UST facility. A marketing and distribution UST was not allowed at this site. Also, there was not enough room on the lot for an aboveground storage tank (AST) to satisfy the setback requirements of fire codes. To date no AST has been installed.

Case 2 - A chain of convenience stores bought a lot next door to one of its stores with the plan to add a diesel dispenser island. Both the existing lot and the new lot were within 1000' of a community water supply. Although the new UST would be on the original site, and therefore allowed under the new regulations, the piping and the diesel dispenser would extend onto the new lot. This was not allowed. The site owner changed the layout to keep all piping and the new dispenser on the original site. Even though traffic routes and parking lots extended onto the newly acquired lot this arrangement complied with the new regulations.

Case 3 - Another site had USTs at one time, but they were removed several years ago. Under the siting regulation, once tanks come out, they cannot go back in if the site (as in this case) is within the regulated distance from private and public water supplies. Because of this new UST siting law, no USTs were allowed. The small size of the site, the location of the store on the site, the required fire protection setbacks, and the presence of a wetland meant a traditional AST installation was also prohibited. The solution was to build a large above ground concrete vault with a sheet metal roof to house a 15,000-gallon tank.

Case 4 - Private wells were close to a prime convenience store site, and the site owners did not wish to deal with the loss of parking space and other aspects of an aboveground storage tank. The result was the installation of a tank manufactured by ArmorVault™. These steel tanks inside a concrete vault are similar to those made by ConVault™, but the entire vault is buried. Unlike traditional "vaulted" tanks where a large underground structure houses the tank and leaves ample room to walk around the tank, these "below-grade, aboveground storage tanks" have small clearances of approximately 2" between the tank and the inside of the vault wall on three sides, with a large clearance of 2' to 3' on one end of the tank. The facility has been in operation for less than one year.

Leaking Underground Tanks and Drinking Water Wells

In December of 1994, the DEP created the Leaking Underground Storage Tank (LUST) Remediation Priority List to keep better track of clean-up sites and to provide an objective scoring system to determine which sites received scarce clean-up dollars. In general, the higher the score, the more quickly resources are allocated to clean up a site. Since its inception, a total of 1,233 sites have been placed on the priority list in the "active" category (requiring clean-up), 842 sites have been "closed" (site has been cleaned-up to a given standard and therefore taken off the list). As of March 2004, there were 365 active sites on the list. The sites on the priority list are limited to those contaminated by petroleum products. Table 6-2 shows the number of private water wells and public water supplies contaminated by petroleum products or threatened with contamination by petroleum products as of March 2004. Note that one active site can contaminate or threaten more than one well.

Table 6-2 Current (March 2004) LUST Remediation Priority Sites – Contamination Summary

Number of Contaminated Wells*	Number of Contaminated Public Water Supplies	Number of Threatened Wells*	Number of Threatened Public Water Supplies
348	23	268	35

* Does not include public water supplies.

Although many sites are closed and removed from the active priority list each year, new sites are also discovered and placed on the active priority list. For example, during the years 2002 and 2003, 291 known sites were closed, but 292 new sites were added. To reduce this backlog of active sites on the priority list, the DEP created two permanent staff positions, both of which are in the Bangor field office. These two positions, a Certified Geologist and a Project Manager, were filled in December 2001 and February 2002, respectively.

Tanks in the Ground in Maine

In 1985, legislation passed that required the registration of USTs and their removal according to a phased-in schedule. Removal was prioritized to first eliminate tanks posing the greatest threat to ground water. As of March 2004, contractors had either removed or cleaned and "abandoned in place" over 37,000 tanks. Of this total, more than 32,000 were tanks constructed of bare steel (where tank walls have no protective coating and no cathodic protection). These tanks are very likely to leak and cause ground water contamination. Over 29,000 of these bare-steel tanks were removed before the October 1997 deadline, one year before the Federal deadline of October 1998. Since then, Maine's active, registered, bare-steel tank population has been reduced to a minute but stubborn population of 266 tanks. Most bare-steel tanks are discovered, registered (added to our database), and removed within a few months. This is especially true when a bare steel tank is discovered during the sale of real estate. However, some tanks are discovered, then registered, but not removed for many months. Most of these remaining bare-steel tanks are residential, "consumptive use" heating oil USTs, meaning that they are used by homeowners.

The DEPs TANKS database currently (as of March 2004) shows 5,343 active, registered USTs. The total storage capacity (volume) of these active USTs amounts to 39.3 million gallons with over half of the volume registered to store gasoline. Details of the UST products and volume figures are provided in Table 6-3 below.

Table 6-3 Information on Active, Registered USTs as of March, 2004

Product Stored	Volume (millions of gallons)	Percentage
Gasoline (no Aviation Fuel)	21.04	54%
Heating Oil (#1 and #2)	9.75	25%
Diesel	6.31	16%
Other (includes petroleum and non-petroleum products)	2.15	5%
Total	**39.25**	**100%**

New Underground Storage Tank Database

The DEP's underground storage tank database has undergone a $462,000 dollar upgrade to make it easier for the six-person tanks enforcement staff do its job and to have more data available online for the entire Response Division. This, in turn, should provide response staff with information needed to more efficiently coordinate the clean-up of petroleum and hazardous material spills. Also, the database can now store "histories." Previously, most of the information was limited to only a current snapshot of the data. Now the results of inspections and the history of enforcement actions and correspondence can be viewed. This allows better tracking of inspections, "evidence of possible leaks", and all corrective actions for enforcement cases. In addition to these improvements, data from the DEP Bureau of Air Quality (BAQ) can now be entered directly into the database.

Spill-Proof Gasoline Cans

Through the years, DEPs Response Division has visited many homes and small businesses in order to investigate and clean up spills. During these visits, staff has seen first hand just how plentiful petroleum-powered tools and toys are in this state. They also see how these machines are used, stored, and filled with fuel. When one considers these activities in light of how often gasoline constituents are discovered in drinking water wells that are far from any gas station or convenience store, connecting a common cause and effect was not difficult. So the DEP decided that there was more that could be done in the home to prevent ground water contamination around the home. The main result of this effort was to develop regulations to require the sale of spill-proof gasoline cans in Maine. In addition to the regulations, staff members from BRWM and BAQ have written informative articles about spill proof gas cans for distribution to newspapers and have exhibited the cans at various fairs and public events. These outreach efforts appear to have been effective and current plans are to continue with them into future.

Above Ground Storage Tanks

Contact: David McCaskill, DEP BRWM, Division of Technical Services

Tel: (207) 287-7056 email: David.McCaskill@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/rwm/ustast/index.htm

Above Ground Storage Tank Spill Information

Since 1995, when the Maine DEP started keeping track of spills from above ground storage tanks (ASTs) there has been an **average of one heating oil spill per day from ASTs at single family residences!** One reason for this statistic is the prevalence of ASTs in Maine. The 1990 U.S. Census figures show that 70% of Maine households are heated with oil. The vast majority of these households have 275 gallon ASTs located either in the basement or outside the residence. In the nine years of record keeping, 2001 had the highest number of spills from heating oil tanks at single family residences with 592 spills. There were 443 spills in 2002 and 439 spills 2003, placing both years slightly above the average of 406 spills per year. Except for 1998, the single most common cause of spills from single family residential ASTs from 1995 through 2003 was corrosion. Single family residential AST-related spills were also caused by tank overfills, ruptures, tip-overs, and other mishaps.

Installing a filter protector over the oil filter is the simplest way to prevent snow and ice from breaking the filter off of an outside tank. To encourage homeowners to take this step, DEP contracted with an advertising agency to produce a public service announcement (PSA) that was aired frequently in early 2002. Although it is difficult to determine how many filter protectors have actually been installed because of this advertising campaign, the DEP did receive many phone calls requesting information on filter protectors. The DEP soon made another version of this ad for summertime use, and February 2004 saw a rebroadcast of the original PSA via both paid advertisements and public service announcements. For this rebroadcast, pre- and post-statewide surveys were conducted to measure the effectiveness of the advertising campaign. The results of this survey are not yet available.

The frequency of spills makes home heating oil tanks significant contributors to ground water contamination. Aside from single family residential ASTs, other ASTs also contribute to ground water contamination, but the number of spills involved are much smaller. In 2002 and 2003 only 181 and 212 heating oil spills, respectively, occurred from ASTs serving structures other than single family residences. In 2002, an additional 85 spills came from ASTs storing other petroleum products, such as gasoline; and only 60 spills from these types of tanks occurred in 2003. Overfilling was the single largest cause of these spills, with mechanical failure and corrosion also being significant causes of spills.

In contrast to the many household AST's, there are fewer AST's requiring permits from the Department of Public Safety (combustible fuel, tanks over 660 gallons, or installations with over 1,320 gallons aggregate). From June 1996 through December of 1999, permits for 495 ASTs were issued. This is an average of 138 tanks permitted per year. From 2000 through 2003, only 97, 104, 121, and 134 ASTs were permitted each year, respectively. The annual average number of new AST permits from 2000 through 2003 declined to 114. It should be noted that these numbers do not include tanks storing liquefied petroleum since this product does not pose a threat to ground water.

The DEP's Home Heating Oil Tank Replacement Program started in 1998. This program uses money from the State's ground water insurance fund to replace old, unstable, and/or leaky tanks and supply lines at low-income households. Through this program new, properly installed, UL80 (bottom outlet to prevent corrosion) tanks are installed free of charge. This highly successful program is conducted by local social service agencies that work with low-income households. Costs average about $1,100 per new tank installation.

Spill Prevention, Control & Countermeasures Program for Above Ground Tanks

Contacts: David McCaskill, DEP BRWM, Division of Technical Services

Tel: (207) 287-7056 email: David.McCaskill@SPAM-ZAPmaine.gov

or Sara Brusila, DEP BRWM, Division of Technical Services

Tel: (207) 287-4804 email: Sara.Brusila@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/rwm/spcc/

In the spring of 2002, the Maine Legislature adopted legislation granting the DEP jurisdiction to enforce the federal Spill Prevention Control and Countermeasures (SPCC) regulations (40 CFR Part 112) for facilities that “market and distribute oil to others.” Retail gas stations and bulk plants comprise the majority of facilities that are subject to the state SPCC statute. Airports and marinas comprise a smaller portion of facilities subject to the statute. The State SPCC statute also mandated that the DEP provide education and outreach to affected facility owners to encourage their compliance with the federal SPCC rules. Starting in the summer of 2002, the DEP retained a private environmental consulting company to develop model SPCC plans and a series of public training seminars. The model SPCC plans for retail facilities and bulk plants and a SPCC Guidance Document were drafted in the fall of 2002, and were last revised in January, 2004.

The DEP hired an environmental specialist to staff the SPCC program in March of 2003. Then in June of 2003, the DEP developed and posted a web page devoted to SPCC planning for AST facilities (see the link above). During the summer of 2003, the DEP compiled a preliminary list of all AST facilities in the state, based upon several existing state databases. Approximately 470 facilities are subject to the State SPCC program. During the summer and fall of 2003, DEP staff began SPCC technical assistance site visits to these AST facilities. In the fall of 2003, the DEP held a series of four SPCC training seminars across the state. A total of approximately 170 people attended these seminars, including facility owners and operators, consultants, and governmental staff.

Current projects within the SPCC program include developing a list of consulting Professional Engineers available to facility owners for SPCC planning, periodic letters to AST facility owners regarding topics pertinent to AST facilities, and developing guidelines on managing stormwater accumulation in dikes. The SPCC program will continue conducting SPCC technical assistance site visits during the 2004 field season.

Bulk Plant Trends: Submerging of Bulk Plants just a Blip?

In the 2000 305(b) Report that covered the years 1998 and 1999, it appeared that large (30,000 gallons or greater) underground storage tanks (USTs) at bulk fuel plants were a new trend that might replace the traditional above ground bulk plant. However, subsequent data shows little evidence to support that view.

1996 was the banner year for large USTs at bulk plants. Eight large (30,000 gallons or greater) tanks were installed at three different facilities, with four 50,000 gallon USTs being installed at one location. Since 1996, only four large (30,000 gallons each) USTs have been installed at bulk fuel plants, and none of these occurred after the year 2000. In contrast, the number of large petroleum ASTs permitted in the years 1997 through 2003 increased each year from zero in 1997, to 3 in 1998, 1 in 1999, 4 in both 2000 and 2001, 1 in 2002 and 17 in 2003. Table 6-4 compares these recent trends between UST and AST bulk plants.

Table 6-4 New Large UST Bulk Plants vs. New Large AST Bulk Plants

Year	Large* Underground Storage Tanks at Bulk Fuel Plants	Large* Above Ground Storage Tanks at Bulk Fuel Plants
1996	8	0**
1997	0	0
1998	1	3
1999	0	1
2000	3	4
2001	0	4
2002	0	1
2003	0	17

* large means a tank capable of holding 30,000 gallons or more

** data available from 6/5/96 – 12/31/96 only

Spills

Contact: Lyle Hall, DEP BRWM, Division of Program Services

Tel: (207) 287-7499 Lyle.S.Hall@SPAM-ZAPmaine.gov

Related Websites: (Database Reports) www.maine.gov/dep/rwm/data/index.htm

(2002 Spill Report) www.maine.gov/dep/rwm/publications/pdf/2002statisticalreport.pdf

The Department's BRWM responded to approximately 5,508 reports of oil or hazardous material spills between January of 2002 and December of 2003. Of these 5,508 spills, 372 do not have completed reports and, therefore, are not included in this discussion. Over 74% of these responses involved discharges of petroleum products to soil and/or ground water. Between 2002 and 2003, response services personnel discovered over 114 wells that had been contaminated from these spills. Table 6-5 provides information on the 5,136 spills that had completed spill reports.

Table 6-5 Oil and Hazardous Materials Spills – January 2002 to December 2003

Spill Location Type	Percent of Total Spills	Number of Spills	Number of Wells Impacted
Business	23.27%	1,195	19
Government	7.18%	369	1
Residential	29.07%	1,493	78
School	2.06%	106	3
Terminal	11.84%	608	12
Transportation System	13.82%	710	1
Utility	8.26%	424	0
Other	4.50%	231	0
Total	**100%**	**5,136**	**114**

Agriculture

Contact: Craig Leonard, Maine Department of Agriculture, Office of Agricultural, Natural and Rural Resources, Agricultural Compliance Program

Tel: (207) 287-1132 email: Craig.Leonard@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/agriculture/oanrr/Compliance.htm

In 1992, the total estimated cropland and pastureland in Maine was greater than 566,000 acres. The agricultural community uses chemicals for pest control and weed eradication; in addition, many farmers apply chemical fertilizers and manure to their agricultural lands. These are all major, potential sources of ground water contamination. Farmers apply over 58,000 tons of chemical fertilizers and 2.1 million tons of manure to agricultural land in Maine each year. In 1992, the Department of Agriculture estimated that chemical fertilizers were spread on over 250,000 acres. The major areas of chemical application include potato fields in Aroostook County, blueberry barrens in Hancock and Washington Counties, and apple orchards and forage cropland in Central Maine. Pesticides and nitrates are the main category of agricultural ground water contaminants.

Maine's Nutrient Management Law

Contact: Bill Seekins, Maine Department of Agriculture, Office of Agricultural, Natural and Rural Resources, Nutrient Management Program

Tel: (207) 287-1132 email: Bill.Seekins@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/agriculture/oanrr/NutrientManagement.htm

In 1998, the Maine Legislature enacted legislation entitled: "An Act Regarding Nutrient Management." This law will have a significant impact on how Maine's farmers handle farm wastes and how they utilize nutrients on the farm.

Requirements of the Law: There are two central components of the Nutrient Management Law:

- A manure spreading ban between December 1st and March 15th and,

- A requirement of all farms that confine and feed 50 animal units (au – where 1 au = 1,000 lbs of live animal body weight) or more at any one time to develop and implement a Nutrient Management Plan (NMP).

The law also states that NMPs must be prepared by a certified nutrient management planner. An NMP provides details on how farm nutrients will be stored, managed and utilized. The NMP also includes plans for intended manure uses as well as actual data that are recorded to document actions taken with regard to the planned usage.

Each of these requirements takes effect on a different date. The winter spreading ban went into effect on December 1, 1999. Nutrient management plans for most farms had to be completed and approved by January 1, 2001 but they need not be fully implemented until October 1, 2007. The time between development of a plan and full implementation allows farmers to arrange financing, buy equipment, and build or upgrade manure storage and handling systems necessary to implement the plan. It is expected that those parts of the plans that do not require structural changes or major investments will be implemented as soon as the plan is approved.

The Law also requires that certain other farm operations develop and implement a nutrient management plan. These include farms that:

- Utilize over 100 tons of manure per year that are not generated on the farm,
- Utilize or store regulated residuals, such as sludge,
- Have a DOA-verified complaint of improper manure handling. In this case an NMP must be developed and implemented according to a schedule established by the Department Commissioner.

Another significant component of the Maine Nutrient Management Program is the training and official recognition of Certified Nutrient Management Planners (CNMP). The University of Maine Cooperative Extension and the Natural Resource Conservation Service are conducting this part of the program. The program offers two types of training. One track is for people who want to be certified as commercial or public CNMPs while the other is for farmers who want to be certified as private CNMPs for their own farming operations. The commercial/public specialist may write and certify plans for anyone, while private certification only allows a farmer to prepare and approve his or her own plan. Failure to meet the standards established for an acceptable Nutrient Management Plan can result in the loss of certification.

In addition to the provisions outlined above, the law also:

- Provides for the establishment of a Nutrient Management Review Board whose duties include approving rule changes, hearing appeals on permit or certification decisions made by the Commissioner, and making recommendations to the Commissioner on issues pertaining to nutrient management.
- Requires that livestock operations obtain a Livestock Operations Permit from the Department of Agriculture if:
- The operation is new, with greater than 300 au or is expanding to greater than 300 au.
- The operation meets the EPA definition of a Concentrated Animal Feeding Operation (CAFO).
- The operation plans to expand beyond its land base or manure storage capacity.

Key requirements for obtaining a permit are having an approved NMP and a facility inspection by the Department of Agriculture.

Impacts of the Law: The implementation of this law has had a number of impacts. These include increased building of manure storage facilities, a significant reduction in winter spreading, and more efficient use of manure and other nutrients for crop production. As farmers take training to become CNMPs or work with a commercial / public CNMP to develop an NMP, they will become more aware of the value of the manure they generate and how it is best utilized. By basing manure application rates on soil tests and crop needs, and not proximity to the barn or feedlot, fields will receive appropriate amounts of manure. Those fields needing additional nutrients to meet crop needs will also much more likely to be identified.

Implementing nutrient management on farms will better protect ground and surface water. By applying manure and other nutrients only in the amounts needed for crop production and in a way that will consider nearby sensitive resources, fewer nutrients will leave the site and impact water quality. Studies of Maine farms where nutrient management practices have been implemented show that water quality within a watershed can be significantly improved.

The implementation of nutrient management plans, which must contain Best Management Practices (BMPs) for insect and odor control, should result in fewer nuisances, in fewer conflicts with neighbors, and consequently in fewer associated complaints to the Department of Agriculture. As the program evolves and all the components are put in place, more BMPs will be implemented on Maine's farms, thereby providing an additional benefit of improved water quality.

Pesticides

Contact: Heather P. Jackson, Maine Department of Agriculture, Office of Agricultural, Natural and Rural Resources, Maine Board of Pesticide Control

Tel: (207) 287-2731 email: Heather.P.Jackson@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/agriculture/pesticides/water/index.htm

Before the mid-1970s, it was thought that soil acted as a protective filter that stopped pesticides from reaching ground water. Subsequent national and state studies have shown that this is not always the case. Pesticides can infiltrate soils and reach aquifers from applications onto commercial lands (cropland, forestry, rights of way, etc.) and home lawns, accidental spills and leaks, or improper disposal. In Maine, increased concern about pesticides in ground water began in 1980 when the agricultural pesticide, aldicarb (trade name Temik) was found in private drinking water wells located near potato fields. Since then, a variety of monitoring projects have been conducted in Maine to determine if the use of pesticides has impacted the quality of ground water.

A summary of pesticide studies follows:

1985: The Maine Geological Survey (MGS) and the Maine Department of Agriculture, Food and Rural Resources (DAFRR) began a three-year evaluation of the effects of agricultural pesticides on ground water. Study results showed that mostly trace levels of pesticides were found in 14% of the samples and suggested that bedrock wells overlain by till in potato regions had the highest incidence of contamination by agricultural pesticides.

1989: MGS, DAFRR, and USEPA tested private wells near potato fields in Aroostook County. Water from 42% of the 51 samples showed traces of pesticides.

1990: The Board of Pesticides Control (BPC) and the University of Maine conducted a study to evaluate the effectiveness of immunoassay testing for monitoring pesticides in ground water samples. Of the 58 wells sampled near pesticide use sites:

- 31% had detectable concentrations of atrazine; two wells had concentrations higher than the MCL of 3.0 ppb,
- 12% had detectable concentrations of alachlor and exceeded the maximum contaminant goal level (MCGL) of 0 ppm,
- 5% had detectable concentrations of carbofuran below the MCL of 40 ppb.

1992: The BPC and the University of Maine conducted the Maine Triazine Survey to verify the reliability and accuracy of immunoassay tests and to aid in the development of Maine's Ground Water Management Plan. Of the 152 samples subjected to immunoassay tests:

- 21% tested positive for the triazine immunoassay (which reacts to both atrazine and simazine),
- Laboratory confirmation found that 20% of all sampled wells were positive for atrazine,
- 3% of all sampled wells were positive for simazine, and 1 sample (<1%) was positive for cyanazine.

1994: The BPC began a statewide ground water monitoring program to assess the impact of highly leachable pesticides on Maine ground water across a variety of agricultural and non-agricultural use sites (e.g. corn, potato, blueberry, Christmas tree, rights-of-way, oat, market garden, and orchard sites). One hundred twenty-nine private domestic wells with certain characteristics were targeted for sampling. The specific well characteristics were that they had to be within ¼ mile of an active pesticide use site and that they had to be either hydrologically down gradient of, or at an even hydrological gradient with, the use site.

Monitoring results were as follows:

- 21% tested positive for at least one of ten pesticides detected during the survey,
- Hexazinone was detected in 15 of the 20 samples tested for the herbicide; the highest detection was 5.97 ppb, well below the health advisory level of 200 ppb,
- Diazinon was detected in one well at a level exceeding the MCL; the well owner stated she used the insecticide around her well casing for ant control,
- Dinoseb was detected in one well but had no registered uses in the state; an investigation of the site found an old, rusty container of the herbicide stored next to the well.

1996: Wells sampled during the 1992 Triazine Survey were re-sampled to determine if new ground water protection measures on the labels of atrazine- and cyanazine-containing pesticides along with the promotion of best management practices (BMPs) for the use of atrazine, simazine, cyanazine, alachlor and metolachlor on corn were effective. In 1992, 38 wells had detectable levels of pesticides; in 1996, only 12 of those 38 wells still had detectable concentrations.

Also in 1996, the BPC published the *State of Maine Hexazinone State Management Plan for the Protection of Ground Water*. New regulations regarding the purchase and application of hexazinone were created under CMR 01-026 Chapter 41: Special Restrictions of Pesticide Use (effective date August 17, 1996).

1998: *Section VII: Monitoring* of the Hexazinone State Management Plan requires the BPC to conduct an assessment of private domestic wells in hexazinone use areas once every four years. The 1994 statewide ground water monitoring project was the first assessment, and 1998 brought the second round of monitoring. The rate of hexazinone detections fell from 75% in 1994 to 42.8% in 1998.

The first revision of the State of Maine Generic State Management Plan for Pesticides and Ground Water was adopted in 1998. The most significant change to the original Plan was in *Section VIII: Response Framework*. The original Plan only required a response (i.e., site inspection, additional monitoring sites) when a certain concentration of a contaminant was reached. The high percentage of wells tested in 1994 with relatively low hexazinone detections resulted in a change in the response framework. The revised plan requires a responsive action not only when a certain concentration of a pesticide is reached, but also when a certain percentage of wells have detections.

1999: *Section VII: Ground Water Monitoring* of the Generic State Management Plan for Pesticides and Ground Water states that the BPC shall assess the occurrence of pesticides in private domestic wells which were within ¼ mile down gradient to active pesticide use sites. The second such assessment was conducted in 1999. A summary of the results is as follows:

- The percentage of tested wells with pesticide detections dropped from 23.3% in 1994 to 9.0% in 1999,
- The number of pesticides detected went from 10 in 1994 to 4 in 1999,
- No pesticides were detected at levels near their respective health advisory levels.

2002: Ground water monitoring as described in Maine's Hexazinone State Management Plan continued; 49 domestic wells within ¼ mile of blueberry fields were tested. The percentage of these wells with positive detections for hexazinone was 59.2%. This compares to 75% in 1994 and 42.8% in 1998. See Table 6-6 below for details on the monitoring activities.

Table 6-6 Hexazinone Monitoring Results - 1994 through 2002

Hexazinone Detection Rate, Mean and Median Concentration, And Highest Reading per Sampling Period			
	Spring 1994	**Spring 1998**	**Spring 2002**
Total Number of Samples Collected	20	42	49
Number of Positive Detections	15	18	29
Percentage with Positive Detections	75%	42.8%	59.2%
Mean Concentration*(ppb)	1.08	0.41	1.45
Median Concentration (ppb)	0.31	ND	0.43
Highest Reading (ppb)	5.97	2.15	11.41

*For statistical purposes only, mean concentration was calculated assuming that non detections (ND) were equal to half of the limit of quantification (LOQ). LOQ = 0.1 ppb for 2002 samples.

Studies have shown that there are pesticides in Maine's ground water. With the exception of a few sites that had point sources of contamination, the levels of pesticides detected do not present a health threat to the citizens of Maine when compared to the health-based standards established by the USEPA and the Maine Bureau of Health. However, at least in the case of pesticides, increased development along with the use of BMPs, lower application rates, and increased awareness of ground water issues should continue to have positive impacts on the quality of Maine's ground water.

Maine's Generic State Management Plan for Pesticides and Ground Water requires that a statewide sampling of ground water will occur every 5 to 7 years. So, plans for

2005 include a statewide ground water monitoring study similar to the 1999 study that was described above. This study will be undertaken and completed in accordance to and in order to comply with the State Plan.

Agricultural Nitrates

Contact: Bill Seekins, Maine Department of Agriculture, Office of Agricultural, Natural and Rural Resources, Nutrient Management Program

Tel: (207) 287-1132 email: Bill.Seekins@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/agriculture/oanrr/NutrientManagement.htm

The documented adverse health effects of nitrate (potential methemoglobinemia in infants and complicity in producing carcinogenic nitrosamines), and its mobility in ground water, may make it the most significant agricultural contaminant in Maine ground water. Nitrate in agricultural areas results primarily from application of chemical fertilizers and manure to cropland. While most of the chemical fertilizer is used on potato cropland, manure is spread primarily on corn and hay fields. In 1992, 755,000 tons of usable manure was produced on Maine farms. A breakdown of the percentage of manure produced by different domestic animals follows in Table 6-7:

Table 6-7 Domestic Animal Manure Production

Category of Domestic Animal	Percent of Manure Produced
Dairy Cattle	41 %
Poultry	32 %
Beef Cattle	17 %
Horses, Hogs & Pigs, and Sheep & Lambs	10 %

In the 1985 MGS/DAFRR three-year study cited previously under the pesticides section, 21 of 100 wells tested for nitrate had nitrate concentrations exceeding the 10 mg/L drinking water standard. The percentage of wells in each crop type exceeding the drinking water standard was greatest in market garden/forage crop regions (40%) and potato regions (23%). Wells in orchard and blueberry areas did not exceed the standard. Mean nitrate concentrations were highest in market garden/forage crop regions (8.6 mg/L) followed by potato regions (6.7 mg/L), orchards (1.1 mg/L), and blueberry areas (0.1 mg/L). Results of the 1989 MGS, DAFRR, and USEPA study conducted in the potato growing regions of Aroostook County showed a similar trend. Nineteen percent of the 211 wells (40 wells) exceeded the 10 mg/L primary drinking water standard for nitrate-N. It is important to note that the nitrate contribution from non-agricultural sources, such as septic systems, has not been evaluated at any of the sites.

The impact of typical manure storage and spreading practices on ground water quality merits greater investigation. Documentation of nitrate ground water contamination from manure storage and spreading currently is limited to DEP and DAFRR case files; these probably represent "worst case scenarios". Some "worst case" examples include a poultry farm in Turner where manure disposal caused extensive ground water contamination (nitrate-N above 600 mg/L locally) in both the overburden and bedrock aquifers and in surface waters; and domestic wells in Clinton and Charleston where leachate from nearby uncovered manure piles is alleged to have contaminated domestic wells with nitrate-N concentrations exceeding 100 mg/L.

In 1990, the Maine Legislature gave DAFRR primary responsibility for investigating complaints related to manure storage and spreading. In 2002, DAFRR investigated 100 complaints. Of these, 6 complaints related to concerns about ground water contamination. Ten complaints related to manure impacts to surface water bodies were investigated during this same period. While the total number of complaints has increased since the late 1990's, the number of complaints specifically concerning ground water or surface water contamination has actually decreased slightly.

The extent of nitrate ground water contamination from manure is unknown but may be significant. The Maine Soil and Water Conservation Districts 1988 Manure Management Project found that the plow layer in approximately one-half of the 249 corn fields sampled had more than twice the level of soil nitrate needed to produce a normal 25 ton/acre crop yield. Although not all of the excess nitrate will leach into ground water (some will be bound by soil organic matter), the data show that a very high potential for ground water quality degradation exists beneath these fields. The Maine Cooperative Extension Service originally published manure utilization guidelines in July 1972 (Miscellaneous Report 142). Revised non-regulatory guidelines were developed in 1990. The key elements include testing soil and plant nitrate levels prior to fertilizer application, and fertilizing according to realistic crop uptake rates. In March 2001, the Department of Agriculture adopted the document 'Manure Utilization Guidelines", replacing the outdated 1972 guidelines. These guidelines apply to any farm operation not required to have a nutrient management plan under the Nutrient Management Law.

DAFRR statistics for 1998 indicate that farmland available for manure spreading includes approximately 63,000 acres of hay, 25,000 acres of oats, 32,000 acres of silage corn, and 12,000 acres of vegetables and nursery crops. According to the agronomic spreading rates recommended in the 1980 Manure Management Project report, available hay and corn cropland can accept all of the manure generated annually in this state. However, because manure production is concentrated regionally, sufficient land for spreading may not be available in the areas of greatest manure production. Even when spreading areas are available locally, it is often economically unfeasible for a farmer to haul manure more than two miles from where it is stored.

Landfills

Contacts: Paula Clark, DEP BRWM, Division of Solid Waste Management

Tel: (207) 287-7718 email: Paula.M.Clark@SPAM-ZAPmaine.gov

and Ted Wolfe, DEP BRWM, Division of Solid Waste Management

Tel: (207) 287-8552 email: Theodore.E.Wolfe@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/rwm/solidwaste/index.htm

The Maine Department of Environmental Protection is directed by statute to regulate the location, establishment, construction, expansion and operation of all solid waste facilities in the state, including landfills. The Department is specifically authorized by the Legislature to "adopt, amend, and enforce rules as it deems necessary to govern waste management, including the location, establishment, construction and alteration of waste facilities as the facility affects the public health and welfare or the natural resources of the State". Further, "The rules shall be designed to minimize pollution of the State's air, land and surface and ground water resources, prevent the spread of disease or other health hazards, prevent contamination of drinking water supplies and protect public health and safety."

In 2001, Maine residents, businesses and visitors generated 1,884,059 tons of municipal solid waste (MSW), an 8.7% increase over the 1,696,006 tons reported in 1999. Of this amount, 432,822 tons were landfilled. In addition 20,651 tons of MSW generated outside of Maine were landfilled in Maine in 2001. Approximately 37.3% of the MSW stream was recycled and a significant percentage was incinerated. 155,195 tons of Maine generated incinerator ash was landfilled, as well as volumes of other types of "special waste," including sludges, paper mill wastes, and contaminated soils.

Of particular significance as related to ground water protection, the Department and the Maine Legislature have focused significant effort over the past two years toward developing legislation and programs that will ensure that certain hazardous constituents are removed from the waste stream prior to landfilling or incineration:

- The Department has worked in conjunction with the Maine State Planning Office to provide technical support and financial assistance to municipalities and regions in the establishment and maintenance of household hazardous and universal waste collection and management programs. The Department has provided extensive training opportunities to municipalities and schools. The State Planning Office has offered grants resulting in the development of collection infrastructure across the state.
- The Department developed a report that was submitted to the Legislature recommending a plan for the collection and recycling of cathode ray tubes (CRTs). The Legislature passed a law this session requiring manufacturers to take responsibility for recycling. A statutory ban on the disposal (landfilling and incineration) of CRTs will take effect on January 1, 2006.
- A statutory ban on the disposal of mercury-added products and switches will take effect on January 1, 2005. The Department also developed a plan to increase the collection and recycling rate of mercury thermostats. The Legislature passed a law concerning this subject during the last session. Mercury switches that are components of motor vehicles are required by law to be removed from the vehicles before they are sent to a scrap recycling facility.

Active Landfills

Related Website: www.maine.gov/dep/rwm/data/landfillactive.htm

There are currently 50 active, licensed landfills in the state of Maine (Figure 6-1). Of these, seven are licensed exclusively for MSW disposal. Seventeen (17) are licensed to accept "special waste" (several of these are also licensed for MSW and demolition debris disposal). Twenty-six (26) are licensed for the acceptance of wood waste and construction/demolition debris.

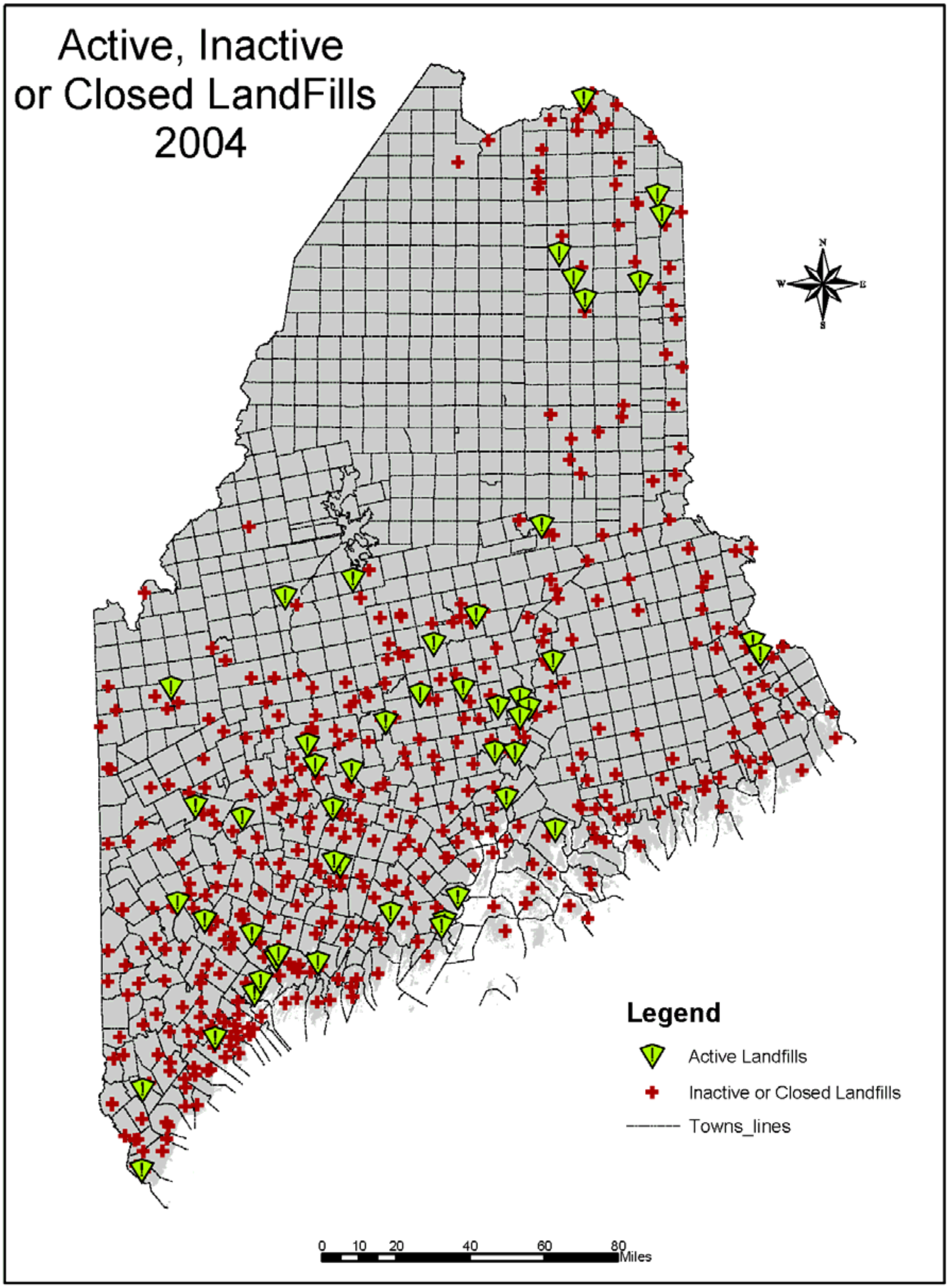


Figure 6-1 Active, Inactive or Closed Landfills in Maine

Inactive Landfills

A total of 414 municipal landfills have been identified in the state. As of July 2003, 388 of these landfills have been closed and capped (Figure 6-1). Twenty-six remain to be closed. These include 15 currently active sites and 11 inactive sites, which are no longer receiving solid waste. In all:

- 184 landfill sites are on sand and gravel aquifers and ground water contamination has been documented at 46 of these sites,
- Sixty other sites have contaminated surface water and/or ground water and are considered to be substandard; 37 of these 60 sites have serious ground water contamination,
- Hazardous substances in ground water are confirmed or suspected at 41 municipal landfills. Public or private water supplies are potentially threatened at 8 of these sites. Additional investigations have determined that 3 public water supplies previously considered at risk have been determined to be safe,
- 135 sites have no reported or documented problems with surface water or ground water,
- 13 of these inactive sites appear to be accepting demolition debris, and
- There are at least 65 sites where open burning occurred.

Maine's landfill closure and remediation program was established in 1987, with the goals of closing and remediating solid waste landfills that were inadequately designed and constructed, or inappropriately sited. DEP has conducted evaluations of municipal landfills and developed closure procedures. As a result of legislation in 1994, municipalities were allowed to determine for themselves (with proper documentation) whether or not their landfill meet the eligibility requirements for a "reduced procedure" closure. The reduced procedure is a further evolution of the Interim Cover and Grading (ICAG) procedure implemented by the Department in 1993. Towns that determined they were eligible for the reduced procedure were able to proceed immediately with the implementation of their closure without obtaining an advance permit from the DEP. These changes were important in enabling many smaller Maine municipalities to reduce costs and expedite the closures of their landfills.

A total of 327 municipalities have received state cost-share funding for past landfill closures or planning activities. As of January 1, 2000, municipalities are no longer eligible to receive state funding for closure activities. Maine voters have approved ten bond issues to fund assessment, closure, and remediation of landfills. A total of $79.25 million was made available during the operating history of the closure program. No additional closure-related costs will be incurred by the state.

The state is continuing with a cost share program on remedial actions that occur at closed municipal landfills where a threat exists to human health or the environment. Bond funds are being utilized for remedial development of replacement water supplies for residents in five of the eight towns where private water supplies are threatened. Maine is experiencing increased residential development in locations outside central city and town areas, especially in southern and coastal Maine. Continued uncontrolled development has the potential of placing future residential areas at risk if private supply wells are placed in areas already impacted by closed municipal landfill sites. The DEP is currently working with a number of towns to identify property that is at risk and to assist with the purchase of this property or to limit ground water use through some other mechanism.

Residual Land Applications

Contact: Jim Pollock, DEP BRWM, Division of Solid Waste Management

Tel: (207) 287-2651 email: Jim.C.Pollock@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/rwm/residuals/index.htm

Land application and composting of solid wastes, such as food waste, wood ash, sewage sludge, paper mill sludge, or fish waste is regulated by the DEP in Department Rules, Chapter 419, Agronomic Utilization of Residuals. These rules establish a framework for the characterization of residuals to determine potential agronomic benefit and harm if the residual is applied to the State's agricultural or forest lands. The rules also establish siting criteria and management practices to protect public health and the environment at utilization sites. Other composting standards are contained in Department rules, Chapter 409, Processing Facilities. Septage land application and storage is regulated by Department Rules Chapter 420, Septage Management Rules.

Currently, residuals are processed and utilized at approximately 536 licensed land application and composting sites in Maine. There are also many more locations where residuals are legally used for agricultural purposes without a site-specific license. The Department has not typically required ground water monitoring at residuals utilization or composting sites. Therefore, actual impacts to ground water from these types of sites have not been widely determined. Ground water monitoring has detected impacts at some sites.

- In the town of Presque Isle, liquid sewage sludge is suspected of contaminating ground water (nitrate) in the vicinity of a sludge storage lagoon. A detailed monitoring plan has been developed and implemented.
- Ground water monitoring at a sludge storage facility in the town of Newcastle showed increased nitrates in downgradient wells, from non-detect to 11.2 ppm; which is above the drinking water standard of 10 ppm. This site has been permanently closed.
- Treated sewage sludge from the Anson-Madison Sanitary District (AMSD) has been used as an ingredient in manufactured topsoil at a gravel pit reclamation site in Sangerville. The results of ground water monitoring at the site indicate that the water chemistry in downgradient wells has been affected by utilization of sludge topsoil. Hardness, calcium, magnesium and alkalinity have increased dramatically in the downgradient wells. Additionally, nitrogen has leached from the manufactured topsoil to ground water. Another obvious impact to ground water was the abrupt, substantial decrease in dissolved oxygen, which was observed in all downgradient wells shortly following the utilization of the manufactured topsoil. The anoxic, reducing ground water environment has resulted in a corresponding increase in the concentrations of iron, manganese and arsenic in downgradient samples. Although the arsenic was likely not generated from the AMSD sludge, but rather from existing sediments and/or parent material at the site, this toxic metal has increased to levels in excess of Maine's drinking water standard, in all downgradient wells.

The University of Maine is conducting a study of potential ground water impacts from the field stacking of sewage sludge. Preliminary results indicate that significant nitrogen is lost, via leachate, from sludge stockpiles after approximately 10 – 14 days of storage.

Table 6-8 Licensed Facilities by Utilization Activity

Type of Utilization Activity	Number of Licensed Facilities
Septage Land Application & Storage	76
Sewage Sludge Land Application & Storage (Class B)	220
Wood-ash & Bio-ash Land Application	223
Other Residual Land Application	75
Composting Facilities	74

Road Salt

Contacts: Erich Kluck, DEP BLWQ, Division of Water Resource Regulation (DWRR)

Tel: (207) 287-3901 email: Erich.D.Kluck@SPAM-ZAPmaine.gov

or Christine Olson, Maine Department of Transportation, Environmental Office

Tel: (207) 287-3323 email: Christine.Olson@SPAM-ZAPmaine.gov

Related Website: (Rules – Chapter 574) www.maine.gov/dep/blwq/574final.pdf

(Sand and Salt Piles) www.maine.gov/dep/blwq/docstand/sandsalt/index.htm

During the winter, more than 100,000 tons of salt are spread on Maine roads for deicing purposes. Today the salt or sand-salt mixes are stored in over 750 registered sand-salt storage piles, two thirds of which are uncovered, a vast improvement over storage just twenty years ago. Leaching of sodium and chloride from uncovered sand-salt storage has caused substantial ground water degradation in Maine. DEP field investigations have documented over 150 drinking water wells in the State that have become unpotable (chloride in excess of 250 mg/L) as a result of contamination from sand-salt storage. Elevated sodium concentrations may pose a health risk for people on sodium-restricted diets, e.g., people with hypertension. For a majority of the population, water will taste salty and household water pumps, hot water heaters, and plumbing fixtures will rust at an accelerated rate if the chloride concentration exceeds the State 250 mg/L secondary (aesthetic) standard.

Nearly every uncovered sand-salt storage pile is assumed to contaminate the ground water downgradient from the source. The impacts range from the Maine Department of Transportation (MDOT) site in Dixfield, where leachate from a sand-salt pile flows a few hundred feet before discharging to the Androscoggin River (where it quickly becomes diluted), to the Town of York's former sand-salt pile and leaky salt storage building that combined to contaminate nine wells and threaten at least 20 other downgradient wells.

An investigation conducted in the Province of New Brunswick, Canada, indicated that as much as 57% of the mass of salt stored may leach annually from uncovered sand-salt storage piles. A British study estimated that approximately 10% of the salt in a typical uncovered sand-salt pile might be lost in one year.

In 1985 and again in 1998, the Maine Legislature directed the DEP to prioritize all known sand-salt storage areas according to the extent of their ground water contamination problems. The priority list is used for the distribution of funds for sand/salt building construction. More than 175 municipal sand/salt storage buildings and 50 MDOT buildings have been constructed, however, continued funding of the program by the Legislature remains uncertain. Nearly 70 towns continue to wait for construction funds as their sand/salt piles continue to impact private water supplies and the environment.

DEP is actively involved with siting of new sand-salt buildings and piles and continues to investigate contamination from sand-salt piles on a case-by-case basis in response to complaints. DEP's Sand-Salt Storage Area Rule (Chapter 574) prohibits siting of new sand-salt storage areas on significant sand and gravel aquifers, within source water protection areas of public water supplies and within 300 feet of a private domestic well. MDOT continues to handle complaints related to sand-salt piles, which they operate, and roads, which they maintain.

A recent trend in winter road maintenance has been a switch by municipalities from using a sand-salt mix to pure salt or liquid calcium chloride, a practice known as "anti-icing." This is being done to improve air quality by eliminating a source of dust, to ease the spring clean-up burden, and to minimize the impact of sand and the pollutants carried by sand into Maine's waterways. Under the new practice where salt is applied under a controlled methodology using pavement temperature sensors, calibrated spreaders, liquid calcium chloride, and a close eye on the timing of the storm event, the amount of sand utilized has dropped by over 80%. However, MDOT files indicate that since 1969 at least 45 wells have been made unpotable by sand-salt spreading on roadways, and MDOT has seen a recent increase in complaints, corresponding with their switch to "anti-icing" practices. Investigations of sand/salt applications in Massachusetts and urbanized areas of Canada have raised concerns that a large percentage of salt can be retained in shallow ground water. The potential result is an increase in chloride and sodium concentrations above the drinking water standards that can persist for many years. The likelihood of this occurring in Maine depends on the volume of applications and conditions within specific ground watersheds. To date, comprehensive studies of sand/salt spreading impacts in specific ground watersheds have not been undertaken in Maine.

Federal Facilities, Superfund and Hazardous Substance Sites

Contact: Mark Hyland, DEP BRWM, Division of Remediation

Tel: (207) 287-7673 email: Mark.Hyland@SPAM-ZAPmaine.gov

Related Websites: (Maine DEP Information) www.maine.gov/dep/rwm/rem/index.htm

(Federal EPA Information) www.epa.gov/ebtpages/cleasuperfund.html

There are numerous sites in Maine where hazardous substances have allegedly been discharged into the environment. As of March 2004, the Uncontrolled Hazardous Substance Sites Program (USP) and the Superfund Program together had 93 active uncontrolled hazardous substance/Superfund sites under investigation. This figure is up from 89 sites in the previous reporting period and 43 of these sites are currently in the Operations and Maintenance stage. Five additional locations require further investigation to determine whether they should be listed as uncontrolled sites. The definition of an "uncontrolled hazardous substance site" or "uncontrolled site" is an area or location, whether or not licensed, at which hazardous substances are or were handled or otherwise came to be located. The term includes all contiguous land under the same ownership or control and includes without limitation all structures, appurtenances, improvements, equipment, machinery, containers, tanks and conveyances on the site.

Since 1983, 492 sites have been reported to the Uncontrolled Hazardous Substance Sites Program. Of these, 135 are active (this number includes Pre-Remedial sites and Department of Defense Sites, in addition to USP/Superfund sites), 248 are inactive, 79 are resolved and 30 have been removed from the USP List.

"Inactive Site" means that the USP does not have an interest in the site. There are several reasons a site can be designated "inactive." Examples of reasons for this status include; the site has been investigated and no real or potential threat was found, or after investigation the site was referred to another program. An "inactive" site may become active if new information comes to light indicating a problem, or if, during a file review; information is uncovered that requires further investigation.

"Resolved Site" means that the USP has performed a final review of the site's case history and has signed off on the site. This designation is not meant to confuse, but as an attempt to clarify the site's standing and to provide an additional level of comfort. If a site is inactive, the USP does not consider the site a threat, but DEP has not conducted a case review. This means that, technically, the USP is not finished with the site. If a site is "resolved", USP is finished with it unless new information, indicating a problem, comes to light.

"No Longer Listed Site" means, that as of January 2000, sites are removed from the List once it is determined that they are not “worthy of listing”. This term is used because there are a number of reasons to remove a site from the List, including; no file exists, the site was reported as an oil spill, there is no evidence of a hazardous substance release or based on an investigation the site is referred to another program unrelated to hazardous substance or hazardous waste. Sites are removed on a case-by-case basis.

While a number of the sites are small in terms of the actual source area, many have the potential to impact a large area. Treatment of drinking water and containing the spread of contamination plume are important steps in eliminating or minimizing human exposure to contaminated ground water. However, protecting public health at the tap and/or removing hazardous substances from ground water is expensive. Generally, even under the best of circumstances, long term monitoring is required. For these reasons, USP sites receive a significant amount of the funds available for ground water protection. Hazardous substances that are commonly found in the ground water at these sites include; organic solvents, pesticides, and metals. Many of these chemicals are carcinogenic, mutagenic, and/or teratogenic.

Thirteen sites are listed on the National Priority List of Superfund Sites, including the Brunswick Naval Air Station, the McKin Disposal Site, O'Connor Salvage, the Pinette Salvage Yard, the Union Chemical Site, the Winthrop Landfill, the former Loring Air Force Base, the Portsmouth Naval Shipyard - West Site, How's Corner in the town of Plymouth, the Eastern Surplus Site, the Eastland Mill, and the Saco Municipal Landfill. Recent changes to the list include: the "de-listing" of the Saco Tannery Waste Pits Superfund Site in 1999 and the addition of the Callahan Mine Site (see the Metallic Mining Section of this report for more information on this site) in the town of Brooksville.

For the Uncontrolled Sites Program (including Superfund and Federal Facilities) at least 157 drinking water wells have been contaminated near or above the BRWMs “action level” (one-half the MCLs or MEGs) at 46 uncontrolled sites and at least 312 other wells are at risk. The database for listing wells contaminated at uncontrolled sites, and the source of the above figures, was updated in March of 2004.

Case Study: The Kerramerican Mine and the Blue Hill Mining District

Prepared by: Tracy Weston-Kelly, DEP BRWM, Division of Remediation

Tel: (207) 287-2651 email: Tracy.Weston@SPAM-ZAPmaine.gov

In 2002, residential sampling conducted as part of the Kerramerican Mine investigation found that a residence adjacent to the site had a water supply contaminated with 26 ppb of cadmium (Maine drinking water standard for cadmium is 3.5 ppb). Tests from neighboring wells were low in cadmium. Because the affected well was hydrologically upgradient from the Kerramerican Mine, the DEP hypothesized that the contamination could be attributed to a source other than the Kerramerican Site.

In response to the discovery, the DHS-Bureau of Health and the DEP decided to look further at other private water wells in the area. In case there was a widespread problem, the agencies wanted residents to know if their water was fit for consumption.

To reach the necessary people, a voluntary mail-in sampling program was devised and implemented. Initially, 36 water-testing kits were sent out and these kits had a return rate of approximately 75 percent. Analytical results indicated that nine wells could potentially be affected by acid mine drainage. However, several results were difficult to make a determination on because of naturally occurring high mineral concentrations. The DEP then expanded the investigation to gain a better understanding of the ground water chemistry in the area. This effort included gathering historical information on other area mines and prospects. DEP also wanted to resample homeowner water supplies whose results indicated potential metals contamination as well as to follow-up with those residents who did not return the initial home water test kits.

The Maine Geological Survey provided information on historical mine locations. This, together with tax maps and topographic information, helped the DEP to define the limit of the Blue Hill Mining District for the purpose of this study. Many abandoned mines were documented in the historical records and today, these areas contain open mine shafts and mine tailings. When these conditions exist, sulfuric acid forms from metal-bearing waste rock and tailings being exposed to air and water. The resulting acidified runoff releases metals including; aluminum, copper, cobalt, manganese, and zinc, allowing them to migrate and impact ground and/or surface water. This phenomenon is known as acid mine drainage, or AMD. Theoretically, the scattered mining areas along with the associated shafts and tailing piles could be sources of the elevated metals found in residential wells.

Next DEP identified properties that appeared to be at risk of ground water contamination due to their proximity to and relative location compared to the locations of abandoned shafts and waste rock piles. A new list of names was compiled to include the additional homes that now fell within the study area as well as homeowners with elevated results from the previous rounds of water testing. Survey forms were sent to homeowners requesting information regarding potential evidence of mining on their properties. If homeowners were interested in participating in the study, they returned a "permission to access property form" to the DEP.

In May 2003, DEP staff explored the mining district area on foot, taking pictures and surveying mine locations with a GPS. Approximately eight open shafts were encountered.

After compiling this information and cross-checking the list of homeowners to sample, DEP visited homes and collected water supply samples. Out of 32 samples collected for this phase, approximately half had elevated levels of metals, most commonly iron and manganese. One cluster of homes had arsenic levels above drinking water guidelines. Elevated levels of cadmium, zinc, copper, iron, manganese and sulfate were seen in the four water supplies suspected of AMD influence. However, because high levels of metals occur naturally in Blue Hill, it is difficult to determine which water supplies are affected and the extent of any affect due to AMD.

At the end of this investigation, participating residents were informed of the results and DEP advised those with high levels of metals to contact water treatment specialists. In addition to old mining activity sites, the investigation documented an extensive amount of waste rock along Route 15/176. This material has been used to build roads, driveways, and culverts and, in some cases, to stabilizing backyard slopes and can be a source of AMD. The DEP determined that this widespread use precluded the practical removal of all potential sources of AMD.

Based on this investigation, the DEP concludes that local ground water is impacted by naturally occurring metals and by AMD resulting from former mining operations. The most practical remedial response is to ensure that residents are aware of the potential problem and are informed of the appropriate precautions available to them. (Please see the Metallic Mining section of this report for more information on this site.)

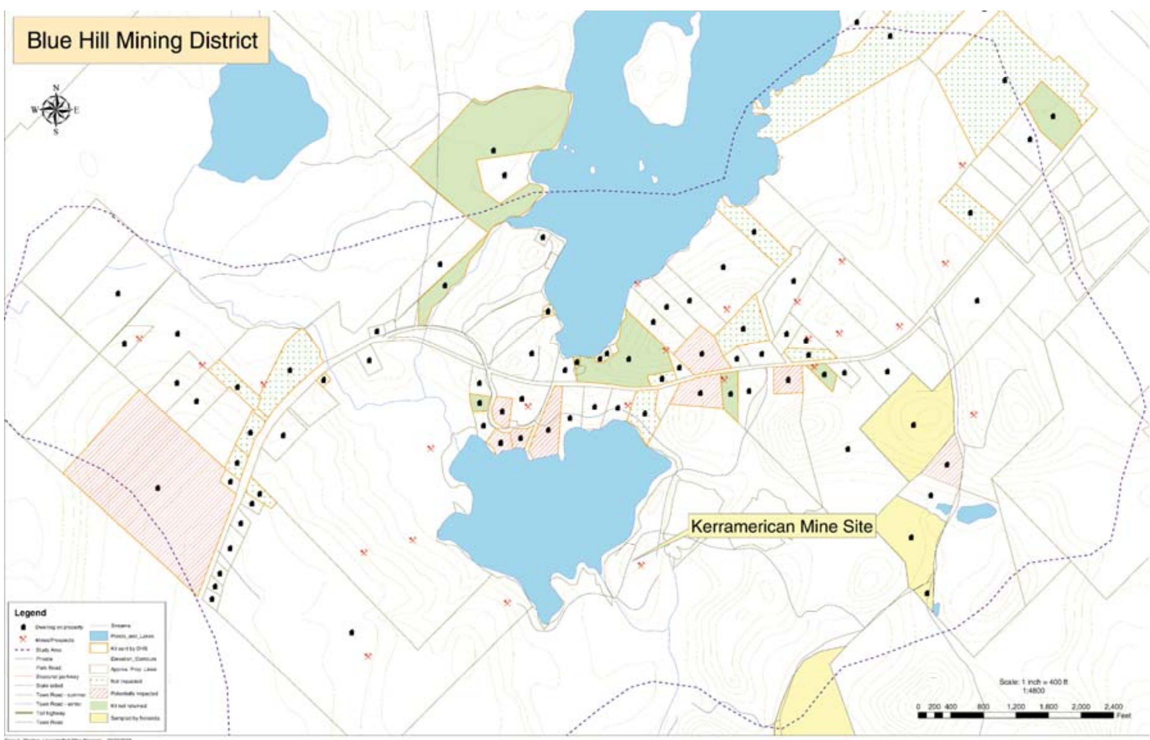


Figure 6-2 Maine's Blue Hill Mining District

Resource Conservation and Recovery Act Sites

Contact: Stacy Ladner, DEP BRWM, Division of Oil and Hazardous Waste Facilities Regulation (OHWFR)

Tel: (207) 287-2651 email: Stacy.A.Ladner@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/rwm/hazardouswaste/index.htm

The BRWM lists approximately 780 large quantity hazardous waste generators (defined as producing greater than 100 kilograms per month) that are currently active in the State of Maine. Additionally, there are about 620 inactive large quantity generators listed. Our records also show approximately 6,100 small quantity (less than 100 kilograms per month) generators in the state.

The DEP currently lists approximately 95 sites with non-interim Resource Conservation & Recovery Act (RCRA) licenses and 60 sites with interim licenses. Over 80 sites are under investigation for possible ground water or surface water contamination. Thirty-seven sites listed under RCRA have ground or surface waters that have been contaminated by discharges of hazardous substances. Thirteen of these 37 facilities have ongoing, active remediation. Some examples of ongoing RCRA remediation activities are described below.

Solvent contamination has been found in the Sanford municipal well field; a source of water that serves over 6,500 customers. A number of manufacturing facilities at the nearby Sanford Industrial Park have been investigated and several have known ground water contamination. However, the cause of the well field contamination has yet to be determined.

Chlorinated solvent contamination has been found in the ground water at Masters Machine in the town of Bristol. At least seven wells have been impacted by the pollution; including four wells on the site and at least three offsite residential wells. A "pump and treat" system that has been operating for a number of years appears to be slowly reducing the contaminant levels. Treatment is expected to be necessary for some time to come.

The Ciba Specialty Chemical Company is currently operating a "pump and treat" system at the former Hamblet & Hayes facility located in the city of Lewiston. During the operation of the facility, chemicals were brought in by bulk and repackaged on site. Large amounts of chlorinated and non-chlorinated solvents were released onto the property's soils. A neighboring residence was found to have solvent contamination in the basement, and the house was bought and demolished by Ciba Chemical. Currently, there are high levels of contaminants in both the clayey soils and ground water of the facility property. The pump and treat system is working to prevent the majority of the contamination from moving offsite and into a lower sand and gravel aquifer. Continued monitoring is in place to insure any breakthrough into the lower aquifer is detected, so it may be addressed.

Septic Systems

Contact: Russell Martin, DHS BOH, Division of Health Engineering, Wastewater and Plumbing Control Program

Tel: (207) 287-4735 email: Russell.Martin@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/plumb/index.html

Maine is a predominantly rural state, and relies heavily on decentralized sewage facilities for the disposal of human wastes. In June of 1974, the state of Maine adopted a comprehensive set of rules covering the design, siting, permitting, and construction of septic systems, or subsurface wastewater disposal systems. These rules established criteria for site suitability, replaced the percolation test with a soils-based site evaluation, recognized various system components and construction techniques, required the use of a standard design form (HHE-200), and strengthened the system of permitting and inspecting systems at the local level. The rules have evolved over time but retain many of the fundamental principles upon which the 1974 document was based. The most significant changes include the licensing of all individuals who prepare subsurface wastewater disposal system designs and the implementation of a voluntary certification program for system installers. In 2003, the Department developed a voluntary program to allow the inspection of existing systems during real estate transfers.

The Department of Human Services, Bureau of Health, has regulated onsite sewage disposal since 1926. This responsibility rests with DHS because the treatment and disposal of human sanitary waste has been historically considered a public health issue. The Wastewater and Plumbing Control Program within the Division of Health Engineering promulgates and administers the Subsurface Wastewater Disposal Rules and assists local plumbing inspectors when requested. The Program also maintains microfiche copies of all plumbing and subsurface wastewater permits that have been issued statewide from 1974 to the present. During the 2003 fiscal year, the Program processed 13,000 internal plumbing and 10,700 subsurface wastewater permits.

U.S. census data from 1990 indicate that there are in excess of 301,000 septic systems in Maine. Given an 11% increase in the number of households in Maine according to the 2000 census, the number of septic systems has increased to approximately 334,100. Of all the sources with the potential to contribute to ground water contamination, in aggregate, septic systems discharge the largest volume of water to the subsurface environment. Horizontal and vertical separation distances required by the Rules provide for significant treatment of most domestic wastewater constituents within the natural soil mantle.

The major contaminants of concern found in septic system effluent are nitrate, bacteria, and viruses. High concentrations of nitrate may cause methemoglobinemia ("blue-baby syndrome") in infants. Correlation has also been shown between the incidence of stomach cancer and the concentration of nitrate in drinking water. The potential for disease transmission by the surface discharge of bacteria and viruses from malfunctioning septic systems is a significant public health concern.

Nitrates and Septic Systems

Major factors that affect the potential of septic systems to contaminate drinking water are (1) the density of the systems per unit area, (2) hydrogeological conditions and, (3) water well construction and location. Areas with a high septic system density may experience substantial ground water quality degradation partly because of the inability of the systems to adequately treat nitrates. Representative septic system effluent nitrate concentrations vary considerably according to the household lifestyle, diet, and water consumption. Studies have shown that the septic effluent reaching ground water contains approximately 40-80 mg/L nitrate-N. In Maine, estimates of the nitrate concentration from septic systems range from 30-40 mg/L. Ground water quality monitoring conducted jointly by DEP and MGS in 1990 at four Maine septic system leachfields recorded total nitrogen concentrations (as nitrate-N, nitrite-N, and/or ammonia-N) ranging between 27 mg/L and 93 mg/L.

Examination of test data for nitrate-N from private wells in Maine can help identify the threat of conventional septic systems to ground water quality. The earliest ground water quality study performed in Maine to address water quality problems was done in 1973 and involved 523 private wells in York County. The study found nitrate-N concentrations exceeding the 10 mg/L standard in 2% of the wells tested. Approximately 33% of the wells sampled had nitrate-N concentrations in the 1.0 - 9.6 mg/L range. More recent studies have been conducted to document the impact of nitrate on private wells. Data from these studies are summarized in Table 6-9.

The Health and Environmental Testing Laboratory (HETL) database contains the results of water tests done on private wells. These tests are requested by homeowners or state or local officials on behalf of homeowners. This database provides the largest sample of private well nitrate concentrations in the state and includes sites impacted by a variety of nitrate sources including septic systems and agricultural activities. Assuming that the HETL database for nitrate-N represents Maine ground water quality, data from January 2002 to December 2003 indicate slightly more than one half of 1% of private wells in Maine are unpotable because they exceed the 10 mg/L drinking water standard for nitrate-N and approximately 97% have concentrations below 5 mg/L, well below the standard. These percentages have remained steady for the past few reporting cycles.

The 1991 Hancock, Lincoln and Knox County (HLK) study focused on the impact of septic systems, but also examined the influence of agriculture on nitrate concentrations. The HLK study represents rural sites with both modern septic systems (post-1974) and older (pre-1974) septic system designs. The study found that 1.5% of the wells sampled exceeded the 10 mg/L nitrate-N primary drinking water standard. Statistical analysis was performed to identify principal factors affecting nitrate-N concentrations in wells. Results suggest that the highest nitrate-N concentrations would occur in dug wells or driven well points in surficial deposits or bedrock with short casing that are located near agricultural areas or a short distance from septic systems.

The DEP-MGS study focused on residential subdivisions with modern septic systems and associated well siting criteria. Site selection minimized the potential influence of agricultural practices on the ground water. This study, designed to represent modern residential development, demonstrated that ground water impacts with respect to nitrate-N may be expected to make less than 1% of private wells unpotable. Approximately 94% of the test wells were shown to have concentrations below 5 mg/L.

The DEP-MGS study was designed to minimize or exclude agricultural impacts on ground water quality and focus on septic system impacts. The small differences in MCL exeedences may not be significant, depending on the variance and number of samples. In the past, a higher percentage of exceedences in the HETL database were tentatively attributed to people who suspect they have problems with nitrate may tend to test more often, increasing the percentage slightly. In the most recent reporting period, exceedences in the HETL data were less numerous than in the HLK study and about the same as in the DEP-MGS study.

Table 6-9 Nitrate-N Frequency Distributions

Nitrate-N (mg/L)	HETL Database[1] (percent)	HLK Study[2] (percent)	DEP-MGS Study[3] (percent)
0.00 to 2.50	92	85.5	83.8
2.51 to 5.00	6	9.2	10.4
5.01 to 7.50	2	2.5	4.1
7.51 to 10.00	0.4	1.3	1.4
Greater than 10.0	0.6	1.5	0.4
Number of Analyses	**3,638**	**381**	**511**

[1]HETL database for private well analyses between 1/1/02 and 12/31/03.

[2]Cooperative project between the Maine DEP and the Hancock and Lincoln-Knox County Soil and Water Conservation Districts. Project focused on private well testing for nitrate-N in unsewered regions of four towns.

[3]Cooperative project between the Maine DEP and MGS. Project designed to evaluate ground water/well water quality impact of septic systems in 20 residential subdivisions with respect to nitrate-N.

Bacteria

Private well testing for presence of bacteria identifies a greater contamination potential from bacteria than from nitrate. In public and private drinking water supplies, coliform bacteria are used as the indicator of microbial contamination. The Primary Drinking Water Standard for total coliform bacteria is 0 colonies per 100 ml.

HETL data for wells tested between 1960 and 1990 showed approximately 31% of the wells tested for total coliform exceeded the drinking water standard. Data for the period January 2002 to December 2003 indicates that 31% of the 12,958 well samples analyzed for total coliform tested positive. During the same time period, the HETL database indicates 3.2% of the 12,955 wells that were tested for E. coli bacteria tested positive. Twenty-six percent of the wells tested for total coliform bacteria in Hancock County as part of the Hancock/Lincoln-Knox County SWCD study had coliform bacteria. 26% of these wells (7% of the wells tested in Hancock County) also tested positive for fecal coliform bacteria.

Fecal coliform bacteria (and specifically E. coli) originate inside the intestinal tract of mammals. The fecal coliform test is a better indicator of septic system contamination than total coliform because the total coliform test results may be affected by input from non-mammalian sources such as decaying vegetation. Surface water infiltration around poorly sealed well casings, especially dug well casings, may contribute to the disparity between detection of total coliform and fecal coliform. Examination of the HETL database for the period between 1960 and 1990 indicates that 52% of dug wells and 24% of drilled wells tested positive for total coliform bacteria; from January 2002 to December 2003 the HETL database shows 29% of the 1,695 tests done on dug wells and 12% of the 12,220 tests done on drilled wells tested positive for E. coli or total coliform. This lends support to the belief that dug wells are more susceptible to bacterial contamination than drilled wells.

Shallow Well Injection and the Underground Injection Control (UIC) Program

Contacts: Erich Kluck, DEP BLWQ, Division of Water Resource Regulation (DWRR)

Tel: (207) 287-3901 email: Erich.D.Kluck@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/uic/index.htm

The underground discharge of pollutants by shallow well injection has been illegal in Maine since 1983 when the State adopted the Federal Underground Injection Control (UIC) regulations. Shallow injection wells in Maine are usually gravity feed, low-technology systems which include dry wells under floor drains, cesspools, septic systems, and infiltration beds. Wastes discharged via injection wells include snow melt and wash water, petroleum products, cleaning solvents and degreasers, storm water runoff, non-contact cooling water, and a variety of other industrial, commercial, and household wastes.

Because of their high ground water contamination potential, the DEP has focused most of the UIC Program efforts on inventorying and eliminating automobile service station and manufacturing facility floor drains. Since 1988, more than 5,200 businesses have been contacted either by mail and/or by on-site inspection to determine the presence of shallow injection wells and the discharge location of floor drains. Other groups targeted for survey and inspection have included: dry cleaners, photo processors, car and truck washes, and auto body shops. Most of these facilities have been required to either seal their floor drains or connect the drains to a municipal sewer system or to holding tanks. Holding tank effluent must often be disposed of at a licensed disposal facility. No ground water quality monitoring has been performed at any of the facilities to assess ground water degradation.

Disposal of hazardous substances through floor drains has led to ground water contamination at many sites, at least two of which are currently classified as uncontrolled hazardous waste sites. Three incidents in 1998 involving floor drains demonstrate their threat to ground water:

- During a weekend, a leaking oil tank at a maintenance garage in Brunswick allowed product to escape through a floor drain and into a ditch outside the building. The leak was not discovered until Monday morning,
- A lobster holding facility in Kennebunk repeatedly allowed small amounts of salt water to enter floor drains that discharged to a septic system, resulting in salt contamination in two nearby residential wells, and
- An auto body shop in Gorham has been linked to contaminants found in at least three wells in a nearby subdivision. Floor drains at the auto body shop discharged to a leaking underground holding tank. As of August 2000, remediation of the site had cost $164,550 and extension of the public water supply to affected homes has cost an additional $254,000. Drinking water monitoring will continue for a minimum of 2-3 years.

In 1998, the focus of the UIC Program shifted from inspections by business sector to a watershed-oriented approach. In the past six years, more than 1,300 Maine businesses have been inspected, with an average non-compliance rate of 33%. The chart below describes activities through the middle of Federal Fiscal Year (FFY) 2004.

Table 6-10 Underground Injection Control Program Inspection Information

General UIC Program Inspection information (Dark Grey Cells Indicate Inspections by Type)										
Federal Fiscal Year	**General Area Covered**	**Towns Included**	**Surveys Mailed**	**Businesses Inspected**	**Routine**	**Complaint**	**Follow-up**	**Total**	**Businesses in Violation**	**Businesses Returned to Compliance**
FFY98	Kennebec	25	**	152	146	6	0	152	39	37
FFY99	Kennebec & Androscoggin	86	**	368	357	11	97	465	76	74
FFY00	Presumpscot & Androscoggin	57	605	313	307	6	53	366	95	94
FFY01	St. John	54	152	168	160	8	129	298	83	78
FFY02	Saco & Piscataqua	35	259	185	178	7	62	247	89	88
FFY03	Mid-Coastal	45	111	172	169	3	116	289	71	71
FFY04	Penobscot			24	23	1	27	51	9	6
Totals		**302**	**1127**	**1382**	**1340**	**42**	**484**	**1868**	**462**	**448**
Statistics:									**33.4%**	**97.0%**

** No surveys were mailed these years.

By emphasizing education, technical assistance and the importance of a business's image within the community, 97% of those businesses have come into compliance within one year of having the violation identified.

Stormwater Infiltration

Contact: John Hopeck, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: John.T.Hopeck@SPAM-ZAPmaine.gov

Infiltration of stormwater runoff has been practiced in Maine for many years, principally as a means of providing runoff quality control, particularly for phosphorous control from residential developments in lake watersheds. Use of infiltration practices for control of stormwater quantity is, in contrast, a relatively recent practice for large commercial/industrial developments. Infiltration has long been a preferred option for stormwater control at sand and gravel mines, in order to minimize the risk of sediment discharge from those operations. With increasing requirements for quality treatment in a variety of watersheds, more developments are considering infiltration as a stormwater treatment option. In addition to the need to provide treatment for runoff quality and quantity, there are some concerns regarding the impacts of developments with large impervious areas on recharge and baseflow, particularly in small watersheds and watersheds of headwater streams.

Many of the examples and techniques used for stormwater infiltration were developed in areas with warmer climates and deeper soils than are generally found in Maine. The DEP supported a conference, held in Portland in November of 2003, specifically addressing the issues of stormwater management in cold climates; much of the following discussion derives from staff presentations at that conference. To be practical, infiltration systems relying on drywells, open basins, and swales must be able to treat the design volume in a relatively limited time; Maine's stormwater BMPs specify that the system must have drained within seventy-two hours of the storm.

Recharge, particularly in Maine's climate, requires long periods of soil saturation and drainage, and is influenced by climatic factors that cannot be simulated within the constraints of most stormwater-management designs.

The high water table, shallow bedrock, and generally low-permeability soils, common in much of Maine, limit infiltration of large volumes of runoff. The area underlain by high-permeability soils is a relatively small percentage of the state's area. Further limitations arise because many of these areas are too thin and discontinuous to allow for construction of large excavated basins, or are interstratified with finer marine sand and silt strata. Many infiltration systems have failed or have had to be extensively redesigned as a result of failure to account for these lower-permeability layers. Significant slope failures have also resulted from location of infiltration systems close to embankments, particularly when restrictive layers were not identified prior to or during the design phase. If simulation of predevelopment baseflow is determined to be a practical goal, gradual release of stored water from subsurface storage or, where storage in surface waters is an option, from artificial wetlands, may be a more practical option.

The DEP has required ongoing monitoring of certain infiltration systems that have only minimal treatment prior to discharge and serve a commercial/industrial area or other facility with a large connected impervious area. Monitored facilities currently include several commercial developments, including industrial parks and retail developments. A condominium development has recently been required to begin monitoring as well, due to the large amount of impervious area. Small commercial facilities, such as fast-food restaurants, may be able to use skimmer socks or equivalent BMPs in drywells or catch basins if the Department is satisfied with their maintenance procedures. Pretreatment and location requirements are presently being defined more completely in revised stormwater management rules, discussed below.

Adverse impacts on ground water quality have been demonstrated at those sites that are conducting regular ground water monitoring, although the increased pollutant concentrations have only rarely and intermittently exceeded drinking water standards. Typical effects include elevation of chloride, sodium, specific conductance, total dissolved solids (TDS), dissolved organic carbon, and a reduction in both pH and dissolved oxygen. These effects are presumed to indicate primarily contamination with salt from parking lot and road runoff (chloride and sodium together may account for more than two-thirds of the increase in dissolved solids) and the effects of low concentrations of hydrocarbons in this runoff as well. Zinc has been detected in some wells downgradient of infiltration areas, although at highly variable concentrations. This metal is generally a required sampling parameter due to its relatively high mobility and its common occurrence at industrial and commercial sites and in stormwater management systems. Despite the high mobility of zinc, however, five or more years passed at some sites before the metal appeared at the monitoring wells. Frequency of detection generally continues to increase once the first result above MDL is obtained, although the concentration is highly variable. This is consistent with the results of studies in other states, which found frequency of detection to be a more reliable indicator of impact on water quality than instantaneous concentration.

In addition to the increasingly frequent detection of zinc, concentrations of many pollutants, including presumably soluble pollutants such as chloride and TDS, also show both a relatively continuous signal, with minor seasonal variability, and continual increases over ten or more years. That is, although the pollutant is highly soluble, and the pollutant load, as salt usage, traffic, size of connected impervious area or comparable measure, is the same, the concentration of the pollutant continues to increase. Given the travel times to the wells, longitudinal dispersion is not a likely explanation for this progressive increase. This suggests that some fraction of the pollutants may be sequestered in the aquifer as relatively less soluble phases during part of the year, and are mobilized only under certain conditions, likely related to seasonal high ground water. As water level drops, an increasing mass of the pollutant may remain as capillary water or coatings on aquifer particles, mobilized only gradually by any water passing through the unsaturated overburden to reach this zone. Any recharge later in the year may be conducted to the phreatic zone along macropore networks or other zones of high conductivity; so that much of the pollutant mass remains fixed until dissolved during seasonal high water.

For reasons discussed above, stormwater infiltration from large impervious areas must be generally conducted at sites with a high transmissivity. Where the aquifer is sufficiently thick, the effect of localizing runoff in the infiltration basin apparently creates sufficient head to drive the impacted water to depths of 40 feet or more. This is potentially very significant if wells are screened relatively deep in the aquifer in order to reduce the risk of contamination from surface sources.

Surface Impoundments

Contact: Bill Noble, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-7748 email: William.T.Noble@SPAM-ZAPmaine.gov

Storage, treatment, and disposal of liquid and semi-liquid materials in surface impoundments have long been suspected as major sources of ground water contamination. Currently, the DEP has authority under different statutes (e.g., the UIC Program, Waste Discharge Law, Site Location of Development Law) to regulate a variety of activities and materials related to surface impoundments. In 1979, the DEP conducted a study to characterize and inventory surface impoundments in the State. EPA funded this Surface Impoundment Assessment. Although the inventory probably was incomplete, the study identified at least 173 impoundment sites with a total of 453 individual pits, ponds, and lagoons (both active and abandoned). Materials stored at these sites included municipal sewage, industrial wastewater (including hazardous wastes), and animal wastes.

Since this study was finished, no follow-up work has been performed to complete the initial surface impoundment inventory, to update the inventory with new sites, or to assess the degree of ground water contamination at the various sites. Some of the sites have subsequently been closed and remediated through the RCRA and Uncontrolled Sites Programs. Improperly operated and abandoned sites probably continue to degrade ground water quality today, while some others may not be a threat. A systematic evaluation of all open and abandoned surface impoundments would facilitate a more comprehensive assessment of their ground water impacts. Presently, new facilities proposing to utilize surface impoundments must demonstrate through proper siting and design that there will be no unreasonable adverse effects on ground water quality. These facilities must also conduct ground water quality monitoring, as illustrated in the following section.

Municipal Facilities

Contact: William Brown, DEP BLWQ, Division of Engineering, Compliance, and Technical Assistance (DECTA)

Tel: (207) 287-7804 email: Bill.P.Brown@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/engin.htm

During the reporting period between January 2002 and December 2003, a new high-density polyethylene (HDPE) lined lagoon wastewater treatment facility was constructed in the town of Mapleton. This lagoon was built to store and treat wastewater to appropriate water quality standards before it is discharged onto land. During warm weather months, the treated wastewater is discharged via traditional spray irrigation, while snowmaking equipment is utilized to spray the stored wastewater during the winter. The ability to spray treated wastewater year-round provides additional storage capacity for the existing lagoon.

The construction of this facility was authorized by BLWQ, Division of Engineering, Compliance and Technical Assistance, under Section 411 MRSA Title 38. In these types of lagoons, biological treatment of domestic wastewater occurs. Oxygen, which is necessary for the treatment process, is introduced naturally in facultative lagoons or artificially introduced by blowers in aerated lagoons.

As was mentioned above, these new lagoons were constructed using a high-density polyethylene (HDPE) synthetic liner, to prevent leakage. These facilities installed monitoring wells to monitor any leakage that may result in the contamination of ground or surface water. If contaminants are discovered in the monitoring wells, or if excessive leakage is confirmed by other testing (e.g. lagoon underdrain discharge), the lagoon is taken off-line as soon as possible and repaired. Indicator parameters that are monitored may include nitrate-nitrogen, ammonia-nitrogen, TKN, TOC, COD, hardness, pH, chloride, alkalinity and fecal coliform. Metals are also monitored periodically and include arsenic, cadmium, zinc, lead, mercury, selenium, silver and nickel. To date there has been no reported ground water contamination from municipal wastewater treatment lagoons within the State.

Salt-Water Intrusion

Contact: Marc Loiselle, DOC BGNA, Maine Geological Survey, Applied Geology Division, Hydrogeology Section

Tel: (207) 287-2801 email: Marc.Loiselle@SPAM-ZAPmaine.gov

In coastal areas, excessive ground water withdrawals and/or well placements that are too close to the shoreline may lead to saltwater intrusion. This is particularly significant considering that Maine has approximately 3,500 miles of coastline and there are immense development pressures along most of the coast. Saltwater intrusion is particularly common on coastal peninsulas and off-shore islands that rely primarily on private drilled bedrock wells for drinking water. For example, a 1982 hydrogeologic study conducted in the peninsula town of Harpswell found approximately 70 wells that were affected by saltwater intrusion. As development pressure along the Maine coast continues, the incidence of saltwater intrusion is expected to increase.

Metallic Mining

Contact: Mark Stebbins, DEP BLWQ, Division of Land Resource Regulation (DLRR)

Tel: (207) 822-6367 email: Mark.N.Stebbins@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/miningpage.htm

Maine does not have any operating metallic mines at this time. In August of 1991, metallic mining rules were adopted by the State of Maine to be administered by the DEP. The purpose of these rules is to protect land and water quality while allowing for metallic mineral exploration and property development. Currently, no new permit applications are pending. One permit was issued in November 1992 to BHP Utah for advanced exploration. This permit has expired and no activity has taken place.

Historical metallic mining sites such as the Callahan Mine site in Brooksville and the Kerramerican Mine in Blue Hill are known to degrade surface water quality by acid rock drainage from tailings ponds. Both of these sites were mined for copper and zinc, however there are other metals that are found at elevated levels onsite and in the nearby surface water bodies.

The Kerramerican Mine site is currently being investigated by Kerramerican, Inc. which is a potentially responsible party at the site. Kerramerican has agreed to work with the State's Uncontrolled Sites Program to investigate and remediate the property in order to avoid being listed on the National Priorities List (NPL or Superfund). The DEP approved a final Remedial Investigation, which included human health and ecological Risk Assessments in late December 2002. Final approval of the Feasibility Study and the Remedial Action Plan (RAP) await final details pending approval of the wetland permit for the site, which is expected in the spring of this year. Following approval of the RAP, remedial construction by Kerramerican will begin in the summer. Metals found at the site are cadmium, chromium, copper, lead, zinc, iron, and mercury. Additional information on this site can be found in the case study under the earlier section entitled "Federal Facilities, Superfund, and Hazardous Substance Sites."

In the fall of 2000, the U.S. Environmental Protection Agency and the State of Maine completed a Hazard Ranking System (HRS) evaluation for the Callahan Mine in Brooksville. The HRS evaluation concluded that the site is eligible for listing on the NPL. The USEPA proposed the Callahan mine for inclusion on the NPL list in 2001, and EPA listed the site in late 2002.

To date, neither the EPA nor the DEP have conducted remedial investigations at the site. Some homeowner wells near the mine have been sampled and were found to have a low level of metals contamination. At least two homes have elevated levels of zinc and one home has elevated levels of cadmium and lead. No conclusion can be made from these samples without a complete and well-designed remedial investigation. At this point no funding has been allocated by the State or by EPA to do any additional investigations.

Gravel Pits

Contact: Mark Stebbins, DEP BLWQ, Division of Land Resource Regulation (DLRR)

Tel: (207) 822-6367 email: Mark.N.Stebbins@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/blwq/docstand/miningpage.htm

Five hundred twenty-eight gravel pits 5 acres or greater in size have been licensed by the Maine DEP. The number of unlicensed (illegal) pits that cover 5 or more areas and the number of gravel pits falling below the licensing thresholds are unknown. Recent changes to performance standards now include a variance provision for excavation into ground water. Previously, a separation distance of one to five feet was required between the base of the excavation and the seasonal high water table (SHWT). In general, prior to issuing any variance to excavate gravel from below the SHWT, the Department investigates the dewatering potential for adjacent wells and protected natural resources. The DEP has issued approximately 24 variances to excavate gravel from below the water table. These sites are extensively monitored for both ground water levels and quality. To date, the Department has not observed the direct dewatering of any protected natural resource due to mining from below the water table at these sites.

Impacts to ground water from gravel pit operations include contamination by spillage or spraying of petroleum products in or near the pits, and dewatering of local surficial aquifers. Improper use, storage, or handling of petroleum products is known to have caused ground water contamination in three gravel pits. The State does not have any record of the number of wells or surface water resources such as wetlands adjacent to gravel pits that have been dewatered due to mining activities. Another threat to ground water indirectly related to gravel pits is dumping into pits that do not adequately restrict unauthorized access. Unreclaimed sand and gravel pits are too often the sites of illegal dumping. At the present time, 16 abandoned gravel pits are listed as uncontrolled hazardous waste sites. Ground water in the area of these pits contains a variety of pollutants such as solvents and PCBs.

Radioactive Waste Storage and Disposal Sites

Contact: Tom Hillman, DHS BOH, Division of Health Engineering, Radiation Control Program

Tel: (207) 287-8401 email: Tom.Hillman@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/rad/hp_waste.htm

Maine has two high-level radioactive waste generators, Maine Yankee Atomic Power Company (in the process of decommissioning) in Wiscasset and Portsmouth Naval Shipyard in Kittery. The naval shipyard currently ships spent nuclear fuel to interim storage at the Idaho National Engineering Laboratory and its low-level waste to facilities in South Carolina or Utah for burial. The decommissioning of Maine Yankee, as of December 2003, was over 83% complete with about 60% of its wastes shipped. In 2003, waste shipments were over 33,000,000 pounds with a total to date in excess of 160 million pounds.

Maine Yankee stores its high level waste (HLW) on-site and will continue to do so after the decommissioning project is complete. The storage facility for this waste was completed in 2002 and called an Independent Spent Fuel Storage Installation (ISFSI). This installation will house 60 spent fuel casks and 4 casks of Greater Than Class C

Waste (GTCC) generated during Maine Yankee's operation. The entire facility covers about six acres of plant property. A security system and double-fenced enclosure are provided as required by U.S. Nuclear Regulatory Commission (NRC) regulations. In addition, the site is surrounded by an earthen berm. The NRC has strict rules for construction and operation of an ISFSI.

All of Maine Yankee's 64 casks are situated above ground on concrete pads. The transfer of spent fuel from the spent fuel pool to the ISFSI has resulted in 49 casks out of 64 being moved as of December 2003. The U.S. Department of Energy (DOE) is responsible for the ultimate disposal of the spent fuel and GTCC. The ISFSI will provide temporary storage of Maine Yankee's HLW and GTCC until the DOE removes it to a permanent national disposal facility expected to be operational in 2010. The ISFSI will be environmentally monitored as long as waste is in storage. The NRC will continue to regulate the waste as long as it remains on site.

Maine Yankee ships its low-level waste to facilities in South Carolina and Utah for burial. The reactor was shipped to South Carolina in the summer of 2003 for burial. Concrete debris from the plant's structure and dome make up most of the waste volume to be shipped out of state throughout the remaining decommissioning.

The Maine Department of Human Service's Radiation Control Program monitors the other generators of low level radioactive waste (LLW) and also inspects their facilities and shipments. Maine's low-level waste generators consist of university and college research facilities, hospitals, research and vendors in the medical field, and a few manufacturing facilities. Most of these sites allow the waste to decay in storage and dispose of it as non-radioactive waste. A small amount of LLW that is not feasible for decay in storage is shipped out-of-state to licensed disposal facilities. On average, twelve out of 132 radioactive material licensees generate LLW that requires out-of-state disposal.

A continuing concern of the State's Radiation Control Program is the discovery of LLW that is appearing at scrap metal recycling yards. Newly installed radiation detection meters have revealed material that makes its way into the waste stream. Typically, these items are consumer items, such as smoke detectors, refuse from nuclear medicine patients and improperly disposed of or naturally occurring radioactive materials (NORM) that have been inadvertently concentrated through other processes. Many other state programs also encounter this problem and efforts are being made to address the issue. Maine has only a couple waste facilities that monitor incoming waste and each year the number of loads triggering alarms increases.

Maine has one confirmed low-level radioactive waste site in Greenbush. Other sites may exist, but they have not been located. Ground water monitoring wells have been installed at the Greenbush site and on adjacent property. No contamination has been detected in the monitoring wells. At this time, threats from chemical contamination are of greater concern than radiological contamination.

Summary of Ground Water Quality

For 2004, DEP has used the statewide 8 digit HUC code watersheds to describe ground water quality (Figure 6-4 depicts these major drainage divides). The three ground watersheds or aquifers that are described below were selected based on the availability of water quality and threats to ground water data. Each watershed includes water quality data for at least one surficial aquifer, and the bedrock aquifer.

Sand and gravel aquifers are often high yield water sources and are often found in developed areas, and are therefore vulnerable to contamination. Bedrock aquifers, though not usually hydrologically connected, underlie the whole state and are mostly used as private water supplies, as are glacial till aquifers. DEP has also added information on raw water quality from a DHS Drinking Water Program (DWP) database to indicate "ambient" water quality. The locations of the wells used to indicate ambient water quality are shown in Figure 6-5 and a summary of the ambient water quality data is in Table 6-11

The ambient ground water quality monitoring network consists of 2,733 public water supplies. A total of 1,445 supplies were used for this analysis. Each of the selected public water supplies is provided by only one source of water: either a drilled well in bedrock; a dug well in glacial till; a drilled well, well point, or dug well in glacial outwash sand and gravel or recent sandy alluvium. Some of the wells are large community water supplies; some are non-transient, non-community water supplies. Analytical results for periodic, routine sampling of raw water were provided by the DWP. Not all the well samples were analyzed for the all the same chemical constituents every time they were obtained: frequency depends on the type of water supply and the population served. Nevertheless, the DEP believes that the selection represents ambient ground water quality in the three major geologic settings that provide ground water in Maine.

Since Maine is early in the process of prioritizing ground water based on use and vulnerability criteria, it is premature to choose specific aquifers based on these criteria. Because of DEPs ongoing efforts at groundwater-threat database management linked with ground water use and vulnerability assessment, the Department hopes to be able to accomplish this type of prioritization during the next round of reporting. Therefore, the examples which follow are an attempt to utilize the format requested by EPA and to assist the Ground Water Program in determining where it can improve data management in order to provide better coverage in the future.

Figure 6-6 shows the locations of the towns discussed in the following section. Figures 6-7, 6-8 & 6-9 and Tables 6-12 through and 6-17 summarize aquifer data and threats to ground water in the selected aquifers. Table 6-18 lists the status of actions being taken to address ground water contaminant problems in these aquifers. This attempt has uncovered three areas that pose a difficulty in reporting information as requested by EPA:

- The data are stored differently (hard copy vs. electronic) and are collected from numerous programs having different sampling reporting periods.
- Aquifer description and setting: private well information from the HETL database does not always clearly identify the source for a well as bedrock or stratified drift.
- The ground water database site information, i.e. type of site, location, owner information, remediation status, etc., are available, but ground water quality monitoring information is not yet accessible for many categories within the database.

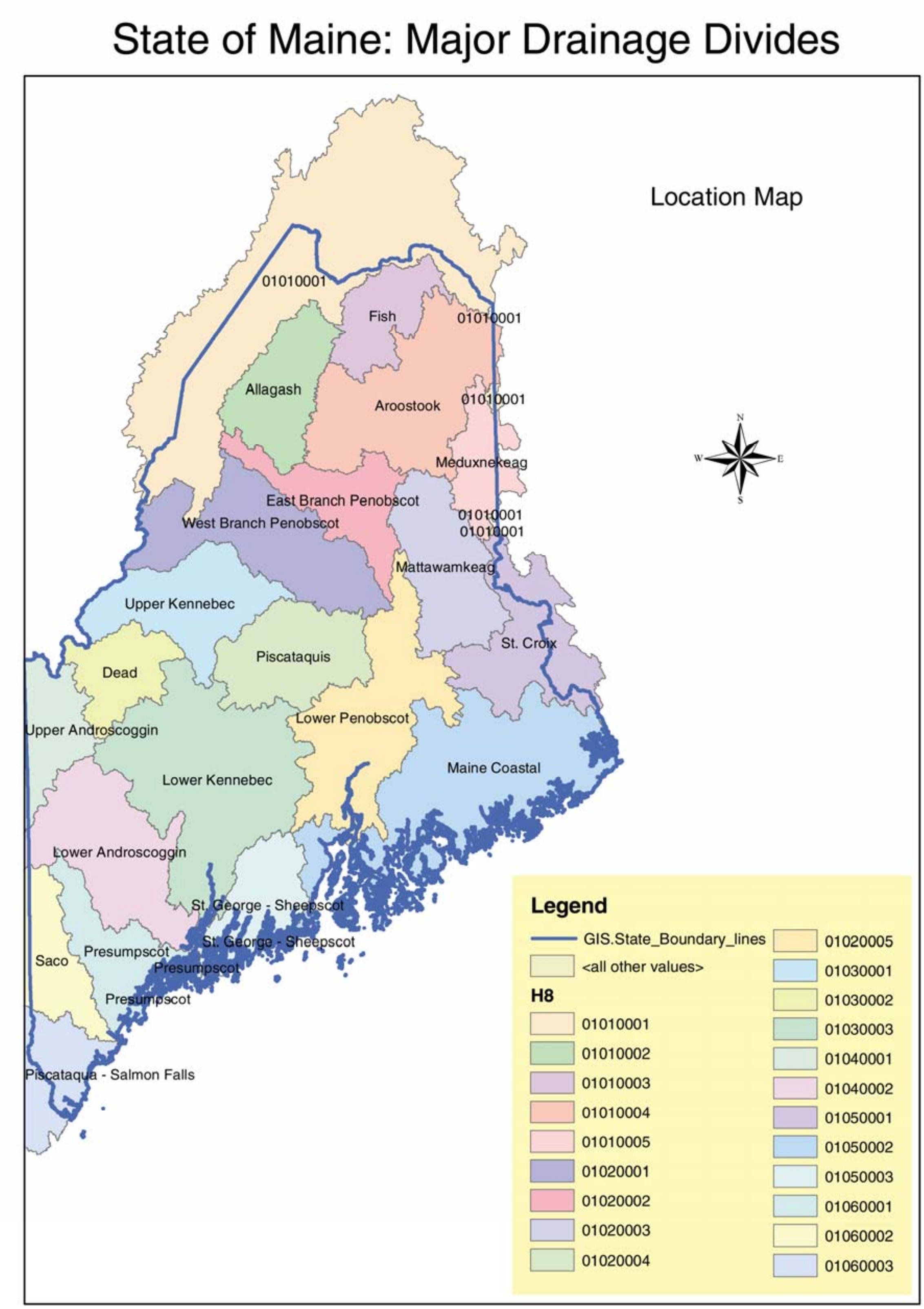


Figure 6-3 Location Map - State of Maine, Major Drainage Divides

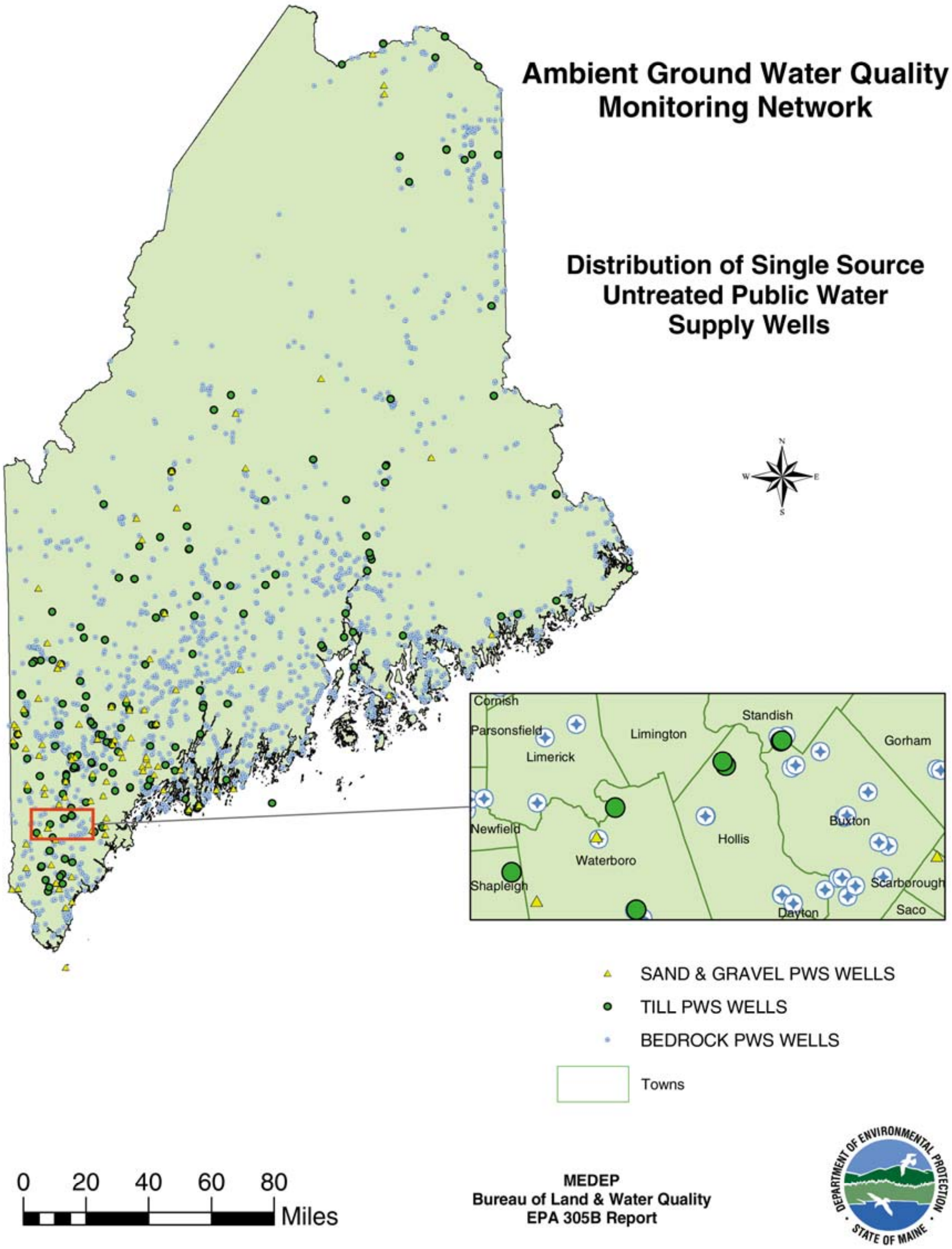


Figure 6-4 Ambient Water Quality Monitoring Network Well Location Map

Table 6-11 Ambient Aquifer Monitoring Data

Ambient Ground Water Quality Monitoring Well Data *

Aquifer Description: Till **Statewide**

Data Reporting Period: Jan. 2002-Dec. 2003

Monitoring data type [1]	Total number of wells used in assessment	Parameter groups	No detections of parameters above MDLs or background levels	No detections of parameters above MDLs or background levels and nitrate concentrations range from background levels to $\leq$5 mg/l	Parameters are detected at concentrations exceeding the MDL, but are less than or equal to MCLs and/or nitrate ranges from >5 to $\leq$10 mg/l	>10m/l	Parameters are detected at concentrations exceeding MCL's
Ambient (raw)	39	VOC	118	0	0	0	0
water quality		SOC	0	0	0	0	0
data from public	# of Tests:	NO3	64	37	0	0	0
water supply wells	325	Other	70	33	2	1	0

Ambient Ground Water Quality Monitoring Well Data *

Aquifer Description: Bedrock **Statewide**

Data Reporting Period: Jan. 2002-Dec. 2003

Monitoring data type [1]	Total number of wells used in assessment	Parameter groups	No detections of parameters above MDLs or background levels	No detections of parameters above MDLs or background levels and nitrate concentrations range from background levels to $\leq$5 mg/l	Parameters are detected at concentrations exceeding the MDL, but are less than or equal to MCLs and/or nitrate ranges from >5 to $\leq$10 mg/l	.10m/l	Parameters are detected at concentrations exceeding MCL's
Ambient (raw)	1322	VOC	27009	107	14	1	0
water quality		SOC	1972	3	0	1	1
data from public	# of Tests:	NO3	1921	1268	78	19	19
water supply wells	40120	Other	4385	2112	328	902	12

Major uses of aquifers or hydrologic units: X Public water supply ___ Irrigation ___ Commercial ___ Mining ___ Baseflow
X Private water supply ___ Thermoelectric ___ Livestock ___ Industrial ___ Maintenance

Uses affected by water quality problems: X Public water supply ___ Irrigation ___ Commercial ___ Mining ___ Baseflow
X Private water supply ___ Thermoelectric ___ Livestock ___ Industrial ___ Maintenance

Table 6-11 Ambient Aquifer Monitoring Data (continued)

Ambient Ground Water Quality Monitoring Well Data *

Aquifer Description: Stratified Drift **Data Reporting Period:** Jan. 2002-Dec. 2003
Statewide

Monitoring data type [1]	Total number of wells used in assessment	Parameter groups	No detections of parameters above MDLs or background levels	No detections of parameters above MDLs or background levels and nitrate concentrations range from background levels to $\leq$5 mg/l	Parameters are detected at concentrations exceeding the MDL, but are less than or equal to MCLs and/or nitrate ranges from >5 to $\leq$10 mg/l	.10m/l	Parameters are detected at concentrations exceeding MCL's
Ambient (raw)	84	VOC	2031	0	4	1	0
water quality		SOC	67	0	0	0	0
data from public	# of Tests:	NO3	73	160	7	4	4
water supply wells	2825	Other	73	0	294	111	0

Major uses of aquifer or hydrologic unit: X Public water supply ___ Irrigation ___ Commercial ___ Mining ___ Baseflow X Private water supply ___ Thermoelectric
__ Livestock ___ Industrial ___ Maintenance

Uses affected by water quality problems: X Public water supply ___ Irrigation ___ Commercial ___ Mining ___ Baseflow X Private water supply ___ Thermoelectric
___ Livestock ___ Industrial ___ Maintenance

* data supplied by DHS /BOH/DHE/Drinking Water Program, analysis by DEP/BLWQ/DEA/Environmental Geology Unit

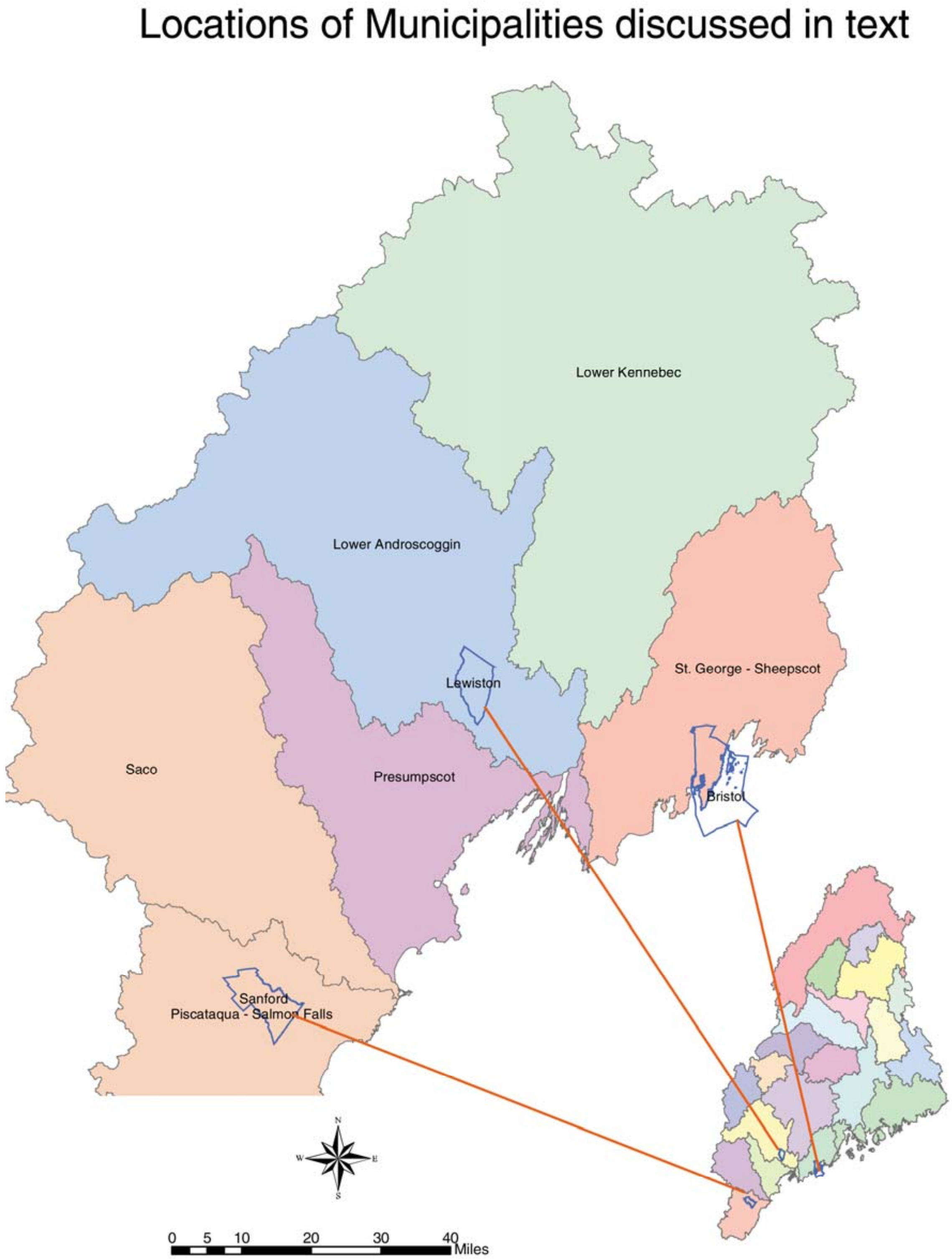


Figure 6-5 Locations of Towns Discussed in the Following Sections

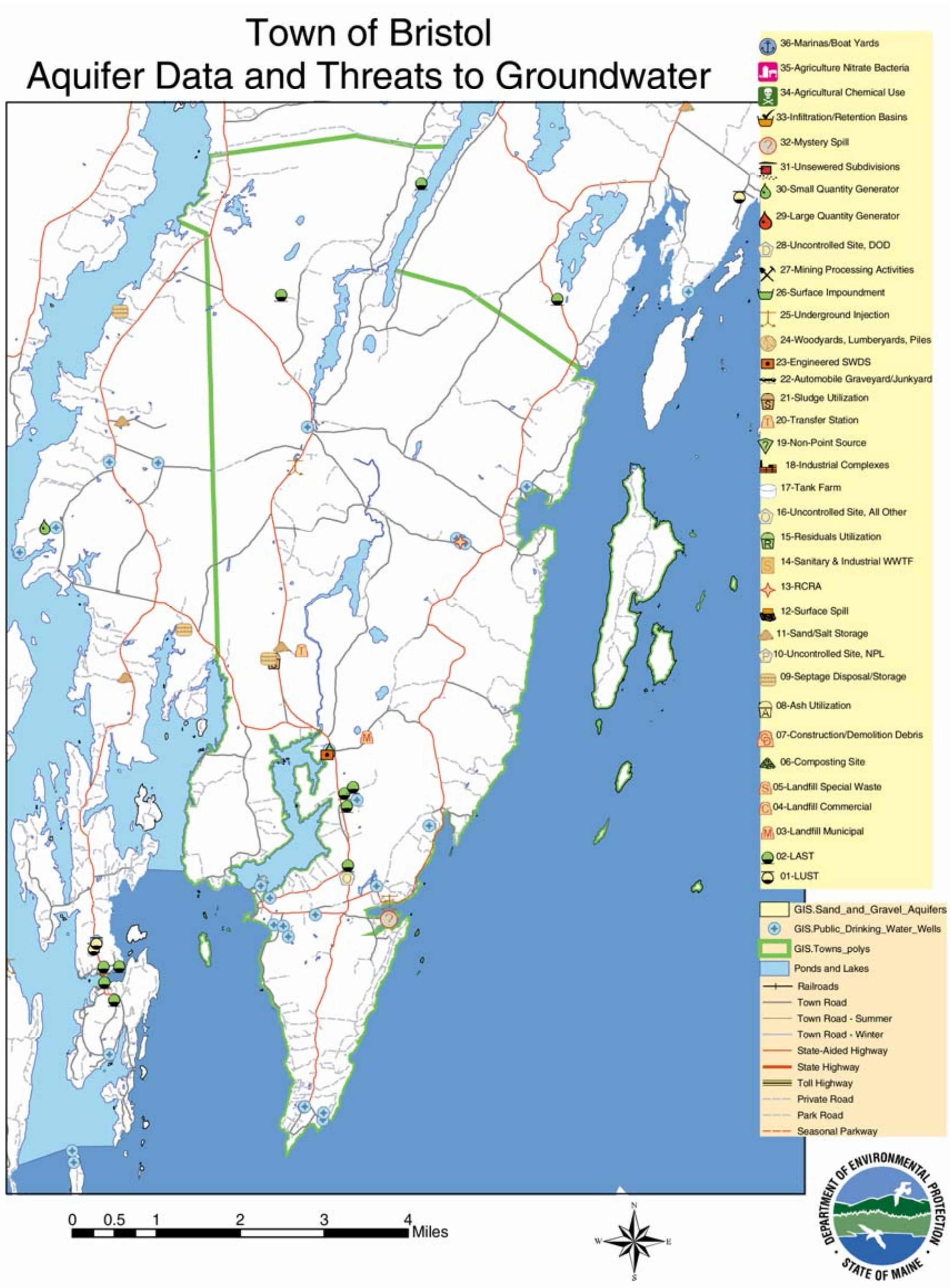


Figure 6-6 Town of Bristol – Aquifer and Threats to Ground Water Data

Table 6-12 Town of Bristol Aquifer Monitoring Data

Aquifer Description: Bristol Bedrock Aquifer **County:** Lincoln
Aquifer Setting: primarily bedrock and till **Data Reporting Period:** Jan. 2002-Dec. 2003

Monitoring data type [1]	Parameter groups	Total number of wells used in assessment	No detections of parameters above MDLs or background levels	No detections of parameters above MDLs or background levels and nitrate concentrations range from background levels to less than or equal to 5 mg/l	Parameters are detected at concentrations exceeding the MDL, but are less than or equal to MCLs and/or nitrate ranges from greater than 5 to less than or equal to 10 mg/l	>10m/l	Parameters are detected at concentrations exceeding MCLs
Finished water quality data from public water supply wells	VOC	1	440	1	0	0	0
	SOC	0	0	0	0	0	0
	NO3	2	2	5	0	0	0
	Other	2	45	11	0	0	0
Raw water quality data from private or unregulated wells (Maine Health and Environmental Testing Laboratory)	VOC*	37	0	0	0	0	0
	SOC*	37	0	0	0	0	0
	NO3	37	19	9	1	0	0
	Other	37	35	16	0	0	2
	*No Tests						
Raw water quality data from public water supply wells "ambient" network	VOC	4	548	1	0	0	0
	SOC	0	0	0	0	0	0
	NO3	19	40	9	2	0	0
	Other	20	84	73	3	5	0

Major uses of aquifer or hydrologic unit: X Public water supply; ___ Irrigation; X Commercial; ___ Mining; ___ Baseflow; X Private water supply; ___ Thermoelectric; ___ Livestock; ___ Industrial; ___ Maintenance

Uses affected by water quality problems: X Public water supply; ___ Irrigation; ___ Commercial; ___ Mining; ___ Baseflow; X Private water supply; ___ Thermoelectric; ___ Livestock; ___ Industrial; ___ Maintenance

Table 6-13 Bristol Aquifer Ground Water Contamination Summary

Aquifer Description: Bristol Aquifer **County: Lincoln**
Aquifer Setting: bedrock and till **Data Reporting Period: 1985-2003**

Source Type	Present in reporting area	Number of sites in area	Number of sites that are listed and/or have confirmed releases	Number with confirmed ground water contamination	Contaminants	Number of site investigations	Number of sites that have been stabilized or have had the source removed	Number of sites with corrective action plans	Number of sites with active remediation	Number of sites with cleanup completed
NPL	N									
CERCLIS (non-NPL)	N									
DOD/DOE	N									
UST/LUST	Y/Y	25/5	5	0	Gasoline	5	5	4	0	4
RCRA Corrective Action	Y	1	1	1	TCE, TCA	1	0	0	0	0
Underground Injection	Y	2	0	0	0	0	0	0	0	0
State Sites	Y	1	1	1	TCE	1	1	1	0	1
Nonpoint Sources	N									
Surface Spills	Y	37	37	8	Gasoline	37	37	3	0	3
Above-ground tanks	Y	12	12	7	#2 Fuel oil	12	12	7	0	12
Municipal landfills	Y	1	1	1	Leachate	1	1	1	0	1
De-icing	Y	1	1	1	Salt	1	0	0	0	0
Biomass ash utilization	N	0	0	0	0	0	0	0	0	0
Residuals	N	0	0	0	0	NA	0	0	0	0
TOTALS		60	58	19		58	56	16	0	21

NPL - National Priority List
CERCLIS (non-NPL) - Comprehensive Environmental Response, Compensation, and Liability Information System
DOE - Department of Energy
DOD - Department of Defense
LUST - Leaking Underground Storage Tanks
RCRA - Resource Conservation and Recovery Act
UST - Underground Storage Tanks, Registered
NA- not available

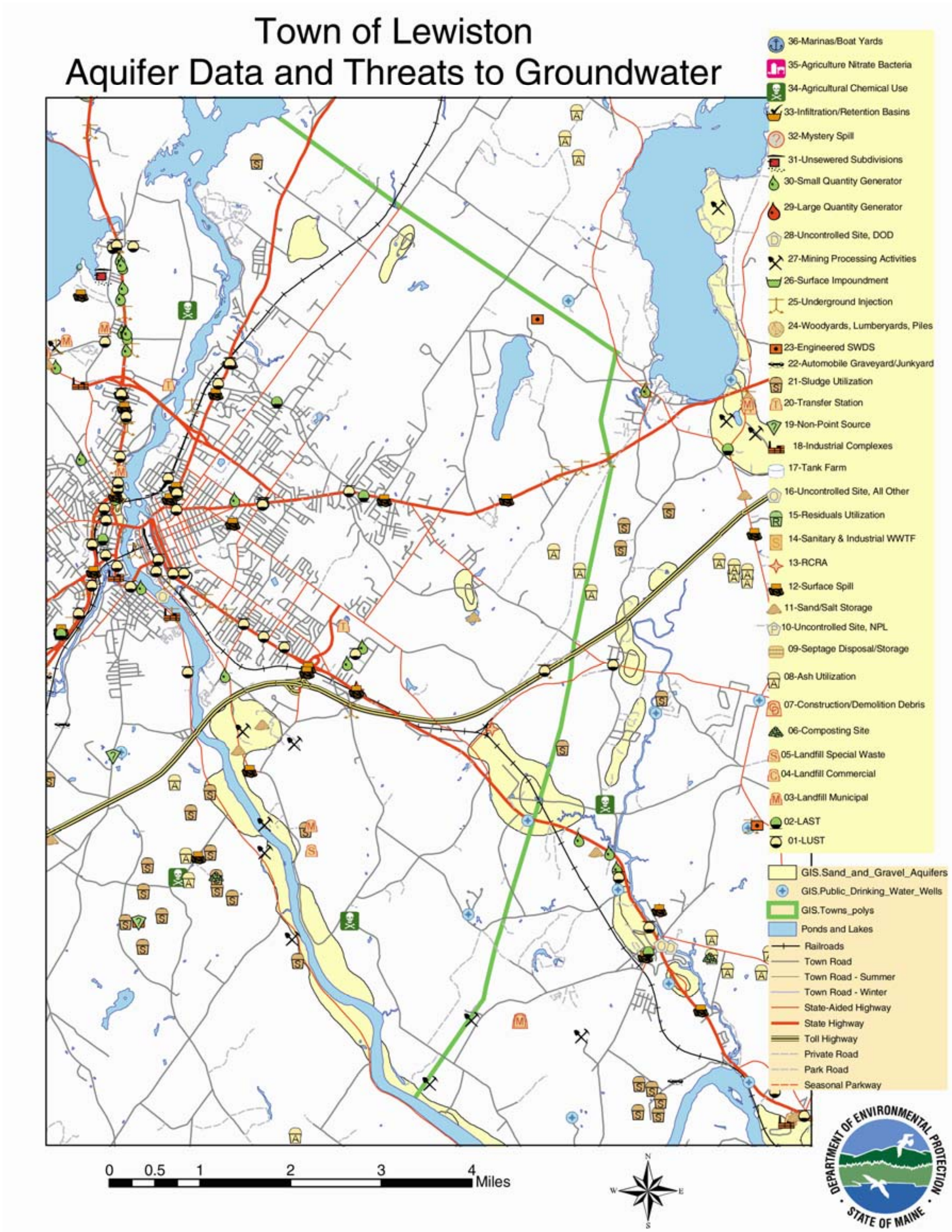


Figure 6-7 Town of Lewiston – Aquifer and Threats to Ground Water Data

Table 6-14 Town of Lewiston Aquifer Monitoring Data

Aquifer Description: Lewiston Bedrock Aquifer **County:** Androscoggin
Aquifer Setting: bedrock **Data Reporting Period:** Jan. 2002-Dec. 2003

Monitoring data type [1]	Parameter groups	Total number of wells used in assessment	No detections of parameters above MDLs or background levels	No detections of parameters above MDLs or background levels and nitrate concentrations range from background levels to less than or equal to 5 mg/l	Parameters are detected at concentrations exceeding the MDL, but are less than or equal to MCLs and/or nitrate ranges from greater than 5 to less than or equal to 10 mg/l	>10m/l	Parameters are detected at concentrations exceeding MCLs
Finished water* quality data from public water supply wells	VOC	0	0	0	0	0	0
	SOC	0	0	0	0	0	0
	NO3	0	0	0	0	0	0
	Other	0	0	0	0	0	0

***NO FINISHED WATER SAMPLING DONE IN THE REPORTING PERIOD IN LEWISTON**

Raw water quality data from private or unregulated wells (Maine Health and Environmental Testing Laboratory)	VOC	32	205	16	0	0	2
	SOC	32	5	7	0	0	2
	NO3	32	25	13	0	0	0
	Other*	32	74	15	0	0	2
	*No Radon testing but 2 results above MCL in Uranium 238 testing (not included in this table)						
Raw water quality data from public water supply wells "ambient" network	VOC	3	0	0	0	0	0
	SOC	3	0	0	0	0	0
	NO3	3	7	6	0	0	0
	Other	3	62	2	3	0	1

Major uses of aquifer or hydrologic unit: X Public water supply; ___ Irrigation; X Commercial; ___ Mining; ___ Baseflow; X Private water supply; ___ Thermoelectric; ___ Livestock; ___ Industrial; ___ Maintenance

Uses affected by water quality problems: X Public water supply; ___ Irrigation; ___ Commercial; ___ Mining; ___ Baseflow; X Private water supply; ___ Thermoelectric; ___ Livestock; ___ Industrial; ___ Maintenance

Table 6-15 Lewiston Aquifer Ground Water Contamination Summary

Aquifer Description: Lewiston Aquifer **County: Androscoggin**
Aquifer Setting: bedrock **Data Reporting Period: 1985-2003**

Source Type	Present in reporting area	Number of sites in area	Number of sites that are listed and/or have confirmed releases	Number with confirmed ground water contamination	Contaminants	Number of site investigations	Number of sites that have been stabilized or have had the source removed	Number of sites with corrective action plans	Number of sites with active remediation	Number of sites with cleanup completed
NPL	N									
CERCLIS (non-NPL)	N									
DOD/DOE	N									
UST/LUST	Y/Y	625/25	21	21	Gasoline/diesel	25	21	21	0	21
RCRA Corrective Action	Y	2	2	2	Solvents, mercury	2	2	2	1	1
Underground Injection	NA	NA	0	0		0	0	0	0	0
State Sites	Y	5	5	5	Coal tar etc	5	4	5	1	3
Nonpoint Sources	N	0	0	0		0	0	0	0	0
Surface Spills	Y	12	12	0	Fuel Oil	12	12	0	0	12
Above-ground tanks	Y	97	97	1	#2 Fuel oil	97	97	1	0	1
Municipal landfills	Y	2	1	1	Sludge, Leachate	1	1	1	0	1
De-icing	Y	3	2	2	Salt, sewage	2	2	1	0	1
Biomass ash utilization	Y	2	0	0	0	0	0	0	0	0
Residuals	N	0	0	0	0	0	0	0	0	0
TOTALS		148	140	32		144	139	31	2	45

NPL - National Priority List
CERCLIS (non-NPL) - Comprehensive Environmental Response, Compensation, and Liability Information System
DOE - Department of Energy
DOD - Department of Defense
LUST - Leaking Underground Storage Tanks
RCRA - Resource Conservation and Recovery Act
UST - Underground Storage Tanks, Registered
NA- not available

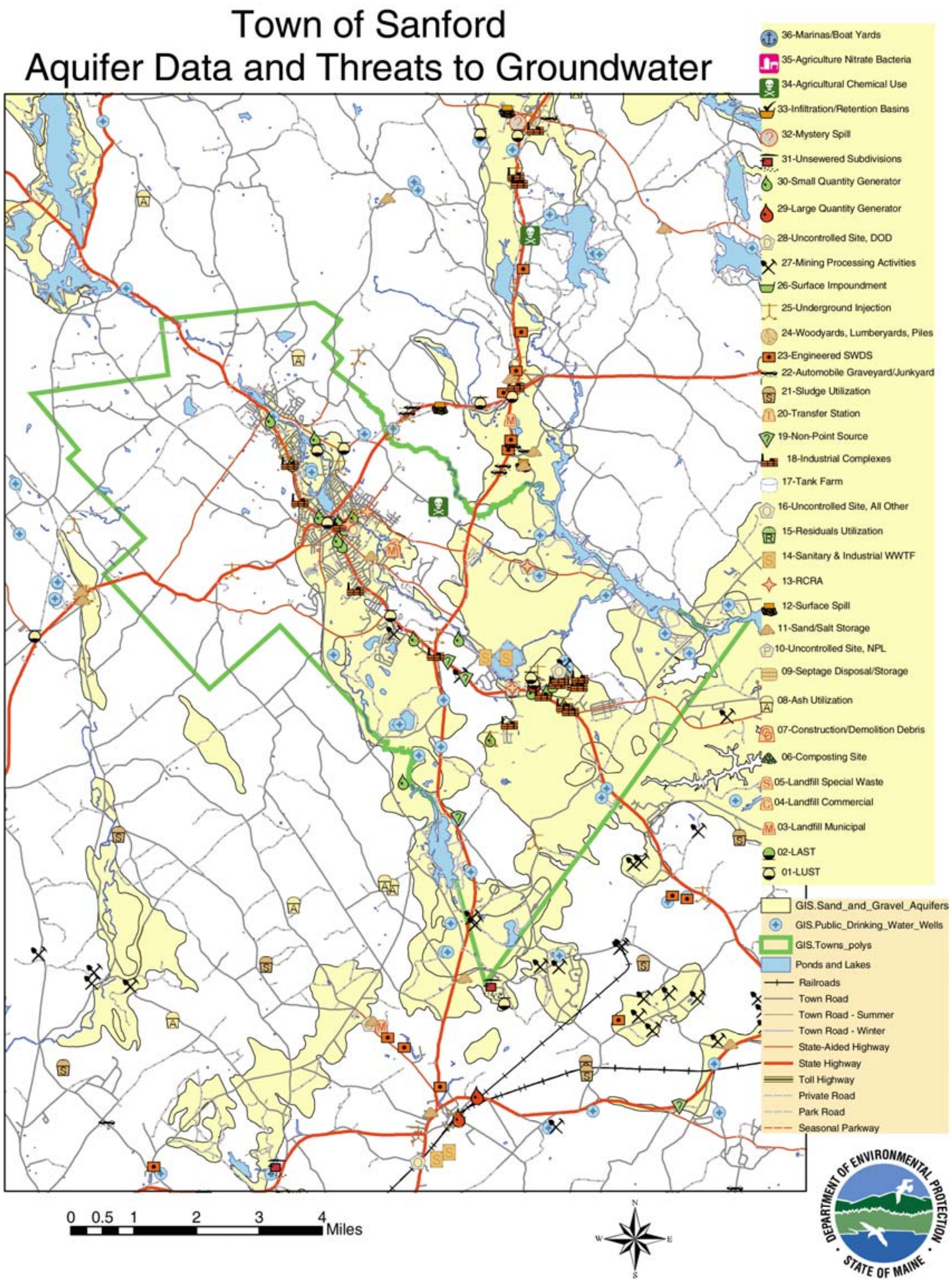


Figure 6-8 Town of Sanford – Aquifer and Threats to Ground Water Data

Table 6-16 Town of Sanford Aquifer Monitoring Data

Aquifer Description: Sanford Bedrock Aquifer **County:** York
Aquifer Setting: primarily bedrock and till **Data Reporting Period:** Jan. 2002-Dec. 2003

Monitoring data type [1]	Parameter groups	Total number of wells used in assessment	No detections of parameters above MDLs or background levels	No detections of parameters above MDLs or background levels and nitrate concentrations range from background levels to less than or equal to 5 mg/l	Parameters are detected at concentrations exceeding the MDL, but are less than or equal to MCLs and/or nitrate ranges from greater than 5 to less than or equal to 10 mg/l	>10m/l	Parameters are detected at concentrations exceeding MCLs
Finished water quality data from public water supply wells	VOC	2	381	17	8	3	0
	SOC	2	0	0	0	0	0
	NO3	2	4	0	0	0	0
	Other	2	52	2	0	0	0
Raw water quality data from private or unregulated wells (Maine Health and Environmental Testing Laboratory)	VOC	17	1560	78	0	0	0
	SOC*	0	0	0	0	0	0
	NO3	17	14	23	0	0	0
	Other	17	7	14	3	16	6
	*No Tests						
Raw water quality data from public water supply wells "ambient" network	VOC	1	49	0	0	0	0
	SOC	0	0	0	0	0	0
	NO3	11	15	6	0	0	0
	Other	3	2	1	0	0	0

Major uses of aquifer or hydrologic unit: X Public water supply; ___ Irrigation; X Commercial; ___ Mining; ___ Baseflow; X Private water supply; ___ Thermoelectric; ___ Livestock; ___ Industrial; ___ Maintenance

Uses affected by water quality problems: X Public water supply; ___ Irrigation; ___ Commercial; ___ Mining; ___ Baseflow; X Private water supply; ___ Thermoelectric; ___ Livestock; ___ Industrial; ___ Maintenance

Table 6-17 Sanford Aquifer Ground Water Contamination Summary

Aquifer Description: Sanford Aquifer
Aquifer Setting: primarily stratified drift

County: York
Data Reporting Period: 1985-2003

Source Type	Present in reporting area	Number of sites in area	Number of sites that are listed and/or have confirmed releases	Number with confirmed ground water contamination	Contaminants	Number of site investigations	Number of sites that have been stabilized or have had the source removed	Number of sites with corrective action plans	Number of sites with active remediation	Number of sites with cleanup completed
NPL	N									
CERCLIS (non-NPL)	N									
DOD/DOE	N									
UST/LUST	Y/Y	245/57	57	4	Gasoline, fuel oil, diesel	57	57	4	0	4
RCRA Corrective Action	Y	6	6	6	TCE, TCA	10	5	6	1	5
Underground Injection	Y	11	1	1	VOC'S	4	1	1	0	1
State Sites	Y	20	20	20	Oil, metals. Hazardous w.	20	16	3	1	16
Nonpoint Sources	Y	3	0	0		0	0	0	0	0
Surface Spills	Y	3	3	0	Hazardous material	3	3	0	0	3
Above-ground tanks	Y	60	60	6	#2 Fuel oil	60	6	0	0	6
Municipal landfills	Y	2	1	1	Metals, SVOCs	1	1	0	0	1
De-icing	Y	1	0	0	0	0	0	0	0	0
Biomass ash utilization	Y	1	0	0		0	0	0	0	0
Residuals	N	0	0	0	0	NA	0	0	0	0
TOTALS		164	148	38		155	89	103	2	36

NPL - National Priority List
CERCLIS (non-NPL) - Comprehensive Environmental Response, Compensation, and Liability Information System

DOE - Department of Energy
DOD - Department of Defense
LUST - Leaking Underground Storage Tanks

RCRA - Resource Conservation and Recovery Act
UST - Underground Storage Tanks, Registered
NA- not available

Ground Water Prioritization and Vulnerability Assessment

Contact: John Hopeck, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: John.T.Hopeck@SPAM-ZAPmaine.gov

The DEP and the Maine Geological Survey (MGS) have been developing a model to regionally assess the intrinsic risk to ground water in the bedrock flow system. The model will use parameters such as the measured depth to bedrock and the overburden hydraulic conductivity, as inferred from geologic mapping. The intent is to set regional priorities for state, county, and municipal agencies, and local organizations. Because of the high spatial variability of both controlling factors and the inherent uncertainty in estimates of hydraulic conductivity, the method is not intended to be used for locating specific facilities, but simply to provide a means of estimating relative risk at the watershed scale. The focus of work to date has been on evaluation of intrinsic vulnerability, rather than development of semi-quantitative measures of risk. Work has been concentrated in the watersheds of the Presumpscot, Fore and Royal Rivers and a surrounding 0.5 kilometer buffer area outside of the combined-watershed boundary

Intrinsic vulnerability is a measure of the physical characteristics of an aquifer that make it susceptible to contamination introduced at or near the land surface. It is a function of overburden thickness and surficial geology at specific points of known overburden thickness; the vulnerability at intervening locations is determined by interpolation of these data, and a grid is prepared with a vulnerability factor assigned to each cell. Overburden thickness is obtained from data supplied to the MGS by well drillers, who are required to submit this information for any new water supply well. These point data are not evenly distributed throughout watersheds or throughout the state, and are biased towards those areas of new residential development where a public water supply is not available.

The minimum grid cell size used to date is 100m x 100m. Because the range in possible values of hydraulic conductivity is very large compared to the range in values of overburden thickness, we have developed a relationship between the two that allows hydraulic conductivity to control the vulnerability factor only at relatively small values of overburden thickness. Failure to correct for this problem is a significant oversight in many existing vulnerability assessment techniques, since most of these methods often differ very little from surficial geologic maps. The accuracy of the overburden-thickness grid was tested by selecting a random subset of the data used to generate the grid, gridding the remaining data, and then comparing the interpolated grid-cell values with the known point represented in the grid.

The vulnerability grid was tested using nitrate data from monitored public water supplies within the study area, and by comparison to a statewide study of housing developments with on-site wastewater disposal. It is understood that this procedure self-selects for water quality at sites where nitrate sources may be relatively low, particularly in the case of public water supplies. Consequently, even though the vulnerability at a site might be high, low or non-detect results for nitrate would be expected. Results did show significant correlation between overburden thickness (or casing length, essentially a surrogate for overburden thickness) and nitrate concentration, but not significant correlation between calculated vulnerability rankings and nitrate concentration. Statistically significant correlation was found between low vulnerability rankings at sites with non-detect results and higher vulnerability ratings at those sites with detectable concentrations of nitrate. This may indicate that it is not practical to correlate the contamination risk at a particular point with the calculated vulnerability at that point, but that there is a broad correlation between larger areas of vulnerability and the likelihood of contamination in bedrock. Consequently, there is general validity to the approach, although, as indicated above, confidence in the accuracy of the vulnerability value at any specific cell of a grid is low.

Vulnerability values at particular points may not be very accurate, but the vulnerability across a particular sub-basin may well be, at least for the purposes of comparison with other basins. The agencies are continuing to seek support for refinement of the method and development of a user-friendly application, and for evaluation of other possibly significant factors, such as assessment of recharge - discharge locations in transport of pollutants to and from the bedrock system.

Environmental Groundwater Analysis Database (EGAD)

Contact: Mark Holden, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-7779 email: Mark.K.Holden@SPAM-ZAPmaine.gov

A ground water quality database, which links site characteristics and ground water quality information to a spatial database, has been in use at the DEP for the past several years. Maintenance of the database includes identification and location of various activities and known contamination sites, which may affect ground water quality and populations served by public and private water supply wells. This effort is part of a coordinated statewide GIS-linked ground water database project that is used to:

1) achieve understanding of the spatial interrelationships between natural resources and population as they relate to potential or known pollution sources;

2) design clean-up strategies in areas of known contamination;

3) plan development to provide for the protection of public health and safety;

4) assist in prioritizing protection of sensitive ground water and surface water bodies, wetlands, and other environmental resources; and

5) assess the flow and transport interrelationships between surface and ground water quality, in order to evaluate ground water impacts on surface water bodies, and ground water dependent habitat

The Environmental Groundwater Analysis Database (EGAD) is being used to develop a Comprehensive Ground Water Protection Program, and to provide a base dataset of potential threats to ground water quality for the DHS Drinking Water Program (DWP). EGAD is also being used to satisfy requests for water quality data, review applications for safety and practicability submitted under the state's environmental laws, and to evaluate the cumulative impact from multiple sources of pollution.

During the 2002-2003 reporting period, EGAD has seen much use for reporting to other State Agencies (DOT, Dept. of Agriculture, DHS DWP) and non-profit organizations (Project SHARE (for Salmon Habitat And River Enhancement), Maine Rural Waters Association (MWRA)) and consultants, as well as most bureau divisions within the DEP.

Recent EGAD developments and activities include:

- The addition of three more "Site Types" in July 2003 in order to coordinate research and reporting with the DHS Drinking Water Program. These sites are Agricultural Chemical Use, Agricultural Nitrate/Bacteria, and Marinas/Boatyards.
- Identifying and listing sites within each activity category, acquiring basic site, ownership, and spatial data information. The database is now 100% spatially enabled.
- Entering site information into EGAD. At the end of 2003, there were approximately 12,500 records in the 36 "Site Type" categories. During 2002-2003, 2,010 sites were added while many pre-existing sites were either updated or corrected. Some duplicate sites were also deleted.
- A new Oracle “backend”, under development since 1999, was completed in 2003. This new software will allow five formally separate uses of the database to be held in one accessible server location. The “front end” use of the database is also being combined for many different types of uses. The contract to complete this "front end" has been signed and should be completed in 2004.

Fundamental procedures include Site Name and Location data as well as Regulatory information (Licenses, Permits, Spill Numbers, etc.) derived from files and field research. Spatial (GIS) data is obtained either by screen digitizing using "ArcMap" software in association with written directions or maps from files or by collecting site locations via a GPS device in the field. However, fieldwork and GPS data collection is not the typical method because it is subject to limited funding. Geological data, narrative information, and ownership data is included in the database whenever it is available. These Site Data are used to depict spatial relationships, via the ArcMap software, between different GIS data “layers” including; location of public water supply wells, wastewater treatment plants and outlets, monitoring wells, etc. Digital maps can be quickly generated to satisfy the needs of a particular line of inquiry.

Further data gathering and entry of site-specific information includes:

- well design and construction information, and
- sampling and analytical data

There are now over 1,000,000 analyte records contained in the database. During 2002-2003 period, a plan to provide for common formatting of all analyte data received from laboratories to the DEP was developed and implemented. It is now part of an Electronic Data Deliverable (EDD) format in EGAD which a single data "gatekeeper" manages. The common format of the EDD easily and efficiently permits quality control over large amounts of analyte data and associated metadata.

A Quality Assurance Project/Program Plan (QAPP) was drafted in 2000, modified in 2001, and has been reviewed and signed by the users. Hierarchical review of this QAPP is still in progress because it will involve four divisions within the DEP. Quality assurance activities focus on data and location accuracy, consistency in expressing data, and the ability to link related data. The DEP GIS Unit and the Maine Office of GIS (MeGIS) will manage the quality of associated spatial data. Procedures for field location data acquisition via GPS have been and continue to be improved through in-house training and oversight.

Some particular areas involving Site research have included a special project to acquire UIC data (Underground Injection Conduits or floor drains) where a UIC was considered to be a possible source of ground water contamination. This project was begun in June 2001 and continued until June 2002. During that period, 1,369 UICs (out of an estimated 8,000 in existence) were added to EGAD.

In 2002-2003, another special project was initiated to locate and place into EGAD, those Small Quantity Generators (SQGs) which have associated "F" or "P" codes (which means that they generate halogenated and non-halogenated solvents and poisonous chemicals). Although 230 SQG sites were added in this time period, there are still approximately 700 more SQGs listed to add in the future. Overall, there are 4,000 additional SQG (including all chemical types) sites to locate. As of January 2004, a total of 520 SQGs are located in EGAD.

In August 2003, 435 Agricultural Chemical Use Sites were added. These sites came from the Maine Dept. of Agriculture's Board of Pesticide Control. Analyte data from private wells is included and greatly increases access to water quality assessment throughout the State.

A significant effort was made in 2002-2003 to improve the amount and quality of regulatory identification codes. The result has been a plan and a prototype whereby the regulatory data (licensing, permits, etc) has been expanded from only 4 fields in EGAD up to 15 fields. These additional fields will permit direct linking to other electronic databases and significantly reduce research time for those seeking more site data.

The individual site types as of January 2004 include:

Agricultural Chemical Use and Storage	RCRA Remediation Sites
Agricultural Nitrate/Bacteria	Sand/Salt Storage Sites
Ash Utilization Sites	Sanitary and Industrial Wastewater Treatment Facilities
Automobile Graveyards	Septage Storage and Disposal Sites
Commercial Landfills	Sludge Utilization Sites
Compost Facilities	Small Quantity Generators
Construction/Demolition Debris Disposal Sites	Solid Waste Transfer Stations
Engineered Subsurface Wastewater Disposal Systems (> 2000 gallons per day)	Special Waste Landfills
Industrial Parks	Surface Impoundments
Large Quantity Generators	Surface Petroleum Spills
LAST Sites	Tank Farms and other bulk storage facilities
LUST Sites	Transfer Stations
Marinas/Boatyards	Uncontrolled Sites – Dept. of Defense
Municipal Landfills	Uncontrolled Sites- State Sites
Mystery Spills	Uncontrolled Sites- Superfund
Nonpoint Sources (highways, golf courses, etc.)	Underground Injection Wells
Residuals Utilization Sites	Unsewered Subdivisions
Resource Extraction	Woodyards, Lumberyards and Biomass Fuel Piles

Ground Water Quality Trends

Maine's complex hydrogeologic setting makes representative ground water quality sampling difficult. The hilly topography, complex geology, and generally shallow water table have created numerous localized ground water flow basins, "ground watersheds", which are similar to and often coincide with surface watersheds. As a result, water quality data obtained from monitoring wells indicate only the water quality at a specific location and depth in an aquifer. These data reflect the ground water quality in the immediate vicinity of the monitoring well, but they are not indicators of ground water quality elsewhere, either inside or outside a particular "ground watershed". Current information about State ground water contamination problems may not describe the actual situation as much as it reflects the reason for the investigation and the manner in which it is conducted, i.e., the contaminants tested for, where the monitoring occurred, and how it was performed.

New occurrences of ground water contamination are documented in Maine each year. Although discovery of existing contamination is expected to continue, future reports of contamination are expected to decline substantially as the State's ground water protection initiatives continue to be implemented. These programs stress contamination prevention rather than remediation. Key aspects of these programs include:

1. Stricter underground storage tank installation and monitoring standards, removal of old and substandard tanks, and registration of all active and abandoned tanks should continue to reduce discharges from underground storage tanks.

2. In light of the increasing number of AST-related ground water threats, better tank standards and a statewide spill protection program have been developed to protect ground water; also, continuing outreach is needed to make the public aware of the threats from weather and overhead dangers to home heating oil ASTs.

3. Continued development and implementation of strategies to protect ground water from agricultural chemicals will diminish the impact of pesticides and fertilizers on ground water quality.

4. Implementation of manure application guidelines reflecting agronomic nutrient utilization rates will decrease the adverse impact of poultry and dairy farms on ground water quality.

5. Final closure of older, polluting landfills will reduce one of the most prominent sources of contamination in the State. Further emphasis on recycling would reduce the waste stream and decrease landfill capacity needs. The DEP and Sate Planning Office have taken over some of the waste reduction and recycling related programs formerly conducted by the disbanded Maine Waste Management Agency.

6. Storing sand-salt mixtures for road maintenance in watertight storage buildings will prevent highly concentrated salty leachate from contaminating ground water. However, this solution is still years away from full implementation. Elevated concentrations of sodium and chloride will increase in the ground water adjacent to roadsides due to a shift away from sand-salt mixtures until an economical and environmentally suitable substitute for sodium chloride can be found.

7. The emphasis of the UIC Program on inventory and elimination or control of shallow injection wells will undoubtedly aid ground water protection efforts. Although the extent of contamination from shallow well injection in Maine is unknown, studies in other states indicate serious ground water quality impacts resulting from routine and accidental discharges of toxic and hazardous substances.

8. The Maine Nonpoint Source Pollution Program will have the greatest impact in reducing ground water contamination. The program develops best management practices (BMPs) for activities contributing to nonpoint source pollution. Despite the paucity of data to quantify the extent of ground water contamination from many of those sources, the deleterious ground water quality impacts from many of the activities are well documented, and studies are underway to fill the existing data gaps. Development of BMPs for those activities can proceed concurrently with ground water monitoring. Developing public awareness of BMPs is one of the most important aspects of the Nonpoint Source Pollution Program.

9. The Maine Geological Survey (MGS) has an ongoing program to survey the ambient water quality of bedrock wells as an extension of the Bedrock Ground Water Resources basic data program. This program is based on well driller information submitted from new well installations all around the state. This will continue to add to our rather limited knowledge of ambient ground water quality.

10. Recent changes to Site Location of Development Act strengthen erosion and sedimentation control and stormwater management, and place emphasis on defining and protecting sensitive watersheds. These changes may help protect drinking water quality in developed areas of the State.

11. The Environmental Groundwater Analysis Database (EGAD), is an ongoing program to geographically locate and provide a database of potential threats to ground water quality. EGAD is being used to satisfy requests for water quality data, review applications submitted under the state's environmental laws for safety and practicability, and to evaluate cumulative impacts to ground water. It is also useful for source water protection in both the public and private sectors. EGAD is also useful in planning future development and in protecting vital natural resources. By continuing to support expansion of this database, the large amounts of data generated in remediating and investigating ground water contamination incidents will be made more widely accessible and useful.

Section 6-3 OVERVIEW OF STATE GROUND WATER PROTECTION PROGRAMS

Background

The protection of Maine ground water is an issue of concern at the local, regional, state and federal levels. In 1989, the State adopted the Maine Ground Water Management Strategy to articulate its ground water protection policy. In 1990, the State also formulated its Nonpoint Source Pollution Management Plan. This plan identifies the major sources of nonpoint source pollution to Maine's ground water and surface water and proposes to implement pollution prevention programs.

Serious ground water pollution problems that have occurred throughout the State and elsewhere have heightened the need for protecting ground water supplies. A few municipalities and regional planning agencies have conducted ground water quality assessment studies, but programs for effective assessment of the quality of ground water resources are needed in many areas of the State. Maine's ground water protection program (Table 6-18) emphasizes three areas of effort:

1. State interagency coordination of ground water programs;

2. Assessment of ground water protection problems, including enhancement of the Environmental Groundwater Assessment Database; and

3. Statutory changes and building upon implemented state ground water protection programs to increase ground water protection and risk reduction.

Table 6-18 Summary of State Ground Water Protection Programs

Programs or Activities	Check (X)	Implementation Status	Responsible State Agency
Active SARA Title III Program		Authority not delegated	
Ambient ground water monitoring system	x	Continuing efforts	MGS, USGS
Aquifer vulnerability assessment	x	Continuing efforts	DHS
Aquifer mapping	x	Stratified drift in progress	MGS
Aquifer characterization	x	Stratified drift in progress	MGS
Comprehensive data management system	x	under development	DEP, DHS, MGS
EPA-endorsed Core Comprehensive State Ground Water Protection Program (CSGWPP)	x	under development	DEP
Ground water discharge permits	x	Continuing efforts	DEP
Ground water Best Management Practices	x	Continuing efforts	DHS
Ground water legislation	x	Continuing efforts	DHS
Ground water classification	x	fully established	DEP
Ground water quality standards	x	Continuing efforts	DHS
Interagency coordination for ground water protection initiatives	x	Continuing efforts	DEP, DHS, MGS, DOT, DOA
Nonpoint source controls	x	under development	DEP
Pesticide State Management Plan	x	Generic plan completed, revised in 1998	BPC
Pollution Prevention Program	x	fully established	DEP
Resource Conservation and Recovery Act (RCRA) Primacy	x	fully established	DEP
State Superfund	x	fully established	DEP
State RCRA Program incorporating more stringent requirements than RCRA Primacy	N/A		
State septic system regulations	x	fully established	DHS
Underground storage tank installation requirements	x	fully established	DEP
Underground Storage Tank Remediation Fund	x	fully established	DEP
Underground Storage Tank Permit Program	x	fully established	DEP
Underground Injection Control Program	x	fully established	DEP
Vulnerability assessment for drinking water/wellhead protection	x	Continuing efforts	DHS
Well abandonment regulations	N/A		
Wellhead Protection Program (EPA-approved)	x	fully established	DHS
Well installation regulations	x	fully established	DHS, MGS

N/A means "Not Applicable"

Ground Water – Surface Water Interaction

Contact: John Hopeck, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: John.T.Hopeck@SPAM-ZAPmaine.gov

As noted elsewhere in this report, stormwater infiltration is sometimes considered as part of an effort to mitigate the effects of construction of large developments on recharge volumes. However, assuming that the major impact on recharge is due mainly to a relatively small number of large developments in a watershed may ignore more significant changes in recharge throughout the watershed that are the result of shifts in land-use. These "more significant changes" may include such items as alteration of wetlands, change in land cover type, compaction of soils, and topographic changes. To date, the DEP has not performed a systematic assessment of recharge changes in large watersheds to determine the relative significance of development on recharge. The need for such an assessment, in at least some areas of the state, is anticipated in the relatively near future. DEP staff are currently studying methods of estimating recharge and evaluating sustainable yield that are used in other areas, as part of possible future development and implementation of a similar method for Maine.

Given recent drought conditions, more consideration has been given to assessing the impacts of ground water withdrawal on baseflow and water levels in surface waters. Detailed monitoring results are available from a small number of facilities required to monitor ground water and surface water levels due to the volume of ground water extracted. These are principally water bottlers and facilities with large irrigation wells or cooling water wells. Because Maine does not have a regulatory threshold for ground water withdrawal, not all high-volume ground water users are required to conduct ground water or surface water monitoring. Only those facilities that are physically large enough to be subject to Maine's Site Location of Development Act and conduct extraction of large volume of ground water are required to conduct monitoring of water levels to measure the impacts of that withdrawal. In addition, the MGS reviews monitoring information and ground water use studies for some large agricultural projects in areas of the state that are outside of DEP jurisdiction.

Water Withdrawal Reporting Program: In 2002, state law established a Water Withdrawal Reporting Program that requires annual reporting of water withdrawals that exceed specified thresholds. The first reporting year began October 1, 2002 and the first annual report of the new program was issued in January 2004. For ground water, reporting withdrawals of over 50,000 gallons in one day is required. The law does not require use of water meters, so the reporting function will allow quantities to be estimated or reported as ranges. Certain uses, such as non-consumptive uses, household uses, public water systems, water users already subject to reporting requirements, public emergencies such as fire suppression, and transfer of water to storage ponds are exempted from the reporting requirements, provided that the users file a notice of intent indicating their intention to be covered by NOI provisions. This statute also requires the Department to develop rules for "maintaining in-stream flows and GPA water levels that are protective of aquatic life and other uses and that establish criteria for designating watersheds most at risk from cumulative water use". These will be major substantive rules, and must be submitted to the Legislature for consideration in 2005. The standards for in-stream flows are to be based on the natural variation of flows and water levels, and are to allow for variances if use will still be protective of water quality.

Proposed Statutory Changes

NPDES Phase II Stormwater Requirements and the Underground Injection Control Program

Contact: John Hopeck, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: John.T.Hopeck@SPAM-ZAPmaine.gov

Related Website: Note – after clicking on the URL, scroll down to Appendix "D" on Page 37
www.maine.gov/dep/blwq/docstand/stormwater/group/500textweb2E05_12_04compiled.pdf

Work is ongoing to mesh NPDES Phase II stormwater requirements and the Underground Injection Control Program (UIC) with Maine's Stormwater Management Program. EPA's definitions for wells and subsurface fluid distribution systems do not cover sumps, retention basins, dry swales, or several other infiltration practices that are relatively common in Maine, leaving a gap in the UIC Program that must be covered by the stormwater law. However, because of the minimum area thresholds for regulation of facilities under Maine's stormwater program and in NPDES Stormwater Phase II, not all sites with dry wells or subsurface fluid distribution systems will necessarily receive the additional level of review required for those permits. Infiltration systems qualifying as underground injection wells are currently required only to register with the UIC Program.

Maine's Waste Discharge Law does not currently allow approval of subsurface discharges under license-by-rule procedures. Rules for infiltration structures, both those which do and do not qualify as underground injection wells, are being revised and expanded as part of a major revision of the stormwater program. The DEP will be proposing a minor statutory change that would grant a license-by-rule authority under the Waste Discharge Law to stormwater injection wells that meet the standards of the new stormwater rules. These wells would still be required to register separately with the UIC Program, as would wells for facilities smaller than the thresholds of the stormwater program. Stormwater wells that cannot meet the standards of the revised stormwater rules are not necessarily prohibited but they would need to apply for an individual waste discharge license.

Chapter 7 Public Health – Related Assessments

Section 7-1 Beach Program Monitoring & Assessments

Contact: Lee Doggett, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Lee.Doggett@SPAM-ZAPmaine.gov

Maine Coastal Beach Monitoring Program

Lee Doggett, Maine Department of Environmental Protection, Esperanza Stancioff, University of Maine Cooperative Extension and Sea Grant and Todd Janeski, Maine State Planning Office/ Maine Coastal Program with a Beach Grant check from EPA.

Contacts: Todd Janeski, State Planning Office, Coastal Program (Lead Agency)

Tel: (207) 287-3261 email: Todd.Janeski@SPAM-ZAPmaine.gov

Esperanza Stancioff, University of Maine Cooperative Extension and Sea Grant (Program Coordinator)

Tel: (207) 832-0343 email: esp@SPAM-ZAPumext.maine.edu

Lee Doggett, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Lee.Doggett@SPAM-ZAPmaine.gov

Clough Toppan, DHS BOH, Division of Health Engineering

Tel: (207) 287-8016 email: Clough.Toppan@SPAM-ZAPmaine.gov

Matt Liebman, EPA Region 1, BEACH Program Coordinator

Tel: (617) 918-1626 email: liebman.matt@SPAM-ZAPepa.gov

Related Websites: (Maine Specific) www.mainehealthybeaches.org/

(Federal) www.epa.gov/ost/beaches

There is growing public interest in monitoring ocean beaches in order to provide protection of swimmer health, although in the past it has not been a priority. Relatively few people swim in the cold ocean water of Maine, especially at beaches in the eastern part of the State. The Maine Department of Environmental Protection (DEP) has focused on ensuring that areas influenced by licensed discharges are not a threat to swimmer health. Prior to the Healthy Beaches Program (see below) most State Park beaches were monitored monthly by Park staff. All participants in the Maine Healthy Beaches Program (MHBP), including some State Parks, monitor beaches on a weekly basis from Memorial Day through Labor Day. Acadia National Park was monitored in the past by park staff, but a volunteer group now monitors the park. Private beach owners are responsible for their own monitoring programs and often do not conduct any monitoring at all.

In Maine, the monitoring of town beaches and providing public notification is the jurisdiction of the municipality. Towns with combined sewer overflows that may impact swimming areas are required to monitor the swimming areas and to report their monitoring data and number of closures to DEP annually, if they choose to open the beach for swimming. For example, Sandy Beach in the town of Rockland is not monitored and is closed to swimming because of Combined Sewer Overflows. Therefore, it is only in partial support of its designated use of "Recreation in and on the Water" because of the combined sewer overflows.

Maine Healthy Beaches Program

Related Website www.mainehealthybeaches.org/

What is the Maine Healthy Beaches Program?

The U.S. Environmental Protection Agency (EPA) initiated the Beaches Environmental Assessment, Closure and Health (BEACH) Act of 2000 in response to the growing concern about public health risks posed by polluted coastal swimming beaches. The Maine Department of Environmental Protection (DEP) wrote a proposal to receive a portion of the available funding that was provided as part of this Act. The Maine State Planning Office (SPO) was designated as the lead agency to administer the program.

The Maine Healthy Beaches Program (MHBP) is a voluntary program to enter and includes two main components: a public education program and a water quality assessment program. The assessment program includes measurement of critical factors that affect the health of the beach environment as well as the health of people who visit them (for participating beaches only).

What activities does the Maine Healthy Beaches Program undertake?

- Gathering information from participating municipalities and state beaches,
- Conducting shoreline surveys with technical assistance from the Maine Department of Marine Resources (DMR),
- Surveying beach users to establish the extent of public knowledge and incidence of health problems related to swimming in coastal areas,
- Developing monitoring methods and a quality assurance plan,
- Monitoring beaches for water quality by municipalities, state parks, and community-based groups such as the Surfriders Club,
- Setting up a system to get samples to the laboratories within the appropriate holding times to produce accurate test results,
- Developing an efficient way of getting the data back to managers of the beaches,

- Developing a database that will be used by municipalities, state agencies, the U.S. Environmental Protection Agency and non-governmental agencies such as the Surfriders Club in their efforts to promote public safety,
- Developing a public education and notification program, and
- Encouraging more communities, private beach owners and volunteer groups to participate in the program.

What is the current status of the program?

In 2002, the first phase of the project was a pilot program that included a select few of Maine's coastal swim beaches as a model for future monitoring. By 2003, there were a total of 14 beach communities monitored. Table 7-1 indicates which towns and beaches were involved with the program during 2002 and 2003. This table also presents the total number of samples collected weekly per town.

Table 7-1 Beaches in the MHBP

Municipality	Beach(es)	Number of Samples / Week / Municipality
Biddeford	Fortune Rocks Beach, Biddeford Pool Beach, Middle Beach	7
Bristol	Pemaquid Beach	3
Cape Elizabeth	Crescent State Park Beach	3
Georgetown	Reid State Park (Mile Beach, Half-mile Beach, Lagoon Beach, East Beach)	7
Kennebunk	Gooches Beach, Kennebunk Beach, Libby Cove Beach, Parsons Beach	6
Mt. Desert Island	Bar Harbor Town Beach, Hulls Cove Beach, Seal Harbor Beach	12
Ogunquit	Ogunquit Beach	4
Old Orchard Beach	Old Orchard Beach	6
Phippsburg	Popham State Park Beach	6
Portland	East End Beach	1
Saco	Ferry State Park Beach	3
South Portland	Willard Beach	3
Wells	Drakes Island Beach, Wells Beach	10
York	Long Sands Beach, Cape Neddick Beach, Short Sands Beach, York Harbor Beach	20

What criteria are used to determine the health of a beach?

There are several relevant and critical factors that are considered when judging the health of a beach. The MHBP uses a "Risk Assessment Matrix" to determine the potential human health risk in each case through consideration of: water test results, beach location, environmental impacts from nearby waste disposal, storm water runoff, public restroom facilities, the presence of dogs or wildlife on the beach, beach usage statistics and a history of previous closings or contamination. A copy (in Adobe ".pdf" format) of the complete Risk Assessment Matrix and scoring system may be viewed and downloaded by visiting this URL:

www.mainehealthybeaches.org/assets/pdfs/matrix.pdf

How is the water tested?

There are different recommended methods and protocols for the testing of salt water and fresh water.

Salt Water: The indicator organism Enterococci is tested by either one of two methods: the "Enterolert" product, using Quantitray MPN technology, or the membrane filtration 24-hour method.

Fresh Water: The indicator organism E. coli is tested by the MMO-MUG methodology: Colilert or equivalent product using "Quantitray" MPN technology.

Monitoring of coastal beach sites should be conducted weekly.

Swimming Beach Closures

Contact: Esperanza Stancioff, University of Maine Cooperative Extension and Sea Grant (Program Coordinator)

Tel: (207) 832-0343 email: esp@SPAM-ZAPumext.maine.edu

Related Website: www.mainehealthybeaches.org/

Under Clean Water Act (CWA) guidelines, the designated use of swimming beaches is for "Recreation in and on the Water." The DEP is pleased to report that participants in the Maine Healthy Beaches Program (see above) had no closures during the summer of 2003, and were therefore always able to meet their designated use. At Willard Beach in South Portland, there was an advisory posted on June 10th but the bacterial counts were acceptable on June 11th. Also, at East End Beach in Portland, there were two precautionary advisories issued because of rainfall. Finally (as was mentioned in the previous section), Sandy Beach in the town of Rockland, does not conduct water testing because of a permanent beach closure order due to Combined Sewer Overflows (CSOs) in the vicinity of the beach.

Section 7-2 SHELLFISH PROGRAM MONITORING & ASSESSMENTS

Shellfish Harvest Area Closures

Contact: Amy Fitzpatrick, Director, DMR BRM, Public Health Division, Shellfish Sanitation Program

Tel: (207) 633-9554 email: Amy.Fitzpatrick@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dmr/rm/public_health/publichealth.html

The Department of Marine Resources (DMR) assesses information on shellfish growing areas to ensure that shellfish harvested are safe for consumption. A goal of the Clean Water Act (CWA) is to have these areas meet their designated use of "Propagation and Harvest of Shellfish." Shellfish areas are closed by DMR if the area is found to have elevated levels of bacteria or if the area is determined as threatened by potential sewage pollution problems. Water samples are collected and tested for fecal coliform bacteria at least six (6) times annually from each of the more than 2,000 established sampling sites that are located along the entire Maine coast. The shoreline survey includes a visual inspection of the shoreline to determine the location and magnitude of potential sewage pollution and toxic contamination problems.

The information collected by monitoring and surveying is put together into a document called a Sanitary Survey. Once assembled, this document is used to classify the various shellfish areas into one of the following categories (based on the goal of having these areas meet their CWA designated use of propagation and harvest of shellfish):

- approved for harvesting (supporting its designated use),
- conditional or restricted (partially supporting its designated use) under a designated set of environmental conditions, or
- prohibited (not supporting its designated use)

Table 7-2 and Figure 7-1 presents both the percentage and the total area in acres under each classification. Current calculations estimate that Maine has a total of 1,821,474 acres of tidal flats and coastal waters in this classification system. This number has varied some over the past few 305b reporting cycles because of changes in the underlying data sets that Geographic Information Systems (GIS) use to calculate areas and because of the way DMR designates its shellfish harvesting areas. These changes have made it difficult to accurately determine how much progress has been made in the opening up of additional shellfish harvesting areas since 1998. (Please note: a list of closed areas is provided in Appendix IV.)

Table 7-2 Classification of Shellfish Harvesting Areas

Classification	Percentage	Acres	Square Miles
Supporting (approved)	90.03 %	1,639,831.74	2,562.24
Partially Supporting (conditional or restricted)	1.13 %	20,577.3	32.15
Not supporting (prohibited)	8.84 %	161,025.2	251.60
Total	**100.00 %**	**1,821,434.24**	**2,845.99**

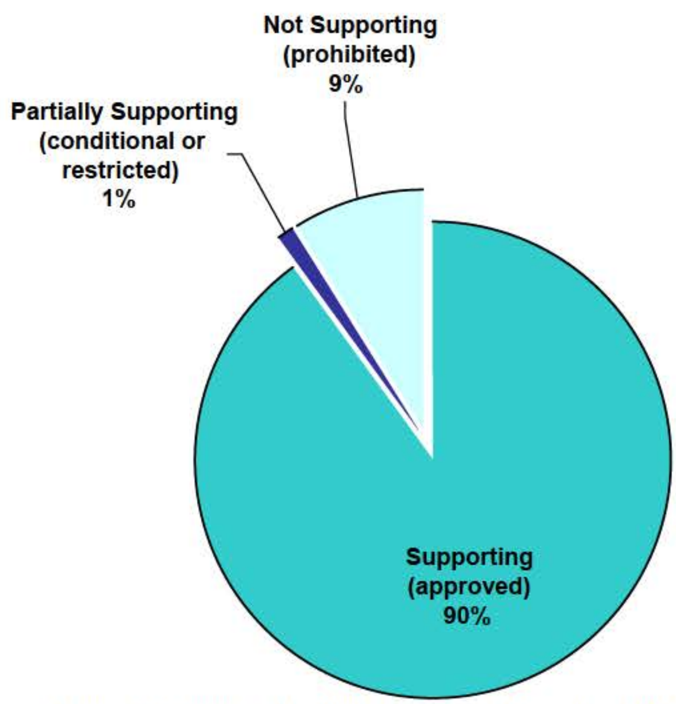


Figure 7-1 Status of Shellfish Areas as of December 2003

Expanding and Sustaining the Shellfisheries of Casco Bay – Phases I and II

Contact: Karen Young, Director, Casco Bay Estuary Project (CBEP)

Tel: (207) 780-4820 email: cbep@SPAM-ZAPusm.maine.edu

Related Website: www.cascobay.usm.maine.edu/clamreport.html

Source: The Casco Bay Estuary Project Final Report - September 2003

What is an overboard discharge?

An overboard discharge (OBD) is the discharge of wastewater from residential, commercial, and publicly owned facilities to Maine's streams, rivers lakes, and the ocean. Commercial and residential discharges of sanitary waste have been regulated since the mid-1970's when most direct discharges of untreated waste were banned. Between 1974 and 1987 most of the "straight pipes" were connected to publicly-owned treatment works or replaced with standard septic systems. Overboard discharge treatment systems were installed for those facilities that were unable to connect to publicly owned treatment works or unable to install a septic system because of poor soil conditions or small lot sizes.

Why are overboard discharges a problem?

All overboard discharge systems include a process to clarify the wastewater then disinfect it prior to discharge. If they are not properly maintained or if they malfunction, they have the potential to discharge the harmful bacteria and other pathogens directly into the water. In 1987, 25 percent of Maine's estimated 49,000 acres of mussel and clam habitat were closed because of actual contamination or the threat of contamination by bacteria and other pathogens from septic systems, boats, animals, and overboard discharges. Today, roughly 8 percent of Maine's mussel and clam habitat are still closed to shellfish harvesting.

The Casco Bay Estuary Project was awarded an EPA Sustainable Challenge Grant to work towards ensuring that communities around the Bay have a healthy shellfish harvest to sustain commercial and recreational shellfishing for generations to come. Three contractors worked with a "clam team" of stakeholders including the US Environmental Protection Agency, the Friends of Casco Bay, Department of Marine Resources, individual cities and towns, and the Department of Environmental Protection. During the first phase of the project, the goals were; to locate the most productive shellfish areas that were currently closed to harvesting, to determine sources causing contamination of those closed areas, and then to find ways of remediating the flats.

Casco Bay contains approximately 57 closed clam flats in nine municipalities that cover more than 800 acres. Existing information on these flats was reviewed and pollution sources contributing to their closure were identified. Through field review, analysis of water quality data, and discussions with towns and clammers, flats were prioritized in terms of their importance to the shellfishing community and their potential for remediation. Water quality data was also reviewed to better understand the factors that were keeping the flats closed. Twenty-one flats with a total area of about 430 acres were selected for remediation based on high clam resource value, ease of remediation, and community support. During the second phase of this project, the goal was to actually remediate sources of coliform, that were identified during the first phase, in order to open up the clam flats to harvest.

Many of the flats are closed simply due to the presence of a nearby overboard discharge (OBD). If there are no other sources of poor water quality, then the removal of one or more OBDs in the vicinity can effectively allow a shellfish bed to be opened. The process of OBD removal is multi-faceted, requiring a partnership between the DEP, which licenses OBDs, the municipal code enforcement officer, who approves (often in conjunction with the Department of Human Services or DHS) replacement systems, a licensed site evaluator, who is required to design a replacement septic system, along with a willing homeowner.

During the fall of 1999, a process for reviewing properties in terms of size, topography, soil type, local setback requirements, and other constraints on developing a design for replacement septic systems began. Homeowner education and involvement was critical to the overall success, with the ultimate goal being to design the simplest, least expensive system for each property. Some systems were relatively straightforward to design, while other properties required installation of high-tech treatment systems.

By the summer of 2001, a majority of the targeted OBDs had been replaced, paving the way to reopen clam flats to shellfish harvesting. In the first six months of 2002, additional work was completed on OBD system removal. During this time, the project team completed further design work and coordinated with homeowners, the DEP and the DHS to implement OBD system replacement. Nearly 250 acres of shellfish resources are now available to harvest through the elimination of twenty-seven OBD systems.

There are still some issues with landowners and abutters, along with technical problems requiring more complicated solutions, all of which, have kept some flats from being opened. Other flats are still closed due to contamination from unknown sources, such as: faulty septic systems, run-off from farms and barnyards, along with wildlife and domestic pets. These areas will require "detective work" in the form of water quality sampling under varying weather conditions and tidal stages to pinpoint possible contamination sources and to evaluate the potential for cleanup. Based on the water quality results, potential solutions could be developed to improve water quality and to continue opening up additional clam flats.

Section 7-3 Ocean Fish and Shellfish Consumption Advisories

Contact Andrew Smith, DHS BOH, Environmental Health Unit

Tel: (207) 287-5189 email: Andrew.E.Smith@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/ehu/fish/

Whenever waters fail to meet their "Clean Water Act-designated use for Fishing," government agencies issue fish and/or shellfish consumption advisories. These advisories are designed to let citizens know that there may be an increased risk to their health if they choose to consume certain species of fish or shellfish. Since 1992, human health consumption advisories have been in place to warn the public against the consumption of lobster tomalley due to high levels of toxic contaminants. However, no evidence of elevated levels of these contaminants was found in lobster meat. The advisory was expanded to include bluefish and striped bass in 1996, also due to detection of elevated levels of toxic contaminants in their flesh. The entire Maine coast is only in partial support of its designated use for fishing due to these consumption advisories.

Advisory Overview

Current information, with a last revision date of February 20, 2001, on ocean fish and shellfish advisories as adapted from the Maine Bureau of Health is as follows:

WARNING About Eating Saltwater Fish and Lobster Tomalley

Warning: Chemicals in some Maine saltwater fish and lobster tomalley may harm people who eat them. Women who are or may become pregnant and children should carefully follow the Safe Eating Guidelines.

It's hard to believe fish that looks, smells, and tastes fine may not be safe to eat. But the truth is that some saltwater fish have mercury, PCBs and Dioxins in them.

All these chemicals settle into the ocean from the air. PCBs and Dioxins also flow into the ocean through our rivers. These chemicals then build up in fish.

Small amounts of mercury can damage a brain starting to form or grow. That's why babies in the womb, nursing babies, and young children are at most risk. Mercury can also harm older children and adults, but it takes larger amounts.

PCBs and Dioxins can cause cancer and other health problems if too much builds up in your body. Since some saltwater fish contain several chemicals, we ask that all consumers of the following saltwater species follow the safe eating guidelines.

Specific Ocean Fish Consumption Advisories

Safe Eating Guidelines

Striped Bass and Bluefish: Recommended to eat no more than 2 meals per month.

Shark, Swordfish, King Mackerel, and Tilefish: Pregnant and nursing women, women who may get pregnant and children under 8 years of age are advised to not eat any swordfish or shark. All other individuals should eat no more than 2 meals per month.

Canned Tuna: Pregnant and nursing women, women who may get pregnant and children under 8 years of age should eat no more than 1 can of "white" tuna or 2 cans of "light" tuna per week.

All other ocean fish and shellfish, including canned fish and shellfish: Pregnant and nursing women, women who may get pregnant and children under 8 years of age should eat no more than 2 meals per week.

Lobster Meat and Tomalley Consumption Advisories

Lobster Meat: A consumption advisory does not exist for lobster meat.

Lobster Tomalley: Recommended to completely avoid consumption of lobster tomalley. While there is no known safety considerations when it comes to eating lobster meat, consumers are advised to refrain from eating the tomalley. The tomalley is the soft, green substance found in the body cavity of the lobster that functions as the liver and pancreas. Test results have shown that the tomalley can accumulate contaminants found in the environment.

For more information, including warnings on freshwater fish call (866) 292-3474 or visit the related web site at: www.maine.gov/dhs/ehu

Section 7-4 Freshwater Fish Consumption Monitoring, Assessments and Advisories

Dioxin Summary

Contact: Barry Mower, DEP BLWQ, Division of Environmental Assessment (DEA)

Tel: (207) 287-3901 email: Barry.F.Mower@SPAM-ZAPmaine.gov

Dioxin levels in fish from Maine rivers continue to decline, approaching background at some locations but still exceeding background at others.

An evaluation of the health implications of dioxin/furan concentrations in fish in Maine Rivers requires a comparison to a health benchmark. The Bureau of Health uses a health benchmark that is expressed as a specific fish tissue concentration of dioxins and furans, referred to as a “Fish Tissue Action Level” or FTAL. For the present report, the Bureau compares the most recent data on contaminant levels in fish tissue to its current FTALs for dioxins and furans of 1.5 parts per trillion (ppt) for protection of cancer-related effects and 1.8 parts per ppt for protection of noncancer-related effects. The Bureau additionally compares sampling data to a lower FTAL of 0.4 ppt, which is under consideration as a potential revision to current FTALs to account for background dietary exposure to dioxins and furans.

All sampling locations on the Penobscot and Kennebec Rivers had average dioxin and furan levels in smallmouth bass and brown trout that were well below the current FTAL of 1.5 ppt, and below a potential lower FTAL of 0.4 ppt. Levels in white suckers were below the current FTAL of 1.5 ppt, but were generally above the potential lower FTAL of 0.4 ppt.

With the exception of the Rumford Point sampling location on the Androscoggin River, all other down river sampling locations had average dioxin and furan concentrations in bass tissue that were below the current FTAL of 1.5 ppt. However, all sampling locations with the exception of Auburn had average levels of dioxins and furans that were above the potential lower FTAL of 0.4 ppt – though for several locations levels were only slightly above this health benchmark. Levels in suckers were above the current FTAL for several sampling locations.

The most recent sampling data for bass and suckers on the Presumpscot and Salmon Falls Rivers indicate dioxin and furan levels below both current FTALs and the potential lower FTAL of 0.4 ppt. The most recent data for the West Branch of the Sebasticook River indicates dioxin and furans levels above current FTALs.

The Dead River connects the Androscoggin Lake to the Androscoggin River. Androscoggin River water enters into Androscoggin Lake whenever floodwaters overtop a floodgate on the Dead River. Average dioxin and furan levels have yet to be above the current FTAL of 1.5 ppt. However, with the exception of the 2000 sampling season, all other sampling seasons have yielded average levels in fish tissue above the potential lower-bound FTAL of 0.4 ppt.

These most recent data on dioxin and furan concentrations in bass and trout from the Kennebec and Penobscot Rivers indicate that we appear to be nearing the point where the presence of these chemicals will no long contribute to the need for additional consumption advisories beyond the statewide mercury advisory. Additional advisories may continue to be needed for suckers.

The prognosis for consumption advisories on the Androscoggin River due to dioxins and furans is less clear. Levels generally remain elevated for suckers, and for bass at some locations.

Fish Advisories

Department of Human Services Guidelines About Eating Freshwater Fish

***Warning:* Mercury in Maine freshwater fish may harm the babies of pregnant and nursing mothers, and young children.**

SAFE EATING GUIDELINES

Pregnant and nursing women, women who may get pregnant, and children under age 8 SHOULD NOT EAT any freshwater fish from Maine's inland waters. Except, for brook trout and landlocked salmon, 1 meal per month is safe.

All other adults and children older than 8 CAN EAT 2 freshwater fish meals per month. For brook trout and landlocked salmon, the limit is 1 meal per week.
It's hard to believe that fish that looks, smells, and tastes fine may not be safe to eat. But the truth is that fish in Maine lakes, ponds, and rivers have mercury in them. Other states have this problem too. Mercury in the air settles into the waters. It then builds up in fish. For this reason, older fish have higher levels of mercury than younger fish. Fish (like pickerel and bass) that eat other fish have the highest mercury levels.

Small amounts of mercury can harm a brain starting to form or grow. That is why unborn and nursing babies and young children are most at risk. Too much mercury can affect behavior and learning. Mercury can harm older children and adults, but it takes larger amounts. It may cause numbness in hands and feet or changes in vision. The Safe Eating Guidelines identify limits to protect everyone.

Warning: Some Maine waters are polluted, requiring additional limits to eating fish.

Fish caught in some Maine waters have high levels of PCBs, Dioxins or DDT in them. These chemicals can cause cancer and other health effects. The Bureau of Health recommends <u>additional</u> fish consumption limits on the waters listed below. <u>Remember</u> to check the mercury guidelines. If the water you are fishing is listed below, check the mercury guideline above and follow the most limiting guidelines.

Androscoggin River Gilead to Merrymeeting Bay:--------------------------- 6-12 fish meals a year.
Dennys River Meddybemps Lake to Dead Stream:----------------------- 1-2 fish meals a month.
Green Pond, Chapman Pit, & Greenlaw Brook
(Limestone):--**Do not eat any fish from these waters**.
Little Madawaska River & tributaries
(Madawaska Dam to Grimes Mill Road):-----------------**Do not eat any fish from these waters**.
Kennebec River Augusta to the Chops:----------------**Do not eat any fish from these waters**.
Shawmut Dam in Fairfield to Augusta:--------- 5 trout meals a year, 1-2 bass meals a month.
Madison to Fairfield: -- 1-2 fish meals a month.
Meduxnekeag River: --- 2 fish meals a month.
North Branch Presque Isle River-- 2 fish meals a month.
Penobscot River below Lincoln:-- 1-2 fish meals a month
Prestile Stream:-- 1 fish meal a month.
Red Brook in Scarborough: -- 6 fish meals a year.
Salmon Falls River below Berwick: --- 6-12 fish meals a year.
Sebasticook River (East Branch, West Branch & Main Stem)
(Corinna/Hartland to Winslow):--2 fish meals a month.

Section 7-5 DRINKING WATER PROGRAM MONITORING & ASSESSMENTS

Public Water Supplies

Wellhead Protection Program

Contact: David Braley, DHS BOH, Division of Health Engineering, Drinking Water Program

Tel: (207) 287-5338 email: David.Braley@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/water/WellheadProtection.htm

The State of Maine Drinking Water Program (DWP), located in the Department of Human Services, administers the Wellhead Protection Program (WHPP). The WHPP continues to be a voluntary program for Maine's public water suppliers, with all reduced or waived monitoring tied to approved protection programs. To be eligible for reduced or waived monitoring, a system must have an approved local Wellhead Protection Plan (WHPP) and have completed a waiver application. To date, the DWP has requested all of the "community" and "non-transient non-community" (see the Finished Waters section below for definitions) systems to submit completed protection area delineations and contamination source inventories. The DWP has also surveyed all of the transient non-community systems to identify systems with wells at risk from acute contaminants.

The DWP has recently completed an assessment (Source Water Assessment Program or SWAP report) of the vulnerability of each public drinking water source in the state. SWAP reports for all of the non-transient non-community, transient non-community and community systems have been provided to every public water supplier, municipality and other interested parties in Maine. Using the results of these reports, the DWP will work with community and non-transient non-community systems to draft comprehensive source management plans, and for larger systems the DWP will help draft contingency plans. This three to four year project should complete Maine's initial wellhead protection efforts as required in the 1986 amendments to the federal Safe Drinking Water Act.

Source Water Assessment Program

Contact: Andrews L. Tolman, DHS BOH, Division of Health Engineering, Drinking Water Program

Tel: (207) 287-2070 email: Andrews.L.Tolman@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/water/SWAPdoc2-25.htm

The Maine Drinking Water Program (DWP) wants to ensure that when a water supply is at risk of contamination, consumers are made aware of the potential hazards so that the appropriate steps can be taken to minimize or eliminate the risk. This protective function is the purpose of the Source Water Assessment Program. By implementing SWAP, the DWP has evaluated each of the 2,600 public water supply sources in Maine. These evaluations were done by assessing the likelihood that the source water could become contaminated due to existing or future land use activities.

The results of these assessments have been provided to towns, water suppliers, and interested members of the public. The DWP is working with suppliers and towns to implement recommendations from the assessment results. The primary risk identified was the high potential for future development of surrounding lands to adversely impact water quality. A principal method used to reduce this threat includes providing outreach both to towns that are conducting comprehensive planning through the State Planning Office as well as to towns that receiving technical assistance and training through the Maine Nonpoint Education for Municipal Officials Program (NEMO). Another strategy to reduce the risk from development through outreach is to encourage additional review of proposed land use changes in source protection areas through the both the DEP and local planning boards.

Finished Waters

Contact: Lindy Moceus, DHS BOH, Division of Health Engineering, Drinking water Program

Tel: (207) 287-8402 email: Lindy.Moceus@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/water/Compliance.htm

The Drinking Water Program (DWP) is the front line enforcement agent of the U.S. Environmental Protection Agency (EPA) for the rules and regulations set forth in the Safe Drinking Water Act (SDWA). The requirements of SDWA apply to the approximately 2,000 public drinking water systems in Maine. There are 80 water systems that use surface water as their primary source and these all have water treatment systems and watershed protection programs. Of the approximately 1,920 ground water systems, 661 have some form of treatment on-line while the remaining systems have no treatment and serve raw water.

Water testing on finished water is the primary means for assessing public water system compliance while verifying the quality of water that is reaching consumers. The presence of contaminants is an indication that there are problems within the water system such as water treatment failure, structural failure, source water contamination or other breakdowns. Along with being in violation with SDWA for having contaminated water, there could be infractions for improper operation and maintenance of the system by the operators.

Water testing requirements are specified in SDWA and are based on the public water system classification, the size of the population served, and the type of water source. There are three classes of public water systems. These classifications were established based on the risk of water-borne disease that pertains to the populations served.

“Community” Water Systems: These systems serve at least 25 year-round residents and are facilities such as town water supplies, trailer parks, and nursing homes. The residents may consume the water daily over many years and therefore, extensive water testing is required. This includes tests for contaminants that pose health risks from long-term exposure.

“Non-Transient Non-Community” Water Systems: Are those that regularly serve at least 25 of the same people for more than six months of the year and include schools and businesses. Their testing requirements are less extensive than those used for "community” systems.

"Transient" Water Systems: These systems serve at least 25 people for at least 60 days or more out of the year and do not meet the definitions of the other two categories. These include restaurants, motels, campgrounds, etc. and due to their minimal exposure to the water, the customers/consumers are at a reduced risk for water borne disease. Water tests are required to detect only microbial contamination and that of nitrates/nitrites. These contaminants can cause acute illness even with limited exposure, such as could be found in a single glass of water.

Table 7-3 SDWA Water Testing Requirements by Public Water System Category

Community Water Systems *	Non-Transient Non-Community Water Systems *	Transient Water Systems *
Coliform Bacteria	Coliform Bacteria	Coliform Bacteria
Nitrate / Nitrites	Nitrate / Nitrites	Nitrate / Nitrites
Lead / Copper	Lead / Copper	
Volatile Organics (VOC)	Volatile Organics (VOC)	
Inorganics	Inorganics	
Semi-volatile Organics	Semi-volatile Organics	
Pesticides	Pesticides	
Herbicides	Herbicides	
Polychlorinated Biphenyls (PCB)	PCB	
Gross Alpha		
Radium 228		
Radon		

*For lists of individually regulated contaminants visit the EPA website at: www.epa.gov/safewater/hfacts.html

In addition to those listed above, tests for other parameters are required for special situations. Examples of these are tests for disinfectant by-products required for systems that chlorinate, fluoride tests in the distribution system for systems that add fluoride, and tests for uranium and radium 226 when the test for gross alpha exceed the trigger level.

The frequency of water testing is also outlined in SDWA. In addition, the DWP has policies for more frequent sampling following contamination episodes, as part of the new well approval process, and for non-compliant facilities. The frequency of sampling for most tests is reduced after an initial period of intense testing demonstrates that the contaminants have not been present. Tests for pesticides, herbicides, and PCBs can be waived after an initial test is clean and if the facility operator certifies that these chemicals are not in use in the watershed of their surface water system or within ½ mile of their well(s). Waivers apply to 3-year compliance periods and require the system operator reapply with updated information triennially.

Table 7-4 Frequency and Location of Water Sampling by Contaminant

Contaminant	Sampling Frequency	Sampling Location
Coliform Bacteria	Monthly or Quarterly	User Faucets within the Distribution System
Lead / Copper	Annual (varied)	High Risk Faucets within the Distribution System
Nitrate / Nitrites	Annual, Quarterly, or Monthly	At the Entry Point into the Distribution System (after treatment)
Inorganics	Every 3 Years (with no detects)	"
Organics	"	"
Herbicides / Pesticides	"	"
PCB	"	"
Gross Alpha	Every 9 Years (with no detects)	"
Radium 228	"	"
Radon	"	"

While water quality testing of finished water confirms the overall efficiency of treatment and integrity of the water system; public water systems must meet other requirements that help to ensure safe drinking water. Treatment systems themselves as well as materials and components of the water system as a whole must meet certain specifications. There are also requirements that call for the training and certification of the operators of certain water systems. Water systems must submit timely reports for water tests, treatment maintenance, and the addition of chemicals.

All public water systems must undergo periodic inspections called 'sanitary surveys' conducted by DWP staff; these surveys are assessments of all aspects of the water system and its operation. In turn, the DWP provides public water systems with round the clock contact for water emergencies, technical assistance, assistance with grants and loans for system improvements, assistance with source water protection, training seminars, and a quarterly newsletter that provides updates of regulatory information and other drinking water information. The DWP strives to assist public water systems in meeting the requirements for compliance, thereby helping to ensure safe drinking water.

Ground Water Indicators

Contact: David Braley, DHS BOH, Division of Health Engineering, Drinking Water Program

Tel: (207) 287-5338 email: David.Braley@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/water/index.html

The Drinking Water Program tracks the number of times public water supplies that utilize ground water exceed the MCL of a given substance, as indicated below in Table 7-5. Table 7-6 (on the next page) shows the population served by ground water based public water supplies and how many of these supplies have local wellhead protection plans (WHPPs) in place. Combined, these tables give a relative indication of the condition of ground water resources that are used as a drinking water supply. Data that are contained in these two tables are for the period of January 1, 2002 to December 31, 2003.

Table 7-5 Summary of Public Water Supplies with MCL Exceedances

Community Public Water Supplies with MCL Exceedences for Selected Contaminants (Ground Water Based or Partially Ground Water Supplied)		
Contaminant group	**Number of MCL Exceedences**	**Number of Samples**
NO3	31	6402
VOCs	5	1176
SVOCs	2	681

Table 7-6 Ground Water Based or Partially Ground Water Supplied Public Water Supply Information

System Type	Number of Systems	Systems with Ground Water as Primary Source	Population Served by Ground Water	Systems with Wellhead Protection Plans (WHPPs)	Population Served by WHPPs Supplies
Community	395	333	190,466	333	190,466
Non-Transient Non-Community	372	370	70,861	370	70,861
Transient	1208	1192	192,673	N/A	N/A

N/A means "Not Applicable"

Private Wells

Contact Andrew Smith, DHS BOH, Environmental Health Unit

Tel: (207) 287-5189 email: Andrew.E.Smith@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/ehu/wells/

The State Bureau of Health's Environmental Health Unit will be issuing on a report on private well water public health issues under a legislative mandate to report back on the need for a safe drinking water program for private wells. This report is currently being assembled and is due back to the legislature in October of 2004. A summary of the results of this report will be included in the 2006 305(b) Report.

Section 7-6 Ground Water and Public Health Concerns

Pubic Health and Environmental Concerns

Contaminants found in ground water have numerous adverse human health and environmental impacts. Public health concerns arise because some of the contaminants are individually linked to numerous toxic effects ranging from allergic reactions and respiratory impairment to liver and kidney damage, and damage to the central nervous system. Additional public health concerns also arise because information is not available about the health impacts of many contaminants found in ground water.

Because of uncertainties in the relationships between exposure to contaminants and impacts on human health, public health efforts are based on identifying the probabilities of impacts (i.e. risk assessment). Conducting a risk assessment for combinations of contaminants that are commonly found in ground water is difficult because there are no generally accepted protocols for testing the effects of contaminant interactions. The primary route of exposure to contaminants is through ingestion of drinking water, although exposure is also possible through contact with skin and inhalation of vapors from ground water sources (bathing, food preparation, industrial processes, etc.)

Because ground water generally provides base flow to streams and rivers, environmental impacts include toxic effects on benthic invertebrates, fish, wildlife and aquatic vegetation. This also presents a public health concern if the surface waterbody is a source of food and recreation. In some areas of the State there are probably links between low-level, long-term ground water quality degradation and the water quality of streams and brooks during low-flow conditions.

MTBE

Contacts: DEP BRWM 207-287-2651; DHS Bureau of Health 207-287-3201; DOC Maine Geological Survey 207-287-2801; or the U.S. Geological Survey, 207-622-8201

Related Websites: (General Information) www.maine.gov/dep/mtbe.htm

(Questions and Answers) www.maine.gov/dep/rwm/publications/mtbeqa.htm

MTBE or methyl tert-butyl ether is an additive used in gasoline since the late 1970's to replace lead. It makes up about 3% of regular unleaded gasoline and 11% of reformulated gas (RFG). To meet federal clean air requirements, Maine began using RFG in November of 1994.

There has been evidence of MTBE in ground water since before 1985. However, no widespread contamination was noted until 1998, when a series of gasoline contamination incidents and concurrent public concern caused the State of Maine to conduct a study of private and public water supply wells. Of the 951 private wells and 793 public water supply wells tested:

- 93% showed either no MTBE or trace levels (below 1ppb).
- 16% showed detectable levels of MTBE, while other gasoline constituents were rarely found.
- While no public water supplies in the study showed MTBE levels above the MCL; 1% of the private wells sampled did show levels above the MCL of 35 ppb.

MTBE-contaminated wells were found in all areas of the state, not only in those areas required to use RFG. Since there are over 300,000 private wells in Maine serving about half of Maine population, the 1% of private wells would indicate an estimated 3,000 private wells in Maine could be contaminated with MTBE. In March of 1999, Maine opted out of the RFG program.

The DEP's 1998 investigations of the wells with MTBE levels over the MCL indicated an association with relatively small gasoline spills that one might categorize as a "backyard" type of spill – e.g. small, accidental spills that occur while filling the gas tanks of an ATV, snowmobile, garden tractor, etc. However, other gasoline constituents were rarely detected in those wells that contained MTBE.

In early 2000, the USGS in cooperation with the DEP and the town of Windham completed a study to determine if other sources of MTBE could be contributing factors to the presence of MTBE in drinking water. Factors investigated were atmospheric deposition, precipitation, as well as point sources such as leaks, spills, and improper disposal of petroleum products. The study concluded that recharge from precipitation containing MTBE is not a likely explanation for the occurrence of low levels of MTBE in the Windham aquifer, and the mostly likely sources were small spills of gasoline associated with use of lawn care equipment and recreational vehicles.

Radon

Contact: Bob Stilwell, DHS BOH, Division of Health Engineering, Radiation Control Program

Tel: (207) 287-5676 email: Bob.Stilwell@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/rad/hp_radon.htm

Not all public health concerns that involve ground water are caused by pollution released from human activities. The presence of naturally occurring radioactive radon gas in ground water drawn from granite bedrock aquifers and overlying soils has long been recognized as a problem in Maine. Based on studies of miners and more recently on people living in homes with high radon concentrations, medical researchers have shown that high radon levels in air are associated with increased incidence of lung cancer. Radon in water supplies is a concern because radon is readily released into the air from water. Therefore the health concerns stems more from inhalation of the radon rather than drinking the water. A large number of Maine wells have radon concentrations that through normal household water use, release concentrations of radon into the air that are as high or higher than the concentrations associated with an increased incidence of lung cancer.

Proposed federal standards for radon have raised concerns regarding ground water that had previously been regarded as acceptable. The average concentration of radon in public or private water supplies in Maine ranges from 5,000 to 10,000 picocuries/Liter (pci/L). Current Maine guidelines limit radon in water to 20,000 pci/L. The proposed federal standard would create a Maximum Contaminant Level (MCL) for radon in water of 300 pci/L with an Alternate MCL (AMCL) of 4,000 pci/L if a radon multimedia mitigation program is developed and instituted by the State or the community water suppliers. This multimedia mitigation plan would require reducing risks from radon in indoor air, which is estimated to cause 14,000 to 32,000 deaths annually in the U.S., compared to radon in drinking water which is estimated to cause 68 deaths annually. The AMCL of 4,000 pci/L was chosen because it is the amount of radon in drinking water that causes a risk equal to the risk from radon found in outdoor air. Statutory authority for the MCL, AMCL and multimedia mitigation plans were set in the Federal Safe Drinking Water Act Amendments of 1996.

Arsenic

Contacts: Robert Marvinney, State Geologist, DOC BGNA, Maine Geological Survey, Administrative Division

Tel: (207) 287-2801 email: Robert.Marvinney@SPAM-ZAPmaine.gov

or David Braley, DHS BOH, Division of Health Engineering, Drinking Water Program

Tel: (207) 287-5338 email: David.Braley@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dhs/eng/water/ArsenicFacts.htm

Several types of cancer including skin and bladder cancer, along with other health problems have been linked to the occurrence of arsenic in drinking water. The current Maximum Contaminant Level (MCL) for arsenic is 50 ppb (parts per billion); however the EPA has recently proposed lowering the MCL to 10 ppb in drinking water. The Maine Bureau of Health has set a maximum exposure guideline (MEG) for arsenic in domestic well water at 0.01 milligrams of arsenic per liter of water (which is equal to

10 ppb). This is also the same amount that the World Health Organization currently recommends.

A 1994 – 1995 study of about 600 randomly selected wells indicates that, statewide, about 1 to 2 percent have arsenic levels greater than 50 ppb. However, about 10 percent have arsenic levels above the MEG of 10 ppb. Table 7-7 shows recent water tests done on private wells in Maine. These data indicate similar arsenic concentrations to what was found in the 1994 - 1995 study.

Table 7-7 Arsenic Levels in Private Wells

Private Well Arsenic Test Results HETL Database 1/1/2002 to 12/31/2003		
Number of Tests	**Result**	**Percent of Total**
511	non-detect for arsenic	47 %
587	positive for arsenic	53 %
16	> 50 ppb arsenic	1.5 %
109	> 10 ppb arsenic	9.9 %
1,098	**Total Number of Tests**	

Currently a source or sources for all arsenic detected in well water has not been determined. However, preliminary work by the MGS, University of Maine Department of Geological Sciences, DEP, and DHS indicate that the problem is of statewide significance and that the arsenic concentration in ground water is most likely the result of both natural processes and human activity. Through a focused study, in conjunction with the University of Maine, in the town of Northport, bedrock is now recognized as a significant source of the contribution to high-arsenic wells. This site-specific study involves rock coring and water sampling of individual fractures to determine arsenic concentrations. Four drill cores have been collected in the recharge and discharge areas of the basin. Analysis of the drill core shows significant amounts of arsenic-bearing minerals that have undoubtedly contributed to the arsenic problem in the area. Fractures within these cores are coated with arsenic bearing iron oxyhydroxide minerals that may play a significant role in the release of arsenic to ground water.

Other Contaminants

The Maine Geological Survey has worked with DEP and DHS on wells contaminated with cadmium in central coastal Maine. This occurrence is probably related to early historical uncontrolled mining activity in the area.

The Maine Geological Survey has also worked with DHS on wells contaminated with antimony in central Maine. The area is known for small antimony deposits but the relationship between high-antimony wells and these deposits is unknown.

Chapter 8 SUMMARY OF IMPAIRED WATERS REQUIRING TMDLs

Section 8-1 TMDL / CATEGORY 5 LIST

Table 8-1 2002 Category 5/TMDL Rivers & Streams not on the 2004 Category 5 / TMDL List

Segment	Assessment Unit (Waterbody) ID	Has EPA Approved TMDL (In 4a)	Has Other Control Measures (Proposed for 4b)	Insufficient Information to Determine If Water Is Impaired (Category 3)	Assessment Unit is Attaining At Least One WQ Standard, With Other Standards Not Assessed (Category 2)	Assessment Unit is Attaining All WQ Standards (Category 1)
Outlet Stream (China Lake)	ME01030000 309 328R01			Recent (2002) biomonitoring indicates attainment, sources may still exist.		
Kennedy Brook	ME01030000 312 333R03				Recent (2003) monitoring in attainment. See case study discussion in Sect 4-4, Small Streams.	
Togus Stream	ME01030000 312 335R02				Draft TMDL completed with findings that water quality impairments are attributable to natural (wetland) sources rather than any identifiable point or nonpoint source	
Bog Stream	ME01050000 308 511R01				Hatchery point source eliminated. Recent (2003) monitoring in attainment.	
Goosefare Brook	ME01060000 106 612R01	TMDL approved 2003				
Deep Brook	ME01060000 211 616R01				Recent (2002) in attainment. No sources found for previous cause	
Presque Isle Stream	ME01010000 412 140R01		Mapleton land treatment system complete. Probable attainment.			
Cobbossee Stream	ME01030000 311 334R05	TMDL approved 2004				
Total Number of Segments Moved From 2002 TMDL List		**2**	**1**	**1**	**4**	

Table 8-2 2002 Category 5/TMDL Lakes not on the 2004 Category 5 / TMDL List

Lake	Assessment Unit (Lake) ID	Year EPA Approved TMDL (In 4a)	Has Other Control Measures (Proposed for 4b)	Insufficient Information to Determine If Water Is Impaired (Category 3)	Assessment Unit is Attaining At Least One WQ Standard, With Other Standards Not Assessed (Category 2)	Assessment Unit is Attaining All WQ Standards (Category 1)
Webber Pond	5408	2003				
Threemile Pond	5416	2003				
Three-cornered Pond	5424	2003				
Highland (Duck) Lake	3734	2003				
Mousam Lake	3838	2003				
Annabessacook Lake	9961	2004				
Pleasant (Mud) Pond	5254	2004				
Total Number of Lakes Moved From 2002 TMDL List		**7 Lakes**				

Table 8-3 2002 Category 5/TMDL Estuarine/Marine Waters not on 2004 Category 5/TMDL List

Segment	Assessment Unit (Waterbody) ID	Year EPA Approved TMDL (In 4a)	Has Other Control Measures (Proposed for 4b)	Insufficient Information to Determine If Water Is Impaired (Category 3)	Assessment Unit is Attaining At Least One WQ Standard, With Other Standards Not Assessed (Category 2)	Assessment Unit is Attaining All WQ Standards (Category 1)
Medomak River Estuary	726-11		4-B-1 Municipal Point Source removed – changed to spray irrigation			
Burnt Cove, Stonington	722-36				OBDs Removed. Monitoring indicates attainment.	
Total Number of Segments Moved From 2002 TMDL List			1		1	

Table 8-4 River and Stream TMDL Current Project Update

Segment	Assessment Unit ID & Pollutant	Project Status	Project TMDL Submittal Targets
Togus Stream	Eutropic Lake, Wetland, PS	Report Preparation	2004
Sabattus River	Eutropic Lake, NPS, PS	Report Preparation	2005
Piscataquis River	NPS, Agriculture; PS	Monitoring & Report Preparation	2006
Androscoggin River – Gulf Island Pond	PS; BOD, TSS, TP	Modeling Report Final 2002; Additional Monitoring 2004	2005
Androscoggin River – Livermore Impoundment	TSS	Modeling Report Final 2002; Additional Monitoring 2004	2005
Penobscot River	PS; BOD, TP	Modeling Report Draft 2003; Final 2004	2006
Sandy River	PS; TP	Initial Monitoring 2002; Finish Monitoring 2004	2006
Carelton Stream	NPS, Metals, Mine Drainage	Report Preparation	2004
Fish Brook	NPS, Agriculture	Report Preparation	2004
Frost Gully	NPS, Urban Runoff	Report Preparation	2004
Concord Gully	NPS, Urban Runoff	Report Preparation	2004
Long Creek	NPS, Urban Runoff	Finish Stressor ID, EPA Innovative Pilot Proposal	2005 [1]
Arctic Brook	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 [2]
Unnamed Bangor Stream (Pushaw)	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 [2]
Unnamed Bond Brook Tributary	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 [2]
Mill Stream	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 [2]
Penjajawock Stream	NPS, Urban Runoff	Conduct Stressor ID, Modeling Completed	2005
Meadow Brook	NPS, Urban Runoff	Partial Data Collected	2005
Capisic Stream	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Trout Brook	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Barberry Creek	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Birch Stream	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Prestile Stream	NPS, Agriculture	Partial Data Collected	2006
Dyer River	NPS, Agriculture	Data Collected	2006
West Branch Sheepscot River	NPS, Agriculture	Data Collected	2006
Shaw Brook	NPS, Urban Runoff	Partial Data Collected	2006

1 Proposed for the EPA Innovative TMDL Pilot Project, but will be completed by Maine DEP if not selected
2 Conditional on acceptance of waterbody into the EPA Innovative TMDL Pilot Project

Table 8-5 Lake TMDL Current Project Update

Lake	Lake ID	Pollutants	Project Status	TMDL Submittal Target*
SABATTUS POND	3796	Nutrients, Siltation	Public Review	2004
HIGHLAND LAKE	3454	Organic Enrich.	Report Preparation	2004
UNITY POND	5172	Nutrients, Siltation	Report Preparation	2004
TOOTHAKER POND	2336	Nutrients	Report Preparation	2004
NARROWS POND (UPPER)	98	Nutrients, Organic Enrich.	Report Preparation	2004
COBBOSSEECONTEE (LT)	8065	Nutrients, Organic Enrich., Siltation	Report Preparation	2004
LONG LAKE	5780	Organic Enrich.	Report Preparation	2004
TOGUS POND	9931	Nutrients, Organic Enrich.	Monitoring & Data Analysis	2005
DUCKPUDDLE POND	5702	Nutrients, Organic Enrich., Siltation	Monitoring & Data Analysis	2005
LOVEJOY POND	5176	Nutrients, Organic Enrich., Siltation	Monitoring & Data Analysis	2005
LILLY POND	83	Nutrients, Organic Enrich.	Monitoring & Data Analysis	2005
HAMMOND POND	2294	Nutrients, Organic Enrich., Siltation	Monitoring & Data Analysis	2005
HERMON POND	2286	Nutrients, Organic Enrich.	Monitoring & Data Analysis	2005
SEWALL POND	9943	Nutrients, Organic Enrich.	Baseline Monitoring	2006
TRAFTON LAKE	9779	Nutrients	Baseline Monitoring	2006
ARNOLD BROOK LAKE	409	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2006
ECHO LAKE	1776	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2006
CHRISTINA RESERVOIR	9525	Organic Enrich.	Baseline Monitoring	2006
CROSS LAKE	1674	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2006
DAIGLE POND	1665	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2007
MONSON POND	1820	Nutrients, Siltation	Baseline Monitoring	2007

* Calendar year projection as of May 2004

Table 8-6 Estuarine/Marine Current TMDL Project Update

Segment	Assessment Unit ID & Pollutant	Project Status	TMDL Submittal Target
Mousam River Estuary	811-9, PS	Report Preparation	2005
Royal River Estuary	802-25, PS	Report Preparation	2005

Chapter 9 ACCESSING AND MANAGING DATA USED IN MAKING DECISIONS ON STATUS OF WATERS

Section 9-1 MAINE DEP QUALITY MANAGEMENT SYSTEM

Contact: Malcolm Burson, DEP Quality Assurance Manager, Office of Policy Services

Tel: (207) 287-7755 email: Malcolm.C.Burson@SPAM-ZAPmaine.gov

Related Website: www.maine.gov/dep/qms.htm

Data used in making decisions on the status of Maine waters are collected, analyzed, and evaluated according to the standards contained in the Department's QMP or Quality Management Plan (Revision 2, as approved by EPA-New England, June, 2003). The Plan documents DEP's Quality Management System (QMS) which applies to all program areas and activities in the Maine DEP.

The QMS uses a rigorous internal second-party audit approach to managing for quality, in addition to program-level QA/QC activities. The latter are documented in Standard Operating Procedures (SOPs) developed and implemented for each program area. SOPs are included in all Quality Assurance Project/Program Plans (QAPPs) applicable to environmental data gathering and analysis.

The auditing program of the QMS uses trained auditors from within Maine DEP to assess the quality of management systems, procedures, and protocols. Audits are scheduled and overseen by the Quality Management Steering Committee (QMSC), and are designed to identify opportunities for improvement as well as non-conformances with established standards. Audits are carried out at three operational levels:

- System-wide audits of QMP elements such as "Documents and Records" or "Planning,"
- Program audits of identifiable operational systems, such as the Permit Compliance System (PCS), and
- Technical audits of QAPPs and similar planning documents.

Since its inception in 2001, the auditing program is assessed the following areas relevant to the 305(b) Report:

- NPDES Permit Compliance System and Discharge Monitoring Report system data management
- NPDES Water Inspection (documentation)
- Division of Land Resource Regulation
- Bureau of Remediation and Waste Management, GRO/DRO Sampling program (ground water)
- CWA 319 program

In 2004, the following areas are scheduled for audit:

- Overboard Discharge Program: operations and removals programs
- Small Community Grants (wastewater) Program as part of Procurement Audit

In 2003, the QMSC initiated an effort to bring all laboratories providing environmental data results to the Department into compliance with basic laboratory standards. DEP published Laboratory Performance Standards and distributed these to all NPDES facilities and other laboratories. These Standards are being incorporated in wastewater permits as these are renewed. The Department is currently developing a Laboratory Quality Assurance Manual template for use by wastewater permit holders through a grant utilizing Joint Environmental Training Coordinating Committee (JETCC) funds.

The other major focus of QMS activity related to decisions regarding the status of waters is in Maine DEP's administration of QAPPs. As the result of a Memorandum of Agreement (January, 2002) between EPA-New England and the Department, authority to review and approve QAPPs is being handed over in stages from EPA to Maine DEP. QAPPs for water quality activities previously approved by EPA-NE are now overseen by Maine DEP, including approval of revisions. Following an initial round of parallel review, all water quality monitoring QAPPs under the CWA 319 program are reviewed and approved by DEP instead of EPA. In 2003 and early 2004, program-level QAPPs for Lakes Monitoring (including TMDL and volunteer monitoring) and Bio-criteria Monitoring are in the final stages of development. Approval in this case will be on the basis of parallel review by EPA-New England and DEP. A project QAPP for the Urban Streams TMDL program was approved using a similar process in 2003. Program-level QAPPs for Marine/Estuarine monitoring, and Wetlands monitoring, are under development. It is expected that when these are complete, DEP will have full authority to review and approve them.

Certain other QAPPs related to water quality describe quality assurance activities for projects outside DEP's span of control. Chief among these are QAPPs for activities carried out by the Casco Bay Estuary Project (CBEP), and projects developed and carried out by EPA-New England in Maine.

Section 9-2 LISTINGS ON INDIVIDUAL WATERS

See the following Appendices (II through IV) for listing information on specific waters.

State of Maine

Department of
Environmental Protection

2004 Integrated Water Quality
Monitoring and Assessment Report

Appendices:

Acronyms, HUC Maps, Definitions
And
Integrated Lists of Surface Waters

Table of Contents

Table of Contents (continued)

APPENDIX I: ACRONYMS FOUND IN THE BODY OF THE 2004 305(B) REPORT ALONG WITH THE MEANING OR DEFINITION

No.	Term	Meaning or Definition
1	303(d) List	List of a state's Impaired Waters
2	305(b) Report	The 305(b) report is a complete assessment of all water quality management sub-segments in the state for which uses and standards are available. (a.k.a. The Integrated Report)
3	A/B	Above/Below (Fish Test for Dioxin)
4	ALPS	Aquifer Lakes Pilot Survey
5	AMCL	Alternate Maximum Contaminant Level
6	AMD	Acid Mine Drainage
7	ANC	Acid Neutralizing Capacity
8	AST	Above Ground Storage tank
9	AU	Animal Unit: 1 AU is equal to 1,000 lbs. of live animal body weight.
10	BMP	Best Management Practice
11	Board	Board of Environmental Protection
12	BOD	Biological or Biochemical Oxygen Demand
13	BPJ	Best Professional Judgement
14	CAFO	Concentrated Animal Feeding Operation
15	CBEP	Casco Bay Estuary Project
16	CDBG	Community Development Block Grant
17	CHL a	Chlorophyll a
18	CNMP	Certified Nutrient Management Planners
19	COD	Chemical Oxygen Demand
20	CSO	Combined Sewer Overflow
21	CWA	Clean Water Act
22	DAFRR	Maine Department of Agriculture, Food and Rural Resources - former name of the MDOA
23	DEP - BAQ	Department of Environmental Protection - Bureau of Air Quality
24	DEP - BLWQ	Department of Environmental Protection - Bureau of Land and Water Quality
25	DEP - BLWQ - DEA	DEP - Bureau of Land and Water Quality - Division of Environmental Assessment
26	DEP - BLWQ - DECTA	DEP - Bureau of Land and Water Quality - Division of Engineering, Compliance and Technical Assistance
27	DEP - BLWQ - DLRR	DEP - Bureau of Land and Water Quality - Division of Land Resource Regulation
28	DEP - BLWQ - DPS	DEP - Bureau of Land and Water Quality - Division of Program Services
29	DEP - BLWQ - DWM	DEP - Bureau of Land and Water Quality - Division of Watershed Management
30	DEP - BLWQ - DWRR	DEP - Bureau of Land and Water Quality - Division of Water Resource Regulation

No.	Term	Meaning or Definition
31	DEP - BLWQ - DWRR - UICP	DEP - BLWQ - Division of Water Resource Regulation - Underground Injection Control Program
32	DEP - BRWM	Department of Environmental Protection - Bureau of Remediation and Waste Management
33	DEP - BRWM - DOHWFR	DEP - Bureau of Remediation and Waste Management - Division of Oil and Hazardous Waste Facilities Regulation
34	DEP - BRWM - DOR	DEP - Bureau of Remediation and Waste Management - Division of Remediation
35	DEP - BRWM - DOR - USP	DEP - BRWM – Division of Remediation - Uncontrolled Hazardous Substance Sites Program
36	DEP - BRWM - DPS	DEP - Bureau of Remediation and Waste Management - Division of Program Services
37	DEP - BRWM - DSWM	DEP - Bureau of Remediation and Waste Management - Division of Solid Waste Management
38	DEP - BRWM - DTS	DEP - Bureau of Remediation and Waste Management - Division of Technical Services
39	DEP, MDEP, MeDEP, "The Department"	State of Maine – Department of Environmental Protection
40	DHS - BOH	Department of Human Services – Bureau of Health
41	DHS - BOH - DHE	DHS - Bureau of Health - Division of Health Engineering
42	DHS - BOH - DHE - DWP	DHS - Bureau of Health - Division of Health Engineering - Drinking Water Program
43	DHS - BOH - DHE - DWP - WHPP	DHS - BOH - DHE – Drinking Water Program - Wellhead Protection Program
44	DHS - BOH - DHE - RCP	DHS - Bureau of Health - Division of Health Engineering - Radiation Control Program
45	DHS - BOH - HETL	DHS - Bureau of Health - Public Health and Environmental Testing Laboratory
46	DHS, MDHS	Department of Human Services
47	DIFW - BRM	Maine Department of Inland Fisheries and Wildlife - Bureau of Resource Management
48	DIFW, IF&W, MDIFW	Maine Department of Inland Fisheries and Wildlife
49	DMR	Discharge Monitoring Report
50	DMR - BRM	Department of Marine Resources – Bureau of Resource Management
51	DMR - BRM - PHD	DMR - Bureau of Resource Management - Public Health Division
52	DMR, MDMR	Department of Marine Resources
53	DOA - OANRR	Maine Department of Agriculture – Office of Agricultural, Natural and Rural Resources
54	DOA - OANRR - BPC	DOA - Office of Agricultural, Natural and Rural Resources - Board of Pesticide Control
55	DOA - OANRR - NMP	DOA - Office of Agricultural, Natural and Rural Resources - Nutrient Management Program
56	DOA, MDOA	Maine Department of Agriculture
57	DOC	Department of Conservation
58	DOC	Dissolved Organic Carbon
59	DOC - BGNA	Department of Conservation - Bureau of Geology and Natural Areas
60	DOC - BGNA - MGS	DOC - Bureau of Geology and Natural Areas - Maine Geologic Survey
61	DOC - BGNA - MNAP	DOC - Bureau of Geology and Natural Areas - Maine Natural Areas Program
62	DOC - LURC	Department of Conservation - Land Use Regulation Commission
63	DOE, U.S. DOE, USDOE	Department of Energy

No.	Term	Meaning or Definition
64	EDD	Electronic Data Deliverable
65	EGAD	Environmental Groundwater Analysis Database
66	ELS	Eastern Lake Survey
67	EMAP	Environmental Monitoring and Assessment Program
68	EPA, USEPA, U.S. EPA	United States Environmental Protection Agency
69	EPA-NE, EPA-New England	Region 1 of the EPA (Covers CT, MA, ME, NH, RI & VT)
70	FFY	Federal Fiscal Year
71	GIS	Geographic Information Systems – computerized mapping systems
72	GPA	Great Pond Class A
73	GPS	Global Positioning System
74	GTCC	Greater Than Class C (radioactive waste)
75	HDPE	High-Density Poly Ethylene
76	HELM	High Elevation Lakes Monitoring
77	HLW	High Level (radioactive) Waste
78	HRS	Hazard Ranking System
79	HUC	Hydrologic Unit Code
80	ICAG	Interim Cover and Grading (procedure for landfills)
81	ISFSI	Independent Spent (nuclear power plant) Fuel Storage Installation
82	JETCC	Joint Environmental Training Coordinating Committee
83	LLW	Low Level (radioactive) Waste
84	LQG	Large Quantity Generators
85	LUST	Leaking Underground Storage Tank
86	MCGL	Maximum Contaminant Goal Level
87	MCL	Maximum Contaminant Level
88	MDL	Maximum Daily Load
89	MDOT	Maine Department of Transportation
90	MEG	Maximum Exposure Guideline
91	MeGIS, OGIS	Maine Office of Geographic Information Systems (GIS)
92	MEPDES	Maine Pollutant Discharge Elimination System
93	mg/L	Milligrams Per Liter
94	MHBP	Maine Healthy Beaches Program
95	MRWA	Maine Rural Waters Association
96	MS4	Municipal Separate Storm Sewer Systems
97	MSW	Municipal Solid Waste

No.	Term	Meaning or Definition
98	MWPP	Maine Water Pollution Prevention Program
99	NCR	Noncompliance Review Meetings (can be monthly or quarterly - QNCR)
100	NEMO	Non-point Education for Municipal Officials Program
101	NGO	Non-governmental Organization
102	NMP	Nutrient Management Plan
103	NORM	Naturally Occurring Radioactive Materials
104	NPDES	National Pollutant Discharge Elimination System
105	NPL	National Priorities List (a.k.a. Superfund Sites)
106	NPS	Nonpoint Source (of Pollution)
107	NRC, U.S. NRC, USNRC	Nuclear Regulatory Commission
108	NRPA	Natural Resources Protection Act
109	OBD	Overboard Discharge -
110	ODGP	Overboard Discharge Grant Program
111	OIA	Office of Innovation and Assistance
112	OME	Operations Management Evaluations
113	P2 Program	Pollution Prevention Program
114	PBT	Persistent Bioaccumulative and Toxic Pollutants
115	PCB	Polychlorinated Biphenyls
116	pci/L	Picocuries Per Liter
117	PCS	Permit Compliance System
118	pg/g	Picograms per Gram
119	POTW	Publically Owned Treatment Works (e.g. a municipal wastewater treatment plant)
120	ppb	Parts Per Billion
121	ppm	Parts Per Million
122	ppq	Parts Per Quadrillion
123	P-WL	Wetland Protection Sub-District
124	QA/QC	Quality Assurance / Quality Control
125	QAPP	Quality Assurance Project/Program Plan
126	QMP	Quality Management Plan
127	QMS	Quality Management System
128	QMSC	Quality Management Steering Committee
129	RAP	Remedial Action Plan
130	RCRA	Resource Conservation and Recovery Act
131	REMAP	Regional Environmental Monitoring and Assessment Program

No.	Term	Meaning or Definition
132	RFP	Request For Proposal
133	RLTM	Regional Long Term Monitoring
134	SBTAP	Small Business Technical Assistance Program
135	SCGP	Small Community Grant Program
136	SDT	Secchi Disk Transparency
137	SDWA	Safe Drinking Water Act
138	SHWT	Seasonal High Water Table
139	SOP	Standard Operating Procedures
140	SPCC	Spill Prevention Control and Countermeasures
141	SPO, MSPO	Maine State Planning Office
142	SPU	Standard Platinum Units
143	SQG	Small Quantity Generators
144	SRF	State Revolving Fund
145	State Fiscal Year	July 1st to June 30th
146	STORET	EPA Database (short for STOrage and RETrieval)
147	SWAP	Surface Water Assessment Program
148	TDS	Total Dissolved Solids
149	THWRP	Toxics and Hazardous Waste Reduction Program
150	TMDL	Total Maximum Daily Load
151	TPH	Total Petroleum Hydrocarbons
152	TSI	Trophic State Indices
153	UIC	Underground Injection Conduit
154	USDA	United State Department of Agriculture
155	USGS	United States Geological Survey
156	UST	Underground Storage Tank
157	VLMP	Volunteer Lake Monitoring Program
158	WET	Whole Effluent Toxicity

Definitions for Appendices II through IV

Assessment Unit (HUC): 10-digit HUC number, HUCs have not been assigned to marine waters

Waterbody ID: Segment numbers within an assessment unit (these are the same numbers used by the Waterbody System in previous 305b reports)

Segment Name/Description

Segment Size: In miles for rivers and streams, in acres for lakes and marine waters

Segment Class: The assigned classification from M.R.S.A. Title 38 Section 467,468,469. Assessment is made according to the standards of the assigned class.

Monitored Date: the last year in which data was collected within an assessment unit or segment. When data is older than five years it is listed as an evaluated segment.

Impaired Use: uses from M.R.S.A. Title 38 Section 465, 465-A, 465-B that are found to not be fully supported

Causes: Criteria that have not been attained or known pollutants that cause impairment. Final determination of all causes may require completion of the TMDL or other problem analysis.

Sources: A list of probable sources of an impairment. Final determination of sources may require completion of the TMDL or other problem analysis.

TMDL Schedule: Projected date for completion of a TMDL. Schedules listing 2004 indicate an expectation that the TMDL will be completed within this listing cycle. Schedules of 2008 and 2012 indicate an expectation before which those TMDLs may be completed (or other management actions taken to bring a segment into attainment). These schedules may be revised in future listings.

APPENDIX II: RIVERS AND STREAMS

Category 1: Rivers and Streams Fully Attaining All Designated Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0101000101	101R	Baker Branch St. John R and its tributaries	210.9	Class AA,A	2001	Nature Conservancy Reserve
ME0101000102	101R	SW Branch St. John R and its tributaries	142.9	Class AA,A	2001	Nature Conservancy Reserve
ME0101000104	106R	Minor tributaries St. John R entering above Nine Mile Bridge	74.4	Class A	2001	
	114R	St. John R, main stem, above Nine Mile Bridge	17.4	Class AA,A	2003	
ME0101000106	103R	Big Black R and its tributaries	159.1	Class AA,A	2003	
ME0101000107	104R	Chimenticook Str and its tributaries, those riverine waters	25.4	Class A	Evaluated	
	105R	Pocwock Str and its tributaries, those riverine waters lying	37.8	Class A	Evaluated	
	106R	Minor tributaries St. John R entering above Ouellette Bk	77.4	Class A	Evaluated	
	114R	St. John R, main stem, above Ouellette Bk	47.2	Class AA,A	Evaluated	
ME0101000108	107R	Little Black R and its tributaries	111.1	Class A	Evaluated	
ME0101000109	106R	Minor tributaries St. John R entering above Little Black R	63.2	Class A	Evaluated	
ME0101000201	119R	Eagle Lake, Allagash R tributaries	98.8	Class AA,A	Evaluated	Allagash Wilderness Waterway
ME0101000202	119R	Heron (Churchill) Lake, Allagash R tributaries	97.5	Class AA,A	Evaluated	Allagash Wilderness Waterway

Category 1: Rivers and Streams Fully Attaining All Designated Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0101000203	119R	Chemquasabamticook Stream and tributaries	159.2	Class AA,A	Evaluated	Allagash Wilderness Waterway
ME0101000204	119R	Long Lake, Allagash R tributaries	155.2	Class AA,A	Evaluated	Allagash Wilderness Waterway
	120R	Allagash R, main stem	7.4	Class AA,A	Evaluated	Allagash Wilderness Waterway
ME0101000205	119R	Musquacook Stream and tributaries	171.5	Class AA,A	Evaluated	Allagash Wilderness Waterway
ME0101000206	119R	Big Brook and tributaries	118.6	Class AA,A	Evaluated	Allagash Wilderness Waterway
ME0101000207	119R	Allagash R tributaries	272.9	Class AA,A	Evaluated	Allagash Wilderness Waterway
	120R	Allagash R, main stem	45.4	Class AA,A	Evaluated	Allagash Wilderness Waterway
ME0101000301	121R	Fish R, main stem, and its tributaries above outlet of Fish River Lake	145.0	Class AA,A	Evaluated	
ME0101000401	130R	Millimagasset Stream and tributaries	97.6	Class AA,A	Evaluated	
ME0101000402	130R	Munsungan Stream and tributaries	103.3	Class AA,A	Evaluated	
ME0101000403	130R	Mooseleuk Stream and tributaries	159.1	Class AA,A	Evaluated	
ME0101000404	130R	Umcolcus Stream and tributaries	77.3	Class AA,A	Evaluated	
ME0101000405	131R	St. Croix Stream, tributaries to St. Croix L	128.0	Class AA,A	Evaluated	
ME0101000406	131R	St. Croix Str and its tributaries	124.7	Class AA,A	Evaluated	

Category 1: Rivers and Streams Fully Attaining All Designated Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0101000407	130R	Aroostook R, main stem, and tributaries above St Croix Str	141.8	Class AA,A	Evaluated	
ME0101000409	133R	Machias R and tributaries above Big Machias L	175.5	Class AA,A	Evaluated	
ME0102000101	201R	North Branch of Penobscot R and its tributaries	176.7	Class A	Evaluated	
ME0102000106	202R	Nesowadnehunk Stream and tributaries	56.9	Class AA, A	1998	Baxter State Park
ME0102000107	202R	Namakanta Stream and tributaries	97.4	Class AA, A	2003	Nature Conservancy Reserve, State Ecological Reserve
ME0102000109	202R	Tributaries of West Branch Penobscot R above Ferguson L	208.0	Class AA,A	2000	Baxter State Park
ME0102000201	206R	Webster Bk and tributaries of East Branch Penobscot R above Grand Matagamon	188.7	Class AA,A	Evaluated	Baxter State Park
ME0102000202	206R	Tributaries of East Branch Penobscot R at Grand Matagamon	167.0	Class AA,A	Evaluated	Baxter State Park
ME0103000101	301R	South Branch Moose R and its tributaries	48.7	Class AA,A	Evaluated	
ME0103000102	301R	Moose R and its tributaries above Attean Pd	139.4	Class AA,A	Evaluated	
		Total Miles	**4,328.3**			

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0101000103	102R	NW Branch St. John R and its tributaries	54.0	Class AA,A	2003	
ME0101000105 *	103R*	Shields Branch of Big Black R, tributaries	7.9	Class AA,A	2003	
ME0101000109	109R	Minor tributaries St. John R entering above St. Francis R	90.9	Class A	Evaluated	
	114R	St. John R, main stem, above confluence St. Francis R	26.6	Class AA,A	Evaluated	
ME0101000110	108R	St. Francis R and its tributaries	134.9	Class A	Evaluated	
ME0101000111	109R	Minor tributaries St. John R entering above Fort Kent	44.0	Class A	Evaluated	
	114R	St. John R, main stem, above Fort Kent	1.4	Class AA,A	1999	
	115R	St. John R, main stem, above Fort Kent	17.5	Class A	1999	
ME0101000112	110R	Minor tributaries St. John R entering above Madawaska	40.7	Class B	Evaluated	
	115R	St. John R, main stem, above Madawaska	0.6	Class A	1999	
	116R	St. John R, main stem, above Madawaska	21.8	Class B	1999	
ME0101000113	111R	Minor tributaries St. John R entering above Grand Isle	14.6	Class B	Evaluated	
ME0101000114	112R	Violette Str and its tributaries (riverine waters only)	72.0	Class B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0101000115	113R	Minor tributaries St. John R entering below Violette Bk	47.3	Class B	Evaluated	
	118R	St. John R, main stem, below Van Buren	10.0	Class C	1999	
ME0101000116	113R	Minor tributaries St. John R entering beloe Grand Falls	5.8	Class B	Evaluated	
ME0101000117	150R	Riviere de Chute and its tributaries	24.7	Class B	Evaluated	
ME0101000118	153R	Minor tributaries of the Eel River	21.2	Class B	Evaluated	
ME0101000121	111R	Minor tributaries St. John R entering Madawaska and Van Buren	15.2	Class B	Evaluated	
	117R	St. John R, main stem, from Madawaska to La Grande Isle	15.5	Class C	1999	
	118R	St. John R, main stem, from La Grande Isle to Van Buren	10.2	Class C	1999	
ME0101000302	121R	Fish R, main stem, and its tributaries above outlet of Porta	106.8	Class AA,A	Evaluated	
	122R	Fish R, main stem, and tributaries above the outlet of St. Froid lake	214.2	Class AA,A	Evaluated	
ME0101000303 *	123R	Tributaries of Fish R entering above the outlet of Mud Lake	87.4	Class B	Evaluated	
	124R	Tributaries of Fish R above the outlet Cross L	24.5	Class B	Evaluated	
	125R	Tributaries of Fish R above the outlet Square L	83.5	Class B	Evaluated	
	126R	Fish R, main stem, and tributaries above outlet of Eagle L	104.4	Class A,B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0101000304	127R	Wallagrass Str and tributaries	76.7	Class B	Evaluated	
	128R	Tributaries of Fish R entering below outlet of Eagle Lake	61.5	Class B	Evaluated	
	129R	Fish R, main stem, below outlet of Eagle Lake	12.6	Class A,B	1999	
	147R	Aroostook River, main stem, between St. Croix and Masardis Gauge	1.8	Class A,B	Evaluated	
ME0101000408	132R	Squapan Stream and tributaries	83.2	Class B,C	Evaluated	
	136R	Minor tributaries of Aroostook R entering between confluence	25.5	Class A,B	Evaluated	
ME0101000410	133R	Machias R and its tributaries	182.9	Class AA,A	Evaluated	
ME0101000411	134R	Little Machias R and its tributaries	67.0	Class A	Evaluated	
	135R	Beaver Brk and its tributaries	104.6	Class B	Evaluated	
	136R	Minor tributaries of Aroostook R above Washburn Gauge	92.3	Class A,B	Evaluated	
	137R	Salmon Brk and its tributaries	52.4	Class B	Evaluated	
	147R	Aroostook River, main stem, above Washburn Gauge	29.4	Class A,B	2001	
ME0101000412 *	138R	Minor tributaries Aroostook R entering from south above Presque Isle	12.0	Class B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	139R	Presque Isle Str, main stem above confluence of Alder Brk	108.6	Class A	Evaluated	
	140R*	Presque Isle Str, main stem below confluence of Alder Brk	48.2	Class B	2000	
	141R	Minor tributaries Aroostook R entering north and west above Caribou	39.6	Class B	Evaluated	
	143R	Minor tributaries Aroostook R entering from south below Presque Isle Str	9.9	Class B	Evaluated	
	148R	Aroostook River, main stem, above Caribou	24.2	Class B,C	2002	
ME0101000413 *	142R	Caribou Str and its tributaries	33.2	Class B	1999	
	143R	Minor tributaries Aroostook R entering from south below Caribou	46.5	Class B	Evaluated	
	144R	Minor tributaries Arosstook R entering from north below Caribou	35.0	Class B	Evaluated	
	145R	Little Madawaska R and tributaries	247.5	Class A,B	2001	
	146R	Limestone Str and its tributaries	40.5	Class B	2001	
	148R	Aroostook River, main stem, above Canadian border	17.6	Class B,C	2001	
ME0101000502	153R	S Branch of Meduxnekeag R and its tributaries	61.3	Class B	2000	
ME0101000503	151R	N Branch of Meduxnekeag R and its tributaries	153.9	Class A,B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0101000504*	152R*	Meduxnekeag R, main stem, and tributaries	243.6	Class B	2000	
ME0102000102	201R	West Branch of Penobscot R and its tributaries above Seboomook L outlet	194.2	Class A	2000	
ME0102000103 *	201R	West Branch of Penobscot R and its tributaries at Chesuncook	233.1	Class A	2000	
ME0102000104 *	201R	West Branch Penobscot R tributaries above Caucomgomoc L	115.9	Class A	Evaluated	
ME0102000105	201R	West Branch of Penobscot R and its tributaries above Chesuncook outlet	300.4	Class A	Evaluated	
ME0102000108	202R	Jo-Mary Lake, tributaries	61.5	Class AA,B	Evaluated	
ME0102000109	203R	West Branch Penobscot R, main stem, from Ripogenus dam to Ferguson L	18.5	Class A, B	2000	
ME0102000110 *	202R	Tributaries of West Branch Penobscot R entering below Ferguson L	247.2	Class AA,B,C	Evaluated	
	205R	West Branch Penobscot R, main stem, below confluence with Millinocket Str	4.3	Class C	2003	
ME0102000110	205R01	Backwater of Dolby Impoundment	0.5	Class C	2003	Previously 4-C listed. New impoundment oxygen measurement in attainment.
ME0102000203	206R	Tributaries of East Branch Penobscot R above Seboeis R	62.6	Class AA,A	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	207R	East Branch Penobscot R, main stem above Seboeis R	22.9	Class AA,A	Evaluated	
ME0102000204	206R	Seboeis River and tributaries	228.5	Class AA,A	Evaluated	
ME0102000205	206R	Tributaries of East Branch Penobscot R below Seboeis R	264.5	Class AA,A	Evaluated	
	207R	East Branch Penobscot R, main stem, below Seboeis R	25.0	Class AA,A	2000	
ME0102000301	208R	West Branch of Mattawamkeag R and its tributaries	337.9	Class A,B	2003	
ME0102000302	209R	East Branch of Mattawamkeag R and its tributaries	160.7	Class A,B	Evaluated	
ME0102000303	212R	Minor tributaries of Mattawamkeag R below confluence of E and W Branch	82.9	Class A	Evaluated	
	213R	Mattawamkeag R, main stem, below confluence with E and W Branch	15.5	Class A	1999	
ME0102000304	210R	Baskahegan Str and its tributaries	203.0	Class A	2002	
ME0102000305	212R	Minor tributaries of Mattawamkeag R below confluence with Baskahegan Str	218.3	Class A	1999	
	213R	Mattawamkeag R, main stem, below confluence with Baskahegan Str	21.9	Class A	1999	
ME0102000306	211R	Molunkus Str and its tributaries	239.0	Class A	1999	
ME0102000307	212R	Minor tributaries of Mattawamkeag R below Kingman	117.4	Class A	1999	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	213R	Mattawamkeag R, main stem, below Kingman	12.8	Class AA, A	1999	
ME0102000401	214R	Piscataquis R, main stem and tributaries, above the Rt. 6 bridge in Guilford	312.1	Class AA,A,B	Evaluated	
ME0102000402 *	218R	Minor tributaries of Piscataquis R above confluence with Sebec R	203.6	Class A,B	1999	
	219R	Piscataquis R, main stem, above confluence with Sebec R	14.5	Class B	2000	
ME0102000403 *	215R	Sebec R and its tributaries	350.6	Class A,B	2000	
ME0102000404 *	216R	Pleasant R and its tributaries	361.1	Class AA,A,B	2001	
ME0102000405	217R	Sebois Str and its tributaries	159.8	Class A	1999	
ME0102000406	218R	Minor tributaries of Piscataquis R entering below confluence with Sebec R	154.7	Class A,B	1999	
	219R	Piscataquis R, main stem, below confluence with Sebec R	23.3	Class B	2000	
ME0102000501	220R	Minor tributaries Penobscot R above confluence of Mattawamkeag R	144.5	Class A, B	2003	
	229R	Penobscot R, main stem, above confluence of Mattawamkeag R	13.0	Class C	2003	
ME0102000502	220R	Minor tributaries Penobscot R above confluence of Piscataquis R	241.9	Class A, B	2003	
ME0102000503	221R	Passadumkeag R and its tributaries	382.4	Class AA, A	2003	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0102000504	222R	Olamon Stream and its tributaries	53.3	Class A	2003	
ME0102000505	226R	Sunkhaze Stream and its tributaries	88.7	Class AA	2003	
ME0102000506	222R	Minor tributaries of Penobscot R between Piscataquis R and Orson Is	91.1	Class A, B	2003	
ME0102000507	226R	Birch stream and its tributaries	63.4	Class B	2003	
ME0102000508	223R	Pushaw Str and its tributaries	277.2	Class B	2003	
ME0102000509 *	226R	Minor tributaries of Penobscot R between Orson Is and Veazie Dam	127.8	Class B	1999	
ME0102000510 *	224R	Kenduskeag Str and its tributaries	199.8	Class B,C	2003	
ME0102000511 *	225R*	Souadabscook Str and tributaries	156.0	Class AA,A,B	2001	
ME0102000512	228R*	Marsh River and its tributaries (nontidal portions)	199.8	Class B	Evaluated	
ME0102000513 *	226R	Minor tributaries Penobscot R between Veazie Dam and Reed Bk (non-tidal portions)	62.1	Class B	2001	
	227R	Minor tributaries entering from the east to Penobscot R between Reed Bk and south end of Verona Is	185.2	Class B	2003	
	227R01	Mill Stream (Orrington)	2.0	Class B	2001	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	228R	Minor tributaries entering from the west to Penobscot R between Reed Bk and south end of Verona Is	26.6	Class B	Evaluated	
	520R	Minor drainages entering Penobscot Bay in Hancock County between Verona Is and Castine	7.5	Class B	Evaluated	
ME0103000103	301R	Moose R and its tributaries above Rt 201 Jackman	88.7	Class AA,A,B	Evaluated	
	302R	Moose R and its tributaries at Long Pond	113.6	Class A,B	Evaluated	
ME0103000104	302R	Moose River and tributaries at Brassua L	134.4	Class A,B	Evaluated	
ME0103000105	303R	Moosehead Lake and minor tributaries of Moosehead Lake (rive	401.9	Class A	Evaluated	
ME0103000106	304R	Minor tributaries of Kennebec R entering above Dead R	268.5	Class AA,A	Evaluated	
	306R	Kennebec R, main stem, above confluence of Dead R	19.2	Class AA,A	1997	
ME0103000201	307R	North Branch of Dead R and its tributaries	132.0	Class A	Evaluated	
ME0103000202	308R	South Branch of Dead R and its tributaries	98.0	Class A	Evaluated	
ME0103000203	309R	Flagstaff Lake and minor tributaries of Flagstaff Lake	96.5	Class A,B	Evaluated	
ME0103000204 *	310R	Tributaries of Dead R entering below Flagstaff Lake	204.9	Class A,B	Evaluated	
	311R	Dead R, main stem	21.5	Class AA,A	2000	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0103000301	312R	Minor tributaries Kennebec R between Dead River and Wyman Dam	80.3	Class A,B	Evaluated	
	336R	Kennebec R, main stem, from Dead R to Wyman Dam	24.9	Class A	Evaluated	
ME0103000302	312R	Austin Stream and tributaries	75.7	Class A,B	Evaluated	
ME0103000303 *	312R	Minor tributaries Kennebec R between Wyman dam and Carrabassett R	69.0	Class A,B	2001	
	337R	Kennebec R, main stem, from Wyman Dam to Carrabassett R	23.1	Class A	2002	Previously Category 4-C. New certification issued. Aquatic life monitoring in attainment 2001, 2002
ME0103000304 *	313R	Carrabassett R and its tributaries	279.5	Class AA,A,B	Evaluated	
ME0103000305 *	315R*	Sandy R and tributaries above Rt 145 Strong	138.7	Class AA,A,B	2002	
	316R*	Sandy River and tributaries between Rt. 145 and Rt. 2 Farmington	190.7	Class A, B	Evaluated	
	317R*	Wilson Str and its tributaries above Wilson Pond	64.8	Class A	Evaluated	
	318R	Wilson Str, main stem, below Wilson Pond	16.0	Class C	2002	
	319R*	Sandy R, main stem, below Rt. 2 bridge in Farmington	29.7	Class B	2000	
ME0103000306 *	314R*	Wesserunsett Str and its tributaries	109.9	Class B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	320R*	Minor tributaries Kennebec R between Carrabassett R and Sebasticook R	193.8	Class B	2002	
ME0103000307	324R	W Branch of Sebasticook R and its tributaries except for main stem below Rt 23 (Hartland)	350.1	Class B	Evaluated	
ME0103000308 *	325R	E Branch of Sebasticook R and its tributaries except for main stem below Corundel Pd	190.9	Class B, C	2002	
	329R*	Minor tributaries of Sebasticook R from E and W Branches to Burnham (bridge)	32.2	Class B	Evaluated	
ME0103000309 *	326R	Twentyfive Mile Str and its tributaries	137.0	Class B	2003	
	327R	Fifteen Mile Str and its tributaries	71.0	Class B	2002	
	328R*	China Lake Outlet and its tributaries	41.0	Class B	2002	
	329R	Minor tributaries of Sebasticook R entering below Burnham	111.5	Class B	Evaluated	
ME0103000310 *	321R	Tributaries Messalonskee Str entering above Messalonskee L	167.1	Class B	Evaluated	
	322R	Tributaries Messalonskee Str entering below Messalonskee L	21.2	Class B	2000	
	323R	Messalonskee Str, main stem	10.3	Class C	1999	
ME0103000311 *	334R*	Cobbosseecontee Str and its tributaries	185.5	Class B	2001	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0103000312 *	333R	Minor tributaries Kennebec R between Sebasticook R and Cobbossee Str	132.5	Class B	Evaluated	
	333R01	Bond Brook (Augusta)	10.0	Class B/C	2003	
ME0103000312	333R03	Kennedy Brook (Augusta)	2.0	Class B	2003	Previously 5-A listed. Stormwater diversion. New data in attainment.
	335R*	Minor tributaries Kennebec R Cobbossee Str to Merrymeeting Bay (Chops)	144.4	Class B	2002	
ME0103000312*	335R02	Togus Stream (Chelsea)	2.0	Class B	2001	Previously 5-A listed. Water quality studies and draft TMDL find low oxygen levels are naturally occurring.
	420R*	Minor tributaries of Merrymeeting Bay	94.3	Class B	Evaluated	
ME0104000101	402R	Mooseleukmeguntic - Cupsuptic R and its tributaries	38.3	Class AA,A	2003	
	403R	Mooseleukmeguntic - Kennebago R and its tributaries	82.7	Class AA,A	2003	
ME0104000102	404R	Umbagog - Rapid R and its tributaries	141.6	Class AA,A	Evaluated	
	405R	Umbagog - Tributaries of Umbagog Lake and segments of minor tributaries entering Androscoggin R in NH	44.0	Class A	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0104000103	401R	Azicohos - Magalloway R and its tributaries upstream of the Maine-NH border	137.8	Class A	Evaluated	
ME0104000104	401R	Magalloway - Sturtevant Str and its tributaries	13.8	Class A	Evaluated	
ME0104000106	405R	Minor tributaries entering Androscoggin R in NH	8.8	Class A	Evaluated	
ME0104000201	406R	Minor tributaries of Androscoggin R entering upstream of the Wild R	11.2	Class A	2002	
ME0104000202 *	406R*	Minor tributaries of Androscoggin R entering above Rumford Point	129.9	Class AA,A	2000	
ME0104000203	407R	Ellis R and its tributaries	119.7	Class A	Evaluated	
ME0104000204	408R	Swift R and its tributaries	66.1	Class A,B	2003	
	410R	Minor tributaries of Androscoggin R entering between Rumford Pt and Webb R	35.5	Class B	Evaluated	
ME0104000205 *	409R	Webb R and its tributaries	102.3	Class A,B	2003	
	410R*	Minor tributaries of Androscoggin R between Webb R and Riley Dam	46.0	Class B	1998	
ME0104000206	410R*	Minor tributaries of Androscoggin R between Riley Dam and Nezinscot R	34.1	Class B	Evaluated	
	411R	Dead R and its tributaries above Androscoggin L	43.5	Class B	Evaluated	
	411R01	Dead R, Androscoggin L to Androscoggin R	8.0	Class B	2001	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0104000207 *	412R*	Nezinscot R and its tributaries	107.9	Class A,B	2001	
ME0104000208 *	413R*	Minor tributaries of Androscoggin R between Nezinscot R and L Androscoggin R	17.3	Class B	Evaluated	
ME0104000209 *	414R*	Little Androscoggin R and tributaries above Rt. 26 bridge in Paris	141.2	Class A,B	1998	
	415R	Bog Brk and other tributaries of Little Androscoggin R below Rt 26 bridge	78.3	Class A, B	Evaluated	
	416R	Little Androscoggin R, main stem, from Rt. 26 bridge in Paris to Rt 121 in Oxford	12.7	Class C	1998	
	417R	Little Androscoggin R, main stem, below Rt. 121 bridge in Oxford	24.5	Class C	1998	
ME0104000210 *	418R	Sabattus R and its tributaries	22.5	Class B,C	2001	
	419R	Minor tributaries of Androscoggin R between L Androscoggin R and Brunswick Dam	89.8	Class B	Evaluated	
ME0105000101	501R	Tributaries of St. Croix R entering above outlet of Spednik L	111.1	Class A,B	Evaluated	
ME0105000102	502R	St. Croix R, main stem, from outlet of Spednik Lake to Spednik Falls	110.6	Class A	Evaluated	
ME0105000103	502R	Grand Lake Stream and tributaries	230.5	Class A,B	2001	
ME0105000104	502R	Musquash Stream and tributaries	123.2	Class A,B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0105000105	502R	Big Lake at Peter Dana Point	134.7	Class A,B	Evaluated	
ME0105000106	502R	Tomah Stream and tributaries	167.0	Class AA,A	Evaluated	
ME0105000107	502R	St. Croix River and tributaries above Grand Falls	60.4	Class A,B	Evaluated	
ME0105000108 *	503R*	Minor tributaries of St. Croix R between Grand Falls and tidewater	59.3	Class B	Evaluated	
	504R	Minor tributaries of St. Croix River Estuary entering tidewater in Calais and Robbinston	38.1	Class B,C	Evaluated	
	505R	St. Croix R, main stem, from Grand Falls to tidewater	22.2	Class A, C	2003	
ME0105000201 *	507R*	Dennys R and its tributaries	125.4	Class AA, A, B	2003	
ME0105000202	508R	Pennamaquan River and tributaries	63.2	Class B	Evaluated	
ME0105000203 *	508R	Minor drainage entering tidewater in Washington County between Robbinston and Sandy Point (Cutler)	180.8	Class B	Evaluated	
ME0105000204	509R	E Machias R and its tributaries	288.1	Class AA, A, B	2003	
	509R01	Chase Mill Stream (East Machias)	1.5	Class B	2003	
ME0105000205	510R	Machias R and its tributaries	489.5	Class AA,A,B	2003	
	513R	Minor drainages entering tidewater in Machias Bay	30.4	Class B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0105000206	508R	Roque Bluffs Coastal - Minor drainages entering tidewater between Sandy Pt (Cutler) and E Machias R	51.7	Class B	Evaluated	
	513R	Roque Bluff Coastal - Minor drainages entering tidewater between E Machias R and Pleasant R	90.1	Class B	Evaluated	
ME0105000207	513R	Chandler R and its tributaries	57.1	Class B	Evaluated	
ME0105000208 *	511R	Pleasant R and its tributaries	109.2	Class AA,A,B	2003	
ME0105000208	511R01	Bog Stream (T18MD)	1.0	Class B	2002	Previously 5-A listed. Aquaculture facility closed. Aquatic life use attainment 2001, 2002.
	513R	Minor drainages entering tidewater in Addison and Harrington	39.9	Class A, B	2002	
ME0105000209 *	512R	Narraguagus R and its tributaries	323.8	Class AA, A, B	2003	
ME0105000210	513R	Tunk Stream and tributaries	54.4	Class A, B	2003	
ME0105000211	513R	Bois Bubert Coastal - Minor drainages entering tidewater between Chandler R and Tunk Str	77.0	Class B	Evaluated	
ME0105000212	515R	W Branch of Union R and its tributaries	210.3	Class B	2003	
	516R	E Branch of Union R and its tributaries	159.2	Class B	2003	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	517R	Minor tributaries of Graham Lake	203.7	Class B	Evaluated	
ME0105000213 *	514R	Minor drainages entering tidewater in Union River Bay - Hancock County	18.6	Class AA,A,B	Evaluated	
	518R	Tributaries of Union R entering below outlet of Graham Lake	64.1	Class B	2003	
ME0105000214	514R	Minor drainages entering tidewater between Tunk Str and Haynes Point (Trenton)	228.7	Class A,B	Evaluated	
ME0105000215	514R	Mt Desert Coastal - tributaries entering from Mt Desert and adjacent islands	116.0	Class AA,A,B	2003	
ME0105000216	520R	Bagaduce River and its tributaries	125.1	Class B	2003	
ME0105000217 *	514R	Stonington Coastal - Minor drainages entering tidewater in Hancock County west of Union River	39.6	Class AA,A,B	2000	
	520R	Stonington Coastal -Minor drainages entering tidewater in Hancock County	209.7	Class B	Evaluated	
ME0105000218 *	521R	Minor drainages entering tidewater in Waldo County	93.2	Class B	Evaluated	
ME0105000219	521R	Ducktrap River and its tributaries	51.6	Class AA ,A	2003	
ME0105000220	521R	West Penobscot Bay Coastal - Minor drainages entering tidewater in Waldo County south of Verona Is	84.4	Class B	Evaluated	
	522R	Minor drainages entering tidewater in Knox County	116.1	Class B	2002	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	522R	West Penobscot Bay Coastal -Minor drainages entering tidewater from Waldo Cty line to Marshall Pt (St George R)	86.0	Class B	2000	
ME0105000301	523R	St. George R and its tributaries	216.8	Class AA,A,B	2000	
	524R	Minor drainages entering tidewater portion of St. George River	79.7	Class B	Evaluated	
ME0105000302	525R	Medomak River and its tributaries, including Meduncook River to Pemaquid Point	86.9	Class A,B	1999	
	524R	Minor drainages to Muscongus Bay, including Meduncook River to Pemaquid Point	13.3	Class B	Evaluated	
ME0105000302	524R01	Unnamed Brook (N. Cushing)	0.5	Class B	2007	Previously category 3. OBD removal complete.
	526R	Minor drainages to Muscongus Bay, including Meduncook River to Pemaquid Point	97.8	Class B	Evaluated	
ME0105000303	526R	Minor drainages entering tidewater into Johns Bay	46.9	Class B	Evaluated	
ME0105000304 *	527R	Damariscotta Lake outlet and its tributaries entering above tidewater	30.8	Class B	Evaluated	
ME0105000304	527R01	Damariscotta River below lake outlet	0.2	Class B		Previously 4-C listed. New hydropower permit.
	526R	Minor drainages entering tidewater of Damariscotta River	40.3	Class B	Evaluated	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
	529R	Minor drainages entering tidewater of Damariscotta River	7.1	Class B	Evaluated	
ME0105000305 *	528R*	Sheepscot R and its tributaries	186.3	Class AA,A,B	2003	
	529R	Minor drainages entering tidewater of Sheepscot River	82.6	Class B	2003	
ME0105000306	529R	Minor drainages entering tidewater of Sheepscot Bay	93.8	Class B	2000	
	530R	Minor drainages entering tidewater of Sheepscot Bay	50.5	Class B	Evaluated	
ME0105000307	530R	Minor drainages entering tidewater of Kennebec Estuary below the Chops	133.4	Class B	Evaluated	
ME0106000101 *	605R	Crooked R and its tributaries	173.6	Class AA,A,B	2001	
	606R	Sebago Lake and its tributaries	256.7	Class A	2001	
ME0106000102 *	603R	Royal R and its tributaries	131.9	Class A,B	2000	
	603R03	Eddy Brook (New Gloucester)	3.7	Class B	2001	
	603R04	Hatchery Brook (Gray)	0.9	Class B	2001	
ME0106000103 *	607R	Tributaries of Presumpscot R entering below outlet of Sebago L	267.6	Class B	2000	
	608R*	Presumpscot R, main stem, above Dundee Dam	4.2	Class A	2000	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0106000106 *	601R	Minor drainages entering tidewater in Sagadhoc County west of Small Point	26.7	Class B	Evaluated	
	602R*	Minor drainages entering tidewater between Cumberland-Sagadahoc line and Royal River	94.5	Class B	2001	
	604R	Minor drainages entering tidewater between Royal River and Presumpscot River	9.8	Class B,C	2000	
	611R*	Minor drainages entering tidewater in Cumberland County between Fore River and Scarborough R	36.5	Class B,C	2003	
	612R	Minor drainages entering tidewater in York County east of Saco River	10.2	Class B,C	2001	
ME0106000203 *	613R	Minor tributaries of Saco R entering above Swans Falls	1.5	Class A	Evaluated	
	618R	Saco R, main stem, between the Maine-New Hampshire border and Swans Falls	5.4	Class AA,A	2003	
ME0106000204	613R	Minor tributaries of Saco R between Swans Falls and Rt 160 in Brownfield	209.7	Class A	2003	
	618R	Saco R, main stem, between Swans Falls and Rt 160 in Brownfield	27.5	Class AA,A	2003	
ME0106000205	613R	Minor tributaries of Saco R between Rt 160 in Brownfield and Ossippee River	116.4	Class A	2003	
	618R	Saco R, main stem, between Rt 160 in Brownfield and Ossippee River	15.0	Class AA,A	2003	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0106000209	614R	Ossipee R and its tributaries	105.4	Class B	2001	
ME0106000210 *	615R	Little Ossippee R and its tributaries	266.2	Class B	2001	
ME0106000211 *	613R	Minor tributaries of Saco R between the Ossippee River and Little Ossippee River	75.6	Class B	Evaluated	
	616R	Minor tributaries of Saco R between Little Ossippee River and tidewater	214.7	Class B	2000	
ME0106000211	616R01	Deep Brook (Saco)	2.5	Class B	2000	Previously 5-A listed. New data in attainment.
	617R	Minor tributaries of Saco River Estuary entering tidewater between head of tide and Camp Ellis	12.0	Class B,C	Evaluated	
	618R	Saco R, main stem, between the Ossippee River and Little Ossippee River	14.7	Class AA,A	2003	
	619R	Saco R, main stem, between the Little Ossippee River and tidewater	24.1	Class AA	2003	
	619R02	Saco River (Dayton)	0.2	Class A,B	2002	
	619R03	Saco River (West Buxton)	0.2	Class A	2002	
	619R04	Saco River (Bar Mills)	0.2	Class A	2002	
ME0106000301 *	622R	Kennebunk R and its tributaries	88.8	Class B	2000	

Category 2: Rivers and Streams Attaining Some Designated Uses - Insufficient Information for Other Uses

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	COMMENTS
ME0106000302 *	623R	Mousam R, main stem, above Rt. 224 bridge in Sanford and all tributaries to the entire main stem	164.9	Class B	2000	
ME0106000303 *	621R	Minor drainages entering tidewater between Saco River and Kennebunk River	37.4	Class B,C	Evaluated	
	624R	Minor drainages entering tidewater between Mousam River and the Ogunquit-York boundary	98.8	Class B	2000	
	626R	Minor drainages entering tide water between Ogunquit-York boundary and Piscataqua Estuary	99.6	Class B	2000	
	626R01	Smelt Brook (York)	3.2	Class B	2001	
ME0106000304 *	625R*	Great Works R, main stem, above Rt. 9 bridge in N Berwick and all tributaries	137.3	Class B	2000	
	629R	Great Works R, main stem, below Rt. 9 bridge in N Berwick	15.2	Class B	2000	
ME0106000305 *	627R	Minor tributaries of Salmon Falls River	155.8	Class B	Evaluated	
ME0106000310	626R	Minor drainages entering tide water of the Piscataqua Estuary	36.2	Class B	Evaluated	
ME0106000305 *	630R	Salmon Falls R, main stem, from Great East Lake to tidewater	22.2	Class B,C	1999	
		Total Miles	**25,414.1**			

* asterisk denotes additional segments of the assessment unit can be found in Categories 3, 4, or 5.

Category 3: Rivers and Streams with Insufficient Data or Information to Determine if Designated Uses are Attained

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	EXPECTED SAMPLING DATE	COMMENTS
ME0102000511	225R01	Souadabscook Stream, main stem below Hammond Pd	5.5	Class AA,A	2005	Eutrophic lake source, (Hermon Pd TMDL required). Data inconclusive for river segment
ME0102000512	228R01	Unnamed Brook (Frankfort)	1.0	Class B	2006	Potential sources for impairment, inconclusive data.
ME0103000305	316R01	Barker Stream (Farmington)	8.2	Class B	2007	Errors or inconsistencies in the original data. Limited new data indicates attainment.
ME0103000305	316R03	Tannery Brook (Farmington)	1.5	Class B	2007	Potential sources for impairment unknown, inconclusive data.
ME0103000305	317R01	Meadow Brook (Wilton)	3.4	Class B	2007	Potential sources for impairment unknown, inconclusive data.
ME0103000306	314R01	Wesserunsett Stream at Athens	2.7	Class B	2007	Errors or inconsistencies in the data.
ME0103000306	320R01	Carrabassett Stream (Canaan, Skowhegan)	19.9	Class B	2007	Errors or inconsistencies in the data.
ME0103000306	339R	Kennebec R, main stem, from Fairfield-Skowhegan boundary to Shawmut Dam	5.5	Class C	2004	Insufficient data.
ME0103000309	328R01	China Lake Outlet (Vassalboro)	4.3	Class B	2008	2002 Aquatic Life assessment in attainment. NPS controls. Improved lake condition. Facility compliance review recommended.

Category 3: Rivers and Streams with Insufficient Data or Information to Determine if Designated Uses are Attained

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	EXPECTED SAMPLING DATE	COMMENTS
ME0103000309	329R02	Twelvemile Brook (Clinton)	3.0	Class B	2007	Errors or inconsistencies in the data.
ME0103000309	329R03	Unnamed stream (Benton)	2.0	Class B	2007	Potential sources for impairment unknown, inconclusive data.
ME0103000309	329R04	Farnham Brook (Pittsfield)	3.0	Class B	2007	Potential sources for impairment unknown, inconclusive data.
ME0103000311	334R01	Mud Mills Stream (Monmouth)	10.5	Class B	2007	Errors or inconsistencies in the data.
ME0103000311	334R02	Potters Brook (Litchfield)	4.2	Class B	2007	Errors or inconsistencies in the data.
ME0103000312	420R01	Abagadasset River (Richmond, Bowdoinham)	13.3	Class B	2007	Errors or inconsistencies in the data.
ME0103000312	335R01	Kimball Brook (Pittston)	3.4	Class B	2007	Errors or inconsistencies in the data.
ME0105000108	503R01	Unnamed stream (Calais)	1.0	Class B	2006	Potential sources for impairment unknown, inconclusive data.
ME0105000213	519R	Union R, main stem (Ellsworth)	2.9	Class B,C	2006	Potential sources for impairment unknown, insufficient data.
ME0104000202		Sunday River (Newry, Bethel)		Class A	2003	Potential sources for impairment, inconclusive data.
ME0104000205	410R01	Spears Stream (Peru)	9.8	Class B	2003	Potential sources for impairment unknown, inconclusive data.

Category 3: Rivers and Streams with Insufficient Data or Information to Determine if Designated Uses are Attained

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	EXPECTED SAMPLING DATE	COMMENTS
ME0104000207	412R01	Nezinscot River at Buckfield	4.0	Class B	2003	Potential sources for impairment, recent data provides conflicting status.
ME0104000207	412R03	Nezinscot River at Turner	2.0	Class B	2003	Potential sources for impairment, inconclusive data.
ME0104000209	415R01	Davis Brook (Poland)	1.0	Class B	2003	Errors or inconsistencies in the data.
ME0104000209	414R02	Penneseeewassee Lake Outlet	1.2	Class B	2008	New information inconclusive.
ME0105000108	505R01	Woodland Impoundment	5.5	Class C	2004	Insufficient data.
ME0106000104	611R	Tributaries of the Scarborough River and Scarborough Marsh	100.0	Class B,C	2005	Potential sources for impairment, insufficient data.
ME0106000105	610R	Stroudwater River and minor drainages of the Fore River	50.5	Class B,C	2005	Potential sources for impairment, insufficient data.
		Total Miles	**269.2**			

Category 4-A: Rivers and Streams with Impaired Use, TMDL Completed

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	IMPAIRED USE	TMDL APPROVED	COMMENTS
ME0101000412	140R03	Presque Isle Stream at Presque Isle	1.0	Class B	Aquatic Life	2000	
ME0101000504	152R01	Meduxnekeag River below confluence with S Branch	11.0	Class B	Aquatic Life	2001	
ME0103000311	334R05	Cobbossee Stream (Gardiner)	1.5	Class B	Aquatic life	2004	Completed as part of Pleasant Pond TMDL
ME0106000103	609R	Presumpscot R, main stem, below Sacarappa Dam	6.9	Class C	Aquatic Life	1998	Closure of pulp mill. Final assessment incomplete. Probable attainment.
ME0106000106	612R01	Goosefare Brook	6.1	Class B	Aquatic Life	2003	Principal sources include urban NPS
ME0106000302	628R	Mousam R, main stem, below Rt. 224 bridge in Sanford	20.5	Class B,C	Aquatic Life	2001	
ME0106000305	630R	Salmon Falls R, main stem, Berwick to S Berwick	5.0	Class B,C	Aquatic Life	1999	Also listed in 5-A for fish consumption
		Total Miles	**52.0**				

Category 4-B-1: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	SAMPLED DATE	IMPAIRED USE	COMMENTS
ME0101000412	140R01	Presque Isle Stream between Mapleton and Presque Isle	11.5	Class B	2000	Aquatic life	Previously 5-A listed. Removal of Mapleton POTW complete. Probable attainment.
ME0101000413	145R01	Little Madawaska River and tributaries including Green Pond and Chapman Pit	20.5	Class B	2001	Fishing (Consumption)	Haz waste remediation project (Superfund)
ME0101000413	145R02	Greenlaw Stream	17.1	Class B	2001	Fishing (Consumption)	Haz waste remediation project (Superfund)
ME0102000506	232R	Penobscot R, main stem, from Piscataquis R to Orson Is	36.5	Class B	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0102000509	233R	Penobscot R, main stem, from Orson Is to Veazie Dam	14.5	Class B	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.

Category 4-B-1: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	SAMPLED DATE	IMPAIRED USE	COMMENTS
ME0102000513	234R02	Penobscot, main stem, Veazie Dam to Reed Bk	10.1	Class B	2001	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0103000306	338R	Kennebec R, main stem, from Carrabassett R to Fairfield- Skowhegan boundary	22.8	Class B	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0103000306	339R	Kennebec R, main stem, from Fairfield-Skowhegan boundary to Sebasticook R	14.7	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0103000308	325R01	East Branch Sebasticook River Corundel Pd to Sebasticook L	4.5	Class C	2003	Fishing (Consumption)	Haz waste remediation project (Superfund). CSO removal. New wastewater permit, removal to land treatment in 2004. Segment attains aquatic life criteria (2003 data).

Category 4-B-1: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	SAMPLED DATE	IMPAIRED USE	COMMENTS
ME0103000312	339R	Kennebec R, main stem, from Sebasticook R to Augusta (Curran Bridge)	17.7	Class B	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0103000312	340R	Kennebec R, main stem, from Augusta (Curran bridge) to Merrymeeting Bay (Chops)	30.5	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0103000312	427R	Merrymeeting Bay, including tidal portions of tributaries from the Androscoggin R to The Chops	3.4	Class B	2001	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.

Category 4-B-1: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	SAMPLED DATE	IMPAIRED USE	COMMENTS
ME0104000201	421R	Androscoggin R, main stem, from Maine-NH border to Wild R	2.4	Class B	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0104000202	421R	Androscoggin R, main stem, above Rumford Point	31.0	Class B	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0104000204	421R	Androscoggin R, main stem, from Rumford Pt to Virginia Bridge	11.0	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.

Category 4-B-1: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	SAMPLED DATE	IMPAIRED USE	COMMENTS
ME0104000204	422R	Androscoggin R, main stem, from Virginia bridge to Webb R	6.8	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0104000205	422R	Androscoggin R, main stem, Webb R to Riley dam	15.7	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0104000206	423R	Androscoggin R, main stem, from Riley Dam to Nezinscot R	21.7	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0104000207	412R02	House/Lively Brook	3.5	Class B	1997	Aquatic life	Waste (manure) removal (Agric NPS) by Consent Order and Site Permit

Category 4-B-1: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	SAMPLED DATE	IMPAIRED USE	COMMENTS
ME0104000208	424R	Androscoggin R, main stem, from confluence of Nezinscot R toGreat Falls in Little Androscoggin R	15.5	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0104000210	425R	Androscoggin R, main stem, from L Androscoggin R to Brunswick Dam	22.2	Class C	2003	Fishing (Consumption)	Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
	426R	Androscoggin R, main stem, from Brunswick Dam to Brunswick-Bath boundary	8.5	Class C	Evaluated	Fishing (Consumption)	Category 2 (in error) of 2002 integrated listing. Dioxin license limits in 38 MRSA Section 420. Compliance is measured by (1) no detection of dioxin in any internal waste stream (at 10 pg/l detection limit), (2) no detection in fish tissue sampled below a mill's outfall greater than upstream reference.
ME0105000201	507R01	Dennys River, Meddybemps L to Dead Str	4.5	Class AA	2001	Aquatic life Fishing (Consumption)	Haz waste remediation project (Superfund)
		Total Miles	**346.5**				

Category 4-C: Rivers and Streams with Impairment not Caused by a Pollutant

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	IMPAIRED USE	COMMENTS
ME0102000103	201R	West Branch of Penobscot R below Seboomook Lake	1.0	Class A,B	Aquatic life	Flow modified for hydropower. New hydro certification pending.
ME0102000109	205R	West Branch Penobscot R, main stem, below outlet of Quakish L	4.2	Class C	Aquatic life Navigation	Flow diversion - modified for hydropower.
ME0102000513	227R02	Silver Lake Outlet	1.3	Class B	Aquatic life	Water withdrawal.
ME0103000204	311R	Dead R, main stem	1.0	Class AA,A	Aquatic life	Flow modified for hydropower. New hydro certification pending.
ME0103000306	338R	Kennebec R, main stem, between Mill Str (Norridgewock) and Weston Dam	5.0	Class B	Aquatic life	Impounded water
ME0103000308	332R	Sebasticcok R, main stem, from E and W Branches to Burnham (bridge)	8.6	Class C	Aquatic life	Impounded water. New hydro certification pending.
ME0103000309	332R01	Sebasticook River (Halifax impoundment)	2	Class C	Aquatic life	Impounded water. Dam removal decision pending.
ME0106000103	608R01	Presumpscot River, Dundee Dam to Sacarrappa Dam	16.1	Class A,B,C	Aquatic life	Impoundments. Draft water quality certificate.
ME0106000203	613R01	Wards Brook (Fryeburg)	1.5	Class C	Aquatic life	Impounded water
		Total Miles	**40.8**			

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0101000105	103R01	Shields Branch of Big Black R, mainstem	11.0	Class AA	2003	Recreation Aquatic life	Bacteria Dissolved oxygen	Municipal PS (Canadian)	2012
ME0101000303	124R01	Dickey Brook	26.0	Class B	2000	Aquatic life	Dissolved oxygen Nutrients	Agric NPS Water withdrawal	2008
ME0101000303	124R02	Daigle Brook	8.5	Class B	2000	Aquatic life	Dissolved oxygen Nutrients	Agric NPS	2008
ME0101000412	140R02	Dudley Brook (Chapman)	4.7	Class A	1999	Aquatic life	Aq life criteria	Agric NPS	2012
ME0101000413	142R01	Caribou Stream (Caribou)	2.0	Class B	1999	Aquatic life	Aq life criteria	Urban NPS, Habitat	2012
ME0101000413	143R01	Everett Brook (Ft. Fairfield)	3.4	Class B	Evaluated	Aquatic life	Dissolved oxygen	Agric NPS	2012
ME0101000501	149R01	Prestile Stream above dam in Mars Hill	14.5	Class A	2000	Aquatic life, Fishing (consumption)	Dissolved oxygen, Aquatic life criteria, Nutrients, DDT	Agric NPS, Eutrophic lake source	2006
ME0102000110	205R03	Millinocket Stream (Millinocket)	3.2	Class C	Evaluated	Recreation	Bacteria	NPS (unspecified)	2008
ME0102000403	215R01	Sebec River at Milo above confluence with Piscataquis R	1.5	Class B	2000	Aquatic life	Aq life criteria	Gen Dev NPS, CSO	2008
ME0102000402	219R01	Piscataquis R, main stem, below Dover Foxcroft	12.0	Class B	2000	Aquatic life	Dissolved oxygen	Agric NPS, Municipal PS, CSO	2006
ME0102000502	220R	Mattanawcook Stream (Lincoln)	1.2	Class C	2003	Aquatic life Recreation	Dissolved oxygen Bacteria	Industrial NPS, Urban NPS	2012
ME0102000502	230R	Penobscot R, main stem, from Mattawamkeag R to Cambolassee Str	16.0	Class B	2003	Aquatic life	Aq life criteria Dissolved oxygen Nutrients	Industrial PS, Municipal PS	2006

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0102000502	231R	Penobscot R, main stem, from Cambolasse Str to Piscataquis R	20.5	Class B,C	2003	Aquatic life Fishing (Consumption)	Aq life criteria Dissolved oxygen Nutrients Dioxin	Industrial PS, Municipal PS	2006
ME0102000503	221R01	Cold Stream (Enfield) downstream of hatchery	1.0	Class A	2001	Aquatic life	Aq life criteria	Aquaculture PS	2006
ME0102000506	222R01	Costigan Str (Costigan)	1.2	Class B	1999	Aquatic life Recreation	Dissolved oxygen Bacteria	Unknown (untreated waste?)	2012
ME0102000509	226R03	Penjajawoc Stream (Bangor) Meadow Bk (Bangor)	6.3	Class B	2001	Aquatic life (Meadow Bk - Threatened)	Aq life criteria Dissolved oxygen	Urban NPS, Habitat	2006
ME0102000510	224R01	Burnham Brook (Garland)	3.7	Class B	1999	Aquatic life	Dissolved oxygen	NPS (unspecified)	2012
ME0102000510	224R03	French Stream (Exeter)	10.2	Class B	1999	Aquatic life	Aq life criteria	Agric NPS	2012
ME0102000510	224R04	Birch Stream (Bangor)	0.5	Class B	2003	Aquatic life	Aq life criteria	Urban NPS (Airport runoff, de-icing)	2006
ME0102000510	224R05	Unnamed (Pushaw) Stream (Bangor)	0.5	Class B	2001	Aquatic life	Aq life criteria	Urban NPS	2006
ME0102000510	224R06	Arctic Brook (near Valley Ave Bangor)	0.5	Class B	1997	Aquatic life	Aq life criteria	Urban NPS	2006
ME0102000511	225R01	Shaw Brook (Bangor, Hampden)	5.5	Class B	2001	Aquatic life	Aq life criteria	Urban NPS	2006
ME0102000511	225R02	Unnamed Stream (Hampden) 44.77326/68.79467	1.0	Class B	2002	Aquatic life	Aq life criteria	GenDev NPS	2012

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0103000304	313R01	Mill Stream (Embden)	2.0	Class B	2000	Aquatic life	Aq life criteria	Aquaculture PS	2006
ME0103000305	319R	Sandy R, main stem, segment below Farmington WWTP	3.0	Class B	2000	Aquatic life	Aq life criteria	Municipal PS	2006
ME0103000305	315R	Unnamed tributary to Sandy River 44.79788/70.31753	0.5	Class B	2002	Aquatic life	Aq life criteria	Aquaculture PS	2006
ME0103000306	314R02	Cold Stream (Skowhegan)	5.4	Class B	2002	Aquatic life	Aq life criteria	Gen Dev NPS	2006
ME0103000306	320R04	Mill Stream (Norridgewock)	6.5	Class B	2002	Aquatic life	Aq life criteria	Waste disposal, habitat	2008
ME0103000306	320R03	Whitten Brook (Skowhegan)	1.0	Class B	2002	Recreation Aquatic life	Bacteria, Aquatic life criteria	Urban NPS	2006
ME0103000307	330R	W Branch of Sebasticook R, main stem, below Rt. 23 bridge in Hartland	14.8	Class C	2001	Fishing (Consumption)	Dioxin, PCBs (toxic sources removed - Superfund)	Munic/Ind PS	2008
ME0103000308	331R	E Branch of Sebasticook R, main stem, below Sebasticook Lake	9.0	Class C	1998	Aquatic life Fishing (Consumption)	Dissolved oxygen Dioxin, PCBs (toxic sources removed - Superfund)	Eutrophic lake source, Agric NPS, NPS (unspecified)	2008 (Lake TMDL complete)
ME0103000308	325R02	Brackett Brook (Palmyra)	2.0	Class B	Evaluated	Aquatic life	Dissolved oxygen	NPS (unspecified)	2012
ME0103000308	325R03	Mulligan Stream (St. Albans)	3.7	Class B	Evaluated	Aquatic life	Dissolved oxygen	NPS (unspecified)	2006

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0103000309	332R	Sebasticook River, main stem, below confluence of E and W Branches	18.0	Class C	2000	Aquatic life Fishing (Consumption)	Dissolved oxygen, Nutrients, Dioxin, PCBs	Munic/Ind PS, Impounded water	2008
ME0103000309	327R01	Mill Stream (Albion)	2.3	Class B	Evaluated	Aquatic life	Dissolved oxygen	Agric NPS	2012
ME0103000310	322R01	Fish Brook (Fairfield)	4.9	Class B	2001	Aquatic life	Aq life criteria	Agric NPS, Habitat	Draft
ME0103000311	334R03	Jock Stream (Wales)	4.8	Class B	2001	Aquatic life	Dissolved oxygen Nutrients	Agric NPS	2006
ME0103000311	334R04	Mill Stream (Winthrop)	1.4	Class B	Evaluated	Aquatic life	Aq life criteria	Urban NPS, Habitat	2006
ME0103000312	333R04	Unnamed tributary to Bond Brook (Augusta) entering below I-95	2.0	Class B	2002	Aquatic life	Aq life criteria	Urban NPS	2006
ME0103000312	335R01	Meadow Brook (Farmingdale)	1.0	Class B	2002	Aquatic life	Aq life criteria	GenDev NPS	2012
ME0103000312	420R01	Unnamed tributary to Androscoggin R (near River Rd. Brunswick) 43.91538/69.98089	0.5	Class B	2002	Aquatic life	Aq life criteria	Urban NPS	2012
ME0103000312	420R02	Unnamed tributary to Androscoggin R (near Water St. Brunswick) 43.92167/69.95586	0.5	Class B	2002	Aquatic life	Aq life criteria	Urban NPS	2012

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0103000312	420R03	Unnamed tributary to Androscoggin R (near Jordan Ave., Brunswick) 43.91077/69.94130	0.5	Class B	2002	Aquatic life	Aq life criteria	Urban NPS	2012
ME0103000312	420R04	Unnamed tributary to Androscoggin R (near Topsham Mall, Topsham) 43.92470/69.95027	0.5	Class B	2002	Aquatic life	Aq life criteria	Urban NPS	2012
ME0105000209	512R	Great Falls Branch, Schoodic Stream (Deblois)	2.0	Class A	2002	Aquatic life	Aq life criteria	Agric NPS	2012
ME0105000213	514R	Card Brook (Ellsworth)	0.6	Class B	2003	Aquatic life Recreation	Dissolved oxygen Bacteria	NPS (unspecified)	2012
ME0105000217	520R01	Carleton Stream (Blue Hill)	1.3	Class C	2000	Aquatic life	Aq life criteria, Metals	Mine waste	Draft
ME0105000218	521R01	Warren Brook (Belfast)	6.3	Class B	Evaluated	Aquatic life	Dissolved oxygen	NPS (unspecified)	2012
ME0105000305	528R02	West Branch Sheepscot River below Halls Corner	4.0	Class AA	2003	Aquatic life	Dissolved oxygen	Agric NPS	2008
ME0105000305	528R08	Sheepscot River below Sheepscot L	4.0	Class B	2003	Aquatic life	Dissolved oxygen	Aquaculture PS	2006
ME0105000305	528R03	Dyer River below Rt 215	6.0	Class B	2003	Aquatic life Recreation	Dissolved oxygen Bacteria	Agric NPS	Draft
ME0105000305	528R04	Trout Brook (Alna)	2.3	Class B	2003	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008
ME0105000305	528R05	Meadow Bk (Whitefield)	5.0	Class B	2003	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0105000305	528R06	Carlton Bk (Whitefield)	2.8	Class B	2003	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008
ME0105000305	528R07	Choate Bk (Windsor)	1.3	Class B	2003	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008
ME0105000305	528R08	Chamberlain Bk (Whitefield)	2.0	Class B	2003	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008
ME0104000205	410R01	Whitney Brook (Canton)	2.0	Class B	1998	Aquatic life	Aq life criteria	NPS (unspecified)	2012
ME0104000208	423R	Androscoggin R, main stem, Livermore impoundment	1.0	Class C	2002	Aquatic life Fishing (Consumption)	Aquatic life criteria	Industrial PS	2006 (Fish consumption use addressed in 4-B-1)
ME0104000208	424R	Androscoggin R, main stem, upstream of the Gulf Island Dam	5.0	Class C	2001	Aquatic life Recreation Fishing (Fish consumption)	Dissolved oxygen, Transparency, Nutrients,	Industrial PS, Municipal PS, Impoundment, NPS (unspecified)	2006 (Fish consumption use addressed in 4-B-1)
ME0104000208	413R01	Jepson Brook (Lewiston)	3.0	Class B	Evaluated	Aquatic life Recreation	Dissolved oxygen Bacteria	Urban NPS, Habitat, CSO	2008
ME0104000208	413R02	Penley Brook (Auburn)	0.7	Class B	Evaluated	Aquatic life	Dissolved oxygen	NPS(unspecified), Habitat	2008
ME0104000208	413R03	Stetson Brook (Lewiston)	5.3	Class B	1998	Aquatic life Recreation	Dissolved oxygen Bacteria	Gen Dev NPS, Habitat	2008
ME0104000208	413R04	Logan Brook (Auburn)	1.0	Class B	Evaluated	Aquatic life Recreation	Dissolved oxygen Bacteria	Urban NPS, Habitat	2008

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0104000208	413R06	Goff Bk (Lewiston)	1.0	Class B	Evaluated	Aquatic life Recreation	Habitat, Bacteria	NPS(unspecified), Habitat	2008
ME0104000208	413R07	Gully Brook (Lewiston)	0.1	Class B	Evaluated	Aquatic life Recreation	Dissolved oxygen Bacteria	NPS(unspecified), Habitat, CSO	2008
ME0104000208	413R08	Bobbin Mill Brook (Lake Auburn Outlet, Auburn)	1.5	Class B	1998	Aquatic life	Aq life criteria	Urban NPS, Habitat	2008
ME0104000210	418R01	Sabattus River between Sabattus and Androscoggin R	12.0	Class C	2003	Aquatic life	Dissolved oxygen, Aquatic life criteria, Nutrients	Eutrophic lake source, Municipal PS, Agric NPS	Draft
ME0104000210	418R02	No Name Brook (Lewiston)	9.2	Class C	Evaluated	Aquatic life Recreation	Dissolved oxygen Bacteria	Gen Dev NPS	2008
ME0104000210	419R02	Dill Bk (Lewiston)	1.0	Class B	2003	Aquatic life	Aq life criteria	Urban NPS, Habitat	2008
ME0104000210	419R01	Unnamed stream (Lisbon Falls at Rt 196)	0.5	Class B	1998	Aquatic life	Aq life criteria	Urban NPS	2008
ME0106000101	605R01	Mile Brook (Casco)	2.0	Class B	2000	Aquatic life	Aq life criteria	Aquaculture PS	2006
ME0106000102	603R05	Royal River, segment below Collyer Bk	2.0	Class B	1996	Drinking water	AWQC	Haz waste	2012
ME0106000102	603R02	Chandler River including East Branch	29.0	Class B	2001	Aquatic life	Dissolved oxygen	NPS (unspecified)	2012
ME0106000102	603R06	Cole Brook (Gray)	2.0	Class B	2000	Aquatic life	Aq life criteria	Agric NPS	2012
ME0106000103	607R01	Black Brook (Windham)	5.6	Class B	1999	Aquatic life	Dissolved oxygen	Gen Dev NPS	2008

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0106000103	607R03	Colley Wright Brook (Windham)	7.6	Class B	1999	Aquatic life Recreation	Dissolved oxygen Bacteria	Gen Dev NPS	2008
ME0106000103	607R06	Hobbs Brook (Cumberland)	1.5	Class B	1999	Aquatic life Recreation	Dissolved oxygen Bacteria	Gen Dev NPS	2008
ME0106000103	607R07	Inkhorn Brook (Westbrook)	4.1	Class B	1999	Aquatic life Recreation	Dissolved oxygen Bacteria	Gen Dev NPS	2008
ME0106000103	607R08	Mosher Brook (Gorham)	1.8	Class B	1999	Aquatic life Recreation	Dissolved oxygen Bacteria	Gen Dev NPS	2008
ME0106000103	607R09	Otter Brook (Windham)	1.9	Class B	1999	Aquatic life Recreation	Dissolved oxygen Bacteria	Gen Dev NPS	2008
ME0106000103	607R10	Thayer Brook (Gray)	4.3	Class B	1999	Aquatic life	Dissolved oxygen	Agric NPS	2008
ME0106000103	607R11	Nasons Brook (Portland)	2.0	Class C	2002	Aquatic life	Aq life criteria	Urban NPS	2008
ME0106000103	607R12	Norton Brook (Falmouth)	1.0	Class B	2002	Aquatic life	Aq life criteria	Gen Dev NPS	2008
ME0106000104	611R02	Phillips Brook (Scarborough)	1.5	Class C	Evaluated	Aquatic life	Dissolved oxygen	Urban NPS	2008
ME0106000105	610R01	Capisic Brook (Portland)	3.0	Class C	2003	Aquatic life	Aq life criteria	Urban NPS, Habitat, CSO	2006
ME0106000105	610R02	Clark Brook (Westbrook)	1.2	Class C	1999	Aquatic life	Dissolved oxygen	Gen Dev NPS, Habitat	2012
ME0106000105	610R03	Long Creek (South Portland)	3.5	Class C	1999	Aquatic life	Aq life criteria	Urban NPS, Habitat	Draft
ME0106000105	610R04	Stroudwater River (South Portland, Westbrook)	14.1	Class B	Evaluated	Aquatic life	Dissolved oxygen	Gen Dev NPS	2012

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0106000105	610R05	Trout Brook (South Portland)	2.9	Class C	2003	Aquatic life	Aq life criteria	Urban NPS	2006
ME0106000105	610R06	Kimball Brook (South Portland)	1.5	Class C	1997	Aquatic life	Aq life criteria	Urban NPS	2012
ME0106000105	610R07	Red Brook (Scarborough, S Portland)	4.6	Class C	1999	Aquatic life Fishing (consumption)	Aq life criteria PCBs	Urban NPS, Waste disposal	2012
ME0106000105	610R08	Fall Bk (Portland)	2.5	Class C	1997	Aquatic life	Aq life criteria	Urban NPS, Habitat	2012
ME0106000105	610R09	Barberry Cr (South Portland)	1.0	Class C	2003	Aquatic life	Aq life criteria	Urban NPS	2006
ME0106000106	602R01	Frost Gully Brook (Freeport)	3.0	Class A	2000	Aquatic life Recreation	Dissolved oxygen Bacteria	Urban NPS	Draft
ME0106000106	602R02	Mare Brook (Brunswick)	3.1	Class B	2003	Aquatic life	Aq life criteria	Indus (military) NPS, Urban NPS	2008
ME0106000106	602R03	Concord Gully (Freeport)	1.0	Class B	2002	Aquatic life	Aq life criteria	Urban NPS	Draft
ME0106000210	615R01	Little Ossippee R, segment from Lake Arrowhead Dam to Saco River	10.0	Class B	2003	Aquatic life	Aq life criteria, Dissolved oxygen	NPS (unspecified)	2008
ME0106000210	615R02	Brown Brook (Limerick)	2.7	Class B	2000	Aquatic life	Aq life criteria	Urban NPS	2008
ME0106000211	616R	Wales Pond Brook (Hollis)	2.0	Class B	2003	Aquatic life	Aq life criteria	Aquaculture PS	2006
ME0106000303	624R01	Stevens Brook (Wells, Ogunquit)	1.5	Class B	2000	Aquatic life	Aq life criteria	GenDev NPS	2008

Category 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHEDULE
ME0106000304	625R01	Adams Brook (Berwick)	2.0	Class B	1995	Aquatic life	Aq life criteria	Agric NPS	2008
ME0106000304	625R	West Brook (N. Berwick)	2.0	Class B	2003	Aquatic life Drinking water	Dissolved oxygen AWQC	Industrial NPS, Haz waste, NPS (unspecified)	2012
ME0106000305	630R01	Salmon Falls R, main stem, from Route 9 to tidewater	5.0	Class B,C	1999, NH Bacteria data	Fishing (Consumption) Recreation	Dioxin, PCBs, Bacteria	Industrial PS, Municipal PS	2008
		Total Miles	**452.9**						

Category 5-B-1: Rivers and Streams Impaired Only by Bacteria Low Priority Recreational Waters

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)
ME0101000413	146R01	Webster Brook	12.1	Class B	Evaluated	Recreation	Bacteria	Unknown Untreated waste? NPS (unspecified)
ME0102000509	226R01	Otter Stream	6.3	Class B	1999	Recreation	Bacteria	Unknown Untreated waste? NPS (unspecified)
ME0102000509	226R02	Boynton Brook	2.6	Class B	1999	Recreation	Bacteria	Unknown Untreated waste? NPS (unspecified)
ME0102000510	224R02	Kenduskeag Stream	1.5	Class B,C	1999	Recreation	Bacteria	Unknown Untreated waste? NPS (unspecified)
ME0103000306	320R02	Currier Brook	3.2	Class B	Evaluated	Recreation	Bacteria	Urban NPS
ME0103000312	333R02	Whitney Brook (Augusta)	2.7	Class B	Evaluated	Recreation	Bacteria	Urban NPS
ME0105000203	508R02	Pottle Brook (Perry)	0.5	Class B	Evaluated	Recreation	Bacteria	Unknown Untreated waste? NPS (unspecified)
ME0105000220	522R01	Megunticook River (Camden)	3.6	Class B	Evaluated	Recreation	Bacteria	Urban NPS
ME0105000220	522R02	Unnamed Brook (Camden)	0.7	Class B	Evaluated	Recreation	Bacteria	Urban NPS
ME0105000220	522R03	Unnamed Brook (Rockport)	0.5	Class B	Evaluated	Recreation	Bacteria	Urban NPS
ME0105000220	522R04	Unnamed Brook (Rockland)	0.5	Class B	Evaluated	Recreation	Bacteria	Urban NPS

Category 5-B-1: Rivers and Streams Impaired Only by Bacteria Low Priority Recreational Waters

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)
ME0105000305	528R01	Sheepscot River at Alna	4.0	Class AA	2003	Recreation	Bacteria	Unknown Untreated waste? NPS (unspecified)
ME0106000103	607R04	Piscataqua River (Falmouth)	12.5	Class B	1999	Recreation	Bacteria	NPS (unspecified)
ME0106000103	607R11	Nason Brook (Gorham)	2.7	Class B	1999	Recreation	Bacteria	NPS (unspecified)
ME0106000106	616R04	Bear Bk	0.5	Class B	Evaluated	Recreation	Bacteria	Urban NPS, CSO
ME0106000204	618R01	Saco R, main stem, Swans Falls to Rt 5 (Fryeburg)	5.0	Class AA,A	2003	Recreation	Bacteria	NPS (unspecified)
ME0106000209	614R01	Ossippee R, mainstem below Kezar Falls	5.0	Class B	2003	Recreation	Bacteria	NPS (unspecified)
ME0106000211	616R02	Tappan Bk	0.5	Class B	Evaluated	Recreation	Bacteria	Urban NPS
ME0106000211	616R03	Sawyer Bk	0.5	Class B	Evaluated	Recreation	Bacteria	Urban NPS
ME0106000211	616R05	Thatcher Bk (Biddeford)	5.7	Class B	2003	Recreation	Bacteria	Urban NPS, CSO
ME0106000211	616R06	Swan Pond Brook at South Street (Biddeford)	1.0	Class B	2003	Recreation	Bacteria	NPS (unspecified)
ME0106000301	622R01	Kennebunk River	3.1	Class B	Evaluated	Recreation	Bacteria	Urban NPS
		Total Miles	**74.7**					

Category 5-B-2: Rivers and Streams Impaired by Bacteria from Combined Sewer Overflows

ASSESSMENT UNIT (HUC)	SEGMENT ID	LOCATION	PERMITTED FACILITY	# CSOs	GOAL (separation or partial)	ENFORCEMENT CONTROL (permit or consent decree, date)	COMMENTS
ME0101000121	117R	St. John River at Madawaska	Madawaska PCF	2	Separation	Permit, 2011	
ME0102000402	219R	Piscataquis River at Dover Foxcroft	Dover-Foxcroft WWTP	4	Separation	Permit, 2009	Also listed in 5-A
ME0102000403	215R	Sebec River at Milo	Milo WD	3	Separation	Permit, 2009	Also listed in 5-A
ME0102000509	233R	Penobscot River at Old Town-Milford	Old Town PCF	4	Partial w/ generic bypass	Permit, 2014	Also listed in 4-B-1
ME0102000509	233R	Penobscot River at Orono	Orono WPCF	1	Separation	Permit, 2012	Also listed in 4-B-1
ME0102000513	234R	Penobscot River at Bangor-Brewer including, Kenduskeag Stream	Bangor WWTP Brewer WWTP	19	Partial w/ generic bypass	Bangor Permit & AO 2013 Brewer Permit & AO	Also listed in 4-B-1 and 5-A (Kenduskeag)
ME0103000306	338R	Kennebec River at Skowhegan	Skowhegan WPCF	9	Partial w/ generic bypass	Permit, 2013	Also listed in 4-B-1
ME0103000306	338R	Kennebec River at Fairfield	Town of Fairfield	2	Separation	Permit, 2013	Also listed in 4-B-1
ME0103000312	339R	Kennebec River at Waterville	Kennebec STD	3	Separation	Permit, 2014	Also listed in 4-B-1
ME0103000312	340R	Kennebec River at Augusta, including Riggs Brook	Augusta SD	24	Partial w/ generic bypass	Permit & AO, 2013	Also listed in 4-B-1
ME0103000312	340R	Kennebec River at Hallowell	Hallowell WD	1	Separation	Permit, 2008	Also listed in 4-B-1

Category 5-B-2: Rivers and Streams Impaired by Bacteria from Combined Sewer Overflows

ASSESSMENT UNIT (HUC)	SEGMENT ID	LOCATION	PERMITTED FACILITY	# CSOs	GOAL (separation or partial)	ENFORCEMENT CONTROL (permit or consent decree, date)	COMMENTS
ME0103000312	340R	Kennebec River at Gardiner-Randolph	Gardiner WWTF, Town of Randolph	3	Partial w/ generic bypass	Permit, 2014	Also listed in 4-B-1
ME0104000209	417R	Little Androscoggin River at Mechanic Falls	Mechanic Falls SD	1	Separation	Permit, 2012	
ME0104000210	425R	Androscoggin River at Lewiston-Auburn, including Jepson Bk, Hart Bk and Gully Bk	Auburn SD L-A WPCA City of Lewiston	37	Partial w/ generic bypass	Permit and CD, 2017	Also listed in 4-B-1
ME0106000103	609R	Presumpscot River at Westbrook	Portland WD - Westbrook	5	Separation	Permit & AO, 2011	Also listed in 4-A
ME0106000106	612R01	Bear Brook, Saco	Saco WWTP	1	Separation	Permit & CD, 2011	Also listed in 5-B
ME0106000211	619R	Saco River at Biddeford-Saco, including Thatcher Bk	Saco WWTP Biddeford WWTF	10	Partial w/ generic bypass	Saco, Permit & CD Biddeford, Permit & AO, 2013	Also listed in 5-B
ME0106000302	628R	Mousam River at Sanford	Sanford SD	2	Separation	Permit, 2008	TMDL approved for other parameters

Estimate of affected river miles is not provided since it is highly variable depending on an overflow event.
Waters partially attain for recreation (bacteria) only unless listed elsewhere.

Category 5-C: Waters Impaired by Atmospheric Deposition of Mercury. Regional or National TMDL may be Required.

There is a statewide advisory for the consumption of fish taken from Maine's freshwaters. Thus, all freshwaters are listed in Category 5-C as partially supporting fishing (fish consumption). This advisory is due to elevated mercury presumed to be from atmospheric contamination and deposition.

The advisory is based on probability data that a stream, river, or lake may contain some fish that exceed the advisory action level. Any freshwater may contain both contaminated and uncontaminated fish depending on size, age and species occurrence in that water. A Regional or National TMDL may be required to eliminate the sources causing this impairment.

Category 5-D: Rivers and Streams Impaired by Legacy Pollutants

ASSESSMENT UNIT (HUC)	SEGMENT ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)
ME0101000412	140R03	N Br Presque Isle Stream	14.7	Class B	1999	Fishing (consumption)	DDT	Agric NPS
ME0101000501	149R	Minor tributaries to Prestile Stream above dam in Mars Hill	77.2	Class B	1999	Fishing (consumption)	DDT	Agric NPS
ME0101000501	150R	Prestile Str and tributaries entering below dam in Mars	95.6	Class B	1999	Fishing (consumption)	DDT	Agric NPS
ME0101000501	150R01	Prestile Stream below dam in Mars Hill	9.2	Class B	1999	Fishing (consumption)	DDT	Agric NPS
ME0101000504	152R01	Meduxnekeag River below confluence with S Branch	11.0	Class B	2001	Fishing (consumption)	DDT	Agric NPS
ME0102000404	216R01	W. Br. Pleasant R (KIW Twp)	1.0	Class AA,A	2000	Aquatic life	Iron	NPS - Abandoned mine (circa 1800s)
ME0102000404	216R01	Blood Bk (KIW Twp)	1.0	Class A	2000	Aquatic life	Iron	NPS - Abandoned mine (circa 1800s)
ME0105000209	512R02	McCoy Brook (Deblois)	1.0	Class B	Evaluated	Aquatic life	Aq life criteria, pH	NPS - Abandoned peat mining
		Total Miles	**210.6**					

Appendix III: Lakes

Category 1: Lake Waters Fully Attaining All Designated Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 1 (Acres)	# of Lakes within the HUC listed in Category 1	Last Sampling within the HUC in Category 1	Other listing categories having lakes within this HUC
ME	0101000101		Baker Branch St. John River	355.24	3383	89	2001	
ME	0101000102		Southwest Branch St. John River	354.42	191	30		
ME	0101000103		Northwest Branch St. John River	504.67	333	5	2000	
ME	0101000104		St. John River (1) at Gauging Station	127.53	211	25	2000	
ME	0101000105		Shields Branch Big Black River	162.98	2	1		
ME	0101000106		Big Black River	466.40	1178	14		
ME	0101000107		St. John River at Oullette Brook	384.74	2866	10		
ME	0101000108	*	Little Black River	261.73	38	4		2
ME	0101000109	*	St. John River above St. Francis	176.48	298	17	1999	2
ME	0101000110	*	St. Francis River	228.41	3289	9	1989	2
ME	0101000114	*	St. John River at Van Buren	64.98	8	1		2
ME	0101000201		Eagle Lake	169.18	11806	30	2003	
ME	0101000202		Heron Lake (Churchill)	129.00	5875	21	2003	
ME	0101000203		Chemquasabamticook Stream	214.54	3293	9	1989	
ME	0101000204		Long Lake	143.40	2436	10	2003	
ME	0101000205		Musquacook Stream	155.53	3889	20	1999	
ME	0101000206		Big Brook	100.88	708	11	2003	
ME	0101000207	*	Allagash River	320.93	2134	15	2003	2
ME	0101000301		Fish River Lake	128.98	3601	15	2001	
ME	0101000302	*	St. Froid Lake	273.95	1238	43	2003	2
ME	0101000303	*	Eagle Lake	353.06	1067	9	2003	2,5a
ME	0101000304	*	Fish River	133.44	107	4		2
ME	0101000401		Millimagasset Stream	108.59	5215	35	2003	
ME	0101000402		Munsungan Stream	120.15	2668	37	2003	

Category 1: Lake Waters Fully Attaining All Designated Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 1 (Acres)	# of Lakes within the HUC listed in Category 1	Last Sampling within the HUC in Category 1	Other listing categories having lakes within this HUC
ME	0101000403		Mooseleuk Stream	168.76	1600	24		
ME	0101000404	*	Umcolcus Stream	82.60	1244	10		2
ME	0101000405	*	St. Croix Lake	112.34	162	25		2
ME	0101000406		St. Croix Stream	126.48	273	17		
ME	0101000407	*	Aroostook River (1) at Masardis Gauging Station	175.93	43	6		2
ME	0101000409		Big Machias Lake	146.85	1542	14		
ME	0101000410		Machias River	182.46	395	10	1980	
ME	0101000411	*	Aroostook River (2) at Washburn Gauging Station	348.80	110	8		2
ME	0101000412	*	Aroostook River (3) at Caribou	289.41	41	2		2,5a
ME	0101000413	*	Aroostook River (4) at Mouth in Canada	499.04	92	2		2,3,4a,5a
ME	0101000501	*	Big Presque Isle Stream	232.18	5	2		2,5a
ME	0101000502	*	South Branch Meduxnekeag River	64.55	4	1		2
ME	0101000503	*	North Branch Meduxnekeag River	147.70	186	12	2001	2
ME	0102000101		North Branch Penobscot River	255.48	3529	59	2001	
ME	0102000102	*	Seeboomook Lake	266.80	2372	101	2001	2,4c
ME	0102000103	*	WEST Branch Penobscot River at Chesuncook Lake	314.76	5473	59	2001	2
ME	0102000104	*	Caucomgomok Lake	178.46	5130	58	2001	4c
ME	0102000105	*	Chesuncook Lake	404.77	32214	72	2001	4c
ME	0102000106		Nesowadnehunk Stream	66.56	1936	32	2003	
ME	0102000107		Nahamakanta Stream	103.18	4679	76	2003	
ME	0102000108		Jo-Mary Lake	83.50	6949	40	1999	
ME	0102000109	*	West Branch Penobscot River (3)	245.71	25876	105	2003	2
ME	0102000110	*	West Branch Penobscot River (4)	211.31	12365	66	1989	2
ME	0102000201	*	Webster Brook	289.69	21919	48	2001	2
ME	0102000202		Grand Lake Matagamon	200.84	6042	51	2003	

Category 1: Lake Waters Fully Attaining All Designated Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 1 (Acres)	# of Lakes within the HUC listed in Category 1	Last Sampling within the HUC in Category 1	Other listing categories having lakes within this HUC
ME	0102000203		East Branch Penobscot River (2)	89.69	913	43		
ME	0102000204	*	Seboeis River	268.31	6638	76	2003	2
ME	0102000205	*	East Branch Penobscot River (3)	269.47	1439	81	1999	2
ME	0102000301	*	West Branch Mattawamkeag River	368.52	129	9		2
ME	0102000302	*	East Branch Mattawamkeag River	165.95	45	1		2
ME	0102000304	*	Baskahegan Stream	233.60	824	4		2
ME	0102000305	*	Mattawamkeag River (2)	276.47	1358	5	1989	2
ME	0102000306	*	Molunkus Stream	233.59	766	8	1996	2
ME	0102000401	*	Piscataquis River (1)	264.05	282	16	1999	2
ME	0102000403	*	Sebec River	351.10	1372	37	1999	2
ME	0102000404	*	Pleasant River	339.32	4354	81	2003	2
ME	0102000405	*	Seboeis Stream	161.16	3812	24	2003	2
ME	0102000501	*	Penobscot River (1) at Mattawamkeag	161.07	941	6		2
ME	0102000502	*	Penobscot River (2) at West Enfield	298.20	1115	5	1989	2
ME	0102000503	*	Passadumkeag River	398.81	10851	27	2003	2
ME	0102000504	*	Olamon Stream	53.88	9	1		2
ME	0102000505	*	Sunkhaze Stream	94.65	68	13		2
ME	0102000508	*	Pushaw Stream	238.53	1014	2	1989	2
ME	0103000101		South Branch Moose River	68.34	171	14		
ME	0103000102	*	Moose River (2) above Attean Pond	180.94	2207	56	2003	2
ME	0103000103	*	Moose River (3) at Long Pond	307.30	1643	35	2003	2
ME	0103000104	*	Brassua Lake	157.53	473	27		4c
ME	0103000105	*	Moosehead Lake	549.00	4116	92	2003	2
ME	0103000106	*	Kennebec River (2) above The Forks	323.12	6404	120	2002	2
ME	0103000201	*	North Branch Dead River	200.89	2348	50	2001	2
ME	0103000202	*	South Branch Dead River	147.96	73	4		2
ME	0103000203	*	Flagstaff Lake	173.02	825	18	1986	2,4c

Category 1: Lake Waters Fully Attaining All Designated Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 1 (Acres)	# of Lakes within the HUC listed in Category 1	Last Sampling within the HUC in Category 1	Other listing categories having lakes within this HUC
ME	0103000204	*	Dead River	357.53	5691	190	1992	2
ME	0103000301	*	Kennebec River (4) at Wyman Dam	158.85	2344	22	2003	2
ME	0103000302	*	Austin Stream	89.87	297	11		2
ME	0103000303	*	Kennebec River (6)	110.29	87	9		2
ME	0103000304	*	Carrabassett River	396.83	398	19	1978	2
ME	0103000305	*	Sandy River	592.92	86	6	1996	2,5a
ME	0103000312	*	Kennebec River at Merrymeeting Bay	314.46	3	1		2,4a,5a
ME	0104000101	*	Mooselookmeguntic Lake	473.72	3283	36	2003	2
ME	0104000102	*	Umbagog Lake Drainage	122.05	759	7	2001	2
ME	0104000103	*	Aziscohos Lake Drainage	245.91	1606	33	2003	4c
ME	0104000202	*	Androscoggin River (2) at Rumford Point	308.23	27	3		2
ME	0104000203	*	Ellis River	164.26	29	2	2000	2
ME	0104000204	*	Ellis River	202.35	89	13		2
ME	0104000205	*	Androscoggin River (3) above Webb River	245.05	22	3	1987	2
ME	0104000209	*	Androscoggin River (6) above Little Androscoggin	353.10	6	1		2,3
ME	0105000101	*	Spednick Lake	411.52	291	1		2
ME	0105000102		St. Croix River (2) at Spednick Falls	216.84	778	6	1996	
ME	0105000103	*	West Grand Lake	224.54	4426	10	2003	2
ME	0105000104	*	Big Musquash Stream	114.17	412	3	2001	2
ME	0105000105	*	Big Lake at Peter Dana Point	121.07	1417	15	1999	2
ME	0105000106	*	Tomah Stream	153.03	233	8	1996	2
ME	0105000201	*	Dennys River	130.64	190	2		2
ME	0105000203	*	Grand Manan Channel	246.09	370	8		2
ME	0105000204	*	East Machias River	311.96	1357	11	2001	2
ME	0105000205	*	Machias River	498.35	11912	90	2003	2
ME	0105000208	*	Pleasant River	130.39	243	13	1992	2

Category 1: Lake Waters Fully Attaining All Designated Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 1 (Acres)	# of Lakes within the HUC listed in Category 1	Last Sampling within the HUC in Category 1	Other listing categories having lakes within this HUC
ME	0105000209	*	Narraguagus River	245.16	826	47	1990	2
ME	0105000210	*	Tunk Stream	48.41	1076	15	2003	2
ME	0105000212	*	Graham Lake	495.07	1908	20	2000	2,3,4c
ME	0105000214	*	Lamoine Coastal	256.14	180	11	2003	2
ME	0106000101	*	Sebago Lake	441.76	306	13	1999	2,3,5a
ME	0106000103	*	Presumpscot River	205.44	15	4		2,3,4a
ME	0106000105	*	Fore River	54.46	1	1		2
ME	0106000305	*	Salmon Falls River	242.91	150	1	1985	2,3
Totals within Category 1:					**285,023**	**2,854**		

* Lakes within this HUC can be found under other listing categories (see right column)

New Category 2 Lake Waters

HUC			Lake Name	Lake ID	Lake Area (Acres)	Comment	2002 Listing Category
ME	0101000303	*	BLACK L	1666	51	No longer supporting repeated nusiance blooms, readings to bottom, verified	3
ME	0101000412	*	HANSON BROOK L	9767	118	No longer supporting repeated nusiance blooms verified	3
ME	0102000511	*	ETNA P	2274	361	High color responsible for low transparencies verified	3
ME	0103000105	*	FITZGERALD P	269	550	No longer supporting repeated nusiance blooms, verified	3
ME	0103000309	*	PATTEE P	5458	712	Moderate color, no longer supporting repeated nusiance blooms, verified	3
ME	0103000310	*	HUTCHINS LAKE	8115	76	Watch list: trophic (high flushing rate; impoundment)	3
ME	0103000310	*	NORTH & LITTLE PDS	5344	2873	Not supporting repeated nusiance blooms, verified	3
ME	0103000310	*	FAIRBANKS P	5296	14	No longer supporting repeated nusiance blooms, verified	3
ME	0103000311	*	WILSON P	3832	582	Trend reversal verified (likely sinusoidal transparency cycle)	3
ME	0103000312	*	TOGUS P (LOWER)	5430	230	High color, no longer supporting repeated nusiance blooms, verified	3
ME	0104000101	*	RICHARDSON LAKES	3308	7100	FERC license drawdown magnitude reduced	4c
ME	0104000209	*	NORTH P	3500	175	Depth limited transparencies verified	3
ME	0105000301	*	HOBBS P	4806	264	Not supporting repeated nusiance blooms, verified	3
ME	0105000306	*	WEST HARBOR P	5372	84	Salt water intrustion causing low DO verified	3
ME	0106000303	*	SCITUATE P	5596	41	High color & shallow max. depth responsible for low transparencies	3
ME	0106000304	*	ELL (L) P	119	32	Not supporting repeated nusiance blooms, verified	3

Category 2: Lake Waters Attaining Some Designated Uses - Insufficient Information for Other Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 2 (Acres)	# of Lakes within the HUC listed in Category 2	Last Sampling within the HUC in Category 2	Other listing categories having lakes within this HUC
ME	0101000108	*	Little Black River	261.73	3	1		1
ME	0101000109	*	St. John River above St. Francis	176.48	41	4		1
ME	0101000110	*	St. Francis River	228.41	330	2		1
ME	0101000111		St. John River at Fort Kent	184.38	266	7	2000	
ME	0101000112		St. John River at Madawaska	310.29	3	1		
ME	0101000113		St. John River at Grand Isle	16.18	16	1		
ME	0101000114	*	St. John River at Van Buren	64.98	4	3		1
ME	0101000115		St. John River (11) at Hamlin	102.19	41	7		
ME	0101000116		St. John River (12) at Tobique River	0.41	19	1		
ME	0101000117		St. John River (13) at Woodstock NB	40.37	28	6		
ME	0101000121		Green and Big Rivers at Van Buren	948.13	11	6		
ME	0101000207	*	Allagash River	320.93	1	1		1
ME	0101000302	*	St. Froid Lake	273.95	4874	2	2003	1
ME	0101000303	*	Eagle Lake	353.06	20281	15	2003	1,5a
ME	0101000304	*	Fish River	133.44	792	18	2001	1
ME	0101000404	*	Umcolcus Stream	82.60	2	2		1
ME	0101000405	*	St. Croix Lake	112.34	416	1		1
ME	0101000407	*	Aroostook River (1) at Masardis Gauging Station	175.93	338	21		1
ME	0101000408	*	Squa Pan Stream	81.21	17	1		4c
ME	0101000411	*	Aroostook River (2) at Washburn Gauging Station	348.80	340	4		1
ME	0101000412	*	Aroostook River (3) at Caribou	289.41	352	15	2002	1,5a
ME	0101000413	*	Aroostook River (4) at Mouth in Canada	499.04	412	32		1,3,4a,5a
ME	0101000501	*	Big Presque Isle Stream	232.18	214	24	1982	1,5a
ME	0101000502	*	South Branch Meduxnekeag River	64.55	290	7		1

Category 2: Lake Waters Attaining Some Designated Uses - Insufficient Information for Other Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 2 (Acres)	# of Lakes within the HUC listed in Category 2	Last Sampling within the HUC in Category 2	Other listing categories having lakes within this HUC
ME	0101000503	*	North Branch Meduxnekeag River	147.70	138	10	1999	1
ME	0101000504		Meduxnekeag River at Woodstock NB	300.02	1868	45	2003	
ME	0102000102	*	Seeboomook Lake	266.80	12	2		1,4c
ME	0102000103	*	West Branch Penobscot River at Chesuncook Lake	314.76	22	1		1
ME	0102000109	*	West Branch Penobscot River (3)	245.71	8	2		1
ME	0102000110	*	West Branch Penobscot River (4)	211.31	554	5		1
ME	0102000201	*	Webster Brook	289.69	58	1		1
ME	0102000204	*	Seboeis River	268.31	1242	10	2001	1
ME	0102000205	*	East Branch Penobscot River (3)	269.47	7	1		1
ME	0102000301	*	West Branch Mattawamkeag River	368.52	5218	43	2003	1
ME	0102000302	*	East Branch Mattawamkeag River	165.95	2732	16	2003	1
ME	0102000303		Mattawamkeag River (1)	102.28	70	1	2003	
ME	0102000304	*	Baskahegan Stream	233.60	10280	6	2003	1
ME	0102000305	*	Mattawamkeag River (2)	276.47	443	12		1
ME	0102000306	*	Molunkus Stream	233.59	1591	13	1989	1
ME	0102000307		Mattawamkeag River (3)	127.82	804	14	1987	
ME	0102000401	*	Piscataquis River (1)	264.05	3406	46	2003	1
ME	0102000402		Piscataquis River (3)	178.58	1253	19	2003	
ME	0102000403	*	Sebec River	351.10	14497	64	2003	1
ME	0102000404	*	Pleasant River	339.32	14	4		1
ME	0102000405	*	Seboeis Stream	161.16	4445	14	1989	1
ME	0102000406		Piscataquis River (4)	164.69	7515	32	2002	
ME	0102000501	*	Penobscot River (1) at Mattawamkeag	161.07	928	8	1999	1
ME	0102000502	*	Penobscot River (2) at West Enfield	298.20	5581	17	2003	1
ME	0102000503	*	Passadumkeag River	398.81	8073	20	2003	1
ME	0102000504	*	Olamon Stream	53.88	318	3		1

Category 2: Lake Waters Attaining Some Designated Uses - Insufficient Information for Other Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 2 (Acres)	# of Lakes within the HUC listed in Category 2	Last Sampling within the HUC in Category 2	Other listing categories having lakes within this HUC
ME	0102000505	*	Sunkhaze Stream	94.65	4	1		1
ME	0102000506		Penobscot River (3) at Orson Island	112.65	6	4		
ME	0102000507		Birch Stream	54.55	103	3		
ME	0102000508	*	Pushaw Stream	238.53	6058	16	2003	1
ME	0102000509		Penobscot River (4) at Veazie Dam	140.50	2253	25	2003	
ME	0102000510		Kenduskeag Stream	191.28	174	5	2003	
ME	0102000511	*	Souadabscook Stream	177.79	645	12	2002	5a
ME	0102000512		Marsh River	168.72	438	20	2003	
ME	0102000513		Penobscot River (6)	290.37	6098	25	2003	
ME	0103000102	*	Moose River (2) above Attean Pond	180.94	19	1		1
ME	0103000103	*	Moose River (3) at Long Pond	307.30	9581	24	2003	1
ME	0103000105	*	Moosehead Lake	549.00	79454	12	2003	1
ME	0103000106	*	Kennebec River (2) above The Forks	323.12	3051	17	2003	1
ME	0103000201	*	North Branch Dead River	200.89	48	5		1
ME	0103000202	*	South Branch Dead River	147.96	657	10	2003	1
ME	0103000203	*	Flagstaff Lake	173.02	83	6		1,4c
ME	0103000204	*	Dead River	357.53	385	23	1977	1
ME	0103000301	*	Kennebec River (4) at Wyman Dam	158.85	4700	21	2003	1
ME	0103000302	*	Austin Stream	89.87	882	11		1
ME	0103000303	*	Kennebec River (6)	110.29	337	16		1
ME	0103000304	*	Carrabassett River	396.83	3615	42	2003	1
ME	0103000305	*	Sandy River	592.92	3741	88	2003	1,5a
ME	0103000306		Kennebec River at Waterville Dam	410.50	3280	43	2003	
ME	0103000307		Sebasticook River at Pittsfield	316.21	7012	28	2003	
ME	0103000308	*	Sebasticook River (3) at Burnham	266.25	2936	14	2003	4a
ME	0103000309	*	Sebasticook River (4) at Winslow	365.58	1898	47	2003	4a,5a
ME	0103000310	*	Messalonskee Stream	207.64	4739	49	2003	3,4a

Category 2: Lake Waters Attaining Some Designated Uses - Insufficient Information for Other Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 2 (Acres)	# of Lakes within the HUC listed in Category 2	Last Sampling within the HUC in Category 2	Other listing categories having lakes within this HUC
ME	0103000311	*	Cobbosseecontee Stream	216.27	5313	46	2003	3,4a,5a
ME	0103000312	*	Kennebec River at Merrymeeting Bay	314.46	1569	33	2003	1,4a,5a
ME	0104000101	*	Mooselookmeguntic Lake	473.72	32243	45	2003	1
ME	0104000102	*	Umbagog Lake Drainage	122.05	8353	4	2001	1
ME	0104000104		Magalloway River	195.10	650	9	1996	
ME	0104000106		Middle Androscoggin River	268.68	24	1		
ME	0104000201		Gorham-Shelburne Tributaries	154.72	7	1		
ME	0104000202	*	Androscoggin River (2) at Rumford Point	308.23	713	5	2003	1
ME	0104000203	*	Ellis River	164.26	1258	6	2003	1
ME	0104000204	*	Ellis River	202.35	108	11		1
ME	0104000205	*	Androscoggin River (3) above Webb River	245.05	3461	11	2003	1
ME	0104000206	*	Androscoggin River (4) at Riley Dam	203.85	5906	52	2003	3
ME	0104000207		Androscoggin River (5) at Nezinscot River	178.75	1743	29	2003	
ME	0104000208		Nezinscot River	83.22	3591	16	2003	
ME	0104000209	*	Androscoggin River (6) above Little Androscoggin	353.10	8862	56	2003	1,3
ME	0104000210	*	Little Androscoggin River	262.87	614	28	2003	5a
ME	0105000101	*	Spednick Lake	411.52	35904	10	2003	1
ME	0105000103	*	West Grand Lake	224.54	31174	22	2003	1
ME	0105000104	*	Big Musquash Stream	114.17	3218	10	2001	2
ME	0105000105	*	Big Lake at Peter Dana Point	121.07	10334	4	2001	1
ME	0105000106	*	Tomah Stream	153.03	239	7		1
ME	0105000107		St. Croix River (3) at Grand Falls	70.20	7627	4	1999	
ME	0105000108		St. Croix River (6) at Robbinston	323.71	2792	20	2003	
ME	0105000201	*	Dennys River	130.64	10294	5	2003	1
ME	0105000202		Pennamaquan River	54.40	2025	10		
ME	0105000203	*	Grand Manan Channel	246.09	3332	12	2003	1

Category 2: Lake Waters Attaining Some Designated Uses - Insufficient Information for Other Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 2 (Acres)	# of Lakes within the HUC listed in Category 2	Last Sampling within the HUC in Category 2	Other listing categories having lakes within this HUC
ME	0105000204	*	East Machias River	311.96	15289	26	2003	1
ME	0105000205	*	Machias River	498.35	1948	14	1997	1
ME	0105000206		Roque Bluffs Coastal	83.23	167	4	1983	
ME	0105000208	*	Pleasant River	130.39	1201	15	2003	1
ME	0105000209	*	Narraguagus River	245.16	2382	17	2003	1
ME	0105000210	*	Tunk Stream	48.41	2466	6	2000	1
ME	0105000211		Bois Bubert Coastal	75.62	53	6		
ME	0105000212	*	Graham Lake	495.07	18173	92	2003	1,3,4c
ME	0105000213		Union River Bay	126.78	4117	12	2003	
ME	0105000214	*	Lamoine Coastal	256.14	3300	51	2002	1
ME	0105000215		Mt. Desert Coastal	108.01	2626	44	2003	
ME	0105000216		Bagaduce River	81.92	1250	12	2003	
ME	0105000217		Stonington Coastal	140.00	1030	55	1999	
ME	0105000218		Belfast Bay	91.60	2254	25	2003	
ME	0105000219		Ducktrap River	33.17	993	16	2003	
ME	0105000220	*	West Penobscot Bay Coastal	162.70	1856	30	2002	3,5a
ME	0105000301		St. George River	278.44	8010	100	2003	
ME	0105000302		Medomak River	152.87	1554	38	2003	
ME	0105000303	*	Johns Bay	46.94	2473	14	2003	5a
ME	0105000304		Damariscotta River	115.51	4604	21	2003	
ME	0105000305		Sheepscot River	250.89	4582	56	2003	
ME	0105000306		Sheepscot Bay	113.16	514	36	2003	
ME	0105000307	*	Kennebec River Estuary	89.51	723	16	2003	5a
ME	0106000101	*	Sebago Lake	441.76	38152	71	2003	1,3,5a
ME	0106000102		Royal River	140.93	769	12	2003	
ME	0106000103	*	Presumpscot River	205.44	729	28	2003	1,3,4a
ME	0106000104		Scarborough River	53.72	10	3		

Category 2: Lake Waters Attaining Some Designated Uses - Insufficient Information for Other Uses

HUC			HUC Name	Total HUC Area (Sq. Miles)	Lake Area within the HUC listed in Category 2 (Acres)	# of Lakes within the HUC listed in Category 2	Last Sampling within the HUC in Category 2	Other listing categories having lakes within this HUC
ME	0106000105	*	Fore River	54.46	45	11		1
ME	0106000106		Casco Bay Coastal Drainages	170.01	368	32	1999	
ME	0106000204		Saco River-Lovewell Pond	566.22	7340	58	2003	
ME	0106000205		Saco River at Ossipee River	114.23	4180	49	2003	
ME	0106000209		Ossipee River	122.89	2052	31	2003	
ME	0106000210		Little Ossipee River	185.21	4287	73	2003	
ME	0106000211	*	Saco River at mouth	220.24	1069	41	2003	3
ME	0106000301	*	Kennebunk River	59.18	95	8	2002	3
ME	0106000302	*	Mousam River	116.97	1035	36	2003	3,4a,5a
ME	0106000303		South York County Coastal Drainages	155.09	594	37	2003	
ME	0106000304	*	Great Works River	86.67	482	21	2003	3
ME	0106000305	*	Salmon Falls River	242.91	2988	19	2003	1,3
ME	0106000310		Coastal Drainages-Portsmouth Harbor to Salisbury	65.19	39	8		
ME	CoastIslan		Coastal Islands not assigned to any HUC	0.00	6	4		
ME	SaltWater		Salt water bodies assigned a lake ID	0.00	16	2		
Totals within Category 2:					**569,540**	**2,866**		

* Lakes within this HUC can be found under other listing categories (see right column)

Category 3: Lake Waters with Insufficient Data or Information to Determine if Designated Uses are Attained

HUC			Lake Name	Lake ID	Lake Area (Acres)	Date of Last Visit; Year of Likely Next Visit		Comments	Other listing categories having lakes within this HUC	2002 Listing Category
ME	0101000413	*	FISCHER L	1808	10	Aug. 01	(04)	Watch list: trophic; flushes 55 times per year	1,2,4a,5a	3
ME	0103000310	*	MESSALONSKEE L	5280	3510	Aug. 03	(04)	Watch list: D.O. model	2,4a	3
ME	0103000310	*	LONG P	5272	2714	Oct. 03	(04)	Watch list: trophic & trend (regular *Gleotrichia* blooms)	2,4a	3
ME	0103000310	*	GREAT P	5274	8239	Oct. 03	(04)	Watch list: trophic & trend (regular *Gleotrichia* blooms)	2,4a	3
ME	0103000311	*	WOODBURY P	5240	436	Oct. 03	(04)	Watch list: D.O. model	2,4a,5a	3
ME	0104000206		ANDROSCOGGIN L	3836	3980	Sept. 03	(04)	Watch list: trophic	2	3
ME	0104000209	*	TAYLOR P	3750	625	Sep. 03	(04)	Watch list: D.O. model	1,2	3
ME	0104000209	*	TRIPP P	3758	768	Oct. 03	(04)	Watch list: D.O. model	1,2	3
ME	0105000212	*	ABRAMS P	4444	423	Aug. 03	(04)	Watch list: trophic & trend	1,2,4c	3
ME	0105000220	*	NORTON P	4850	133	Oct. 02	(04)	Watch list: D.O. model	2,5a	3
ME	0106000101	*	THOMAS P	3392	442	Oct. 03	(04)	Watch list: D.O. model	1,2,5a	3
ME	0106000101	*	BAY OF NAPLES	9685	762	Sept. 03	(04)	Watch list: D.O. model	1,2,5a	3
ME	0106000101	*	PAPOOSE P	3414	64	Sept. 03	(04)	Watch list: trophic	1,2,5a	3
ME	0106000103	*	SEBAGO L (LITTLE)	3714	1898	Oct. 03	(04)	Watch list: D.O. model	1,2,4a	3
ME	0106000211	*	WATCHIC P	5040	448	Sept. 03	(04)	Watch list: D.O. model	2	3
ME	0106000301	*	KENNEBUNK P	3998	224	Oct. 03	(04)	Watch list: D.O. model	2	3
ME	0106000302	*	SQUARE P	3916	910	Sep. 03	(04)	Watch list: D.O. model	2,4a	3
ME	0106000302	*	ESTES L	7	387	Aug. 03	(04)	Was on 2002 4b1 - now meets due to treatment upgrade; will verify 2004-2005	2,4a	4b1
ME	0106000304	*	LEIGH'S MILL P	117	37	Aug. 03	(04)	Watch list: trophic (high flushing rate 249/yr.; impoundment)	2	3
ME	0106000305	*	NORTHEAST P	3876	778	Aug. 01	(04)	Watch list: D.O. model	1,2	3

* Lakes within this HUC can be found under other listing categories (see column second in from right)

Category 4-A: Lake Waters with Impaired Use, TMDL Completed

HUC			Lake Name	Lake ID	Lake Area (Acres)	Date of Last Visit; Year of Likely Next Visit		TMDL Year approved by EPA (Impaired use)	Other listing categories having lakes within this HUC	2002 Listing Category
ME	0101000413	*	MADAWASKA L	1802	1526	Oct. 03	(04)	2000 (Primary contact)	1,2,3,5a	4a
ME	0103000308	*	SEBASTICOOK L	2264	4288	Sept. 03	(04)	2001 (Primary contact)	2	4a
ME	0103000309	*	CHINA L	5448	3845	Oct. 03	(04)	2001 (Primary contact)	2,5a	4a
ME	0103000310	*	EAST P	5349	1823	Sept. 03	(04)	2001 (Primary contact)	2,3	4a
ME	0103000311	*	ANNABESSACOOK LAKE	9961	1420	Nov. 03	(04)	2004 (Primary contact)	2,3,5a	5a
ME	0103000311	*	PLEASANT (MUD) POND	5254	746	Oct. 03	(04)	2004 (Primary contact)	2,3,5a	5a
ME	0103000311	*	COBBOSSEECONTEE L	5236	5543	Oct. 03	(04)	2000 (Primary contact)	2,3,5a	4a
ME	0103000312	*	THREECORNERED P	5424	182	Sept. 03	(04)	2003 (Primary contact)	1,2,5a	5a
ME	0103000312	*	THREEMILE P	5416	1162	Sept. 03	(04)	2003 (Primary contact)	1,2,5a	5a
ME	0103000312	*	WEBBER P	5408	1201	Aug. 03	(04)	2003 (Primary contact)	1,2,5a	5a
ME	0106000103	*	HIGHLAND (DUCK) L	3734	634	Sept. 03	(04)	2003 (Decl. Trend in Transp.)	1,2,3	5a
ME	0106000302	*	MOUSAM L	3838	900	Oct. 03	(04)	2003 (Decl. Trend in Transp.)	2,3	5a

* Lakes within this HUC can be found under other listing categories (see column second in from right)

Category 4-B-1: Lake Waters Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

No lakes are listed in Category 4-B-1in 2004

Category 4-C: Lake Waters with Impairment not Caused by a Pollutant

HUC			Lake Name	Lake ID	Lake Area (Acres)	Date of Last Visit; Year of Likely Next Visit		Comment (Impaired use)	Other listing categories having lakes within this HUC	2002 Listing Category
ME	0101000408	*	SQUAPAN L	1654	5120	Aug. 01	(06)	Delist: nonnpol. (Aquatic Life: draw down)	2	4c
ME	0102000102	*	CANADA FALLS L	2516	2627	Jul. 01	(04)	Delist: nonnpol. (Aquatic Life: draw down)	1,2	4c
ME	0102000102	*	SEBOOMOOK L	4048	6448	Jun. 01	(04)	Delist: nonnpol. (Aquatic Life: draw down)	1,2	4c
ME	0102000104	*	CAUCOMGOMOC L	4012	5081	Aug. 01	(06)	Delist: nonnpol. (Aquatic Life: draw down)	1	4c
ME	0102000105	*	RAGGED L	2936	2712	Jun. 01	(06)	Delist: nonnpol. (Aquatic Life: draw down)	1	4c
ME	0103000104	*	BRASSUA L	4120	8979	Aug. 96	(04)	Delist: nonnpol. (Aquatic Life: draw down)	1	4c
ME	0103000203	*	FLAGSTAFF L	38	20300		(04)	Delist: nonnpol. (Aquatic Life: draw down)	1,2	4c
ME	0104000103	*	AZISCOHOS L	3290	6700	Aug. 03	(06)	Delist: nonnpol. (Aquatic Life: draw down)	1	4c
ME	0105000212	*	GRAHAM L	4350	7865	Sep. 03	(06)	Delist: nonnpol. (Aquatic Life: draw down)	1,2,3	4c

* Lakes within this HUC can be found under other listing categories (see column second in from right)

Category 5-A: Lake Waters Needing TMDLs

HUC	Lake Name	Lake ID	Lake Area (Acres)	Date of Last Visit; Year of Likely Next Visit	Impaired Use	TMDL (Target Dates)	Priority **	Other listing categories having lakes within this HUC	2002 Listing Category
ME 0101000303 *	CROSS L	1674	2515	Oct. 03 (04)	Prim. Cont.	2005 - 2007	31	1,2	5a
ME 0101000303 *	DAIGLE P	1665	36	Aug. 03 (04)	Prim. Cont.	2005 - 2007	32	1,2	5a
ME 0101000412 *	ARNOLD BROOK L	409	395	Sept. 03 (04)	Prim. Cont.	2004 - 2006	28	1,2	5a
ME 0101000412 *	ECHO L	1776	90	Sept. 03 (04)	Prim. Cont.	2005 - 2007	29	1,2	5a
ME 0101000413 *	MONSON P	1820	160	Aug. 03 (04)	Prim. Cont.	2005 - 2007	33	1,2,3,4a	5a
ME 0101000413 *	TRAFTON L	9779	85	Sept. 03 (04)	Prim. Cont.	2004 - 2006	27	1,2,3,4a	5a
ME 0101000501 *	CHRISTINA RESERVOIR	9525	400	Sept. 03 (04)	Prim. Cont.	2005 - 2007	30	1,2	5a
ME 0102000511 *	HAMMOND P	2294	83	Aug. 03 (04)	Prim. Cont.	2004 - 2006	24	2	5a
ME 0102000511 *	HERMON P	2286	461	Aug. 03 (04)	Prim. Cont.	2004 - 2006	25	2	5a
ME 0103000305 *	TOOTHAKER P	2336	30	Oct. 03 (04)	Prim. Cont.	2002 - 2004	16	1,2	5a
ME 0103000309 *	LOVEJOY P	5176	324	Sept. 03 (04)	Prim. Cont.	2003 - 2005	22	2,4a	5a
ME 0103000309 *	UNITY P	5172	2528	Oct. 03 (04)	Prim. Cont.	2002 - 2004	15	2,4a	5a
ME 0103000311 *	COBBOSSEECONTEE (LT)	8065	75	Oct. 03 (04)	Prim. Cont.	2003 - 2005	18	2,3,4a	5a
ME 0103000311 *	NARROWS P (UPPER)	98	279	Oct. 03 (04)	Decl. Trend (DO)	2003 - 2005	17	2,3,4a	5a
ME 0103000312 *	TOGUS P	9931	660	Oct. 03 (04)	Prim. Cont.	2003 - 2005	20	1,2,4a	5a
ME 0104000210 *	SABATTUS P	3796	1962	Nov. 03 (04)	Prim. Cont.	2002 - 2004	13	2	5a
ME 0105000220	LILLY P	83	29	Aug. 03 (04)	Prim. Cont.	2004 - 2006	23	2,3	5a
ME 0105000303 *	DUCKPUDDLE P	5702	293	Sept. 03 (04)	Prim. Cont.	2003 - 2005	21	2	5a
ME 0105000307 *	SEWALL P	9943	46	Oct. 03 (04)	Prim. Cont.	2004 - 2006	26	2	3
ME 0106000101 *	HIGHLAND L	3454	1401	Sept. 03 (04)	Decl. Trend (DO)	2002 - 2004	14	1,2,3	5a
ME 0106000101 *	LONG L	5780	4867	Sept. 03 (04)	Decl. Trend (DO)	2003 - 2005	19	1,2,3	5a

* Lakes within this HUC can be found under other listing categories (see column second in from right)

** Priority rank begins with number 11 because TMDLs for lakes having priorities 1 - 10 are complete (listed in category 4a)

Category 5-C: Lake Waters Impaired by Atmospheric Deposition of Mercury

All lakes are listed in Category 5-C

APPENDIX IV: ESTUARINE AND MARINE WATERS

Category 1: Estuarine and Marine Waters Fully Attaining All Designated Uses

No waters are listed in Category 1 in 2004

Category 2: Estuarine and Marine Waters Attaining Some Designated Uses – Insufficient Information for Other Uses

Waterbody ID	DMR Area		Segment Description	Segment Acres	Segment Class	Last Year Sampled	Comments
812		*	Piscataqua R. Estuary		SC/SB		
826		*	Fort Foster, Kittery to Bald Head York		SB/SA		
824		*	Bald Head, York to Kennebunk R. Estuary (east bank), Kennebunkport		SB		
824-1	4		Ogunquit River	32.7	SB	Current	STP (Sewage Treatment Plant) outfall
824-1	4B		Ogunquit & Moody Beaches	1,108.3	SB	Current	2 STP outfalls
821		*	Kennebunk R. Estuary (east bank), Kennebunkport to Biddeford Pool, Biddeford		SB		
821-3	8-B		Timber Point to Fortunes Rocks, Biddeford	282.7	SB	Current	OBDs (Over Board Discharges)
811		*	Biddeford Pool, Biddeford to Dyer Point (Two Lights), Cape Elizabeth		SB		
811-3	12		Prouts Neck, Scarborough	832.5	SB	Current	STP outfall
804		*	Dyer Point (Two Lights), Cape Elizabeth to Parker Point (west bank of Royal R.), Yarmouth		SB/SA		
804-4	14-D		Great Chebeague Island, Cumberland	49.1 (estimate split with 802-1)	SB	Current	OBDs
802		*	Parker Point (west Bank of Royal R.), Yarmouth to south end of Butler Cove (Merrymeeting Bay), Bath		SB/SA		
802-1	14-D		Great Chebeague Island, Cumberland	49.0 (estimate split with 804-4)	SB	Current	OBDs
802-3	16-C		Cousins & Littlejohn Islands, Yarmouth	59.5	SB	Current	STP outfall; OBDs
802-4	17		Harraseeket River, Freeport	290.0	SB	Current	STP outfall
802-6	17-D		Bustins Island, Freeport	29.1	SB	Current	OBD
802-10	18-C		Mere Point Neck, Brunswick	15.3	SB	Current	No prohibited areas
802-12	18-E		Cundy's Harbor and Dingley Island, Harpswell	235.2	SB	Current	OBDs

Category 2: Estuarine and Marine Waters Attaining Some Designated Uses – Insufficient Information for Other Uses

Waterbody ID	DMR Area		Segment Description	Segment Acres	Segment Class	Last Year Sampled	Comments
802-12	18-F		Quahog Bay		SB	Current	Seasonal Boat Closure
802-13	18-G		Birch Island, Harpswell	58.6	SB	Current	Previously closed for improper septic systems, then opened
802-14	18-H		Harpswell Sound, Harpswell	57.6	SB	Current	OBDs
802-15	18-I		Harpswell Fuel Depot, Harpswell	102.3	SB	Current	Closed originally because of presumed fuel contamination; 2002 mussel results show no contamination; Testing clams and sediments in the SWAT program
802-16	18-M		Lookout Point & Wilson Cove, Harpswell	9.9	SB	Current	Horse manure runoff, but elevated fecal counts not reported
802-17	18-R		East Harpswell and Long Island, Harpswell	15.4	SB	Current	Improper septic systems
802-20	18-Z		Bates Island-Bailey Island	669.1	SB	Current; except 9/13/01-Bates Is.	OBDs
802-21	18AA		Little Yarmouth Island	8.4	SB	Current	Improper septic systems
802-23	19-A		Birch Point, West Bath - Bear Island, Phippsburg	107.0	SB	Current	OBDs; Improper septic systems
802-22	19B		N. Cape Small Hbr.	7.0	SB	Current	Septic system problems
802-24	19-C		Dam Cove - Birch Point, West Bath	291.6	SB	Current	OBDs
802-9	19-D		Foster Pt. And Treasure Island	19.7	SB	Current	OBDs; Gray water pipe
802-9	19-E		New Meadows River	11.4	SB	Current	OBDs
802-9	19-F		Long Cove, West Bath	7.7	SB	Current	Failing septic system
710		*	South end of Butler Cove (Meerymeeting Bay), Bath to east point of Sagadahoc Bay, Georgetown		SB		
730		*	East point of Sagadahoc Bay, Georgetown to Ocean Point, Boothbay		SB/SA		
730-2	20-E		N.Robinhood Cove, So. Robinhood Cove, & Knubble Bay, Georgetown/Westport	674.0	SB	Current	OBDs
730-3	21		Indian Point, Georgetown, to Fowle Pt., Westport	2,424.1	SB	Current	OBDs
730-4	22		Sheepscot River	1,337.9	SB	Current	OBDs

Category 2: Estuarine and Marine Waters Attaining Some Designated Uses – Insufficient Information for Other Uses

Waterbody ID	DMR Area		Segment Description	Segment Acres	Segment Class	Last Year Sampled	Comments
730-5	22-B		Knickercane Cove - Merrow Island, Boothbay	242.7	SB	Current	OBD
730-5	22-C		Back River, Boothbay	6.1	SB	Current	Failing septic system
730-8	22-G		Upper Sheepscot River & Tributaries	299.2	SB		No prohibited areas - 7/2/1997
730-9	23		Boothbay Harbor - Damariscove Island	9,059.6	SB/SA	Mainland is current	OBDs; Boats
730-11	23-B		Southwestern Southport Island	268.2	SB	Current	OBDs
729-1	24		Damariscotta River - Boothbay	692.6	SB	Current	OBDs; Boats
729		*	Ocean Point, Boothbay to Pemaquid Point, Bristol		SB		
729-3	25-A		South Bristol	550.4	SB	Damari-scotta side no longer sampled	OBDs; Boats
729-4	25-B		Pemaquid River, Bristol	324.6	SB	Current	OBDs
726-1	25-C		New Harbor, Bristol	161.8	SB	1994	OBDs; Boats
729-5	25-E		Inner Heron Island	11.0	SB	no station	No station; Septic system problems
729-6	25-F		Pemaquid Neck, Bristol	580.1	SB	1994	OBDs
726-2	25-D		Long Cove Point to Muscongus Harbor, Bristol	425.0	SB	Current	OBDs
726-4	25-G		Soldiers Cove, Bristol	18.7	SB	Current	OBDs
726-5	25-H		Keene Narrows, Medomak - Bremen	70.4	SB	Current	Marina; Septic system problems
726-6	25-I		Muscongus Harbor, Bristol-Bremen	11.7	SB		OBD; Boats, Septic system problems
726-7	25-J		Eastern Farmers Island, South Bristol	13.4	SB	no station	OBD
726-8	25-N		High Island to McFarlands Cove, South Bristol	172.7	SB	Current	OBD
726-9	25-O		Louds Island, Bristol & Bremen, Long Island Areas	505.6	SB	Current	Septic system violation
726		*	Pemaquid Point, Bristol to middle north side of Back River Cove, Waldoboro		SB		
724		*	Middle north side of Back River Cove, Waldoboro to Marshall Point, St. George		SB		
724-3	26-B		Friendship Harbor	375.7	SB	Current	OBDs
724-5	26-H		Broad Cove, Cushing	26.2	SB	5/20/1992	No prohibited areas
724-6	26-K		Upper Meduncook Rive - Crotch Island, Cushing	27.0	SB	Current	Septic system problems - Crotch Island

Category 2: Estuarine and Marine Waters Attaining Some Designated Uses – Insufficient Information for Other Uses

Waterbody ID	DMR Area		Segment Description	Segment Acres	Segment Class	Last Year Sampled	Comments
724-7	26-M		Pleasant Point Gut - Davis Cove, Cushing	24.9	SB	Current	Septic system problems
724-12	28-A		Port Clyde and the St. George Islands, St. George and Cushing	390.4	SB	Current	OBDs; Septic system problems
722		*	Marshall Point, St. George to Naskeag Point, Brooklin		SB/SA		
722-3	28-B		Spruce Head Island - Thorndike Point	403.7	SB	Current	Incomplete DMR sanitary survey; OBDs; Boats
722-4	28-C		Rackliff Island, St. George	65.3	SB	2 stations dropped in 2002	OBDs
722-5	28-E		Ash Point-Birch Point, Owl's Head	60.2	SB	Current	Incomplete DMR sanitary survey; OBDs
722-9	29-A		Owl's Head	726.8	SB	Current	OBDs
722-12	30-A		Southwestern Vinalhaven	4,347.6	SB	Current	Incomplete DMR sanitary survey; OBDs; Septic system problems
722-15	30-I		North Haven Island	3,984.8	SB	Current	OBDs; Boats
722-18	30-L		Ames Creek, North Haven	47.4	SB	Current	Untreated household sewage (straight pipe)
722-20	30-N		Indian Point - Burnt Island, North Haven	40.9	SB	Current	OBDs; Septic system problems
722-26	36		Penobscot & Bagaduce Rivers, in Castine-Penobscot	2,399.0	SB/SA	Current	OBDs
722-27	36-F		Islesboro	1,760.3	SB	Current	Incomplete DMR sanitary survey; OBD; Boats; Septic system problems
722-28	37		Condon Point, Brooksville, to "Herricks" Village Brooksville	547.0	SB	Current	OBDs
722-29	37-A		Deer Isle	61.0	SB	Current	OBDs
722-30	37-B		Blastow Cove, Deer Isle	7.0	SB	Current	OBDs
722-31	37-C		Heart Island, Deer Isle	9.0	SB	Current	OBDs
722-32	37-E		Eggemoggin, Little Deer Isle	43.0	SB	Current	OBDs
722-35	38-A		Inner Harbor, Stonington-Deer Isle	0.5	SB	Current	OBDs (and STP)
722-36	38-B		Burnt Cove, Stonington	75.0	SB	Current	OBD, formerly high fecal counts, on OBD removal list
722-37	38-C		Fifield Point to Moose Island	51.0	SB	Current	OBDs
707		*	Naskeag Point, Brooklin to Bass Harbor Head, Tremont		SB/SA		

Category 2: Estuarine and Marine Waters Attaining Some Designated Uses – Insufficient Information for Other Uses

Waterbody ID	DMR Area		Segment Description	Segment Acres	Segment Class	Last Year Sampled	Comments
707-1	39		Blue Hill Harbor	309.0	SB	Current	OBDs (and STP)
707-2	39-C		McHerd Cove - Webber Cove, East Blue Hill	42.0	SB	Current	OBDs
707-3	39-D		High Head-Sand Point, South Blue Hill	38.0	SB	Current	OBDs
707-5	40		Union River Bay, Patten Bay & the Union River, Ellsworth, Surry & Trenton	1,828.0	SB	Current	OBDs (and STP)
707-7	42-A		Lunt Harbor, Frenchboro	10.0	SB	Current	OBDs
707-8	42-B		Burnt Coat Harbor, Swans Island	64.0	SB	Current	OBDs
707-9	42-D		Red Point, Swans Island	178.0	SB	Current	OBDs
714		*	Bass Harbor Head, Tremont to Schoodic Point, Winter Harbor		SB/SA		
714-1	43		Southwest Harbor	469.0	SB	Current	OBDs
714-2	44		Southern Mt. Desert Island & the Cranberry Isles	8,711.0	SB/SA	Current	OBDs
714-3	44A		Broad Cove and Somes Harbor, Mount Desert	125.0	SB/SA	Current	OBDs; Seasonal marina
714-4	46		Seal Harbor	122.0	SB	Current	OBDs
714-5	46-A		Otter Cove, Mt. Desert - Bar Harbor	181.0	SB/SA	Current	OBDs (and STP)
714-6	47		Bar Harbor	1,941.0	SB	Current	OBDs
714-6	47		Bar Harbor depuration area (Bar Island bar)	46.0	SB	Current	CSOs; Seasonal marina
714-8	49		Salisbury Cove, Bar Harbor	208.0	SB	Current	OBDs
714-12	50		Sorrento	49.0	SB	Current	OBDs; Seasonal marina
714-17	51		Winter Harbor	139.0	SB	Current	OBDs
714-18	51-A		Arey Cove, Winter Harbor	84.0	SB	Current	OBDs
714-19	51-B		Grindstone Neck, Winter Harbor	292.0	SB	Current	OBDs
714-20		*	Northwest End Flanders Bay, Sullivan-Sorrento		SB		DMR Area 50-D; 9/19/2001 Repealed - open; Was on TMDL list in 1998
706		*	Schoodic Point, Winter Harbor to Petit Manan Point, Steuben		SB		
706-1	52		Prospect Harbor and Corea Harbor, Gouldsboro	443.0	SB	Current	OBDs
706-2	52-A		Corea Harbor	42.0	SB	Current	OBDs
706-4	52-C		Bunkers Harbor, Gouldsboro	207.0	SB	Current	OBDs
706-5	52-D		Southwestern Petit Manan Point, Steuben	106.0	SB	Current	OBDs

Category 2: Estuarine and Marine Waters Attaining Some Designated Uses – Insufficient Information for Other Uses

Waterbody ID	DMR Area		Segment Description	Segment Acres	Segment Class	Last Year Sampled	Comments
706-9	52-H		Wonsqueak Harbor, Gouldsboro	10.0	SB	Current	OBDs
705		*	Petit Manan Point, Steuben to Ray Point, Milbridge		SB/SA		
705-1	53		Narraguagus River, Milbridge	821.0	SB	Current	OBDs
704		*	Ray Point, Milbridge to south end of Cape Split, Addison		SB		
704-1	53-A		Pleasant River and Dyer Cove, Addison	489.0	SB	Current	OBDs
705-1	53-B		Western Bar Island, Milbridge	2.0	SB	Current	Possible malfunctioning septic system
704-4	53-H		Cape Split, Addison	84.0	SB	Current	OBDs
703		*	South end of Cape Split, Addison to Kelley Point, Jonesport		SB/SA		
703-1	53-H		Cape Split, Addison	85.0	SB	Current	OBDs
713		*	Kelley Point, Jonesport to Point of Maine, Machiasport		SB		
703-7	54-N		Eastern Great Wass Island, Beals	17.0	SB	Current	Opened 9/19/1995
713-3	54-H		Chandler River, Jonesboro	180.0	SB	Current	OBDs
709		*	Point of Maine, Machiasport to Thorton Point, Cutler		SB		
709-1	55		Machias - East. Machias Rivers and Northwestern Machias Bay	729.0	SB	Current	OBDs (and STP)
709-2	55-B		Howard Cove - Starboard Cove, Bucks Harbor	118.0	SB	Current	OBDs
709-3	55-C		Northeastern Holmes Bay, Whiting - Cutler	144.0	SB	Current	OBDs
709-4	55-H		Bucks Harbor, Machiasport	47.0	SB	Current	OBDs
708		*	Thorton Point, Cutler to Todd Head, Eastport		SB/SA/SC		
708-2	55-D		Great Head, Cutler & Bog Brook Cove, Trescott	167.0	SB	Current	OBDs
708-5	57		Eastport	653.0	SC	Current	OBDs (STP or 2 – boundary dependent)
701		*	Cobscook Bay		SB/SA		
701-5	57		Eastport	653.0	SC	Current	OBDs (STP or 2 – boundary dependent)
701-6	57-A		Pleasant Point, Perry and Kendall Head, Eastport	872.0	SB	Current	OBDs (STP or 2 – boundary dependent)
701-9	58-C		North Lubec	70.0	SB	Current	OBDs
702		*	Todd Head, Eastport to Whitlocks Mill, Calais		SB/SC		
702-1	57		Eastport	653.0	SC	Current	OBDs (STP or 2 – boundary dependent)
702-2	57-A		Pleasant Point, Perry and Kendall Head, Eastport	872.0	SB	Current	OBDs (STP or 2 – boundary dependent)

*segments of this waterbody can be found in other listing categories

Category 3: Estuarine and Marine Waters with Insufficient Data or Information to Determine if Designated Uses are Attained

Waterbody ID	DMR Area	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Projected Sample Date	Comments
826-2	2A	York Harbor		SB	Current		Seasonal Boat Closure
824-2	4-A	Perkins Cove	13.2	SB	No station		Many boats – no data
802-18	18-W	Woodward Point, New Meadows River, Brunswick		SB	No info.		No longer a DMR area
811-5	13-A	Spurwink River, Scarborough to McKenney Point, Cape Elizabeth		SB			Repealed 10/10/2002
802-26		Quahog Bay, inside of the south end of Pole Island	899.0	SB	2003		Possible Dissolved Oxygen Nonattainment
730-2	20-E	N.Robinhood Cove, So. Robinhood Cove, & Knubble Bay, Georgetown/Westport	674.0	SB	Current		OBD; Marina
724-9	26-0	Friendship Long Island & Vicinity, Friendship	167.6	SB	Current but more samples needed		Septic system problems
722-10	29-B	Matinicus Island – Ragged Island	2,203.2	SB	no survey or samples	Far off the coast of Maine - logistical problems	Never
702-3	60	Little River, Perry	29.0	SB	7/25/1988		No information

Category 4-A: Estuarine and Marine Waters with Impaired Use, TMDL Completed

Waterbody ID	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	TMDL Approved	Comments
812	Piscataqua R. Estuary, Eliot, So. Berwick	Acres included in Category 5-B-1	SB	1994	Marine Life Use Support	Dissolved Oxygen	Municipal point sources	1999	

(TMDL Complete but insufficient new data to determine that attainment has been achieved.)

Category 4-B-1: Estuarine and Marine Waters Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment

Waterbody ID	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	Comments
824-5	Ogunquit R.	64.0	SB	1995	Marine Life Use Support	Dissolved Oxygen	Municipal point source	Outfall moved out of estuary
811-8	Goosefare Brook	320.0	SC	1994	Marine Life Use Support	Dissolved Oxygen	Municipal point source	Outfall moved out of estuary; Draft TMDL on freshwater brook
726-11	Medomak R. Estuary	Acres included in Category 5-B-1	SB	2003	Marine Life Use Support	Dissolved Oxygen	Listed previously for Marine Life Use Support for Dissolved Oxygen caused by Municipal Point Source. Discharge has been removed (spray irrigation).	No data available yet on attainment.
724-13	St. George R. Estuary (DMR Area 27)	Acres included in Category 5-B-1	SB	1999	Marine Life Use Support; Bacteria (Included in Category 5-B-1)	Dissolved Oxygen	Listed previously for Marine Life Use Support for Dissolved Oxygen caused by Municipal Point Source. New discharge license has been issued; Nonpoint source.	New license issued based on modeling; No data available yet on attainment
722-45	Penobscot R. Estuary	7,808.0	SC		Fish Consumption	Toxics: Mercury, Dioxin, PCBs, Bacteria	Industrial point sources, CSOs	Dioxin legislation passed; hazardous waste clean-up

Category 4-C: Estuarine and Marine Waters with Impairment not Caused by a Pollutant

Waterbody ID	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	Comments
802-27	New Meadows R. Estuary, including the "Lake" upstream of Howard Point	313.0	SB	2002	Marine Life Use Support	Dissolved Oxygen	Partial Impoundment	

Category 5-A: Estuarine and Marine Waters Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required)

Waterbody ID	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	TMDL Date	Comments
811-9	Mousam R. Estuary (DMR Area 6)	192.0	SB	1995 - current for bacteria	Marine Life Use Support	Dissolved Oxygen; Elevated Fecals	Municipal point source, Nonpoint source, Sediment Oxygen Demand	Pending DO legislation – 2006	
811-8	Saco R. Estuary	576.0	SC	1998	Marine Life Use Support	Toxicity, Copper, Elevated Fecals	Municipal point source, CSOs	2008	
804-7	Fore R. Estuary	768.0	SC	2001	Marine Life Use Support	Aquatic life, Toxics, Elevated Fecals	Municipal point source, CSOs, Stormwater, Hazardous waste sites, Nonpoint (spills of all sizes)	2012	Additional acres included in category 5-B-1
802-25	Royal & Cousins R. Estuaries (DMR Area 16)	487.0	SB	1994 - current for bacteria	Marine Life Use Support	Dissolved Oxygen; Elevated Fecals	Municipal point source, Nonpoint source (stormwater), Sediment Oxygen Demand	Pending DO legislation-2006	

Category 5-B-1: Estuarine and Marine Waters Impaired only by Bacteria (TMDL Required)

Waterbody ID	DMR Area	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Source	Comments
812-1	1	Piscataqua R. Estuary, Kittery, Eliot, So. Berwick	927.4	SB/SC	Current	4 STP outfalls; Stormwater; Elevated fecals; Nonpoint Source	
826-1	1B	Jaffrey Point, N. H. to Brave Boat Harbor, York	1,211.9	SB	Current	2 STP outfalls; Stormwater, Elevated fecals; Nonpoint Source	
826-2	2	York River	277.3	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
826-3	2B	Lobster Cove	30.9	SB	Current	Elevated fecals; Nonpoint Source	
826-3	3	Cape Neddick	1,207.1	SB	Current	1 STP outfall; Elevated fecals; Nonpoint Source	
824-3	5	Webhannet River	642.2	SB	Current	1 STP outfall; Elevated fecals; Nonpoint Source	
824-3	5A	Little River	134.7	SB	Current	Elevated fecals; Nonpoint Source	
824-4	7	Kennebunk River	498.3	SB	Current	1 STP outfall; Nonpoint Source; Elevated fecals	
821-1	8	Goosefare Bay	806.2	SB/SC	Current	OBDs; Elevated fecals; Nonpoint Source	
821-2	8-A	Cape Porpoise Harbor	540.6	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
811-1	9	Saco River and Saco Bay	2,983	SB/SC	Current	6 STP outfalls; Storrmwater; Elevated fecals; Nonpoint Source	An additional 576 acres are included in Category 5-A
811-2	11	Northern Saco Bay & Scarborough River	172.8	SB/SA	Current	OBDs; Elevated fecals; Nonpoint Source	
811-4	13	Spurwink River	45.1	SB/SA	Current	Elevated fecals; Nonpoint Source	
804-1	14	Portland – Falmouth Area	12,418.6	SB/SC	2/19/2002	4 STP outfalls; Stormwater; Elevated fecals; Nonpoint Source	An additional 768 acres are included in Category 5-A
804-2	14-A	Falmouth - Cumberland	11.5	SB	Current	Elevated fecals; Nonpoint Source	
804-3	14-C	Long Island - Cliff Island, Portland	934.4	SB	Current - Long Is; 10/12/00 – others	OBDs; Elevated fecals; Nonpoint Source	

Category 5-B-1: Estuarine and Marine Waters Impaired only by Bacteria (TMDL Required)

Waterbody ID	DMR Area	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Source	Comments
802-5	17-B	Maquoit Bay, Brunswick and Freeport	132.1	SB	Current	OBDs; Elevated fecals; Nonpoint Source	Combined 17-A & 17-B, 2002 report
802-7	18	Potts Harbor	679.0	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
802-8	18-A	Gurnet Strait, Harpswell	154.5	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
802-9	18-B	New Meadows River, Brunswick, West Bath, Harpswell	22.5	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
802-10	18-C	Middle Bay	75.0	SB	Current	Elevated fecals; Nonpoint Source	
802-11	18-D	Eastern Bailey – Orr's Island, Western Quahog Bay,	1,256.6	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
802-19	18-X	Little Hen Island and Big Hen Island, Harpswell	70.7	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
802-22	19	Wood Island - Malagala Island, Phippsburg	350.3	SB	Current except around some of the islands	OBDs; Elevated fecals; Nonpoint Source	
710-1	20	Upper Kennebec River and Tributaries	17,293.8	SB	Current	Elevated fecals; Nonpoint Source	
710-2	20-H	Lower Kennebec, Phippsburg/Georgetown	1,857.5	SB	Current	OBD; Elevated fecals; Nonpoint Source	
730-1	20-B	Back River, Wiscasset and Westport	139.4	SB	Current	OBD; Elevated fecals; Nonpoint Source	
730-6	22-E	Western Barters Island, Boothbay	225.9	SB	Current	Elevated fecals; Nonpoint Source	
730-7	22-F	Ovens Mouth - Sherman Creek, Boothbay – Edgecomb	162.3	SB	Current	Elevated fecals; Nonpoint Source	
730-10	23-A	Ebencook Harbor, Southport	1,351.2	SB	Current	OBDs; Boats; Elevated fecals; Nonpoint Source	
729-2	24-A	Great Bay	516.1	SB	Current	Elevated fecals; Nonpoint Source	
729-2	25	Damariscotta River, Newcastle – Damariscotta	169.1	SB	Current	STP; Elevated fecals; Nonpoint Source	
726-10	26	Medomak River, Waldoboro and Friendship	334	SB	Current	Elevated fecals after rainfall; Nonpoint Source	

Category 5-B-1: Estuarine and Marine Waters Impaired only by Bacteria (TMDL Required)

Waterbody ID	DMR Area	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Source	Comments
724-2	26-A	Monhegan Island	521.6	SB	Never	Untreated household sewage (straight pipe)	Permanent PSP (paralytic shellfish poisoning) Closure
724-4	26-D	Hawthorne Point - Bailey Point, Cushing	98.3	SB	Current	Elevated fecals; Nonpoint Source	
724-8	26-N	Maple Juice Cove, Cushing	150.1	SB	Current	Septic system problems; Elevated fecals; Nonpoint Source	
724-10	27	St. George River	1,046.4	SB	Current	STP; Elevated fecals; Nonpoint Source	
724-11	27-B	Deep Cove - Otis Cove, St. George	281.9	SB	Current	OBD; Septic system problems; Elevated fecals; Nonpoint Source	
722-1	27-A	Eastern Wheeler Bay, St. George	17.9	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
722-2	28	Tenants Harbor to Mosquito Head, St. George	621.4	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
722-6	28-H	Marshall Point - Mosquito Head, St. George	193.8	SB	Current	OBD; Septic system problems; Elevated fecals; Nonpoint Source	
722-7	28-I	Weskeag River, So. Thomaston and Owls Head	9.8	SB	Current	Septic system problems; Elevated fecals; Nonpoint Source	
722-8	29	Rockland	2,459.9	SB/SC	Current	STP; OBDs; Stormwater; Boats; Elevated fecals; Nonpoint Source	
722-11	30	Rockport	2,036.3	SB	Current	OBDs; Boats; Elevated fecals; Nonpoint Source	
722-13	30-D	Vinalhaven	1,255.1	SB	Current	OBDs; Boats; Elevated fecals; Nonpoint Source	
722-14	30-H	Kent Cove, North Haven	180.8	SB	Current	Elevated fecals; Nonpoint Source	
722-16	30-J	Vinal Cove - Starboard Rock, Vinalhaven	90.4	SB	Current	OBD; Elevated fecals; Nonpoint Source	
722-17	30-K	Southern Harbor, North Haven	36.4	SB	Current	Elevated fecals; Nonpoint Source	
722-19	30-M	Roberts Harbor, Vinalhaven	175.4	SB	Current	OBD; Elevated fecals; Nonpoint Source	
722-21	31-A	Rockport Harbor to Ducktrap Harbor, Lincolnville	2,139.6	SB	Current	STP; Elevated fecals; Nonpoint Source	

Category 5-B-1: Estuarine and Marine Waters Impaired only by Bacteria (TMDL Required)

Waterbody ID	DMR Area	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Source	Comments
722-22	31-B	Great Spruce Head - Kelleys Cove, Northport	1,237.3	SB	Current	STP; Elevated fecals; Nonpoint Source	
722-23	32	Belfast Bay	4,172	SB	Current	STP; OBDs; Boats; Elevated fecals; Nonpoint Source	
722-24	33	Searsport - Stockton Springs	2,832.7	SB/SC	Current	STP; OBDs; Septic system problems; Elevated fecals; Nonpoint Source	
722-25	35	Penobscot River	12,743.0	SB/SC	Current	STP; OBDs; Boats; Elevated fecals; Nonpoint Source	
722-33	37-I	Western Cove, Stinson Neck, Deer Isle	18.0	SB	Current	Elevated fecals; Nonpoint Source	
722-34	38	Stonington Harbor & NW Branch of Crocket Cove, Deer Isle & Stonington	222.0	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
722-38	39-A	Center Harbor – Brooklin	32.0	SB	Current	Elevated fecals; Nonpoint Source	
722-38	39-B	Eastern Flye Point, Brooklin	11.0	SB	Current	Elevated fecals; Nonpoint Source	
722-39	39-F	Benjamin River, Sedgwick	23.0	SB	Current	Seasonal marina; Elevated fecals; Nonpoint Source	
707-4	39-E	Salt Pond, Sedgwick - Brooklin	95.0	SB	Current	Elevated fecals; Nonpoint Source	
707-6	42	Bass Harbor & Eastern Duck Cove, Tremont	702.0	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
707-10	42-E	Mackerel Cove, Swans Island	4.0	SB	Current	Elevated fecals; Nonpoint Source	
707-5	48-A	Goose Cove, Trenton	121.0	SB	Current	Elevated fecals; Nonpoint Source	
707-11	48-B	Pretty Marsh Harbor, Mount Desert	180.0	SB	Current	Elevated fecals; Nonpoint Source	
707-11	48-C	Tinker Brook (Goose Cove), West Tremont	9.0	SB	Current	Elevated fecals; Nonpoint Source	
714-7	48	Thomas Bay, Bar Harbor	10.0	SB	Current	Elevated fecals; Nonpoint Source	
714-9	49-A	Jellison Cove, Hancock	9.0	SB	Current	Elevated fecals; Nonpoint Source	
714-10	49-B	Carrying Place, Hancock	25.0	SB	Current	Elevated fecals; Nonpoint Source	
714-11	49-C	Kilkenny Cove, Hancock	43.0	SB	Current	Elevated fecals; Nonpoint Source	
714-13	50-A	US Rt. 1 Bridge, West Sullivan and Long Cove, Sullivan	30.0	SB	Current	Elevated fecals; Nonpoint Source	
714-14	50-B	Springer Brook, Mill Brook and West Brook, W. Franklin	93.0	SB	Current	Elevated fecals; Nonpoint Source	

Category 5-B-1: Estuarine and Marine Waters Impaired only by Bacteria (TMDL Required)

Waterbody ID	DMR Area	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Source	Comments
714-15	50-C	Johnny's Brook and Card Mill Stream, Franklin	2.0	SB	Current	Elevated fecals; Nonpoint Source	
714-16	50-E	Egypt Bay, Hancock & Franklin	106.0	SB	Current	Elevated fecals; Nonpoint Source	
706-3	52-B	Mill Pond Stream, Gouldsboro	8.0	SB	Current	Elevated fecals; Nonpoint Source	
706-6	52-E	Dyer Harbor - Pinkham Bay, Steuben	73.0	SB	Current	Elevated fecals; Nonpoint Source	
706-7	52-F	Birch Harbor, Gouldsboro	19.0	SB	Current	Seasonal marina; Elevated fecals; Nonpoint Source	
706-8	52-G	Tucker Creek, Gouldsboro and Steuben Harbor	44.0	SB	Current	Elevated fecals; Nonpoint Source	
706-8	52-J	Dyer Harbor, Steuben	162.0	SB	Current	Elevated fecals; Nonpoint Source	
705-3	52-K	Mitchell Point, Milbridge	32.0	SB	Current	Septic system problems; Elevated fecals; Nonpoint Source	
705-2	53-C	Back Bay, Milbridge	53.0	SB	Current	Elevated fecals; Nonpoint Source	
704-2	53-D	Curtis Creek, Flat Bay, Harrington	31.0	SB	Current	Elevated fecals; Nonpoint Source	
704-3	53-E	Upper Harrington River	483.0	SB	Current	Elevated fecals; Nonpoint Source	
705-3	53-G	Smith Cove, Narraguagus Bay, Milbridge	3.0	SB	Current	Elevated fecals; Nonpoint Source	
703-2	54	Jonesport and West Jonesport	595.0	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
703-3	54-A	North End of Beals Island	149.0	SB	Current	Elevated fecals; Nonpoint Source	
703-4	54-B	Indian River, Addison - Jonesport	68.0	SB	Current	Elevated fecals; Nonpoint Source	
703-5	54-K	Southeastern Alley Bay & Pig Island Gut, Beals	24.0	SB	Current	Elevated fecals; Nonpoint Source	
703-6	54-M	Lamesen Brook in West River, Addison	52.0	SB	Current	Elevated fecals; Nonpoint Source	
713-1	54-D	East & West Branches, Little Kennebec Bay, Machias and Machiasport	68.0	SB	Current	Elevated fecals; Nonpoint Source	
713-2	54-G	White Creek, Masons Bay, Jonesport – Jonesboro	47.0	SB	Current	Elevated fecals; Nonpoint Source	
709-5	55-I	Indian Head, Machiasport	17.0	SB	Current	Elevated fecals; Nonpoint Source	
708-1	55-A	Little River - Cutler Harbor	37.0	SB	Current	Elevated fecals; Nonpoint Source	
708-3	55-G	Money Cove, Cutler	32.0	SB	Current	Elevated fecals; Nonpoint Source	
708-4	56-C	Haycock Harbor, Trescott	16.0	SA/SB	Current	Elevated fecals; Nonpoint Source	

Category 5-B-1: Estuarine and Marine Waters Impaired only by Bacteria (TMDL Required)

Waterbody ID	DMR Area	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Source	Comments
708-6	58	Lubec and South Lubec	70.0	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
701-1	56	Denny's River and Northwest Denny's Bay, Edmunds – Pembroke	88.0	SA/SB	Current	Elevated fecals; Nonpoint Source	
701-2	56-A	Pennamaquan Bay, Pembroke	80.0	SB	Current	Elevated fecals; Nonpoint Source	
708-4	56-B	East Stream, Trescott	15.0	SA/SB	Current	Elevated fecals; Nonpoint Source	
701-3	56-I	Canal Cove, Seward Neck, Lubec	47.0	SB	Current	Elevated fecals; Nonpoint Source	
701-4	56-J	Sipp Bay, Perry and Robinston	54.0	SB	Current	Elevated fecals; Nonpoint Source	
701-7	57-B	Deep Cove, Eastport	154.0	SC	Current	Elevated fecals; Nonpoint Source	
701-8	58	Lubec and South Lubec	487.0	SB	Current	OBDs; Elevated fecals; Nonpoint Source	
701-10	58-F	The Haul-Up, South Bay, West Lubec	40.2	SB	Current	Elevated fecals; Nonpoint Source	
702-4	62	St. Croix River – Passamaquoddy Bay	7,933.0	SB/SC	Current	OBDs (and STP); Elevated fecals; Nonpoint Source	

Category 5-B-2: Estuarine and Marine Waters Impaired by Bacteria from Combined Sewer Overflows

Waterbody ID	Location	Permitted Facility	Goal (separation or partial)	Enforcement Control (permit or consent decree, date) *	Comments
812-2	Kittery	Kittery WPCF	Separation	Permit 2006	Abatement anticipated by permit renewal time.
811-6	Biddeford	Biddeford WWTF	Separation	Permit & A.O. 2013	(2) Biddeford - By August 1, 2004 the permittee shall submit to the Department for review and approval, a scope of work for the Phase II CSO Master Plan and by July 1, 2005 submit a draft Phase II CSO Master Plan and implementation schedule for review and approval by the Department.
811-7	Saco	Saco WWTP	Partial w/ generic bypass	Permit and C.D. 2011	Will include Major Milestone in permit being renewed in 2006.
804-7	Cape Elizabeth	Portland Water District - Portland WWTF	Separation	2008	Abatement anticipated by permit renewal time.
804-6	South Portland	South Portland WPCF	Partial	2012	(1) By July 1, 2005, the permittee shall complete the installation of a generator at the Main Street Pump Station and eliminate the associated CSO #021. (1) By November 30, 2006, the permittee shall submit an updated CSO Master Plan and abatement schedule.
804-5	Portland	Portland Water District - Portland WWTF	Partial	2018	(2) PWD - As an exhibit to the application for permit renewal, the permittee shall submit an updated CSO Master Plan and abatement schedule. (3/6/08). Will include Major Milestone in permit being renewed in 2008.
710-03	Bath	Bath WPCF	Separation	Permit 2015	Will include Major Milestone in permit being renewed in 2006.
722-40	Rockland	Rockland WWTF	Partial w/ generic bypass	Permit 2011	Will include Major Milestone in permit being renewed in 2006.
722-41	Belfast	Belfast WWTF	Separation	Permit 2011	Will include Major Milestone in permit being renewed in 2006.
722-42	Bucksport	Bucksport WWTP	Separation	Permit 2012	(2) A draft CSO Master Plan and abatement project schedule must be submitted to the Department by June 30, 2002, for review and approval.
722-43	Winterport	Winterport Sewerage District	Separation	Permit 2009	(1) On or before August 1, 2004 the permittee shall submit to the EPA and the Department a CSO Master Plan and abatement schedule for review and approval. Modification of the final schedule compliance date will require a formal modification to the schedule including public notice.

Category 5-B-2: Estuarine and Marine Waters Impaired by Bacteria from Combined Sewer Overflows

Waterbody ID	Location	Permitted Facility	Goal (separation or partial)	Enforcement Control (permit or consent decree, date) *	Comments
722-44	Hamden	Hamden, Town of	Partial w/ storage	Permit 2015	(2) By June 30, 2003, the permittee is required to submit to the Department for review and approval an infiltration/inflow monitoring report and a revised CSO abatement/elimination schedule.
714-21	Bar Harbor	Bar Harbor, Town of	Separation	Permit 2007	Will include Major Milestone in permit being renewed in 2005.
709-6	Machias	Machias WWTF	Separation	Permit 2008	Will include Major Milestone in permit being renewed in 2005.

*Last date in schedule OR best estimation of when water quality standards will be attained.

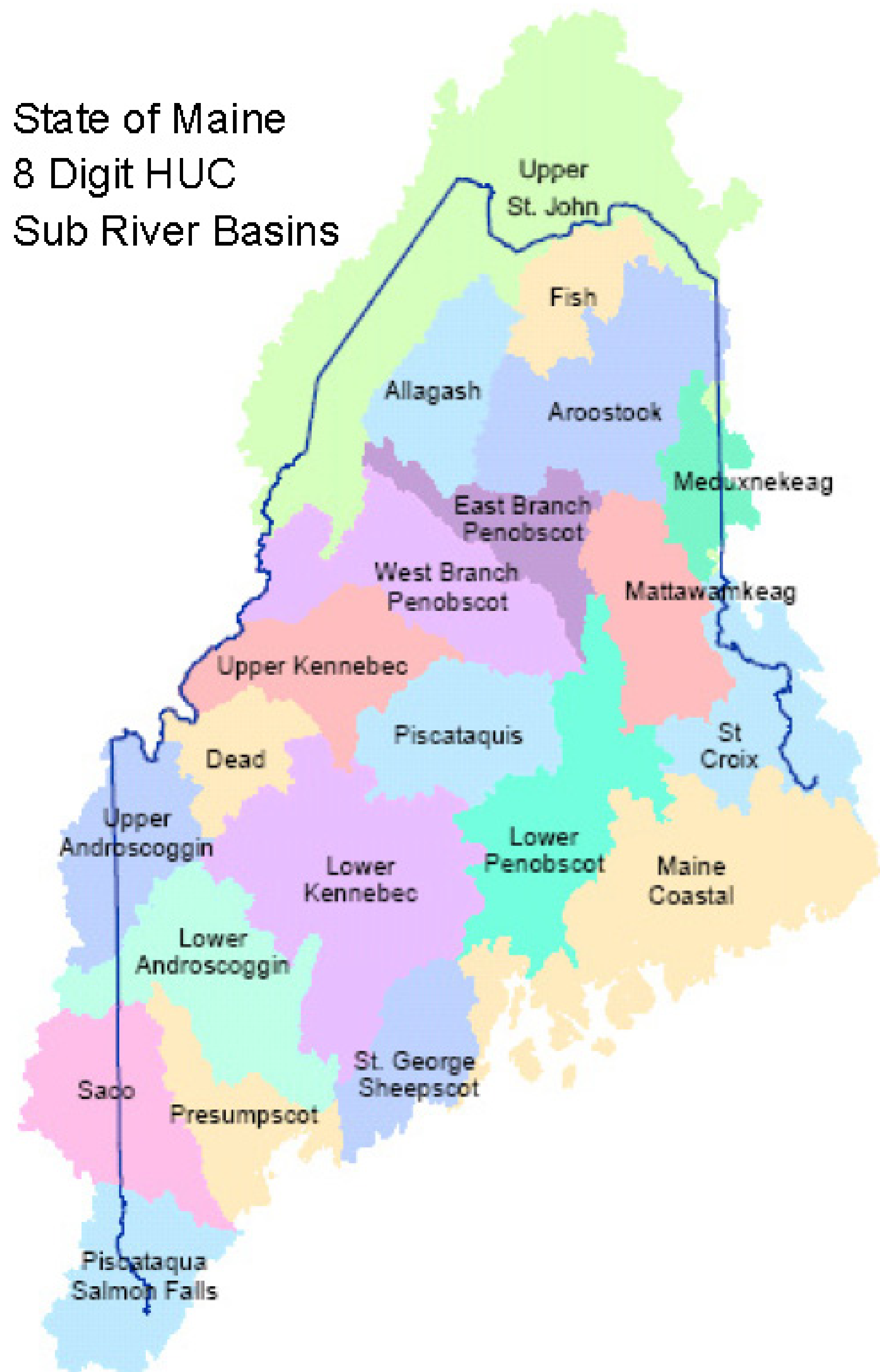
(1) Major Milestone is listed in permit with statement that it can not be modified without formal application renewal.

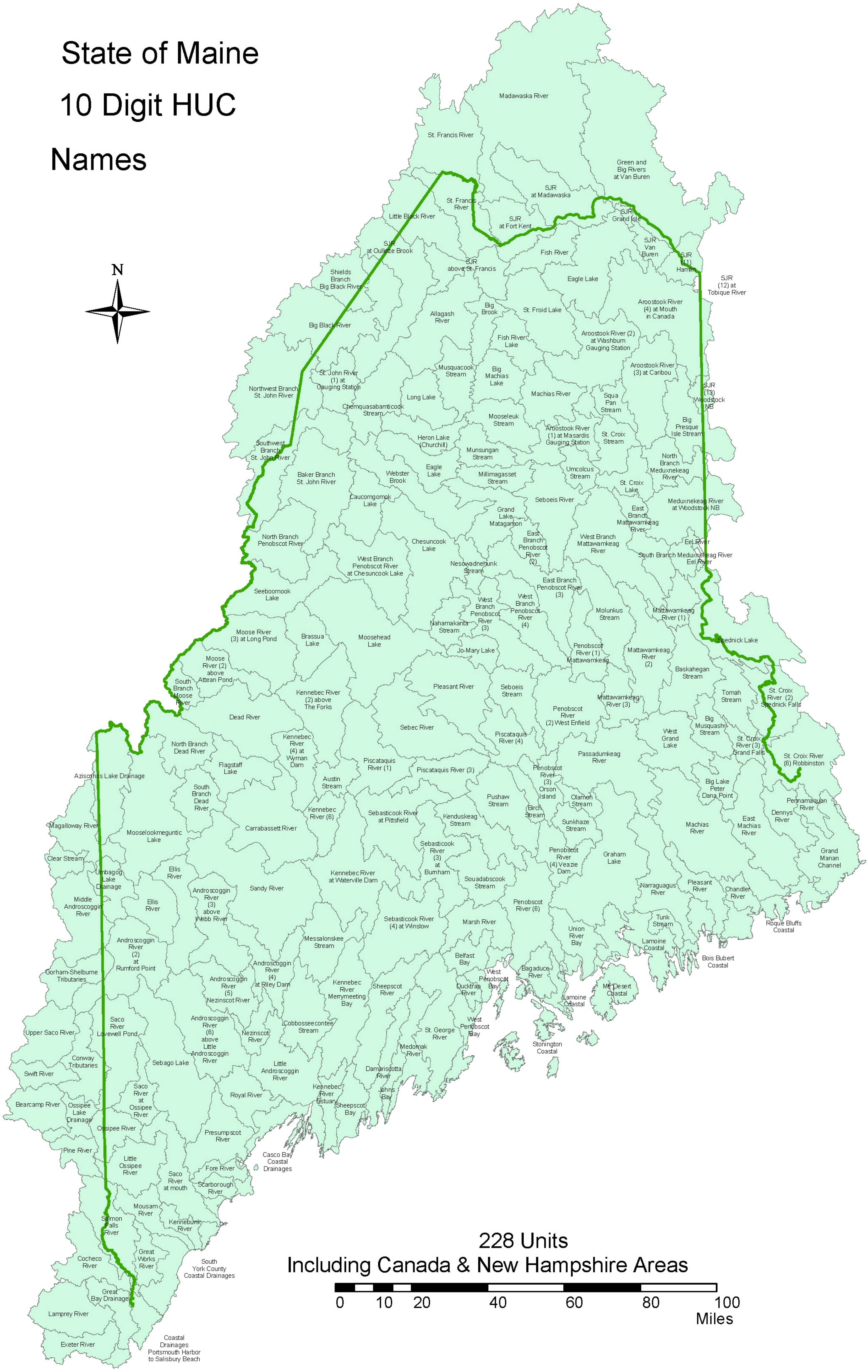
(2) Major Milestone is listed in permit, but does not include statement that it can not be modified without formal application renewal.

Category 5-D: Estuarine and Marine Waters Impaired by Legacy Pollutants

All estuarine and marine waters are listed in Category 5-D, partially supporting fishing (fish and "shellfish" consumption) due to elevated levels of PCBs in tissues of some fish and as well as other persistent bioaccumulating substances in lobster tomalley.

HUC MAPS FOR APPENDICES II THROUGH IV




State of Maine
10 Digit HUC
Names
N
Madawaska River
St. Francis River
Green and Big Rivers at Van Buren
SJR at Madawaska
St. Francis River
SJR at Fort Kent
SJR Grand Isle
Little Black River
SJR at Ouellette Brook
SJR Van Buren
Fish River
SJR (11) Hamlin
SJR above St. Francis
SJR (12) at Tobique River
Shields Branch Big Black River
Eagle Lake
Aroostook River (4) at Mouth in Canada
Big Brook
St. Froid Lake
Allagash River
Big Black River
Fish River Lake
Aroostook River (2) at Washburn Gauging Station
Aroostook River (3) at Caribou
Musquacook Stream
St. John River (1) at Gauging Station
Big Machias Lake
SJR (13) Woodstock NB
Northwest Branch St. John River
Long Lake
Machias River
Squa Pan Stream
Chemquasabamticook Stream
Mooseleuk Stream
Big Presque Isle Stream
Heron Lake (Churchill)
Aroostook River (1) at Masardis Gauging Station
St. Croix Stream
Southwest Branch St. John River
Munsungan Stream
North Branch Meduxnekeag River
Eagle Lake
Webster Brook
Millimagasset Stream
Umcolcus Stream
Baker Branch St. John River
St. Croix Lake
Caucomgomok Lake
Seboeis River
Meduxnekeag River at Woodstock NB
Grand Lake Matagamon
East Branch Mattawamkeag River
North Branch Penobscot River
Chesuncook Lake
East Branch Penobscot River (2)
West Branch Mattawamkeag River
Eel River
West Branch Penobscot River at Chesuncook Lake
Nesowadnehunk Stream
South Branch Meduxnekeag River Eel River
East Branch Penobscot River (3)
Seeboomook Lake
West Branch Penobscot River (3)
West Branch Penobscot River (4)
Molunkus Stream
Mattawamkeag River (1)
Nahamakanta Stream
Moose River (3) at Long Pond
Brassua Lake
Moosehead Lake
Spednick Lake
Jo-Mary Lake
Penobscot River (1) Mattawamkeag
Mattawamkeag River (2)
Moose River (2) above Attean Pond
Baskahegan Stream
Pleasant River
Seboeis Stream
South Branch Moose River
Kennebec River (2) above The Forks
Tomah Stream
St. Croix River (2) Spednick Falls
Mattawamkeag River (3)
Penobscot River (2) West Enfield
Dead River
Sebec River
Big Musquash Stream
West Grand Lake
Kennebec River (4) at Wyman Dam
Piscataquis River (4)
St. Croix River (3) Grand Falls
North Branch Dead River
St. Croix River (6) Robbinston
Passadumkeag River
Piscataquis River (1)
Flagstaff Lake
Piscataquis River (3)
Azisconhos Lake Drainage
Penobscot River (3) Orson Island
Austin Stream
Big Lake Peter Dana Point
South Branch Dead River
Pushaw Stream
Olamon Stream
Pennamaquan River
Kennebec River (6)
Sebasticook River at Pittsfield
Birch Stream
Dennys River
Kenduskeag Stream
Magalloway River
Carrabassett River
Sunkhaze Stream
Machias River
East Machias River
Mooselookmeguntic Lake
Sebasticook River (3) at Burnham
Grand Manan Channel
Penobscot River (4) Veazie Dam
Clear Stream
Graham Lake
Ellis River
Kennebec River at Waterville Dam
Umbagog Lake Drainage
Souadabscook Stream
Androscoggin River (3) above Webb River
Sandy River
Narraguagus River
Pleasant River
Chandler River
Middle Androscoggin River
Ellis River
Penobscot River (6)
Sebasticook River (4) at Winslow
Marsh River
Tunk Stream
Roque Bluffs Coastal
Union River Bay
Androscoggin River (2) at Rumford Point
Messalonskee Stream
Lamoine Coastal
Belfast Bay
Bois Bubert Coastal
Gorham-Shelburne Tributaries
Androscoggin River (4) at Riley Dam
Bagaduce River
West Penobscot Bay
Androscoggin River (5) Nezinscot River
Kennebec River Merrymeeting Bay
Sheepscot River
Ducktrap River
Mt Desert Coastal
Lamoine Coastal
Saco River Lovewell Pond
Upper Saco River
Androscoggin River (6) above Little Androscoggin River
Nezinscot River
Cobbosseecontee Stream
West Penobscot Bay
St. George River
Stonington Coastal
Conway Tributaries
Medomak River
Sebago Lake
Little Androscoggin River
Damariscotta River
Swift River
Saco River at Ossipee River
Royal River
Kennebec River Estuary
Johns Bay
Bearcamp River
Ossipee Lake Drainage
Sheepscot Bay
Ossipee River
Presumpscot River
Pine River
Casco Bay Coastal Drainages
Little Ossipee River
Fore River
Saco River at mouth
Scarborough River
Mousam River
Salmon Falls River
Kennebunk River
228 Units
Including Canada & New Hampshire Areas
Cocheco River
Great Works River
South York County Coastal Drainages
0
10
20
40
60
80
100
Miles
Great Bay Drainage
Lamprey River
Exeter River
Coastal Drainages Portsmouth Harbor to Salisbury Beach

State of Maine 10 Digit HUC Numbers