



**Report to the Joint Standing Committee on the
Environment and Natural Resources:**

**Sources of Fecal Coliform that affect the
State's Shellfish Areas**

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February 22, 2011

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Background

In 2009 the legislature enacted PL. Chapter 213, An Act Making Unified Appropriations and Allocations for the Expenditure of State Government, General Fund and Other Funds, and Changing Certain Provisions of the Law Necessary to the Proper Operations of State Government for the Fiscal Years Ending June 30, 2009, June 30, 2010 and June 30, 2011.

The law, in part:

1. Authorized three new positions in the Department of Marine Resources (DMR) Shellfish Sanitation Program to address a critical staffing shortage that threatened the viability of the State's shellfish program.
2. Provided partial funding for these positions through new surcharges on:
 - a. New subsurface wastewater disposal permits issued by municipalities;
 - b. Overboard discharge systems licensed by the Department of Environmental Protection (DEP);
 - c. Municipal combined sewer overflows that have the potential to impact shellfish harvesting areas; and
 - d. Publically owned wastewater treatment facilities whose outfalls cause adjacent shellfish growing areas to be closed.¹
3. Created a new Water Quality Improvement Fund at DEP to house the above revenues.
4. Required that this report be submitted as follows: "The Department of Marine Resources and the Department of Environmental Protection shall submit a report to the joint standing committee of the Legislature having jurisdiction over natural resources matters by January 1, 2011 that identifies the point and nonpoint sources of fecal coliform that affect the State's shellfish areas based upon existing information readily available to the departments. The report must be comprehensive and include but not be limited to analysis of: stormwater runoff, overboard discharge sources, farm and agricultural operations, municipal wastewater systems, direct industrial discharges and private septic systems. The joint standing committee of the Legislature having jurisdiction over natural resources matters is authorized to submit legislation to the First Regular Session of the 125th Legislature to amend the fee structure under the Maine Revised Statutes, Title 38, section 353-B on the basis of the fecal coliform source report."

¹ The combined funding from these four sources is not sufficient to support the three DMR positions. The law also authorized one time transfer of \$160,000 from the Department of Conservation to cover the balance of the positions.

Executive Summary

There are numerous sources of fecal coliform² that affect the State's shellfish areas requiring evaluation and causing some areas to be closed to shellfish harvesting. Shellfish are filter feeders, concentrating and bioaccumulating fecal coliform and other deleterious substances from the water column. As a human food source often eaten raw they require special consideration. Some sources may cause an adjacent shellfish area to be closed because the source causes unacceptable levels of fecal pollution in the receiving waters.

Other sources require an adjacent shellfish harvest area be closed as a precautionary measure because of the potential for discharge of fecal coliform. These sources have the ability to discharge fecal coliform due to unexpected events, increases in discharges beyond design capabilities, problems in operation and malfunctions. Due to the unexpected nature of events contaminated shellfish would be harvested before a closure could be enacted. Therefore, to prevent contaminated shellfish from ever reaching the markets, precautionary closures are required for some sources.

All actual and potential sources of fecal coliform must be evaluated requiring staff time and resources whether they are closed or not. Categories of sources are:

Point Sources:

- Municipal wastewater treatment facilities³ and combined sewer overflows (require precautionary closure area)
- Stormwater conveyances from MS4, and non MS4, communities
- Overboard discharges (require precautionary closure area)
- Certain marinas and boat moorings⁴ (require precautionary closure area)

Non Point Sources:

- Malfunctioning septic systems (require precautionary closure area)
- Farm and agriculture operations
- Other polluted stormwater runoff

The number of these sources in any particular area can vary widely throughout the state. Shellfish closures may have multiple sources causing the closure. However, no shellfish area can be open for harvest without a thorough evaluation of all point and non point sources

Sources of Data and Information

² Fecal coliform is a type of bacteria found in the intestines of humans and animals. Their presence in water is an indicator of possible contamination by disease causing pathogens. The Department of Marine Resources uses fecal coliform monitoring as a method to determine if shellfish areas are safe for harvesting.

³ For the purpose of this report, the term municipal wastewater treatment facilities also refers to quasi-municipal facilities such as those operated by sanitary districts.

⁴ Those with more than 10 boats with heads.

The DEP and DMR have a variety of data and information on the sources noted above. These include data collected during ambient monitoring to assess the attainment status of the waters of the State, sanitary survey work performed by DMR to meet the requirements of the National Shellfish Sanitation Program, sanitary survey work performed by the DEP to identify potential sources of contamination to shellfish areas, complaint investigations performed by the DEP, and monitoring information submitted by licensed dischargers such as municipal wastewater treatment facilities and OBDs. The conclusions drawn from this data and information are summarized below.

Point and Non Point Sources of Fecal Coliform Contamination

Point Sources

For the purposes of this report, a point source refers to a discharge from a municipal wastewater facility or collection system, stormwater from MS4 and non MS4 entities, an overboard discharge, a boat, or an industrial treatment facility.

Municipal Wastewater Treatment Facility or Collection System

A municipal wastewater system may collect residential, commercial, and industrial wastewater. The wastewater is treated and disinfected and discharged to surface waters, or in some cases spray irrigated on to the surface of the land or discharged subsurface.

There are currently 165 municipal wastewater systems. 59 (36%) discharge directly to marine waters. The remaining 106 (64%) discharge to fresh water or spray irrigate onto land, or discharge subsurface. All are licensed and inspected by the DEP. The presence of a municipal wastewater outfall pipe in marine waters requires the DMR to close any adjacent shellfish area as a precautionary measure regardless of the level of fecal coliform discharged. All municipal wastewater systems that discharge to surface waters are required to meet bacteria limits to ensure the protection of public health and safety, to and to ensure that all designated uses of the receiving water, including shellfishing, are met.

Occasionally, the collection system of pipes designed to carry sewage to a wastewater treatment facility may have breaks that allow raw sewage to escape the system prior to reaching the treatment facility. Once these breaks are discovered they are repaired.

All municipal wastewater systems, including the 59 that discharge to marine waters and cause adjacent shellfish areas to be closed for the purpose of harvesting shellfish, currently pay an annual fee to DEP to support the waste discharge licensing and inspection program. These 59 municipal wastewater systems also pay an annual surcharge established by PL 2009, Ch. 213. The law requires that collectively, a total of \$37,000 be collected from these systems. The amount of a facility's individual fee is based on the amount of shellfish area caused to be closed by the municipal wastewater

system outfall, and any combined sewer overflow⁵ discharges the facility may have had in the last three years. Individual 2010 fees under PL 2009, Ch. 213 ranged from \$10 to \$11,905.

Stormwater from MS4 and non MS4 entities

Due to their population density, certain communities and entities in Maine that have municipal separate stormwater sewer systems (MS4) are subject to DEP's MS4 permit⁶. There are currently 38 such entities. Less densely populated communities and entities may have stormwater systems that are not subject to permitting. Sanitary surveys conducted by DMR have identified certain stormwater outfalls from MS4 entities, and stormwater outfalls from non MS4 entities as sources of fecal contamination.

Collection system of pipes designed to carry stormwater may contain improper connections that result in a direct discharge of sewage. These improper or cross connections, occur when residences are erroneously hooked up to the stormwater system. These types of discharges are referred as illicit discharges. In 2010 DEP sampled 5 streams served by municipal sewers and 4 of those streams had bacterial contamination attributed to illicit discharges. Municipalities eliminate illicit discharges when they are discovered, but detection is difficult. Systematic elimination of this source of fecal coliform contamination requires review of the collection system and development of an Illicit Discharge Detection and Elimination Program.

Pet and animal waste may be a source of polluted stormwater that is conveyed by a stormwater system. MS4 communities are required to address these sources and these communities have initiated public campaigns to educate residents regarding proper pet waste disposal.

MS4 entities pay an annual fee to DEP to support the MS4 licensing and inspection program. Neither MS4, nor non MS4 entities, are currently required to pay an annual surcharge under PL 2009, Ch. 213.

Overboard Discharge Sources (OBDs):

An OBD is a discharge to surface waters of domestic pollutants not conveyed to nor treated in a municipal wastewater treatment facility. OBDs are typically houses, schools, and commercial establishments such as marinas, motels, and restaurants located in areas that are not served by a municipal sewer and where soil conditions or lot size prevent the installation of a subsurface disposal system. OBDs provide secondary treatment and disinfection of the discharged wastewater through mechanical treatment or a sand filter.

There are currently approximately 1,300 OBDs in the State of Maine. Approximately 1,194 (92%) discharge to marine waters. The remaining 106 (8%) discharge to fresh

⁵ Combined sewer overflows (CSOs) typically occur during storm events when a mixture of wastewater and stormwater overflows a combined sewer collection system.

⁶ As required by the Federal Clean Water Act

waters. All are licensed and inspected by the DEP. The presence of the OBD outfall pipe requires the DMR to close any adjacent shellfish area as a precautionary measure regardless of the level of fecal coliform discharged.

OBDs currently pay an annual fee to DEP to support the OBD licensing and inspection program. OBDs also pay an annual \$75 surcharge established by PL 2009, Ch. 213. Collectively approximately \$97,500 was billed to OBDs in 2010 as required by PL 2009, Ch. 213.

Marinas and Boat Moorings

While there are several provisions in state and federal law to minimize impacts, discharges from boats may also be a source of fecal coliform that affect shellfish areas. It is illegal to discharge raw sewage within 3 miles of the sea coast. It is illegal for non fishing commercial vessels greater than 78' to discharge gray water within 3 miles of the sea coast. For coastal waters, federal law requires vessels with a head to have a Coast Guard approved Marine Sanitation Device that treats or stores sewage. There are also several areas in the State where discharges of treated waste from boats is prohibited⁷. In addition, State law requires pump-out stations at marinas on coastal or inland waters that provide services and have 18 or more slips or moorings for boats greater than 24' in length.⁸ Because it is impossible to police or enforce all marina area laws and regulations and to prevent contaminated shellfish from reaching markets, DMR is required to close shellfish areas adjacent to marinas or mooring stations with 10 or more boats with heads.

Marinas and boat moorings are not currently required to pay an annual surcharge under PL 2009, Ch. 213.

Direct Industrial Discharges

For the purposes of this report, a direct industrial discharger is any licensed discharger to surface waters of the state that is not a municipal wastewater system. These facilities may discharge a variety of wastewater types including: treated process wastewater, and non contact cooling water. Examples of wastewater sources include pulp and paper mills and other manufacturers, food processing facilities, fish hatcheries, marine aquaculture facilities, snow dumps, and discharges of treated sanitary wastewater from a commercial source.

There are currently 189 direct industrial dischargers that discharge to marine waters, fresh water, and spray irrigate onto the land. All are licensed and inspected by the DEP. Unlike municipal wastewater systems, the presence of a direct industrial discharger wastewater outfall pipe does not require the DMR to close any adjacent shellfish area as a precautionary measure. The majority of these discharges do not include sanitary wastewater or wastewater that would otherwise be contaminated with fecal coliform. Of the 18 direct industrial dischargers that discharge treated sanitary

7 Casco Bay, Boothbay Region, Kennebunk-Wells, Southern Mount Desert, West Penobscot Bay

8 There are currently 80 coastal pump-out stations in Maine.

wastewater, none discharge to surface waters. Therefore, none of these direct industrial dischargers are sources of fecal coliform that affect the State's shellfish areas.

All industrial dischargers currently pay an annual fee to DEP to support the licensing and inspection program. None are currently required to pay an annual surcharge under PL 2009, Ch. 213.

Non Point Sources

Nonpoint source discharges are diffuse and result in the transport of fecal coliform to shellfish areas by rainfall or snow melt. The primary sources of fecal coliform in stormwater are noted below.

Private Septic Systems

A private septic system treats sanitary wastewater from a residential or commercial facility through a septic tank that settles out solids and clarifies grease and scum and a leach field that treats effluent from the septic tank before it is discharged to groundwater.

Septic systems are regulated through the plumbing code which is administered through local plumbing inspectors. The Department of Health and Human Services is charged with overseeing municipal administration of the plumbing code.

When properly designed, installed, permitted, inspected, used and maintained septic systems can be expected to properly function for approximately 15-20 years. A properly functioning septic system is not a source of fecal coliform bacteria that affects the State's shellfish areas. However, a malfunctioning septic system can be a source of fecal coliform that can affect the State's shellfish areas.

All septic systems located near the shoreline must be evaluated for proper functioning. Based on data from DEP and DMR surveys, approximately 10% of the septic systems that are surveyed are found to be either a potential or an actual source of fecal coliform that can affect the State's shellfish areas.

Under PL 2009, Ch. 213, applicants for a municipal permit to construct a new non engineered septic system are required to pay a one time surcharge of \$15. In calendar year 2010 approximately \$45,500 was collected from these permits.

Farm and Agricultural Operations

DMR sanitary surveys indicate a variety of farms and agricultural operations adjacent to shellfish areas. These operations are sometimes identified as sources of fecal contamination due to manure storage or livestock management issues. The extent of any contamination is subject to a variety of factors including number of animals, manure management practices, pasturing practices, proximity to shellfish areas, and topography and vegetative cover.

All marine shoreline property must be evaluated by DMR for the presence of farm animals and agricultural operations. Water quality sample stations must be established. Where there is the presence of animals and water quality does not meet fecal standards shellfish areas are closed.

The vast majority of farms in Maine are not regulated by the DEP. Currently, nine farms are designated as Concentrated Animal Feeding Operations (CAFOs) due to their size, and are subject to waste discharge licensing. These are all large dairy or poultry farms, or beef feedlot operations, and none of these are located adjacent to shellfish areas.

Since the inception of Maine's Nutrient Management Program administered by the Maine Department of Agriculture (MDOA), 740 nutrient management plans have been developed for farms with fifty animal units or more (one animal unit equals 1000 pounds of live animal), or that meet certain other criteria. CAFOs are required to obtain a Livestock Operations Permit (LOP) issued by the MDOA, as are new livestock operations proposing to confine and feed 300 or more animal units. Fifteen LOPs have been issued to date. Complaints against farms that involve environmental concerns are investigated by the MDOA. If a determination is made that an agriculture-related environmental problem exists, the MDOA will recommend site-specific best management practices for adoption that are appropriate to the situation. Staff from DEP, MDOA, and the USDA Natural Resources Conservation Service recently collaborated with DMR, the Freeport area clammer's association, local farmers and others to develop and implement expanded best management practices for that area.

The nine CAFOs currently pay an annual fee to DEP to support the licensing and inspection program. No farm or agricultural operation is currently required to pay an annual surcharge under PL 2009, Ch. 213

Other Stormwater Runoff

Improperly disposed of pet waste can be a source of fecal coliform. In some urban areas pet waste may be the leading source of bacteria contamination. Natural sources of bacteria, such as areas where geese congregate, can also be a source of contamination.

**Point and Nonpoint Sources of Fecal Coliform that affect the State's Shellfish Areas
Based upon Existing Information Readily Available to DEP and DMR**

Source Category	Source of Fecal Coliform that Affect the State's Shellfish Areas	Currently Subject to Fees under PL 2009, Ch. 213	Annual Fee Amount Per Entity	Total Fee Amount Billed or Collected Annually
Municipal Wastewater Systems	Yes ⁹	Yes	Based on impact. Range from \$10 - \$11,905	\$37,000
MS4 and non MS4 Stormwater Systems	Yes ¹⁰	No	None	None
Overboard Discharges	Yes ¹¹	Yes	\$75	\$97,500
Marinas and Moorings with more than 10 boats with heads	Yes ¹²	No	None	None
Malfunctioning Private Septic Systems	Yes	Yes ¹³	For new systems, one time fee of \$15	\$45,500 ¹⁴
Farm and Agricultural Operations	Yes ¹⁵	No	None	None

⁹ Via mandatory closure areas, occasional malfunctions, and CSOs

¹⁰ Via closure areas based on actual fecal coliform scores. Not all stormwater outfalls have scores high enough to require closure areas

¹¹ Via mandatory closure areas and occasional malfunctions

¹² Via mandatory closure areas

¹³ PL Chapter 213 established a \$15 surcharge on new septic systems

¹⁴ Approximate. Varies annually

¹⁵ Case by case based on a variety of variables