

Chapter 7 PUBLIC HEALTH – RELATED ASSESSMENTS

Section 7-1 BEACH PROGRAM MONITORING & ASSESSMENTS

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Maine Coastal Beach Monitoring Program



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(Federal) www.epa.gov/ost/beaches

There is growing public interest in monitoring ocean beaches in order to provide protection of swimmer health, although in the past it has not been a priority. Relatively few people swim in the cold ocean water of Maine, especially at beaches in the eastern part of the State. The Maine Department of Environmental Protection (DEP) has focused on ensuring that areas influenced by licensed discharges are not a threat to swimmer health. Prior to the Healthy Beaches Program (see below) most State Park beaches were monitored monthly by Park staff. All participants in the Maine Healthy Beaches Program (MHBP), including some State Parks, monitor beaches on a weekly basis from Memorial Day through Labor Day. Acadia National Park was monitored in the past by park staff, but a volunteer group now monitors the park. Private beach owners are responsible for their own monitoring programs and often do not conduct any monitoring at all.

In Maine, the monitoring of town beaches and providing public notification is the jurisdiction of the municipality. Towns with combined sewer overflows that may impact swimming areas are required to monitor the swimming areas and to report their monitoring data and number of closures to DEP annually, if they choose to open the beach for swimming. For example, Sandy Beach in the town of Rockland is not monitored and is closed to swimming because of Combined Sewer Overflows. Therefore, it is only in partial support of its designated use of "Recreation in and on the Water" because of the combined sewer overflows.

Maine Healthy Beaches Program

Related Website www.mainehealthybeaches.org/

What is the Maine Healthy Beaches Program?

The U.S. Environmental Protection Agency (EPA) initiated the Beaches Environmental Assessment, Closure and Health (BEACH) Act of 2000 in response to the growing concern about public health risks posed by polluted coastal swimming beaches. The Maine Department of Environmental Protection (DEP) wrote a proposal to receive a portion of the available funding that was provided as part of this Act. The Maine State Planning Office (SPO) was designated as the lead agency to administer the program.

The Maine Healthy Beaches Program (MHBP) is a voluntary program to enter and includes two main components: a public education program and a water quality assessment program. The assessment program includes measurement of critical factors that affect the health of the beach environment as well as the health of people who visit them (for participating beaches only).

What activities does the Maine Healthy Beaches Program undertake?

- Gathering information from participating municipalities and state beaches,
- Conducting shoreline surveys with technical assistance from the Maine Department of Marine Resources (DMR),
- Surveying beach users to establish the extent of public knowledge and incidence of health problems related to swimming in coastal areas,
- Developing monitoring methods and a quality assurance plan,
- Monitoring beaches for water quality by municipalities, state parks, and community-based groups such as the Surfriders Club,
- Setting up a system to get samples to the laboratories within the appropriate holding times to produce accurate test results,
- Developing an efficient way of getting the data back to managers of the beaches,

- Developing a database that will be used by municipalities, state agencies, the U.S. Environmental Protection Agency and non-governmental agencies such as the Surfriders Club in their efforts to promote public safety,
- Developing a public education and notification program, and
- Encouraging more communities, private beach owners and volunteer groups to participate in the program.

What is the current status of the program?

In 2002, the first phase of the project was a pilot program that included a select few of Maine's coastal swim beaches as a model for future monitoring. By 2003, there were a total of 14 beach communities monitored. Table 7-1 indicates which towns and beaches were involved with the program during 2002 and 2003. This table also presents the total number of samples collected weekly per town.

Table 7-1 Beaches in the MHBP

Municipality	Beach(es)	Number of Samples / Week / Municipality
Biddeford	Fortune Rocks Beach, Biddeford Pool Beach, Middle Beach	7
Bristol	Pemaquid Beach	3
Cape Elizabeth	Crescent State Park Beach	3
Georgetown	Reid State Park (Mile Beach, Half-mile Beach, Lagoon Beach, East Beach)	7
Kennebunk	Gooches Beach, Kennebunk Beach, Libby Cove Beach, Parsons Beach	6
Mt. Desert Island	Bar Harbor Town Beach, Hulls Cove Beach, Seal Harbor Beach	12
Ogunquit	Ogunquit Beach	4
Old Orchard Beach	Old Orchard Beach	6
Phippsburg	Popham State Park Beach	6
Portland	East End Beach	1
Saco	Ferry State Park Beach	3
South Portland	Willard Beach	3
Wells	Drakes Island Beach, Wells Beach	10
York	Long Sands Beach, Cape Neddick Beach, Short Sands Beach, York Harbor Beach	20

What criteria are used to determine the health of a beach?

There are several relevant and critical factors that are considered when judging the health of a beach. The MHBP uses a "Risk Assessment Matrix" to determine the potential human health risk in each case through consideration of: water test results, beach location, environmental impacts from nearby waste disposal, storm water runoff, public restroom facilities, the presence of dogs or wildlife on the beach, beach usage statistics and a history of previous closings or contamination. A copy (in Adobe ".pdf" format) of the complete Risk Assessment Matrix and scoring system may be viewed and downloaded by visiting this URL:

www.mainehealthybeaches.org/assets/pdfs/matrix.pdf

How is the water tested?

There are different recommended methods and protocols for the testing of salt water and fresh water.

Salt Water: The indicator organism Enterococci is tested by either one of two methods: the "Enterolert" product, using Quantitray MPN technology, or the membrane filtration 24-hour method.

Fresh Water: The indicator organism E. coli is tested by the MMO-MUG methodology: Colilert or equivalent product using "Quantitray" MPN technology.

Monitoring of coastal beach sites should be conducted weekly.

Swimming Beach Closures

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Under Clean Water Act (CWA) guidelines, the designated use of swimming beaches is for "Recreation in and on the Water." The DEP is pleased to report that participants in the Maine Healthy Beaches Program (see above) had no closures during the summer of 2003, and were therefore always able to meet their designated use. At Willard Beach in South Portland, there was an advisory posted on June 10th but the bacterial counts were acceptable on June 11th. Also, at East End Beach in Portland, there were two precautionary advisories issued because of rainfall. Finally (as was mentioned in the previous section), Sandy Beach in the town of Rockland, does not conduct water testing because of a permanent beach closure order due to Combined Sewer Overflows (CSOs) in the vicinity of the beach.

Section 7-2 SHELLFISH PROGRAM MONITORING & ASSESSMENTS

Shellfish Harvest Area Closures

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The Department of Marine Resources (DMR) assesses information on shellfish growing areas to ensure that shellfish harvested are safe for consumption. A goal of the Clean Water Act (CWA) is to have these areas meet their designated use of "Propagation and Harvest of Shellfish." Shellfish areas are closed by DMR if the area is found to have elevated levels of bacteria or if the area is determined as threatened by potential sewage pollution problems. Water samples are collected and tested for fecal coliform bacteria at least six (6) times annually from each of the more than 2,000 established sampling sites that are located along the entire Maine coast. The shoreline survey includes a visual inspection of the shoreline to determine the location and magnitude of potential sewage pollution and toxic contamination problems.

The information collected by monitoring and surveying is put together into a document called a Sanitary Survey. Once assembled, this document is used to classify the various shellfish areas into one of the following categories (based on the goal of

having these areas meet their CWA designated use of propagation and harvest of shellfish):

- approved for harvesting (supporting its designated use),
- conditional or restricted (partially supporting its designated use) under a designated set of environmental conditions, or
- prohibited (not supporting its designated use)

Table 7-2 and Figure 7-1 presents both the percentage and the total area in acres under each classification. Current calculations estimate that Maine has a total of 1,821,474 acres of tidal flats and coastal waters in this classification system. This number has varied some over the past few 305b reporting cycles because of changes in the underlying data sets that Geographic Information Systems (GIS) use to calculate areas and because of the way DMR designates its shellfish harvesting areas. These changes have made it difficult to accurately determine how much progress has been made in the opening up of additional shellfish harvesting areas since 1998. (Please note: a list of closed areas is provided in Appendix IV.)

Table 7-2 Classification of Shellfish Harvesting Areas

Classification	Percentage	Acres	Square Miles
Supporting (approved)	90.03 %	1,639,831.74	2,562.24
Partially Supporting (conditional or restricted)	1.13 %	20,577.3	32.15
Not supporting (prohibited)	8.84 %	161,025.2	251.60
Total	100.00 %	1,821,434.24	2,845.99

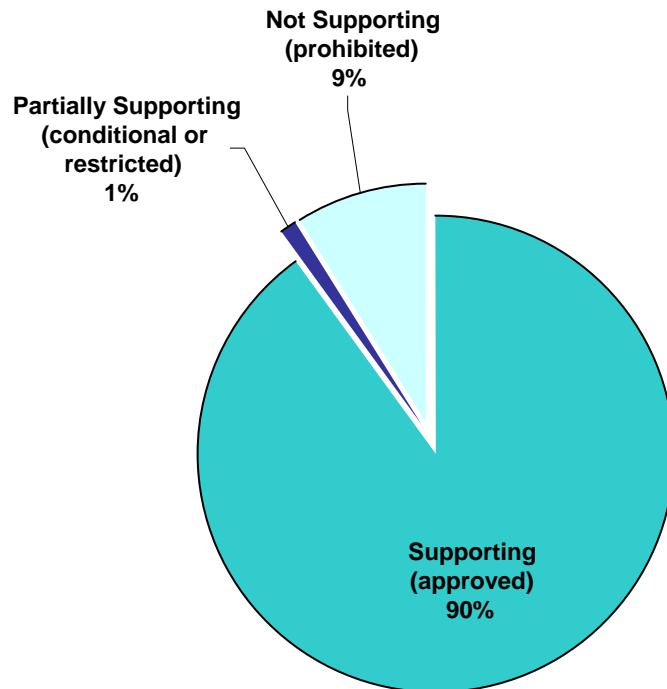


Figure 7-1 Status of Shellfish Areas as of December 2003

Expanding and Sustaining the Shellfisheries of Casco Bay – Phases I and II

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Related Website: www.cascobay.usm.maine.edu/clamreport.html

Source: The Casco Bay Estuary Project Final Report - September 2003

What is an overboard discharge?

An overboard discharge (OBD) is the discharge of wastewater from residential, commercial, and publicly owned facilities to Maine's streams, rivers lakes, and the ocean. Commercial and residential discharges of sanitary waste have been regulated since the mid-1970's when most direct discharges of untreated waste were banned. Between 1974 and 1987 most of the "straight pipes" were connected to publicly-owned treatment works or replaced with standard septic systems. Overboard discharge treatment systems were installed for those facilities that were unable to connect to publicly owned treatment works or unable to install a septic system because of poor soil conditions or small lot sizes.

Why are overboard discharges a problem?

All overboard discharge systems include a process to clarify the wastewater then disinfect it prior to discharge. If they are not properly maintained or if they malfunction, they have the potential to discharge the harmful bacteria and other pathogens directly into the water. In 1987, 25 percent of Maine's estimated 49,000 acres of mussel and clam habitat were closed because of actual contamination or the threat of contamination by bacteria and other pathogens from septic systems, boats, animals, and overboard discharges. Today, roughly 8 percent of Maine's mussel and clam habitat are still closed to shellfish harvesting.

The Casco Bay Estuary Project was awarded an EPA Sustainable Challenge Grant to work towards ensuring that communities around the Bay have a healthy shellfish harvest to sustain commercial and recreational shellfishing for generations to come. Three contractors worked with a "clam team" of stakeholders including the US Environmental Protection Agency, the Friends of Casco Bay, Department of Marine Resources, individual cities and towns, and the Department of Environmental Protection. During the first phase of the project, the goals were; to locate the most productive shellfish areas that were currently closed to harvesting, to determine sources causing contamination of those closed areas, and then to find ways of remediating the flats.

Casco Bay contains approximately 57 closed clam flats in nine municipalities that cover more than 800 acres. Existing information on these flats was reviewed and pollution sources contributing to their closure were identified. Through field review, analysis of water quality data, and discussions with towns and clambers, flats were prioritized in terms of their importance to the shellfishing community and their potential for remediation. Water quality data was also reviewed to better understand the factors that were keeping the flats closed. Twenty-one flats with a total area of about 430 acres were selected for remediation based on high clam resource value, ease of remediation, and community support. During the second phase of this project, the goal was to actually remediate sources of coliform, that were identified during the first phase, in order to open up the clam flats to harvest.

Many of the flats are closed simply due to the presence of a nearby overboard discharge (OBD). If there are no other sources of poor water quality, then the removal of one or more OBDs in the vicinity can effectively allow a shellfish bed to be opened. The process of OBD removal is multi-faceted, requiring a

partnership between the DEP, which licenses OBDs, the municipal code enforcement officer, who approves (often in conjunction with the Department of Human Services or DHS) replacement systems, a licensed site evaluator, who is required to design a replacement septic system, along with a willing homeowner.

During the fall of 1999, a process for reviewing properties in terms of size, topography, soil type, local setback requirements, and other constraints on developing a design for replacement septic systems began. Homeowner education and involvement was critical to the overall success, with the ultimate goal being to design the simplest, least expensive system for each property. Some systems were relatively straightforward to design, while other properties required installation of high-tech treatment systems.

By the summer of 2001, a majority of the targeted OBDs had been replaced, paving the way to reopen clam flats to shellfish harvesting. In the first six months of 2002, additional work was completed on OBD system removal. During this time, the project team completed further design work and coordinated with homeowners, the DEP and the DHS to implement OBD system replacement. Nearly 250 acres of shellfish resources are now available to harvest through the elimination of twenty-seven OBD systems.

There are still some issues with landowners and abutters, along with technical problems requiring more complicated solutions, all of which, have kept some flats from being opened. Other flats are still closed due to contamination from unknown sources, such as: faulty septic systems, run-off from farms and barnyards, along with wildlife and domestic pets. These areas will require "detective work" in the form of water quality sampling under varying weather conditions and tidal stages to pinpoint possible contamination sources and to evaluate the potential for cleanup. Based on the water quality results, potential solutions could be developed to improve water quality and to continue opening up additional clam flats.

Section 7-3 OCEAN FISH AND SHELLFISH CONSUMPTION ADVISORIES

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

Whenever waters fail to meet their "Clean Water Act-designated use for Fishing," government agencies issue fish and/or shellfish consumption advisories. These advisories are designed to let citizens know that there may be an increased risk to their health if they choose to consume certain species of fish or shellfish. Since 1992, human health consumption advisories have been in place to warn the public against the consumption of lobster tomalley due to high levels of toxic contaminants. However, no evidence of elevated levels of these contaminants was found in lobster meat. The advisory was expanded to include bluefish and striped bass in 1996, also due to detection of elevated levels of toxic contaminants in their flesh. The entire Maine coast is only in partial support of its designated use for fishing due to these consumption advisories.

Advisory Overview

Current information, with a last revision date of February 20, 2001, on ocean fish and shellfish advisories as adapted from the Maine Bureau of Health is as follows:

WARNING About Eating Saltwater Fish and Lobster Tomalley

Warning: Chemicals in some Maine saltwater fish and lobster tomalley may harm people who eat them. Women who are or may become pregnant and children should carefully follow the Safe Eating Guidelines.

It's hard to believe fish that looks, smells, and tastes fine may not be safe to eat. But the truth is that some saltwater fish have mercury, PCBs and Dioxins in them.

All these chemicals settle into the ocean from the air. PCBs and Dioxins also flow into the ocean through our rivers. These chemicals then build up in fish.

Small amounts of mercury can damage a brain starting to form or grow. That's why babies in the womb, nursing babies, and young children are at most risk. Mercury can also harm older children and adults, but it takes larger amounts.

PCBs and Dioxins can cause cancer and other health problems if too much builds up in your body. Since some saltwater fish contain several chemicals, we ask that all consumers of the following saltwater species follow the safe eating guidelines.

Specific Ocean Fish Consumption Advisories

Safe Eating Guidelines

Striped Bass and Bluefish: Recommended to eat no more than 2 meals per month.

Shark, Swordfish, King Mackerel, and Tilefish: Pregnant and nursing women, women who may get pregnant and children under 8 years of age are advised to not eat any swordfish or shark. All other individuals should eat no more than 2 meals per month.

Canned Tuna: Pregnant and nursing women, women who may get pregnant and children under 8 years of age should eat no more than 1 can of "white" tuna or 2 cans of "light" tuna per week.

All other ocean fish and shellfish, including canned fish and shellfish: Pregnant and nursing women, women who may get pregnant and children under 8 years of age should eat no more than 2 meals per week.

Lobster Meat and Tomalley Consumption Advisories

Lobster Meat: A consumption advisory does not exist for lobster meat.

Lobster Tomalley: Recommended to completely avoid consumption of lobster tomalley. While there is no known safety considerations when it comes to eating lobster meat, consumers are advised to refrain from eating the tomalley. The tomalley is the soft, green substance found in the body cavity of the lobster that functions as the liver and pancreas. Test results have shown that the tomalley can accumulate contaminants found in the environment.

For more information, including warnings on freshwater fish call (866) 292-3474 or visit the related web site at: www.maine.gov/dhs/ehu

Section 7-4 FRESHWATER FISH CONSUMPTION MONITORING, ASSESSMENTS AND ADVISORIES

Dioxin Summary

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Dioxin levels in fish from Maine rivers continue to decline, approaching background at some locations but still exceeding background at others.

An evaluation of the health implications of dioxin/furan concentrations in fish in Maine Rivers requires a comparison to a health benchmark. The Bureau of Health uses a health benchmark that is expressed as a specific fish tissue concentration of dioxins and furans, referred to as a “Fish Tissue Action Level” or FTAL. For the present report, the Bureau compares the most recent data on contaminant levels in fish tissue to its current FTALs for dioxins and furans of 1.5 parts per trillion (ppt) for protection of cancer-related effects and 1.8 parts per ppt for protection of noncancer-related effects. The Bureau additionally compares sampling data to a lower FTAL of 0.4 ppt, which is under consideration as a potential revision to current FTALs to account for background dietary exposure to dioxins and furans.

All sampling locations on the Penobscot and Kennebec Rivers had average dioxin and furan levels in smallmouth bass and brown trout that were well below the current FTAL of 1.5 ppt, and below a potential lower FTAL of 0.4 ppt. Levels in white suckers were below the current FTAL of 1.5 ppt, but were generally above the potential lower FTAL of 0.4 ppt.

With the exception of the Rumford Point sampling location on the Androscoggin River, all other down river sampling locations had average dioxin and furan concentrations in bass tissue that were below the current FTAL of 1.5 ppt. However, all sampling locations with the exception of Auburn had average levels of dioxins and furans that were above the potential lower FTAL of 0.4 ppt – though for several locations levels were only slightly above this health benchmark. Levels in suckers were above the current FTAL for several sampling locations.

The most recent sampling data for bass and suckers on the Presumpscot and Salmon Falls Rivers indicate dioxin and furan levels below both current FTALs and the potential lower FTAL of 0.4 ppt. The most recent data for the West Branch of the Sebasticook River indicates dioxin and furans levels above current FTALs.

The Dead River connects the Androscoggin Lake to the Androscoggin River. Androscoggin River water enters into Androscoggin Lake whenever floodwaters overtop a floodgate on the Dead River. Average dioxin and furan levels have yet to be above the current FTAL of 1.5 ppt. However, with the exception of the 2000 sampling season, all other sampling seasons have yielded average levels in fish tissue above the potential lower-bound FTAL of 0.4 ppt.

These most recent data on dioxin and furan concentrations in bass and trout from the Kennebec and Penobscot Rivers indicate that we appear to be nearing the point where the presence of these chemicals will no long contribute to the need for additional consumption advisories beyond the statewide mercury advisory. Additional advisories may continue to be needed for suckers.

The prognosis for consumption advisories on the Androscoggin River due to dioxins and furans is less clear. Levels generally remain elevated for suckers, and for bass at some locations.

Fish Advisories

Department of Human Services Guidelines About Eating Freshwater Fish

Warning: Mercury in Maine freshwater fish may harm the babies of pregnant and nursing mothers, and young children.

SAFE EATING GUIDELINES

Pregnant and nursing women, women who may get pregnant, and children under age 8 SHOULD NOT EAT any freshwater fish from Maine's inland waters. Except, for brook trout and landlocked salmon, 1 meal per month is safe.

All other adults and children older than 8 CAN EAT 2 freshwater fish meals per month. For brook trout and landlocked salmon, the limit is 1 meal per week.

It's hard to believe that fish that looks, smells, and tastes fine may not be safe to eat. But the truth is that fish in Maine lakes, ponds, and rivers have mercury in them. Other states have this problem too. Mercury in the air settles into the waters. It then builds up in fish. For this reason, older fish have higher levels of mercury than younger fish. Fish (like pickerel and bass) that eat other fish have the highest mercury levels.

Small amounts of mercury can harm a brain starting to form or grow. That is why unborn and nursing babies and young children are most at risk. Too much mercury can affect behavior and learning. Mercury can harm older children and adults, but it takes larger amounts. It may cause numbness in hands and feet or changes in vision. The Safe Eating Guidelines identify limits to protect everyone.

Warning: Some Maine waters are polluted, requiring additional limits to eating fish.

Fish caught in some Maine waters have high levels of PCBs, Dioxins or DDT in them. These chemicals can cause cancer and other health effects. The Bureau of Health recommends additional fish consumption limits on the waters listed below. Remember to check the mercury guidelines. If the water you are fishing is listed below, check the mercury guideline above and follow the most limiting guidelines.

Androscoggin River Gilead to Merrymeeting Bay:----- 6-12 fish meals a year.
Dennys River Meddybemps Lake to Dead Stream:----- 1-2 fish meals a month.
Green Pond, Chapman Pit, & Greenlaw Brook

(Limestone):-----**Do not eat any fish from these waters.**

Little Madawaska River & tributaries

(Madawaska Dam to Grimes Mill Road):-----**Do not eat any fish from these waters.**

Kennebec River Augusta to the Chops:-----**Do not eat any fish from these waters.**

Shawmut Dam in Fairfield to Augusta:----- 5 trout meals a year, 1-2 bass meals a month.

Madison to Fairfield: ----- 1-2 fish meals a month.

Meduxnekeag River: ----- 2 fish meals a month.

North Branch Presque Isle River----- 2 fish meals a month.

Penobscot River below Lincoln:----- 1-2 fish meals a month

Prestile Stream:----- 1 fish meal a month.

Red Brook in Scarborough: ----- 6 fish meals a year.

Salmon Falls River below Berwick: ----- 6-12 fish meals a year.

Sebasticook River (East Branch, West Branch & Main Stem)

(Corinna/Hartland to Winslow):-----2 fish meals a month.

Section 7-5 DRINKING WATER PROGRAM MONITORING & ASSESSMENTS

Public Water Supplies

Wellhead Protection Program

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Related Website: www.maine.gov/dhs/eng/water/WellheadProtection.htm

The State of Maine Drinking Water Program (DWP), located in the Department of Human Services, administers the Wellhead Protection Program (WHPP). The WHPP continues to be a voluntary program for Maine's public water suppliers, with all reduced or waived monitoring tied to approved protection programs. To be eligible for reduced or waived monitoring, a system must have an approved local Wellhead Protection Plan (WHPP) and have completed a waiver application. To date, the DWP has requested all of the "community" and "non-transient non-community" (see the Finished Waters section below for definitions) systems to submit completed protection area delineations and contamination source inventories. The DWP has also surveyed all of the transient non-community systems to identify systems with wells at risk from acute contaminants.

The DWP has recently completed an assessment (Source Water Assessment Program or SWAP report) of the vulnerability of each public drinking water source in the state. SWAP reports for all of the non-transient non-community, transient non-community and community systems have been provided to every public water supplier, municipality and other interested parties in Maine. Using the results of these reports, the DWP will work with community and non-transient non-community systems to draft comprehensive source management plans, and for larger systems the DWP will help draft contingency plans. This three to four year project should complete Maine's initial wellhead protection efforts as required in the 1986 amendments to the federal Safe Drinking Water Act.

Source Water Assessment Program

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Related Website: www.maine.gov/dhs/eng/water/SWAPdoc2-25.htm

The Maine Drinking Water Program (DWP) wants to ensure that when a water supply is at risk of contamination, consumers are made aware of the potential hazards so that the appropriate steps can be taken to minimize or eliminate the risk. This protective function is the purpose of the Source Water Assessment Program. By implementing SWAP, the DWP has evaluated each of the 2,600 public water supply sources in Maine. These evaluations were done by assessing the likelihood that the source water could become contaminated due to existing or future land use activities.

The results of these assessments have been provided to towns, water suppliers, and interested members of the public. The DWP is working with suppliers and towns to implement recommendations from the assessment results. The primary risk identified was the high potential for future development of surrounding lands to adversely impact water quality. A principal method used to reduce this threat includes providing outreach both to towns that are conducting comprehensive planning through the State Planning Office as well as to towns that receiving technical assistance and training through the Maine Nonpoint Education for Municipal Officials Program (NEMO). Another strategy to reduce the risk from development through outreach is to encourage additional review of proposed land use changes in source protection areas through the both the DEP and local planning boards.

Finished Waters

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Related Website: www.maine.gov/dhs/eng/water/Compliance.htm

The Drinking Water Program (DWP) is the front line enforcement agent of the U.S. Environmental Protection Agency (EPA) for the rules and regulations set forth in the Safe Drinking Water Act (SDWA). The requirements of SDWA apply to the approximately 2,000 public drinking water systems in Maine. There are 80 water systems that use surface water as their primary source and these all have water treatment systems and watershed protection programs. Of the approximately 1,920 ground water systems, 661 have some form of treatment on-line while the remaining systems have no treatment and serve raw water.

Water testing on finished water is the primary means for assessing public water system compliance while verifying the quality of water that is reaching consumers. The presence of contaminants is an indication that there are problems within the water system such as water treatment failure, structural failure, source water contamination or other breakdowns. Along with being in violation with SDWA for having contaminated water, there could be infractions for improper operation and maintenance of the system by the operators.

Water testing requirements are specified in SDWA and are based on the public water system classification, the size of the population served, and the type of water source. There are three classes of public water systems. These classifications were established based on the risk of water-borne disease that pertains to the populations served.

“Community” Water Systems: These systems serve at least 25 year-round residents and are facilities such as town water supplies, trailer parks, and nursing homes. The residents may consume the water daily over many years and therefore, extensive water testing is required. This includes tests for contaminants that pose health risks from long-term exposure.

“Non-Transient Non-Community” Water Systems: Are those that regularly serve at least 25 of the same people for more than six months of the year and include schools and businesses. Their testing requirements are less extensive than those used for “community” systems.

“Transient” Water Systems: These systems serve at least 25 people for at least 60 days or more out of the year and do not meet the definitions of the other two categories. These include restaurants, motels, campgrounds, etc. and due to their minimal exposure to the water, the customers/consumers are at a reduced risk for water borne disease. Water tests are required to detect only microbial contamination and that of nitrates/nitrites. These contaminants can cause acute illness even with limited exposure, such as could be found in a single glass of water.

Table 7-3 SDWA Water Testing Requirements by Public Water System Category

Community Water Systems *	Non-Transient Non-Community Water Systems *	Transient Water Systems *
Coliform Bacteria	Coliform Bacteria	Coliform Bacteria
Nitrate / Nitrites	Nitrate / Nitrites	Nitrate / Nitrites
Lead / Copper	Lead / Copper	
Volatile Organics (VOC)	Volatile Organics (VOC)	
Inorganics	Inorganics	
Semi-volatile Organics	Semi-volatile Organics	
Pesticides	Pesticides	
Herbicides	Herbicides	
Polychlorinated Biphenyls (PCB)	PCB	
Gross Alpha		
Radium 228		
Radon		

*For lists of individually regulated contaminants visit the EPA website at: www.epa.gov/safewater/hfacts.html

In addition to those listed above, tests for other parameters are required for special situations. Examples of these are tests for disinfectant by-products required for systems that chlorinate, fluoride tests in the distribution system for systems that add fluoride, and tests for uranium and radium 226 when the test for gross alpha exceed the trigger level.

The frequency of water testing is also outlined in SDWA. In addition, the DWP has policies for more frequent sampling following contamination episodes, as part of the new well approval process, and for non-compliant facilities. The frequency of sampling for most tests is reduced after an initial period of intense testing demonstrates that the contaminants have not been present. Tests for pesticides, herbicides, and PCBs can be waived after an initial test is clean and if the facility operator certifies that these chemicals are not in use in the watershed of their surface water system or within ½ mile of their well(s). Waivers apply to 3-year compliance periods and require the system operator reapply with updated information triennially.

Table 7-4 Frequency and Location of Water Sampling by Contaminant

Contaminant	Sampling Frequency	Sampling Location
Coliform Bacteria	Monthly or Quarterly	User Faucets within the Distribution System
Lead / Copper	Annual (varied)	High Risk Faucets within the Distribution System
Nitrate / Nitrites	Annual, Quarterly, or Monthly	At the Entry Point into the Distribution System (after treatment)
Inorganics	Every 3 Years (with no detects)	“
Organics	“	“
Herbicides / Pesticides	“	“
PCB	“	“
Gross Alpha	Every 9 Years (with no detects)	“
Radium 228	“	“
Radon	“	“

While water quality testing of finished water confirms the overall efficiency of treatment and integrity of the water system; public water systems must meet other requirements that help to ensure safe drinking water. Treatment systems themselves as well as materials and components of the water system as a whole must meet certain specifications. There are also requirements that call for the training and certification of the operators of certain water systems. Water systems must submit timely reports for water tests, treatment maintenance, and the addition of chemicals.

All public water systems must undergo periodic inspections called 'sanitary surveys' conducted by DWP staff; these surveys are assessments of all aspects of the water system and its operation. In turn, the DWP provides public water systems with round the clock contact for water emergencies, technical assistance, assistance with grants and loans for system improvements, assistance with source water protection, training seminars, and a quarterly newsletter that provides updates of regulatory information and other drinking water information. The DWP strives to assist public water systems in meeting the requirements for compliance, thereby helping to ensure safe drinking water.

Ground Water Indicators

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Related Website: www.maine.gov/dhs/eng/water/index.html

The Drinking Water Program tracks the number of times public water supplies that utilize ground water exceed the MCL of a given substance, as indicated below in Table 7-5. Table 7-6 (on the next page) shows the population served by ground water based public water supplies and how many of these supplies have local wellhead protection plans (WHPPs) in place. Combined, these tables give a relative indication of the condition of ground water resources that are used as a drinking water supply. Data that are contained in these two tables are for the period of January 1, 2002 to December 31, 2003.

Table 7-5 Summary of Public Water Supplies with MCL Exceedances

Community Public Water Supplies with MCL Exceedances for Selected Contaminants (Ground Water Based or Partially Ground Water Supplied)		
Contaminant group	Number of MCL Exceedances	Number of Samples
NO3	31	6402
VOCs	5	1176
SVOCs	2	681

Table 7-6 Ground Water Based or Partially Ground Water Supplied Public Water Supply Information

System Type	Number of Systems	Systems with Ground Water as Primary Source	Population Served by Ground Water	Systems with Wellhead Protection Plans (WHPPs)	Population Served by WHPPs Supplies
Community	395	333	190,466	333	190,466
Non-Transient Non-Community	372	370	70,861	370	70,861
Transient	1208	1192	192,673	N/A	N/A

N/A means "Not Applicable"

Private Wells

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

The State Bureau of Health's Environmental Health Unit will be issuing on a report on private well water public health issues under a legislative mandate to report back on the need for a safe drinking water program for private wells. This report is currently being assembled and is due back to the legislature in October of 2004. A summary of the results of this report will be included in the 2006 305(b) Report.

Section 7-6 GROUND WATER AND PUBLIC HEALTH CONCERNS

Pubic Health and Environmental Concerns

Contaminants found in ground water have numerous adverse human health and environmental impacts. Public health concerns arise because some of the contaminants are individually linked to numerous toxic effects ranging from allergic reactions and respiratory impairment to liver and kidney damage, and damage to the central nervous system. Additional public health concerns also arise because information is not available about the health impacts of many contaminants found in ground water.

Because of uncertainties in the relationships between exposure to contaminants and impacts on human health, public health efforts are based on identifying the probabilities of impacts (i.e. risk assessment). Conducting a risk assessment for combinations of contaminants that are commonly found in ground water is difficult because there are no generally accepted protocols for testing the effects of contaminant interactions. The primary route of exposure to contaminants is through ingestion of drinking water, although exposure is also possible through contact with skin and inhalation of vapors from ground water sources (bathing, food preparation, industrial processes, etc.)

Because ground water generally provides base flow to streams and rivers, environmental impacts include toxic effects on benthic invertebrates, fish, wildlife and

aquatic vegetation. This also presents a public health concern if the surface waterbody is a source of food and recreation. In some areas of the State there are probably links between low-level, long-term ground water quality degradation and the water quality of streams and brooks during low-flow conditions.

MTBE

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Related Websites: (General Information) www.maine.gov/dep/mtbe.htm

(Questions and Answers) www.maine.gov/dep/rwm/publications/mtbeqa.htm

MTBE or methyl tert-butyl ether is an additive used in gasoline since the late 1970's to replace lead. It makes up about 3% of regular unleaded gasoline and 11% of reformulated gas (RFG). To meet federal clean air requirements, Maine began using RFG in November of 1994.

There has been evidence of MTBE in ground water since before 1985. However, no widespread contamination was noted until 1998, when a series of gasoline contamination incidents and concurrent public concern caused the State of Maine to conduct a study of private and public water supply wells. Of the 951 private wells and 793 public water supply wells tested:

- 93% showed either no MTBE or trace levels (below 1ppb).
- 16% showed detectable levels of MTBE, while other gasoline constituents were rarely found.
- While no public water supplies in the study showed MTBE levels above the MCL; 1% of the private wells sampled did show levels above the MCL of 35 ppb.

MTBE-contaminated wells were found in all areas of the state, not only in those areas required to use RFG. Since there are over 300,000 private wells in Maine serving about half of Maine population, the 1% of private wells would indicate an estimated 3,000 private wells in Maine could be contaminated with MTBE. In March of 1999, Maine opted out of the RFG program.

The DEP's 1998 investigations of the wells with MTBE levels over the MCL indicated an association with relatively small gasoline spills that one might categorize as a "backyard" type of spill – e.g. small, accidental spills that occur while filling the gas tanks of an ATV, snowmobile, garden tractor, etc. However, other gasoline constituents were rarely detected in those wells that contained MTBE.

In early 2000, the USGS in cooperation with the DEP and the town of Windham completed a study to determine if other sources of MTBE could be contributing factors to the presence of MTBE in drinking water. Factors investigated were atmospheric deposition, precipitation, as well as point sources such as leaks, spills, and improper disposal of petroleum products. The study concluded that recharge from precipitation containing MTBE is not a likely explanation for the occurrence of low levels of MTBE in the Windham aquifer, and the mostly likely sources were small spills of gasoline associated with use of lawn care equipment and recreational vehicles.

Radon

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Related Website: www.maine.gov/dhs/eng/rad/hp_radon.htm

Not all public health concerns that involve ground water are caused by pollution released from human activities. The presence of naturally occurring radioactive radon gas in ground water drawn from granite bedrock aquifers and overlying soils has long been recognized as a problem in Maine. Based on studies of miners and more recently on people living in homes with high radon concentrations, medical researchers have shown that high radon levels in air are associated with increased incidence of lung cancer. Radon in water supplies is a concern because radon is readily released into the air from water. Therefore the health concerns stems more from inhalation of the radon rather than drinking the water. A large number of Maine wells have radon concentrations that through normal household water use, release concentrations of radon into the air that are as high or higher than the concentrations associated with an increased incidence of lung cancer.

Proposed federal standards for radon have raised concerns regarding ground water that had previously been regarded as acceptable. The average concentration of radon in public or private water supplies in Maine ranges from 5,000 to 10,000 picocuries/Liter (pci/L). Current Maine guidelines limit radon in water to 20,000 pci/L. The proposed federal standard would create a Maximum Contaminant Level (MCL) for radon in water of 300 pci/L with an Alternate MCL (AMCL) of 4,000 pci/L if a radon multimedia mitigation program is developed and instituted by the State or the community water suppliers. This multimedia mitigation plan would require reducing risks from radon in indoor air, which is estimated to cause 14,000 to 32,000 deaths annually in the U.S., compared to radon in drinking water which is estimated to cause 68 deaths annually. The AMCL of 4,000 pci/L was chosen because it is the amount of radon in drinking water that causes a risk equal to the risk from radon found in outdoor air. Statutory authority for the MCL, AMCL and multimedia mitigation plans were set in the Federal Safe Drinking Water Act Amendments of 1996.

Arsenic

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Related Website: www.maine.gov/dhs/eng/water/ArsenicFacts.htm

Several types of cancer including skin and bladder cancer, along with other health problems have been linked to the occurrence of arsenic in drinking water. The current Maximum Contaminant Level (MCL) for arsenic is 50 ppb (parts per billion); however the EPA has recently proposed lowering the MCL to 10 ppb in drinking water. The Maine Bureau of Health has set a maximum exposure guideline (MEG) for arsenic in domestic well water at 0.01 milligrams of arsenic per liter of water (which is equal to

10 ppb). This is also the same amount that the World Health Organization currently recommends.

A 1994 – 1995 study of about 600 randomly selected wells indicates that, statewide, about 1 to 2 percent have arsenic levels greater than 50 ppb. However, about 10 percent have arsenic levels above the MEG of 10 ppb. Table 7-7 shows recent water tests done on private wells in Maine. These data indicate similar arsenic concentrations to what was found in the 1994 - 1995 study.

Table 7-7 Arsenic Levels in Private Wells

Private Well Arsenic Test Results HETL Database 1/1/2002 to 12/31/2003		
Number of Tests	Result	Percent of Total
511	non-detect for arsenic	47 %
587	positive for arsenic	53 %
16	> 50 ppb arsenic	1.5 %
109	> 10 ppb arsenic	9.9 %
1,098	Total Number of Tests	

Currently a source or sources for all arsenic detected in well water has not been determined. However, preliminary work by the MGS, University of Maine Department of Geological Sciences, DEP, and DHS indicate that the problem is of statewide significance and that the arsenic concentration in ground water is most likely the result of both natural processes and human activity. Through a focused study, in conjunction with the University of Maine, in the town of Northport, bedrock is now recognized as a significant source of the contribution to high-arsenic wells. This site-specific study involves rock coring and water sampling of individual fractures to determine arsenic concentrations. Four drill cores have been collected in the recharge and discharge areas of the basin. Analysis of the drill core shows significant amounts of arsenic-bearing minerals that have undoubtedly contributed to the arsenic problem in the area. Fractures within these cores are coated with arsenic bearing iron oxyhydroxide minerals that may play a significant role in the release of arsenic to ground water.

Other Contaminants

The Maine Geological Survey has worked with DEP and DHS on wells contaminated with cadmium in central coastal Maine. This occurrence is probably related to early historical uncontrolled mining activity in the area.

The Maine Geological Survey has also worked with DHS on wells contaminated with antimony in central Maine. The area is known for small antimony deposits but the relationship between high-antimony wells and these deposits is unknown.

Chapter 8 SUMMARY OF IMPAIRED WATERS REQUIRING TMDLS

Section 8-1 TMDL / CATEGORY 5 LIST

Table 8-1 2002 Category 5/TMDL Rivers & Streams not on the 2004 Category 5 / TMDL List

Segment	Assessment Unit (Waterbody) ID	Has EPA Approved TMDL (In 4a)	Has Other Control Measures (Proposed for 4b)	Insufficient Information to Determine If Water Is Impaired (Category 3)	Assessment Unit is Attaining At Least One WQ Standard, With Other Standards Not Assessed (Category 2)	Assessment Unit is Attaining All WQ Standards (Category 1)
Outlet Stream (China Lake)	ME01030000 309 328R01			Recent (2002) biomonitoring indicates attainment, sources may still exist.		
Kennedy Brook	ME01030000 312 333R03				Recent (2003) monitoring in attainment. See case study discussion in Sect 4-4, Small Streams.	
Togus Stream	ME01030000 312 335R02				Draft TMDL completed with findings that water quality impairments are attributable to natural (wetland) sources rather than any identifiable point or nonpoint source	
Bog Stream	ME01050000 308 511R01				Hatchery point source eliminated. Recent (2003) monitoring in attainment.	
Goosefare Brook	ME01060000 106 612R01	TMDL approved 2003				
Deep Brook	ME01060000 211 616R01				Recent (2002) in attainment. No sources found for previous cause	
Presque Isle Stream	ME01010000 412 140R01		Mapleton land treatment system complete. Probable attainment.			
Cobbossee Stream	ME01030000 311 334R05	TMDL approved 2004				
Total Number of Segments Moved From 2002 TMDL List		2	1	1	4	

Table 8-2 2002 Category 5/TMDL Lakes not on the 2004 Category 5 / TMDL List

Lake	Assessment Unit (Lake) ID	Year EPA Approved TMDL (In 4a)	Has Other Control Measures (Proposed for 4b)	Insufficient Information to Determine If Water Is Impaired (Category 3)	Assessment Unit is Attaining At Least One WQ Standard, With Other Standards Not Assessed (Category 2)	Assessment Unit is Attaining All WQ Standards (Category 1)
Webber Pond	5408	2003				
Threemile Pond	5416	2003				
Three-cornered Pond	5424	2003				
Highland (Duck) Lake	3734	2003				
Mousam Lake	3838	2003				
Annabessacook Lake	9961	2004				
Pleasant (Mud) Pond	5254	2004				
Total Number of Lakes Moved From 2002 TMDL List		7 Lakes				

Table 8-3 2002 Category 5/TMDL Estuarine/Marine Waters not on 2004 Category 5/TMDL List

Segment	Assessment Unit (Waterbody) ID	Year EPA Approved TMDL (In 4a)	Has Other Control Measures (Proposed for 4b)	Insufficient Information to Determine If Water Is Impaired (Category 3)	Assessment Unit is Attaining At Least One WQ Standard, With Other Standards Not Assessed (Category 2)	Assessment Unit is Attaining All WQ Standards (Category 1)
Medomak River Estuary	726-11		4-B-1 Municipal Point Source removed – changed to spray irrigation			
Burnt Cove, Stonington	722-36				OBDs Removed. Monitoring indicates attainment.	
Total Number of Segments Moved From 2002 TMDL List			1		1	

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Table 8-4 River and Stream TMDL Current Project Update

Segment	Assessment Unit ID & Pollutant	Project Status	Project TMDL Submittal Targets
Togus Stream	Eutropic Lake, Wetland, PS	Report Preparation	2004
Sabattus River	Eutropic Lake, NPS, PS	Report Preparation	2005
Piscataquis River	NPS, Agriculture; PS	Monitoring & Report Preparation	2006
Androscoggin River – Gulf Island Pond	PS; BOD, TSS, TP	Modeling Report Final 2002; Additional Monitoring 2004	2005
Androscoggin River – Livermore Impoundment	TSS	Modeling Report Final 2002; Additional Monitoring 2004	2005
Penobscot River	PS; BOD, TP	Modeling Report Draft 2003; Final 2004	2006
Sandy River	PS; TP	Initial Monitoring 2002; Finish Monitoring 2004	2006
Carenton Stream	NPS, Metals, Mine Drainage	Report Preparation	2004
Fish Brook	NPS, Agriculture	Report Preparation	2004
Frost Gully	NPS, Urban Runoff	Report Preparation	2004
Concord Gully	NPS, Urban Runoff	Report Preparation	2004
Long Creek	NPS, Urban Runoff	Finish Stressor ID, EPA Innovative Pilot Proposal	2005 ¹
Arctic Brook	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 ²
Unnamed Bangor Stream (Pushaw)	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 ²
Unnamed Bond Brook Tributary	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 ²
Mill Stream	NPS, Urban Runoff	EPA Innovative Pilot Proposal	2005 ²
Penjajawock Stream	NPS, Urban Runoff	Conduct Stressor ID, Modeling Completed	2005
Meadow Brook	NPS, Urban Runoff	Partial Data Collected	2005
Capisic Stream	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Trout Brook	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Barberry Creek	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Birch Stream	NPS, Urban Runoff	Conduct Stressor ID, Prepare Report	2005
Prestile Stream	NPS, Agriculture	Partial Data Collected	2006
Dyer River	NPS, Agriculture	Data Collected	2006
West Branch Sheepscot River	NPS, Agriculture	Data Collected	2006
Shaw Brook	NPS, Urban Runoff	Partial Data Collected	2006

¹ Proposed for the EPA Innovative TMDL Pilot Project, but will be completed by Maine DEP if not selected

² Conditional on acceptance of waterbody into the EPA Innovative TMDL Pilot Project

Table 8-5 Lake TMDL Current Project Update

Lake	Lake ID	Pollutants	Project Status	TMDL Submittal Target*
SABATTUS POND	3796	Nutrients, Siltation	Public Review	2004
HIGHLAND LAKE	3454	Organic Enrich.	Report Preparation	2004
UNITY POND	5172	Nutrients, Siltation	Report Preparation	2004
TOOTHAKER POND	2336	Nutrients	Report Preparation	2004
NARROWS POND (UPPER)	98	Nutrients, Organic Enrich.	Report Preparation	2004
COBBOSSECONTEE (LT)	8065	Nutrients, Organic Enrich., Siltation	Report Preparation	2004
LONG LAKE	5780	Organic Enrich.	Report Preparation	2004
TOGUS POND	9931	Nutrients, Organic Enrich.	Monitoring & Data Analysis	2005
DUCKPUDDLE POND	5702	Nutrients, Organic Enrich., Siltation	Monitoring & Data Analysis	2005
LOVEJOY POND	5176	Nutrients, Organic Enrich., Siltation	Monitoring & Data Analysis	2005
LILLY POND	83	Nutrients, Organic Enrich.	Monitoring & Data Analysis	2005
HAMMOND POND	2294	Nutrients, Organic Enrich., Siltation	Monitoring & Data Analysis	2005
HERMON POND	2286	Nutrients, Organic Enrich.	Monitoring & Data Analysis	2005
SEWALL POND	9943	Nutrients, Organic Enrich.	Baseline Monitoring	2006
TRAFTON LAKE	9779	Nutrients	Baseline Monitoring	2006
ARNOLD BROOK LAKE	409	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2006
ECHO LAKE	1776	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2006
CHRISTINA RESERVOIR	9525	Organic Enrich.	Baseline Monitoring	2006
CROSS LAKE	1674	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2006
DAIGLE POND	1665	Nutrients, Organic Enrich., Siltation	Baseline Monitoring	2007
MONSON POND	1820	Nutrients, Siltation	Baseline Monitoring	2007

* Calendar year projection as of May 2004

Table 8-6 Estuarine/Marine Current TMDL Project Update

Segment	Assessment Unit ID & Pollutant	Project Status	TMDL Submittal Target
Mousam River Estuary	811-9, PS	Report Preparation	2005
Royal River Estuary	802-25, PS	Report Preparation	2005

Chapter 9 ACCESSING AND MANAGING DATA USED IN MAKING DECISIONS ON STATUS OF WATERS

Section 9-1 MAINE DEP QUALITY MANAGEMENT SYSTEM

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Data used in making decisions on the status of Maine waters are collected, analyzed, and evaluated according to the standards contained in the Department's QMP or Quality Management Plan (Revision 2, as approved by EPA-New England, June, 2003). The Plan documents DEP's Quality Management System (QMS) which applies to all program areas and activities in the Maine DEP.

The QMS uses a rigorous internal second-party audit approach to managing for quality, in addition to program-level QA/QC activities. The latter are documented in Standard Operating Procedures (SOPs) developed and implemented for each program area. SOPs are included in all Quality Assurance Project/Program Plans (QAPPs) applicable to environmental data gathering and analysis.

The auditing program of the QMS uses trained auditors from within Maine DEP to assess the quality of management systems, procedures, and protocols. Audits are scheduled and overseen by the Quality Management Steering Committee (QMSC), and are designed to identify opportunities for improvement as well as non-conformances with established standards. Audits are carried out at three operational levels:

- System-wide audits of QMP elements such as "Documents and Records" or "Planning,"
- Program audits of identifiable operational systems, such as the Permit Compliance System (PCS), and
- Technical audits of QAPPs and similar planning documents.

Since its inception in 2001, the auditing program is assessed the following areas relevant to the 305(b) Report:

- NPDES Permit Compliance System and Discharge Monitoring Report system data management
- NPDES Water Inspection (documentation)
- Division of Land Resource Regulation
- Bureau of Remediation and Waste Management, GRO/DRO Sampling program (ground water)
- CWA 319 program

In 2004, the following areas are scheduled for audit:

- Overboard Discharge Program: operations and removals programs
- Small Community Grants (wastewater) Program as part of Procurement Audit

In 2003, the QMSC initiated an effort to bring all laboratories providing environmental data results to the Department into compliance with basic laboratory standards. DEP published Laboratory Performance Standards and distributed these to all NPDES facilities and other laboratories. These Standards are being incorporated in

wastewater permits as these are renewed. The Department is currently developing a Laboratory Quality Assurance Manual template for use by wastewater permit holders through a grant utilizing Joint Environmental Training Coordinating Committee (JETCC) funds.

The other major focus of QMS activity related to decisions regarding the status of waters is in Maine DEP's administration of QAPPs. As the result of a Memorandum of Agreement (January, 2002) between EPA-New England and the Department, authority to review and approve QAPPs is being handed over in stages from EPA to Maine DEP. QAPPs for water quality activities previously approved by EPA-NE are now overseen by Maine DEP, including approval of revisions. Following an initial round of parallel review, all water quality monitoring QAPPs under the CWA 319 program are reviewed and approved by DEP instead of EPA. In 2003 and early 2004, program-level QAPPs for Lakes Monitoring (including TMDL and volunteer monitoring) and Bio-criteria Monitoring are in the final stages of development. Approval in this case will be on the basis of parallel review by EPA-New England and DEP. A project QAPP for the Urban Streams TMDL program was approved using a similar process in 2003. Program-level QAPPs for Marine/Estuarine monitoring, and Wetlands monitoring, are under development. It is expected that when these are complete, DEP will have full authority to review and approve them.

Certain other QAPPs related to water quality describe quality assurance activities for projects outside DEP's span of control. Chief among these are QAPPs for activities carried out by the Casco Bay Estuary Project (CBEP), and projects developed and carried out by EPA-New England in Maine.

Section 9-2 LISTINGS ON INDIVIDUAL WATERS

See the following Appendices (II through IV) for listing information on specific waters.