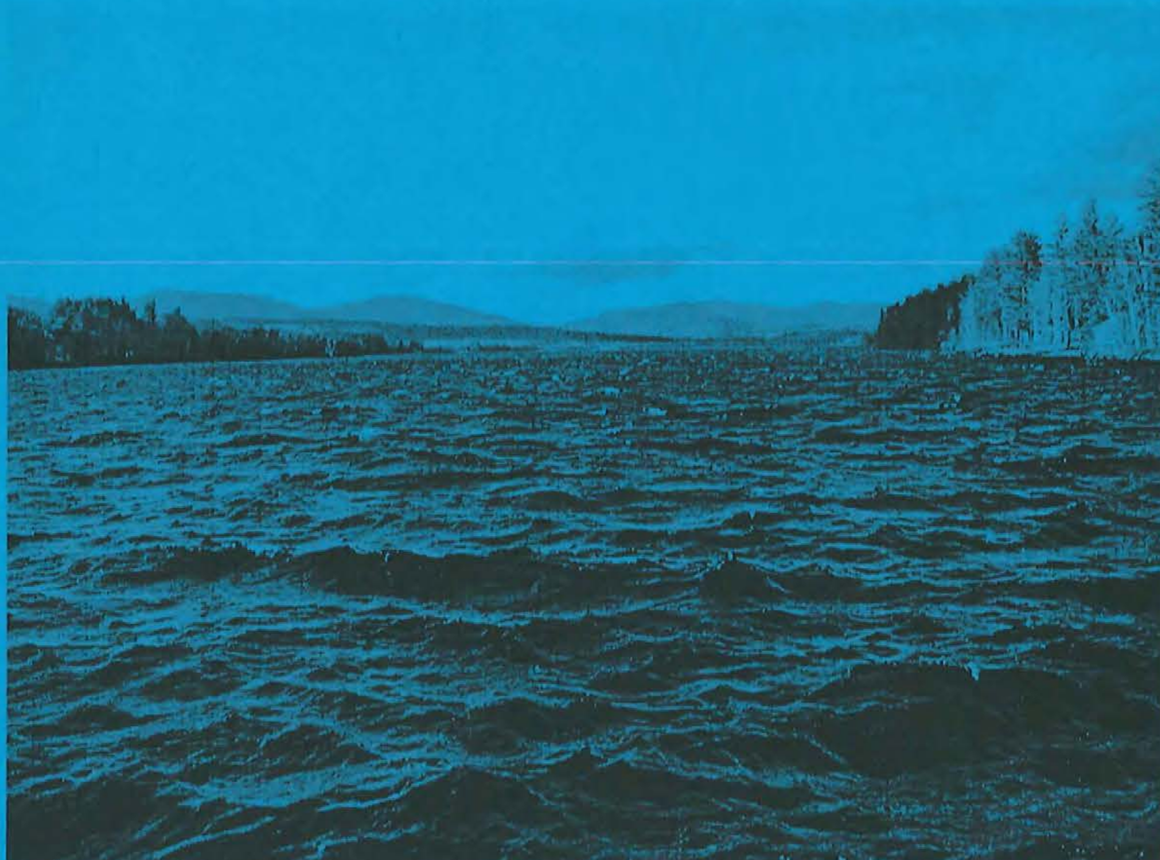
STATE OF MAINE

2002 INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT



A Report to Congress
Prepared Pursuant to Section 305(b) of the
Federal Water Pollution Control Act, as Amended

Prepared by the
Maine Department of Environmental Protection
Bureau of Land and Water Quality

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Part I. Overview

INTRODUCTION

The following report is submitted to satisfy the requirements of the Clean Water Act (CWA) Section 305(b) report , Section 303(d) list, Section 314 and as a biennial report to the Maine Legislature as required in 38 MRSA Section 464.3.A. The Clean Water Act Section 305(b) report and Section 303(d) list are an important way of communicating the health and status of our State's waters. This report is a significant change from previous 305(b) reports and 303(d) lists in that it integrates the requirements of the two sections of the CWA into a single document. This Integrated Report provides:

- Delineation of water quality assessment units (AUs) based on the National Hydrography Dataset (NHD), identified by their 10-digit Hydrologic Unit Code (HUC)
- 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,
- Identifies Assessment Units requiring Total maximum Daily Load (TMDL) determinations and establishes a schedule (priority) for those waters.

A key new feature of this report is the establishment of five new assessment categories (see section on listing methods). The new assessment categories require a reordering of the attainment assessment different from previous 305b reports and thus may not be readily comparable. In particular, impaired waters that were previously combined into a single 303d list are now separated into a number of lists under categories 4 and 5. Only those under category 5 will require development and submission of Total Maximum Daily Load (TMDL) reports.

Assessment information will also be submitted to the USEPA in their Assessment Database (ADB version 1.0 or compatible format). The ADB contains information on Assessment Unit and segment descriptions (dimensions, designated uses), assessment date, monitoring dates, types of information used in the assessment, and if use impairment is determined, the probable causes and sources. The current ADB version does not list the assessment category that is provided in the appendices of this report. The ADB allows for the construction a number of 'reports' that summarize information in the database. These are the basis for a number of the summary tables provided in the different chapters.

As a consequence of conversion to the ADB and adoption of Assessment Units based on the Hydrologic Unit Code (HUC – 10 digit), the number of river miles used in this 305b report deviates slightly from that used in previous 305b reports (31,171 miles currently used vs. 31,672 miles previously used). Some segment lengths have also changed somewhat based on the new coverage.

The total number of lakes (and lake acres) has changed slightly since the 2000 assessment and is expected to change in the future as the Department migrates to a spatially-oriented GIS system for the management of location information and morphometric data.

Current guidance for the Integrated Report does not require that the State provide information on groundwater or wetland resources as in previous years. However, Maine has included an assessment of these resources in this report using the 1998 305b guidance document (see Parts V and VI).

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, 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 and conservation organizations (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 (V.L.M.P., 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, 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). Water utilities that belong to Maine Association of Water Districts will join this list in future years. Additional data is acquired through the Maine Department of Inland Fisheries & Wildlife (DIF&W) and through cooperative projects with the University of Maine System, 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. The Casco Bay Estuary Project (CBEP), funded by EPA's National Estuary Program, monitors and supports monitoring in Casco Bay and coordinates the National Coastal Assessment for the entire Maine coast.

LISTING METHODOLOGY FOR 2002 305b/303d INTEGRATED LIST

Determination of attainment is based on attainment of all standards and criteria established by a water's classification (38 MRSA Section 465, 465-A, 465-B). Listing does not consider fish consumption advisories due to mercury (note: all freshwaters are listed narratively in 5-C as well as in one other category. See explanation in 5-C.), or for lobster tomalley (note: all marine waters are listed narratively in 5-D as well as in one other category. See explanation in 5-D).

The "Monitored Date" shown in the assessment tables 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)

1. **Attaining all designated uses and water quality standards, and no use is threatened.** Highest level, waters in the assessment unit attain all applicable standards. Assessment is based on combined evaluation of the following information.

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

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

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

    4. Qualitative data or information from professional sources showing attainment of standards and showing no identifiable sources (e.g. no detectable points of entry of either licensed or unlicensed wastes), 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. (For lakes) Determination that the direct drainage area has a population of zero (0) according to U.S. Census data obtained in 2000. Determinations are based on census data at the town level and consider all towns in the direct drainage of larger (previously referred to 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 Index database.

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, no trend toward expected non-attainment within the listing period, or 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, 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 a random monitoring of that class of waters.

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

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 nonattainment of uses.

2. Qualitative data or information from professional sources showing potential presence of stressors that may cause impairment of one or more uses, but no quantitative water quality information.

3. Old data, with:
    a. low reliability, no repeat measurement (e.g. one-time synoptic data),
    b. change of conditions without subsequent remeasurement, or
    c. no evidence of causes or sources to account for water quality condition (natural conditions that don't attain water quality standards are allowed by 38 M.R.S.A. Section 464.4.C).

4. (For lakes) Recent data indicates return to attainment standards over the recent few years but requires confirmation, or, that trophic or dissolved oxygen profile evaluation suggests deteriorating conditions requiring 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.)

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 it is impaired 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 Category 4 lists when:

1. Current or old data (from previous listing) for a standard indicating impaired use, or a trend toward expected non-attainment within the listing period, but where enforceable management changes are expected to correct the condition,

2. Water quality models that predict impaired use under current loading for some standard, but prediction of attainment when controls are in place, or,

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

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

4-B. Other pollution control requirements reasonably expected to result in attainment of standards in the near future.
Waterbodies where enforceable controls (including 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) have reasonable expectation of attaining standards, but where no new data are available to determine that attainment has been achieved.

4-C. Impairment not caused by a pollutant. Waters impaired by habitat modification.

5. **Impaired or threatened for one or more designated uses by a pollutant(s), TMDL required.** Waters are listed in one of the Category 5 lists when:

1. Current data (collected within five years) for a standard indicating 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 that 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. A water has been previously listed on the State's 303d list of impaired waters. Based on current or old data that indicated the involvement of a pollutant(s), and there is no change in management or conditions that would indicate attainment of use. (Note that a few previously listed waters have been moved to Category 3 if the previous listing was based on data that does not meet present assessment methodology quality or errors may have been made in the analysis. See Category 3.)

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

5-B. Impairment caused solely by bacteria contamination, TMDL required.

> **5-B-1.** Certain waters impaired only by high bacteria contamination may be high priority resources, such as shellfish areas, but low priority for TMDL development if other actions are already in progress and will correct the problem in advance of TMDL development (e.g. OBD removals). 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-1. A projected schedule of TMDL completion is included where applicable.
>
> **5-B-2**. Waterbodies impaired by bacteria contamination solely from Combined Sewer Overflows and with current CSO Master Plans (Long Term Control Plans) which include assurances that water quality standards will be attained.

5-C. Impairment caused by atmospheric deposition (all Maine freshwaters are listed as 5-C and are also listed under one of the other categories), regional scale TMDL required. Maine has a fish consumption advisory for fish taken from all freshwaters due to mercury. Many waters, and many fish from any water, do not exceed the action level for mercury. There is considerable variation in the amount of mercury in a particular fish depending on the species, age, size, water it was taken from, and other factors. Therefore, 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 has decided to establish a statewide advisory for all freshwater fish that recommends limits on consumption thus reducing the potential for an individual to consume too much mercury. 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.

- Includes waters impaired only by PCBs, DDT or other substances already banned from production or use, or from activities that have been long abandoned. 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.

- Includes 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 the previous 303(d) impaired waters list

Because there are a number of listing options available in this new integrated list, some waterbodies may be removed from the previous 303(d) list, however, only under certain circumstances. A State must describe a good cause demonstration, to EPA's satisfaction, for not listing a specific water that had been previously listed 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:

1. 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);
2. The results of more sophisticated water quality modeling demonstrates that the applicable water quality standard(s) is being met (list in Category 1 or 2);
3. 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);
4. It can be documented that there are changes in the conditions that originally caused the water to be impaired and therefore originally led to the listing. For example, new control equipment has been installed, or a discharge has been eliminated (list in Category 1, 2, 3, or 4-B).
5. 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);
6. 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).
7. 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).

8. A TMDL has been approved or established by EPA since the last 303(d) list (list in Category 4-A).

In all cases of delisting to Category 3, more recent data or information indicate probable compliance with water quality standards. However, the State has chosen to place these waters in Category 3 to reflect its intention of doing additional confirmatory monitoring.

ASSESSMENT CRITERIA

The following tables provide the designated use categories and the criteria (with references) used to assess attainment of the use. A determination of nonattainment is only made when there is documented evidence (e.g. monitoring data) that indicates 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 draft) • Dissolved oxygen (38 MRSA Section 465) • 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) • Wetted habitat (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-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)

Interpretation of the data

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, accident, short duration license exceedence, or 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 (draft).

Lake Trophic State: Assessment is based on measures of transparency, chlorophyll a, total phosphorus and color (see table). 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.

Numerical Criteria for Evaluation of Trophic Status in Maine (Note: Dystrophy is not evaluated as a trophic category separately from catgories below.)

	Trophic Status		
Parameter[1]	Oligotrophic	Mesotrophic[2]	Eutrophic
SDT[3]	> 8 M	4-8 M	< 4 M
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 &/or repeated algal blooms

[1] SDT, CHL a, 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) and best professional judgment must be used to assign trophic category.
[4] TSI = Trophic State Indices are calculated when adequate data exists and color is at or below 30 SPU.

Support of indigenous species: Assessment based on the known absence of a species that previously was documented as indigenous to a waterbody.

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 loading information, or expected loadings (for threatened waters).

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 loading information, or expected loadings (for threatened waters).

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.

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), 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.

MONITORING AND TMDL SCHEDULES

Rivers and Streams

The Maine Department of Environmental Protection uses a five year rotation schedule for monitoring rivers and streams. The Surface Water Ambient Toxics program and Biomonitoring program generally adhere to this schedule although special monitoring demands may cause some waters to be monitored out of sequence. The following rotation is projected for the next five years:

2003 – Androscoggin River basin
2004 – St. John River and Presumpscot River basins
2005 – Saco River and southern Maine river basins
2006 – Penobscot River, St. Croix River and downeast river basins
2007 – Kennebec River basin

The projected monitoring schedule for Category 3 waters is assigned based on the above rotation. In addition to regular monitoring conducted on this schedule, the State regularly conducts river-scale water quality monitoring to develop and update water quality models. In the next two years, Maine will be conducting such monitoring on the Sandy River, Sebasticook River, St. Croix River and Presumpscot River.

Lakes

Lakes are monitored as a statewide unit since much of the screening is conducted by individuals, regional entities or local organizations through the Volunteer Lake Monitoring Program (VLMP). The Department's Lake Assessment Section conducts various levels of monitoring on lakes depending on their attainment status. For example, lakes in the VLMP that are attaining all or most of their standards are visited once every 5 years during August to obtain data from parameters in addition to those routinely gathered by the volunteers to aid in the interpretation of volunteer-collected data. Lakes in non-attainment that are in the process of having TMDLs developed are generally monitored through the Department or by cooperators at a more intensive level (twice a month during the ice-free season; 2-3 trophic parameters). Lakes that have had TMDLs completed (4a), or that are on the Category 3 Watch List are often monitored once a month during the summer season by Department staff or cooperators. Other lakes in Category 3 are monitored less frequently because risk of being in non-attainment has decreased (e.g., removal of discharge). A few lakes-of-interest are also monitored once a month to track success of past restoration efforts under Section 314 or removal of point source discharges. Lakes slated for TMDL development in the distant future are visited every few years to verify that non-attainment is still an issue; often these lakes have a 'chronic' issue that needs to be treated differently than the majority of non-attainment lakes.

August baseline monitoring occurs from August 10th through August 31st. Generally 120 lakes are visited. Approximately 40 are VLMP lakes that are in attainment. Another 15-20 lakes located in areas designated as EcoReserves by the Maine Department of Conservation or The Nature Conservancy are included. All active TMDL lakes are visited as well as lakes with active NonPoint Source projects being implemented in their watersheds (under Section 319). Lakes with special concerns due to anecdotal reports of unusual events (e.g., planktonic algal blooms, blooms of near shore algal metaphyton) are often visited during the baseline period.

Marine and Estuarine

The Maine Department of Environmental Protection uses a three year rotation for marine waters. However, since 2000, the State has devoted a larger share of its monitoring resources to the USEPA Coastal Assessment Program. This is a probability based monitoring design. The Department is largely dependent on the monitoring efforts of the Department of Marine Resources for the listed Category 3 waters. A schedule from DMR is not available at this time.

TMDL Schedules

TMDL schedules are assigned based on the value of a water (based on size, public use, proximity to population centers, and especially by the level of public interest for water quality improvement), the nature of the impairment and the source of the problem (Maine has generally pursued point sources as a higher priority), available information to complete the TMDL, and availability of staff and contractual resources to acquire information and complete the TMDL study. TMDL schedules that indicate 2004 are for impaired segments where a TMDL is reasonably expected to be complete by the end of this listing cycle. Other TMDLs are projected for four (2008) or eight year (2012) planning increments. The schedules for the latter TMDLs may be adjusted when the integrated list is revised in the future.

RESPONSE TO COMMENTS

Public review and comment of the 2002 INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT was invited by public notice advertisement in statewide newspapers, through the comment page on the DEP website, and through press release. Notice of the draft report was sent to all parties on the mailing list of interest groups maintained by the Board of Environmental Protection. Notice of the draft report also went out to all state natural resource agencies. The comment period ran from October 1-November 1, 2002. Internal departmental, along with EPA, review and comments on the document were also included in the final draft.

Public comments were received from the Conservation Law Foundation (CLF) and Maine Real Estate Development Association (MERDA). The following issues from those comments are paraphrased below with agency response about how those issues are addressed in the final draft:

- *The DEP fails to give sufficient information for de-listing a waterbody from the 303(d) list* (CLF). Reasons for de-listing are summarized in the Listing Methodology section and follow the allowable causes provided in 40 CFR 130.7(b). Where a specific waterbody has been de-listed (from the previous 303(d) list) and placed in Category 2-3, comments are now provided in the Comments column of the assessment tables. Impaired waters that have been moved from the previous 303(d) list to Category 4 are placed in the appropriate listing of that category. These waters are still listed as impaired, however, may not require a TMDL under the new listing protocol.

- *The DEP has improperly placed certain impaired waterbodies in Category 3* (CLF). The DEP has followed de-listing as provided in 40 CFR 130.7(b). It should be noted that text has been added in the Listing Methodology narrative stating, "In all cases of de-listing to Category 3, more recent data or information indicate probable compliance with water quality standards. However, the State has chosen to place these waters in Category 3 to reflect its intention of doing additional confirmatory monitoring." It is not the intention of the State to consider these waters unimpaired, but rather to provide an opportunity for the State to document, with reasonable confidence, that impairment occurs and to identify potential causes and sources of an impairment. For many of these waters, either due to insufficient, inconclusive, or conflicting data, the DEP does not have reasonable confidence of its assessment. It should also be noted that after consultation with EPA on the Category 3 list, certain waters were moved from Category 3 back into an impaired listing.

- *TMDLs should be prepared for certain Category 4 waters* (CLF). Waters are only placed in Category 4 if there has been a determination that a TMDL is not warranted. The list of CSO waters that caused this concern has been amended, in consultation with EPA, and most CSO-affected waters have been re-listed in Category 5-B-2. In the case of Rockland Harbor noted by CLF, the DEP does not have information to indicate that impairment is due to sources other than the CSOs. As stated in the document, license violations are not used to establish a water as impaired and are considered a compliance issue. Enforcement of license violations is expected to result in attainment of water quality standards.

- *Certain waters closed to shellfishing by DMR are placed in Category 3 if there is not an identified source.* (CLF). DMR may close waters to shellfishing for a variety of reasons, and in many cases no ambient water quality data may be available to establish that water quality has been documented as the cause for closure. In those instances, the DEP has determined that a Category 3 listing is the most appropriate category until actual water quality conditions can be ascertained.

- *Wording under Category 4 infers that certain of these waters are partially impaired and therefore were not listed in Category 5 and do not require a TMDL* (CLF). The term "partial impairment" was only used as a footnote in Category 4-B-2 for CSO listed waters. CSOs present a unique circumstance where impairment only occurs under certain short-term event conditions. Waterbodies are not placed in Category 4 because of partial-impairment but rather because there is already a control mechanism in place that precludes the need for a TMDL analysis to occur. The Category 4-B-2 CSO list has been moved to Category 5-B-2 following recommendations from EPA. It is still the State's intention to avoid conducting a TMDL analysis of these waters pending resolution of water impairment issues through abatement provided in the facility CSO Master Plans.

- *The DEP may have overstated its summary of state's waters and that some statement of confidence should be made about the findings* (CLF). The DEP agrees that any summary of impairment is not complete but rather reflects current knowledge of water quality. Wording in the document is amended to reflect this.

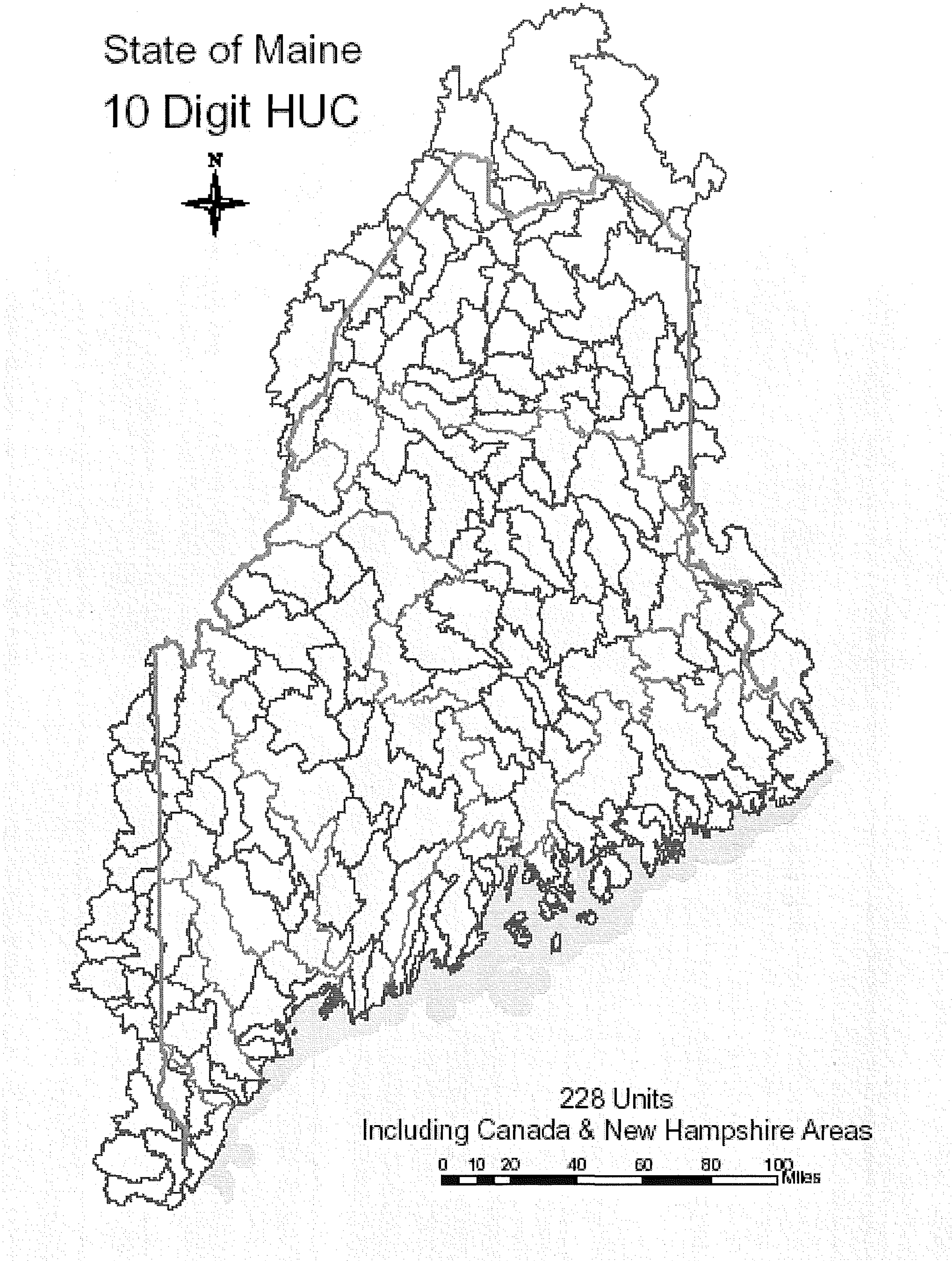
- *Concern for large number of Category 3 waters in the marine assessment and the possible use of other data sources* (CLF). Many waters are listed in Category 3 where there is not conclusive data to indicate that the closure is based on water quality conditions. Previous 305(b) reports did not provide a comparable listing category. In many instances, DMR has established administrative closures where a closed zone has been placed around existing discharge(s) but where no data has been collected to determine water quality attainment. The DEP regards the use of a Category 3 listing as appropriate for waters in these circumstances. The DEP participates in the coastal EMAP program cited in the comments, however, only very limited data was available for the coast of Maine at the time of the report. Future assessments will allow the use of this probabilistic-based data.

- *No date is given for completion of a regional TMDL for mercury* (CLF). There is no expected date of completion at this time. The Maine DEP is one of many states participating.

- *Concern that many assessment determinations were based on a draft rule for the use of biomonitoring data* (MERDA). Assessment of water quality using biomonitoring data and inclusion in the 305(b) assessment and 303(d) lists has occurred since 1992. Maine water quality statute provides explicit narrative biological standards with associated definitions that allow these biological assessments to be made. Maine has developed accompanying numerical methods (draft rule) that allow a more consistent analysis of information. Even without the numerical methods, these biological assessments would still be possible and provide an important analytical tool.

- *Biomonitoring based determinations may have been based on as little as one sample* (MERDA). The DEP considers biomonitoring a more powerful assessment tool than traditional water sampling because it is an integrative measure that assesses the performance of the biological community over a period of time (up to a year for most macroinvertebrates). Biological samples integrate conditions over space and time (a continuous sampling regime) that even high intensity water sampling cannot equal. Replication of biomonitoring sample results has been tested and is documented in the DEP's Biomonitoring Retrospective publication. The DEP also uses a probability cut-off that excludes the use of low probability results and further strengthens the confidence placed on the assessment.

- *Recommendation for a public hearing and listing decision by the Board of Environmental Protection where an assessment decision may affect private property* (MERDA). Decisions of impairment and nonimpairment in the 305(b)document and 303(d) list express extant conditions of water quality determined from empirical evidence collected through DEP monitoring and from other documented information sources. This evidence and the resultant decisions cannot be affected on the basis of "consequences to affected property owners" or other such factors suggested in the comment letter. The purpose of the Integrated Listing document is only to describe the condition of the State's waters and for those waters found to be impaired, to establish the need for a TMDL or other appropriate analysis to bring those waters into attainment. The report does not further define how the information should be used, or assess any consequences that may result. The standards and methods used for the assessment are described in the document and follow accepted State and EPA protocols.


State of Maine
10 Digit HUC
N
228 Units
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0 10 20 40 60 80 100
Miles

Part II. SUMMARY ASSESSMENT OF FRESHWATER RIVERS AND STREAMS

Maine is presently using the National Hydrography Dataset at a 1:100,000 resolution. Using that, 31,171 miles of rivers and streams are assessed. This is a decline in total miles (from 31,672 miles) that was used in previous 305b reports but that estimate was not based on a consistent methodology. Clearly, many more miles of small streams exist in the State and would be counted if a smaller scale resolution is used (expected in future reports).

Maine has four classes for the management of rivers and streams: AA, A, B, and C. Class AA waters are managed for their outstanding natural ecological, recreational, social or scenic qualities. Discharges, dams or other significant human disturbances are prohibited. Class A waters are managed for high water quality with limited human interference allowed. Direct discharges of pollutants are highly restricted in A waters. Class B waters are general-purpose waters and are managed to attain good quality water. Well-treated discharges of pollutants that have ample dilution are allowed. Class C waters are managed to at a minimum attain the fishable/swimmable goals of the Clean Water Act and maintain the structure and function of the biological community. Well-treated discharges of pollutants are allowed in C waters. Each class is managed for designated uses and has dissolved oxygen, bacteria and aquatic life standards. The distribution of the four classes is presented below.

Distribution of River and Stream Classes

Class	Percentage
AA	5.8%
A	44.1%
B	47.9%
C	2.2%

This assessment found 1161 miles (3.7%) of rivers and streams impaired for one or more designated uses (Categories 4 and 5) of the total assessed miles. These miles denote an increase of 432 miles (83% increase) of all river and stream miles assessed. Of those miles, 741 miles are impaired by the effects of pollutants or a combination of pollutant and non-pollutant stressors, are listed in Category 5, and will require the development of a TMDL. A river and stream segment is only listed in one category with two exceptions:
(1) all Maine freshwaters are listed in Category 5-C (impaired by atmospheric deposition of mercury),
(2) certain river and stream segments listed in Category 5-B-2 (impaired due to Combined Sewer Overflows with a CSO Master Plan established for control) may also be listed in another category because of the highly variable temporal and spatial effects of CSOs, and the Salmon Falls River/Piscataqua Estuary is listed in 4-A (TMDL complete for certain pollutants) but is still listed in Category 5-A for additional pollutants.

Mileages for CSO-only affected waters are not included since impairmetn from such sources are highly variable and usually of very short duration.

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 stress. Rather, the State has been better able to assess its waters with improved monitoring tools and increased participation from cooperators. The DEP's recent monitoring strategy has placed greater emphasis on small streams in urban and agricultural settings. Most of the new impaired listings appear to be due to conditions that have probably been in place for many years.

It should be noted that Maine can state with good confidence that it has not had any pollution caused fish kills within this assessment period. This is a remarkable achievement given the history of such events in the State.

Overall Use Support in Assessed Rivers and Streams
(linear miles)

Use Support	Evaluated	Monitored	Total
Fully supporting	16,930	13,080	30,010
Partially supporting (consumption advisory for mercury)	(0)	(31,171)	(31,171)
Not supporting	91	1070	1161
TOTAL	17,021	14,150	31,171

Category 1. Rivers and streams attaining all designated uses and water quality standards, and no use threatened. There are 1072 miles of waters from 7 assessment units that the Department can confidently place in Category 1. These include waters in parks and ecological reserve lands where there is little human intrusion.

Category 2. Rivers and streams attaining some of the designated uses, no use is threatened and insufficient data and information is available for the remaining uses (but where there is a high expectation that all uses are attained). The majority of Maine's rivers and streams (28,686 miles, 92% of river and stream miles) fall in Category 2. The Department has current (monitored) data for 98 of the 228 assessment units.

Category 3. Rivers and streams with insufficient data and information to determine if designated uses are attained (but where there is some expectation that certain waters within the assessment unit or segment may not attain some uses). Twenty-six waterbody segments (250 miles) have been placed in Category 3. Waters were placed in Category 3 if previous data was inconclusive or possibly in error or where there was no identifiable cause or source (i.e. criteria are not met due to natural conditions as provided in 38 M.R.S.A. Section 464-4-C). Waters were also placed in Category 3 if similar waters in other assessment units had been determined to be impaired, and similar causes and sources were known to occur in the Category 3 waters.

Category 4. Rivers and streams that are impaired or threatened for one or more uses, but not requiring a TMDL (a TMDL has already been prepared, other controls are in place, or no pollutants are involved). Category 4 includes 35 segments (420 miles).

Individual Use Support Summary for Rivers and Streams in Category 4
(linear miles)

Use	TMDL complete	Other controls established	No pollutant involved
Fishing (consumption)	0	323.2	0
Aquatic Life Support	66.5	12.5	27.3
Navigation	0	0	4.2

Causes of Impairment in Rivers and Streams in Category 4
(linear miles)

Cause Categories	Miles impaired
Priority Organics	323.2
Low Oxygen (Enrichment)	66.5
Aquatic life	106
Flow modification	9.7
Habitat Alteration	17.6

Sources of Impairment in Rivers and Streams in Category 4
(linear miles)

Source Categories	Miles impaired
Industrial Point Sources	309.2
Water withdrawal	1.3
Habitat – Impoundment (non-hydropower)	1.5
Habitat – Impoundment (Hydropower)	16.1
Flow modification (hydropower)	8.4
Land Disposal (landfills, haz waste)	68.5

Category 5. Rivers and streams that are impaired or threatened for one or more designated uses where a TMDL is required. Category 5 includes 136 segments (741 miles).

Causes of Impairment in Rivers and Streams in Category 5
(linear miles)

Cause Categories	Miles Impaired
Priority Organics	288.6
Metals	3.3
Aquatic life	160.1
Low Oxygen (Enrichment)	323.5
Nutrients	111.1
Hydrologic modification	16.1
Pathogen Indicators	126.6
Habitat Alteration	17.2
pH	1.0

Sources Impairment in Rivers and Streams in Category 5
(linear miles)

Source Categories	Miles Impaired
Unknown	28.2
Industrial Point Sources	41.5
Municipal Point Sources	74.3
Aquaculture PS	11.0
Other point source	2.0
Onsite Waste Treatment (domestic)	30.2
Agriculture NPS	189.7
Urban NPS (stormwater)	84.8
General development NPS	59.2
Other NPS (unspecified)	147.6
Resource extraction	4.3
Abandoned mining	2.0
Habitat modification	52.1
Flow modification (Hydropower)	16.1
Land Disposal (landfills, haz waste)	12.7
Sediment oxygen demand	3.0
Upstream eutrophic lake	23.5

Part II. Summary Assessment of Lakes

The total area of Maine's 5782 Lakes and Ponds is estimated as 987,172 acres accounting for 1,543 square miles or 4.6% of the state's surface area.[1] Maine statute has designated one standard (GPA) for the classification of great ponds and natural lakes less than 10 acres in size. Specifically, Class GPA waters:

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.

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 based on the *type* of water classified. 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

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[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).

impaired in any of our 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.

Maine lakes exhibit a great amount of diversity as does the state's topography and population. Maine's 5782 lakes span a range in size of 1 acre to 74890 acres (Moosehead Lake). Of these, 804 lakes are listed as 1 acre in size and only 11 greater than 10,000 acres. Similarly, Maine lakes range from approximately 1 foot in depth to 316 feet deep (Sebago Lake). The 5782 lake list includes many waters that are small and/or shallow that are not at all representative of a true Maine lake but are more representative of transition waters or open water in a wetland. Class GPA does not expect more from a small, shallow lake than it can be reasonably expected to attain. 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 interested in managing or assessing. Lakes that are not considered 'significant' are tiny and/or shallow waters that are not managed as a 'typical' lake water.

Table 1. Maine Lake Population Summary

	Number	Acres
Total Lakes	5782 (100%)	987,172 (100%)
Significant Lakes	2314 (40%)	959,193 (97%)

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.

The 2002 Integrated Report represents a slightly new way to evaluate lake attainment status. EPA has established Listing Categories 1 through 5 in which lake waters are placed depending on our 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) and thus require the development of a TMDL. Lakes in Category 3 have insufficient data or information to determine to make attainment determinations. Table 2 summarizes categories and subcategories.

Table 2

Listing Category	Category Explanation
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
4b1	Expected to meet standards
4b2	Expected to meet standards when CSO is addressed
4c	Not impaired by a pollutant
5a	TMDL needed
5b	TMDL for bacteria needed
5c	Regional TMDL needed due to airborne Hg deposition
5d	TMDL would be needed if pollutant was not legacy pollutant (banned substance)

It is important to recognize that the use of the term 'Threatened' has changed in this assessment. EPA guidelines have 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 are listed as 'Threatened' in the 2002 assessment. The term 'watch list' is used for a subset of Category 3 lakes for which additional data & 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 five 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); the remaining lake, Fitzgerald Pond, is presently listed in category 3, but is expected to continue recovery from a point-source discharge removal and be in full attainment when visited again.

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 2700 lake direct drainages. These 2700 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 were 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 2854, totaling 285,023 acres. Of these, 1016 (270,550 acres) are considered 'Significant' and 1838 (14,473 acres) are not. Waters are combined to the

10 digit HUC within which they are located (Appendix II, Category1). 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 2850 lakes or 556,277 lake acres. Of these, 1220 (542,771 acres) are considered 'Significant' and 1630 (13,506 acres) are not. Waters are combined to the 10 digit HUC within which they are located (Appendix II, Category 2).

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 study results from the mid-1990s indicated that 4% of that lake subpopulation (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. Looking at current assessment information from the overall population from which the REMAP lakes were selected reveals that 25 of 1903 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 36 lakes covering 32,693 acres listed in category 3 (Appendix II, 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 that suggests that most of these waters are meeting some criteria but has evidence that suggests the lakes are 'borderline' with respect to others. These lakes are the highest priority for data collection over the next few years. Other lakes were removed from the 'partially supporting' list in the 2000 assessment and are now being delisted from the 1998 303(d) list. For these lakes, we have monitoring data suggesting that they now are in attainment of the designated uses originally involved in their 303(d) listing. Others have some inconclusive data that suggests they may be heading toward eventual non-attainment but not necessarily before the next assessment cycle, otherwise they would have been listed as 'threatened'. Such lakes are now considered to be on our 'watch list.

Category 4. Lake waters that are impaired or threatened for one or more designated uses, but does not require development of a TMDL. There are currently 16 lakes covering 90,344 acres listed in category 4, all of which are designated as

'Significant'. These lakes are divided into three subcategories. The first subcategory, lake waters on which TMDLs have been completed (4-A), contains 5 lakes totaling 17,025 acres. Cobbosseecontee Lake and Madawaska Lake TMDLs were competed in 2000 and China Lake, East Pond and Sebasticook Lake TMDLs were completed in 2001. These represented the highest priority lakes on the 1998 303(d) list for TMDL completion. Monthly open-water season monitoring will likely continue on these lakes for a number of years.

Estes Lake (387 acres) is the only lake in category 4-B1, lakes having other pollution control requirements expected to result in attainment of standards in the near future. 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.

Ten lakes (72,932 acres) are listed in category 4-C, 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). These lakes have been delisted from the 303(d) list established in 1998.

Category 5. Lake waters that are impaired or threatened for one or more designated uses by a pollutant(s), TMDL required. Four sub categories have been designated under category 5, however lakes have been listed in only two of them. Category 5-A currently includes 26 lakes (22,835 acres) all of which are designated as 'Significant' (lakes impaired by pollutants, required TMDL to be conducted by State of Maine). Appendix II, Category 5-A lists these lakes and indicates target dates for TMDL completion indicating development priority. Table 3 summarizes individual use support for lakes in category 5-A.

Table 3. Individual Use Support Summary for Category 5a Lakes and Ponds (acres)

Use	Non Attaining	Attainment
Drinking Water Supply (after disinfection/treatment)	0	22,835
Aquatic Life use Support	22,835	0
Fishing		
Fish Consumption (other than Hg)	0	22,835
Fish Consumption (due to Hg[1])	22,835	0
Recreation In/ On	14,837	8,081
Navigation, Hydropower, Agriculture & industrial Supply	0	22,835

[1] Based on statewide fish consumption advisory; only category 5a lakes included.

All Maine lakes are listed in Category 5-C, lakes impaired by atmospheric deposition of mercury resulting in a statewide fish consumption advisory. Pollutants causing non-attainment and sources of these pollutants are summarized in Table 4.

Table 4. Causes of Non-attainment in Category 5 Maine Lakes and Ponds (acres)

Cause Categories	Major Impact	Moderate/Minor Impact
Nutrients	568	15,139
Siltation	0	13,807
Organic Enrichment	6,902	10,972
Methyl Mercury - (Fish Tissue)	987,172	0

Table 5. Sources of Non-attainment in Category 5 Maine Lakes and Ponds (acres)

Source Categories	Major Impact	Moderate/Minor Impact
Agriculture	329	13,124
Urban Runoff/Storm Sewers	6,902	14,895
Land Disposal	429	1,420
Atmospheric Deposition	987,283	0
Internal Nutrient Recycling	0	3281
Upstream Eutrophic Lake	83	0

Evaluation Criteria

Designated Use: **Aquatic Life Support**

Attainment: *Lakes exhibiting stable or decreasing (improving) trends in trophic state.*
Non-attainment: *Lakes that experience extreme water level fluctuations or severe turbidity.* Lakes exhibiting a statistically valid deteriorating trend in trophic state as indicated by analysis of transparency data or a combination of data examination (dissolved oxygen, chlorophyll, and total phosphorus in addition to transparency) and best professional judgement.

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 as Partially Supporting fish consumption due to mercury contamination.

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 SPUs 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.*

Trophic Status of Significant Publicly Owned Maine Lakes (required under Section 314)

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 support nuisance algal blooms year round. Lakes having a color resembling weak tea are stained with humic acids and can also be classified as ***dystrophic***. In this report, 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, Chlorophyll 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.

The table on page A-17 above (section on Interpretation of Data) illustrates how TSI values compare to trophic parameters in the determination of trophic state. No Maine lakes support nuisance algal blooms year round, thus hypereutrophic status is not included in this table. Section 314 requires a summary of trophic classification for Maine's significant lakes. This summary is compiled using the best information available. TSIs are considered the most accurate; in lieu of a TSI, actual parameter distributions are used. When little or no standard trophic data are available but information exists regarding a supported fishery, or, modeling based on morphometry has been done, a trophic assignment is made using best professional judgement of either DEP lake biologists or Maine Department of Inland Fisheries and Wildlife (DIFW) fisheries biologists. When a DEP determination is not available, the DIFW assignment is used with the recognition that their trophic assignment reflects productivity of the whole ecosystem rather than just the water. This occasionally can result in a rating slightly more productive that what the chemistry might reveal if data were available. Regardless, all of these approaches are considered valid for the purposes of this report.

Table 6 below summarizes overall trophic status of significant Maine lakes. As in past assessments, no lakes have been assigned to the "dystrophic" category. Maine defines dystrophy as high 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. Degree of dystrophy is considered when evaluating lake data however, trophic status assignment continues to be based on primary productivity evaluations (DEP) or whole ecosystem productivity (DIFW). For example, Threecornered Pond in Augusta is classified in this report as eutrophic but could also be classified as dystrophic.

Table 6. Trophic Status of Significant Publicly Owned Maine Lakes

Status	Number of Lakes	Acreage of Lakes
Total	2,314	959,193
Oligotrophic	131	111,806
Mesotrophic	1109	662,537
Eutrophic	656	153,055
Hypereutrophic	0	0
Dystrophic	N/A	N/A
Unknown	580	32,865

PART IV. SUMMARY ASSESSMENT OF ESTUARINE AND MARINE WATERS

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 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 must be fishable/swimmable and 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 has dissolved oxygen, bacteria and aquatic life standards. The distribution of the three marine and estuarine classes is presented in Table 1 below.

Table 1
Distribution of Marine and Estuarine Classes

Class	Percentage	Acres
SA	7%	133,379
SB	92%	1,672,368
SC	1%	18,893

This section provides an assessment of the degree to which water quality supports the designated uses. Applicable monitoring results and attainment assessments are summarized within each of these two categories. Appendix 1 lists waterbodies assigned to each of the listing categories described in the Listing Methodology section of this report.

Designated Use: Shellfish Propagation and Harvest of Shellfish

The Department of Marine Resources (DMR) assesses information for shellfish growing areas to ensure that shellfish harvested are safe to eat. Shellfish areas are closed by DMR if they find that that the area has elevated levels of bacteria or if it is felt that the area is threatened by potential sewage pollution problems. Areas are listed in Category 3 in Appendix 1 until the reason for the closure is determined (from DMR). Shellfish areas are classified as 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 2 presents the percentage and acres of the areas for each classification of Maine's 1,825,008 acres of flats and waters. Since 1998, 52,979 additional shellfish acres have been opened.

Table 2
Classification of Shellfish Harvesting Areas

Classification	Percentage	Acres
Supporting (approved)	89.64	1,635,979
Partially supporting (conditional or restricted)	1.81	33073.1
Not supporting (prohibited)	8.55	155,955.90
Total	100.00	1,825,008

Designated Use: Recreation in and on the Water

There is limited monitoring of Maine beaches. In Maine, the monitoring of town beaches and providing public notification is the jurisdiction of the municipality. Towns that have combined sewer overflows that may impact swimming areas are required to monitor the swimming areas and report the data and number of closures to DEP annually. The State Parks are monitored monthly by the State Parks. Acadia National Park was monitored in the past by the park but is now monitored by a volunteer group. Private beaches are responsible for monitoring their own beaches. DEP's monitoring focuses on ensuring that areas influenced by licensed discharges are not a threat to swimmer health. A few beaches are in partial support of their designated use because of combined sewer overflows. Of the beaches monitored there were only two closures posted, at Willard Beach in South Portland. These closures were not attributed to CSO activity. The CSO at Willard Beach did not discharge in 2001. East End Beach in Portland has had closures in the past; however, there were none in 2001. Sandy Beach in Rockland is still closed because of a CSO.

Designated Use: Fishing

A human health consumption advisory has existed since 1992 coast wide against the consumption of lobster tomalley. No evidence of elevated levels of toxic contaminants was found in lobster meat. The advisory was expanded to include bluefish and striped bass in 1996. Most of these fish migrate to the Maine coast in the summer. The entire Maine coast is in partial support of its designated use due to these consumption advisories.

Designated Use: Marine Life Use Support

Attainment of Dissolved Oxygen Standards

The Royal River estuary and the Mousam River estuary are impaired because sections of these estuaries do not meet State Standards for dissolved oxygen. The Piscataqua River estuary has a completed TMDL but implementation has not begun. A new license, based on modeling and sampling, was issued to the wastewater treatment plant in Warren in order to resolve the dissolved oxygen problems in the St. George River estuary. There are insufficient new data to determine if dissolved oxygen standards are being met. The discharges into Goosefare Brook and the Ogunquit River estuary have been moved offshore in order to resolve dissolved oxygen problem in these estuaries. The upper New Meadows estuary and "Lake" appear to have dissolved oxygen problems because of a partial impoundment on Old Route 1 at the Brunswick-West Bath town line. 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 levels measured were a result of natural processes. DEP is reviewing the appropriateness of statutory dissolved oxygen standards for estuarine and marine waters.

Eutrophication

Although there are estuaries that do not meet state water quality dissolved oxygen standards (see previous section), incidences of hypoxia ($>0-\leq 2$ mg/l dissolved oxygen) or anoxia appear to be episodic. New Meadows "impoundment" (salinity over 20 ppt) has anoxic conditions in the deep hole each summer. Causes of events have ranged from influxes of large schools of fish, algae blooms being blown into a small bay to unknown. 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 marcoalgal 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. The results of 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) suggest land-derived nitrogen loading. 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 from nutrients 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 closes shellfish harvesting areas to protect the public health when toxic algae blooms ("red tide") occur.

Designated Uses: Navigation, Hydropower, Industrial Supply and Aquaculture

Aside from general provisions, there are no criteria for assessing these designated uses. The protection of the uses described above should result in the protection of navigation, hydropower, industrial supply and aquaculture.

Summary Assessment of Non-Attainment of Designated Uses

A summary of the extent to which designated uses of Maine water quality classifications are being supported is presented in Table 3. Table 4 summarizes attainment of the designated uses of State Law and the Clean Water Act. The total sizes of waters not fully supporting uses are broken down by cause categories (Table 5) and source categories (Table 6).

Table 3
Overall Use Support in Assessed Marine and Estuarine Waters in Maine (square miles)

Use Support	Evaluated	Monitored	Total
Fully supporting	2,255.2	300.0[1]	2,555.2
Partially supporting[2]	0.0	51.7	51.7
Not supporting	0.0	244.7	244.7
TOTAL	2,255.2	595.4	2851.6

Table 4
Individual Use Support Summary for Marine and Estuarine Waters in Maine (square miles)

Use	Supporting	Partially Supporting	Not Supporting	Not Attainable
Fish Consumption[3]	0	0	2851.6	0
Shellfish[4] (excluding tomalley)	2,555.2	51.7	244.7	0
Shellfish[3] (lobster tomalley only)	0	0	2851.6	0
Aquatic Life Support	2851.1	0	0.5	0
Swimming (including Secondary Contact)	2851.4	0.02	0	0

[1] Estimated miles of monitored estuarine/marine waters.
[2] Partial support does not include statewide advisories for mercury in fish or dioxin in lobster tomalley.
[3] Based on a statewide fish/shellfish consumption advisory.
[4] Area estimated by the Department of Marine Resources.

Table 5

Causes of Non-attainment in Marine and Estuarine Waters in Maine (square miles)

Cause Categories	Major Impact	Moderate/Minor Impact
Priority pollutants	2851.6	0
Organic Enrichment	0	1.4
Pathogen Indicators	244.7	51.7

Table 6

Sources of Surface Water Non-attainment in Maine in Estuarine and Marine Waters (square miles)

Source Categories	Major Impact	Moderate/Minor Impact
Industrial Point Source	2851.6	
Municipal Point/Overboard discharge	244.7	
Combined Sewer Overflows		51.7
Urban Runoff/Storm Sewers		51.7

PART V. GROUNDWATER ASSESSMENT

Chapter 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 98% 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 increasing 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 localized groundwater shortages. This situation has been exacerbated by lower than average preciptiation since the Spring of 2000. The Maine Drought Task Force (convened by the Maine Emergency Management Agency) publishes information on Maine groundwater and surface water levels at the following website: http://www.state.me.us/mema/drought

Ground water is withdrawn from two basic types of aquifers in Maine: unconsolidated glaciofluvial deposits (stratified drift or sand and gravel aquifers), 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.

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 nonpoint source pollution. As public concern about ground water quality increases, more widespread monitoring and detection of contamination can be expected. The Maine Environmental Priorities Project has 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.

Chapter 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 generally 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. This information is scattered in a number of state agencies including the DEP Bureaus of Land and Water Quality, and 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, DHS Health and Environmental Testing Laboratory; and the Department of Agriculture, Food and Rural Resources, Board of Pesticide Control. Other information is collected by the Department of Conservation, the U. S. Geological Survey (USGS), and the Maine Geological Survey (MGS). The data are stored on paper or in computer files. Many of these data are potentially useful for research purposes but are not easily accessed by either the public or by other agencies. This access problem is the subject of a three-phase study of ground water data management, the first two parts of which are completed. Phase II resulted in specific and detailed recommendations for a more efficient and accessible system. This effort is concurrent with the EPA - Maine data management pilot study aimed at improving data communication between the EPA, Maine, and other state or 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 such monitoring under one of 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 data thus derived are incorporated into the maps and reports and have proven invaluable to town planning boards and 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 & 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 (wood waste 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. Sand and gravel aquifers are geologic settings that are particularly susceptible to adverse impacts. Areas with shallow-to-bedrock soils within sensitive lake watersheds are also generally required to monitor ground water.

Ground water monitoring data from these project sites have generally been reviewed on a case-by-case basis. Due primarily to staffing limitations, this is likely to continue to be the case, although some measures have been taken to simplify data management and more routine review

Consistent monitoring requirements for sites engaged in the same activity have been developed renewals and new licenses of waste discharge licenses for certain categories of projects, based on similarities in the site usage and wastewater quality generated. The facilities covered under this program are thus far 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 filed 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 groundwater 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. Monitoring of upgradient and down-gradient 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 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 Maine's drinking water supplies. The study is summarized in the "Public Health and Environmental Concerns" section of this report.

MGS sand and gravel maps are useful in defining aquifer boundaries. Since the boundaries are in GIS, they can be combined with the DHS water supply data and the contaminant site and land use data available in DEP databases.

MGS Aquifer Characterization Activities

As far as characterizing the physical and chemical attributes of the stratified drift aquifers, the 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 a sand and gravel aquifer are also lacking. The MGS and USGS are adding a ground water quality component to their current ground water quantity monitoring program. MGS has some ambient water quality data but has not fully characterized any one aquifer system. Since 2000, MGS has a program to monitor ambient bedrock ground water quality in the Camden, Rockland, Rockport area (in 2000), in northeastern Maine in the Presque Isle area (2001), and currently in west central Maine in the Weld area (2002). Studies of arsenic in ground water wells in main through cooperative efforts of MGS, University of Maine, and USGS have been ongoing. Basic data collection from well drillers on bedrock aquifer characteristics is ongoing. Finally, the stratified drift mapping program is continuing, with an effort to complete mapping such aquifers at a 1:24,000 scale.

Overview of Ground Water Contamination Sources

Key for the Factors and Contaminants Listed in Table 4-2.1 'Major Sources of Ground Water Contamination"

Factors Considered in Selecting a Contaminant Source	
A	Human health and/or envronmental risk (toxicity)
B	Size of population at risk
C	Location of sources relative to drinking water sources
D	Number and/or size of contaminant sources
E	Hydrogeologic sensitivity
F	State findings, other findings
G	Documented from mandatory reporting
H	Geographic distribution/occurrence
I	Other criteria, specified

Contaminants Associated With the Source	
A	Inorganic pesticides
B	Organic pesticides
C	Halogenated solvents
D	Petroleum compounds
E	Nitrate
F	Fluoride
G	Salinity/brine
H	Metals
I	Radionuclides
J	Bacteria
K	Protozoa
L	Viruses
M	Other, specified

Almost all ground water contamination in Maine originates from nonpoint source pollution rather than point source pollution. Table 4-2.1 lists the contaminant sources that are the greatest threats to ground water quality.

Table 4-2.1. 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			

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 Storage Tanks

Underground Tanks
Contact: Bruce Hunter, DEP BRWM, bruce.e.hunter@state.me.us, (207) 287-7672.

Studies to Gauge Effectiveness of Maine's UST Program.
The State of Maine DEP is confident that the environmental regulations governing the installation, maintenance, and operation of underground storage tanks (USTs) are adequate to protect the groundwaters of the state. Two studies were undertaken to see how effective the regulations were in practice. These studies were paid for by the Maine Groundwater Oil Clean-up Fund, which derives its funds from a fee placed on all oil and gasoline imported into the state. The studies are summarized below:

Study # 1: Study of Underground Storage System Annual Inspection Reports, July 2000
Maine UST regulations require annual inspections of all UST facilities, but the results of these inspections are not required to be delivered to the DEP. They only need be kept on site. The objective of the study was to determine how many facilities were inspected, what problems were found, and what problems were corrected. Note that the facilities involved were typically not visited by the consultant. This study was limited to the review of the inspection forms, not the actual facility. A random sampling of 262 facilities showed:

73% had an inspection within the last year, while 27% did not.

For the 73% (190 facilities) that had an inspection:

71% of these facilities had no problems reported, while 29% reported problems.
Only 61% of the problems were remedied, while 39% were not.

The Spring 2001 legislative session enacted legislation that requires annual inspection results be mailed to the DEP and directed the independent Board that certifies underground tank installers to create a new class of technicians, that of Certified Underground Tank Inspector.
This study cost $ 15,000.

Study # 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.
A total of 73 facilities and 134 tanks were tested for adequate corrosion protection. The measurement for pass or fail was a reading of negative 0.85 volts (or more negative) between the tank and the soil. These tests showed:

- 58% passed with 3 good readings along the tank centerline, 13% passed with only one good reading along the tank centerline, and 29% failed the test. The requirement for three good readings is a recommended practice, but the DEP's UST rules only require one good reading. Hence the reason for the two levels of "passing" tests.
- Only 21% of the facilities have the legally required, three year's worth of cathodic protection testing results.
- No relation between the corrosion protection status and the age of the tank was found.
- Smaller tanks (less than 6,000 gallons) are more likely to be adequately protected from corrosion than larger tanks.

The final report recommended the UST rules be changed to require three passing readings along the centerline of the tank and the creation of a new class of technicians, that of Certified Cathodic Protection Tester. No action has been taken on these recommendations as of yet.
This study cost $25,000.

Leaking Underground Tanks and Drinking Water Wells
In December of 1994, to better track clean-up sites and to provide an objective scoring system to prioritize which sites received scarce clean-up dollars, the DEP created the LUST Remediation Priority List. In general, the higher the score, the more quickly resources are allocated to clean-up a site. Since its inception a total of 970 sites have been placed on the priority list in the "active" (requiring clean-up) category, 555 sites have been "closed" (site has been cleaned-up to a given standard and therefore taken off the list), and as of December 2001 396 active sites were on the list. The sites on the priority list are limited to those contaminated by petroleum products.

Table 4-2.1 shows the number of private water supplies (wells) and public water supplies contaminated by petroleum products or threatened with contamination by petroleum products as of December 2001. Note that one active site can contaminate or threaten more than one well.

Table 4-2.1. LUST Priority Sites - Contamination Summary

Number of Contaminated Wells*	Number of Contaminated Public Water Supplies	Number of Threatened Wells*	Number of Threatened Public Water Supplies
365	**23**	**556**	**36**
* Does not include public water supplies			as of Dec 2001

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. Between 1999 and 2001, 390 sites were closed, but 386 new sites were added. To reduce the "backlog" of active sites on the priority list the DEP created and filled two permanent positions, both in the Bangor field office. These two positions are for a Certified Geologist and a Project Manager.

Tanks in the Ground in Maine

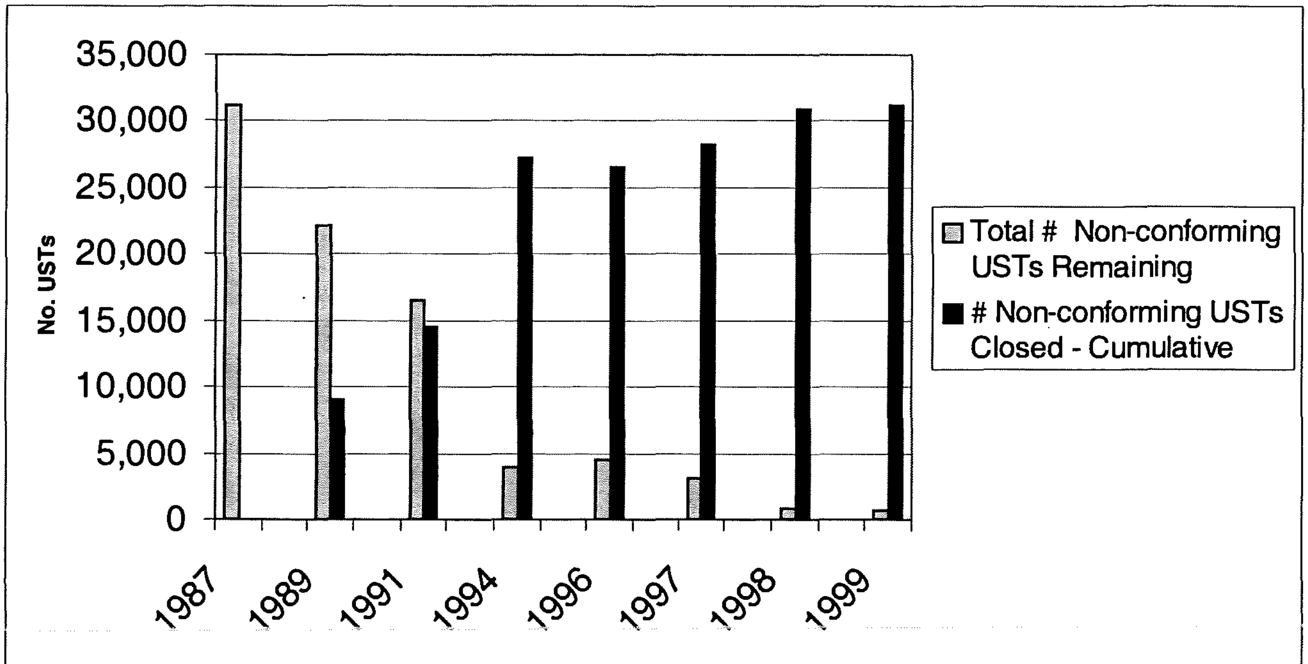
In 1985 legislation required the registration of USTs, and their removal according to a phased in schedule. Removal was prioritized to first eliminate tanks posing the highest threat to groundwater. As of April 2002 contractors had removed or "abandoned in place" over 35,000 tanks. Almost 32,000 of these were tanks constructed of "bare steel" where the walls of the tank have no protective coating and no cathodic protection. These tanks are very likely to leak and cause groundwater 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 221 tanks. Most of these remaining, bare-steel tanks are residential, "consumptive use" heating oil USTs, meaing they are used to heat someone's house.

The DEP's TANKS database currently (April 2002) shows 5323 active, registered USTs. The combined storage capacity (volume) of these active USTs amounts to 38.5 million gallons, with over half of the volume registered to store gasoline. The volumes are given in Table 4-2.2 .

Table 4-2.2 Volume of Active, Registered USTs as of April 2002

Product Stored	Volume (millions of gallons)	Percent
Gasoline, no av-gas	20.53	53%
#1 and #2 heating oil	9.67	25%
Diesel	6.04	16%
Other (includes petroleum and non-petroleum products)	2.31	6%
Total	**38.56**	**100%**

Figure 4-2.1. Changes in the Make-Up of the Maine UST Population. Facilities: 1987-1999.



What's in Store for 2002?

The DEP has initiated a third study to determine how effectively the existing UST environmental regulations are actually being practiced. This study will again use a consultant to look inside and underneath every fuel dispenser at randomly selected UST facilities. The main objectives of this study are to quantify the frequency and estimate the severity of leakage from motor fuel dispensers and submersible pumps. As of early August 2002, 41 of the 100 randomly selected facilities had been surveyed. Over half of these displayed "evidence of a lead", indicating a problem at that facility. The final report should be available by the end of 2002.

The DEP is developing a detailed UST inspection form for UST facilities to assure that all aspects of the underground tank, the piping system, the dispenser, overfill prevention system, and leak detection system are in proper working order and are being used by the operator. Beginning in 2003, the DEP will require that this form be used to complete the required annual UST inspection. Rules will also require this completed form be mailed to the DEP. Presently no set standard for inspection forms exists and mailing forms to the DEP is voluntary. The operator need only keep the form on site for three years.

Above Ground Tanks
Contact: David McCaskill, DEP BRWM, david.mccaskill@state.me.us, (207) 287-7056.

Recent legislation required that the Maine Department of Environmental Protection convene a taskforce to address certain questions regarding the AST Program. The AST Task Force met throughout 2000 and 2001 and published its final report in January of 2002. The executive summary of the report is summarized below. The full report is available at the following website, http://www.state.me.us/dep/rwm/usts.htm.

Summary of Conclusions and Recommendations Concerning Home Heating Oil Tanks
<u>Question #1</u>: Are current regulatory requirements governing home heating oil tanks adequate?

- The Task Force concluded that the existing regulatory requirements are adequate.
- The Task Force acknowledges and supports the continuing efforts of the Oil and Solid Fuel Board concerning the new rule changes that will result in fewer releases of petroleum from home heating oil tanks.
- The Task Force recommends continuance of the current Home Heating Oil Tank replacement program for residential households and sensitive geological areas.
- The Task Force recognizes that driver and technician training is essential to avoid spills. The Task Force acknowledges and supports current industry and OSFB efforts and further encourages the industry to fully implement the training and education programs that are underway.

<u>Question #2</u>: Are the appropriate agencies responsible for regulating home heating oil tanks?

- The Task Force agreed that the Oil and Solid Fuel Board is the appropriate agency to be responsible for the regulation of home heating oil tanks.

<u>Question #3</u>: Are current resources adequate to regulate home heating oil tanks properly?

- The Task Force concluded that current resources are adequate to properly regulate home heating oil tanks.

Summary of Conclusions and Recommendations Concerning Non-Home Heating Oil Aboveground Tanks
<u>Question #1</u>: Are current regulatory requirements governing non-home heating aboveground oil tanks adequate?

- ➢ The Task Force concluded that existing regulatory requirements provide adequate protection. The Task Force identified the enforcement and compliance gaps mentioned in this report. Some of these gaps can be addressed by interagency cooperation or by providing additional resources. The Task Force concluded that legislation is needed to address the lack of enforcement of federal environmental Spill Prevention Control and Countermeasures (SPCC) regulations. Because of time constraints, the Task Force was not able to determine whether requirements should be created to address siting issues and recommended further study of this question.

Question #2: Are the appropriate agencies responsible for regulating non-home heating AST's?

- The Task Force concluded that the appropriate agencies are responsible for administration of existing state regulatory requirements, except in the area of permitting of non-home heating oil supply tanks. The Task Force concluded that the Office of the State Fire Marshal (OFSM) is the appropriate agency to enforce fire protection codes and permitting for non-home heating oil storage tanks, and that DEP is the appropriate agency to administer environmental protection provisions governing marine oil terminals and underground piping associated with ASTs.

Question #3: Are current resources adequate to regulate non-home heating AST's properly?

- The Task Force concluded that additional resources are needed for DEP to enforce the federal SPCC requirements. Additional resources are also needed for OSFM to enforce NFPA requirements pertaining to both storage and supply tanks. The Task Force recommended that in combination with the approximately $85,000 currently allocated annually from the Ground Water Oil Clean-up Fund, 3.5 positions in the OSFM be dedicated to work on AST's (specifically, 3.0 positions funded by the Ground Water Oil Clean-up Fund and a .5 position funded by a permit increase).

Heavy Snowfall Causes Many Spills

The year 2001 was a big year for damage to home heating oil tanks from ice and snow. Since 1995 when the Maine DEP started keeping track of spills from above-ground storage tanks (AST's) there has been an **average of 1 heating oil spill per day from ASTs at single family residences!** One reason for this is the prevalence of these tanks in Maine. 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 which are located either in the basement or outside the residence. In the seven years of record keeping, 2001 holds the record for spills from heating oil tanks at single family residences. There were 558 such spills in 2001 versus 2nd place 1998 at 447 spills and the annual average of 390 spills.

The large snowfalls received early in 2001 are the primary cause of the record number of spills. Although the snowfall received in the winter of 2000/2001 was not unusual, it was more than the amounts received in the winters of 1994/1995 through 1999/2000. There were 351 spills in the first 4 months of 2001 (January through April) versus 206 for the first four months of 1998 and only 178 for the average of the first four months of each year, 1995 through 2001. The typical spill was caused by heavy snow or ice sliding off the roof of a house and landing on the oil filter protruding from the heating oil tank placed next to the house. The weight of the snow or ice snaps the pipe connecting the filter to the tank, allowing the entire contents of the tank to empty into the snow or onto (and often into) the ground.

Installing a filter protector over the oil filter is the simplest way to prevent snow and ice from breaking the oil filter off an outside tank. To encourage homeowners to take this step, DEP contracted with an advertising agency to produce a 30 second public service announcement that was aired frequently in early 2002. Although it is impossible 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.

Other AST-related spills include tank overfills, ruptures, tip-overs, and other mishaps. The frequency of spills makes home heating oil tanks a significant contributor to ground water contamination. Other types of ASTs also contribute to groundwater contamination, but the number of spills involved are much smaller. In 2001, only 168 home heating oil spills (#1 - kerosene and #2) occurred from ASTs serving all other types of structures, and only another 76 spills came from ASTs storing other fuels such as gasoline.

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 1320 gallons aggregate). From June 1996 through December of 1999 only 495 AST's requiring permits were known to be installed (this number does not include tanks storing liquified petroleum since this product does not pose a threat to groundwater). This is an average of 138 tanks installed per year. Only 100 such tanks were installed in 2001.

The DEP's Home Heating Oil Tank Replacement Program started in 1998. This program uses money from the State's groundwater insurance fund to replace old, unstable, and/or leaky tanks and supply lines at low income households with new, properly installed, UL80 (bottom outlet to prevent corrosion) tanks free of charge. This highly successful program is conducted by local social service agencies that deal with low income households. Costs average about $1,100 per new tank. Data from the first three years show 2678 tanks were replaced at a cost (including administrative fees paid to the local social service agencies) of $2.9 million.

In the previous 305b report , the state noted the trend to submerging bulk fuel plants. This means entire bulk fuel plants are being fed by USTs instead of the traditional ASTs. Our UST database records only two USTs of 30,000 gallons or greater storing home heating oil (#1 and #2) installed before June of 1996. Between June 1996 through December 1999 a total of eight USTs (all either 30,000 gallon or 50,000 gallon) at three different bulk fuel facilities were installed. The number of these large heating oil USTs exceed the number of large heating oil ASTs installed at bulk fuel plants in the same period (seven ASTs at five different facilities).

Recent data shows the number of submerged bulk fuel plants continues to grow, but that new, large, AST installations outnumber them. In the two-year period of 2000- 2001, a total of three USTs of 30,000 gallons or greater, storing home heating oil were installed at two different bulk fuel facilities. In the same time, eight heating oil ASTs were installed at five different facilities.

In the spring 2002 session, the State Legislature directed the DEP to administer the Federal EPA regulations dealing with Spill, Prevention, Control, and Countermeasure (SPCC) plans, but this state legislation applies only to aboveground storage tanks (AST) facilities involved in the "marketing and distribution of oil". Therefore, the legislation will apply to gas stations and bulk fuel plants that store petroleum products in ASTs in volumes of over 660 gallons in a single tank or over 1320 gallons aggregate. Plans are underway to administer this new regulation, including the hiring of additional staff and extensive education and outreach before any significant enforcement actually takes place.

Spills
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The DEP's BRWM responded to approximately 4,969 reports of oil or hazardous material spills between January of 2000 and December of 2001. Over 76% of these responses involved discharges of petroleum products to soil and ground water. Between 2000 and 2001, response services personnel discovered over 120 wells that had been contaminated because of petroleum spills around the state; sources of these discharges range from overturned tanker trailers to home heating oil tank overfills (Table 4-2.3).

Table 4-2.3. Oil and Hazardous Materials Spills January 2000 through December 2001

Spill Location	Percent of Total Spills	Number of Wells Impacted
Business	19.5%	15
Residential	30.0%	81
Terminal	8.9%	13
Transportation	18.5%	0
Other	23.1%	17
Total	**100% (4969 spills)**	**126**

Federal Facilities
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During 2000 and 2001 DEP investigated releases of petroleum and hazardous substances at numerous federal facility sites in Maine. Ground water contamination has been documented at active and former military installations in Limestone, Kittery, Brunswick, Cutler, Long Island, Harpswell, Caswell, Caribou, Machiasport, and Bangor. Remedial action continued at Loring Air Force Base to remove solvents from bedrock ground water using an experimental steam injection system. Brunswick Naval Air Station is working to better define the extent of solvent ground water contamination in the eastern plume. At Portsmouth Naval Shipyard in Kittery, the Jamacia Island Landfill is being consolidated and approximately 2 acres of the landfill is being removed from the intertidal zone to improve ground water and surface water quality. Releases from a former Air Force radar site in Machiasport have contaminated residential wells in the area. The Army Corps of Engineers has begun looking into the feasibility of constructing a replacement water supply. Over 19,000 pounds of jet fuel was recovered from contaminated soil using thermal extraction technology at the former Air Force fuel line pumping station in Argyll, Maine.

Agriculture
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In 1992, the total estimated cropland and pasture land 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. These are 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 fertilizer was spread on over 250,000 acres. The major areas of chemical application include potato fields in Aroostook County, blueberry barrens in Hancock and Washington County, and apple orchards and forage cropland in Central Maine. Pesticides and nitrates are the main agricultural ground water contaminants.

Maine's Nutrient Management Law
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In 1998, the Maine Legislature enacted a nutrient management law called "An Act Regarding Nutrient Management". This new 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
Two central pieces of the Nutrient Management Law are:

- A manure spreading ban between December 1 and March 15 and,
- The requirement that all farms confining and feeding 50 animal units or more at any one time develop and implement a Nutrient Management Plan (NMP). An NMP details how farm nutrients will be stored, managed and utilized, and also includes intended manure uses as well as actual recorded data. The NMP's have to be prepared by a certified nutrient management planner.

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 not generated on the farm,
- Utilize or store regulated residuals, such as sludge,
- Are the subject of a verified complaint of improper manure handling (as confirmed by the Department of Agriculture). In this case a plan must be developed and implemented according to a schedule established by the Commissioner.

Another significant part of the Maine Nutrient Management Program is the training and certification of Certified Nutrient Management Planners (CNMP). The University of Maine Cooperative Extension and the NRCS are conducting this part of the program. The program offers two types of training. One is for people who want to be certified as commercial or public CNMP's and the other is for farmers who want to be certified as private CNMP's. The commercial/public specialists can 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:

- Establishes 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 animal units (au) or expanding to greater than 300 au (1 au = 1000 lbs live animal body weight.)
➢ 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.

<u>Impacts of the Law</u>
The implementation of the new 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.

The development and implementation of nutrient management plans will result in more efficient use of nutrients, including manure, on agricultural land. As farmers take training to become CNMP's they will become more aware of the value of the manure they generate and how best to utilize it. 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 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 were implemented, show that water quality within a watershed can be significantly improved.

The implementation of nutrient management plans, which must contain Best Management Practices (BMP's) for insect and odor control, should result in fewer nuisances, fewer conflicts with neighbors, and consequently fewer complaints to the Department of Agriculture. As the program evolves and all the components are put in place, more BMP's will be used on Maine's farms, thereby benefiting water quality.

Pesticides

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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 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 have impacted the quality of its 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 quality. Fourteen percent of the samples showed mostly trace levels of pesticides. The study results suggest that bedrock wells overlain by till in potato regions have 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 samles 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:

- 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 (corn, potato, blueberry, Christmas tree, rights-of-way, oat, makret garden, and orchard sites). One-hundred twenty-nine private domestic wells within 1/4 mile of an active pesticide use site and down gradient of or even with the use site were targeted for sampling. 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 200ppb,
- 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 herdicide stored next to the well.

1996: Wells sampled during the 1992 Triazine Survey were resampled to determine if new ground water protection measures on the labels of atrazine- and cyanazine-containing pesticides plus the promotion of best management practices (BMP's) 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 states that the BPC shall conduct an assessment of private domestic wells in hexazinone use areas 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. In summary:

- 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.

Studies have shown that there are pesticides in Maine's ground water. With the exception of a few sites which 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. In addition, there appears to be a downward trend in the number of wells showing detectable levels of pesticide residues. Increased development and use of BMP's, lower application rates, and increased awareness of ground water issues have had positive impacts on the quality of Maine's ground water.

Nitrate. 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. 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 4-2.4:

Table 4-2.4. Domestic Animal Manure Production

Category of Domestic Animal	% of Manure Produced
Dairy cattle	41
Poultry	32
Beef cattle	17
Horses, hogs and pigs, sheep and lambs	10

Twenty-one of 100 wells tested for nitrate in the MGS/DAFRR three-year study cited above 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 MGS, DAFRR, and USEPA study conducted in 1989 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 (see the section on ground water - surface water interactions); 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. Between 1998 and 1999, DAFRR investigated 100 complaints. Of these, 14 complaints related to drinking water contamination. Twenty-two complaints related to manure impacts to surface water bodies were investigated during this same period.

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.

DAFRR statistics for 1998 indicate that farm land 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 usually economically unfeasible for a farmer to haul manure more than two miles from where it is stored.

Landfills

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The Maine Department of Environmental Protection is directed by statute to regulate the location, establishment, construction expansion and operation of any solid waste facility 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 1999, 1.696 million tons of municipal solid waste (MSW) was generated in Maine. Of this amount, 376,924 tons (or 22%) were landfilled. In addition, 28,670 tons of MSW generated outside of Maine were landfilled in Maine. Approximately 40% of the MSW stream was recycled and a significant percentage was incinerated. 91,274 tons of MSW were exported for disposal outsided of Maine. Although complete data are not presently available for the total amount of "special waste" (non-hazardous solid waste other than MSW) landfilled in Maine in 1999, it can be reported that approximately 165,000 tons of Maine-generated incinerator ash was disposed of in Maine landfills during that year. In addition, other special wastes such as sludges and contaminated soils, an paper mill wastes were disposed.

Comprehensive new solid waste management regulations were adopted in November of 1998. These regulations included substantial changes to the standards and requirements concerning landfill siting, operations and water quality, all of which are directly related to groundwater protection. In part, the regulations required the upgrading of water quality monitoring programs at certain landfills, and detailed specific approaches to detection and assessment monitoring and the implementation of corrective action plans at landfills. Transition provisions were included in the rule, requiring compliance with new requirements by dates certain. Most landfills have revised their monitoring programs and operations plans in accordance with the rule. The Department is currently preparing a package of minor revisions to the Solid Waste Management Rules, principally for the purpose of providing clarification of certain provisions. Some of these revisions concern standards and requirements related to groundwater protection.

Active landfills. There are currently 57 active landfills in Maine (Figure 4-2.3). The majority of these are in substantial compliance with relevant regulatory standards. Of these active landfills, 7 are licensed to accept municipal solid waste; 19 to accept "special waste"; and 31 to accept wood and demolition debris only.

Figure 4-2.3.
Active Landfills in Maine

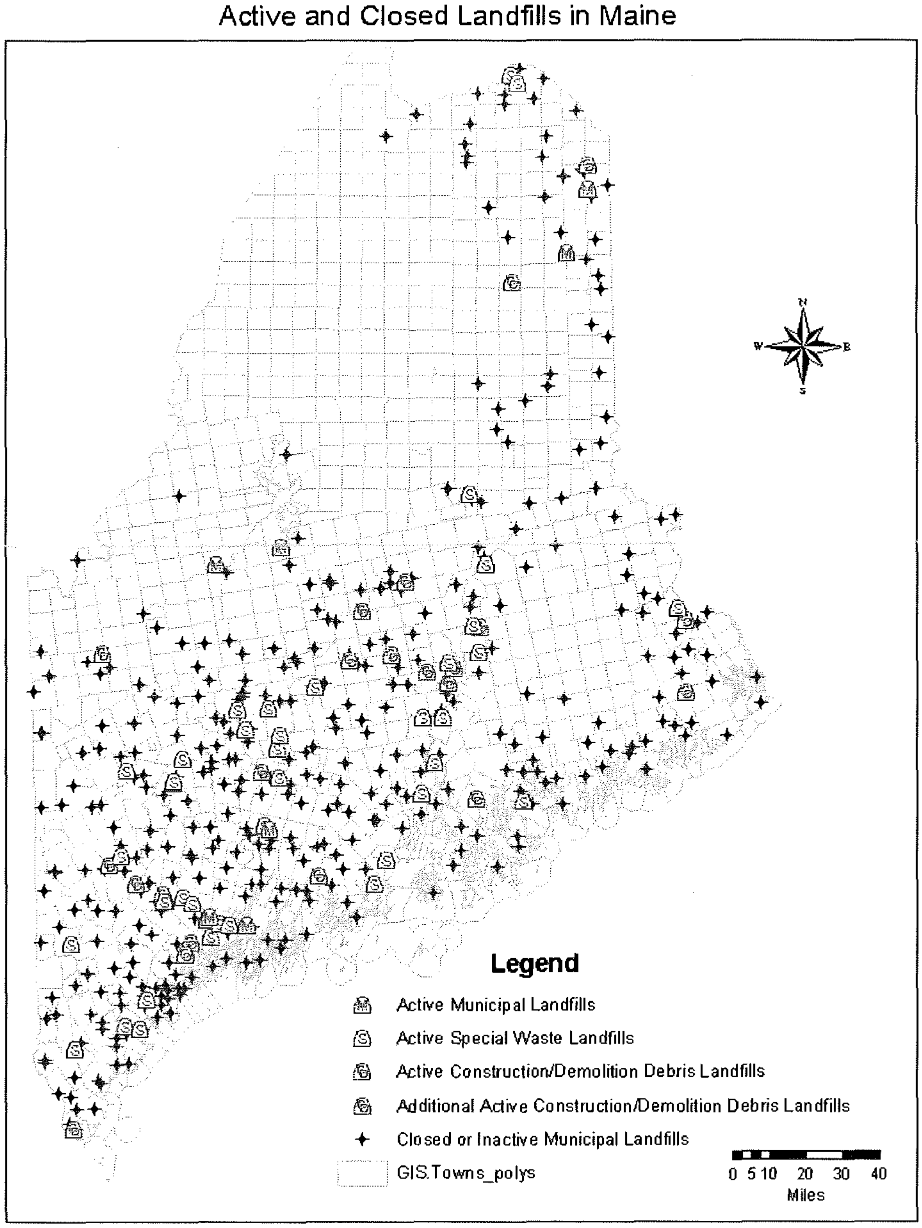


Table of Active Landfills can be found at this internet address:
http://www.state.me.us/dep/rwm/reports/ActiveLF.htm

mholden/09/04/02

Inactive landfills. A total of 404 municipal landfills have been identified in the state. As of July 2002, 375 of these landfills have been closed and capped (Fig. 4-2.4). Twenty-nine remain to be closed. These include 15 currently active sites and 14 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 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.

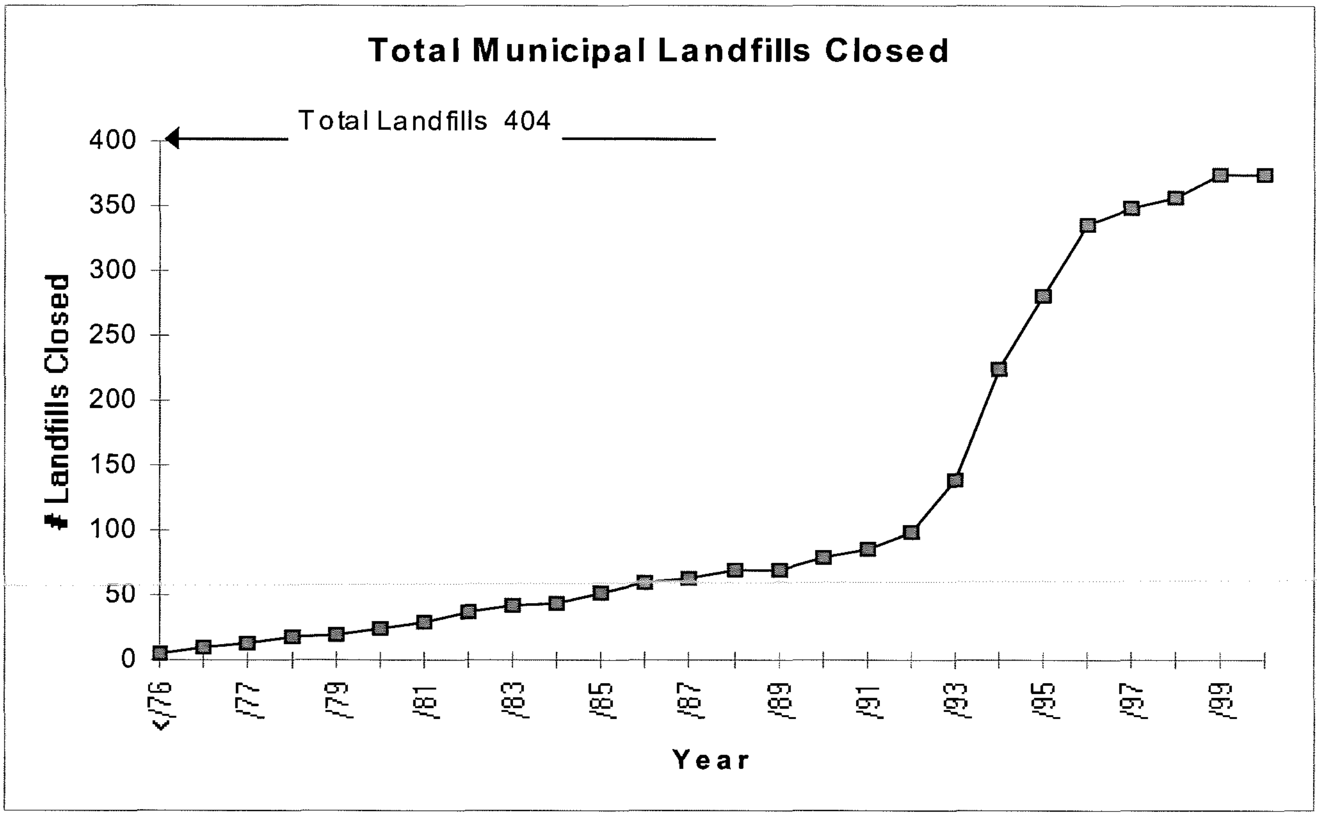
Maine's landfill closure and remediation program was established in 1987, with goals of closing and remediating solid waste landfills that are inadequately designed and constructed, or inappropriately sited. DEP has conducted evaluations of municipal landfills and developed closure procedures. As a result of legislation in 1994, municipalities were allowed to determine for themselves (with proper documentation) whether their landfill meets 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 that 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.

One landfill closure project was completed under state guidance during the 2000-2001 reporting cycle. 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 operaton 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. In November 2001, one million dollars was approved for use on remedial development of replacement water supplies for residents in five of the eight towns where private water supplies are threatened.

Figure 4-2.4.

Total Municipal Landfills Closed in Maine



Sludge, Septage, and Residual Land Applications
Contact: David Wright, DEP BRWM, david.w.wright@state.me.us, (207) 287-7676.

Land application or composting of solid waste, such as food waste, wood ash, sewage sludge (biosolids), paper mill sludge, or fish waste is regulated by the DEP in Department Rules, Chapter 419, Agronomic Utilization of Residuals. Septage is regulated by Department Rules Chapter 420, "Septage Management Rules". These rules establish a framework to characterize residuals to determine potential agricultural benefit and harm if the residual is applied to the State's agricultural or forest lands. The rule also establishes siting criteria and management practices to protect public health and the environment at utilization sites.

Currently residuals are processed and utilized at 536 licensed land application and composting sites in Maine (see table below). There are also many more locations where residuals are legally used for agricultural purposes without a site-specific license. There are no documented cases of significant contamination of soil, surface water, or ground water arising from the land application of sewage sludge, other residuals, or septage in Maine when applicable rules have been followed. However, the Department has required four groundwater investigations at sites where the rules have been violated. The results are in for only one of these sites. The results show localized groundwater contamination with nitrates where biosolids were improperly field stacked.

The Department with the University of Maine is conducting a study of potential groundwater impacts from the field stacking of biosolids. The Department is also reviewing groundwater data from use of artificial topsoils in reclamation projects. Early results show an initial, localized liberation of arsenic as dissolved carbon lowers dissolved oxygen in downgradient groundwater. The Department has also documented several instances of nitrate contamination attributable to the use of animal manure as fertilizer, while investigating potential impacts from residual use.

Type of Utilization Activity	Number of Licensed Facilities
Septage Land Application & Storage	67
Biosolids Land Application & Storage (Class B)	204
Wood-ash & Bio-ash Land Application	174
Other Residual Land Application	15
Composting Facilities	76

Road Salt

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During the winter, more than 100,000 tons of salt are spread on Maine roads for deicing purposes. Today the salt is stored in over 640 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 and spreading 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 the 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 down gradient 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 down gradient 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 may be lost in one year.

In 1985, the Maine Legislature directed the DEP to prioritize all known sand-salt storage areas according to the extent of their ground water contamination problems. Documentation of ground water contamination was based primarily on private well testing. The prioritization was completed in 1986, however funds did not exist for DEP to continue a monitoring program for sand salt storage piles in the state.

In 1986, the Legislature passed two laws to protect ground water by dealing with sand-salt storage facilities. One statute established a state cost-share program for construction of municipal sand-salt storage facilities. The other statute established a compliance schedule for public and private sand-salt storage operations to construct sand-salt storage facilities. This bill originally required that all sand-salt be stored under building cover by January 1, 1996, but the Legislature continued to extend that date because of state budget shortfalls and the lack of state cost-share funds.

In 1998, a multi-agency task force investigated revitalizing the sand-salt storage facility program by (1) modifying the 1986 priority-setting system to include impacts to surface water and current and future ground water use considerations and (2) injecting new monies to complete construction of sites considered most threatened under a new priority system. Legislation passed in 1999 accomplished both of these goals but also eliminated the need for lower priority sites to construct sand-salt storage buildings. In all 145 sand-salt storage sites remain in the sand-salt storage facility program, eliminating more than 300 sites from having to construct a building. $2.5 million was appropriated in that biennium and $1 million more in the next for municipal, county, and DOT sand-salt construction, however, given current building costs, this amount will pay for construction of only those twenty-four new storage sites identified as contaminating groundwater above drinking water standards.

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. This is being done to improve air quality by eliminating a source of dust and to ease the spring clean-up burden. MDOT files indicate that since 1969 at least 45 wells have been made unpotable by sand-salt spreading on roadways. Recent 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.

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. In December 2000, the BEP adopted new rules to govern the siting and operation of all new sand-salt storage areas. This rule 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. DOT continues to handle complaints related to sand-salt piles, which they operate, and roads, which they maintain.

Hazardous Substance Sites
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There are numerous sites in Maine where hazardous substances have allegedly been discharged to the environment. As of December 2001, BRWM Division of Remediation's Uncontrolled Hazardous Substance Sites Program (USP) and the Superfund Program had 89 (up from 78 in the previous reporting period) active uncontrolled hazardous substance/Superfund sites under investigation, 38 of these are in the Operations and Maintenance stage. Eight 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, 476 sites have been reported to the Uncontrolled Hazardous Substance Sites Program (USP). Of these, 135 are active (this includes Pre-Remedial sites and Department of Defense Sites, in addition to USP/Superfund sites), 241 are inactive, 70 are resolved and 30 have been removed from the USP's List.

- "Inactive" means that the USP does not have an interest in the site. There are several reasons a site can be designated "inactive", including: 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, reason is uncovered to require further investigation.

- "Resolved" means that the USP has performed a final review of the site's case history and signed off on the site. This is not meant to be confusing, but as an attempt to clarify the site's standing and to provide additional comfort. If a site is inactive, the USP doesn't 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" 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 groundwater. However, protecting public health at the tap and/or removing hazardous substances from groundwater is expensive. Generally, even under the best of circumstances, long term monitoring is required. For these reasons these sites receive a significant amount of the funds available for ground water protection. Common hazardous substances found in the ground water at these sites include organic solvents, pesticides, and metals. Many of these chemicals are carcinogenic, mutagenic, and/or teratogenic.

Twelve sites are listed on the National Priority List of Superfund Sites, including the Brunswick NAS, McKin disposal site, O'Connor Salvage, Pinette Salvage Yard, the Union Chemical site, Winthrop Landfill, Loring AFB, Portsmouth Naval Shipyard West Site, Hows Corner in Plymouth, the Eastern Surplus Site , the Eastland Mill, and the Saco Municipal Landfill. The Saco Tannery Waste Pits Superfund Site was "de-listed" in 1999. The Callahan Mine site in Brooksville has been proposed to be added to Superfund (see mining section for more information on this site). At least 136 drinking water wells have been contaminated above the BRWM's "action level" (one-half the MCL's or MEG's) at 39 uncontrolled sites and at least 305 other wells are at risk. The database listing wells contaminated at uncontrolled sites has not been updated since January 1999, so it likely underestimates the number of wells impacted.

Case Study:
Eastland Woolen Mill Superfund Site, Corinna, Maine

Eastland Woolen Mill in Corinna, Maine manufactured woolen materials from the 1930s to 1997 when the mill closed. Hazardous substances, such as chlorobenzene compounds, were used in the manufacturing process. Over time, some of these substances were released, impacting local groundwater, surface water, sediments and soil. The U.S. Environmental Protection Agency (EPA) and the Maine Department of Environmental Protection (DEP) are involved with the investigation and cleanup of this site. See the map on the following page for site details.

On July 22, 1999, the site was listed in the Federal Register on the National Priorities List (Remedial Superfund site list) and the site became eligible for federal remedial cleanup funds. In 1999 two federal cleanup programs were initiated at the site: the standard remedial Superfund process and the Non-Time Critical Removal Action process. The standard remedial Superfund process starts with Remedial Investigation/Feasibility Study activities and evaluates the long term cleanup of the site. The Non-Time Critical Removal Action (NTCRA) process consists of removal activities that can be implemented to address more imminent cleanup actions conducted in the short term. The U.S. Army Corps of Engineers (ACE) worked with the EPA to conduct both the Remedial Investigation / Feasibility Study and NTCRA activities. Additionally, several contractors and sub-contractors have worked for ACE and EPA at the site.

During the summer of 1999, contractors working for EPA initiated data collection activities for the Remedial Investigation/ Feasibility Study reports. EPA and ACE's contractors developed and initiated a work plan and a Phase 1 investigation, to collect site data. The Remedial Investigation data collection included the following activities: installation of soil borings and monitoring wells, collection and analysis of groundwater, surface water, residential well, soil and sediment samples, aquatic tests in the East Branch of the Sebasticook River. The site data collected in 1999 was compiled and used to develop a phase 2 data collection, which began in autumn of 2000. The Remedial Investigation / Feasibility Study data has also been used to aid in conducting actions for the Non-Time Critical Removal Action. Also,
during 1999, EPA / ACE's contractors initiated site activities for the Non-Time Critical Removal Action.

In 2000 and 2001, EPA and ACE contractors conducted NTCRA site activities, changing the landscape of downtown Corinna from what it was in 1999. By the end of December 2001, the following activities were completed:

- ♦ Hazardous materials & asbestos abatement in the mill buildings prior to their demolition,
- ♦ Demolition of several buildings located on Route 7 (Newport Road and Main Street),
- ♦ Route 7 bridge construction and road relocation,
- ♦ Mill Pond was drained and restored as a river/wetland, thereby completing the restoration
- ♦ Corundel Dam repair,
- ♦ Recreational trail bridge construction,
- ♦ Relocation of utilities (sewer and water lines, etc.) and the Odd Fellows Hall building,
- ♦ Excavation of chlorobenzene and petroleum contaminated soils from Area 4 (located on mill property on the east side of Mill pond and on the north side of Route 7/ Main Street) and backfilling of the excavation,
- ♦ Excavation of chlorobenzene contaminated soils from Area 1 (located under the former mill complex, the former Route 7 bridge and the former river bed of the East Branch of the Sebasticook River),
- ♦ The temporary water treatment system for treating contaminated groundwater and excavation water was relocated,
- ♦ Approximately 75,000 cubic yards of contaminated soil from 2000 & 2001 excavation activities were screened (to remove rocks) and stockpiled,
- ♦ Several underground tanks were removed,
- ♦ A low-temperature soil treatment pilot-test was conducted on the contaminated soil.

NTCRA activities are scheduled to continue in 2002. These activities include:

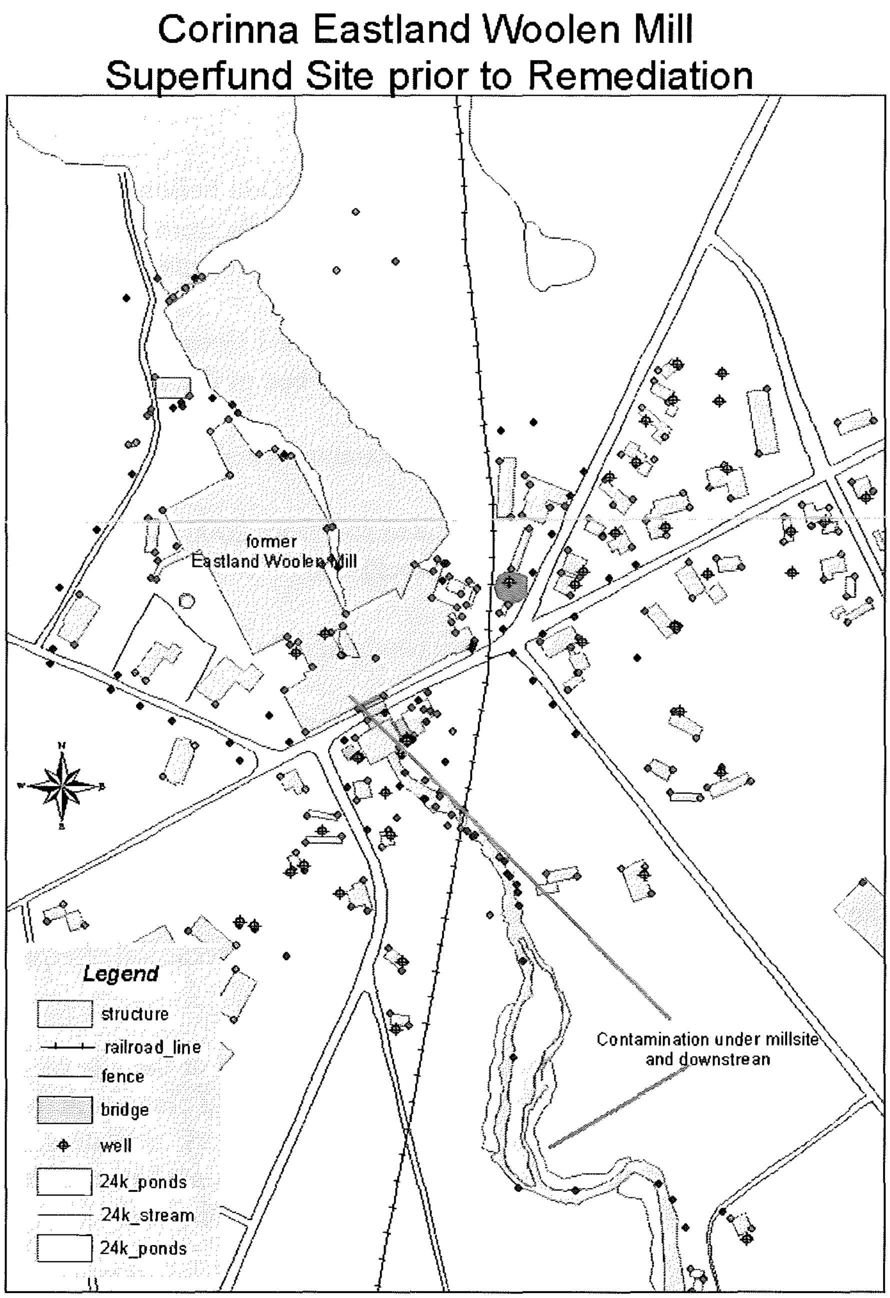
- Low-temperature treatment of the stockpiled contaminated soil,
- Continued operation of the water treatment system,
- Completion of Area 1 back-filling,
- Restoration of the relocated section of the East Branch of the Sebasticook River.

In addition to the NTCRA activities in 2002, EPAreleased the Remedial Investigation and Feasibility Study (RI/FS) reports and is in the process of selecting remedial alternative(s) for the entire Eastland Woolen Mill site.

The DEP has played an active role in the clean up work conducted at the site by reviewing site documents, participating in decisions regarding site investigation and cleanup activities, assuring compliance with State laws/ rules/ regulations, observing the work activities, attending site meetings, etc. DEP will continue its participation in the cleanup activities at the site in the coming year, particularly the selection of the final clean-up plan for the site.

The investigation and cleanup activities at the site will continue to involve many parties. The EPA, ACE, and their contractors are working with many groups, such as the DEP, the Town of Corinna, the Corinna Coalition Committee, Maine DOT, Maine Historic Preservation Committee and several other State and Federal entities to coordinate the NTCRA activities. All of the groups involved in the NTCRA activities are committed to seeing that the cleanup of the site is done.

Eastland Woolen Mill Superfund Site Corinna, Maine. Prior to Remediation.



Resource Conservation and Recovery Act Sites
Contact: Stacy Ladner, DEP BRWM, stacy.a.ladner@state.me.us, 207-287-2651.

The BRWM lists approximately 725 large quantity (greater than 100 kilograms per month) hazardous waste generators that currently active in the State of Maine. Additionally, there are about 560 inactive large quantity generators listed. Our records also show approximately 5500 small quantity (less than 100 kilograms per month) generators in the state. Maine DEP currently lists approximately 85 sites with non-interim Resource Conservation & Recovery Act (RCRA) licenses and 60 sites with interim licenses. Over 72 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. Ten of these 37 facilities have ongoing, active remediation.

Solvent contamination has been found in the Sanford municipal well field, which serves over 6,500 customers. A number of manufacturing facilities at the Sanford Industrial Park have been investigated and several have known groundwater contamination. The source of the well field contamination has yet to be confirmed.

Chlorinated solvent contamination has been found in the groundwater at Masters Machine in Bristol. Four onsite wells and at least three residential wells offsite have been impacted. 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 Franklin Shoe facility in Farmington conducted a hydrogeological investigation in the fall of 2000 as part of its site closure. The concern was that ground water at the site may have been contaminated by chlorinated solvents. A well survey of the properties surrounding the was conducted to determine if there were any residential wells in the area. Soil samples were taken and analyzed from microborings in the area of the facility that had historical solvent contamination. Additional samples were taken from the septic system and leachfield. One sample taken from an outdoor drum storage area detected some contamination. No residential wells were found from the well survey. In the spring of 2001, Franklin Shoe removed soil from the drum storage area for disposal. Further sampling in the area did not detect any further contamination.

The Lisbon municipal water supply, which supplies 6,600 people has been impacted by chlorinated solvents, MTBE, and road salt over the past two decades. The Moody Road Well in Lisbon has been impacted by solvents from the Maine Electronics Plant as well as by MTBE from a nearby gasoline station. The solvents from Maine Electronics were discovered in 1987 and a carbon filtration system was installed at the well to filter out these contaminants. Since that time, a pump-and-treat system installed on the Maine Electronics site is controlling the offsite migration of chlorinated solvents. The Moody Road Well has shown no detections of Maine Electronics site chemicals for three years. The Moody Road Well has also tested positive for MTBE since 1991 and continues to show low levels of MTBE. A separate town well has recently tested positive for road salt, a nearby DOT storage yard is the suspected source.

Septic Systems
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Maine is a predominantly rural state, and relies heavily on decentralized sewage disposal facilities for disposal of human waste, i.e. onsite sewage disposal systems. The State of Maine has regulated onsite sewage disposal since 1926, to varying degrees. Over the years, the Maine State Plumbing Code, Subsurface Wastewater Disposal Rules (Rules) in their various iterations have been promulgated by the Department of Human Services, Bureau of Health and its antecedents. The DHS Division of Health Engineering, within the Bureau of Health, currently regulates septic system design and permitting. The Bureau has been, and continues to be, responsible for the Rules because they have historically been viewed as a public health code, rather than an environmental regulation.

The Wastewater and Plumbing Control Program within the Division of Health Engineering is the program which promulgates and administers the Rules. The Wastewater and Plumbing Control Program maintains copies of all plumbing and subsurface wastewater permits issued statewide. Approximately 40,000 plumbing permits are processed annually. During the 1998 Fiscal year the Program processed 10,072 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, it is reasonable to assume the number of septic systems has increased a similar amount to approximately 334,100. Of all the sources known to contribute to ground water contamination, septic systems directly discharge the largest volume of wastewater into the subsurface environment. The major contaminants of concern found in septic system effluent are nitrate, bacteria, and viruses. As discussed previously, high concentrations of nitrate may cause methemoglobinemia ("blue-baby syndrome") in infants. Correlations have also been shown between the incidence of stomach cancer and the concentration of nitrate in drinking water. The potential for disease transmission by the microbes discharged by septic systems is also a public health concern.

Nitrate. Major factors affecting 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 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 4-2.5.

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 2000 to December 2001 indicate less 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-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 was tentatively attributed to people who suspect they have problems with nitrate may tend to test more often, increasing the percentage slightly. Various other considerations might affect comparisons among the studies.

Table 4-2.5. Nitrate-N Frequency Distributions.

Nitrate-N (mg/L)	HETL Database[1] %	HLK Study[2] %	DEP-MGS Study[3] %
0.00 to 2.50	91.3	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	.65	1.3	1.4
Greater than 10.0	.05	1.5	0.4
# Analyses	7,337	381	511

[1]HETL database for private well analyses between 1/1/00 and 12/31/01.
[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 2000 and December 2001 shows that 30% of the 6744 well samples analyzed for total coliform tested positive. During the same time period, the HETL database indicates 3.5% of the 4367 wells tested for E. coli 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 2000 to December 2002 the HETL database shows 35% of the dug wells and 16% of the drilled wells testing 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

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Discharge of pollutants underground 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 4,000 businesses have been contacted either by mail and/or 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, photoprocessors, car and truck washes, and auto body shops. Most of these facilities have been required to 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:

- A weekend leaking oil tank at a maintenance garage in Brunswick allowed oil to escape through a floor drain to 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 homeowner wells; and
- An autobody shop in Gorham has been linked to contaminants found in at least threee 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 has 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 1992, dry cleaning businesses were surveyed for their waste handling practices and the presence of injection wells. Photoprocessors were surveyed in 1993. Car and truck washes were surveyed in 1994.

In 1998, the focus shifted from inspections by business sector to a watershed-oriented approach. In FFY 98 facilities within the Kennebec River watershed were targeted for inspection and in FFY 99, the Androscoggin River watershed was chosen. During that two-year period, more than 500 businesses were inspected and 115 businesses (23%) were identified as being in violation.

The two most recent watershed projects, in FFY 00 and FFY 01, were conducted in the Presumpscot River and St. John River watersheds, respectively. Using an protocol that targeted suspected businesses with a pre-inspection mailing to assess violation potential, 425 business inspections yielded 150 violations (35%). By emphasizing education, technical assistance and the importance of a business's image within the community, nearly 98% of those businesses came into compliance within one year of having the violation identified.

Stormwater Infiltration
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Infiltration of stormwater runoff has been practiced in Maine for many years, although it has been used primarily as a means of stormwater quality control, principally 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; although infiltration is encouraged in sand and gravel mines by performance standards which allow less complex permitting procedures in pits which remain naturally internally drained throughout their development and reclamation. There are increasing concerns about the potential impacts of developments with large impervious areas on recharge and baseflow, particularly in small watersheds. However, the sites suitable for infiltration of large volumes of runoff are limited by the high water table, shallow bedrock, and generally low-permeability soils common in much of Maine. These factors suggest that subsurface storage and gradual release of stored water to the surface may be the only practical option in many circumstances.

The current generation of stormwater management systems using infiltration for quantity control provides minimal treatment prior to discharge of stormwater to the infiltration structure. Current Department practice requires ground water quality monitoring in most situations, particularly if runoff is from a commercial/industrial area or other facility with a large connected impervious area, unless more aggressive treatment practices, such as underdrained swales or similar measures, are employed above the infiltration facility. Small commercial facilities may be able to use skimmer socks or equivalent BMPs in drywells or catch basins if the Department is satisfied with their maintenance procedures. These BMPs are frequently recommended even for smaller developments during and following road construction and resurfacing, following observation of several inches of free product in oil – water separators at various sites following construction of new parking areas. Groundwater quality monitoring is not generally required at residential developments due to the relatively clean runoff from those facilities, provided that sufficient pre-treatment measures, such as grassed swales or buffers, are provided ahead of the infiltration area. All proposals for infiltration systems must include a detailed maintenance program.

Adverse impacts on groundwater quality have been demonstrated at those sites that are conducting regular groundwater 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), and dissolved organic carbon, and reduced 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 and median concentration have been gradually increasing since the first result above MDL. This might be expected with metals, including sodium to some extent, which would accumulate gradually and be released due to changing chemical conditions, principally onset of reducing conditions from accumulation of organic matter in the basin soils, but concentrations of many pollutants, including chloride and TDS, also show continual increases over eight or more years.

Stormwater infiltration is generally conducted at sites with a significant thickness of unconsolidated sandy aquifer. Sites with multi-level wells show that, prior to starting infiltration, groundwater at depths of five feet or less shows the effects of many of these contaminants, while groundwater at depths of twenty feet or more shows little adverse impact. 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. Recent monitoring results suggest that shallow groundwater quality has stabilized at somewhat higher pollutant concentrations than pre-infiltration conditions, while the quality of deeper water continues to deteriorate, with pollutant concentrations significantly greater than those found in shallower groundwater.

Surface Impoundments

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. The Surface Impoundment Assessment was funded by EPA. 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 completed, 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, but some 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, bill.p.brown@state.me.us, 207-287-7804.

During the reporting period January 2000 and December 2001, one new HDPE lined lagoon wastewater treatment facility in Waldoboro was constructed to treat and store treated wastewater before discharging to the land (spray irrigation).

The construction of these facilities was authorized by the BLWQ, Division of Engineering and Technical Assistance under Section 411 MRSA Title 38. In these lagoons, biological treatment of domestic wastewater occurs. Oxygen, which is necessary for the treatment, is introduced naturally in facultative lagoons or artificially introduced by blowers in aerated lagoons.

To minimize leakage these new lagoons were constructed using a high-density polyethylene synthetic liner (HDPE). These facilities installed monitoring wells to monitor any leakage that may result in the contamination of ground or surface water. If contaminants are noted 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 monitored may include nitrate-nitrogen, ammonia-nitrogen, TKN, TOC, COD, hardness, pH, chloride, alkalinity and fecal coliform. Metals monitored periodically include arsenic, cadmium, zinc, lead, mercury, selenium, silver and nickel

To date there has been no reported groundwater contamination from municipal wastewater treatment lagoons within the State.

Salt-water Intrusion
Contact: Marc Loiselle, Maine Geological Survey, marc.loiselle@state.me.us, 207-287-2801.

In coastal areas, excessive ground water withdrawals and well placement too close to the shoreline may lead to saltwater intrusion. This is particularly significant considering that Maine has approximately 3500 miles of coastline and development pressures are great along most of it. 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, mark.n.stebbins@state.me.us, 207-287-7810.

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 mines were mined for copper and zinc, however there are other metals which are found at elevated levels onsite and in the nearby surface water bodies.

The Kerramerican Mine site is currently being investigated by Noranda, a Canadian mining company, who is a potentially responsible party at the site. Noranda has agreed to work with the State's Uncontrolled Sites Program to investigate and remediate the property to avoid being listed on the National Priorities List (NPL or Superfund). Metals found at the site are cadmium, chromium, copper, lead, zinc, iron, and mercury.

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 we are waiting for EPA headquarters to list the site.

Gravel Pits
Contact: Mark Stebbins, DEP BLWQ, mark.n.stebbins@state.me.us, (207) 287-7810.

Five hundred twenty-eight gravel pits 5 acres or greater have been licensed by the State. The number of unlicensed (illegal) pits and gravel pits falling below licensing thresholds is unknown. Recent changes to performance standards 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.

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 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, Radiation Control Program, Division of Health Engineering, Department of Human Services, tom.hillman@state.me.us, 207-287-8401.

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 it low-level waste to facilities in South Carolina or Utah for burial. Maine Yankee as of November 2001 was over 50% complete in decommissioning.

Maine Yankee stores its high level waste (HLW) on-site and will continue to do so after decommissioning. The storage facility for this waste was completed in 2002 and called an Independent Spent Fuel Storage Installation (ISFSI). This installation will house all the spent fuel and 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.

The transfer of spent fuel from the spent fuel pool to the new dry fuel storage facility (ISFSI) was expected to begin in the spring of 2001 and be completed by the fall of 2002. This event has been rescheduled to start in summer 2002 and end summer 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. All of Maine Yankee's spent fuel will be housed in 60 casks with GTCC in another 4 casks and all situated above ground on concrete pads. The ISFSI will be 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 or Utah for burial. The reactor is scheduled for shipment to and disposal in South Carolina in late 2002. Concrete debris was to be used as back fill on-site, but will instead be shipped out of state to a disposal.

Maine's Department of Human Services, Radiation Control Program monitors generators of low level radioactive waste (LLW) and 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 and tritium exit signs, that have been 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 it.

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 2002, DEP has used the statewide 8 digit HUC code watersheds to describe ground water quality (Figure 4-2.5 shows these minor drainage divides). The three ground watersheds or aquifers were selected based on 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 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 database to indicate "ambient" water quality. The locations of the wells used to indicate ambient water quality are shown in Figure 4-2.6, and the summary of the ambient water quality data is in Table 4-2.6.

The ambient ground water quality monitoring network consists of 2198 public water supplies. A total of 413 were used for this analysis. Each of the selected public water supplies is provided by only one source of water: 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, we believe 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 on use and vulnerability criteria, it is premature to choose specific aquifers based on these criteria. Because of our ongoing efforts at groundwater-threat database management linked with groundwater use and vulnerability assessment, we hope 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 help the Ground Water Program determine where we can improve our data management to provide better coverage in the future.

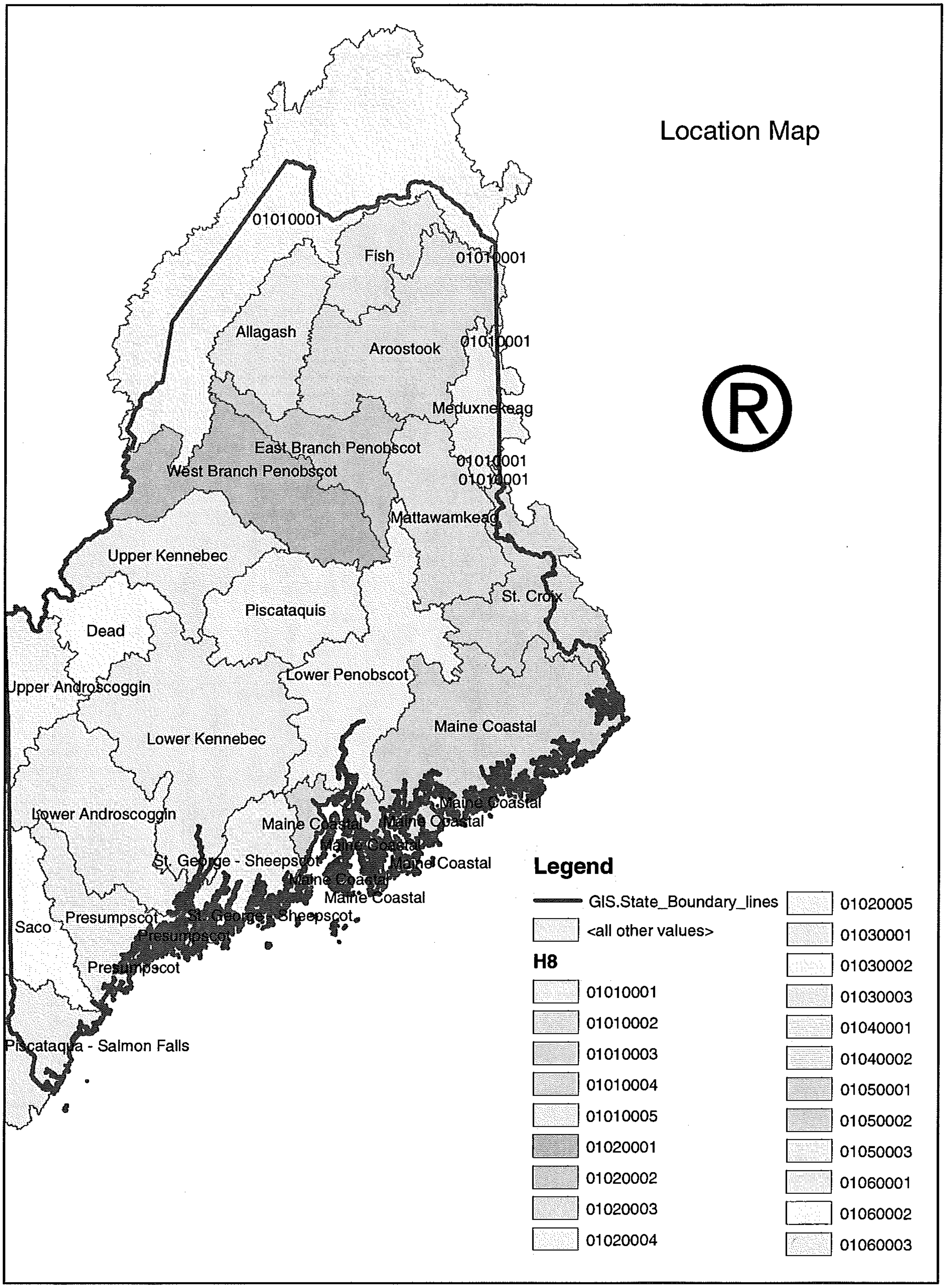
Figure 4-2.7 shows the locations of the towns discussed in the following section. Figures 4-2.8 A,B,C and Tables 4-2.7A through and 4-2.9B summarize aquifer data and threats to ground water in the selected aquifers. Table 4-3.1 lists the status of actions being taken to address ground water contaminant problems in these aquifers. This attempt has uncovered three areas that pose a difficulty in reporting information as requested by EPA:

1. The data are stored differently (hard copy vs. electronic) and are collected from numerous programs having different sampling reporting periods.

2. 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.

3. 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.

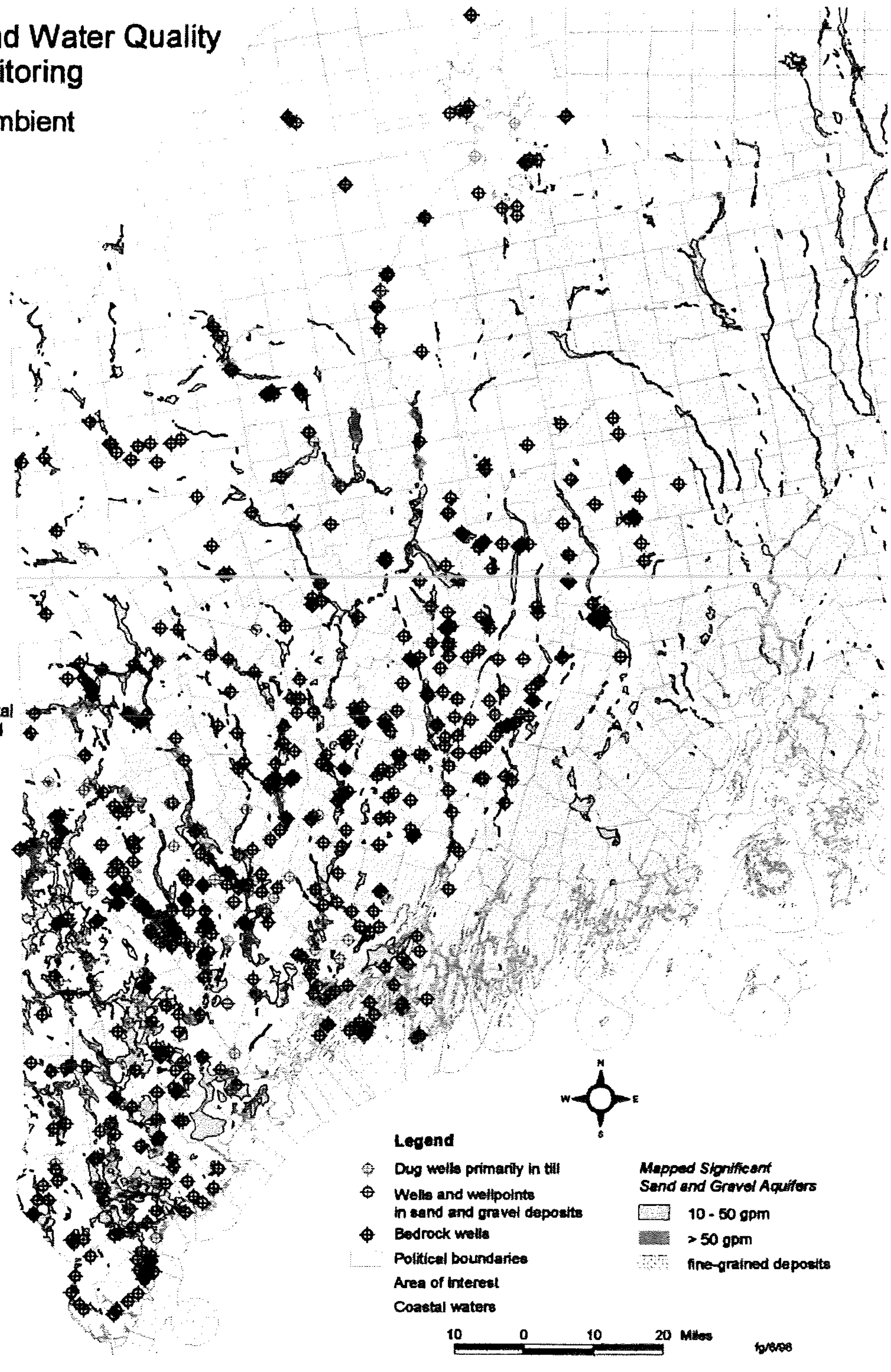
State of Maine: Major Drainage Divides

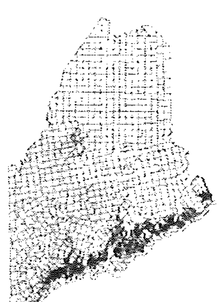


Ambient Ground Water Quality Monitoring

Distribution of Ambient Water Quality Wells

Created for the
Maine Dept. of Environmental Protection, Bureau of Land and Water Quality
EPA 305b Report





Location Map

Table 4-2.6 Ambient Aquifer Monitoring Data*

Ambient Ground Water Quality Monitoring Well Data

Aquifer Description: Till **Data Reporting Period:** Jan. 2000-Dec. 2001
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 ≤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 ≤10 mg/l	>10mg/l nitrate	Parameters are detected at concentrations exceeding MCL's
Ambient (raw) water quality data from public water supply wells	18	VOC	0	0	0	0	0
		SOC	0	0	0	0	0
	# of Tests:	NO3	14	9	1	0	1
	25	Other	1	0	0	0	0

Ambient Ground Water Quality Monitoring Well Data

Aquifer Description: Bedrock **Data Reporting Period:** Jan. 2000-Dec. 2001
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 ≤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 ≤10 mg/l	>10mg/l nitrate	Parameters are detected at concentrations exceeding MCL's
Ambient (raw) water quality data from public water supply wells	357	VOC	3427	26	2	1	1
		SOC	355	1	0	0	0
	# of Tests:	NO3	324	153	13	2	2
	5,418	Other	589	317	67	141	28

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

* data supplied by DHS /BH/DHE/Drinking Water Program, analysis by DEP/DEA/Environmental Geology Unit

Table 4-2.6 Aquifer Monitoring Data* (Continued)

Ambient Ground Water Quality Monitoring Well Data

Aquifer Description: Stratified Drift **Data Reporting Period:** Jan. 2000-Dec. 2001
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 ≤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 ≤10 mg/l	>10mg/l nitrate	Parameters are detected at concentrations exceeding MCL's
Ambient (raw) water quality data from public water supply wells	38	VOC	1	0	0	0	0
		SOC	23	1	0	5	0
	# of Tests:	NO3	14	12	0	0	0
	145	Other	39	21	3	26	19

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 /BH/DHE/Drinking Water Program, analysis by DEP/DEA/Environmental Geology Unit

Figure 4-2.7. Locations of Towns Discussed in the Following Sections

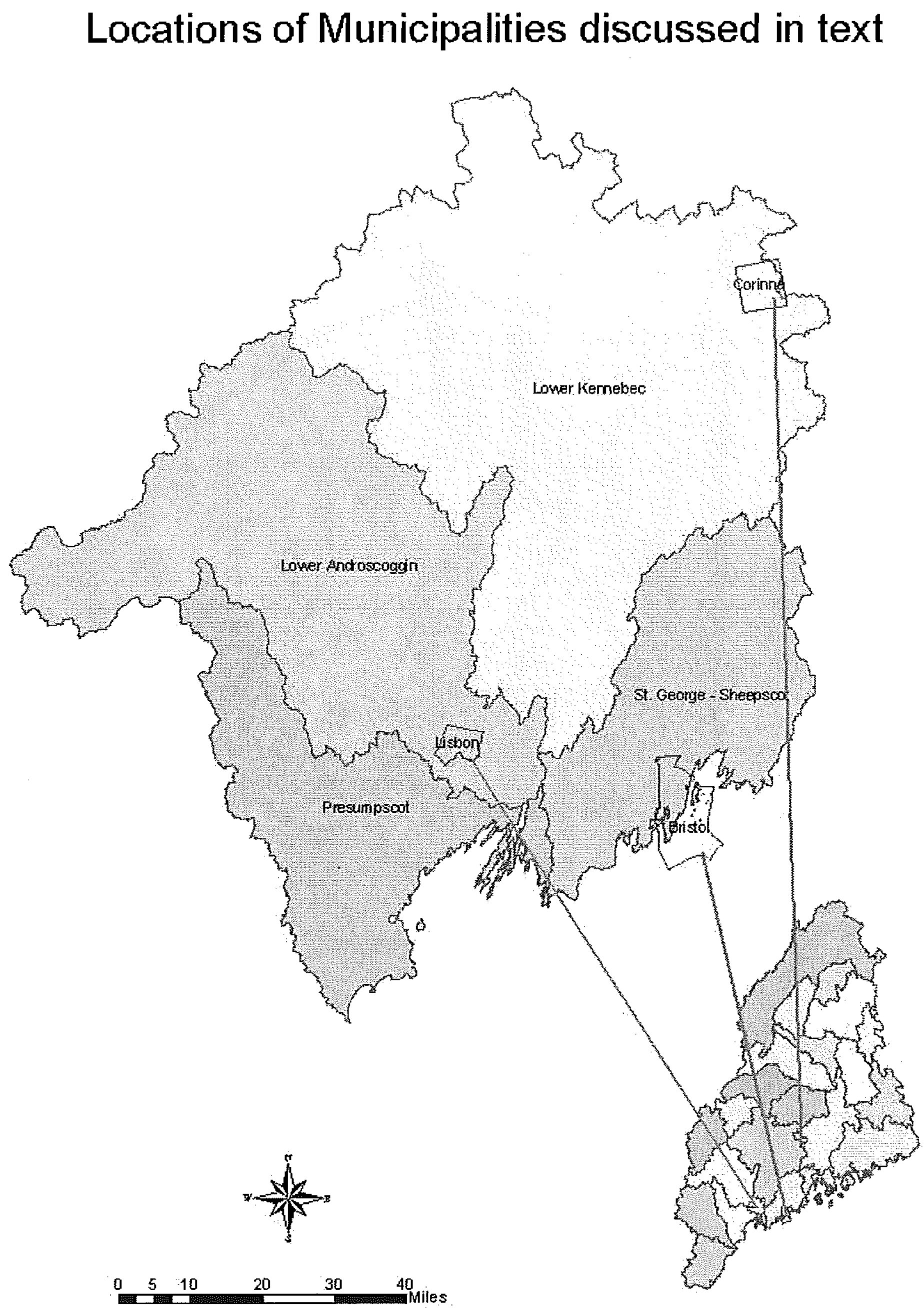


Figure 4-2.8A Town of Bristol - Aquifer Data and Threats to Ground Water

map here

Town of Bristol
Aquifer Data and Threats to Groundwater

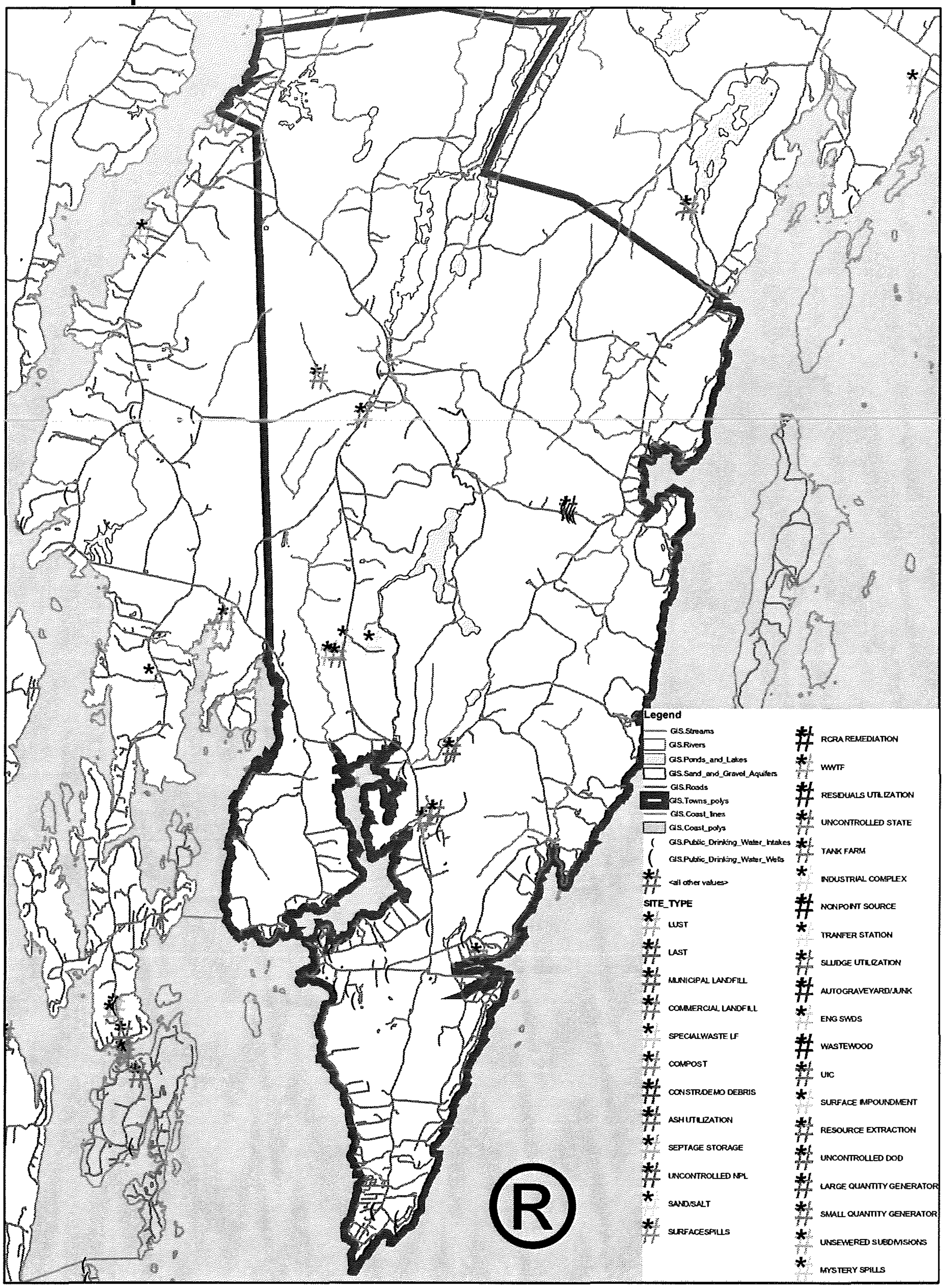


Table 4-2.7A. Town of Bristol Aquifer Monitoring Data

Aquifer Description: Bristol Bedrock Aquifer **County:** Lincoln
Aquifer Setting: primarily bedrock and till **Data Reporting Period:** Jan. 2000-Dec. 2001

Monitoring data type [1]	Parameter groups	Total number of wells used in assessment	No detections of parameters above MDL's 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	Nitrate >10ml/l	Parameters are detected at concentrations exceeding MCLs
Finished water quality data from public water supply wells	VOC	0			0	0	
	SOC	0	0	0	0	0	
	NO3	0			0	0	
	Other	0	0		0	0	
Raw water quality data from private or unregulated wells (Maine Health and Environmental Testing Laboratory)	VOC	1	1	0	0	0	0
	SOC	0	0	0	0	0	0
	NO3	20	0	20	0	0	0
	Other	147	96	10	33	0	8
Raw water quality data from public water supply wells "ambient" network	VOC	*	*	*		0	
	SOC	*	*	*	0	0	
	NO3		0		0	0	
	Other		0	0			

Major uses of aquifer or hydrologic unit: X Public water supply; X Private water supply; ___ Irrigation; ___ Thermoelectric; X Commercial; ___ Livestock; ___ Mining; ___ Industrial; ___ Baseflow; ___ Maintenance

Uses affected by water quality problems: X Public water supply; X Private water supply; ___ Irrigation; ___ Thermoelectric; ___ Commercial; ___ Livestock; ___ Mining; ___ Industrial; ___ Baseflow; ___ Maintenance

1. Department of Human Services does not collect raw water quality data from public water supply wells.
* # wells tested for VOC's and SOC's not tabulated if < MDL

Table 4-2.7B Bristol Aquifer Ground Water Contamination Summary

Aquifer Description: Bristol Aquifer **County: Lincoln**

Aquifer Setting: bedrock and till **Data Reporting Period: 2000-2001**

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										
CERCLIS (non-NPL)										
DOD/DOE										
UST/LUST		0	0	0	0	0	0	0	0	0
RCRA Corrective Action							0	0	0	0
Underground Injection										
State Sites			0	0	0	0	0	0	0	0
Nonpoint Sources										
Surface Spills										
Above-ground tanks			2	2		2	2	2	0	2
Municipal landfills			1	0		1	1	0	0	NA
De-icing			0	0	0	0	0	0	0	0
Biomass ash utilization										
Residuals			0	0	0	NA	0	0	0	0
TOTALS									0	

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

Town of Lisbon
Aquifer Data and Threats to Groundwater

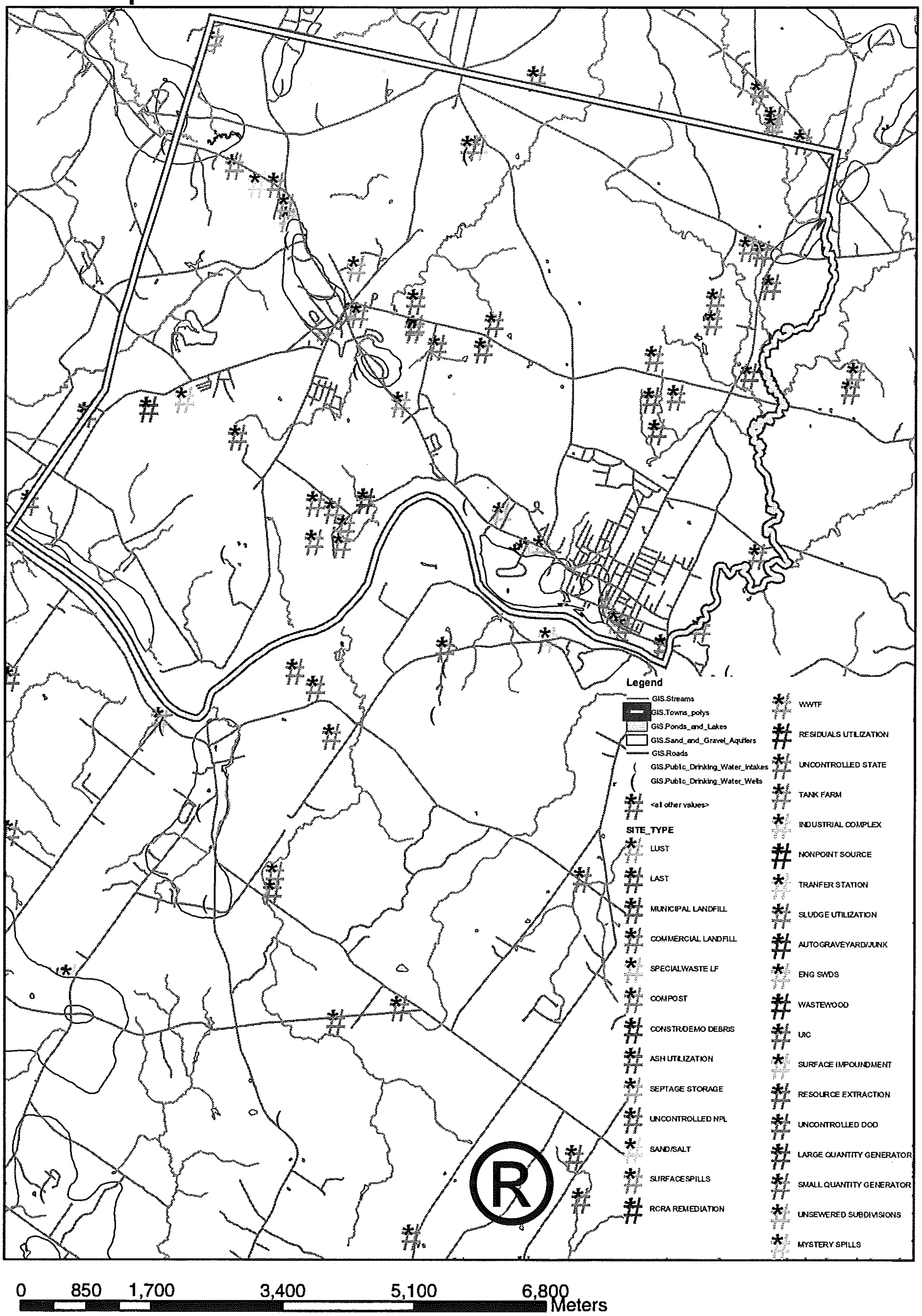


Table 4-2.8A. Town of Lisbon Aquifer Monitoring Data

Aquifer Description: Lisbon Aquifer
Aquifer Setting: Stratified Drift

County: Androscoggin
Data Reporting Period: 2000-2001

Monitoring data type [1]	Parameter groups	Total number of wells used in assessment	No detections of parameters above MDL's or back-ground 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	Nitrate >10ml/l	Parameters are detected at concentrations exceeding MCLs
Finished water quality data from public water supply wells	VOC			0	0		
	SOC	0	0	0	0	0	
	NO3			0	0		
	Other	0	0	0	0	0	
Raw water quality data from private or unregulated wells (Maine Health and Environmental Testing Laboratory)	VOC	2	2	0	0	0	0
	SOC	0	0	0	0	0	0
	NO3	6	0	6	0	0	0
	Other	60	35	0	22	0	3
Raw water quality data from public water supply wells "ambient" network	VOC	*	*	*		0	
	SOC	*	*	*	0	0	
	NO3		0		0	0	
	Other		0	0		0	

Major uses of aquifer or hydrologic unit: X Public water supply; X Private water supply; ___ Irrigation; ___ Thermoelectric; X Commercial; ___ Livestock; ___ Mining; ___ Industrial; ___ Baseflow; ___ Maintenance

Uses affected by water quality problems: X Public water supply; X Private water supply; ___ Irrigation; ___ Thermoelectric; ___ Commercial; ___ Livestock; ___ Mining; ___ Industrial; ___ Baseflow; ___ Maintenance

1. Department of Human Services does not collect raw water quality data from public water supply wells.
* # wells tested for VOC's and SOC's not tabulated if < MDL

Table 4-2.8B. Town of Lisbon Ground Water Contamination Summary

Aquifer Description: Lisbon Aquifer **County: Androscoggin**

Aquifer Setting: stratified drift **Data Reporting Period: 2000-2001**

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					petroleum, VOCs,SOCs, metals		0	1	1	0
CERCLIS (non-NPL)										
DOD/DOE										
UST/LUST		38/1	1	0	gasoline	1	1	0	0	
RCRA Corrective Action										
Underground Injection										
State Sites										
Nonpoint Sources										
Surface Spills										
Above-ground tanks										
Municipal landfills			0	0						
De-icing			0	0		4	NA	NA	NA	NA
Biomass ash utilization			0							
Residuals			0							
TOTALS										

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 Tank
RCRA - Resource Conservation and Recovery Act
UST - Underground Storage Tanks, Registered
NA- not available

Town of Corinna
Aquifer Data and Threats to Groundwater

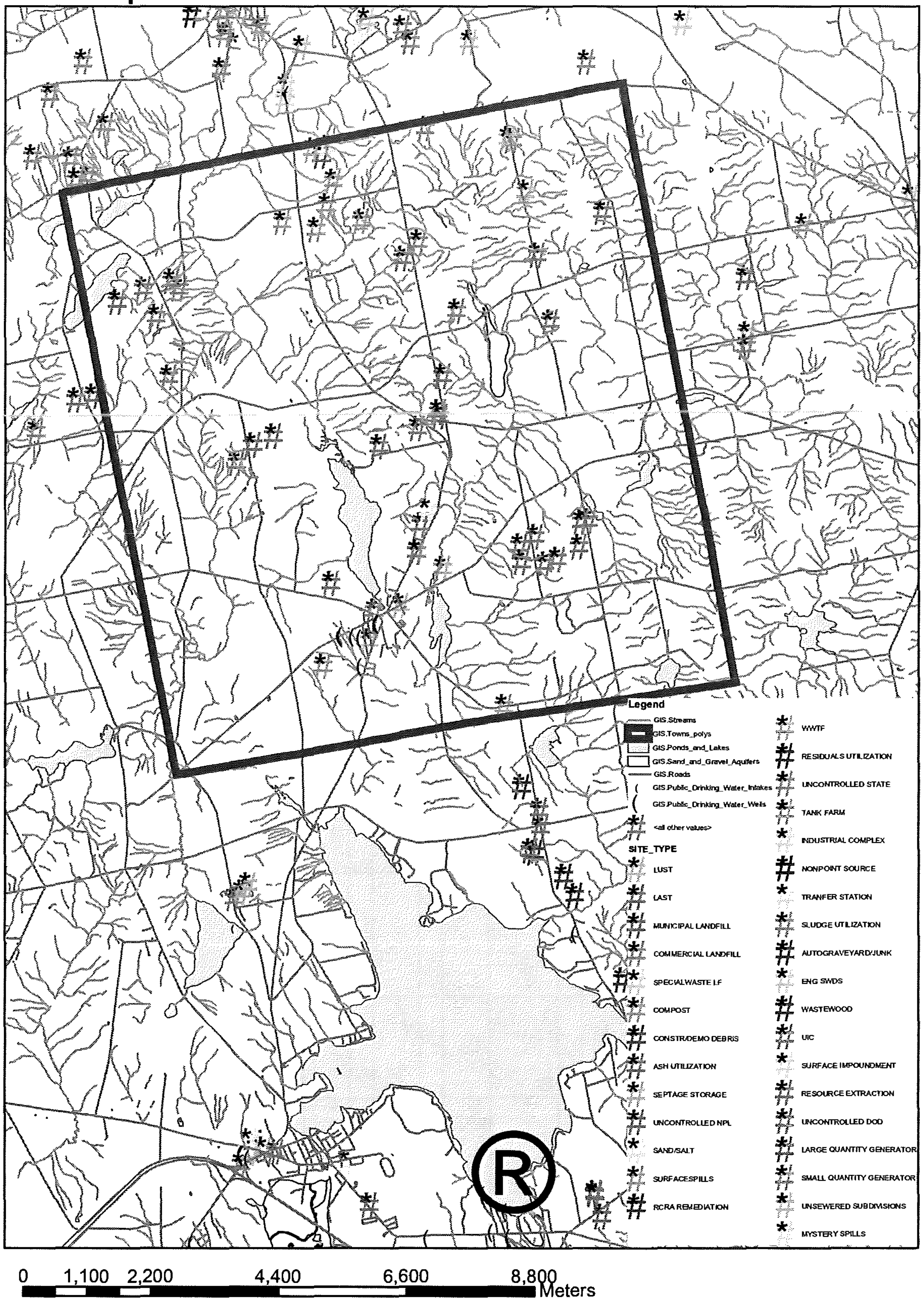


Table 4-2.9A. Town of Corinna Aquifer Monitoring Data

Aquifer Description: Stratified drift aquifer **County:** Penobscot
Aquifer Setting: stratified drift (some private wells in bedrock) **Data Reporting Period:** 2000-2001

Monitoring data type [1]	Parameter groups	Total number of wells used in assessment	No detections of parameters above MDL's or back-ground 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	Nitrate >10ml/l	Parameters are detected at concentrations exceeding MCLs
Finished water quality data from public water supply wells	VOC				0	0	
	SOC	0	0	0	0	0	
	NO3			0	0		
	Other	0	0	0	0	0	
Raw water quality data from private or unregulated wells (Maine Health and Environmental Testing Laboratory)	VOC	364	354	0	10	0	0
	SOC	0	0	0	0	0	0
	NO3	42	24	18	0	0	0
	Other	385	178	0	184	0	0
Raw water quality data from public water supply wells "ambient" network	VOC	*	*	*		0	
	SOC	*	*	*	0	0	
	NO3		0		0	0	
	Other		0	0		0	

Major uses of aquifer or hydrologic unit: X Public water supply; X Private water supply; ___ Irrigation; ___ Thermoelectric; X Commercial; ___ Livestock; ___ Mining; ___ Industrial; ___ Baseflow; ___ Maintenance

Uses affected by water quality problems: X Public water supply; X Private water supply; ___ Irrigation; ___ Thermoelectric; ___ Commercial; ___ Livestock; ___ Mining; ___ Industrial; ___ Baseflow; ___ Maintenance

1. Department of Human Services does not collect raw water quality data from public water supply wells.
* # wells tested for VOC's and SOC's not tabulated if < MDL

Table 4-2.9B. Town of Lisbon Ground Water Contamination Summary

Aquifer Description: Lisbon Aaquifer **County: Penobscot**
Aquifer Setting: stratified drift **Data Reporting Period: 2000-2001**

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	11/1	0/1	0		1	1	0	0	1
RCRA Corrective Action	Y	1	1	0		1	1	0	0	1
Underground Injection	NA									
State Sites	N									
Nonpoint Sources	Y	6	0							
Surface Spills	N									
Above-ground tanks	N									
Municipal landfills	Y	2	0	0		2				
De-icing	Y	5	0	0		5				
Biomass ash utilization	Y	3	0							
Residuals	Y	14	0							
TOTALS		43	2	0		9	2			2

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, john.t.hopeck@state.me.us, (207) 287-3901.

Although CSGWPP stresses prevention of contamination whenever possible as the first priority in ground water protection, it also recognizes that all human activity has impact on ground water, and that the degree of protection afforded should be based on the relative vulnerability of the resource and, where necessary, the ground water's use and value. Maine DEP, together with the Maine Geological survey, have been developing a model intended to assess the regional intrinsic risk to groundwater in the bedrock flow system using the measured depth to bedrock and the overburden hydraulic conductivity, 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 specifically not intended to be used for locating specific facilities, but simply to provide a means of estimating relative risk on 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 a pilot study area consisting of 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; 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 self-select for those areas of new residential development where 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 only at relatively small values of overburden thickness. Failure to correct for this is a significant problem in many existing techniques for vulnerability assessment.

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 values for those locations that had not been used in generating the grid. This test was performed to compare several methods of generating the overburden-thickness grid. It was found that inverse-distance weighting interpolation of the data produced the lowest standard error (approximately 7 meters) and cumulative-frequency curves for grid data most similar to those observed in the field data. Due to very limited field data, there was no practical way to test the hydraulic conductivity grid, although it should be expected that the pattern of hydraulic conductivity across the study area is much more varied than is 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 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 to 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.

Maine Ground Water Resource Database

Contact: Mark Holden, mak.k.holden@state.me.us, DEP, BLWQ, (207)287-7779.

A ground water quality database, which links site characteristics and ground water quality information to a spatial database, has been in development at the DEP for the last several years. The work includes identification and location of various activities, which may affect ground water quality, known contamination sites, and populations served by public and private water supply wells. This effort is part of a statewide GIS-linked ground water database project, which when fully developed, can be 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 Maine Ground Water Resource Database (the Database) will be used to develop a Comprehensive Ground Water Protection Program, and to provide a base of potential threats to ground water quality for the DHS Drinking Water Program's Source Water Assessment Plan (SWAP). The Database 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 cumulative impact.

During the 2000-2001 reporting period, we have continued the construction and development of the Database. All three phases of project activity have been underway during the latest reporting period:

Phase I includes:

- Listing and defining activities which may release contaminants at levels that could contribute significantly to the concentration of contaminants in ground and surface waters, particularly in drinking water source water areas. This phase is complete but is subject to addition of other activities of concern.
- Identifying and listing sites within each activity category; acquiring basic site, ownership, and spatial data information. The database is 98% spatially located.
- Entering this information into the Database. At the end of 2001, there were approximately 10,000 records in 32 categories. During 2000-2001, 2,685 sites were added. Many pre-existing sites were updated or additional categories (Site Types) were added to those sites' locations. Many sites were consolidated.

Spatial data files were then created. These are used in mapping relationships between various activities, natural resources, and ground and surface water use. Spatial data is obtained by field GPS and screen digitizing. Only limited funding is available limited for this purpose.

The Phase II activities include data gathering and entry of site-specific information including:

- geology,
- well design and construction information, and
- sampling and analytical data.

Phase II is well along with the addition of electronic transfer of analyte data from various laboratories. There are approximately 900,000 analyte records which have been added in 2000-2001.

Procedures for Phase III of the project, database maintenance and upkeep are partially documented but have not yet been finalized. A draft of a Quality Assurance Project Plan (QAPP) was completed in 2000, modified in 2001, and is still a work in progress. Quality assurance activities focus on data and location accuracy, consistency in expressing data, and the ability to link related data. DEP-GIS and OGIS will manage spatial data quality. Field acquisition GPS procedures are being improved through in-house training and oversight.

Many of the above-mentioned project activities were conducted jointly through 2000 with the DHS Drinking Water Program, in order to focus attention on gathering information that best meets the needs of the most people, especially in developing SWAP programs. This project was carried into June 2001 with separate funding. An Underground Injection Conduit (UIC) location project was initiated in June 2001 and will be continued till June 2002. Out of an estimated 8,000 UIC's, approximately 1400 UIC's that are considered a potential source of contamination to ground water will be located spatially and added to the Database. By the end of 2001, over 700 UIC's had been added to the 100 sites in the Database that were added previously.

During the 2000-2001 reporting period, the number of sites for which general site and location data had been compiled and entered exceeded 10,000. Data gathering and entry of the last of the active registered underground petroleum storage tanks is nearly complete and is in the quality review process. There are presently 32 site types (categories) in the database and new contamination site types will be added as we work with staff from the DHS Drinking Water Program and other programs.

Several new front ends (using Microsoft Access) for the Database back end (Oracle) are in development and should be implemented by the end of 2002. The Oracle back end is also being re-configured to adapt to different user requests. The new front ends will allow for greater ease of entry of site data, quality control, data analysis, and cross referencing with the Oil Spill Database.

The individual site types as of September 2002 include:

Ash Utilization Sites
Automobile Graveyards
Compost Facilities
Industrial Parks
Commercial Landfills
Municipal Landfills
Special Waste Landfills
Small Quantity Generators
Large Quantity Generators
LAST Sites
LUST Sites
Mystery Spills
Residuals Utilization Sites
Resource Extraction
RCRA Remediation Sites
Sand/Salt Storage Sites
Septage Storage and Disposal Sites
Sludge Utilization Sites
Surface Impoundments
Surface Petroleum Spills
Solid Waste Transfer Stations
Uncontrolled Sites- State Sites
Uncontrolled Sites- Superfund
Uncontrolled Sites- D. O. Defense
Underground Injection Wells
Unsewered Subdivisions
Non-Point Sources (highways, golf courses, etc.)
Construction/Demolition Debris Disposal Sites
Engineered Subsurface Wastewater Disposal Systems (>2000 gallons per day)
Sanitary and Industrial Wastewater Treatment Facilities
Tank Farms and other bulk storage facilities
Woodyards, Lumberyards, Biomass Fuel Piles

Spatial data entry for all public water supply wells has been completed by the DHS. Two limited period positions exist to develop procedures for the maintenance, upkeep, and expansion of the Database. These positions involve spatial location and addition of new site data, and the addition of electronically transmitted analyte data to the database.

Resources for Aquifer Delineation and Ground Water Prioritization
Contact: John Hopeck, Maine DEP BLWQ, john.hopeck@state.me.us, 207-287-7733.

For the future, we see a major challenge in defining all aquifers in the State. At this point, the goal will be to define the aquifer boundaries of stratified drift aquifers as either ground water divides or major surface water bodies (i.e. real hydrogeologic boundaries). For the bedrock flow system we envision using surface drainage divides as opposed to a town or similar unit. While it is not clear that bedrock ground water flow will be controlled by surface drainage divides, it will be a closer approximation than a political boundary and will be a more realistic scenario with respect to collecting data from a variety of local sources. Also for the bedrock system we can identify the principal basins of interest. With current data coverage we should be able to identify reasonable sized drainage basins.

To support this effort, we will use the sand and gravel aquifer maps and the significant aquifer maps that have been published and digitized by the Maine Geological Survey. We do not have an ongoing ambient monitoring program for ground water with an established network of wells. The MGS is developing plans for an ambient water quality survey in Knox County; also planned is an extension of the Bedrock Ground Water Resources basic data program conducted with the USGS to include water quality information. There is also a bedrock well database consisting of information on bedrock wells supplied by water well drillers in Maine. Many of these wells have been located through field visits to town offices and reference to property tax records and tax maps. The basic data on well yield, well depth, and estimated overburden thickness, including some information on fracture depth and yield, have been published as a series of Maine Geological Survey Open-File maps. The MGS has an aquifer index map available for reference.

This database can serve as the starting point for an ambient bedrock ground water quality database. To study ambient ground water quality, a subset of wells in a variety of hydrogeologic settings and geologic units would be selected for sampling and analysis of major cations and anions, trace elements, pH, Eh, dissolved oxygen, and an organic contaminant screen. The data would be examined for correlations between ambient water quality and hydrogeologic setting and or geologic unit. This database would eventually contain all state information on groundwater usage, availability, ambient quality, monitoring data and threats to quality.

The advantage of using the existing bedrock well database is the ability to first screen the database for wells with as much information on yield, depth, etc., as possible. At this point the GIS can be used to select a subset of wells in varied hydrogeologic settings and geologic units with the knowledge that it will be possible to obtain current ownership information with minimum effort. This process would significantly reduce the amount of field work needed to identify wells for sampling and analysis.

The information reporting system requested by EPA does not work well for characterizing overall ground water quality in the state. Therefore in this report, DEP has relied on the previous narrative section entitled "Overview of Ground Water Contamination Sources" to indicate ground water quality problems and the sections on ground water protection programs to indicate progress in protecting ground water quality and to identify areas that still need improvement.

Public 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 about the relationship 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 is probably a link between low-level, long-term ground water quality degradation and the water quality of streams and brooks during low-flow conditions.

Radon

Contact: Bob Stilwell, Department of Human Services, Division of Health Engineering, Radiation Control Program, bob.stilwell@state.me.us, (207) 287-5676.

Not all ground water public health concerns are caused by pollutants 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 an MCL for radon in water of 300 pci/l with an alternate MCL 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 alternate MCL 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, alternate MCL and multimedia mititgation plan were set in the Federal Safe Drinking Water Act Amendments of 1996.

Arsenic

Contacts: Robert Marvinney, Maine Geological Survey (MGS), robert.marvinney@state.me.us, (207) 287-2801, and David Braley, david.braley@state.me.us, Department of Human Services, Division of Health Engineering, (207) 287-5338.

Several types of cancer including skin and bladder cancer, and other health problems have been linked to the occurrence of arsenic in drinking water. The current MCL for arsenic is 50 ppb, however the USEPA has recently propsed to lower the MCL to 5 ppb in drinking water.

Wells showing high levels of arsenic have been found in a number of areas in Maine. In the fall of 1993, occurrences of arsenic concentrations in well water above the 50 ppb MCL in York and Cumberland Counties came to public attention. In this area, approximately 13% of nearly 1,200 well water samples tested greater than the MCL. HETL records show that of 356 private wells tested statewide between January 1, 1994 and December 31, 1995, 12.4% had levels of arsenic greater than .05 mg/L. Additionally, MDEP records indicate that 27 public water supplies are contaminated with arsenic.

Studies elsewhere have brought into question the statistical validity for statewide extrapolation of self-selected analyses. To address this concern, the Maine Geological Survey and the Maine Bureau of Health jointly funded arsenic analyses of randomly selected wells. This study uses the wells that were randomly selected for the state's MTBE study in 1998. With about 500 wells reported to date, only 1-2 percent have arsenic levels greater than .05mg/L. However, about 10 percent have arsenic levels above the new MCL of .01 mg/L.

A source or sources for the arsenic is unknown. 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 of ground water is most likely the result of both natural processes and human activity. It is possible that agricultural and industrial activities have contributed to some cases of contamination, although arsenic is known to occur naturally in soils and bedrock in Maine, and may also be a source. Affected towns in southern Maine are also researching historical land uses to find possible anthropogenic sources.

A 1999 USGS National Water Quality Assessment Program report on national arsenic occurrence has also added to data characterizing arsenic occurrence in Maine drinking water. The MGS is currently conducting site specific studies involving rock coring and water sampling of individual fractures to determine arsenic concentrations. Northport is the first locality being studied in this manner. In cooperation with the University of Maine and the U.S. Geological Survey, one round of drilling and sampling has been completed. Analysis of the drill core shows significant amounts of arsenic-bearing minerals which have undoubtedly contributed to the arsenic problem in the area. Fractures within these cores are coated with arsenic-bearing iron oxyhydroxide minerals which may play a significant role in the release of arsenic to groundwater. Further work is planned in Northport during 2002 with funding from the EPA.

MTBE

Contacts: Maine DEP BRWM, 207-287-2651; DHS Bureau of Health, 207-287-3201; MGS, 207-287-2801, U.S.Geological Survey, 207-622-8201.

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 showed 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 about 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 with MTBE. In March of 1999, Maine opted out of the RFG program.

The Maine DEP's 1998 investigations of the wells with MTBE levels over the MCL indicated an association with relatively small gasoline spills, often the backyard-type spills. However, other gasoline constituents were rarely found.

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.

Ground Water - Surface Water Interaction

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No single program addresses the water quality concerns that arise from ground water- surface water interactions. However, contamination, or potential contamination of surface water, primarily through subsurface wastewater disposal, is being evaluated at several locations. Due to the severity of the problems found at one agricultural site described in previous reports, installation of a storage lagoon and land application of effluent has been required, in order to obtain better treatment for wastewater than is available through a subsurface system. This system has only recently been installed, and it is not possible to determine the effect of these actions on surface water quality at this time. Other sites with large septic systems for sanitary wastewater have been found to have measurable effects on surface water quality, although these surface waters remain within the standards for their classifications. A possible study measuring impacts on surface waters from large POTW subsurface disposal systems is under consideration, but is not a high priority at this time.

Given recent and ongoing drought conditions, more consideration has been given to assessment of impacts of groundwater withdrawal on baseflow and water levels in surface waters. Detailed monitoring results are available from a small number of facilities required to monitor groundwater and surface water levels due to the volume of groundwater 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 groundwater withdrawal, not all high-volume groundwater users are required to conduct groundwater 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 groundwater are required to conduct monitoring of water levels to measure the impacts of that withdrawal. In addition, the Maine Geological Survey reviews monitoring information and groundwater use studies for some large agricultural projects in areas of the state outside DEP jurisdiction.

Although some facilities monitored by DEP have recorded historic low groundwater levels, these are comparable in magnitude to the historic lows recorded at U.S.G.S. index wells, and do not indicate that any unusually low conditions are due to the groundwater withdrawal. These low elevations were recorded during winter conditions of no recharge following the relatively dry fall, and occurred in recharge areas toward watershed divides, as would be expected. Recent data show levels remaining low, but not at historic lows for those months over the monitoring period.

State law recently established a Water Withdrawal Reporting Program, that requires annual reporting of water withdrawals exceeding specified thresholds, with the first reporting year beginning October 1, 2002. The first reports are due December 1, 2003. For groundwater, reporting of withdrawal of over 50,000 gallons in one day is required. The law does not require use of water meters, so that the reporting 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.

Ground Water Indicators

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Table 4-3.0 shows the number of exceedances of MCLs for public water supplies using ground water. Table 4-3.1 shows the population served by ground water based public water supplies and how many of these supplies have local wellhead protection plans in place. Combined, these tables give a relative indication of the condition of the ground water resource used as a drinking water supply. Data as for the period of January 1, 2000 to December 31, 2001.

Table 4-3.0. Summary of Public Water Supplies with MCL Exceedences.

Ground Water Based or Partial Ground Water Supplied Community Public Water Supplies with MCL Exceedences for Selected Contaminants:

Contaminant group	Number of MCL Exceedences	Number of Samples
NO3	461	5024
VOC's	9	1435
SVOC's	2	343

Table 4-3.1. Ground Water Based or Partial Ground Water Supplied Public Water Supply Information.

System type	Total Number of systems	Number of systems with groundwater as their primary source	Population served by groundwater	Number of systems with wellhead protection programs (WHPP) in place	Population served by supplies with WHPP's
Community	394	332	190,893	309	186,357
Non-Transient Non-Community	378	376	71,837	345	68,554
Transient	1248	1228	196,078	NA	NA

Ground Water Quality Trends

Maine's complex hydrogeologic setting makes representative ground water quality sampling difficult. The hilly topography, complex geology, and general 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. The 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 State 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 need to be developed to protect ground water; also, continuing outreach is needed to make the public aware of weather and overhead dangers as threats to home heating oil ASTs.

3. Continued development and implementation of a strategy 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 the poultry and dairy farms on ground water quality.

5. Final closure of the 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, however with the abolition of the Maine Waste Management Agency, it is not clear how recycling will be promoted in the future.

6. Storing sand-salt mixtures for road maintenance in water-tight 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 most impact toward reducing ground water contamination. The program develops best management practices (BMP's) 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. Development of BMP's for those activities can proceed concurrently with ground water monitoring. Developing public awareness of BMP's 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 from 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 Maine Groundwater Resource Database, is an ongoing program to geographically locate potential sites or actual sources of contamination. It is very useful in source water protection for both the public and private sectors. It is also useful in planning future development, and protecting vital natural resources.

In the past three years the number of records in the Maine Groundwater Resource Database has increased 33%,by the addition of 3,595 records in 32 different type categories. Of these sites, 98% have been spatially located. The database presently includes 10,700 site records and over 800,000 water-quality analyses. Data collected to date are available on the Web.

Over the next three years (FY03-FY05), 2500 sites, including GPS locations, are planned to be added based on current licensing of locations. Current funding, however, is inadequate to continue the program. In addition, 1000 Small Quantity Generators are planned to be added over the coming year, with 5,000 targeted over the next three years. This project is also inadequately funded.

Chapter 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 4-3.1) emphasizes three areas of effort:

1. State interagency coordination of ground water programs through the development and implementation of a Comprehensive State Ground Water Protection Program;

2. Assessment of ground water protection problems, including development of a ground water resource database;

3. Statutory changes and building upon implemented state ground water protection programs to increase ground water protection and risk reduction.

Wellhead Protection Program

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The Wellhead Protection Program (WHPP) is administered by the State of Maine Drinking Water Program (DWP), located in the Department of Human Services. 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 WHPP and have completed a waiver application. To date the DWP has requested all of the community and non-transient non-community systems to submit completed protection area delineations and contamination source inventories and has surveyed all of the transient non-community systems to identify systems with wells at risk from acute contaminants. Management and contingency plans which are required to complete a wellhead protection plan will follow the results of Maine's SWAP program.

Maine recently completed a project to improve the delineations for many of our community systems, specifically community systems that serve more than 250 people with wells. For both wells completed in surficial deposits and wells drilled in bedrock the DWP hired a geologist to work with the Maine Geological Survey to complete numerical models for each source. Zones representing 200 and 2,500 day time of travel were delineated for each well. Maps were created in the DWP GIS and distributed to the systems. These delineations should help systems and communities better protect the sources they rely on for drinking water.

In addition, the DWP has provided each municipality in Maine with maps of all the public water supply protection zones in their town, integrating existing contamination source information with data collected by the Maine DEP. Using the information received from the survey, SWAP reports have been completed for the transient systems.

The DWP is currently completing the SWAP reports for all of the non-transient non-community and community systems.

Surface Water Assessment Program (SWAP)
Contact: Andrews L. Tolman, DHS DWP, andrews.l.tolman@state.me.us, (207) 287-2070.

The Maine Drinking Water Program (DWP) wants to ensure that when a water supply is at risk of contamination, the people are made aware so that the appropriate steps can be taken to minimize or eliminate the risk. That is the purpose of the Source Water Assessment Program. By implementing SWAP, the DWP is evaluating each of the 2,600 public water supply sources in Maine, by conducting an assessment of the likelihood of contamination by existing or future activities. The results of the assessments will be widely available to the public.

The Maine Drinking Water Program has received approval from the USEPA for the SWAP program, and is in the process of implementing the plan. Surface Water Sources have been assessed with the assistance of a contractor, while ground water assessments are being performed by source protection section staff. Assessments for transient sources are complete, and drafts of both non-community and community non-transient sources have been prepared. DEP staff conducted a major database update to assist in identifying potential threats to public water supplies. Because the SWAP utilizes many existing sources of information, data collection has been underway for several years. Implementation is expected to be complete and results publicized in 2003.

Comprehensive State Ground Water Protection Program (CSGWPP)
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Maine's draft core CSGWPP program was developed through preparation of a summary and assessment of existing programs and by developing legislative and non-statutory initiatives to improve measures of ground water quality and vulnerability, better coordinate ground water-related programs on the state level, and more effectively deliver services to the public and other agencies. The draft of Maine's CSGWPP was submitted to EPA for review in February of 1997. At approximately this same time, Maine began a process of re-evaluation of several major statutes dealing with impact on natural resources, including groundwater. This has particularly affected programs within the Department of Environmental Protection relating to subsurface discharge, sand – salt pile management, stormwater management, water withdrawal, and land-use. Many of these changes are described in this report, and have been undertaken to close or minimize gaps in protection identified in the draft CSGWPP and other studies. These activities have necessitated reorganization and rewriting of sections of the draft CSGWPP, particularly those dealing with enabling legislation and ongoing programs. A final version of the document will be developed following conclusion of current work on integration of groundwater – surface water issues in the NPDES Phase II process.

Table 4-3.1. 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

Proposed Statutory Changes

NPDES Phase II Stormwater Requirements and the Underground Injection Control Program

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Work is ongoing to mesh NPDES Phase II stormwater requirements and the Underground Injection Control 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. Because of threshold limits in 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 state; it is expected that most of these can approved through a permit-by-rule process once rulemaking is complete. Permit-by-rule standards will allow a particular well to be rejected if it is found to present a significant risk to groundwater quality, and a full Waste Discharge License may be required for that well. Rulemaking for Underground Injection Control is expected in the fall or winter of 2002; workgroups developing rules for to address NPDES Construction requirements are ongoing, but development of rules to address Multi-Sector requirements has not yet been scheduled.

Maine's New Underground Storage Tank Siting Law

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A law that will add significant protection to Maine's drinking water wells and supplies went into effect September 30, 2001. This new law prohibits the installation of new motor fuel, waste oil, and marketing and distribution 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 mapped by the Department of Human Services' Bureau of Health. A process to allow a variance is included in the regulations.

Despite the advances in tank and piping construction and the advances in leak detection, many recently installed UST facilities end up releasing fuel to the environment. Motor fuels (gasoline, diesel, av-gas) are prohibited from being installed close to water supplies because of their high ability to contaminate wells and groundwater. Marketing and distribution facilities, even those handling fuels without gasoline's high potential for contamination, such as heating oil, are prohibited because of the increased risk of spills and contamination that comes with the double handling of oil. (Spills can occur both upon filling a tank and upon emptying a tank.)

The same law directed the DEP to establish siting rules to protect the state's future water supplies. These new rules take effect on 1 August 2002 and restrict the installation of new motor fuel, waste oil, and marketing and distribution UST facilities over significant sand and gravel aquifers, the terrain of choice for cities and towns seeking new sources of drinking water. Although not yet in effect, it is hoped that the administration of these rules will not be contentious because the law does not apply to existing facilities and the restricted areas are well-defined. This allows potential developers to see the restricted areas long before they invest resources in planning or developing sites. The MGS has mapped the sand and gravel aquifers for 75% of the state's land area; the unmapped 25% is in areas where new, commercial UST facilities are unlikely to be placed.

PART VI. WETLANDS ASSESSMENT

BACKGROUND

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 which are essential to both human society and the ecological balance of the natural world. Wetlands serve as natural water storage areas which help to lessen flood impacts by absorbing flowing water and reducing it's 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 which 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, the aesthetic values of wetlands are enjoyed by Maine residents and visitors through recreational activities such as sport fishing, hunting, canoeing, hiking and wildlife viewing.

Federal Regulatory Framework

Wetlands are regulated by the U.S. Army Corps of Engineers (ACE) and EPA under Section 404 of the Clean Water Act, which established a permit program for discharge of dredged or fill material into waters of the United States, including wetlands. Federal regulations state that a Section 404 permit cannot be issued unless the proposed project complies with guidelines set forth in Section 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material. These guidelines require avoidance of adverse impacts to wetlands by selecting the least environmentally damaging practicable project alternative. Applicants must also take "appropriate and practicable steps" to minimize environmental damage. Once the avoidance and minimization steps have been completed, compensation may be required for any remaining unavoidable wetland loss. Examples of compensation include restoration of previously degraded wetlands, creation of new wetlands on upland sites, enhancement of existing functions or values, and preservation of significant or threatened wetlands.

In addition, Section 401 of the Clean Water Act requires applicants to obtain a certification or waiver from the appropriate State water pollution control agency for Federally permitted or licensed activities that may result in a discharge to waters of the United States, including wetlands. The State agency may review the proposed project with respect to State water quality standards, and may grant or deny certification. States may also place conditions on water quality certifications, or may waive their certification authority. For activities within a State's coastal zone, Section 307(c) of the Coastal Zone Management Act requires applicants to obtain a certification or waiver that the activity complies with the State's coastal zone management program.

State of Maine Wetlands Regulatory Program in the Organized Townships

The State of Maine regulates activities in wetlands under the Natural Resources Protection Act (NRPA). Effective September 29, 1995, changes in the NRPA (P.L. 1995, Chapter 460) made it more consistent with the Federal Section 404 wetlands regulatory program. Maine's Wetland Protection Rules (Chapter 310 of the NRPA) were also amended accordingly effective July 4, 1996. Concurrent with the revisions to the NRPA, ACE instituted a Programmatic General Permit (PGP) with review thresholds comparable to those of the State's program. To streamline the wetland regulatory process, Maine DEP and ACE have adopted a joint permit application form. A single application may now be 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, and ACE has agreed to meet the State's mandated processing times for most projects. Section 401 certification is issued simultaneously with permits approved under the NRPA by DEP.

The Department uses a 3 tiered review process to assess applications for wetlands alterations which is based on the size of the proposed wetland alteration:

Tier I. For projects affecting up to 15,000 square feet of wetland, where the wetland is not considered to be of special significance (defined under 38 MRSA Section 480-X(4)). Maximum review time is 30 days. Information required is relatively simple, and professional assistance is generally not needed to complete the application.

Tier II. For projects affecting between 15,000 square feet and 1 acre of wetland, where the wetland is not of special significance. Maximum review time is 60 days. If the proposed alteration is greater than 20,000 square feet, additional application requirements pertain, including a functional assessment and possible compensation.

Tier III. For projects affecting wetlands of special significance, or those affecting greater than 1 acre of wetland. A full review occurs, with a maximum review time of 120 days. Tier III projects are generally the most complex due to analysis of project alternatives and compensation requirements to mitigate for lost wetland functions.

Summary comments on cy 2001 – 2002 licensing efforts:

-No cranberry or agricultural pond general permits were issued. The bottom fell out of the cranberry market and federal agencies have not authorized agricultural ponds without individual permits which renders the state's general permit ineffective.

-In 1997, the 118th Legislature directed the Department to study the feasibility of instituting a Compensation Fee Program to be developed in consultation with the State Planning Office and other state and federal agencies. After several years of analysis of the impact/mitigation data resulting from the wetlands regulatory program, it has been determined that it is not feasible to develop such a program given the relatively low amount of mitigation required under either the state or federal program and the wide geographic distribution of impacts resulting from projects.

-There have been no large scale projects in the last 2 years with attendant large scale mitigation (i.e. Bath Iron Works level loading facility)

-The majority of mitigation achieved is due to state impact thresholds, not federal requirements. The state may seek compensation for *any* level of impact when certain types of wetlands are involved, for example coastal wetlands and peatlands. However, in most cases, the Department cannot seek compensation for projects affecting less than 20,000 square feet. The majority of the several hundred permits issued per year are for projects involving less than 20,000 square feet.

Wetlands Regulatory Program in Maine's Unorganized Territories

The Maine Land Use Regulation Commission (LURC) uses a land use planning approach to regulate activities within wetlands in unorganized portions of the State. 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 subdistricts. The Wetlands Protection Subdistrict (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's regulatory system is based on mapped wetlands. Mapping, which is in the process of being completed, is based on National Wetlands Inventory maps and includes all wetlands greater than 15,000 square feet. In general, all mapped wetlands are regulated, and unmapped wetlands are not regulated unless a wetland delineation is required. The exceptions to this are (1) streams draining 50 square miles or less (some are mapped, some are not, but all are regulated), and (2) 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. There is also a 4,300 square foot exemption for impacts to a P-WL2 or P-WL3.

Permitting is based on a three-tiered system similar to the Maine Department of Environmental Protection under the Natural Resources Protection Act. LURC's rules incorporate standards for avoidance, minimal alteration, water quality, erosion control, compensation, and no unreasonable impact. The thresholds for the level of tier review are tied to the size of the wetland impact and the type of wetland.

Tier 1: Used for projects impacting from 4,300 sq. ft. to 15,000 sq. ft. P-WL2 or P-WL3 wetlands. Applies standards for avoidance, minimal alteration, water quality, erosion control. No wetland delineation, functional assessment, or compensation required.

Tier 2: Used for projects impacting 15,000 sq. ft. to 43,560 sq. ft. P-WL2 or P-WL3 wetlands that do not contain critically imperiled or imperiled natural communities. Applies standards for avoidance, minimal alteration, water quality, erosion control, and compensation. Requires alternatives analysis and wetland delineation, and may require functional assessment and compensation.

Tier 3: Used for projects impacting any area of P-WL1 wetland, 15,000 sq. ft. to 43,560 sq. ft. of P-WL2 or P-WL3 wetlands containing critically imperiled natural communities, or 43,560 sq. ft. or more of P-WL2 or P-WL3 wetlands. Applies standards for avoidance, minimal alteration, water quality, erosion control, compensation, and no unreasonable impact. Requires alternatives analysis, and usually functional assessment for alterations that are greater than 500 square feet. May require wetland delineation and compensation.

As of September 1999, LURC has sole jurisdiction over wetlands in unorganized areas and does not co-review wetland impacts with the Department of Environmental Protection. LURC has developed a method of reducing the level of tier review for a selected group of minor wetlands-related activities in a way that is similar to DEP's permit-by-rule.

Although wetland impacts have not been tracked in the past, LURC is considering modifications to its database and is also discussing tracking options with the State Planning Office. Wetland impacts due to land management road construction submitted with forest operations notifications are being tracked in a separate database at LURC.

DEVELOPMENT OF WETLAND WATER QUALITY STANDARDS

Maine has made great strides in recent years to develop an efficient State wetland regulatory program, administered through the Natural Resources Protection Act, Wetland Protection Rules and Land Use Regulatory Commission regulations. The current program focuses largely on physical wetland alterations, but is not well coordinated with State and federal water quality protection programs which more broadly address the health of aquatic resources. Numerous human activities which may not result in wetland loss, but which nevertheless degrade wetland quality, are not currently regulated in Maine. The implementation of State water quality standards for wetlands is a crucial remaining gap which needs to be addressed to adequately protect the ecological integrity of Maine wetlands.

Under the federal Clean Water Act, States are required to develop programs to evaluate the physical, chemical, and biological integrity of the Nation's waters, including wetlands, and to adopt water quality standards to restore and maintain that integrity. States must also report on the condition of all waters every two years, including attainment status in relation to water quality standards. The steps involved in applying water quality standards to wetlands include:

1. Inclusion of wetlands in the definition of "State waters";
2. Designating uses which address State management concerns and the goals of the Clean Water Act;
3. Adopting criteria sufficient to protect designated uses; and
4. Application of the State antidegredation policy to wetlands.

As required by EPA for other water bodies, designated uses for wetlands must, at a minimum, provide for the protection of fish, shellfish, wildlife, and recreation. Effective in 1987, States are required to adopt numeric criteria for toxic pollutants for which EPA has published criteria. Where numeric criteria are not available, States may adopt criteria based on biological monitoring and assessment methods. States must also adopt nutrient criteria for all waters, including wetlands, by 2004. Maine's water quality standards framework and related policies will need to be clarified with respect to wetlands in order to comply with these requirements.

Current Status of Wetland Water Quality Standards in Maine

Wetlands are implicitly included in Maine's definition of "Waters of the State" under the Protection and Improvement of Waters Act, 38 M.R.S.A. Section 361-A(7) as follows:

"...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."

Although wetlands may be considered waters of the State under the above definition, Maine does not have wetland-specific designated uses or criteria. Development of biological criteria and other water quality standards for wetlands is a priority in DEP's Performance Partnership Agreement with EPA and is also included in the Maine Wetland Conservation Plan. A primary goal of the Maine DEP Biological Monitoring Program is to develop wetland-specific biological criteria and incorporate them into State water quality standards. The expected time frame needed to complete this effort is not sufficient to address immediate program needs and federal requirements, however.

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 as an interim measure. Existing standards, including designated uses, criteria, and Maine's antidegradation policy, are largely applicable to wetlands, provided appropriate assessment methods are used to determine wetland attainment status. Current narrative biological criteria are expected to be especially useful for wetlands. In addition, the Maine Water Classification Law provides for flexibility where specific uses or criteria may not be suitable.

DEP already applies existing water quality standards for certain activities related to wetlands, particularly in wetlands contained within or directly adjacent to other surface waters. Most other states which currently implement water quality standards for wetlands have also used a similar initial approach. Although this policy has precedent within Maine DEP, it is not uniformly applied across all program areas, and needs clarification to ensure adequate protection of State wetland resources, regulatory consistency, and compliance with the Clean Water Act.

Development of Nutrient Criteria

In response to EPA's 2004 deadline to implement nutrient criteria for all waters, Maine DEP has submitted a Nutrient Criteria Adoption Plan, including a plan for wetlands. Due to the range of natural conditions inherent to wetlands, including wide spatial and temporal variability in nutrient concentrations, 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 (community composition, productivity, etc). DEP will also investigate the use of chemical nutrient concentration thresholds as appropriate for specific wetland classes. Biological impairment thresholds developed for nutrients will be tied to existing use classes, if it is determined that these classes are applicable to wetlands on an interim basis. Otherwise, new classes will need to be defined and adopted into law before nutrient criteria may be implemented. As stated above, the long term goal for Maine is to develop wetland-specific uses and criteria.

In order to implement the Nutrient Criteria Adoption Plan for wetlands by 2004, Maine DEP will need additional staff and funding. The Plan will involve conducting vegetative and algal assessments for freshwater wetlands which are not currently performed, and additional assessment data for coastal wetlands. Since DEP currently does not have sufficient resources to fund and staff this initiative, development of nutrient criteria for wetlands is currently unscheduled.

The Need for Wetland Water Quality Standards

Regulatory Consistency

Because various environmental laws which govern activities in and around wetlands reference State water quality standards, discrepancies in interpreting or applying the Water Classification Law with respect to wetlands may affect regulatory consistency. Examples of wetland-related programs which are linked to standards and criteria in the Water Classification Law include: permitting under the Natural Resources Protection Act, Site Location of Development Law, and Maine Stormwater Management Law, wetland regulations administered by the Land Use Regulatory Commission (LURC) in the unorganized territories, the Shoreland Zoning program, State water discharge licensing, Section 401 water quality certification (including hydropower licensing), the National Pollutant Discharge Elimination System (NPDES) program, and risk assessments and remediation projects related to oil and hazardous materials laws.

Environmental Concerns

Unclear or inconsistent policies regarding wetland water quality standards and their relationship to other State environmental laws pose a serious threat to the integrity of Maine wetlands. Aside from direct physical loss of wetlands (by filling, etc.), wetlands may be damaged by point and nonpoint source pollution, changing water levels, soil erosion, stormwater runoff, and agricultural and forestry activities. Impacts to wetlands may include nutrient enrichment and eutrophication, changes in natural wetland chemistry, excess sedimentation, habitat loss, accumulation of toxic substances, and detrimental changes in wetland community structure. Ultimately, these impacts may result in loss of desirable or sensitive plant and animal species, over-abundance of pollution-tolerant organisms, and the spread of invasive species. It is therefore essential that water quality standards are applied to all waters to compliment existing wetland protection efforts and ensure that wetlands are fully integrated into State water quality protection programs.

Ecological degradation of wetlands also impacts the quality of associated water bodies through both physical and biological links. Since wetlands often occur within or adjacent to lakes, rivers, streams and coastal waters, it is not always possible to distinguish clear boundaries between different types of surface waters. Often it may be more appropriate to view wetlands as part of a continuum between deep water habitats and uplands. Wetlands perform important hydrologic and geochemical functions which benefit adjacent aquatic systems, including ground water recharge, maintenance of stream flow, sediment and toxicant retention and nutrient cycling.

Wetlands also play a vital role in food chain support, and provide essential breeding, foraging and resting habitat for aquatic life and wildlife. Many organisms which inhabit other water bodies depend on wetlands on a seasonal basis, or during certain life stages. Wetlands need not be physically connected with other surface waters in order to provide these biological functions. Since the relationships among wetlands and other waters are complex, it is important to consider water quality issues in a watershed context, rather than isolated by water body type.

Economic Concerns

The loss of wetland health from human activities has potential negative consequences to Maine's economy. A large number of businesses rely directly or indirectly upon tourism and recreational activities involving wetlands, such as sport fishing, hunting, canoeing, hiking and wildlife observation. Commercial fisheries and shellfish production in Maine also depend on wetlands to provide nursery areas and food sources for many valuable species. These industries are vulnerable to water quality impairment which may degrade wetland biological communities.

In addition, wetlands are important in storing flood waters, mitigating peak flows, and absorbing wave energy to reduce shoreline erosion. A decline in these wetland functions due to changes in hydrology (i.e. increasing the depth, frequency or duration of flooding) increases the likelihood of property damage and risks to human life. Experience has shown that wetland restoration is expensive, and it is often difficult or impossible to effectively duplicate natural wetland systems. The consistent application of State water quality programs to enhance wetland protection and pollution prevention represents a far more cost-effective option.

INTEGRITY OF WETLAND RESOURCES

Guidelines for the Functional Assessment of Maine's Coastal Wetlands

The State of Maine has strong coastal management laws under the Wetland Protection Rules, Natural Resources Protection Act, and Water Classification Program that are designed to reduce impacts caused by commercial and private development in marine environments. However, there is no standard assessment methodology to assess the potential effects of permitted activities on coastal intertidal and sub-tidal habitats. After reviewing all the comments and scientific data, approval or denial of an application is based on the permit reviewers "best professional judgment" to evaluate threats to marine environments. This decision is often based on inadequate and inconsistent biological assessments that provide little insight into the functions and values of the habitat that may be lost upon development and/or modifications.

In October 1997, a NOAA Coastal Management Fellow was hired by Maine DEP to develop a coastal wetland assessment methodology for Maine. The two year project was a collaborative effort between Maine DEP, Maine and New Hampshire Sea Grant, Maine State Planning Office and Maine Department of Marine Resources.

The primary objectives of the project were to improve the permitting process through education, development, and use of functional assessment guidelines. The guidelines provide information on the ecological functions; commercial, recreational, social and educational values; species composition; physical, chemical and geological characteristics; seasonal fluctuations; and aesthetics. Sampling protocols for each type of marine habitat are included. In addition, a natural history guide was developed for licensing staff that includes the distribution and quantity of Maine coastal habitats, the potential functions and values of each undeveloped environment and management guidelines.

A draft assessment protocol was written and distributed to licensing staff and Maine marine environmental consultants. Comments from consultants were gathered, reviewed and incorporated into a second draft. In December 1998, a second draft was distributed to two consultants for review and testing. In the fall of 1999, the final functional assessment report was completed along with educational material on the value and sensitivity of Maine marine intertidal and sub-tidal habitats.

Biological Assessment of Freshwater Wetlands

The Need for Wetland Bioassessment

Wetlands are an integral component of Maine watersheds, and comprise roughly 25% of the State's area. Compared with other aquatic resources however, there is relatively little information available on wetland condition in Maine. Since colonial times, over half of the wetland acreage in the lower 48 states has been lost due to development, agriculture and forestry activities, including about 20% of Maine's wetlands. Moreover, the ecological integrity of our remaining wetlands is threatened by habitat fragmentation, toxic chemicals, polluted runoff, hydrologic modifications and invasive species, especially in rapidly urbanizing areas. Past efforts to track and report wetland impacts have largely focused on wetland quantity, for example, the number of acres filled compared to acres restored. Until recently, little attention has been devoted to assessing the health of Maine wetlands, despite federal requirements described in the Clean Water Act.

With ever-increasing pressure on Maine wetlands from development and other human activities, there is a compelling need for improved scientific information about the current condition of wetlands in the State, sources and causes of impairment, and long-term trends in wetland health. To make sound decisions in wetland management, planning, and regulation , it is essential to understand the relative risks to wetlands from various human activities. It is also important to develop tools for wetland assessment and management on a watershed basis, and ensure that complex ecological linkages with other water bodies are taken into account.

Most wetland evaluations conducted in Maine for regulatory or planning purposes currently use an assessment approach based on wetland functions and values, typically the U.S. Army Corps of Engineers Highway Methodology[1]. The Highway Methodology is a qualitative, descriptive approach used to characterize wetland functions and values for the wetland permitting process. The Highway Methodology is a useful rapid-assessment tool for wetland planning and management, especially for screening-level wetland characterizations or to predict expected changes in wetland functions and values from proposed activities.

Function and value assessments of this type generally focus on the physical structure of wetlands and their utility to humans , but do not directly measure ecological health or impacts to water quality, aquatic life and wildlife. For example, a wetland may appear to contain good habitat for

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[1] USACOE. 1995. The Highway Methodology Workbook Supplement: Wetland Functions and Values, A Descriptive Approach. U.S. Army Corps of Engineers New England Division. 32 pp. NEDEP-360-1-30a.

fish and wildlife, but actual populations may be impaired by chemical contamination which would not likely be detected by a function and value assessment. Similarly, a wetland which has high value for flood control may be in poor shape from an ecological standpoint due to man-made alterations (ditches, dikes or dams), polluted runoff, excess sediment, and the presence of invasive species. Moreover, since function and value assessments like the Highway Methodology are descriptive in nature and designed to incorporate human values (such as scenic/aesthetic beauty and educational value), results are often subjective and may vary significantly depending on the evaluator and purpose of the assessment.

For many applications, assessment methods that employ a standardized scientific approach designed to evaluate wetland condition are needed. Traditional chemical measures of water quality are useful to help determine sources of wetland contamination, but do not provide information about acute or long-term impacts on aquatic life and wildlife. Chemical water samples serve as a "snapshot in time", since chemical concentrations measured may be highly variable from day to day depending on such factors as the timing of discharges, amount of recent precipitation and water flow patterns. Water samples alone may therefore be misleading, and may fail to detect intermittent contaminants that can damage wetland ecosystems. Moreover, chemical sampling is not useful to evaluate certain types of wetland impacts, such as the presence of invasive species.

Information about resident wetland plant and animal communities is especially beneficial as an indication of both water quality and overall wetland health. Unlike physical and chemical measures, biological communities integrate the effects of environmental stressors over time, since the numbers and types of organisms present reflect the quality of their surroundings. Biological assessment provides a direct, objective measure of wetland condition and can be used to evaluate impacts from a variety of human activities. The following are potential applications of wetland bioassessment:

Detecting ecological impairment for screening-level inventories, site-specific impact assessments and long-term trend analysis;

Diagnosing physical, chemical and biological stressors, including toxics, nutrient enrichment, non-point source pollution, hydrologic changes, and introduced species;

Evaluating the effectiveness of wetland protection activities;

Developing performance standards for restoration projects;

Identifying ecological linkages among wetlands and other water bodies to refine water quality modeling;

Developing and supporting wetland standards and criteria, including biological and nutrient criteria, and

Tracking wetland condition over time, including information for the Maine Water Quality Assessment Report to Congress required under Section 305(b) of the Clean Water Act.

DEP Wetland Biological Monitoring Program: Status and Implementation Plan

In 1998, Maine DEP began development of a biological monitoring and assessment program for freshwater wetlands. DEP conducted a 3 year pilot study in the Casco Bay watershed to develop monitoring protocols, examine differences in wetland community structure along a gradient of human disturbance, and identify candidate metrics (indicators) to assess wetland biological integrity. The project focused on aquatic macroinvertebrates and algae, including collection of associated physical, chemical and habitat data. During 2001 and 2002, DEP expanded monitoring to the Saco, Piscataqua and Kennebec River watersheds using the methods developed in the pilot study. As of 2002, DEP has conducted wetland biomonitoring at 88 different sites encompassing 115 sampling events. Some sites have been sampled repeatedly over multiple years.

As part of the effort to develop a wetland biomonitoring program, Maine DEP staff actively participated on EPA's Biological Assessment of Wetlands Work Group (BAWWG). BAWWG was formed in 1997 to improve methods and programs to assess the biological integrity of wetlands. The group included wetland scientists from Federal and State agencies and universities. A major accomplishment of the BAWWG was development of a series of state-of-the-science modules related to wetland biological assessment. These modules, collectively titled " Methods for Evaluating Wetland Condition", were published by EPA in 2002. Copies of the modules and additional information about wetland bioassessment may be found on the BAWWG web site at http://www.epa.gov/owow/wetlands/bawwg . The modules may also be downloaded from the following U.S. EPA web site: http://www.epa.gov/ost/standards .

EPA Region I formed a regional work group as a counterpart to BAWWG in 1998. The New England Biological Assessment of Wetlands Work Group (NEBAWWG) currently coordinates a regional wetland biomonitoring network and sponsors state biomonitoring pilot projects. NEBAWWG also hosts conferences and training workshops related to wetland bioassessment in New England. DEP staff maintain an active role in this group. More information about NEBAWWG may be found at http://www.epa.gov/region01/eco/wetland/ .

The functions of BAWWG were merged into EPA's National Wetland Monitoring and Assessment Work Group in 2002. This new group was formed to help states implement wetland monitoring and assessment programs through policy and guidance development and technical support. A major goal of the work group is to ensure that wetlands are integrated into state and tribal monitoring strategies along with other waters. A technical subcommittee supports the scientific objectives of the work group, and is continuing work formerly performed by the BAWWG. A Maine DEP biologist currently serves on the national work group and technical subcommittee.

Program Purpose and Goals

The purpose of DEP's wetland biological monitoring program is to provide the State with scientific and technical information related to wetland water quality and ecological integrity, especially biological aspects. Major program functions include conducting wetland biological monitoring and assessment, investigating causes and sources of wetland impairment, developing wetland standards and criteria, and providing technical support to other State programs involved in wetland regulation, planning and management. Biomonitoring program staff also represent DEP at pertinent state and federal meetings, serve on technical and policy work groups related to wetlands, and are involved in a variety of wetland education and outreach activities.

These activities support the following overall program goals:

- 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, threats to wetland health and protection measures

Implementation Strategy and Monitoring Design

The Maine wetland biomonitoring initiative has been incorporated into DEP's existing Biological Monitoring and Criteria Program. This has been an efficient way to pool limited resources in areas such areas as equipment purchases, seasonal field staff and contract management. This strategy has also allowed DEP to build on the experience of Maine's nationally recognized river and stream biomonitoring program, which was established in 1983. As of 2002, annual wetland monitoring is coordinated with the State's river and stream biomonitoring program using the 5-year rotating basin schedule shown below. Figure 3-6.1 depicts the areas of the state included in each of these major regions, along with 88 wetland stations for which monitoring data has previously been collected.

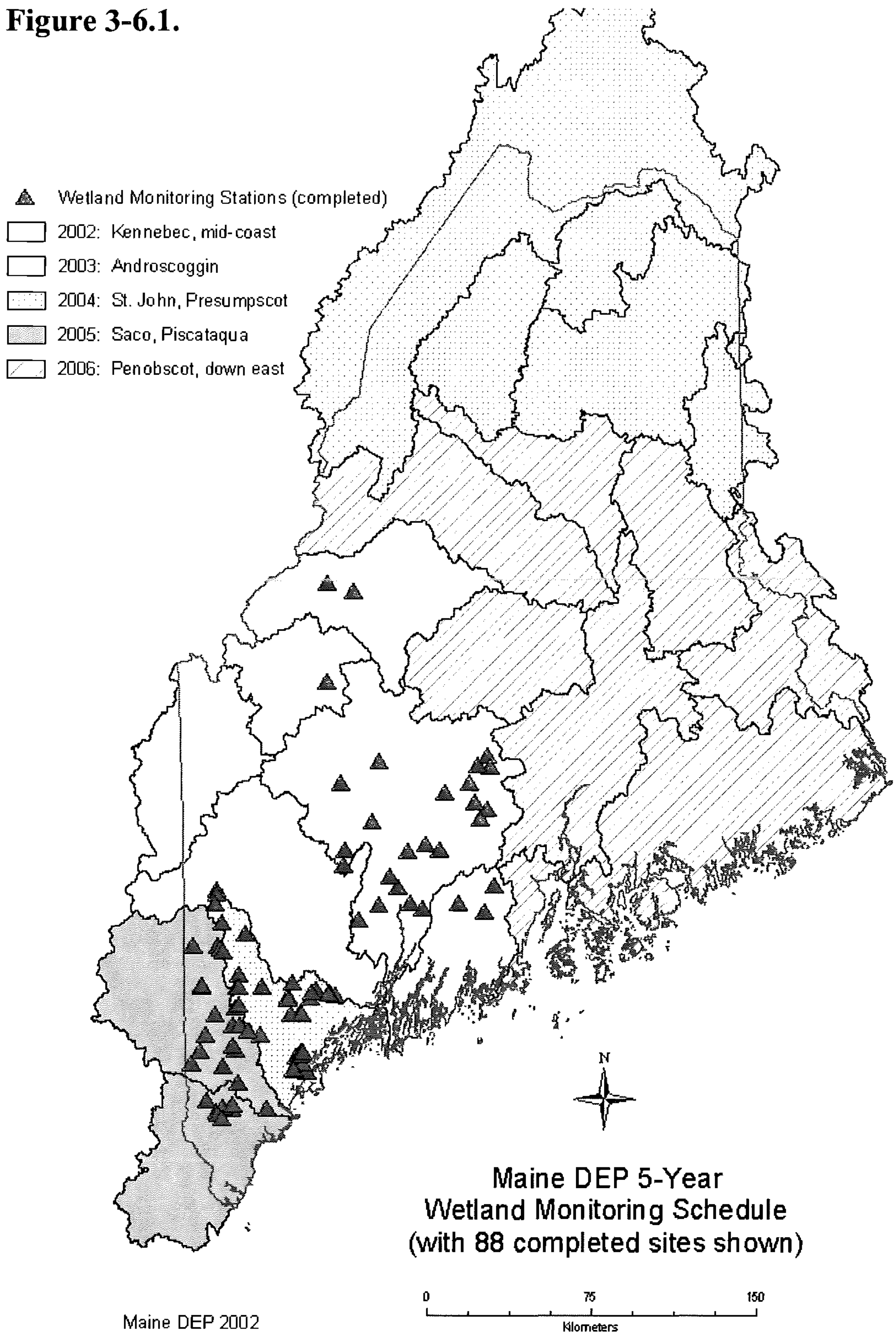
DEP Five Year Biomonitoring Schedule

Androscoggin watershed	2003
St. John, Presumpscot watersheds	2004
Saco, southern coastal watersheds	2005
Penobscot, downeast watersheds	2006
Kennebec, mid-coast watersheds	2007

All wetlands currently sampled are semi-permanently or permanently inundated (i.e. sites having standing water most of the time except during unusually dry periods). These include palustrine, riverine fringe and lacustrine wetlands. 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.

Other considerations for site selection include hydrologic regime, geographic distribution of sites, landscape position, management significance, and accessibility. The selection process involves a review of existing spatial data using a Geographic Information System (GIS), including National Wetland Inventory maps, topographic maps, air photos, and State hydrography and road layers. Field reconnaissance is performed prior to monitoring to verify wetland types, locations, and access.

Figure 3-6.1.


Wetland Monitoring Stations (completed)
2002: Kennebec, mid-coast
2003: Androscoggin
2004: St. John, Presumpscot
2005: Saco, Piscataqua
2006: Penobscot, down east
N
Maine DEP 5-Year
Wetland Monitoring Schedule
(with 88 completed sites shown)
0
75
150
Kilometers
Maine DEP 2002

Indicators and Overview of Methods

Aquatic Macroinvertebrates

Maine DEP currently assesses aquatic macroinvertebrates as the primary taxonomic group for the wetland biomonitoring program. Macroinvertebrates are found in virtually all wetlands, and are an essential component of wetland food webs. They consume algae, detritus, plants and smaller prey organisms, and provide an important food source for fish, waterfowl and other wildlife. Macroinvertebrates also play an integral role in nutrient cycling and energy transfer, both within wetland ecosystems and between wetlands and other habitats.

Since macroinvertebrates are a highly diverse group of organisms having a wide range of tolerance to human-induced stressors, they are extremely useful as indicators of environmental condition. Aquatic invertebrates are generally limited in mobility, and have relatively long and complex life cycles of up to several years. Macroinvertebrate communities therefore integrate and reflect environmental changes over time which may not be detected by other types of assessment.

Wetland macroinvertebrates are currently sampled during June and early July. Three different sampling methods to collect macroinvertebrates have been tested to develop tools for various applications and sampling intensity:

Multi-Habitat Sampling – A qualitative, multihabitat sampling approach was developed as a screening level assessment tool. A standard D-frame net is used to sample all inundated microhabitats at each site, including emergent vegetation, aquatic macrophyte beds, pools and channels. Samples are "picked" or sorted from detritus in the field. One to several organisms representing each different taxon found are placed into a vial of alcohol until no different taxa are observed.

Stovepipe Sampler –A five-gallon bucket with the bottom removed is used to enclose 3 replicate plots to restrict the movement of organisms. Samples are collected in areas of emergent vegetation. The stovepipe sampler is pressed into the wetland substrate, and the contents of the sampler are then agitated. Vegetation and surface sediment are placed into a sieve bucket. The sampler is then swept 10 times with a small hand net. Large pieces of vegetation are washed and discarded, however finer plant material and detritus are retained. Samples are preserved for later sorting and taxonomic analysis in the laboratory.

Dip Net Measured Sweep – A standard D-frame net is used to obtain a semi-quantitative sample. Samples are collected in areas of emergent vegetation. A sample is collected by submersing the net and sweeping through the water column for a distance of one meter. The net is bumped against the bottom substrate 3 times (at the beginning, middle and end of the sweep) to dislodge and collect organisms from the sediment. All material collected is placed in a sieve bucket. Large pieces of vegetation are washed and discarded, however finer plant material and detritus are retained. Three replicate samples are collected in areas of emergent vegetation. Samples are preserved for later sorting and taxonomic analysis in the laboratory.

Algae and Diatoms

Algae are an important component of wetland ecosystems. They serve as a food source for invertebrates and small fish, and also play an essential role in nutrient and energy cycling. Algae strongly influence oxygen levels in the water column through photosynthesis and respiration, and often account for a significant portion of wetland metabolism.

Algae and diatoms have been widely used as indicators of water quality and biological integrity in aquatic ecosystems. They are highly sensitive to a range of environmental stressors including nutrient enrichment, changes in pH, pesticides and many other contaminants. Since algae have rapid growth rates and respond quickly to perturbations, they often provide an early warning of changing environmental conditions which may not be detected by other methods. Diatoms are particularly useful in assessing wetlands during dry periods and to determine historic environmental conditions, as their cell walls consist of a glass-like material which persists in wetland sediments over long periods of time.

DEP began collecting algae and diatom samples in 1998 during the Casco Bay pilot project. This was a collaborative effort with Dr. R. Jan Stevenson of Michigan State University to develop algal indicators of wetland integrity. The algae and diatom project was initially supported through an EPA Headquarters Cooperative Agreement, but has not yet been completed due to lack of continued funding. Although DEP collected wetland algae and diatom samples each summer from 1998 through 2002, only samples from 1998 and 1999 have been processed. Samples from subsequent years have been archived until adequate funding can be obtained for taxonomic identification, statistical analysis and metric development. Based on available data from 1998, algae show great promise for use as indicators of wetland condition in Maine.

Four algae sample types were tested to determine which produce the best indicators of wetland condition. Material from multiple sites within each wetland are combined into a single sample from each of the following habitats:

Water column – Water samples are collected for quantitative analysis of phytoplankton abundance and species composition. Chlorophyll a is also analyzed as an indicator of algal biomass. A long handled dipper is used to collect water samples just below the surface. Water from multiple areas of the wetland are combined into a single sample.

Plant stems - Garden shears are used to clip plant stems below the water line to collect epiphytic algae. The plant stems are placed into a whirlpak bag, and distilled water is added. The stems are then massaged to remove attached algae and diatoms, rinsed with additional distilled water and discarded. As of 2002, the surface area of each plant stem is also calculated from field measurements to obtain a more quantitative sample.

Sediments – Sediments for qualitative algae and diatom samples are collected using a turkey baster and/or plastic spoon. As of 2002, a quantitative sample is obtained using a petrie dish pressed into the substrate and retrieved with a spatula. Three replicates are collected and combined into a single sample.

Multihabitat sample – Material from each of the above single-habitat samples is combined into single container to obtain a qualitative multihabitat sample.

Vegetation

Plants are a conspicuous feature of wetland ecosystems, and form the foundation for wetland structure and function. Vegetation comprises the base of wetland food chains, and provides essential habitat for all types of wetland life. In some wetlands, primary productivity (the amount of biomass produced by plants) is comparable to productivity measured in rain forests. Wetland plant communities play a significant role in carbon cycling, including compounds such as carbon dioxide and methane, and function to moderate climate patterns on a regional and even global scale. Plants influence water quality through uptake of nutrients, metals and other contaminants, as well as by moving nutrients from sediments into the water column. They also stabilize shoreline areas and sediments, and modify currents and water flow patterns.

Plant communities are sensitive indicators of wetland health, and are especially useful for evaluating impacts from nutrients, hydrologic changes, sedimentation, habitat fragmentation and invasive species. Plants may serve as the primary biological assemblage to monitor "drier" wetlands where aquatic invertebrates are not abundant, and can also be used to detect chronic long-term stress to wetland ecosystems.

As funding becomes available, Maine DEP plans to incorporate standardized plant community assessments into its biological monitoring program, and to develop vegetative metrics related to wetland condition. Examples of plant metrics used in other states include species richness, percent cover of dominant species, relative proportions of native and non-native taxa, percentages of tolerant/intolerant taxa, and numbers of annual vs perennial species. DEP also plans to use vegetative indicators of nutrient enrichment to help develop wetland nutrient criteria. Measures of nutrient enrichment include structural indicators such as community composition metrics, and functional indicators such as stem height, biomass production and nutrient content in plant leaves. The proposed vegetative assessment component of DEP's wetland biomonitoring program is currently unscheduled due to lack of adequate staff and funding.

Water Quality and Site Characterization

Physical and chemical water quality data are obtained through field measurements and analysis of water samples. These may include water temperature and depth, dissolved oxygen, conductivity, pH, nutrients, chlorophyll a, anions and cations, dissolved organic carbon, color, and alkalinity. Habitat descriptions, including Cowardin classification, substrate type and a qualitative listing of dominant plant species are also recorded.

Human activities observed in the field which may impact wetland condition are also noted and scored based on relative severity and type of disturbance. Major disturbance categories include hydrologic and vegetative modifications, evidence of chemical pollutants, impervious surface in the watershed, and other potential non-point sources of pollution.

This information is used to characterize wetlands for appropriate classification, determine relative levels of human disturbance for metric development, identify sources and causes of degradation, and verify that candidate reference wetlands are actually minimally-impaired.

Landscape Level Wetland Assessment

Maine DEP plans to apply landscape level assessment methods to predict risks to wetlands from various human activities on a watershed basis. This work will incorporate elements from existing GIS-based models developed in Maine and other States. Land use and land cover will be characterized to create watershed profiles (for example, percent impervious area, forest, agricultural lands, etc.). Other available watershed data related to wetland health will also be included, such as known discharges, dams, water quality data and population growth information. Potential data sources include:

- Land use and land cover satellite classification;
- DEP Watershed Management Division land use/impervious surface data;
- Maine State Planning Office wetland risk data (including data from the Casco Bay wetlands characterization project);
- DEP river and stream bioassessment data;
- DEP ground water threats database;
- DEP monitoring data required for permits;
- Maine Natural Areas Program endangered and threatened plant data.

Land use profiles and other watershed characterization data will be scored and compiled to produce a landscape disturbance index, including thresholds and criteria to predict wetland risk categories. Wetland risk estimations will be verified, refined and calibrated using biological monitoring data and associated physical and chemical data. DEP will examine the relationships between predicted risks (based on the landscape disturbance index), and on-the-ground measures of wetland health (based on biological metrics). The landscape disturbance index and/or risk categories may then be modified as necessary to improve their capability to predict wetland ecological impairment.

Based on this work, DEP expects to develop strategies and actions for wetland management to protect and improve wetland ecological integrity. Landscape level assessments will be used to identify potential wetland threats, diagnose sources and causes of impairment, and better describe the human disturbance gradient for use in biological assessments. This information may also be used to identify and prioritize potential wetland restoration sites. The landscape disturbance index will be a flexible tool designed for use at various scales, depending on the desired application. The initial phase of the project is planned for the Casco Bay watershed due to the availability of more comprehensive GIS layers and biological monitoring data. Landscape level assessments will be applied to additional portions of the State provided adequate funding and staff resources are available.

Quality Assurance

DEP's wetland monitoring program incorporates established quality assurance/quality control practices of the Biological Monitoring Program and the Division of Environmental Assessment, with modifications as needed where sampling protocols are specific to wetlands. Examples include the use of standard procedures for collecting field data and replicate samples, sample tracking, equipment calibration, and sorting, identification and coding of macroinvertebrate samples. Maine DEP has an EPA approved Quality Management Plan, and is working to develop a comprehensive Quality Assurance Project Plan which will address various components of the Biological Monitoring Program.

Data Management

DEP's biomonitoring program is close to completing development of an ACCESS database including macroinvertebrate, physical, chemical and habitat data. This database will facilitate calculation of complex biological metrics, statistical data analysis and reporting. The wetland biomonitoring database can interface with data stored in ORACLE, including DEP's river and stream biomonitoring data. This is important to avoid duplication of effort, and for quality assurance purposes. Both the wetland and river and stream programs utilize a number of common data tables, such as macroinvertebrate taxa codes, hydrologic unit codes, and other hydrography and political boundary data. The wetland database will have the capacity to interface with statistical analysis and GIS applications, and will be compatible with EPA's STORET database. DEP also maintains a spatial database containing wetland biological monitoring station locations using ArcInfo.

Data Analysis and Assessment

Biological monitoring results are analyzed on an ongoing basis to identify and refine biological metrics used to evaluate wetland condition. Metrics are selected by examining biological monitoring data from a number of wetlands sampled across a gradient of human disturbance. Wetlands are targeted for monitoring to encompass a wide range of ecological condition, from highly impacted sites to minimally disturbed reference wetlands. Wetland attributes that show predictable changes in response to human activities are then tested using data from additional sites to determine which metrics provide the most reliable information about wetland condition.

Analyses performed to date reveal significant relationships between a number of candidate invertebrate metrics and watershed development. Examples of macroinvertebrate metrics include the diversity and relative abundance of dragonflies, mayflies, caddisflies and midges. Many invertebrate metrics tested also respond to changes in water quality typically associated with urban non-point source pollution, including elevated conductivity and concentrations of dissolved ions and nutrients.

DEP is currently working to develop thresholds and criteria for incremental levels of biological impairment based on wetland macroinvertebrates. DEP is also exploring statistical methods to summarize wetland data, including multimetric and multivariate analyses. These are necessary steps to enable the State to use biological monitoring data in wetland regulatory and management decisions, develop wetland-specific water quality standards, and report on wetland condition as required under the Clean Water Act. To accomplish this, candidate metrics must be tested statewide, since wetland biomonitoring data are limited or absent for many regions. As additional data are collected in areas of the state not previously sampled, DEP will also examine potential regional issues and ecological linkages among wetlands and other waters.

Reporting

DEP has reported on the progress of wetland monitoring and assessment in the State's Water Quality Assessment required under section 305(b) of the Clean Water Act for the past several reporting cycles. DEP eventually plans to report on attainment status for wetlands, but will first need policy clarifications and/or legislative changes to consistently implement water quality standards for wetlands. DEP is currently working with EPA to upload monitoring data for all waters, including wetlands, into the national STORET database.

Program Review

DEP has worked closely with EPA and wetland experts across the U.S. in developing its wetland biological monitoring program. DEP staff have served on relevant national and regional work groups including the Biological Assessment of Wetlands Work Group (BAWWG), the New England Biological Assessment of Wetlands Work Group (NEBAWWG), the National Wetland Monitoring and Assessment Work Group, and the New England Interstate Water Pollution Control Commission (NEIWPCC) wetland work group. DEP's wetland bioassessment work has been peer reviewed through presentations at meetings of these work groups and professional organizations including the Society of Wetland Scientists, the Association of State Wetland Managers, and the New England Association of Environmental Biologists. DEP staff have also presented to staff of various State agencies involved in wetland management in Maine.

Education and Outreach

In addition to presentations at professional meetings and conferences, DEP staff periodically assist with wetland biomonitoring training workshops for other agency staff, wetland professionals and volunteers. DEP biomonitoring program staff have also contributed to the writing and review of several major EPA documents related to wetland monitoring and assessment.

DEP biomonitoring staff respond to wetland information and speaking requests from schools and conservation groups as time allows, and have participated in educational programs such as the Maine Envirothon, an environmental competition for high school students. Program staff are also designing a wetlands web page for the Maine DEP web site. The wetlands web page is scheduled for completion by fall 2002, and may be accessed by visiting the Bureau of Land and Water Quality at http://www.state.me.us/dep/blwq/ .

Future Program Needs

To successfully implement a comprehensive biological monitoring program for wetlands, Maine 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. Although DEP has made good progress in developing assessment methods for aquatic macroinvertebrates, there is a particular need to incorporate vegetative and algal assessments into the biological monitoring program for wetlands. This will greatly improve the State's ability to monitor a variety of wetland types, including less frequently inundated wetlands, and to evaluate impacts from a wide range of human activities. The use of plants and algae to assess ecological condition is also an important step in developing environmental response-based nutrient criteria for Maine wetlands.

Current staff and funding levels are not adequate to fully implement and sustain an effective State wetland biomonitoring program. At present, DEP's wetland bioassessment program is administered and staffed by one permanent full-time biologist, with limited additional support provided by river and stream biomonitoring program biologists and summer field staff. This position has primary responsibility for all aspects of the wetland monitoring program, including grant management, planning and oversight of field work, data management, data analysis, reporting, biological criteria development, outreach, and technical support to other programs. Additional professional staff having advanced knowledge of biological assessment principals, taxonomy, wetland science, data analysis and environmental policy are urgently needed for continued program development and continuity. Other ongoing program expenses include laboratory analyses, contracts for taxonomic identification, equipment and supplies, vehicle leasing and travel to meetings.

DEP faces significant obstacles to adequately staff this program, including obtaining stable multi-year funding. The Department has also had difficulty receiving authorization from the Maine legislature to create and hire new positions, even if they are funded through federal sources. Additionally, long-term funding to cover program operation costs is needed. The DEP wetland biomonitoring program has to date been supported almost entirely through Section 104(b)(3) funding for wetland program development. This includes 104(b)(3) money received through Maine's Performance Partnership Grant, which currently supports the DEP wetland biologist position, and wetland bioassessment pilot project grants administered by EPA Region I.

Section 104(b)(3) funding has enabled DEP to make substantial progress, however the amount available is not nearly sufficient to implement the basic elements necessary for an adequate State wetland monitoring and assessment program. Moreover, competition for 104(b)(3) funds among various programs and agencies is intense, both within Maine and at the regional and national levels. This competition can only be expected to increase as more states attempt to comply with federal requirements to monitor wetlands. As a result, wetland monitoring program managers cannot predict from year to year what resources, if any, may be available. In order to sustain a viable State monitoring program for wetlands, staffing and dedicated financial support comparable to monitoring programs for other waters is fundamental.

EXTENT OF WETLAND RESOURCES

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 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 2000 and 2001 are summarized in Tables 3-6.1 and 3-6.2 below.

Table 3-6.1. Wetland Mitigation Totals in the Organized Townships.
Source: Maine DEP Wetland Loss Tracking System

Area of Mitigation (Acres) - 2000 (1/1/2000-12/31/2000)					
Wetland Type	**Creation**	**Enhancement**	**Preservation**	**Restoration**	**Total**
Forested	0	0	8.77	0.37	**9.14**
Intertidal (other)	0	0	0	0.02	**0.02**
Other/Mixed	0	.05	0	0.64	**0.69**
Wet Meadow	1.70	1.74	15.08	0	**18.52**
Total	**1.70**	**1.79**	**23.85**	**1.03**	**28.38**
Area of Mitigation (Acres) – 2001 (1/1/2001-12/31/2001)					
Wetland Type	**Creation**	**Enhancement**	**Preservation**	**Restoration**	**Total**
Forested	0	0	2.13	0	**2.13**
Other/Mixed	0.34	0.46	24.20	0	**25.00**
Scrub-shrub	0.15	0	1.89	0	**2.04**
Total	**0.49**	**0.46**	**28.23**	**0**	**29.18**

Table 3-6.2. Permitted Wetland Impacts in the Organized Townships.
Source: Maine DEP Wetland Loss Tracking System

Area Impacted (Acres) - 2000 (1/1/2000-12/31/2000)										
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	3.30	0	0	0.028	0	0	**3.30**	**0.03**
Forested	0	0	10.64	9.92	15.61	0.99	9.73	1.61	**13.02**	**12.52**
Great Pond	0	0	0.002	0.018	x	x	x	x	**0.002**	**0.02**
Intertidal (mudflat)	0	0	0.18	0.023	x	x	x	x	**0.18**	**0.02**
Intertidal (other)	0	0	0.61	0.36	x	x	x	x	**0.61**	**0.36**
Intertidal (vegetated)	0	0	0.006	0.08	x	x	x	x	**0.006**	**0.08**
Open Water	0	0	0	0	0.24	0	0	0	**0.24**	**0**
Other/Mixed	0	0	6.80	2.37	1.89	0	1.55	0.46	**10.24**	**2.83**
Peatland	0	0	0	0	0.28	0	0	0	**0.28**	**0**
Riverine	0	0	0	0.005	0.06	0	0	0	**0.06**	**0.005**
Scrub-shrub	0	0	0.03	0.05	6.59	0.35	2.68	0.40	**9.31**	**0.80**
Subtidal (aquatic bed)	0	0	0.14	0.09	x	x	x	x	**0.14**	**0.09**
Subtidal (other)	0	0	.02	1.22	x	x	x	x	**0.02**	**1.22**
Wet Meadow	0	0	8.72	1.89	2.06	0.56	2.33	0.18	**13.11**	**2.63**
Total	**0**	**0**	**30.45**	**16.04**	**26.74**	**1.93**	**16.29**	**2.65**	**73.47**	**20.61**

Area Impacted (Acres) - 2001 (1/1/2001-12/31/2001)										
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	2.38	0	0.51	0	0.50	0	**3.39**	**0**
Forested	0	0	11.38	18.51	14.15	0.90	6.85	0.41	**32.38**	**19.82**
Great Pond	0	0	0.01	0.02	x	x	x	x	**0.01**	**0.02**
Intertidal (other)	0	0	0.09	0.14	x	x	x	x	**0.09**	**0.14**
Intertidal (vegetated)	0	0	0.57	0.15	x	x	x	x	**0.57**	**0.15**
Open water	0	0	0	0.01	0	0	0	0	**0.00**	**0.01**
Other/Mixed	0	0	5.38	0	2.83	0.30	3.29	0.53	**11.51**	**0.83**
Riverine	0	0	0.73	0.29	0	0	0	0	**0.73**	**0.29**
Scrub-shrub	0	0	11.71	0.91	4.31	0.53	3.30	0	**19.32**	**1.44**
Subtidal (aquatic bed)	0	0	0.05	1.77	x	x	x	x	**0.05**	**1.77**
Wet Meadow	0	0	1.61	0.11	2.73	0.42	0.60	0	**4.94**	**0.54**
Total	**0**	**0**	**34.18**	**21.90**	**24.52**	**2.16**	**14.55**	**0.94**	73.25	25.0

X = Tier review not available for projects located in these resources

ADDITIONAL WETLAND PROTECTION ACTIVITIES

The following additional activities were funded wholly or in part by the U.S. Environmental Protection Agency through Clean Water Act Section 104(b)3 Wetland Program Development Grants:

Wetland Conservation Plan

The State Planning Office (SPO) has completed a State Wetland Conservation Plan which addresses regulatory, program and policy issues, and makes recommendations for future goals related to wetlands. In 1994, SPO convened the Wetlands Conservation Plan Task Force to guide development and implementation of the Plan. The Task Force included State and Federal agency staff, business members and conservation groups. The first priority of the Task Force was to respond to a 1993 Legislative Resolve which required DEP and SPO to explore the feasibility of assuming jurisdiction over federal wetlands regulation, and to report on other options for streamlining the wetland permitting process. In response to the Resolve, the Task Force formed a wetlands regulatory workgroup. The efforts of the regulatory workgroup resulted in the changes to the State's wetland regulatory program summarized above. The Task Force subsequently formed three additional workgroups to develop goals for wetland inventory, wetland assessment, and wetland mitigation. The Wetland Conservation Plan is currently available from SPO.

Wetland Characterization Pilot Project

Wetlands planning and watershed management in Maine have taken significant steps forward since the initiation of work on the State Wetland Conservation Plan and the creation of the Division of Watershed Management at Maine DEP in 1994. The Wetland Conservation Plan effort led to a recognition that watershed level planning for wetlands was needed, which in turn led to the Casco Bay Watershed Pilot Project (CBWPP).

Work on the CBWPP which began in 1997 was completed in late spring 2000. It provides landscape-level assessment of wetland functions using a GIS system based on National Wetland Inventory (NWI) maps. The geographic information system also includes soils, hydrography, population, FEMA flood zone mapping, roads, and cultural feature layers. A series of queries specific to six chosen wetland functions were applied to the GIS which identified those wetlands likely to perform the chosen wetland functions at a significant level. Field work to determine the sensitivity of the method was undertaken during the 1998 and1999 field seasons. The field work indicated a high level of accuracy between the GIS characterization and the functions found on site. The methodology developed during the Casco Bay Wetland Characterization Project will also be extended to the Piscataqua, Salmon Falls and Saco watersheds.

The State Planning Office is working with federal and state agencies, localities, and land trusts to develop uses of the characterization. The characterization work also will be incorporated into broader habitat planning strategies being developed by the state. SPO has distributes packages of relevant open space planning, GIS , and hard copy maps to 14 pilot towns. Staff will be using the characterization as a base layer of data in supporting detailed local assessment of wetland priorities for conservation action.

Wetland Compensation Report

Early in 2002, DEP submitted a report to the Maine Legislature on the analysis of existing wetland compensation results, and recommendations for changes to policy concerning compensation and compensation funds/banks. The report assesses impacts to wetlands under the State's wetland permit program, and identifies that localized cumulative impacts in some southern Maine towns may justify local action to protect wetlands. State staff recommended to the Legislature that the state provide tools to localities seeking to protect wetlands, including a model ordinance for wetlands protection, a method for local prioritization of wetland conservation activities, and guidance on the establishment of local wetland compensation funds to ensure some return to local wetlands protection in exchange for wetland loss. The report further recommends that the state not establish a state-level compensation fund at this time, due to a lack of adequate state-wide wetland alterations within the relevant range for use of such a fund. However, state staff are recommending that the existing statutory possibility for such a fund not be allowed to sunset, as regional or local compensation funds may prove to be beneficial over time, and should have the same ability to be considered in the future as mitigation banks.

Wetland Restoration

The State Planning Office is working with Corporate Partners and the New England Regional Inter-Agency Team to identify and seek resources for the restoration of priority wetlands. Staff worked with the CRWP technical community to review potential projects and make recommendations to the Executive Board. Eleven projects were funded and restoration work is ongoing or will begin in the summer of 2002.

Ecological Assessment of the Boundary Plateau and St. John Uplands Ecoregions

This project involves natural resource assessment work in the Boundary Plateau and St. John Uplands (over 4.5 million acres). Utilizing information from landowners and recent landscape analysis conducted by the Maine Natural Areas Program, inventory priorities will be developed to conduct a coarse filter survey of the ecoregions. The assessment focuses on locating exemplary natural communities and ecosystems, and habitats supporting rare, threatened and endangered plants and animals. Data gathered will support forest management plans.

Defining and Assessing the Vernal Pool Resource in Southern Maine

Maine hosts several common, rare and endangered wildlife species that require vernal pools to complete their life history, but because of their small size (often less than 0.1 acre), current federal and state regulations do not adequately protect these valuable wetland habitats. In response, the Maine Department of Inland Fisheries and Wildlife is cooperating with the State Planning Office to develop and evaluate strategies for conserving Maine's vernal pool resources. The project includes the following major goals:

To provide MDIFW and SPO with the field data needed to determine the magnitude of the "Significant Vernal Pool" resource in southern Maine.

To evaluate the effectiveness and feasibility of moving forward with the protection of such pools under MDIFW's Landscape Habitat Analysis Project (a proactive initiative to help Maine towns identify and incorporate important wildlife habitats into their comprehensive planning process), and/or as candidates for Significant Wildlife Habitat under the Natural Resources Protection Act.

To assess the cost and feasibility of conducting a comprehensive survey and delineation of southern Maine's vernal pool resource.

Vernal Pools Education and Outreach

To move forward in support of the Wetlands Conservation Plan goal of furthering protection of vernal pools throughout the state, SPO will develop an integrated program of outreach, education and field services. The Vernal Pools Focus Group has identified this as a need of paramount importance to ensure the success of the State's vernal pool regulatory program by raising the general level of understanding and appreciation for these important resources.

SPO will direct efforts to develop and deliver educational materials for identified groups within the state, including developers, realtors, foresters, municipal code enforcement officers and conservation commissions. In addition, educational forums will be held throughout the state, with particular emphasis on those areas of high growth and development where vernal pools are currently at the greatest risk. SPO will also work to initiate a voluntary data gathering effort aimed at developing a landowner-directed Significant Vernal Pools certification program.

Conserving Habitat in a Developing Landscape

The goal of this project is to conserve wildlife habitat and plant communities in southern Maine in the face of habitat loss from fragmentation and development. This is important to protect the full spectrum of Maine's native plant and animal species, and to help keep species of concern from becoming threatened or endangered. The project involves preparation of coarse site conservation plans for focus areas of approximately 15 land trusts in southern Maine. It will present local land trusts with information on the impacts of development on wildlife, and will provide GIS maps for at least one priority project of each land trust. This project will also provide legal, technical, and fundraising support and guidance to each land trust for securing lands of conservation interest.

Natural Community Classification Revisions

The Maine Natural Areas Program has revised the State's natural community classification to reflect information collected in the field over the past decade. As the revisions were made, demand for a more user-friendly product was voiced by the forestry and consulting communities. In response, MNAP drafted natural community fact sheets, which are cross-referenced to all available classification systems. The resulting product is designed as a user friendly field guide for a diverse array of land managers, ecologists, foresters and consultants. The product also provides updated information on S1 (critically imperiled) and S2 (imperiled) communities that fall into the regulatory realm in Maine.

Plant Conservation Volunteer Program

The New England Plant Conservation Program (NEPCOP) initiated the Plant Conservation Volunteer Program (PCV) in response to unfilled plant conservation needs of the New England region. The PCV program is expanding into Maine, and will create the opportunity to accomplish on the ground plant conservation work that would otherwise be ignored. The goals of the PCV program are to 1) monitor rare plant habitats; 2) work with landowners to manage rare plant habitats; and 3) develop a constituency for native plants. Of the 250 rarest plant species tracked by the Maine Natural Areas Program, 107 are associated with wetlands.

The project objectives include: 1) assist the New England Wildflower Society in training Plant Conservation Volunteers to conduct monitoring of rare plant populations using natural heritage methodology; 2) prioritize the selection of 100 sites to be monitored, and provide information and assistance to private landowners; and 3) incorporate data from the work of Plant Conservation Volunteers into the state Biological and Conservation Data System for further use by private and public agencies in conservation and development planning.

Invasive Plant Education

A partnership of federal, state and private organizations has been created to facilitate a statewide educational outreach effort to increase awareness of the adverse effects of invasive plants species. Project objectives include: 1) To educate the public and private land managers about the threat of invasive plant species; 2) To educate garden suppliers and members of the nursery industry about the threat of invasive plant species, and to encourage them to sell native plant species; 3) To educate the general public about the threat of invasive plant species, and to encourage them to be more selective in choosing garden and landscape plantings; 4) To create educational materials or programs on invasive plant species suitable for use in schools and other educational settings.

Staff Support

Section 104(b)(3) Wetland Program Development Grant funding was used for staff support by the Maine State Planning Office and the Maine DEP Wetland Biomonitoring Program.

STATE OF MAINE

DEPARTMENT OF ENVIRONMENTAL PROTECTION

2002 INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT

APPENDICES:

INTEGRATED LISTS OF WATERS AND MONITORING SCHEDULES

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APPENDIX II: LAKE WATERS

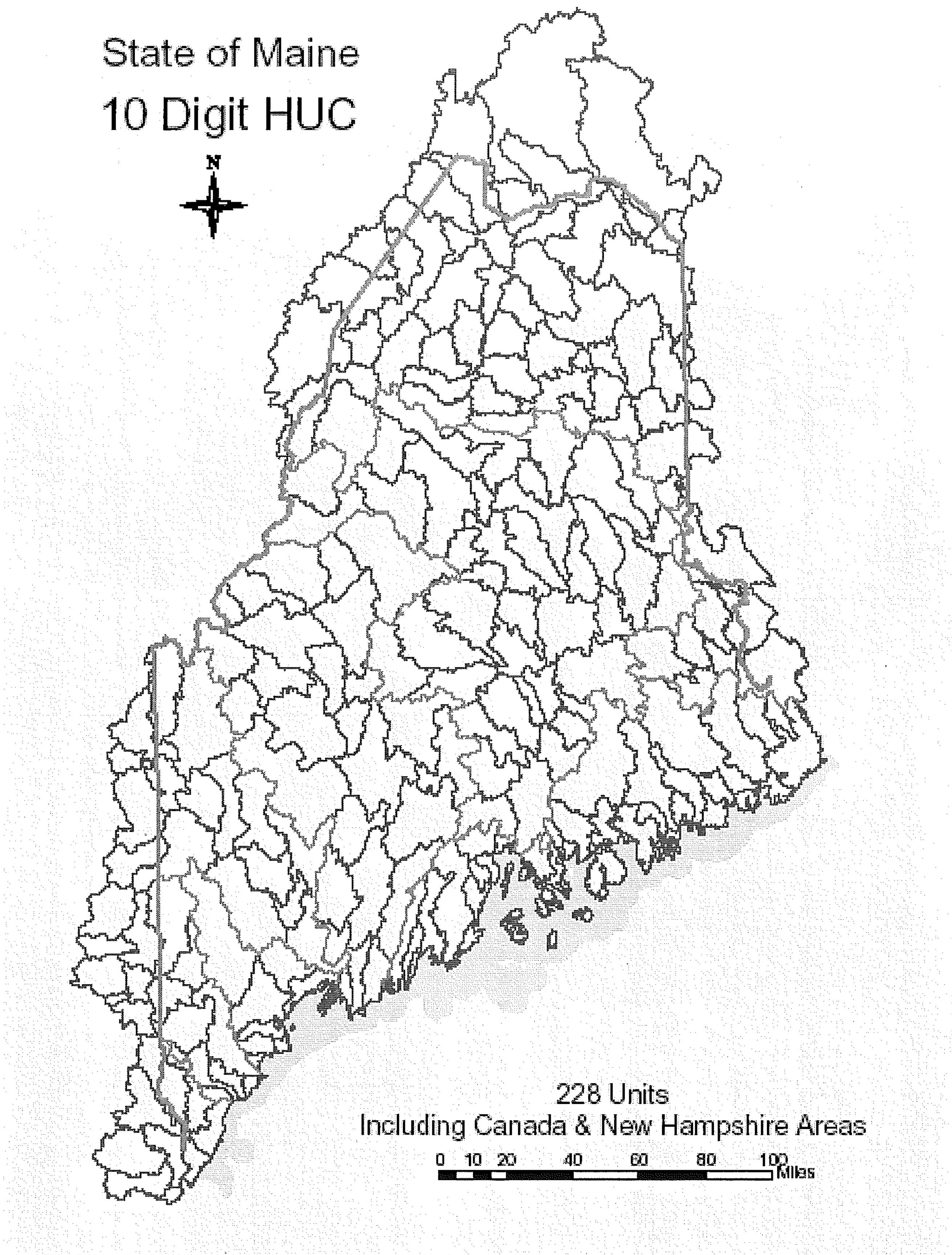
APPENDIX III: ESTUARINE AND MARINE WATERS

DEFINITIONS

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.


State of Maine
10 Digit HUC
N
228 Units
Including Canada & New Hampshire Areas
0 10 20 40 60 80 100
Miles

APPENDIX I: RIVERS AND STREAMS

CATEGORY 1: RIVERS AND STREAMS FULLY ATTAINING ALL DESIGNATED USES

ASSESSMENT UNIT (HUC)	SEGID	SEGMENT NAME	SEGSIZE	SEGCLASS	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
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,B	2000	Baxter State Park
ME0102000109	202R	Tributaries of West Branch Penobscot R above Ferguson L	208.0	Class AA,B	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
		Total miles	1071.8			

CATEGORY 2: RIVERS AND STREAMS ATTAINING SOME DESIGNATED USES INSUFFICIENT INFORMATION FOR OTHER USES

ASSESSMENT UNIT (HUC)	WATERBODY 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	2001	
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	2001	
ME0101000105	103R	Shields Branch of Big Black R and its tributaries	18.9	Class AA,A	Evaluated	
ME0101000106	103R	Big Black R and its tributaries	159.1	Class AA,A	Evaluated	
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	
	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	
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	

ME0101000201	119R	Eagle Lake, Allagash R tributaries	98.8	Class AA,A	Evaluated	
ME0101000202	119R	Heron (Churchill) Lake, Allagash R tributaries	97.5	Class AA,A	Evaluated	
ME0101000203	119R	Chemquasabamticook Stream and tributaries	159.2	Class AA,A	Evaluated	
ME0101000204	119R	Long Lake, Allagash R tributaries	155.2	Class AA,A	Evaluated	
	120R	Allagash R, main stem	7.4	Class AA,A	Evaluated	
ME0101000205	119R	Musquacook Stream and tributaries	171.5	Class AA,A	Evaluated	
ME0101000206	119R	Big Brook and tributaries	118.6	Class AA,A	Evaluated	
ME0101000207	119R	Allagash R tributaries	272.9	Class AA,A	Evaluated	
	120R	Allagash R, main stem	45.4	Class AA,A	Evaluated	
ME0101000301	121R	Fish R, main stem, and its tributaries above outlet of Fish River Lake	145.0	Class AA,A	Evaluated	
ME0101000302	121R	Fish R, main stem, and its tributaries above outlet of Portage Lake	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 Lake	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	

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	
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	
ME0101000407	130R	Aroostook R, main stem, and tributaries above St Croix Str	141.8	Class AA,A	Evaluated	
	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	1998	
	136R	Minor tributaries of Aroostook R entering between confluence	25.5	Class A,B	Evaluated	
ME0101000409	133R	Machias R and tributaries above Big Machias L	175.5	Class AA,A	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	Evaluated	
ME0101000412 *	138R	Minor tributaries Aroostook R entering from south above Presque Isle	12.0	Class B	Evaluated	
	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	2001	
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	
ME0101000504	152R	Meduxnekeag R, main stem, and tributaries	243.6	Class B	2000	
ME0102000101	201R	North Branch of Penobscot R and its tributaries	176.7	Class A	Evaluated	
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	2000	

ME0102000203	206R	Tributaries of East Branch Penobscot R above Seboeis R	62.6	Class AA,A	Evaluated	
	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	Evaluated	
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	1999	
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	
	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	1997	
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	1999	
	229R	Penobscot R, main stem, above confluence of Mattawamkeag R	13.0	Class C	2001	
ME0102000502	220R	Minor tributaries Penobscot R above confluence of Piscataquis R	241.9	Class A, B	2000	
ME0102000503	221R	Passadumkeag R and its tributaries	383.4	Class AA, A	1999	
ME0102000504	222R	Olamon Stream and its tributaries	53.3	Class A	1999	
ME0102000505	226R	Sunkhaze Stream and its tributaries	88.7	Class AA	1999	
ME0102000506	222R	Minor tributaries of Penobscot R between Piscataquis R and Orson Is	91.1	Class A, B	1999	

ME0102000507	226R	Birch stream and its tributaries	63.4	Class B	1999	
ME0102000508	223R	Pushaw Str and its tributaries	277.2	Class B	1999	
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	2001	
ME0102000511 *	225R	Tributaries of Souadabscook Str	141.5	Class B	2001	
	225R01	Souadabscook Stream, main stem	15.5	Class AA,A,B	Evaluated	
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	2000	
	227R01	Mill Stream (Orrington)	2.0	Class B	2000	Previously 303d listed. New data in attainment.
	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	
ME0103000101	301R	South Branch Moose R and its tributaries	48.7	Class AA,A,B	Evaluated	
ME0103000102	301R	Moose R and its tributaries above Attean Pd	139.4	Class AA,A,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 (riverine waters only)	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 (riverine waters only)	21.5	Class AA,A	Evaluated	
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	Evaluated	

	337R	Kennebec R, main stem, from Wyman Dam to Carrabassett R	21.1	Class A	2000	
ME0103000304 *	313R	Carrabassett R and its tributaries	279.5	Class AA,A,B	1997	
ME0103000305 *	315R	Sandy R and tributaries above Rt 145 Strong	139.2	Class AA,A,B	2000	
	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	1997	
	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	
	320R	Minor tributaries Kennebec R between Carrabassett R and Sebasticook R	193.8	Class B	Evaluated	
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	Evaluated	
	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	Evaluated	
	327R	Fifteen Mile Str and its tributaries	71.0	Class B	Evaluated	
	328R	China Lake Outlet and its tributaries	41.0	Class B	1997	

	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	Previously 303d listed. New data in attainment.
ME0103000311 *	334R	Cobbosseecontee Str and its tributaries	185.5	Class B	2001	Tingley Bk previously 303d listed. New data in attainment.
ME0103000312 *	333R	Minor tributaries Kennebec R between Sebasticook R and Cobbossee Str	134.5	Class B	Evaluated	
	333R01	Bond Brook (Augusta)	10.0	Class B/C	2002	Previously 303d listed. New data in attainment.
	335R	Minor tributaries Kennebec R Cobbossee Str and Merrymeeting Bay (Chops)	145.4	Class B	Evaluated	
	420R	Minor tributaries of Merrymeeting Bay	96.3	Class B	Evaluated	
ME0104000101	402R	Mooseleukmeguntic - Cupsuptic R and its tributaries	38.3	Class AA,A	Evaluated	
	403R	Mooseleukmeguntic -Kennebago R and its tributaries	82.7	Class AA,A	Evaluated	
ME0104000102	404R	Umbagog - Rapid R and its tributaries	141.6	Class AA,A	1997	
	405R	Umbagog - Tributaries of Umbagog Lake and segments of minor tributaries entering Androscoggin R in NH	44.0	Class A	Evaluated	
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	Evaluated	
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	1998	
ME0104000204	408R	Swift R and its tributaries	66.1	Class A,B	1998	
	410R	Minor tributaries of Androscoggin R entering between Rumford Pt and Webb R	35.5	Class B	1998	
ME0104000205 *	409R	Webb R and its tributaries (riverine waters only)	102.3	Class A,B	Evaluated	
	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	Previously 303d listed. Fish consumption advisory removed
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 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	1998	
	426R	Androscoggin R, main stem, from Brunswick Dam to Brunswick-Bath boundary	8.5	Class C	Evaluated	Previously 303d listed. New data in attainment.
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,B	Evaluated	
ME0105000103	502R	West Grand Lake and tributaries	230.5	Class A,B	1998	
ME0105000104	502R	Musquash Stream and tributaries	123.2	Class A,B	Evaluated	
ME0105000105	502R	Big Lake at Peter Dana Point	134.7	Class A,B	Evaluated	
ME0105000106	502R	Tomah Stream and tributaries	167.0	Class A,B	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	64.8	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 C	2000	
ME0105000201 *	507R	Dennys R and its tributaries (riverine waters only)	125.4	Class AA, A, B	2001	
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	2001	
	509R01	Chase Mill Stream (East Machias)	1.5	Class B	2001	Previously 303d listed. Improved treatment. New data in attainment.
ME0105000205	510R	Machias R and its tributaries (riverine waters only)	489.5	Class AA,A,B	2001	
	513R	Minor drainages entering tidewater in Washington County betw	30.4	Class B	Evaluated	
ME0105000206	508R	Roque Bluffs Coastal - Minor drainages entering tidewater between Sandy Pt (Cutler) and E Machias R	51.7	Class C	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	2001	
	513R	Minor drainages entering tidewater in Addison and Harrington	39.9	Class B	Evaluated	

ME0105000209 *	512R	Narraguagus R and its tributaries	325.8	Class B	2001	
ME0105000210	513R	Tunk Stream and tributaries	54.4	Class B	2001	
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	Evaluated	
	516R	E Branch of Union R and its tributaries	159.2	Class B	Evaluated	
	517R	Minor tributaries of Graham Lake	203.7	Class B	Evaluated	
ME0105000213 *	514R	Minor drainages entering tidewater in Union River Bay - Hancock County	19.2	Class AA,A,B	Evaluated	
	518R	Tributaries of Union R entering below outlet of Graham Lake	64.1	Class B	Evaluated	
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	2001	
ME0105000216	520R	Bagaduce River and its tributaries	125.1	Class B	Evaluated	
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	2001	
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	Evaluated	
	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	
	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	
	526R	Minor drainages entering tidewater of Damariscotta River	40.3	Class B	Evaluated	
	529R	Minor drainages entering tidewater of Damariscotta River	7.1	Class B	Evaluated	
ME0105000305 *	528R	Sheepscot R and its tributaries	193.3	Class AA,A,B	2001	

	529R	Minor drainages entering tidewater of Sheepscot River	82.6	Class B	2000	
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	2000	
	606R	Sebago Lake and its tributaries	256.7	Class A	Evaluated	
ME0106000102 *	603R	Royal R and its tributaries	131.9	Class A,B	2000	
	603R03	Eddy Brook (New Gloucester)	3.7	Class B	2001	Previously 303d listed. Improved treatment. New data in attainment.
	603R04	Hatchery Brook (Gray)	0.9	Class B	2001	Previously 303d listed. Improved treatment. New data in attainment.
ME0106000103 *	607R	Tributaries of Presumpscot R entering below outlet of Sebago L	269.6	Class B	2000	
	608R	Presumpscot R, main stem, above Dundee Dam	4.2	Class A	2000	
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	2001	
	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	2001	Previously 303d listed. Improved flow management. New data in attainment.
ME0106000204	613R	Minor tributaries of Saco R between Swans Falls and Rt 160 in Brownfield	209.7	Class A	Evaluated	
	618R	Saco R, main stem, between Swans Falls and Rt 160 in Brownfield	22.5	Class AA,A	2001	
ME0106000205	613R	Minor tributaries of Saco R between Rt 160 in Brownfield and Ossippee River	116.4	Class A	Evaluated	
	618R	Saco R, main stem, between Rt 160 in Brownfield and Ossippee River	20.0	Class AA,A	2001	
ME0106000209	614R	Ossippee R and its tributaries	107.4	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	Deep Bk previously 303d 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	2001	
	619R	Saco R, main stem, between the Little Ossippee River and tidewater	24.1	Class AA	2001	Previously 303d listed. Improved flow management. New data in attainment.
	619R02	Saco River (Dayton)	0.2	Class A,B	2000	Previously 303d listed. Improved flow management. New data in attainment.
	619R03	Saco River (West Buxton)	0.2	Class A	2000	Previously 303d listed. Improved flow management. New data in attainment.
	619R04	Saco River (Bar Mills)	0.2	Class A	2000	Previously 303d listed. Improved flow management. New data in attainment.
ME0106000301 *	622R	Kennebunk R and its tributaries	88.8	Class B	2000	
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	Previously 303d listed. Improved dam management. New data in attainment.

ME0106000304 *	625R	Great Works R, main stem, above Rt. 9 bridge in N Berwick and all tributaries	139.3	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	
		Total miles	28685.8			
* asterik 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)	SEGID	SEGMENT NAME	SEGSIZE	SEGCLASS	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	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing. 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	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.
ME0103000306	320R01	Carrabassett Stream (Canaan, Skowhegan)	19.9	Class B	2007	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.

ME0103000309	329R02	Twelvemile Brook (Clinton)	3.0	Class B	2007	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.
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	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.
ME0103000311	334R02	Potters Brook (Litchfield)	4.2	Class B	2007	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.
ME0103000312	420R01	Abagadasset River (Richmond, Bowdoinham)	13.3	Class B	2007	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.
ME0103000312	335R01	Kimball Brook (Pittston)	3.4	Class B	2007	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.
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.
ME0105000302	524R01	Unnamed Brook (N. Cushing)	0.5	Class B	2007	Previously 303d listed, OBD removal

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.
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	Previously 303d listed. Errors or inconsistencies in the original data led to incorrect listing.
ME0104000209	414R02	Pennesseewassee Lake Outlet	1.2	Class B	1998	New information inconclusive.
ME0106000106	602R03	Concord Gully (Freeport)	1.0	Class B	2002	Previously 303d listed. New information inconclusive. Incorrectly listed as Class A in previous 303d list.
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	250.0			

CATEGORY 4-A: RIVERS AND STREAMS WITH IMPAIRED USE, TMDL COMPLETED

ASSESSMENT UNIT (HUC)	SEGID	SEGMENT NAME	SEGSIZE	SEGCLASS	IMPAIRED USE	TMDL APPROVED	
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	
ME0106000103	609R	Presumpscot R, main stem, below Sacarappa Dam	6.9	Class C	Aquatic Life	1998	
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, from Great East Lake to tidewater	27.1	Class B,C	Aquatic Life	1999	Also listed in 5-A for fish consumption and recreation
		Total miles	66.5				

CATEGORY 4-B: RIVERS AND STREAMS IMPAIRED BY POLLUTANTS
POLLUTION CONTROL REQUIREMENTS REASONABLY EXPECTED TO RESULT IN ATTAINMENT

ASSESSMENT UNIT (HUC)	SEG ID	SEGMENT NAME	SEG SIZE	SEG CLASS	SAMPLED DATE	IMPAIRED USE	COMMENTS
ME0101000413	145R01	Little Madawaska River and tributaries including Green pond and Chapman Pit	20.5	Class B	1995	Fishing (Consumption)	Haz waste remediation project (Superfund)
ME0101000413	145R02	Greenlaw Stream	17.1	Class B	1995	Fishing (Consumption)	Haz waste remediation project (Superfund)
ME0102000506	232R	Penobscot R, main stem, from Piscataquis R to Orson Is	36.5	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.
ME0102000509	233R	Penobscot R, main stem, from Orson Is to Veazie Dam	14.5	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.

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	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	339R	Kennebec R, main stem, from Fairfield-Skowhegan boundary to Sebasticook R	14.7	Class C	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.

ME0103000308	325R01	East Branch Sebasticook River Corundel Pd to Sebasticook L	4.5	Class C	2001	Aquatic life Fishing (Consumption)	Haz waste remediation project (Superfund). CSO removal. New permit.
ME0103000312	339R	Kennebec R, main stem, from Sebasticook R to Augusta (Curran Bridge)	17.7	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.
ME0103000312	340R	Kennebec R, main stem, from Augusta (Curran bridge) to Merrymeeting Bay (Chops)	30.5	Class C	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.

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.
ME0104000201	421R	Androscoggin R, main stem, from Maine-NH border to Wild R	2.4	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.
ME0104000202	421R	Androscoggin R, main stem, above Rumford Point	31.0	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.

ME0104000204	421R	Androscoggin R, main stem, from Rumford Pt to Virginia Bridge	11.0	Class C	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.
ME0104000204	422R	Androscoggin R, main stem, from Virginia bridge to Webb R	6.8	Class C	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.
ME0104000205	422R	Androscoggin R, main stem, Webb R to Riley dam	15.7	Class C	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.

ME0104000206	423R	Androscoggin R, main stem, from Riley Dam to Nezinscot R	21.7	Class C	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.
ME0104000207	412R02	House/Lively Brook	3.5	Class B	1997	Aquatic life	Waste (manure) removal (Agric NPS) by Consent Order and Site Permit
ME0104000208	424R	Androscoggin R, main stem, from confluence of Nezinscot R toGreat Falls in Little Androscoggin R	15.5	Class C	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.

ME0104000210	425R	Androscoggin R, main stem, from L Androscoggin R to Brunswick Dam	22.2	Class C	1998	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.
ME0105000201	507R01	Dennys River, Meddybemps L to Dead Str	4.5	Class AA	1999	Aquatic life Fishing (Consumption)	Haz waste remediation project (Superfund)
		Total miles	326.5				

CATEGORY 4-C: RIVERS AND STREAMS WITH IMPAIRMENT NOT CAUSED BY A POLLUTANT

ASSESSMENT UNIT (HUC)	SEGID	SEGMENT NAME	SEGSIZE	SEGCLASS	IMPAIRED USE	COMMENTS
ME0102000103	201R	West Branch of Penobscot R below Seboomook Lake	1.0	Class A,B	Aquatic life	Flow modified for hydropower
ME0102000109	205R	West Branch Penobscot R, main stem, below outlet of Quakish L	4.2	Class C	Aquatic life Navigation	Flow modified for hydropower - diversion
ME0102000110	205R01	Backwater of Dolby Impoundment	0.5	Class C	Aquatic Life	Impounded water
ME0102000513	227R02	Silver Lake Outlet	1.3	Class B	Aquatic life	Water withdrawal.
ME0103000204	311R	Dead R, main stem (riverine waters only)	1.0	Class AA,A	Aquatic life	Flow modified for hydropower
ME0103000303	337R	Kennebec River (Bingham)	2.0	Class A	Aquatic life	Flow modified for hydropower
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
ME0103000309	332R01	Sebasticook River (Halifax impoundment)	2	Class C	Aquatic life	Impounded water
ME0105000304	527R01	Damariscotta River below lake outlet	0.2	Class B	Aquatic life	Flow modified for hydropower
ME0106000203	613R01	Wards Brook (Fryeburg)	1.5	Class C	Aquatic life	Impounded water
		Total miles	27.3			

CATEGORY 5-A: RIVERS AND STREAMS IMPAIRED BY POLLUTANTS OTHER THAN THOSE LISTED IN 5-B THROUGH 5-D (TMDL REQUIRED)

ASSESSMENT UNIT (HUC)	WATERBODY ID	SEGMENT NAME	SEGMENT SIZE	SEGMENT CLASS	MONITORED DATE	IMPAIRED USE	CAUSE(S)	POTENTIAL SOURCE(S)	TMDL SCHED.
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	140R01	Presque Isle Stream between Mapleton and Presque Isle	11.5	Class B	2000	Aquatic life	Dissolved oxygen Nutrients	Agric NPS Water withdrawal	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 Nutrients, DDT	Agric NPS	2008
ME0102000110	205R03	Millinocket Stream (Millinocket)	3.2	Class C	Evaluated	Recreation	Bacteria	Untreated waste	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	2008
ME0102000402	219R01	Piscataquis R, main stem, below Dover Foxcroft	12.0	Class B	2000	Aquatic life	Dissolved oxygen	Agric NPS, Municipal PS	2008
ME0102000502	230R	Penobscot R, main stem, from Mattawamkeag R to Cambolassee Str	16.0	Class B	2001	Aquatic life	Aq life criteria Dissolved oxygen Nutrients	Industrial PS, Municipal PS, NPS	2008
ME0102000502	231R	Penobscot R, main stem, from Cambolasse Str to Piscataquis R	20.5	Class B,C	2001	Aquatic life Fishing (Consumption)	Aq life criteria Dissolved oxygen Nutrients Dioxin	Industrial PS, Municipal PS, NPS	2008

ME0102000506	222R01	Costigan Str (Costigan)	1.2	Class B	1999	Aquatic life Recreation	Dissolved oxygen Bacteria	Unknown	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	2004
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	Unnamed Stream near Ohio St (Bangor)	0.5	Class B	2001	Aquatic life	Aq life criteria	Urban NPS	2004
ME0102000510	224R05	Unnamed (Pushaw) Stream (Bangor)	0.5	Class B	2001	Aquatic life	Aq life criteria	Urban NPS	2004
ME0102000510	224R06	Unnamed Stream near Valley Ave (Bangor)	0.5	Class B	1997	Aquatic life	Aq life criteria	Urban NPS	2004
ME0102000511	225R01	Shaw Brook (Bangor, Hampden)	5.5	Class B	2001	Aquatic life	Aq life criteria	Urban NPS	2008
ME0103000304	313R01	Mill Stream (Embden)	2.0	Class B	2000	Aquatic life	Aq life criteria	Aquaculture PS	2004
ME0103000305	319R	Sandy R, main stem, segment below Farmington WWTP	3.0	Class B	2000	Aquatic life	Aq life criteria	Municipal PS	2004
ME0103000306	314R02	Cold Stream (Skowhegan)	5.4	Class B	2001	Aquatic life	Aq life criteria	Gen Dev NPS	2012
ME0103000306	320R04	Mill Stream (Norridgewock)	6.5	Class B	2001	Aquatic life	Aq life criteria	Waste disposal, habitat	2008
ME0103000307	330R	W Branch of Sebasticook R, main stem, below Rt. 23 bridge in Hartland	14.8	Class C	2001	Fishing (Consumption)	Dioxin, PCBs	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	Eutrophic lake source, Agric NPS, NPS (unspecified)	2008

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)	2012
ME0103000309	332R	Sebasticook River, main stem, below Burnham	18.0	Class C	2000	Fishing (Consumption)	Dioxin, PCBs	Munic/Ind PS	2008
ME0103000309	327R01	Mill Stream (Albion)	2.3	Class B	Evaluated	Aquatic life	Dissolved oxygen	Agric NPS	2012
ME0103000309	328R01	China Lake Outlet (Vassalboro)	4.3	Class B	1997	Aquatic life	Aq life criteria Nutrients	Eutrophic lake source, Agric NPS	2008
ME0103000310	322R01	Fish Brook (Fairfield)	4.9	Class B	2001	Aquatic life	Aq life criteria	Agric NPS, Habitat	2004
ME0103000311	334R03	Jock Stream (Wales)	4.8	Class B	2001	Aquatic life	Dissolved oxygen Nutrients	Agric NPS	2008
ME0103000311	334R04	Mill Stream (Winthrop)	1.4	Class B	Evaluated	Aquatic life	Aq life criteria	Urban NPS, Habitat	2012
ME0103000311	334R05	Cobbossee Stream (Gardiner)	1.5	Class B	Evaluated	Aquatic life	Aq life criteria Nutrients	Eutrophic lake source, habitat	2012
ME0103000312	333R03	Kennedy Brook (Augusta)	2.0	Class B	Evaluated	Aquatic life Recreation	Aq life criteria Bacteria	Urban NPS, Habitat	2012
ME0103000312	335R02	Togus Stream (Chelsea)	2.0	Class B	2001	Aquatic life	Aq life criteria Dissolved oxygen Nutrients	Eutrophic lake source, Hospital PS	2004
ME0105000208	511R01	Bog Stream (T18MD)	1.0	Class B	2001	Aquatic life	Aq life criteria	Aquaculture PS	2004
ME0105000209	512R02	McCoy Brook (Deblois)	1.0	Class B	Evaluated	Aquatic life	Aq life criteria, pH	Peat mining NPS	2012
ME0105000217	520R01	Carleton Stream (Blue Hill)	1.3	Class C	2000	Aquatic life	Aq life criteria, AWQC	Mine waste	2004
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	2000	Aquatic life Recreation	Dissolved oxygen Bacteria	Agric NPS	2008
ME0105000305	528R03	Sheepscot River below Sheepscot L	4.0	Class	2000	Aquatic life	Dissolved oxygen	Aquaculture PS	2008
ME0105000305	528R03	Dyer River below Rt 215	5.0	Class B	2000	Aquatic life Recreation	Dissolved oxygen Bacteria	Agric NPS	2008
ME0105000305	528R04	Trout Brook (Alna)	2.3	Class B	2000	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008
ME0105000305	528R05	Meadow Bk (Whitefield)	5.0	Class B	2000	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008
ME0105000305	528R06	Carlton Bk (Whitefield)	2.8	Class B	2000	Aquatic life	Dissolved oxygen	NPS (unspecified)	2008
ME0105000305	528R07	Choate Bk (Windsor)	1.3	Class B	2000	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	424R	Androscoggin R, main stem, 4 mi upstream of the Gulf Island Dam	4.0	Class C	2001	Aquatic life Recreation	Dissolved oxygen, Transparency, Nutrients,	Industrial PS, Municipal PS Habitat, NPS (unspecified)	2004
ME0104000208	413R01	Jepson Brook (Lewiston)	3.0	Class B	Evaluated	Aquatic life	Dissolved oxygen	Urban NPS, Habitat	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
ME0104000208	413R06	Goff Bk (Lewiston)	1.0	Class B	Evaluated	Aquatic life Recreation	Habitat, Bacteria	Urban NPS, Habitat	2008
ME0104000208	413R07	Gully Brook (Lewiston)	0.1	Class B	Evaluated	Aquatic life Recreation	Habitat, Bacteria	Urban NPS, Habitat	2008

ME0104000208	413R08	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	22.8	Class C	2001	Aquatic life	Dissolved oxygen, Nutrients	Eutrophic lake source, Municipal PS, Agric NPS	2004
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	1998	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	2004
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	608R01	Presumpscot River, Dundee Dam to Sacarrappa Dam	16.1	Class A,B,C	2000	Aquatic life	Dissolved oxygen, Flow modified, Habitat	Hydropower, NPS (unspecified)	2004
ME0106000103	607R01	Black Brook (Windham)	5.6	Class B	1999	Aquatic life	Dissolved oxygen	Gen Dev NPS	2008
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
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	1999	Aquatic life	Aq life criteria	Urban NPS, Habitat	2008
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	Fishing Aquatic life	Aq life criteria	Urban NPS, Habitat	2004
ME0106000105	610R04	Stroudwater River (South Portland, Westbrook)	14.1	Class B	Evaluated	Aquatic life	Dissolved oxygen	Gen Dev NPS	2012
ME0106000105	610R05	Trout Brook (South Portland)	2.9	Class C	1999	Aquatic life	Aq life criteria	Urban NPS	2012
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	2012
ME0106000105	610R09	Barberry Cr (South Portland)	1.0	Class C	1999	Aquatic life	Aq life criteria	Urban NPS	2012
ME0106000106	602R01	Frost Gully Brook (Freeport)	3.0	Class A	2000	Aquatic life Recreation	Dissolved oxygen Bacteria	Urban NPS	2004
ME0106000106	602R02	Mare Brook (Brunswick)	3.1	Class B	2001	Aquatic life	Aq life criteria	Indus (military) NPS, Urban NPS	2008
ME0106000106	612R01	Goosefare Brook	6.1	Class B	2001	Aquatic Life	Aq life criteria, metals	Urban NPS, Waste disposal	drafted

ME0106000210	615R01	Little Ossippee R, segment from Lake Arrowhead Dam to Saco River	10.0	Class B	2000	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	2001	Aquatic life	Aq life criteria	Aquaculture PS	2004
ME0106000211	616R01	Deep Brook (Saco)	2.5	Class B	2000	Aquatic life	Dissolved oxygen	Agric NPS	2008
ME0106000303	624R01	Stevens Brook (Wells, Ogunquit)	1.5	Class B	2000	Aquatic life	Aq life criteria	Urban NPS	2008
ME0106000304	625R01	Adams Brook (Berwick)	2.0	Class B	1995	Aquatic life	Aq life criteria	Agric NPS	2008
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	477.4						

CATEGORY 5-B-1: RIVERS AND STREAMS IMPAIRED ONLY BY BACTERIA
LOW PRIORITY RECREATIONAL WATERS

ASSESSMENT UNIT (HUC)	WATERBODY 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
ME0103000306	320R03	Whitten Brook	1.0	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
ME0105000305	528R01	Sheepscot River at Alna	4.0	Class AA	2001	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
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	Evaluated	Recreation	Bacteria	Urban NPS, CSO
ME0106000301	622R01	Kennebunk River	3.1	Class B	Evaluated	Recreation	Bacteria	Urban NPS
		Total miles	64.7					

CATEGORY 5-B-2. RIVERS AND STREAMS IMPAIRED BY BACTERIA FROM COMBINED SEWER OVERFLOWS (TMDL REQUIRED ONLY IF CONTROL PLANS ARE INSUFFICIENT)

ASSESSMENT UNIT (HUC)	WATERBODY ID	LOCATION	# CSOs	Goal (separation or partial)	Enforcement control (permit or consent decree schedule)	Comments
ME0101000121	117R	St. John River at Madawaska	2	Separation	Permit	
ME0101000412	140R	Presque Isle Stream at Presque Isle	1	Separation	Permit	
ME0102000402	219R	Piscataquis River at Dover Foxcroft	4	Separation	Permit	Also listed in 5-A
ME0102000403	215R	Sebec River at Milo	3	Separation	Permit	Also listed in 5-A
ME0102000509	233R	Penobscot River at Old Town-Milford	4	Partial w/ generic bypass	Permit	
ME0102000509	233R	Penobscot River at Orono	1	Separation	Permit	
ME0102000513	234R	Penobscot River at Bangor-Brewer	19	Partial w/ generic bypass	Bangor Permit & AO Brewer Permit & AO	
ME0103000306	338R	Kennebec River at Skowhegan	9	Partial w/ generic bypass	Permit	
ME0103000306	338R	Kennebec River at Fairfield	2	Separation	Permit	
ME0103000312	339R	Kennebec River at Waterville	3	Separation	Permit	
ME0103000312	340R	Kennebec River at Augusta, Riggs Brook	23	Partial w/ generic bypass	Permit & AO	
ME0103000312	340R	Kennebec River at Hallowell	1	Separation	Permit	
ME0103000312	340R	Kennebec River at Gardiner-Randolph	3	Partial w/ generic bypass	Permit	

ME0104000209	417R	Little Androscoggin River at Mechanic Falls	1	Separation	Permit	
ME0104000210	425R	Androscoggin River at Lewiston-Auburn	39	Partial w/ generic bypass	Permit and CD	
ME0106000103	609R	Presumpscot River at Westbrook	5	Separation	Permit & AO	
ME0106000106	612R01	Bear Brook, Saco	1	Separation	Saco, Permit & CD	Also listed in 5-B-1
ME0106000211	619R	Saco River at Biddeford-Saco, Thatcher Bk	10	Partial w/ generic bypass	Saco, Permit & CD Biddeford, Permit & AO	
ME0106000302	628R	Mousam River at Sanford	2	Separation	Permit	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

All freshwaters are listed as 5-C, partially supporting fishing (fish consumption) due to elevated level of mercury in tissue of some fish.

CATEGORY 5-D: RIVERS AND STREAMS IMPAIRED BY LEGACY POLLUTANTS

ASSESSMENT UNIT (HUC)	WATERBODY 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	1.0	Class AA,A	2000	Aquatic life	Iron	Abandoned mine (circa 1800s)
ME0102000404	216R01	Blood Bk.	1.0	Class A	2000	Aquatic life	Iron	Abandoned mine (circa 1800s)
		Total miles	209.6					

APPENDIX II: LAKES

CATEGORY 1: LAKE WATERS FULLY ATTAINING ALL DESIGNATED USES

HUC	HUC Name	Total HUC Area (sq. mi.)	Lake area within HUC listed in Category 1 (acres)	# of Lakes within HUC listed in Category 1	Last Sampling within HUC	Other listing categories having lakes within this HUC
ME 0101000101	Baker Branch St. John River	355.24	3383	89	2000	
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	466.4	1178	14		
ME 0101000107	St. John River at Oullette Brook	384.74	2866	10		
ME 0101000108 *	Little Black River	261.73	38	4	1981	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	2001	
ME 0101000202	Heron Lake (Churchill)	129	5875	21	2001	
ME 0101000203	Chemquasabamticook Stream	214.54	3293	9	1989	
ME 0101000204	Long Lake	143.4	2436	10	2001	
ME 0101000205	Musquacook Stream	155.53	3889	20	1999	
ME 0101000206	Big Brook	100.88	708	11	2002	
ME 0101000207 *	Allagash River	320.93	2134	15	1995	2
ME 0101000301	Fish River Lake	128.98	3601	15	2001	
ME 0101000302 *	St. Froid Lake	273.95	1238	43	2002	2
ME 0101000303 *	Eagle Lake	353.06	1067	9	2001	2,3,5a
ME 0101000304 *	Fish River	133.44	107	4		2
ME 0101000401	Millimagasset Stream	108.59	5215	35	1996	
ME 0101000402	Munsungan Stream	120.15	2668	37	2001	

ME 0101000403	Mooseleuk Stream	168.76	1600	24		
ME 0101000404 *	Umcolcus Stream	82.6	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 Sta.	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 Sta.	348.8	110	8		2
ME 0101000412 *	Aroostook River (3) at Caribou	289.41	41	2		2,3,5a
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		
ME 0101000503 *	North Branch Meduxnekeag River	147.7	186	12	2001	2
ME 0102000101	North Branch Penobscot River	255.48	3529	59	1996	
ME 0102000102 *	Seeboomook Lake	266.8	2372	101	1996	2,4c
ME 0102000103 *	West Branch Penobscot Riv. at Chesuncook Lk	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	2001	
ME 0102000107	Nahamakanta Stream	103.18	4679	76	2002	
ME 0102000108	Jo-Mary Lake	83.5	6949	40	1999	
ME 0102000109 *	West Branch Penobscot River (3)	245.71	25876	105	2002	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	1998	
ME 0102000203	East Branch Penobscot River (2)	89.69	913	43		
ME 0102000204 *	Seboeis River	268.31	6638	76	2001	2
ME 0102000205 *	East Branch Penobscot River (3)	269.47	1439	81	1989	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	233.6	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	351.1	1372	37	1999	2
ME 0102000404 *	Pleasant River	339.32	4354	81	2001	2
ME 0102000405 *	Seboeis Stream	161.16	3812	24	1989	2
ME 0102000501 *	Penobscot River (1) at Mattawamkeag	161.07	941	6		2
ME 0102000502 *	Penobscot River (2) at West Enfield	298.2	1115	5	1989	2
ME 0102000503 *	Passadumkeag River	398.81	10851	27	2001	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	2001	2
ME 0103000103 *	Moose River (3) at Long Pond	307.3	1643	35	1999	2
ME 0103000104 *	Brassua Lake	157.53	473	27		4c
ME 0103000105 *	Moosehead Lake	549	4116	92	2001	2,3
ME 0103000106 *	Kennebec River (2) above The Forks	323.12	6404	120	2001	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
ME 0103000204 *	Dead River	357.53	5691	190	1992	2
ME 0103000301 *	Kennebec River (4) at Wyman Dam	158.85	2344	22	2001	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		2,3,5a
ME 0104000101 *	Mooselookmeguntic Lake	473.72	3283	36	2002	2,4a
ME 0104000102 *	Umbagog Lake Drainage	122.05	759	7	2001	2
ME 0104000103 *	Aziscohos Lake Drainage	245.91	1606	33	2001	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 R. (6) above Little Androscoggin	353.1	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	2
ME 0105000103 *	West Grand Lake	224.54	4426	10	1989	2
ME 0105000104 *	Big Musquash Stream	114.17	412	3		1
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		2
ME 0105000205 *	Machias River	498.35	11912	90	1996	2
ME 0105000208 *	Pleasant River	130.39	243	13	1992	2
ME 0105000209 *	Narraguagus River	245.16	826	47	1990	2
ME 0105000210 *	Tunk Stream	48.41	1076	15	2002	2
ME 0105000212 *	Graham Lake	495.07	1908	20	2000	2,3,4c
ME 0105000214 *	Lamoine Coastal	221.91	180	11		2
ME 0106000101 *	Sebago Lake	441.76	306	13	1999	2,3,5a
ME 0106000103 *	Presumpscot River	205.44	15	4		2,3,5a
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:			285023	2854		

* Lakes within this HUC can be found under other listing categories (see right column)

CATEGORY 2: LAKE WATERS ATTAINING SOME DESIGNATED USES INSUFFICIENT DATA OR INFORMATION FOR OTHER USES

HUC	HUC Name	Total HUC Area (sq. mi.)	Lake area within HUC listed in Category 2 (acres)	# of Lakes within HUC listed in Category 2	Last Sampling within HUC	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	2002	1
ME 0101000303 *	Eagle Lake	353.06	20230	14		1,3,5a
ME 0101000304 *	Fish River	133.44	792	18	2001	1
ME 0101000404 *	Umcolcus Stream	82.6	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	348.8	340	4		1
ME 0101000412 *	Aroostook River (3) at Caribou	289.41	234	14		1,3,5a
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		
ME 0101000503 *	North Branch Meduxnekeag River	147.7	138	10	1999	1
ME 0101000504	Meduxnekeag River at Woodstock NB	300.02	1868	45	2002	

ME 0102000102 *	Seeboomook Lake	266.8	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	2001	1
ME 0102000302 *	East Branch Mattawamkeag River	165.95	2732	16	2001	1
ME 0102000303 *	Mattawamkeag River (1)	102.28	70	1		1
ME 0102000304 *	Baskahegan Stream	233.6	10280	6	2001	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	2001	1
ME 0102000402	Piscataquis River (3)	178.58	1253	19	2001	
ME 0102000403 *	Sebec River	351.1	14497	64	2002	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	2000	
ME 0102000501 *	Penobscot River (1) at Mattawamkeag	161.07	928	8	1989	1
ME 0102000502 *	Penobscot River (2) at West Enfield	298.2	5581	17	2001	1
ME 0102000503 *	Passadumkeag River	398.81	8073	20	2001	1
ME 0102000504 *	Olamon Stream	53.88	318	3		1
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	2002	1
ME 0102000509	Penobscot River (4) at Veazie Dam	140.5	2253	25	2002	
ME 0102000510	Kenduskeag Stream	191.28	174	5	2001	
ME 0102000511 *	Souadabscook Stream	177.79	284	11	1996	3,5a
ME 0102000512	Marsh River	168.72	438	20	2001	

ME 0102000513	Penobscot River (6)	290.37	6098	25	2002	
ME 0103000102 *	Moose River (2) above Attean Pond	180.94	19	1		1
ME 0103000103 *	Moose River (3) at Long Pond	307.3	9581	24	1999	1
ME 0103000105 *	Moosehead Lake	549	78904	11	2001	1,3
ME 0103000106 *	Kennebec River (2) above The Forks	323.12	3051	17	2001	1
ME 0103000201 *	North Branch Dead River	200.89	48	5		1
ME 0103000202 *	South Branch Dead River	147.96	657	10	2001	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	2001	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	2002	1
ME 0103000305 *	Sandy River	592.92	3741	88	2001	1,5a
ME 0103000306	Kennebec River at Waterville Dam	410.5	3280	43	2001	
ME 0103000307	Sebasticook River at Pittsfield	316.21	7012	28	2001	
ME 0103000308 *	Sebasticook River (3) at Burnham	266.25	2936	14	2001	4a
ME 0103000309 *	Sebasticook River (4) at Winslow	365.58	1186	46	2001	3,4a,5a
ME 0103000310 *	Messalonskee Stream	207.64	1776	46	2002	3,4a
ME 0103000311 *	Cobbosseecontee Stream	216.27	4731	45	2001	3,4a,5a
ME 0103000312 *	Kennebec River at Merrymeeting Bay	314.46	1339	32	2001	1,3,5a
ME 0104000101 *	Mooselookmeguntic Lake	473.72	25143	44	2002	1,4a
ME 0104000102 *	Umbagog Lake Drainage	122.05	8353	4	2001	1
ME 0104000104	Magalloway River	195.1	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	2002	1
ME 0104000203 *	Ellis River	164.26	1258	6	2001	1
ME 0104000204 *	Ellis River	202.35	108	11		1
ME 0104000205 *	Androscoggin River (3) above Webb River	245.05	3461	11	2001	1
ME 0104000206	Androscoggin River (4) at Riley Dam	203.85	5906	52	2002	
ME 0104000207	Androscoggin River (5) at Nezinscot River	178.75	1743	29	2002	

ME 0104000208	Nezinscot River	83.22	3591	16	2002	
ME 0104000209 *	Androscoggin River (6) above Little Androscoggin	353.1	8687	55	2002	1,3
ME 0104000210 *	Little Androscoggin River	262.87	614	28	2002	5a
ME 0105000101 *	Spednick Lake	411.52	35904	10	2002	1
ME 0105000103 *	West Grand Lake	224.54	31174	22	2001	1
ME 0105000104 *	Big Musquash Stream	114.17	3218	10	2001	2
ME 0105000105 *	Big Lake at Peter Dana Point	121.07	10334	4	1999	1
ME 0105000106 *	Tomah Stream	153.03	239	7		1
ME 0105000107	St. Croix River (3) at Grand Falls	70.2	7627	4	1999	
ME 0105000108	St. Croix River (6) at Robbinston	323.71	2792	20	2001	
ME 0105000201 *	Dennys River	130.64	10294	5	2001	1
ME 0105000202	Pennamaquan River	54.4	2025	10		
ME 0105000203 *	Grand Manan Channel	246.09	3332	12	1999	1
ME 0105000204 *	East Machias River	311.96	15289	26	2002	1
ME 0105000205 *	Machias River	498.35	1948	14	1997	1
ME 0105000206	Roque Bluffs Coastal	83.23	164	4	1983	
ME 0105000208 *	Pleasant River	130.39	1201	15	2001	1
ME 0105000209 *	Narraguagus River	245.16	2382	17	2002	1
ME 0105000210 *	Tunk Stream	48.41	2466	6	2000	1
ME 0105000211	Bois Bubert Coastal	75.63	53	6		
ME 0105000212 *	Graham Lake	495.07	18173	92	2001	1,3,4c
ME 0105000213	Union River Bay	126.78	4117	12	2001	
ME 0105000214 *	Lamoine Coastal	256.148	3300	51	2002	1
ME 0105000215	Mt. Desert Coastal	108.01	2626	44	2001	
ME 0105000216	Bagaduce River	81.92	1250	12	2001	
ME 0105000217	Stonington Coastal	140	1030	55	1999	
ME 0105000218	Belfast Bay	91.6	2254	25	2002	
ME 0105000219	Ducktrap River	33.17	993	16	2002	
ME 0105000220 *	West Penobscot Bay Coastal	162.697	1856	30	2001	3,5a
ME 0105000301 *	St. George River	278.44	7746	99	2002	3
ME 0105000302	Medomak River	152.87	1554	38	2002	
ME 0105000303 *	Johns Bay	46.94	2473	14	2002	5a

ME 0105000304	Damariscotta River	115.51	4604	21	2001	
ME 0105000305	Sheepscot River	250.89	4582	56	2002	
ME 0105000306 *	Sheepscot Bay	113.16	430	35	2001	3
ME 0105000307 *	Kennebec River Estuary	89.51	723	16	2002	3
ME 0106000101 *	Sebago Lake	441.76	38152	71	2002	1,3,5a
ME 0106000102	Royal River	140.93	769	12	2002	
ME 0106000103 *	Presumpscot River	205.44	729	28	2002	1,3,5a
ME 0106000104	Scarborough River	53.72	10	3		
ME 0106000105 *	Fore River	54.46	45	11		1
ME 0106000106	Casco Bay Coastal Drainages	170.013	368	32	1999	
ME 0106000204	Saco River-Lovewell Pond	283.11	7340	58	2001	
ME 0106000205	Saco River at Ossipee River	114.23	4180	49	2001	
ME 0106000209	Ossipee River	122.89	2052	31	2001	
ME 0106000210	Little Ossipee River	185.21	4287	73	2002	
ME 0106000211 *	Saco River at mouth	220.24	1069	41	2002	3
ME 0106000301 *	Kennebunk River	59.18	95	8		3
ME 0106000302 *	Mousam River	116.97	1035	36	2002	3,4b1,5a
ME 0106000303 *	South York County Coastal Drainages	155.098	553	36	2002	3
ME 0106000304 *	Great Works River	86.67	450	20	2002	3
ME 0106000305 *	Salmon Falls River	242.91	2988	19	1999	1,3
ME 0106000310	Coastal Drainages-Portsmouth Harbor to Salisbury	65.19	39	8		
ME CoastIslan	Coastal Islands not assigned to any HUC	unkn	6	4		
ME SaltWater	Salt water bodies assigned a lake ID	unkn	16	2		
Totals within Category 2:			447677	2207		

* 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; likely next visit (yr)	Comment	Other listing categories having lakes within this HUC
ME 0101000303 *	BLACK L	1666	51	Aug. 02 04	Delisted; no longer supporting repeated nuisance blooms	1,2,5a
ME 0101000412 *	HANSON BROOK L	9767	118	Aug. 02 04	Delisted; no longer supporting repeated nuisance blooms	1,3,5a
ME 0101000413 *	FISCHER L	1808	10	Aug. 01 03	Watch list: trophic; flushes 55 times per year	1,2,4a,5a
ME 0102000511 *	ETNA P	2274	361	Aug. 02 04	Delisted; high color responsible for low transparencies	2,5a
ME 0103000105 *	FITZGERALD P	269	550	Aug. 02 07	Delisted; discharge removed; no longer supports repeat blooms	1,2
ME 0103000309 *	PATTEE P	5458	712	Aug. 02 04	Delisted; no longer supporting repeated nuisance blooms	2,4a,5a
ME 0103000310 *	NORTH & LITTLE PDS	5344	2873	Aug. 02 04	Watch list: trophic	2,4a
ME 0103000310 *	GREAT P	5274	8239	Aug. 02 03	Watch list: trophic & trend (regular *Gleotrichia* blooms)	2,4a
ME 0103000310 *	MESSALONSKEE L	5280	3510	Aug. 02 03	Watch list: D.O. model	2,4a
ME 0103000310 *	FAIRBANKS P	5296	14	Aug. 02 05	Delisted; no longer supporting repeated nuisance blooms	2,4a
ME 0103000310 *	HUTCHINS LAKE	8115	76	Aug. 01 03	Watch list: trophic (high flushing rate; impoundment)	2,4a
ME 0103000310 *	LONG P	5272	2714	Aug. 02 02	Watch list: trophic & trend (regular *Gleotrichia* blooms)	2,4a
ME 0103000311 *	WILSON P	3832	582	Aug. 02 03	Watch list: trend	2,4a,5a
ME 0103000311 *	WOODBURY P	5240	436	Oct. 01 03	Watch list: D.O. model	2,4a,5a

ME 0103000312	*	TOGUS P (LOWER)	5430	230	Aug. 02	03	Watch list: trophic	1,2,5a
ME 0104000206		ANDROSCOGGIN L	3836	3980	Aug. 02	03	Watch list: trophic	
ME 0104000209	*	TRIPP P	3758	768	Oct. 01	04	Watch list: D.O. model	1,2
ME 0104000209	*	TAYLOR P	3750	625	Sep. 01	04	Watch list: D.O. model	1,2
ME 0104000209	*	NORTH P	3500	175	Sep. 01	03	Watch list: trophic	1,2
ME 0105000212	*	ABRAMS P	4444	423	Sep. 00	03	Watch list: trophic & trend	1,2,4c
ME 0105000220	*	NORTON P	4850	133	Aug. 02	04	Watch list: D.O. model	2,5a
ME 0105000301	*	HOBBS P	4806	264	Aug. 02	04	Watch list: trophic & trend	2
ME 0105000306	*	WEST HARBOR P	5372	84	Aug. 02	04	Delisted; salt water intrusion causing low DO	2
ME 0105000307	*	SEWALL P	9943	46	Oct. 01	03	Watch list: trophic	2
ME 0106000101	*	THOMAS P	3392	442	Sep. 01	03	Watch list: D.O. model	1,2,5a
ME 0106000101	*	BAY OF NAPLES	9685	762	Sep. 01	03	Watch list: D.O. model	1,2,5a
ME 0106000101	*	PAPOOSE P	3414	64	Oct. 01	03	Watch list: trophic	1,2,5a
ME 0106000103	*	SEBAGO L (LITTLE)	3714	1898	Aug. 02	04	Watch list: D.O. model	1,2,5a
ME 0106000211	*	WATCHIC P	5040	448	Oct. 01	03	Watch list: D.O. model	3
ME 0106000301	*	KENNEBUNK P	3998	224	Oct. 01	03	Watch list: D.O. model	2
ME 0106000302	*	SQUARE P	3916	910	Sep. 01	03	Watch list: D.O. model	2,4b1,5a
ME 0106000303	*	SCITUATE P	5596	41	Aug. 02	04	Delisted; high color responsible for low transparencies	2

ME 0106000304	*	ELL (L) P	119	32	Aug. 00	05	Delisted; no longer supporting repeated nuisance blooms	2
ME 0106000304	*	LEIGH'S MILL P	117	37	Aug. 01	06	Watch list: trophic (high flushing rate 249/yr.; impoundment)	2
ME 0106000305	*	NORTHEAST P	3876	778	Aug. 01	04	Watch list: D.O. model	1,2

* Lakes within this HUC can be found under other listing categories (see right column)

CATEGORY 4-A: LAKE WATERS WITH IMPAIRED USE, TMDL COMPLETED

HUC	Lake Name	Lake ID	Lake Area (acres)	Date of last visit; likely next visit (yr)	TMDL Year approved by EPA (Impaired use)	Other listing categories having lakes within this HUC
ME 0101000413 *	MADAWASKA L	1802	1526	Aug. 02 (03)	2000 (Prim. contact)	1,2,3,5a
ME 0103000308 *	SEBASTICOOK L	2264	4288	Aug. 02 (03)	2001 (Prim. contact)	2
ME 0103000309 *	CHINA L	5448	3845	Aug. 02 (03)	2001 (Prim. contact)	2,3,5a
ME 0103000310 *	EAST P	5349	1823	Aug. 02 (03)	2001 (Prim. contact)	2,3
ME 0103000311 *	COBBOSSEECONTEE L	5236	5543	Aug. 02 (03)	2000 (Prim. contact)	2,3,5a

* Lakes within this HUC can be found under other listing categories (see right column)

CATEGORY 4-B1: LAKE WATERS IMPAIRED BY POLLUTANTS, POLLUTION CONTROL REQUIREMENTS REASONABLY EXPECTED TO RESULT IN ATTAINMENT

HUC	Lake Name	Lake ID	Lake area (acres)	Date of last visit; likely next visit (yr)	Comment (Impaired use)	Other listing categories having lakes within this HUC
ME 0106000302 *	ESTES L	7	387	Aug. 02 (04)	Delist:treatm't upgrade(Prim.Cont.)	2,3,5a

* Lakes within this HUC can be found under other listing categories (see right column)

CATEGORY 4-C: LAKE WATERS WITH IMPAIRMENT NOT CAUSED BY A POLLUTANT

HUC	Lake Name	Lake ID	Lake area (acres)	Date of last visit; likely next visit (yr)	Comment (Impaired use)	Other listing categories having lakes within this HUC
ME 0101000408 *	SQUAPAN L	1654	5120	Aug. 01 (06)	Delist: nonpol. (Aq.Life:drwdn)	2
ME 0102000102 *	CANADA FALLS L	2516	2627	(03)	Delist: nonpol. (Aq.Life:drwdn)	1,2
ME 0102000102 *	SEBOOMOOK L	4048	6448	(03)	Delist: nonpol. (Aq.Life:drwdn)	1,2
ME 0102000104 *	CAUCOMGOMOC L	4012	5081	Aug. 01 (06)	Delist: nonpol. (Aq.Life:drwdn)	1
ME 0102000105 *	RAGGED L	2936	2712	Aug. 01 (06)	Delist: nonpol. (Aq.Life:drwdn)	1
ME 0103000104 *	BRASSUA L	4120	8979	Aug. 96 (03)	Delist: nonpol. (Aq.Life:drwdn)	1
ME 0103000203 *	FLAGSTAFF L	38	20300	(03)	Delist: nonpol. (Aq.Life:drwdn)	1,2
ME 0104000101 *	RICHARDSON LAKES	3308	7100	Aug. 01 (06)	Delist: nonpol. (Aq.Life:drwdn)	1,2
ME 0104000103 *	AZISCOHOS L	3290	6700	Aug. 01 (06)	Delist: nonpol. (Aq.Life:drwdn)	1
ME 0105000212 *	GRAHAM L	4350	7865	Sep. 01 (06)	Delist: nonpol. (Aq.Life:drwdn)	1,2,3

* Lakes within this HUC can be found under other listing categories (see right column)

CATEGORY 5-A: LAKE WATERS NEEDING TMDLs

HUC	Lake Name	Lake ID	Lake area (acres)	Date of last visit; likely next visit (yr)	Impaired Use	TMDL (target dates)	Priority **	Other listing categories having lakes within this HUC
ME 0101000303 *	CROSS L	1674	2515	Oct. 01 (03)	Prim. Cont.	2005 - 2006	24	1,2,3
ME 0101000303 *	DAIGLE P	1665	36	Sep. 99 (03)	Prim. Cont.	2005 - 2006	25	1,2,3
ME 0101000412 *	ARNOLD BROOK L	409	395	Aug. 02 (03)	Prim. Cont.	2006 - 2007	28	1,2,3
ME 0101000412 *	ECHO L	1776	90	Oct. 01 (03)	Prim. Cont.	2006 - 2007	27	1,2,3
ME 0101000413 *	TRAFTON L	9779	85	Aug. 02 (03)	Prim. Cont.	2006 - 2007	26	1,2,3,4a
ME 0101000413 *	MONSON P	1820	160	Sep. 01 (03)	Prim. Cont.	2007 - 2008	29	1,2,3,4a
ME 0101000501 *	CHRISTINA RESERVOIR	9525	400	Aug. 02 (03)	Prim. Cont.	2007 - 2008	30	1,2
ME 0102000511 *	HERMON P	2286	461	Oct. 01 (03)	Prim. Cont.	2007 - 2008	31	2
ME 0102000511 *	HAMMOND P	2294	83	Aug. 98 (03)	Prim. Cont.	2007 - 2008	31	2
ME 0103000305 *	TOOTHAKER P	2336	30	Aug. 02 (03)	Prim. Cont.	2004 - 2005	21	1,2
ME 0103000309 *	LOVEJOY P	5176	324	Aug. 02 (03)	Prim. Cont.	2004 - 2005	19	2,3,4a
ME 0103000309 *	UNITY P	5172	2528	Aug. 02 (03)	Prim. Cont.	2003 - 2004	14	2,3,4a
ME 0103000311 *	NARROWS P (UPPER)	98	279	Aug. 02 (03)	Decl. Trend (DO)	2003 - 2004	16	2,3,4a
ME 0103000311 *	PLEASANT (MUD) P	5254	746	Aug. 02 (03)	Prim. Cont.	2002 - 2003	12	2,3,4a
ME 0103000311 *	COBBOSSEECONTEE (LT)	8065	75	Oct. 01 (03)	Prim. Cont.	2003 - 2004	17	2,3,4a
ME 0103000311 *	ANNABESSACOOK L	9961	1420	Oct. 01 (03)	Prim. Cont.	2002 - 2003	11	2,3,4a
ME 0103000312 *	WEBBER P	5408	1201	Sep. 01 (03)	Prim. Cont.	2002 - 2003	8	1,2,3
ME 0103000312 *	TOGUS P	9931	660	Aug. 02 (03)	Prim. Cont.	2005 - 2006	22	1,2,3
ME 0103000312 *	THREECORNERED P	5424	182	Aug. 01 (03)	Prim. Cont.	2002 - 2003	10	1,2,3
ME 0103000312 *	THREEMILE P	5416	1162	Sep. 01 (03)	Prim. Cont.	2002 - 2003	9	1,2,3
ME 0104000210 *	SABATTUS P	3796	1962	Aug. 02 (03)	Prim. Cont.	2004 - 2005	18	2
ME 0105000220	LILLY P	83	29	Aug. 98 (03)	Prim. Cont.	2005 - 2006	23	2,3
ME 0105000303 *	DUCKPUDDLE P	5702	293	Aug. 02 (03)	Prim. Cont.	2004 - 2005	20	2
ME 0106000101 *	HIGHLAND L	3454	1401	Aug. 02 (03)	Decl. Trend (DO)	2003 - 2004	13	1,2,3
ME 0106000101 *	LONG L	5780	4867	Aug. 02 (03)	Decl. Trend (DO)	2003 - 2004	15	1,2,3

ME 0106000103 *	HIGHLAND (DUCK) L	3734	634	Aug. 02 (03)	Decl. Trend(Transp)	2001 - 2002	7	1,2,3
ME 0106000302 *	MOUSAM L	3838	900	Aug. 02 (03)	Decl. Trend(Transp)	2001 - 2002	6	2,3,4b1

* Lakes within this HUC can be found under other listing categories (see right column)

CATEGORY 5-C: LAKE WATERS IMPAIRED BY ATMOSPHERIC DEPOSITION

All freshwaters are listed as 5-C, partially supporting fishing (fish consumption) due to elevated level of mercury in tissue of some fish.

APPENDIX III: ESTUARINE AND MARINE WATERS

CATEGORY 1: ESTUARINE AND MARINE WATERS FULLY ATTAINING ALL DESIGNATED USES

No waters listed.

CATEGORY 2: ESTUARINE AND MARINE WATERS ATTAINING SOME DESIGNATED USES NO USE IS THREATENED, AND INSUFFICIENT DATA OR INFORMATION TO DETERMINE IF OTHER USES ARE ATTAINED OR THREATENED

Waterbody #		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		
821	*	Kennebunk R. estuary (east bank), Kennebunkport to Biddeford Pool, Biddeford		SB		
811	*	Biddeford Pool, Biddeford to Dyer Point (Two Lights), Cape Elizabeth		SB		
804	*	Dyer Point (Two Lights), Cape Elizabeth to Parker Point (west bank of Royal R.), Yarmouth		SB/SA		
802	*	Parker Point (west Bank of Royal R.), Yarmouth to south end of Butler Cove (Merrymeeting Bay), Bath		SB/SA		
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		
729	*	Ocean Point, Boothbay to Pemaquid Point, Bristol		SB		
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		

722	*	Marshall Point, St. George to Naskeag Point, Brooklin	SB/SA		
707	*	Naskeag Point, Brooklin to Bass Harbor Head, Tremont	SB/SA		
714	*	Bass Harbor Head, Tremont to Schoodic Point, Winter Harbor	SB/SA		
714-20	*	Northwest End Flanders Bay, Sullivan-Sorrento	SB		DMR Area 50-D; 9/19/2001 Repealed–open; was on TMDL list in 1998. Listed in 1998 for bacteria, nps.; fecal levels were high particularly after storms. A 319 project got cows out of the stream. The bacteria levels became acceptable so DMR was able to opening the shellfish flats for harvest.
706	*	Schoodic Point, Winter Harbor to Petit Manan Point, Steuben	SB		
705	*	Petit Manan Point, Steuben to Ray Point, Milbridge	SB/SA		
704	*	Ray Point, Milbridge to south end of Cape Split, Addison	SB		
703	*	South end of Cape Split, Addison to Kelley Point, Jonesport	SB/SA		
713	*	Kelley Point, Jonesport to Point of Maine, Machiasport	SB		
709	*	Point of Maine, Machiasport to Thorton Point, Cutler	SB/SA		
708	*	Thorton Point, Cutler to Todd Head, Eastport	SB/SA /SC		
701	*	Cobscook Bay	SB/SA		
702	*	Todd Head, Eastport to Whitlocks Mill, Calais	SB/SC		

*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 #	DMR Area	Segment Description	DMR Effective Date	Segment Acres	Segment Class	Last Year Sampled	Projected Sample Date	Comments
826-1	1B	Jaffrey Point, N. H. to Brave Boat Harbor, York	4/6/2001		SB			
826-2	2	York River-York Harbor	6/12/2001		SB			
826-3	3	Cape Neddick Nubble to Bald Head Cliff	1/18/2000		SB			
824-1	4	Ogunquit River – Ogunquit & Moody Beaches	3/13/2001		SB			
824-2	4-A	Bald Head Cliff, York to Israels Head, Ogunquit	11/27/1989		SB			
824-3	5	Webhannet River & Beaches of Wells & Kennebunk	3/13/2001		SB			
824-4	6	Mousam and Kennebunk Rivers	6/24/1997		SB			
821-1	8	Cape Porpoise Harbor - Goosefare Bay	6/5/2000		SB/SC			
821-2	8-A	Cape Porpoise Harbor - Kennebunkport	12/22/2000		SB			
821-3	8-B	Timber Point to Fortunes Rocks, Biddeford	11/16/1993		SB			
811-1	9	Saco River and Saco Bay	4/13/2001		SB/SC			
811-2	11	Northern Saco Bay & Scarborough River	2/14/2002		SB/SA			
811-3	12	Prouts Neck, Scarborough	2/7/1989		SB			
811-4	13	Prouts Neck - Spurwink River	4/8/2002		SB/SA			
811-5	13-A	Spurwink River, Scarborough to McKenney Point, Cape Elizabeth	11/19/1993		SB			
804-1	14	Portland - Falmouth Area	5/7/2002		SB/SC			
804-2	14-A	Falmouth - Cumberland	4/6/2001		SB			
804-3	14-C	Cape Elizabeth - Cliff Island, Portland	8/14/2001		SB			
804-4	14-D	Great Chebeague Island, Cumberland	8/14/2001		SB			
802-1	14-D	Great Chebeague Island, Cumberland	8/14/2001		SB			
802-2	16	Royal River & Cousins River, Yarmouth/Freeport	7/1/2002		SB			
802-3	16-C	Cousins & Littlejohn Islands, Yarmouth	6/30/1995		SB			

802-4	17	Harraseeket River, Freeport	5/30/2002		SB			
802-6	17-D	Bustins Island, Freeport	12/29/1994		SB			
802-8	18-A	Gurnet Strait, Harpswell	1/21/1999		SB			
802-9	18-B	New Meadows River, Brunswick, West Bath, Harpswell	7/1/2002		SB			
802-10	18-C	Mere Point Neck, Brunswick	1/31/1995		SB			
802-11	18-D	Eastern Bailey-Orr's Island, Western Quahog Bay,	3/22/2002		SB			
802-12	18-E	Cundy's Harbor and Dingley Island, Harpswell	12/11/1997		SB			
802-13	18-G	Birch Island, Harpswell	2/24/1994		SB			
802-14	18-H	Harpswell Sound, Harpswell	4/16/1999		SB			
802-15	18-I	Harpswell Fuel Depot, Harpswell	4/22/1994		SB			
802-16	18-M	Lookout Point & Wilson Cove, Harpswell	7/25/1990		SB			
802-17	18-R	East Harpswell and Long Island, Harpswell	4/16/1999		SB			
802-18	18-W	Woodward Point, New Meadows River, Brunswick	5/17/1993		SB			
802-19	18-X	Hen Island and unnamed cove located east of Big, Hen Island, Cundys Harbor, Harpswell	12/3/1998		SB			
802-20	18-Z	Cliff Island to Bailey Island, Casco Bay	4/16/1999		SB/SC			
802-21	18-AA	Little Yarmouth Island, Harpswell	4/16/1999		SB			
802-23	19-A	Birch Point, West Bath - Bear Island, Phippsburg	5/24/1993		SB			
802-24	19-C	Dam Cove to Birch Point, West Bath	8/28/2000		SB			
802-26		Quahog Bay, inside of the south end of Pole Island			SB	2001		Possible Dissolved Oxygen Nonattainment
710-2	20-H	Lower Kennebec, Phippsburg/Georgetown	5/24/2002		SB			
730-1	20-B	Back River, Wiscasset and Westport	1/15/1998		SB			
730-2	20-E	N.Robinhood Cove, So. Robinhood Cove, & Knubble Bay, Georgetown/Westport	8/7/2000		SB			
730-3	21	Indian Point, Georgetown, to Fowle Pt., Westport	10/12/1995		SB			

730-4	22	Sheepscot River and Tributaries	5/15/1998		SB			
730-5	22-B	Sawyer Island, Hodgdon Island, Merrow Island & adjacent shores, Boothbay	9/21/2000		SB			
730-6	22-E	Western Barters Island, Boothbay	1/2/1997		SB			
730-7	22-F	Gooseberry Island - Oven Mouth, Boothbay-Edgecomb	3/29/1994		SB			
730-8	22-G	Upper Sheepscot River & Tributaries	7/2/1997		SB			
730-9	23	Boothbay Harbor - Damariscove Island Area	8/27/1999		SB/SA			
730-10	23-A	Ebencook Harbor & Vicinity, Southport - Boothbay Harbor	5/4/1989		SB			
730-11	23-B	Southwestern Southport Island	5/5/1999		SB			
729-1	24	East Boothbay to Reeds Island	5/27/1993		SB			
729-3	25-A	South Bristol	5/27/1993		SB			
729-4	25-B	Pemaquid River, Bristol	8/27/1999		SB			
729-5	25-E	Inner Heron Island	12/29/1999		SB			
729-6	25-F	Pemaquid Neck, Bristol	2/22/1988		SB			
726-1	25-C	New Harbor, Bristol	5/5/1999		SB			
726-2	25-D	Long Cove Point to Muscongus Harbor, Bristol	10/9/1991		SB			
726-3	25-F	Pemaquid Neck, Bristol	2/22/1988		SB			
726-4	25-G	Soldiers Cove, Bristol	10/18/1988		SB			
726-5	25-H	Keene Narrows, Medomak - Bremen	1/11/1990		SB			
726-6	25-I	Muscongus Harbor, Bristol-Bremen	1/20/1989		SB			
726-7	25-J	Eastern Farmers Island, South Bristol	4/10/1990		SB			
726-8	25-N	High Island to McFarlands Cove, South Bristol	5/9/1990		SB			
726-9	25-O	Louds Island, Bristol & Bremen, Long Island Areas	5/14/1992		SB			
726-10	26	Medomak River, Waldoboro and Friendship	7/2/2002		SB			
724-1	26	Medomak River, Waldoboro and Friendship	7/2/2002		SB			
724-2	26-A	Monhegan Island	12/29/1999		SB			
724-3	26-B	Friendship Harbor	2/22/1999		SB			
724-4	26-D	Hawthorne Point - Bailey Point, Cushing	7/9/1991		SB			
724-5	26-H	Broad Cove, Cushing	5/20/1992		SB			

724-6	26-K	Meduncook River and Hornbarn Cove - Crotch Island, Cushing	10/6/1999		SB			
724-7	26-M	Pleasant Point Gut, Cushing	2/27/2001		SB			
724-8	26-N	South & North and Eastern portions of Maple Juice Cove, Cushing	9/6/2000		SB			
724-9	26-0	Friendship Long Island & Vicinity, Friendship	2/27/2001		SB			
724-10	27	St. George River	6/24/2002		SB			
724-11	27-B	Deep Cove to Watts Point, St. George	10/26/2001		SB			
724-12	28-A	Port Clyde and the St. George Islands, St. George and Cushing	9/23/1999		SB			
722-1	27-A	Eastern Wheeler Bay, St. George	11/23/1999		SB			
722-2	28	Tenants Harbor to Mosquito Head, St. George	6/17/1997		SB			
722-3	28-B	Spruce Head Island, So. Thomaston to Spaulding Island, Owl's Head	6/22/2001		SB			
722-4	28-C	No End of Rackliff Island, St. George	11/29/1999		SB			
722-5	28-E	Spaulding Island to Ash Point, Owl's Head	3/11/1996		SB			
722-6	28-H	Marshall Point, Mosquito Head, St. George	9/6/2000		SB			
722-7	28-I	Weskeag River, So. Thomaston and Owls Head	7/8/2002		SB			
722-8	29	Rockland (Rockland Habor, Broad & Deep Coves)	12/29/1999		SB/SC			
722-9	29-A	Owl's Head	12/8/2000		SB			
722-10	29-B	Matinicus Island	1/7/2000		SB			
722-12	30-A	Southwestern Vinalhaven	5/11/1998		SB			
722-13	30-D	Vinalhaven & Vicinity	2/12/2001		SB			
722-14	30-H	Kent Cove, North Haven	9/23/1998		SB			
722-15	30-I	North Haven Island	6/15/1990		SB			
722-16	30-J	Vinal Cove - Starboard Rock, Vinalhaven	8/2/1990		SB			
722-17	30-K	Northeastern End of Southern Harbor, North Haven	10/8/1998		SB			
722-18	30-L	Ames Creek Area, North Haven	6/22/1999		SB			
722-19	30-M	Roberts Harbor, Vinalhaven	3/22/1991		SB			
722-20	30-N	Indian Point to Burnt Island, North Haven	10/15/1993		SB			

722-21	31-A	Rockport Harbor to Ducktrap Harbor, Lincolnville	11/29/1999		SB			
722-22	31-B	Spruce Head to Kelleys Cove, Northport	5/2/2002		SB			
722-23	32	Belfast Bay	1/3/2000		SB			
722-25	35	Penobscot River	12/1/1999		SB/SC			
722-26	36	Penobscot & Bagaduce Rivers, in Castine, Penobscot & Brooksville	6/27/2002		SB			
722-27	36-F	Islesboro	10/25/2001		SB			
722-28	37	Condon Point, Brooksville, to "Herricks" village Brooksville	9/10/1996		SB			
722-29	37-A	Deer Isle	12/1/1999		SB			
722-30	37-B	Blastow Cove, Deer Isle	8/17/1988		SB			
722-31	37-C	Heart Island, Deer Isle	4/13/2001		SB			
722-32	37-E	Eggemoggin, Little Deer Isle	5/22/1989		SB			
722-33	37-I	Western Cove, Stinson Neck, Deer Isle	10/17/2000		SB			
722-34	38	Stonington Harbor & NW Branch of Crocket Cove, Deer Isle & Stonington	11/28/2001		SB			
722-35	38-A	Inner Harbor, Stonington-Deer Isle	12/29/1999		SB			
722-37	38-C	Fifield Point to Moose Island	11/28/2001		SB			
722-38	39-A	Center Harbor - Brooklin	9/10/1996		SB			
722-39	39-F	Benjamin River, Sedgwick	11/8/1993		SB			
707-1	39	Blue Hill Harbor to Blue Hill Falls	12/21/2001		SB			
707-2	39-C	McHerd Cove - Webber Cove, East Blue Hill	12/17/1993		SB			
707-3	39-D	High Head-Sand Point, South Blue Hill	7/13/2001		SB			
707-4	39-E	Salt Pond, Sedgwick - Brooklin	10/12/2001		SB			
707-5	40	Union River Bay, Patten Bay & the Union River, Ellsworth, Surry & Trenton	11/21/2001		SB			
707-7	42-A	Lunt Harbor, Frenchboro	8/25/1997		SB			
707-8	42-B	Burnt Coat Harbor, Swans Island	11/5/2001		SB			
707-9	42-D	Red Point, Swans Island	4/9/2001		SB			
707-10	42-E	Mackerel Cove, Swans Island	3/30/1998		SB			
707-11	48-C	Tinker Brook, West Tremont	12/29/1999		SB			
714-1	43	Southwest Harbor	5/9/1986		SB			

714-2	44	Southern Mt. Desert Island & the Cranberry Isles	11/7/2000		SB/SA			
714-3	44A	Broad Cove and Somes Harbor, Mount Desert	11/7/2000		SB/SA			
714-4	46	Seal Harbor	6/17/1987		SB			
714-5	46-A	Otter Cove, Mt. Desert - Bar Harbor	1/26/1990		SB/SA			
714-6	47	Bar Harbor	1/26/1990		SB			
714-7	48	Thomas Bay, Bar Harbor	4/17/1992		SB			
714-8	49	Salisbury Cove, Bar Harbor	5/9/1986		SB			
714-9	49-A	Jellison Cove, Hancock	9/10/1996		SB			
714-10	49-B	Carrying Place, Hancock	6/3/2002		SB			
714-11	49-C	Kilkenny Cove, Hancock	5/30/1989		SB			
714-12	50	Sorrento	1/11/1999		SB			
714-13	50-A	US Route One Bridge, West Sullivan and Long Cove, Sullivan	8/15/2001		SB			
714-15	50-C	Johnny's Brook and Card Mill Stream, Franklin	9/5/2001		SB			
714-16	50-E	Egypt Bay, Hancock & Franklin	1/23/1995		SB			
714-17	51	Winter Harbor	1/26/1990		SB			
714-18	51-A	Arey Cove, Winter Harbor	12/1/1999		SB			
714-19	51-B	Grindstone Neck, Winter Harbor	12/4/1989		SB			
706-1	52	Prospect Harbor, Gouldsboro	12/20/1999		SB			
706-2	52-A	Corea Harbor	12/1/1999		SB			
706-3	52-B	Mill Pond Stream, Gouldsboro	7/27/2000		SB			
706-4	52-C	Bunkers Harbor, Gouldsboro	9/19/1994		SB			
706-5	52-D	Southwestern Petit Manan Point, Steuben	10/30/1990		SB			
706-6	52-E	Dyer Harbor - Pinkham Bay, Steuben	11/26/2001		SB			
706-7	52-F	Birch Harbor, Gouldsboro	2/11/1991		SB			
706-9	52-H	Wonsqueak Harbor, Gouldsboro	7/6/1999		SB			
705-1	53	Narraguagus River, Milbridge	1/7/2000		SB			
705-2	53-C	Back Bay, Milbridge	9/8/1999		SB			
705-3	53-G	Stover Cove and Privy Point, Milbridge	9/5/2001		SB			
704-1	53-A	Pleasant River, South end of Dyer Cove & Batson Brook, Addison	1/3/2000		SB			

704-2	53-D	Curtis Creek, Flat Bay, Harrington	9/3/1993		SB			
704-3	53-E	Upper Harrington River	11/19/1991		SB			
704-4	53-H	Cape Split, Addison	11/23/1999		SB			
703-1	53-H	Cape Split, Addison	11/23/1999		SB			
703-3	54-A	North End of Beals Island	1/11/1995		SB			
703-6	54-M	Lamesen Brook in West River, Addison	1/11/1995		SB			
703-7	54-N	Eastern Great Wass Island, Beals	9/19/1995		SB			
713-1	54-D	East & West Branches, Little Kennebec Bay, Machias & Machiasport	11/13/1996		SB			
713-2	54-G	White Creek, Masons Bay, Jonesport	5/22/1996		SB			
713-3	54-H	Chandler River, Jonesboro	8/29/1997		SB			
709-1	55	Machias & E. Machias Rivers	4/15/2002		SB			
709-2	55-B	Howard Cove - Starboard Cove, Bucks Harbor	7/13/1999		SB			
709-3	55-C	Whiting - Cutler	8/2/1993		SB			
709-4	55-H	Bucks Harbor, Machiasport	9/4/1990		SB			
709-5	55-I	Indian Head, Machiasport	9/24/1990		SB			
708-1	55-A	Little River - Cutler Harbor	4/7/1995		SA			
708-2	55-D	Great Head, Cutler & Bog Brook Cove, Trescott	3/30/2001		SB			
708-3	55-G	Money Cove, Cutler	1/16/1990		SA			
708-4	56-C	Haycock Harbor, Trescott	9/10/1991		SB/SA			
708-5	57	Eastport	12/10/1998		SB			
708-6	58	Lubec and South Lubec	8/26/1992		SB			
701-1	56	Denny's River & NE Denny's Bay, Edmunds & Pembroke	10/8/1996		SA/SB			
701-2	56-A	Pennamaquan Bay, Pembroke	3/12/1992		SB			
701-3	56-I	Canal Cove, Seward Neck, Lubec	11/1/1991		SB			
701-4	56-J	Sipp Bay, Perry & Pembroke	12/19/1996		SB			
701-5	57	Eastport	12/10/1998		SB			
701-6	57-A	Pleasant Point, Perry and Kendall Head, Eastport	10/29/1997		SB			
701-7	57-B	Carrying Place Cove, Eastport	12/3/1996		SB			
701-8	58	Lubec and South Lubec	8/26/1992		SB			

701-9	58-C	Pirates Creek, North Lubec	7/1/2002		SB				
701-10	58-F	The Haul-Up, South Bay, West Lubec	2/2/1999		SB				
702-1	57	Eastport	12/10/1998		SC				
702-2	57-A	Pleasant Point, Perry and Kendall Head, Eastport	10/29/1997		SB				
702-3	60	Little River, Perry	7/25/1988		SB				
702-4	62	St. Croix River - Passamaquoddy Bay	5/30/1996		SB/SC				

CATEGORY 4-A: ESTUARINE AND MARINE WATERS WITH IMPAIRED USE, TMDL COMPLETED

Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	TMDL Approved	Comments
Piscataqua R. estuary, Eliot, So. Berwick	320	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: ESTUARINE AND MARINE WATERS IMPAIRED BY POLLUTANTS POLLUTION CONTROL REQUIREMENTS REASONABLY EXPECTED TO RESULT IN ATTAINMENT

Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	Comments
Ogunquit R.	64	SB	1995	Marine Life Use Support	Dissolved Oxygen	Municipal point source	Moved outfall out of estuary. Need new data to determine attainment
Goosefare Brook	320	SC	1994	Marine Life Use Support	Dissolved Oxygen	Municipal point source	Moved outfall out of estuary, Draft TMDL on freshwater brook. Need new data to determine attainment.
St. George	1920	SB	1999	Marine Life Use Support	Dissolved Oxygen	Municipal point source	New license issued based on modeling. Additional data needed to determine attainment.
Penobscot R. estuary	7808	SC		Fish Consumption	Toxics: dioxin	Industrial point sources	Dioxin legislation passed; hazardous waste clean-up

CATEGORY 4-C: ESTUARINE AND MARINE WATERS WITH IMPAIRMENT NOT CAUSED BY A POLLUTANT

Waterbody #	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		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 (TMDL REQUIRED)

Waterbody #	Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	TMDL Date	Comments
811-8	Saco R. estuary	576	SC	1998	Marine Life Use Support	Toxicity, Copper, Bacteria	Municipal point source, CSOs	2008	
811-9	Mousam R. estuary	192	SB	1995	Marine Life Use Support	Dissolved Oxygen	Municipal point source	Pending DO legislation	
804-7	Fore R. estuary	768	SC	2001	Marine Life Use Support	Aquatic life, toxics, Bacteria	Municipal point source, CSOs, Stormwater, Hazardous waste sites, Nonpoint (spills of all sizes)	2012	
802-25	Royal R. Estuary	512	SB	1994	Marine Life Use Support	Dissolved Oxygen, Sediment Oxygen Demand	Municipal point source, nonpoint source (stormwater)		
726-11	Medomak R. estuary	640	SB	2002	Marine Life Use Support	Dissolved oxygen	Municipal point source, nonpoint source	Pending DO legislation	

CATEGORY 5-B-1: ESTUARINE AND MARINE WATERS IMPAIRED ONLY BY BACTERIA (TMDL REQUIRED)

Waterbody #	DMR Area	Segment Description	DMR Effective Date	Segment Acres	Segment Class	Last Year Sampled	Source	Comments
812-1	1	Piscataqua R. estuary, Kittery, Eliot, So. Berwick	3/9/2001		SB/SC			Also listed in 5-B-2 for CSO
802-5	17-B	Maquoit Bay, Brunswick and Freeport	6/26/2002		SB			Previously 303(d) listed; prior listings for area 17-A, Bunganuc Stream, Freeport-Brunswick merged with 17-B.
802-7	18	Potts Harbor, Merriconeag Sound and Harpswell Sound	4/27/2001		SB			
802-22	19	Wood Island to Harbor Island, Phippsburg	9/18/1992		SB			
710-1	20	Upper Kennebec River and Tributaries	12/14/2000		SB			
729-2	25	Damariscotta River, Newcastle - Damariscotta	10/5/2001		SB			
722-11	30	Rockport Area	12/29/1999		SB			
722-24	33	Searsport-Stockton Springs	11/2/2001		SB/SC			
722-36	38-B	Burnt Cove, Stonington	11/28/2001		SB			
707-6	42	Bass Harbor & Eastern Duck Cove, Tremont	11/6/1995		SB			
714-14	50-B	Springer Brook, Mill Brook and West Brook, W. Franklin	6/5/2000		SB			
706-8	52-G	Tucker Creek, Gouldsboro & Steuben Harbor	2/21/1991		SB			
703-2	54	Jonesport and West Jonesport	2/8/1996		SB			
703-4	54-B	Indian River, Addison-Jonesport	1/11/1995		SB			
703-5	54-K	Southeastern Alley Bay & Pig Island Gut, Beals	7/26/1996		SB			

CATEGORY 5-B-2: ESTUARINE AND MARINE WATERS IMPAIRED BY BACTERIA FROM COMBINED SEWER OVERFLOWS (TMDL REQUIRED ONLY IF CONTROL PLANS ARE INSUFFICIENT)

WATERBODY ID	LOCATION	# CSOs	Goal (separation or partial)	Enforcement control (permit or consent decree schedule)	Comments
812-2	Piscataqua River estuary at Kittery	3	Separation	Permit	
811-6	Saco River estuary at Biddeford	3	Separation	Permit & AO	Also listed in 5-A
811-7	Saco River estuary at Saco	2	Partial w/ generic bypass	Permit & CD	Also listed in 5-A
804-7	Casco Bay at Cape Elizabeth	1	Separation	Included in PWD Permit	
804-6	Casco Bay at South Portland	10	Partial w/ generic bypass	Permit & CD	Also listed in 5-A
804-5	Casco Bay at Portland	34	Partial w/ generic bypass	Permit & AO	Also listed in 5-A
710-3	Kennebec River estuary at Bath	4	Partial w/ generic bypass	Permit	
722-40	Rockland Harbor	2	Partial w/ generic bypass	Permit	
722-41	Belfast Harbor	2	Separation	Permit	
722-42	Penobscot River estuary at Bucksport	2	Separation	Permit	
722-43	Penobscot River estuary at Winterport	1	Separation	Permit	
722-44	Penobscot River estuary at Hamden	1	Partial w/ storage	Permit	
714-21	Frenchman's Bay at Bar Harbor	3	Separation	Permit	
709-6	Machias Bay at Machias	2	Separation	Permit	

CATEGORY 5-C: ESTUARINE AND MARINE WATERS IMPAIRED BY ATMOSPHERIC DEPOSITION

All estuarine and marine waters listed as 5-C, partially supporting fishing (fish consumption) due to elevated level of mercury in tissue of some fish.

Segment Description	Segment Acres	Segment Class	Last Year Sampled	Impaired Use	Cause	Source	Comments
Penobscot R. estuary	7808	SC		Fish Consumption	Toxics: mercury, dioxin, PCBs		Impairement may also be affected by former industrial point source (closed facility). Also listed in 4-b