

GROWING AREA WI

**Towns of Cape Elizabeth, South Portland, Portland, Long Island, Great Chebeague Island, Falmouth,
Cumberland, Yarmouth, and Freeport**

Sanitary Survey Report

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Figure 1. Growing Area WI, with Active Water Stations. Map insets: A.) Pollution area 13, Western Casco Bay and Islands; B.) Pollution area 14, Royal River, Cousins River and vicinity.

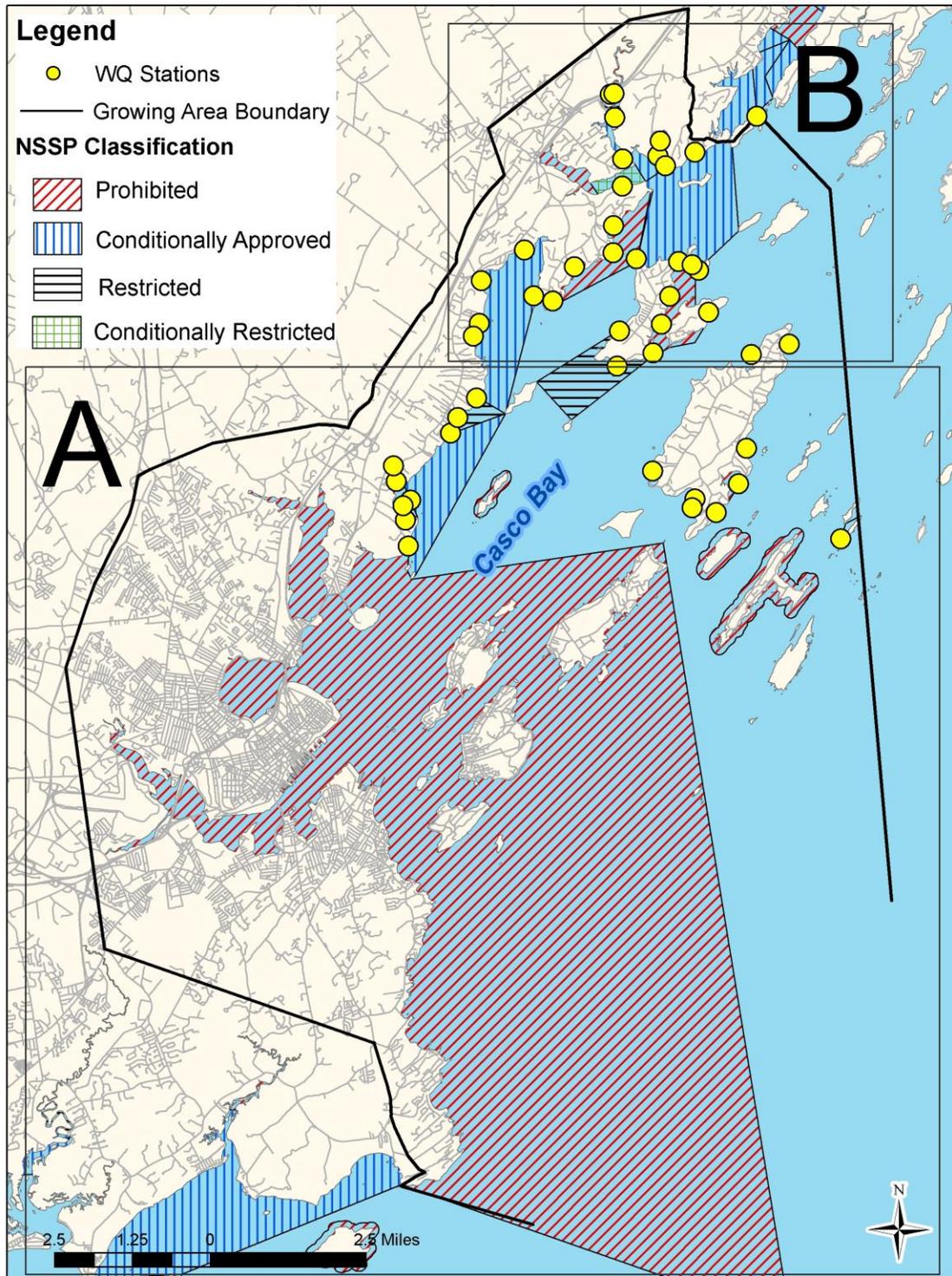


Figure 2. Map A: Pollution Area 13 including corresponding legal notice area designations indicated in blue text with white outline.

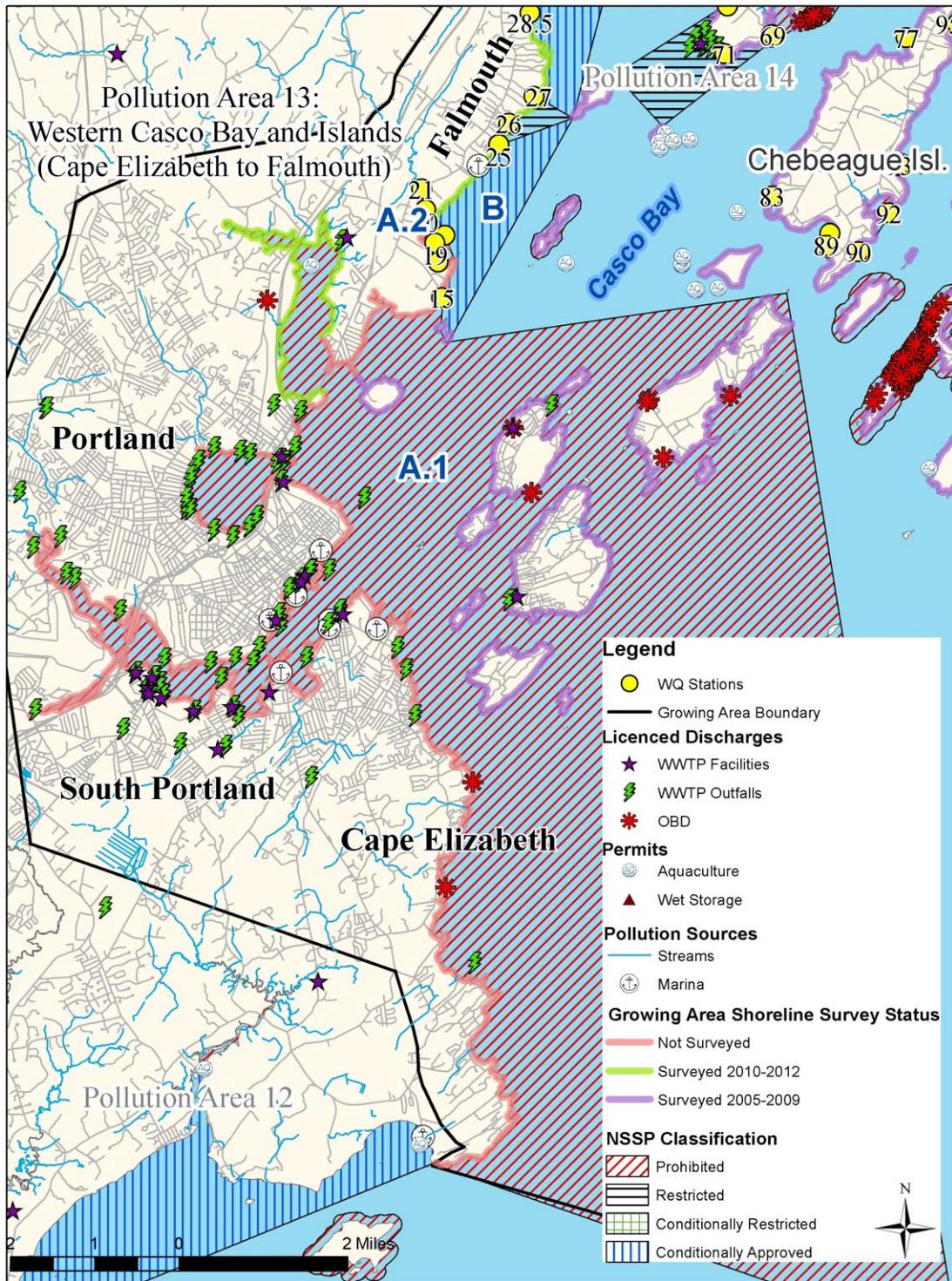


Figure 3. Detail of Pollution Area 13: Portland Metro area including Fore and Presumpscot Rivers. Map includes streams sampled from 2000-2012 and legal notice area designations (blue text with white outline.)

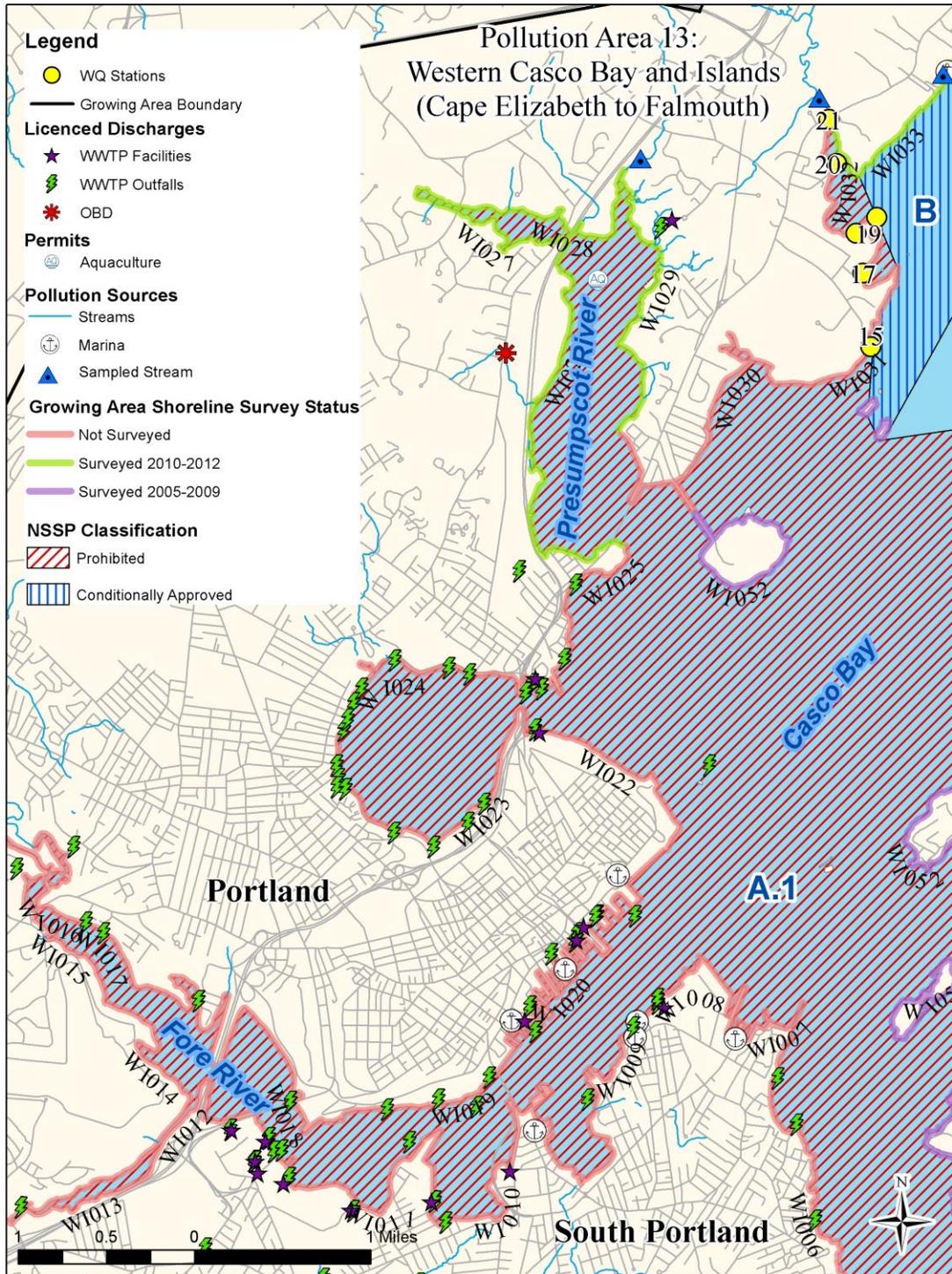


Figure 4. Detail of Pollution Area 13: Western Casco Bay Islands. Map includes streams sampled and septic problems documented from 2000-2012 and legal notice area designations (blue text with white outline.)

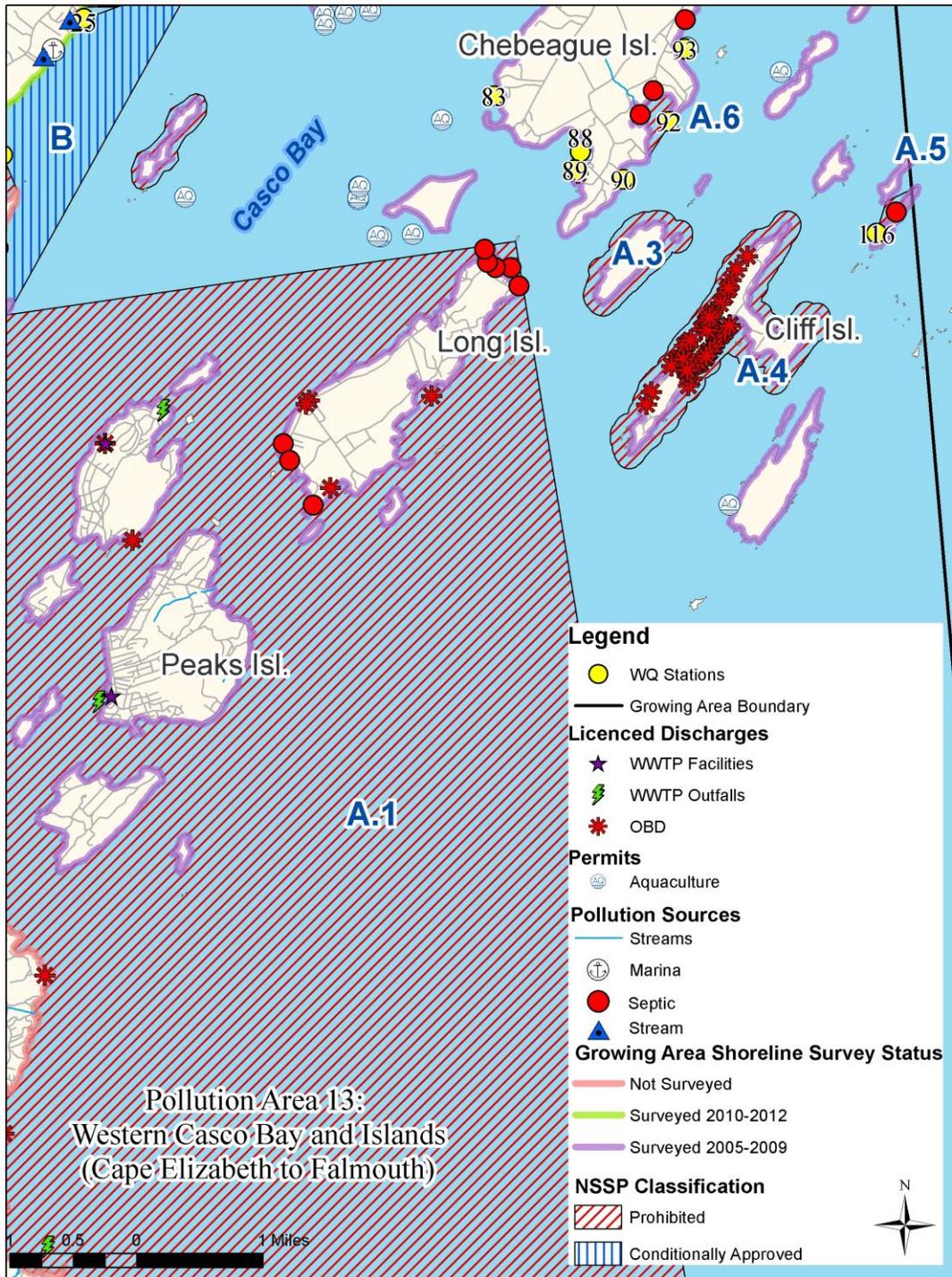


Figure 5. Map B: Pollution Area 14. Map includes streams sampled and septic problems documented from 2000-2012 and legal notice area designations (blue text with white outline.)

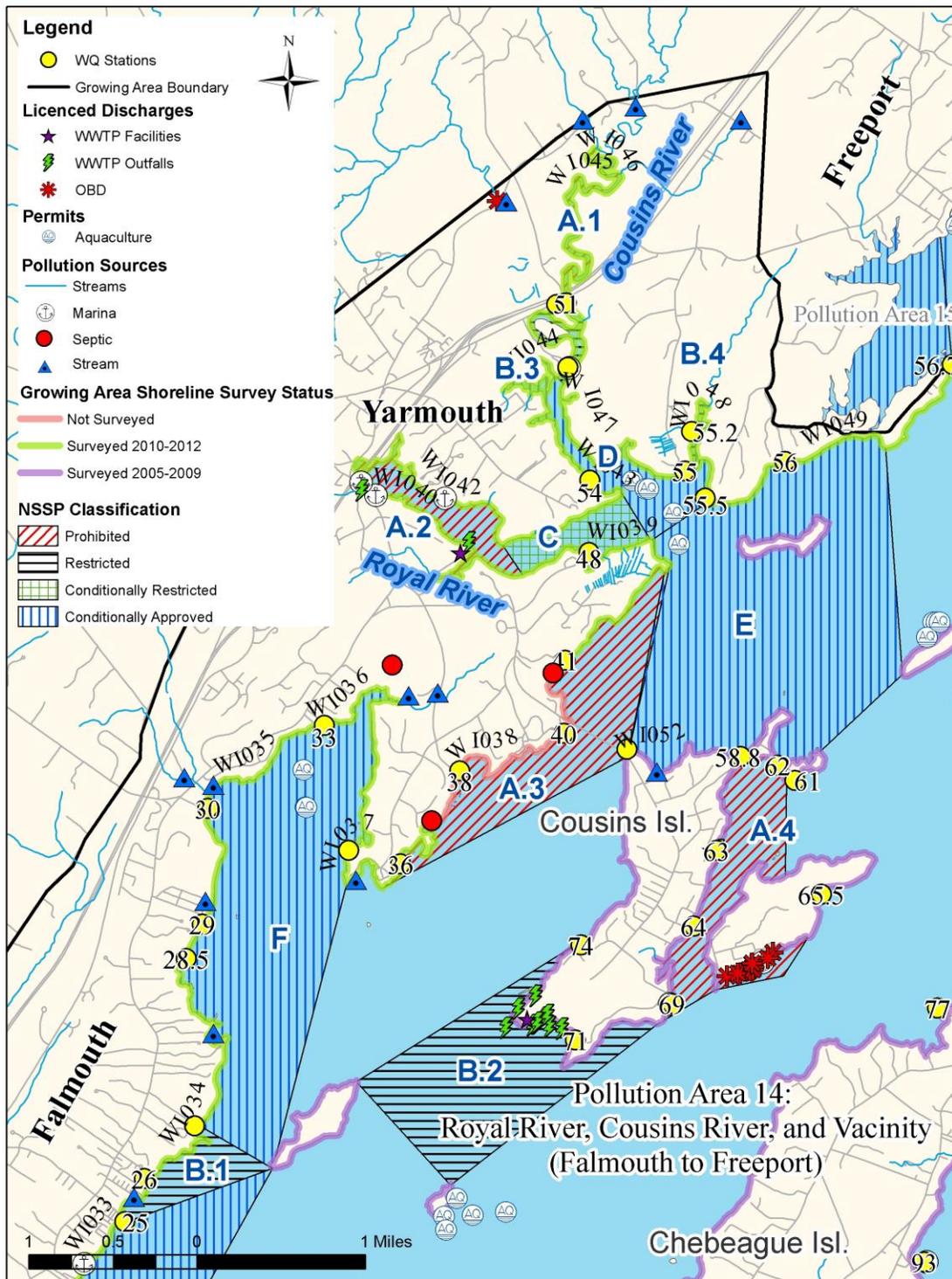
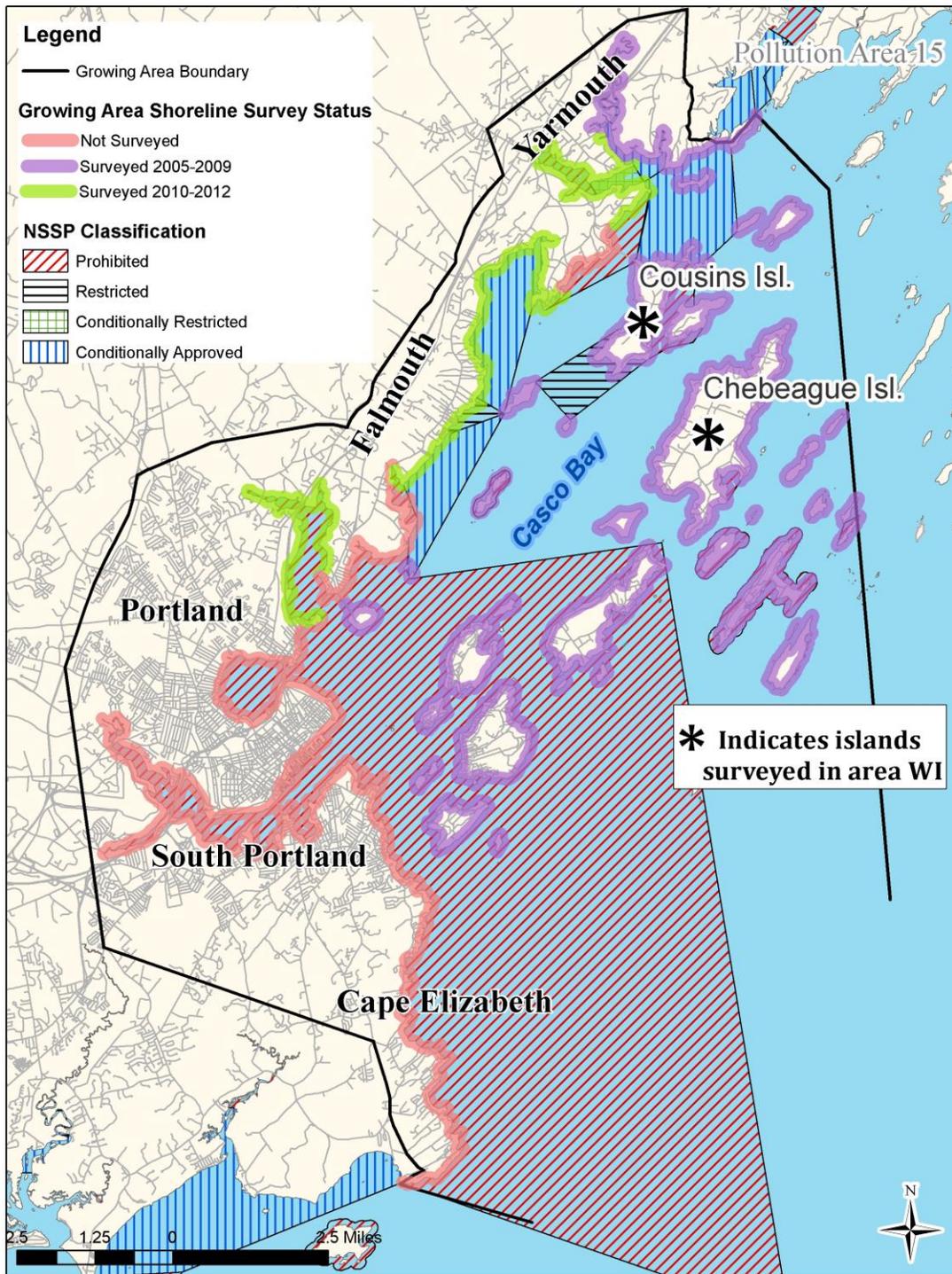


Figure 6. Growing Area WI with highlighted coastal areas demonstrating status of shoreline survey. *Note: all islands were not surveyed, Islands surveyed over the period of this sanitary survey are highlighted.



Executive Summary

This is a sanitary survey report for growing area WI written in compliance with the requirements of the 2011 Model Ordinance and the National Shellfish Sanitation Program. This sanitary survey report reviews shoreline survey information which was compiled during the 2004, 2005, 2007, 2009, 2010, and 2012 surveys of the growing area.

In 2006, growing area WI was restructured. The Spurwink River area of the town of Scarborough was placed into its own growing area and the towns of Cape Elizabeth, South Portland, Portland, Falmouth, Cumberland, Yarmouth, and the surrounding islands were reorganized into pollution areas 13 and 14 within the current growing area boundaries.

Growing area WI includes the rocky coast of Cape Elizabeth, all of Portland Harbor, narrow beaches along the Falmouth and Cumberland shore, the Cousins and Royal Rivers in Yarmouth and Freeport, and numerous islands in Casco Bay including, but not limited to, Great Chebeague Island, Cousins Island, Littlejohn Island and Long Island (Figure 1).

The major sources of pollution in Growing Area WI include the Cape Elizabeth, South Portland, Portland, Peaks Island and Falmouth Wastewater Treatment Plants (WWTP), and combined sewer overflows (CSOs) in Portland, South Portland and Cape Elizabeth which are located in the large prohibited area around Portland Harbor. There is also the Yarmouth WWTP in the Royal River and the Sea Meadows Community WWTP on the east side of Cousins Island. There are 78 active licensed overboard discharges (OBDs) in Growing Area WI and 77 National Pollution Discharge Elimination System (NPDES) permits in the growing area, all of which are located in prohibited areas. There are 14 marina facilities in the growing area all of which are either located in prohibited areas or have seasonal closures.

Shoreline surveys were conducted in the growing area during the following years: 2004, 2005, 2007, 2009, 2010, and 2012. Cape Elizabeth, Portland, and South Portland lie within a large prohibited area and do not have current surveys. The open approved and conditionally approved areas of Cousins Island in Yarmouth were surveyed in 2007. Great Chebeague Island was surveyed in 2009. The conditionally approved areas of Falmouth and Cumberland were surveyed in 2010. The Cousins River area of Yarmouth was surveyed in 2012. A total of 16 actual or potential pollution sources were identified over the course of these surveys. A shoreline survey of the lower Presumpscot River was completed in 2012 in anticipation of a possible depuration operation in the river.

Two stations were created in Growing Area WI in 2012, five stations were reactivated, and seven stations were reclassified. On 2/3/12 stations WI 19, 20, and 21 were reactivated in Mussel Cove (Falmouth) to investigate a possible upgrade. On 7/16/12 stations WI 48 and 55.5 were reclassified as conditionally restricted to reflect previous classification changes. On 9/9/12 stations WI 53, 54, 55, 55.2, and 55.5 were reclassified to conditionally approved based on proper functioning of the Yarmouth WWTP and rainfall. On 11/21/12 stations WI 10.3, 10.7, and 10.8 were reactivated in the Presumpscot River (Portland/Falmouth) to investigate the possibility of future depuration activities.

Current Classification(s)

The following legal notices describe the shellfish classification boundaries in Shellfish Growing Area WI and can be found on the DMR website at: http://www.maine.gov/dmr/rm/public_health/closures/closedarea.htm#

- Area No. 13 Western Casco Bay and Islands (Cape Elizabeth to Falmouth)
- Area No. 14 Royal River, Cousins River, and vicinity (Cumberland to Freeport)

Pollution Area Activity 2000-2012

Activity 2000:

No classification changes in 2000

Activity 2001:

No classification changes in 2001

Activity 2002:

No classification changes in 2002

Activity 2003:

No classification changes in 2003

Activity 2004:

No classification changes in 2004

Activity 2005:

No classification changes in 2005

Activity 2006:

November 6, 2006 - Area No. 14-A, Falmouth-Cumberland; Area No. 14, Portland – Falmouth Area; This new rule administratively combines the areas previously described in Closed Areas No. 14-A and 14 and places them in this legal notice; and, due to water quality, reclassifies the area near Stornoway Lane as Restricted.

November 6, 2006 - Area No. 16, Royal River and Cousins River, Yarmouth and Freeport; Area No. 16-C, Cousins and Littlejohn Islands, Yarmouth; This new rule administratively combines the areas previously described in Closed Areas No. 16 and 16-C and places them in this legal notice; AND due to water quality, reclassifies most of the waters of the Cousins River as Conditionally Restricted; and classifies a large area at the mouth of the Cousins River as Conditionally Approved, based on the proper functioning of the Yarmouth Wastewater Treatment Plant.

November 14, 2006 - Area No. 14-C, Town of Long Island, Cumberland and Cliff Island, Portland; Area No. 14-D, Great Chebeague Island and Bates Island, Cumberland; This new rule administratively combines the areas previously described in Closed Areas No. 14-C and 14-D and places them in legal notice 13-B.

Activity 2007:

April 19, 2007 - Area No. 14, Royal River, Cousins River, Cousins Is, Littlejohn Is (Yarmouth and Freeport), This new rule CLOSES the conditionally restricted area in the Cousins River and conditionally approved area outside the Cousins and Royal Rivers due to a malfunction at the Yarmouth Wastewater Treatment Plant.

May 17, 2007 - Area No. 14, Royal River, Cousins River, Cousins Is, Littlejohn Is (Yarmouth and Freeport), This new rule reopens and enlarges the conditionally restricted area in the Cousins River, and reopens and reduces the conditionally approved area outside the Cousins and Royal Rivers. It also reclassifies a portion of the public beach area on Cousins Island, east of the causeway, as conditionally restricted due to non-point pollution.

August 15, 2007 - Area No. 14, Royal River, Cousins River, Cousins Is, Littlejohn Is (Yarmouth and Freeport), This new rule reclassifies Broad Cove, Yarmouth and Cumberland, and the shore northeast of Prince Point in Yarmouth as restricted due to non-point pollution. It also enlarges the prohibited area around the Sea Meadows outfall on Cousins Island due to failing water quality.

August 16, 2007 - Area No. 13-B, Great Chebeague, Bates, Long and Cliff Islands (Cumberland, Long Island, Portland), this new rule closes all of the Long Island shore.

Activity 2008:

February 14, 2008 - Area No. 14, Cumberland and Yarmouth Mainland, Royal River, Cousins River, Cousins Is, Littlejohn Is (Cumberland, Yarmouth and Freeport), amended on August 15, 2007. This amendment closes Broad Cove, and the Yarmouth conditional areas due to a sewage bypass.

February 29, 2008 - Area No. 14, Cumberland and Yarmouth Mainland, Royal River, Cousins River, Cousins Is, Littlejohn Is (Cumberland, Yarmouth and Freeport), amended on February 14, 2008. This amendment returns the Broad Cove restricted area to the open status for depuration and relay; and returns the Yarmouth conditional areas to the open status.

March 7, 2008 - Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland), amended on November 6, 2006. This amendment reclassifies the restricted area of Mussel Cove, Falmouth, to prohibited for shellfish harvesting; it also defines the closure line in Part B, across Mussel Cove, which was left out of the description for the conditional area.

March 19, 2008 - Area No. 14, Cumberland and Yarmouth Mainland, Royal River, Cousins River, Cousins Is, Littlejohn Is (Cumberland, Yarmouth and Freeport), amended on February 29, 2008. This amendment reclassifies Broad Cove, Cumberland and Yarmouth, from restricted to approved for shellfish harvesting.

June 6, 2008 - Area No. 14, Cumberland and Yarmouth Mainland, Royal River, Cousins River, Cousins Is, Littlejohn Is (Cumberland, Yarmouth and Freeport), amended on March 19, 2008. This amendment changes the title of the rule, and reclassifies Whites Cove (Yarmouth) from conditionally approved, to conditionally restricted for shellfish harvesting, due to poor water quality.

August 14, 2008 - Area No. 14, Royal River, Cousins River, and vicinity (Cumberland to Freeport), amended on June 6, 2008. This amendment closes the conditionally restricted and conditionally approved areas in the Royal River, Cousins River, and vicinity due to a sewage bypass after heavy rainfall.

August 27, 2008 - Area No. 14, Royal River, Cousins River, and vicinity (Cumberland to Freeport), amended on August 8, 2008. This amendment opens the conditionally restricted and conditionally approved areas in the Royal River, Cousins River, and vicinity.

November 14, 2008 - Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland), amended on March 7, 2008. This amendment moves the boundary line between the seasonal conditional area and the restricted area, and therefore increases the size of the restricted area.

December 31, 2008 - Area No. 14, Royal River, Cousins River, and vicinity (Cumberland to Freeport), amended on August 27, 2008. This amendment creates a larger restricted area because water quality exceeds approved standards due to point (stormwater drains, industrial outfalls) and non-point pollution (storm drains, cows, horses).

December 31, 2008 - Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland), amended on November 14, 2008. This amendment moves the restricted area in A. 1. to Area No. 14 because it is part of a new larger restricted area due to non-point source pollution and point source pollution.

Activity 2009:

January 21, 2009 - Area No. 13-A, Portland Area (Cape Elizabeth to Falmouth), This amendment reclassifies an area in Falmouth from “Conditionally Approved” and “Approved” to “Prohibited,” due to lack of a recent shoreline survey.

January 22, 2009 - Area No. 13-B, Great Chebeague, Bates, Long and Cliff Islands (Cumberland, Long Island, Portland), This amendment changes the title of the rule, and reclassifies Hope Island and most of Great Chebeague Island from “Approved” to “Prohibited,” due to lack of a recent shoreline survey.

May 12, 2009 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reclassifies the southeastern shore of Cousins Island and the southwestern shore of Littlejohn Island as prohibited due to a malfunctioning septic system on the Cousins Island shore. It also reclassifies, combines and enlarges the conditionally restricted area north and west of the Cousins Island bridge on the Yarmouth shore and the Sandy Point area on Cousins Island as prohibited due to one malfunctioning septic system and one straight pipe on the Yarmouth shore and dog feces on the beach at Sandy Point along with a malfunctioning septic system along that shore. This amendment also reclassifies a portion of the Princes Point area of Yarmouth from restricted to prohibited due to a malfunctioning septic system.

May 21, 2009 - Area No. 13-B, Western Casco Bay (Long Island to Chebeague Island), This amendment re-opens the Back Shore, a portion of Hamilton Beach, and a portion of Chandler Cove, Chebeague Island, due to a recent update in sanitary survey status.

May 27, 2009 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reclassifies that portion of the Cousins River and Pratt’s Brook (Yarmouth, Freeport) north of U.S. Route 1, from conditionally restricted to prohibited, due to the presence of a malfunctioning septic system.

October 1, 2009 - Area No. 13-B, Western Casco Bay (Long Island to Chebeague Island), This amendment reclassifies the Eastern Shore of Chebeague Island from prohibited to approved due to the completion of a shoreline survey. All existing pollution and red tide/psp closures remain in effect.

October 27, 2009 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment closes a portion of the Cousins River conditionally restricted area, due to a gasoline spill.

November 13, 2009 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reopens a portion of the Cousins River conditionally restricted area post gasoline spill due to shellfish passing the fuel spill test criteria.

Activity 2010:

June 7, 2010 - Area No. 13-B, Western Casco Bay (Long Island to Chebeague Island), This amendment reclassifies Johnson Cove, locally known as the Cricks, to prohibited, due to the presence of a septic system malfunction.

September 9, 2010 - Area No. 13-B, Western Casco Bay (Long Island to Chebeague Island), This repeal is an administrative change and all the growing area classifications from this rule are now found in a new rule, Area No. 13 Western Casco Bay and Islands (Cape Elizabeth to Falmouth).

September 9, 2010 - Area No. 13-A, Portland Area (Cape Elizabeth to Falmouth), This repeal is an administrative change and all the growing area classifications from this rule are now found in a new rule, Area No. 13 Western Casco Bay and Islands (Cape Elizabeth to Falmouth).

September 9, 2010 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), This new rule consolidates Area No 13-A, Portland Area (Cape Elizabeth to Falmouth) and Area No 13-B, Western Casco Bay (Long Island to Chebeague Island), into one regulation, Area No 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth). This new rule also enlarges the existing prohibited area in Western Casco Bay, due to the presence of wastewater treatment plants in the western Casco Bay region in order to provide an adequate dilution area to protect public health.

September 28, 2010 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reopens the cove in Yarmouth between Sunset Point and Princes Point due to a completed review of potential pollution sources in the area and water quality meeting approved standards and reopens Potato Cove (Yarmouth) due to the remediation of known pollution sources and water quality returning to approved standards.

October 11, 2010 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment closes the conditionally restricted and conditionally approved areas in the Cousins and Royal Rivers and vicinity due to sewage line rupture in the area.

October 13, 2010 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reopens the conditionally approved area in Casco Bay at the mouth of the Cousins and Royal Rivers due to a review of the Yarmouth WWTP discharge incident report for the amount of sewage spilled due to the ruptured sewer line. The conditionally restricted area in the Cousins River remains closed.

October 29, 2010 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reopens the conditionally restricted area in the Cousins River due to water quality returning to restricted standards 14 days after the sewer force main pipe break. All existing pollution and red tide/psp closures remain in effect.

December 20, 2010 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), This amendment reclassifies the Falmouth shoreline from prohibited to conditionally approved due to an updated shoreline survey and water quality meeting the approved standard during the open status of November 15 – April 30.

December 20, 2010 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reclassifies Broad Cove (Cumberland) from restricted to conditionally approved with an open status from November 1 to May 31 due to a recent shoreline survey and water quality meeting the approved standard during the open status.

Activity 2011:

January 27, 2011 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), This amendment closes a portion of the eastern shore of Great Chebeague Island, due to an oil spill caused by a boat fire.

March 23, 2011 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), This amendment creates an emergency closure in the Falmouth area due to a raw sewage spill which occurred on the evening of March 22, 2011.

March 28, 2011 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), This amendment removes the emergency closure that was in place on Chebeague Island, due to a boat fire and oil spill. It has been determined that there is no longer any risk to public health in that area.

April 13, 2011 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), This amendment repeals the emergency closure (Section C) following the raw sewage spill at the Falmouth WWTP. This amendment places the conditionally approved area surrounding the Falmouth shoreline (Section B) into CLOSED status, due to shellfish meat samples showing elevated fecal coliform scores, and not meeting the re-opening criteria following the raw sewage spill.

June 8, 2011 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), This amendment reclassifies a portion of the Royal River from "prohibited" to "conditionally restricted," for the purpose of a permitted pilot project for male specific coliphage (MSC) depuration.

November 14, 2011 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), This amendment reopens the conditionally approved area due to water quality meeting approved standards.

Activity 2012:

August 31, 2012 - Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth): This notice reclassifies Chandler Cove, Great Chebeague Island from prohibited to approved due to removal of an OBD and updated shoreline survey.

September 9, 2012 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport): This change reclassifies a portion of the Cousins River from conditionally restricted to conditionally approved and will close when rainfall meets or exceeds 1 inch in twenty four hours, during any malfunction of the treatment plant or if flow rates exceed 2.5 MGD (million gallons/day) at the Yarmouth Pollution Control Waste Facility.

October 30, 2012 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport): This notice closes the rainfall conditional areas on the Cousins River due to greater than one inch of rainfall in a twenty-four hour period.

November 14, 2012 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport): This notice reopens the rainfall conditional area on the Cousins River due to water quality returning to approved standards.

December 18, 2012 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport): This notice closes the rainfall conditional areas on the Cousins River due to greater than one inch of rainfall in a twenty-four hour period.

December 22, 2012 - Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport): This notice resets the rainfall conditional area on the Cousins River, effective December 21st, due to greater than one inch of rainfall in a twenty-four hour period.

Sanitary and Shoreline Survey Activity 2000-2012

The approved and conditionally approved areas of growing area WI were surveyed over the years 2003- 2012. All of Falmouth and Cumberland were surveyed in 2010. Cousins Island was surveyed in 2003. All open approved and conditional portions of Cousins Island were again surveyed in 2007. The conditionally restricted portion of the Royal River (Yarmouth) was surveyed in 2004 and in 2012. The Cousins River (Yarmouth) was surveyed in 2012. Great Chebeague Island was surveyed in 2009. Table 2 lists all identified domestic pollution sources. All actual or potential pollution sources have been either remediated or classified prohibited.

OVERVIEW OF POLLUTION SOURCES

Tables 1 - 3 lists all new and pre-existing pollution sources in Growing Area WI that are considered discharges to the Growing Area that could affect water quality. Sources of pollution may include domestic or industrial waste, discharges from boats, run-off from manure piles in agricultural areas, streams that have consistently elevated scores or anything else that could cause impairment of the waters of the growing area. Pollution sources are categorized in the database as a problem with a Y (yes) or N (no). Each pollution source is given an impact rating which advises whether the pollution source is an actual or potential pollution source with a direct or indirect discharge to the shore. All of the domestic pollution sources have been reported to the local plumbing inspector. Pollution sources noted on Tables 1 through 3 are shown in Figures 1 thru 3. The column labeled GASS ID represents the new growing area shoreline survey (GASS) identification code that shows which two mile segment in the growing area the pollution source is located in. Pollution sources with a GASS ID of NA (not applicable) are located on islands and as of 12/31/2012 have yet to be assigned a two mile segment.

Federally Permitted Discharges: There 77 National Pollution Discharge Elimination System (NPDES) permits in growing area WI. The permits consist of a combination of Marina operations, waste water treatment plant operations, a power station, and industrial operations (see Table 1 and Figures 2 and 3). All NPDES facilities are located in either prohibited or restricted areas.

Table 1. Area WI NPDES Permitted Discharges:

Pollution Area	GASS ID	Lic #	Type	Facility	Waterbody
13 A.1	WI022	ME0023205	OIL-WATER SEPARA	BATH IRON WORKS (PORTLAND)	PORTLAND HARBOR
13 A.1	WI022	ME0023205	NON-CONTACT COOL	BATH IRON WORKS (PORTLAND)	PORTLAND HARBOR
13 A.1	WI025	ME0001741	NON-CONTACT OUTF	BURNHAM AND MORRILL CO.	CASCO BAY
13 A.1	WI025	ME0001741	NON-CONTACT OUTF	BURNHAM AND MORRILL CO.	CASCO BAY

Pollution Area	GASS ID	Lic #	Type	Facility	Waterbody
13 A.1	WI003	ME0102121	TREATMENT PLANT	CAPE ELIZABETH WWTF	ATLANTIC OCEAN
13 A.1	WI006	ME0102075	CSO	CAPE ELIZABETH, TOWN OF	ATLANTIC OCEAN
13 A.1	WI011	ME0021571	SKIMMER OUTFALL	CLEAN HARBORS OF MAINE	FORE RIVER
13 A.1	WI029	ME0100218	TREATED OUTFALL	FALMOUTH WWTF	PRESUMPSCOT RIVER
14 B.2	NA	ME0000272	MAJOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
14 B.2	NA	ME0000272	MINOR OUTFALL	FPL ENERGY WYMAN STATION	CASCO BAY
13 A.1	WI018	ME0036943	MINOR OUTFALL	FRESH ATLANTIC USA	FORE RIVER
13 A.1	WI009	ME0022314	SEPARATOR OUTFAL	GULF OIL LIMITED PARTN	PORTLAND HARBOR
13 A.1	WI021	ME0023957		ISF TRADING COMPANY	PORTLAND HARBOR
13 A.1	WI018	ME0002372	SEPARATOR OUTFAL	KOCH MATERIALS CO.	FORE RIVER
13 A.1	NA	ME0023248		MCKINLEY PARTNERS LIMITED	HUSSEY SOUND
13 A.1	WI011	ME0000485	SEPARATOR OUTFAL	MOBIL PORTLAND TERMINAL	FORE RIVER
13 A.1	WI011	ME0001775	SEPARATOR OUTFAL	NORTHEAST PETROLEUM	BRABERRY CREEK

Pollution Area	GASS ID	Lic #	Type	Facility	Waterbody
13 A.1	NA	ME0102237	TREATMENT PLANT	PEAKS ISLAND, CITY OF	CASCO BAY
13 A.1	WI021	ME0101435	CSO	PORTLAND DPW	PORTLAND HARBOR
13 A.1	WI024	ME0101435	CSO	PORTLAND DPW	BACK COVE
13 A.1	WI020	ME0101435	CSO	PORTLAND DPW	PORTLAND HARBOR
13 A.1	WI024	ME0101435	CSO	PORTLAND DPW	BACK COVE
13 A.1	WI016	ME0101435	CSO	PORTLAND DPW	CAPISIC BROOK
13 A.1	WI023	ME0101435	CSO	PORTLAND DPW	BACK COVE
13 A.1	WI023	ME0101435	CSO	PORTLAND DPW	BACK COVE
13 A.1	WI023	ME0101435	CSO	PORTLAND DPW	BACK COVE
13 A.1	WI023	ME0101435	CSO	PORTLAND DPW	BACK COVE
13 A.1	WI022	ME0102075	CSO	PORTLAND WATER DISTRICT	CASCO BAY
13 A.1	WI023	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI015	ME0102075	CSO	PORTLAND WATER DISTRICT	STROUDWATER MARSH
13 A.1	WI024	ME0102075	CSO	PORTLAND WATER DISTRICT	FORE RIVER
13 A.1	WI024	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI023	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI022	ME0102075	TREATED OUTFALL	PORTLAND WATER DISTRICT	CASCO BAY
13 A.1	WI024	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI024	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI025	ME0102075	CSO	PORTLAND WATER DISTRICT	CASCO BAY
13 A.1	WI023	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI023	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI019	ME0102075	CSO	PORTLAND WATER DISTRICT	FORE RIVER
13 A.1	WI020	ME0102075	CSO	PORTLAND WATER DISTRICT	FORE RIVER
13 A.1	WI023	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI020	ME0102075	CSO	PORTLAND WATER DISTRICT	FORE RIVER

Pollution Area	GASS ID	Lic #	Type	Facility	Waterbody
13 A.1	WI021	ME0102075	CSO	PORTLAND WATER DISTRICT	PORTLAND HARBOR
13 A.1	WI025	ME0102075	CSO	PORTLAND WATER DISTRICT	CASCO BAY
13 A.1	WI019	ME0102075	CSO	PORTLAND WATER DISTRICT	FORE RIVER
13 A.1	WI022	ME0102075	CSO	PORTLAND WATER DISTRICT	CASCO BAY
13 A.1	WI021	ME0102075	CSO	PORTLAND WATER DISTRICT	PORTLAND HARBOR
13 A.1	WI023	ME0102075	CSO	PORTLAND WATER DISTRICT	BACK COVE
13 A.1	WI019	ME0102075	CSO	PORTLAND WATER DISTRICT	FORE RIVER
13 A.1	WI020	ME0102075	CSO	PORTLAND WATER DISTRICT	FORE RIVER
13 A.1	WI024	ME0102075	CSO	PORTLAND WATER DISTRICT	CASCO BAY
13 A.1	WI008	ME0100633	CSO	SOUTH PORTLAND WPCF	PORTLAND HARBOR
13 A.1	WI011	ME0100633	CSO	SOUTH PORTLAND WPCF	FORE RIVER
13 A.1	WI008	ME0100633	CSO	SOUTH PORTLAND WPCF	PORTLAND HARBOR
13 A.1	WI013	ME0100633	CSO	SOUTH PORTLAND WPCF	LONG CREEK
13 A.1	WI011	ME0100633	TREATED OUTFALL	SOUTH PORTLAND WPCF	FORE RIVER CHANNEL
13 A.1	WI008	ME0100633	CSO	SOUTH PORTLAND WPCF	PORTLAND HARBOR
13 A.1	WI011	ME0100633	CSO	SOUTH PORTLAND WPCF	FORE RIVER CHANNEL
13 A.1	WI011	ME0100633	CSO	SOUTH PORTLAND WPCF	FORE RIVER
13 A.1	WI007		CSO	SOUTHERN MAINE TECHNICAL	CASCO BAY
13 A.1	WI012	ME0021016	OLD GETTY	SPRAGUE ENERGY	FORE RIVER
13 A.1	WI012	ME0001821	TANK FARM	SPRAGUE ENERGY CORP	ROLLING MILLS BROOK
13 A.1	WI012	ME0001821	TREATED OUTFALL	SPRAGUE ENERGY CORP.	FORE RIVER
13 A.1	WI011	ME0002291	SEPARATOR OUTFAL	STAR ENTERPRISE	FORE RIVER
14 A.2	WI040	ME0100765	TREATMENT PLANT	YARMOUTH WWTP	ROYAL RIVER ESTUARY
14 A.4	NA	ME0023299	TREATED OUTFALL	YARMOUTH, SEA MEADOW	SEA MEADOWS

Residential Domestic Waste: Shellfish Growing Area WI has a total of 49 two mile segments as well as two additional segments it shares with bordering growing areas. Each segment has its' own growing area shoreline survey (GASS) ID number and pollution sources are identified by the two mile segment that the source was found on. As each growing area's survey is updated, each property will have their septic system's coordinates entered into the new Public Health Division shoreline survey database which will then have the ability to show each property on a GIS map along with the specifics of the property's waste disposal. Growing area WI includes portions of the towns of Cape Elizabeth, South Portland, Portland, Falmouth, Cumberland, Yarmouth, and Freeport, as well as several off shore island communities. Each of these towns have their own licensed plumbing inspectors (LPI).

Table 2. Area WI Shoreline Survey Identified Pollution Sources:

Town	GASS ID	Source	Survey Date	Impact	Action Taken
Chebeague Island	WI052	Septic	October 8, 2009	Potential Indirect	Remediated
Chebeague Island	WI052	Unknown	October 8, 2009	Actual Indirect	Remediated
Chebeague Island	WI052	Septic	May 20, 2009	Potential Indirect	Remediated
Cumberland	WI052	Straight Pipe	September 11, 1997	Actual Direct	Closure
Long Island	WI052	Straight Pipe	July 14, 2006	Actual Direct	Closure
Long Island	WI052	Straight Pipe	July 14, 2006	Actual Direct	Closure
Long Island	WI052	Septic	July 20, 2005	Actual Direct	Closure
Long Island	WI052	Septic	July 14, 2006	Actual Direct	Closure
Long Island	WI052	Gray Water	July 14, 2006	Actual Direct	Closure
Long Island	WI052	Gray Water	July 28, 2006	Actual Direct	Closure
Long Island	WI052	GW	October 7, 2005	Actual Direct	Closure
Long Island	WI052	Straight Pipe	July 28, 2006	Actual Direct	Closure
Long Island	WI052	Straight Pipe	July 28, 2006	Actual Direct	Closure
Yarmouth	WI038	Leach Field	May 18, 2009	Actual Direct	Remediated
Yarmouth	WI038	Drain	September 11, 2007	Potential Indirect	Remediated
Yarmouth	WI036	Septic	July 7, 2004	Actual Direct	Remediated

Licensed Overboard Discharges: There are a total of 78 active licensed overboard discharges in growing area WI. 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 properties 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.

All overboard discharge systems include a process to clarify the wastewater and disinfect it prior to discharge. There are two general types of treatment systems; mechanical package plants and sand filters. OBDs are licensed and inspected by the Maine Department of Environmental Protection (DEP). At each inspection, DEP looks for tags on each treatment unit identifying the service contractor and the last date of service. If an OBD is not properly maintained, or if the OBD malfunctions, it has the potential to directly discharge untreated wastewater to the shore; therefore, preventative closures are implemented surrounding every

OBD located in the growing area. The size of each closure is determined based on a dilution calculation, using on the permitted flow rate of the OBD, and the depth of the receiving water that each OBD discharges to; the fecal concentration used for this dilution calculation is 1.4X10⁵ fc/100 ml. All closures are of adequate size to protect public health. Seven OBDs were removed during the review period.

Table 3. Area WI Active Licensed Overboard Discharges:

Pollution Area	OBD ID	GASS ID	Location	Receiving Waterbody	Flow (gpd)	Acres Needed for Closure	Current Prohibited Acreage
13A.1	1474	WI004	Cape Elizabeth	Casco Bay	300	1.92	17,438
13A.1	3157	WI005	Cape Elizabeth	Casco Bay	500	3.2	
13A.1	3381	WI026	Falmouth	Presumpscot River	420	2.58	
13A.1	2314	NA	Great Diamond Island	Casco Bay	900	5.64	
13A.1	6931	NA	Great Diamond Island	Casco Bay	35,000	219.22	
13A.1	7028	NA	Long Island	Casco Bay	300	1.88	
13A.1	2385	NA	Long Island	Casco Bay	360	2.25	
13A.1	7963	NA	Long Island	Casco Bay	375	2.35	
13A.1	7773	NA	Long Island	Casco Bay	1500	9.4	
TOTAL						248.44	
13 A.4	4666	NA	Cliff Island	Casco Bay	315	1.97	769
13 A.4	2912	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	1891	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	1890	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	2934	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	3518	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	8120	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	1117	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	1116	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	3176	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	1435	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	7890	NA	Cliff Island	Casco Bay	180	1.13	
13 A.4	7897	NA	Cliff Island	Casco Bay	450	2.82	
13 A.4	1892	NA	Cliff Island	Casco Bay	500	3.13	
13 A.4	2463	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	2367	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	8041	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	8040	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	3215	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	6405	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	7860	NA	Cliff Island	Casco Bay	450	2.82	
13 A.4	7733	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	3746	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	4529	NA	Cliff Island	Casco Bay	300	1.88	
13 A.4	8203	NA	Cliff Island	Casco Bay	300	1.88	

Pollution Area	OBD ID	GASS ID	Location	Receiving Waterbody	Flow (gpd)	Acres Needed	Current Prohibited	
13 A.4	3197	NA	Cliff Island	Casco Bay	300	1.88	769	
13 A.4	8047	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	2125	NA	Cliff Island	Casco Bay	200	1.25		
13 A.4	3205	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3207	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3148	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3178	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3301	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3200	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	6728	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3196	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	1386	NA	Cliff Island	Casco Bay	50	0.031		
13 A.4	3949	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	5191	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	7704	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	2098	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3177	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	1976	NA	Cliff Island	Casco Bay	1300	8.14		
13 A.4	3059	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	4098	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	2053	NA	Cliff Island	Casco Bay	200	1.25		
13 A.4	3967	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3210	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	8032	NA	Cliff Island	Casco Bay	200	1.25		
13 A.4	7981	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3194	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	1975	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	1303	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	7692	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	3629	NA	Cliff Island	Casco Bay	400	2.51		
13 A.4	7899	NA	Cliff Island	Casco Bay	300	1.88		
13 A.4	4048	NA	Cliff Island	Casco Bay	300	1.88		
TOTAL						112.781		769
14 A.4	1295	NA	Littlejohn Island	Casco Bay	400	2.56		77.95
14 A.4	2555	NA	Littlejohn Island	Casco Bay	300	1.92		
14 A.4	339	NA	Littlejohn Island	Casco Bay	450	2.88		
14 A.4	988	NA	Littlejohn Island	Casco Bay	300	1.92		
14 A.4	1307	NA	Littlejohn Island	Casco Bay	360	2.3		
14 A.4	6812	NA	Littlejohn Island	Casco Bay	300	1.92		
14 A.4	3892	NA	Littlejohn Island	Casco Bay	300	1.92		
14 A.4	7389	NA	Littlejohn Island	Casco Bay	300	1.92		
14 A.4	7388	NA	Littlejohn Island	Casco Bay	300	1.92		
14 A.4	3000	NA	Littlejohn Island	Casco Bay	300	1.92		
14 A.4	1447	NA	Littlejohn Island	Casco Bay	300	1.92		
TOTAL						23.1	77.95	
14 A.1	6128	WI045	Yarmouth	Cousins River	300	1.88	28	

Municipal Waste Water Treatment Plant, Lift/Pump Stations and Combined Sewer Overflow

The Department of Environmental Protection (DEP) is responsible for monitoring municipal waste discharges in the state of Maine. Growing Area WI has seven municipal waste water treatment plants.

Portland WWTP: The Portland WWTP was last reviewed on September 25, 2012. This secondary treatment plant has a design flow of 19.8 million gallons a day (mgd), an average daily flow of 17.82 mgd and a peak wet weather flow of 80 mgd (36.8 mgd thru secondary treatment; 43.2 mgd thru primary treatment). There are 33 combined sewer overflows (CSOs) and Portland (City and the Portland Water District) discharges 589.2 million gallons per year of untreated wastewater or 39% of the total State CSO volume. The plant has year round disinfection and an outfall pipe that has twin barrels extending to the outer side of Pomroy Rock, and then bending 90 degrees to a diffuser assembly. The end of the outfall is in 13 feet of water at low tide. The prohibited area is 17,437.64 acres in size. Details about the plant review can be found in the central files.

South Portland WWTP: The South Portland WWTP was last reviewed on April 13, 2012. This is a secondary treatment plant with a design flow of 9.3 mgd, an average daily flow of 6.5 mgd and a peak wet weather flow of 22.9 mgd. This plant has five CSOs and So. Portland discharges 15.7 million gallons per year of untreated wastewater or 1% of the total State CSO volume. The plant seasonally disinfects from May through September and discharges into the Fore River. The outfall pipe is 54 inches in diameter, open ended and has about 4.5 feet of water over it at low tide. The prohibited area is 17,437.64 acres in size. Details about the plant review can be found in the central files.

Cape Elizabeth WWTP: The Cape Elizabeth WWTP was last reviewed on July 10, 2012. This is a secondary treatment plant operated by the Portland Water District. The design flow is 0.52 mgd with an average daily flow of 0.31 mgd and a peak wet weather flow of 1.58 mgd. There is only seasonal disinfection from May 15 through September 30 and the outfall is located in Peabbles Cove in 4.65 feet of water at low tide. There is also another sewage system in the northern part of the Cape Elizabeth that pumps sewage to the South Portland WWTP. This "Cape South" system has one CSO. The prohibited area is 17,437.64 acres in size. Details about the plant review can be found in the central files.

Falmouth WWTP: The Falmouth Wastewater Treatment Plant was last reviewed on March 28, 2012. This plant is located in the Presumpscot River, in the large prohibited area around Portland Harbor. A hydrographic study indicated that flow from the Falmouth WWTP ebbs out of the Presumpscot River and may partially flow into the Mackworth Cove area through the causeway bridge before being diluted 1000:1. The prohibited area is 17,437.64 acres in size. Details about the plant review can be found in the central files.

Peaks Island WWTP (managed by the Portland Water District): The Peaks Island Wastewater Treatment Plant was last reviewed on February 2, 2012. This is a secondary treatment plant operated by the Portland Water District. The design flow is 0.2 mgd with an average daily flow of 0.20 mgd. There is only seasonal disinfection from May 15 through September 30 and the outfall is located in Casco Bay off the southwest shore of the island north of Brackett Point in 45 feet of water at MLW. There are no CSOs associated with this facility and they do not accept any septage. There are three pump stations on the island. The prohibited area is 17,437.64 acres in size.

Yarmouth WWTP: The town of Yarmouth has 30 pump stations and nearly 40 miles of gravity sewers. The Yarmouth Wastewater Treatment Plant was last reviewed on May 14, 2012. This plant is located in the middle of the Royal River, the upper portion of the Royal River is classified prohibited and the prohibited area is 120 acres. The lower portion of the Royal River is classified as conditionally restricted and the conditionally restricted area is 112 acres. The Royal River converges with the Cousins River at the mouths of both rivers. The convergence and all of the Cousins River and a large area outside the rivers is classified conditionally approved based on the proper functioning of the Yarmouth WWTP. A hydrographic study determined the size of the prohibited and conditional areas.

A hydrographic dye study of effluent from the Yarmouth WWTP facility was first conducted in 2002 and then again on May 24-26, 2010 by the FDA in cooperation with DMR. The study assessed the dilution, time of travel, and dispersion of effluent in the Royal River and Cousins River. Five cages filled with oysters were deployed at various locations (stations) along the anticipated path of the effluent to correlate the dye concentrations found at the cages with the bacterial indicator and viral findings in the oysters. The final report can be found in the DMR central files.

Additionally, the FDA conducted a follow up to the 2010 study in April of 2012. The main objective of the additional study was to conduct a shoreline survey to identify potential sources of fecal contamination other than the WWTP outfall. This study coincided with a major rain event resulting in flows of 3.5 MGD. The findings from this additional effort will be included in an addendum to the 2010 report, but this has not been provided to DMR as of August 2012. Preliminary results that were provided suggest that in wet weather conditions the WWTP is the main source of MSC (an indicator for Norovirus) and although sewage is still treated in high flow conditions the primary and secondary treatment is not fully obtained. "As the Yarmouth WWTP flow rates begin to exceed the design capacity (1.31 MGD) the quality of treatment degrades" (pers. com. Gregory Goblick, FDA)

Sea Meadows WWTP: The Town of Yarmouth Sea Meadows Wastewater Treatment Plant is located on the east side of Cousins Island. It is a secondary treatment plant. The monthly average flow is 0.028 mgd. Effluent is discharged for up to two hours per day on the outgoing high tide. The outfall is in approximately four feet average depth. There are no CSOs associated with this facility. The prohibited area is approximately 270 acres.

Treatment Plant Pollution Areas: *Pollution areas 13 A.1, 14 A.2, 14 A.3, and 14 A.4 are associated with WWTP facilities.*

STORMWATER

Storm water runoff is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated (US EPA 2009). Thus, storm water pollution is caused by the daily activities of people within the watershed. Currently, polluted storm water is the largest source of water quality problems in the United States.

In 2008 the town of Falmouth prepared a comprehensive storm water management plan. The plan identifies Mill Creek and Casco Bay Foreside as its highest priority watersheds. In 2008 the Town of Cumberland prepared a comprehensive stormwater management plan. Their plan identifies the east branch of the Piscataqua River and coastal drainage as its highest priority watersheds. The towns of Cape Elizabeth, South Portland, Portland, Falmouth, Cumberland, and Yarmouth are part of a larger Interlocal Stormwater Workgroup (ISWG) working to address stormwater issues at a regional level. The ISWG is overseen by the Cumberland County Soil and Water District.

Storm-water Pollution Areas: *There are no storm-water system pollution areas in area WI.*

NON-POINT SOURCE POLLUTION

Non-point source (NPS) pollution is water pollution affecting a water body from diffuse sources, such as polluted runoff from agricultural areas draining into a river, or wind-borne debris blowing out to sea. Nonpoint source pollution can be contrasted with point source pollution, where discharges occur to a body of water at a single location, such as discharges from a chemical factory, urban runoff from a roadway storm drain or from ships at sea. NPS may derive from many different sources with no specific solution to rectify the problem, making it difficult to regulate.

The upper portion of the Cousins River is classified as prohibited (14 A.1) due to potential impact from non-point source pollution. Broad Cove in Cumberland and Falmouth (14 F) is conditionally approved on season to an increase in non-point source pollution during the summer months. Broad Cove is closed from June 1st to October 31st.

Streams and Drainages: Streams and tidal creeks are a source of fresh water to the WI growing area, and carry stormwater, snowmelt and groundwater into the estuary system. Waste, including that containing fecal matter, which is deposited on land, may be washed into streams and tidal creeks and transported to shellfish growing areas, contributing to elevated fecal counts in waters that are filtered by shellfish.

Stream samples have been collected in WI throughout the 2000 to 2012 review period. Sample records prior to 2007 only have anecdotal location information and therefore cannot be used in identifying specific pollution sources. 2007 was the first year that streams in growing area WI were sampled with corresponding location information (Table 4) as part of the annual survey review and the results obtained from stream samples in 2007 were used as a preliminary baseline assessment. Only streams that were easily accessible and flowing on the day of the survey were sampled and streams were located throughout the growing area. DMR collected stream samples from various sites on various dates from June 2008 through December 2010 (Table 4) in growing area WI (Figures 2 and 3). Streams were again sampled in 2012 as part of a larger effort by DMR to assess freshwater impact on growing areas.

Stream Pollution Areas: There are no pollution areas associated with streams in WI.

Table 4. Area WI Stream

Town	Polution Area	Stream ID	Gass ID	Date	Score	
Yarmouth	14 B.3	S40WI051.00	WI045	6/5/07	1260	
	14 B.3	S30WI051.00			1700	
	14 B.4	S20WI055.20	WI048		1060	
	14 B.3	S20WI051.00	WI045		1486	
	14 B.3	S10WI051.00			1700	
	14 B.4	S10WI055.20	WI048		320	
	14 B.4	S20WI055.20		86		
	14 B.3	S20WI051.00	WI045	6/24/07	33	
	14 B.3	S30WI051.00			38	
	14 B.3	S40WI051.00			2	
	14 B.3	S10WI051.00			18	
	14 B.4	S10WI055.20			WI048	8
	14 B.3	S40WI051.00			WI045	7/15/07
	14 B.3	S10WI051.00	140			
	14 B.3	S30WI051.00	120			
	14 B.4	S20WI055.20	WI048	400		
	14 B.4	S10WI055.20		38		
	14 B.3	S20WI051.00	WI045	121		
Falmouth	14 B.1	2	WI032	9/11/07	400	
	14 B.1	1			8	
	14 B.1	3	WI034		15	

Town	Polution Area	Stream ID	Gass ID	Date	Score
Cumberland	14 F	5	WI035		>1600
	14 F	6			>1600
	14 F	7			>1600
	14 F	8			>1600
Yarmouth	14 F	9	WI036		>1600
	14 F	11	WI037		>1600
	14 A.3	12	WI038		>1600
	14 E	13	NA		>1600
Falmouth	13 A.2	3	WI034	9/17/07	340
Cumberland	14 F	6	WI035		200
Yarmouth	14 E	13	NA		>1600
Chebeauge Island	13 A.6	S1WI092.00		6/8/08	27
	13 A.6	S2WI092.00		2	
Yarmouth	14 B.3	S40WI051.00	WI045	4/8/09	2
	14 B.3	S20WI051.00			14
	14 B.3	S30WI051.00			12
	14 B.4	S10WI055.20	WI048		5.5
	14 B.4	S20WI055.20			9.1
	14 B.3	S10WI051.00	WI045		6
Cumberland	14 F	S10WI033.00	WI036	6/15/09	320
Yarmouth	14 E	S10WI058.50	NA		1700
Cumberland	14 F	S10WI030.00	WI035	6/15/09	160
	14 F	S10WI030.00			4/6/10
	14 F	S10WI030.00		6/8/10	420
	14 F	S10WI030.00		6/28/10	1700
	14 F	S10WI030.00		7/14/10	1480
	14 F	S10WI030.00		8/11/10	580
	14 F	S10WI030.00		8/17/10	1020
	14 F	S10WI030.00		9/8/10	92
Yarmouth	14 B.3	S20WI051.00	WI045	6/5/12	900
	14 B.3	S10WI051.00			620
	14 B.3	S30WI051.00			260
	14 A.4	S10WI064.00	NA	10/2/12	500
Cumberland	14 F	S20WI030.00	WI035		68
Yarmouth	14 B.3	S10WI052.00	WI044		400
	14 B.4	S10WI055.20	WI048		320
Cumberland	14 B.3	S10WI033.00	WI036		120
Yarmouth	14 B.3	S10WI051.00	WI045		460
Cumberland	14 F	S10WI033.00	WI036		120
Yarmouth	14 B.3	S10WI051.00	WI045		460

Town	Polution Area	Stream ID	Gass ID	Date	Score
	14 B.4	S10WI055.20	WI048		320
Cumberland	14 F	S20WI030.00	WI035	10/31/12	90
	14 F	S10WI033.00	WI036		95
	14 F	S10WI030.00	WI035		108

SEASONAL AREAS, MARINAS AND MOORING FIELDS

Seasonal activity in growing area WI is limited to marinas along the Falmouth and Cumberland coastal zones and the seasonal increase in water quality scores in pollution area 14 F. A seasonal closure accounts for these two areas.

Falmouth Foreside: Interviews with the Falmouth Harbormaster on December 21, 2010, there are 1114 boat moorings, 60 owned by Handy Boatyard, and all are managed by the harbormaster. There are no slips at Falmouth Foreside. About 703, or 63%, of the boats have heads and have the capacity to discharge fecal waste into Maine waters. The peak season for usage is May to October; the area is classified conditionally approved and only open from November 15 through April 30. The open season, in the conditionally approved area, is based on observations and interviews with marina operators and harbormasters. The marina calculation, which can be found in the central files, shows that 401 acres are needed to dilute the potential pollution from 623 boats with heads at mid tide. Assuming only 75% of the boats with heads will be used at any given time; the prohibited area needs to be 301 acres. The conditionally approved area is 1,232 acres. There is a free pump out facility at the town dock which goes directly to the town sewer, and there is also a pump out wagon at Handy Boatyard dock, which is emptied into a sewer pump station.

Royal River: On June 10, 2008, interviews were conducted with marina owners at Yarmouth Boatyard, Royal River Boatyard and Yankee Marina. These marinas are located at the head of the Royal River. The Yarmouth Boatyard has 135 slips and 54 boats, or 40%, have heads and are capable of discharging fecal waste into Maine waters. They have a portable pump out tank that empties into the town sewer. The Royal River Boatyard has 80 slips, and approximately 20 boats have heads. This marina has a pump out facility that is directly connected to the town sewer system. The Yankee Marina has 105 slips and 50 boats have heads. They also have a pump out facility that is directly connected to the town sewer. In addition to the marina slips, the town manages 66 moorings for small boats without heads.

The Army Corps of Engineers took over control of the river channel many years ago, keeping the channel dredged and maintaining navigational right of way. The marina areas and river channel are about 7-8 feet deep at dead low tide. The marina calculation, located in the central files, shows that 221 acres are needed to dilute potential pollution from the 124 boats with heads in the upper half of the tidal portion of the Royal River at mid tide. Assuming that only 75% of the boats will be used at any given time, the prohibited area around the boats should be 166 acres. The upper portion of the Royal River is classified prohibited due to the presence of the Yarmouth Wastewater Treatment Plant outfall and the prohibited area is 120 acres. The lower portion of the Royal River is classified as conditionally restricted and the conditionally restricted area is 112 acres.

Littlejohn Island: There is a small town landing on the east side of Littlejohn Island and moorings for residents to use. There are fewer than 10 boats with heads, and the area is classified approved, monitored by station WI 65.5.

Cousins Island: There is a small town landing on the west side of Cousins Island where the Chebeague Island passenger-only ferry docks. Small boats also use the dock for temporary tie up. There are no slips or on-shore facilities. This area is classified prohibited, monitored by station WI 69.

Chebeague Island: There are several moorings on the west side of Great Chebeague Island that are used for local fishing boats and small sailboats. The Chebeague Island Boatyard provides fuel, launching, storage, boat repair and painting services, and is in operation most of the year. There are fewer than 10 boats with heads and the area is classified approved, monitored by station WI 93.

Marina Pollution Areas: Area 13B is conditionally approved due to the presence of a marina is closed from May 1st to November 14th.

Seasonal Pollution Areas: Area 13B and 14 F are conditionally approved due to the presence of a marinas and a seasonal increase in fecal scores. 13 B is closed from May 1st to November 14th. 14F is closed from June 1st to October 31st.

INDUSTRIAL POLLUTION

The W. F. Wyman Energy Center owned by FPL Energy Wyman, LLC is located on the southern end of Cousins Island, Yarmouth. The Energy Center is comprised of four conventional oil fired steam generators and steam turbines. The power plant sits on 50 acres and is comprised of a power plant, an oil terminal, screen house, dock, six oil storage tanks with a capacity of 39 million gallons and other related piping facilities. Wyman is a peaking plant which means that it operates during high electricity demands in the region. The Maine Pollutant Discharge Elimination System (MEPDES) permit (#ME0000272 issued July 1, 2008, expires June 30, 2013) authorizes the discharge of a daily maximum of 530 mgd of cooling water and 7.4 mgd of treated miscellaneous process waste water into Casco Bay. Sanitary waste waters generated at the facility are disposed of via a subsurface waste disposal system. There are 12 outfalls (Figure 11) which are comprised of and permitted for the following:

Outfall #001: Circulating cooling waters from two generating units. The outfall consists of two side by side pipelines discharging water which has passed through the condensers of the two steam generators during normal operating conditions. The daily maximum discharge limit is 95 mgd with a monthly maximum of 90 mgd. The daily maximum temperature of the discharge must not exceed 105°F from June 1- August 31 and 90°F from September 1 – May 31.

Outfall #002: Intake screen wash. FPL Energy has installed marine booms in front of the intake pipes to prevent the plugging of the pipes from excess debris in the water. Debris does occasionally get past the boom and screen and pressurized seawater is used to remove the debris from the screen. The wash water is discharged through the boomed containment area. Periodically, the direction of the water flow in the intake pipe is reversed and flushed with warm water (118°F) for a 3-4 hour period to control mussel growth. The water discharges through the intake screens. The daily maximum discharge limit is 1.0 mgd with a monthly maximum of 5.0 mgd. There is a daily maximum temperature limit of 123°F for backwash water.

Outfall #003: Circulating cooling waters from two generating units. The discharge is similar to outfall #001 but services two other steam generators. The daily maximum discharge limit is 435 mgd with a monthly average limit of 300 mgd. The daily maximum temperature of the discharge must not exceed 110°F from June 1- August 31 and 90°F from September 1 – May 31.

Outfall #004: Treatment lagoons A & B (Contact Waste Waters). Municipal water is used for boiler make-up water and is used in the sanitary facilities throughout the plant. The monthly average and daily maximum discharge limits are 1.0 mgd and 7.4 mgd, respectively. There are oil and grease limits and daily maximum temperature of 105°F and whole effluent toxicity testing and specific chemical testing required. Waste waters discharged through this outfall consist of:

- a. Tank farm stormwater runoff and occasional blow down from steam generators,

- b. Ash transport system waters which utilizes sea water to transport fly ash and bottom ash from five boiler units to the waste water treatment ponds,
- c. Boiler water treatment system waste waters that include boiler blowdown and regeneration waters from the demineralizer system which processes make up water for the boilers,
- d. Miscellaneous plant floor drains, cooling waters and wash down waters.

Outfall #005: Treatment lagoons A & B (Boiler Cleaning Chemicals). Waste waters discharged from this are generated as a result of periodic chemical cleaning of the boilers. Waste waters are conveyed to treatment lagoons and eventually are discharged into Casco Bay via outfall #004. Outfall #005 and #004 are physically the same outfall but have a different designation in the permit as testing regimes for the two effluents can be tested and measured independently. The boilers are usually scheduled for cleaning every three to five years but the activity has not been conducted in the last ten year period. The monthly average and daily maximum discharge limits are 1.0 mgd and 7.4 mgd, respectively. There are oil and grease limits and daily maximum temperature of 105°F and whole effluent toxicity testing and specific chemical testing required (total iron and total copper).

Outfalls #006 - #012: Stormwater. These outfalls discharge stormwater from various catchments within the 50 acre complex.

Outfalls #001, #002 and #003 do not receive any treatment. The primary pollutant of concern for outfalls #001 and #003 is heat. The primary pollutant of concern for outfall #002 is debris. Outfalls #004 and #005 receive treatment in the four treatment ponds by means of settling, neutralization with sodium hydroxide or sulfuric acid. If after a visual inspection oil sheen is present in stormwater runoff from the tank farm, the stormwater passes through an oil water separator prior to entering the treatment ponds.

***Industrial Pollution Areas:** Area 14 B.2 is classified as restricted due to the presence of the Energy Center.*

OTHER POLLUTION AND ASSOCIATED ACTIVITIES

Agricultural Activity: Growing area WI has no commercial agricultural activity within the coastal zone.

Domestic Animals and Wildlife Activity: A drive-through survey in Falmouth on November 13, 2008 noted approximately 15 cows pastured on the northwestern shore of Broad Cove, horses pastured in the upper Broad Cove area and sheep at another property. The horses and sheep are near streams, with little buffer between the pasture and the shore, and the streams flow into the upper Broad Cove area. This area is conditionally approved and all stations meet approved standards during the open period.

Conservation/Recreation Areas (beaches, trails, etc.): Royal River Park is a 22 acre parcel with a mile of paved walking trails. The Royal River Town Landing is an 8.6 acre parcel with a public boat launch, docks and parking. The Bayview Estuary Preserve is a 48 acre parcel with over 2 miles of hiking trails, a pond and a picnic spot. All three of these areas are located in the Royal River prohibited area.

Sandy Point Beach is located immediately on the left after crossing the bridge onto Cousins Island. It is a popular dog walking spot and has been observed as a water quality actual/direct problem due to dog walkers not picking up after their pets. The area is classified as conditionally restricted.

Aquaculture/Wet Storage Activity: There are ten active shellfish lease sites in growing area WI. Seven sites are located in approved waters. Two sites are located in the conditionally approved area of the Cousins River (14 D)

and one site is located in the conditionally restricted area at the mouth of the Cousins River (14 E). There are no wet storage permits in growing area WI.

HYDROGRAPHIC AND METEOROLOGIC ASSESSMENT

The NSSP program requires, as part of the sanitary survey, the evaluation of hydrographic and meteorological factors in order to determine the factors that may affect distribution and persistence of pollutants throughout the growing area (WI). Climate and weather can affect the distribution of pollutants or can be the cause of pollutant delivery to a growing area. Prevailing winds can determine the distribution of pollutants in a growing area. Rainfall patterns and intensity can affect water quality through pollutant delivery in runoff or cause flooding which can affect the volume and duration of pollutant delivery. Examples of hydrographic factors that are evaluated in this report are tidal transport, and rainfall.

The Casco Bay Estuary Partnership (CBEP) commissioned a study to model water circulation in Casco Bay. The model, developed by Pearce, Pettigrew and Gong of the University of Maine characterizes what influences Casco Bay hydrodynamics and patterns of water circulation in Casco Bay.

Water circulation in Casco Bay is dominated by tides. The tidal range in Casco Bay is nine feet. Tides are caused by the gravitational effects of the moon and sun on the ocean; other influences are heavy rainfall, low barometric pressure and strong onshore winds which will increase tides. Tide levels fluctuate during the month based on the positions of the sun, moon and earth. These fluctuations and the speed and direction of the tidal currents constantly change during a tidal cycle. Tidal currents have the greatest energy when water is pushed in and out of bays and channels during the highest and lowest tide levels. Growing area WJ is subject to a semidiurnal tidal cycle with two high tides and two low tides per day. The tidal cycle is 12 hours and 25 minutes long, so that high and low tides are 50 minutes later each day.

The CBEP and a study by True and Manning describe the circulation in Casco Bay as predominantly counterclockwise in direction. The greatest input of ocean water in eastern Casco Bay is through Broad Sound (just east of Great Chebeague Island) where the circulation pushes water into Middle Bay, Maquoit Bay and circulates in a westerly direction down to where it exits Casco Bay through Portland Channel. Broad Sound is the deepest channel in Casco Bay where colder, more saline water enters the inner Bay. When there is no wind and only tidal force on the currents, there is equal input from all channels into the inner bay from Casco Bay. The tidal flow shows little variation in direction with depth. The True and Manning study further illustrated that circulation of the waters with Casco Bay can be affected by offshore winds, fresh water runoff from the Kennebec/Androscoggin River (especially in the spring) and the Western Maine Coastal Current (WMCC), depending on it's location. The water in Middle Bay and Maquoit Bay is piled against the western shore which contributes to a southwesterly flow along the Yarmouth and Falmouth shores.

Tides: Coastal Maine experiences a mixed, semi-diurnal tide, with diurnal inequalities that are more pronounced on spring tides. National Oceanic and Atmospheric Administration data for station at Portland, Maine indicate a mean tidal range of 9.2 ft. Currents in the area are predominantly driven by the tides. All along the coast of Maine, the tide flows generally to the north and east and ebbs to the south and west. Weather conditions effect tidal ranges and current speeds, sometimes very strongly.

In order to explore the effect of tide on water quality in growing area WI, samples collected at flood and ebb tides were analyzed and presented in the Tables 5 and 6.

Table 5. Geometric Mean and P90 Report for Samples Collected at Ebb Tide

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI015.00	CA	92	36	4.3	0.39	93	13.9	40	236	1/3/2000
WI017.00	P	71	23	6.1	0.59	240	35.6	42	246	1/3/2000

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI017.50	CA	44	36	4.7	0.51	104	21.8	33	182	1/9/2006
WI019.00	P	34	11	12	0.71	400	95.8	42	246	1/3/2000
WI020.00	P	41	12	7.3	0.57	240	39.4	42	250	1/3/2000
WI021.00	P	40	12	16	0.65	460	106	42	249	1/3/2000
WI025.00	CA	99	34	5.1	0.58	460	28.7	41	243	1/3/2000
WI026.00	R	44	15	13	0.68	460	101	41	243	1/3/2000
WI027.00	CA	36	23	6.1	0.54	150	30.6	36	203	7/20/2000
WI028.50	CA	21	21	1.9	0	2	1.9	31	163	2/16/2010
WI029.00	CA	29	24	2.4	0.22	16	4.7	33	181	7/20/2000
WI030.00	CA	42	30	4.1	0.57	460	22.7	35	194	5/31/2001
WI033.00	CA	51	32	5.3	0.58	1100	29.5	36	204	3/23/2000
WI034.00	CA	57	35	3.9	0.53	420	18.6	36	206	3/23/2000
WI036.00	P	35	17	3.1	0.36	93	9.2	39	223	3/23/2000
WI038.00	P	43	18	6.7	0.73	1100	59.4	40	232	3/23/2000
WI040.00	P	40	19	5.2	0.54	460	26	39	224	6/26/2000
WI041.00	P	37	17	6.5	0.71	1200	53.5	39	226	6/26/2000
WI048.00	CR	38	16	13	0.72	1200	113	40	232	6/14/2000
WI051.00	CR	60	20	9.4	0.71	1700	78.3	42	244	6/14/2000
WI051.50	CR	19	19	10	0.8	1700	110	30	163	7/25/2007
WI053.00	CA	75	24	7.9	0.69	1700	61.7	42	246	6/14/2000
WI054.00	CA	78	26	5.4	0.6	1100	32.7	42	244	6/14/2000
WI055.00	CA	23	23	4.8	0.6	760	28.8	31	163	7/25/2007
WI055.20	R	21	21	9.8	0.8	1700	108	31	163	1/7/2008
WI055.50	CA	95	38	5.2	0.49	760	22.7	40	235	6/14/2000
WI056.00	CA	77	64	4.8	0.49	84	21	33	180	6/28/2000
WI056.70	A	25	7	3.2	0.32	93	8.5	43	252	6/28/2000
WI058.50	CA	43	22	3.9	0.51	240	18.2	38	219	6/26/2000
WI058.80	CA	26	26	2.8	0.36	34	8.4	31	163	7/23/2007
WI061.00	A	5	5	1.9	0	2	1.9	31	163	7/30/2008
WI062.00	P	24	6	5.8	0.74	1200	54	43	257	6/26/2000
WI063.00	P	25	6	4.9	0.65	460	34.6	43	259	6/26/2000
WI064.00	P	24	5	5.7	0.55	240	29.8	44	264	3/23/2000
WI065.50	A	29	8	3.9	0.48	240	16.4	43	253	3/23/2000
WI069.00	P	31	9	3.3	0.32	93	8.7	42	251	6/26/2000
WI071.00	R	31	8	3.7	0.37	75	11.3	43	256	6/26/2000
WI074.00	R	32	8	4.1	0.52	460	19.7	43	257	6/26/2000
WI077.00	A	31	13	4.3	0.44	130	15.9	40	232	5/31/2001
WI083.00	A	22	13	2.5	0.23	23	5.2	37	209	5/31/2001
WI088.00	A	25	14	3	0.36	72	9	37	213	5/31/2001
WI089.00	P	25	14	3.4	0.44	98	12.8	37	213	5/31/2001

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI090.00	A	23	12	2.8	0.3	43	7	38	218	5/31/2001
WI092.00	A	25	13	3.5	0.35	23	10.1	38	218	5/31/2001
WI093.00	A	25	12	2.6	0.15	9.1	4.1	39	223	5/31/2001
WI095.00	A	29	13	2.7	0.19	14	4.9	39	228	5/31/2001
WI116.00	P	22	12	2.3	0.09	3.6	3.1	38	215	5/30/2000

Table 6. Geometric Mean and P90 Report for Samples Collected at Flood Tide

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI015.00	CA	125	67	3.9	0.44	93	14.5	38	216	9/28/2000
WI017.00	P	106	48	5.5	0.57	600	29.9	39	227	9/28/2000
WI017.50	CA	71	69	4.1	0.46	100	16.2	31	165	2/15/2006
WI019.00	P	53	27	12	0.81	1700	136	38	219	11/16/2000
WI020.00	P	49	26	6.7	0.67	440	48.7	38	217	11/16/2000
WI021.00	P	48	26	15	0.75	920	136	38	215	11/16/2000
WI025.00	CA	119	67	4.7	0.54	1200	24	37	212	11/16/2000
WI026.00	R	50	29	6.9	0.66	1100	49.7	37	210	11/16/2000
WI027.00	CA	76	47	3.9	0.41	96	13.5	36	205	5/30/2000
WI028.50	CA	52	52	3.7	0.58	920	20.9	31	163	5/31/2010
WI029.00	CA	73	49	3.3	0.51	1220	15.3	36	199	5/30/2000
WI030.00	CA	91	61	5.5	0.58	680	31.4	36	199	5/30/2000
WI033.00	CA	64	43	4.6	0.53	1200	22.7	36	199	4/17/2000
WI034.00	CA	48	28	3.4	0.38	93	10.8	37	210	4/17/2000
WI036.00	P	28	14	2.8	0.21	18	5.2	38	221	4/17/2000
WI038.00	P	36	19	5	0.71	1601	40.9	38	217	4/17/2000
WI040.00	P	27	12	4.2	0.42	93	14.9	39	228	3/23/2000
WI041.00	P	95	74	5.9	0.61	1700	36.6	34	186	3/23/2000
WI048.00	CR	113	58	7.2	0.67	1100	53.3	38	219	3/22/2000
WI051.00	CR	119	56	5.5	0.58	1100	31.1	39	225	3/22/2000
WI051.50	CR	47	47	5.7	0.55	120	29.7	31	163	9/11/2007
WI053.00	CA	146	59	5.1	0.58	680	28.3	40	234	3/22/2000
WI054.00	CA	150	58	4.8	0.55	1160	25.1	41	236	3/22/2000
WI055.00	CA	50	50	3.9	0.49	200	17	31	163	6/10/2007
WI055.20	R	46	46	5.3	0.5	160	23.7	31	163	6/10/2007
WI055.50	CA	136	54	5.6	0.52	460	26.6	40	235	3/22/2000
WI056.00	CA	115	86	3.5	0.42	93	12.4	34	190	5/17/2000
WI056.70	A	63	39	3.1	0.34	120	8.5	36	205	5/17/2000
WI058.50	CA	103	82	3.5	0.42	80	12.5	34	184	3/23/2000
WI058.80	CA	106	106	3.9	0.57	560	21.7	31	163	6/6/2007
WI061.00	A	28	28	2.4	0.23	12	4.9	31	163	9/11/2007
WI062.00	P	57	35	3.3	0.37	93	10.2	36	206	3/23/2000

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI063.00	P	56	35	5	0.65	1100	34.6	36	204	3/23/2000
WI064.00	P	58	37	5	0.5	207	22.1	36	203	4/17/2000
WI065.50	A	52	33	3.5	0.41	126	12.1	36	203	4/17/2000
WI069.00	P	50	30	3.1	0.45	1200	12	37	208	3/23/2000
WI071.00	R	50	31	3.5	0.52	1700	16.8	36	205	3/23/2000
WI074.00	R	49	31	3.2	0.4	240	10.6	36	203	3/23/2000
WI077.00	A	50	27	3.9	0.49	580	16.8	38	215	5/30/2000
WI083.00	A	59	27	2.9	0.31	144	7.3	39	226	5/30/2000
WI088.00	A	56	28	3.5	0.4	146	11.5	38	221	5/30/2000
WI089.00	P	58	28	4	0.41	100	13.9	39	223	5/30/2000
WI090.00	A	58	28	2.9	0.3	64	7.3	39	223	5/30/2000
WI092.00	A	55	27	3.4	0.4	240	11.3	39	222	5/30/2000
WI093.00	A	56	28	2.7	0.27	140	6.1	38	221	5/30/2000
WI095.00	A	52	27	3.1	0.42	580	11	38	218	5/30/2000
WI116.00	P	39	25	2.3	0.14	7.3	3.5	36	202	4/20/2000

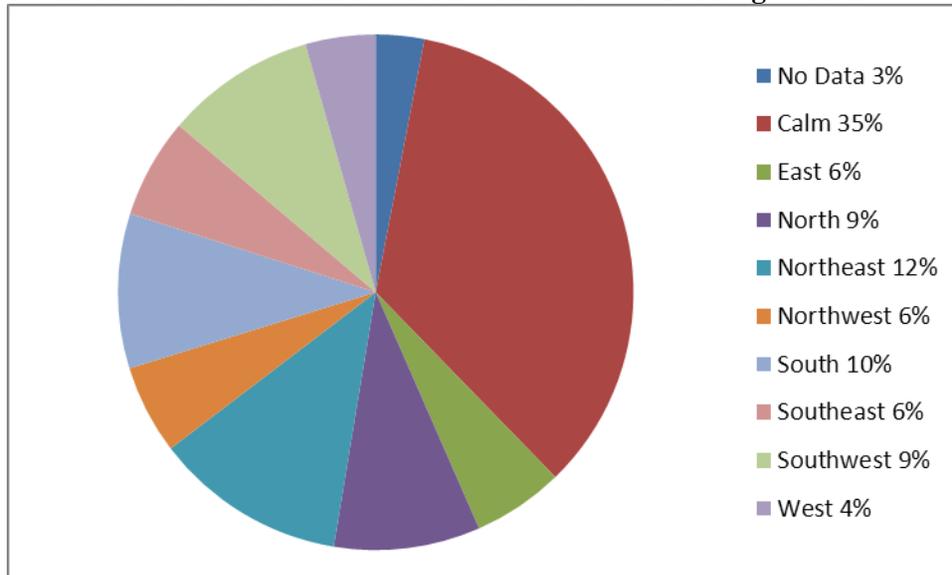
Rainfall: In order to investigate how water quality is impacted by rainfall events which do not necessitate an emergency flood closure, a rainfall assessment for all approved and conditionally approved stations in growing area WI was completed. For this assessment, the geometric mean and P90 scores were recalculated using only data points which were collected after 0.50 or more inches of cumulative rainfall were recorded up to 72 hours prior to sample collection (sum of rainfall recorded in the AM on day of sample, day before sample and two days before sample was taken; Table 5) and for stations with at least 10 samples. In this calculation, all random data collected between 2003 and 2012 were included. In completing this assessment, the data collected under dry or near dry conditions (<0.50 inches of rainfall in 72 hours), were omitted from the calculation. While the results of this calculation show that all stations that are classified as approved retain geometric mean scores of less than 14 when using data collected after rainfall, the P90 scores for multiple stations increase, indicating that multiple approved stations are impacted by intermittent pollution that occurs after rain events.

Table 7. Geometric Mean and P90 Report for Samples Collected after >0.5 in. of Rainfall

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI015.00	CA	4	4	1.9	0	1.9	1.9	31	163	11/16/2011
WI017.50	CA	6	6	11.6	0.61	35	74.8	31	163	11/16/2011
WI025.00	CA	4	4	1.9	0	1.9	1.9	31	163	11/16/2011
WI027.00	CA	8	8	5	0.78	96	54.6	31	163	6/27/2011
WI028.50	CA	6	6	2.7	0.23	5.5	5.5	31	163	11/1/2011
WI029.00	CA	6	6	1.9	0.01	2	2	31	163	11/1/2011
WI030.00	CA	6	6	6.1	0.56	31	33.6	31	163	11/1/2011
WI033.00	CA	8	8	2.2	0.14	4	3.5	31	163	6/27/2011
WI034.00	CA	8	8	4.5	0.5	28	20.9	31	163	6/27/2011
WI053.00	CA	6	0	3.3	0.04	3.6	3.8	48	299	4/26/2006

WI054.00	CA	6	0	2.9	0	3	3	48	299	4/26/2006
WI055.50	CA	7	7	3.2	0.21	6	6.2	31	163	1/8/2007
WI056.00	CA	8	8	3.6	0.3	8	9	31	163	10/19/2011
WI056.70	A	14	14	2.6	0.27	16	5.9	31	163	11/17/2008
WI058.50	CA	8	8	3.6	0.36	13	10.8	31	163	10/19/2011
WI058.80	CA	8	8	11.1	0.23	22	22.5	31	163	10/19/2011
WI061.00	A	10	10	2.8	0.28	12	6.5	31	163	2/11/2008
WI065.50	A	11	11	2.9	0.33	14	8	31	163	2/11/2008
WI077.00	A	7	7	11.9	0.97	580	224.2	31	163	7/8/2009
WI083.00	A	6	6	2.9	0.48	29	12.8	31	163	7/8/2009
WI088.00	A	7	7	6.2	0.72	146	55	31	163	7/8/2009
WI090.00	A	7	7	3.1	0.57	64	17.9	31	163	7/8/2009
WI092.00	A	7	7	6.2	0.6	64	39	31	163	7/8/2009
WI093.00	A	7	7	3.8	0.69	140	31.4	31	163	7/8/2009
WI095.00	A	5	5	6	1.1	580	170.8	31	163	7/8/2009

Winds: Wind direction can have an impact on the water quality in an area if the wind is found to be predominantly blowing from an area associated with large concentrations of pollutants such as industries or large farming operations bordering on the shore. The Department of Marine Resources started collecting wind direction data in March of 2005. The direction the wind is blowing is noted on the sample collection field sheet at each sample site during the collection of the random run. Using data collected from 2005-2010, the percentage of samples collected at each of the wind directions was placed on a pie chart (Figure 4) to illustrate which wind directions were most frequently noted on the field sheet. The predominant wind direction noted was a calm condition (35%) which is little to no wind at all. The next most common wind direction noted is Northeast (12%). The large industrial areas in and around Portland Harbor lie within a 17, 438 acre prohibited area. It is unlikely that wind direction has any impact on pollution loading in this area.

Figure 7. Breakdown of wind direction values 2005 - 2012 in Growing Area WI

River Discharge: The Cousins River is 4.7-miles long. It is primarily tidal and large sections of mud bottom are exposed during low tide. The upper Cousins River is classified prohibited. A portion of the Cousins between Interstate 295 and Heron Point is classified restricted. The area below Heron Point out to the mouth is classified conditionally approved on both one inch of rainfall and flow rates of the Yarmouth WWTP remaining below 2.5 MGD. No hydrographic studies have been conducted on the Cousins River. A hydro graphic dye study was done on the Royal River in 2002. The cousins and Royal rivers share a common outlet to Casco Bay.

The Royal River is 39 miles long and originates in Sabbath Day Pond located in New Gloucester, ME. The tidal portion of the river below US Route 1 in Yarmouth is prohibited (14 A.2) to the “stone pier”. The remaining portion of the Royal River is conditionally restricted (14 C) based on proper function of the Yarmouth WWTP. The US FDA conducted a hydrographic dye study of the Yarmouth WWTP effluent and its effect on the Royal River in 2002. The objectives of the study were to determine the bacterial conditions that could arise with a short term lapse in treatment and the steady state bacterial conditions that could arise in the event of a long term lapse in treatment. The study indicates that river flow might be a minimal factor at influencing dilution of effluent. Intertidal flow has a greater impact on dilutions. Results of the short term study indicate that travel time of untreated effluent to the mouth of the river is 2.6 hours. This short response time and the size of the conditional area need to achieve a 1000:1 dilution are accounted for in the current management plan. A copy of the hydrographic study report can be found in DMR’s central files.

WATER QUALITY REVIEW

Geomean and P90 calculations for 2012 for all active approved, restricted and prohibited stations in Growing Area WI are provided in table 8. Conditional station geomean and P90 calculations are displayed in Tables 9 thru 13 data and reflect open status only. All approved, restricted and conditional stations in area WI met the NSSP approved standards in 2012. Table 14 displays NSSP requirements of sampling frequency and compliance for all WI stations. Please refer to Appendix A for a key to interpreting the headers on the columns. All approved stations, met their NSSP classification standard in 2012.

Table 8. Growing Area WI Geometric Mean and P90 Report

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI017.00	P	30	13	4.4	0.52	480	21.1	40	230	4/29/2003
WI019.00	P	30	9	22	0.88	1700	293.5	42	249	3/10/2004
WI020.00	P	30	9	7.5	0.6	240	45	42	249	3/10/2004
WI021.00	P	30	9	19	0.73	460	165.1	42	249	3/10/2004
WI026.00	R	28	28	4.8	0.53	108	23.5	31	163	2/6/2008
WI036.00	P	29	9	3.5	0.38	93	11	42	248	5/9/2002
WI038.00	P	30	15	6.6	0.81	1100	73.2	38	221	7/1/2004
WI040.00	P	30	9	6	0.54	460	30.2	42	249	9/5/2002
WI041.00	P	30	29	4.4	0.57	100	24.2	31	166	7/19/2006
WI051.00	R	30	30	6.6	0.54	70	32.9	31	163	6/10/2010
WI051.50	R	30	30	8.7	0.62	120	55.6	31	163	6/10/2010
WI055.20	R	30	30	6.5	0.61	100	40.4	31	163	6/10/2010
WI056.70	A	30	30	2.3	0.2	16	4.2	31	163	9/22/2008
WI061.00	A	30	30	2.4	0.22	12	4.7	31	163	2/11/2008
WI062.00	P	30	9	5.7	0.68	1200	43.4	42	249	5/29/2003
WI064.00	P	30	9	5.9	0.55	240	30.3	42	249	5/29/2003
WI065.50	A	30	30	2.6	0.28	18	6	31	163	2/11/2008
WI071.00	R	30	30	2.4	0.31	24	6.3	31	163	2/11/2008
WI074.00	R	30	30	2.3	0.19	10	4.2	31	163	2/11/2008
WI077.00	A	30	30	3.2	0.54	580	16.2	31	163	10/10/2007
WI083.00	A	30	30	2	0.21	29	3.9	31	163	5/20/2008
WI088.00	A	30	30	2.5	0.37	146	7.7	31	163	10/10/2007
WI090.00	A	30	30	2.1	0.27	64	4.8	31	163	5/20/2008
WI092.00	A	30	30	2.8	0.38	64	8.8	31	163	5/20/2008
WI093.00	A	30	30	2.3	0.35	140	6.5	31	163	5/20/2008

Table 9. Falmouth Marina Conditional Area, Open Status November 15 – April 30

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI015.00	CA	30	27	2.9	0.31	22	7.5	32	173	2/15/2006
WI017.50	CA	30	26	3.3	0.39	104	10.7	32	176	1/9/2006
WI025.00	CA	30	27	2.7	0.29	23	6.6	32	173	2/15/2006

Table 10. Broad Cove Conditional Area, Open Status November 1 – May 31

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI027.00	CA	30	30	3.1	0.37	50	9.3	31	163	11/17/2008
WI028.50	CA	30	30	2.2	0.21	14	4.3	31	163	2/16/2010
WI029.00	CA	30	30	2.1	0.22	16	4.2	31	163	2/16/2010
WI030.00	CA	30	30	3.6	0.51	160	16.4	31	163	11/2/2009

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI033.00	CA	30	30	3.1	0.35	26	8.9	31	163	6/10/2009
WI034.00	CA	30	30	3.5	0.52	420	16.5	31	163	4/8/2008

Table 11. Royal River Conditional Restricted Area, Open Status: Special Permit Only

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI048.00	CR	30	19	11	0.7	1100	88.1	36	203	6/9/2004

Table 12. Cousins River Rainfall Conditional Approved Area, Open Status

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI055.50	CA	30	30	5.2	0.57	280	28.9	31	163	7/12/2010
WI053.00	CA	30	30	4.2	0.51	76	19.6	31	163	6/10/2010
WI054.00	CA	30	30	3.3	0.4	46	11	31	163	6/10/2010
WI055.00	CA	30	30	5.4	0.55	200	27.8	31	163	6/10/2010

Table 13. Royal/Cousins River Area, Open Status: Conditional on performance of WWTP

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI048.00	CR	30	19	11	0.7	1100	88.1	36	203	6/9/2004
WI051.00	R	30	30	6.6	0.54	70	32.9	31	163	6/10/2010
WI051.50	R	30	30	8.7	0.62	120	55.6	31	163	6/10/2010
WI053.00	CA	30	30	4.2	0.51	76	19.6	31	163	6/10/2010
WI054.00	CA	30	30	3.3	0.4	46	11	31	163	6/10/2010
WI055.00	CA	30	30	5.4	0.55	200	27.8	31	163	6/10/2010
WI055.20	R	30	30	6.5	0.61	100	40.4	31	163	6/10/2010
WI055.50	CA	30	30	5.2	0.57	280	28.9	31	163	7/12/2010
WI056.00	CA	30	30	4.4	0.52	84	20.7	31	163	7/12/2010
WI058.50	CA	30	30	3.2	0.42	48	11.4	31	163	2/4/2009
WI058.80	CA	30	30	4.5	0.57	180	25	31	163	7/12/2010

Table 14. WI 2012 Sampling Effort

Stations	Class	Closed			Open		Totals
		Adverse	Extra	Random	Adverse	Random	
WI015.00	CA			5		6	11
WI017.00	P			6			6
WI017.50	CA		1	5		6	12
WI019.00	P		14	6			20
WI020.00	P		14	6			20
WI021.00	P		14	6			20
WI025.00	CA			5		6	11
WI026.00	R					6	6

Stations	Class	Closed			Open		Totals
		Adverse	Extra	Random	Adverse	Random	
WI027.00	CA			4		6	10
WI028.50	CA			4		6	10
WI029.00	CA			4		6	10
WI030.00	CA			4		6	10
WI033.00	CA			4		6	10
WI034.00	CA			3		6	9
WI036.00	P			6			6
WI038.00	P			6			6
WI040.00	P			6			6
WI041.00	P			12			12
WI048.00	CR					12	12
WI051.00	R				1	12	13
WI051.50	R					12	12
WI053.00	CA	1		1	1	12	15
WI054.00	CA	1		1	1	12	15
WI055.00	CA	1		1	1	12	15
WI055.20	R					12	12
WI055.50	CA	1		1		12	14
WI056.00	CA					12	12
WI056.70	A					6	6
WI058.50	CA					12	12
WI058.80	CA					12	12
WI061.00	A					6	6
WI062.00	P			6			6
WI063.00	P			6			6
WI064.00	P			6			6
WI065.50	A					6	6
WI069.00	P			6			6
WI071.00	R					6	6
WI074.00	R					6	6
WI077.00	A					6	6
WI083.00	A					6	6
WI088.00	A					6	6
WI089.00	P			6			6
WI090.00	A					6	6
WI092.00	A					6	6
WI093.00	A					6	6
WI095.00	A					6	6
WI116.00	P			6			6

Water Quality Discussion and Classification Determination

Chandler Cove, Great Chebeague Island

On August 31, 2012 Chandler Cove, Great Chebeague Island was reclassified from prohibited to approved due to removal of an OBD and updated shoreline survey.

Table 15. Chandler Cove Station

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WI088.00	A	30	30	2.5	0.37	146	7.7	31	163	10/10/2007

Cousins River (Yarmouth)

On September 9th, 2012 the Cousins River was reclassified from conditionally restricted to conditionally approved based on the performance of the Yarmouth Waste Water Treatment Plant (WWTP) and rainfall of equal to or greater than one inch in 24 hours. A detailed description of this upgrade can be found in Appendix C.

Recommendation for Future Work

1. Look into causes for seasonal pollution in Broad Cove (Cumberland and Yarmouth) for possible open approved status.
2. Monitor and maintain conditionally approved status for Cousins River (Yarmouth).
3. Investigate possibility of reducing size of prohibited area 14 A.4 (Cousins Island).

Appendix A. Key to Water Quality Table Headers

Station = water quality monitoring station

Class = classification assigned to the station; prohibited (P), restricted (R), conditionally restricted (CR), conditionally approved (CA) and approved (A).

Count = the number of samples evaluated for classification, must be a minimum of 30.

MFCNT = the number of samples evaluated with the MTec method (included in the total Count column)

Geo_Mean = means the antilog (base 10) of the arithmetic mean of the sample result logarithm (base 10).

SDV = standard deviation

Max = maximum score of the 30 data points in the count column

P90 = 90th percentile

APPD_STD = the 90th percentile, at or below which the station would meet approved criteria in the absence of pollution sources or poisonous and deleterious substances.

RESTR_STD = the 90th percentile, at or below which the station would meet restricted criteria.