



**GROWING AREA WI**

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

**Triennial Report for 2008-2010**

**Report Date: 8-11-2011**

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**APPROVAL**

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Figure 1. Growing Area WI, Western Portion, with Active Water Stations

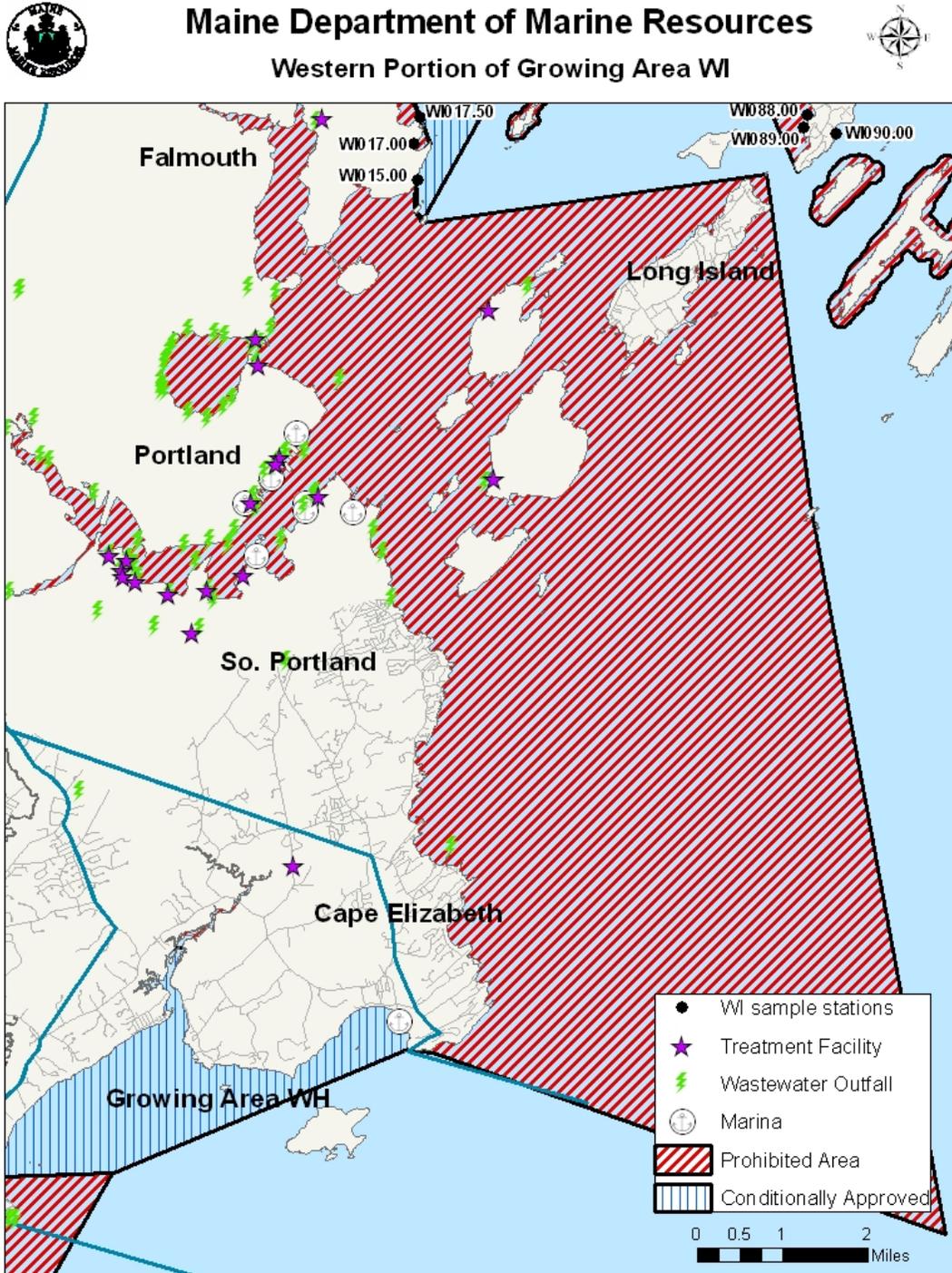


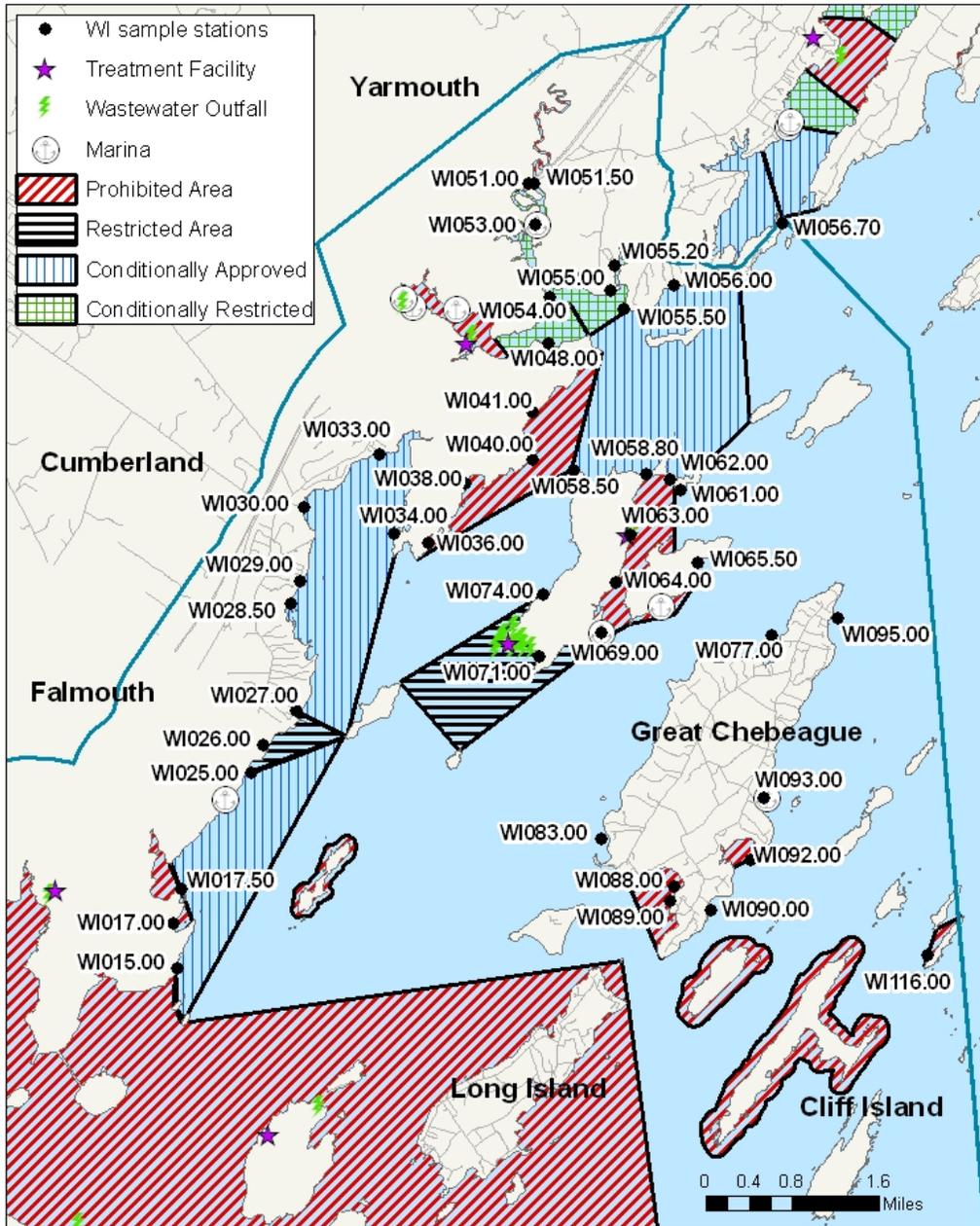


Figure 2. Growing Area WI, Eastern Portion, with Active Water Stations



### Maine Department of Marine Resources

Eastern Portion of Growing Area WI





## Executive Summary

This is a triennial report for growing area WI written in compliance with the requirements of the 2005 Model Ordinance and the National Shellfish Sanitation Program. The next sanitary survey for growing area WI is due following completion of the 2012 field season.

Growing Area WI includes Cape Elizabeth, South Portland, Portland, Falmouth, Cumberland, Yarmouth, Long Island, Great Chebeague Island, other Casco Bay islands and part of Freeport. Over the triennial review period there have been no notable changes in pollution sources in growing area WI. Four stations on Long Island, three stations in Falmouth, one station on Littlejohn Island and one station on Sturdivant Island were deactivated due to numerous septic problems, poor water quality and lack of local interest in correcting problems. One over board discharge (OBD) was removed from growing area WI (2008, Portland). Three stations were created and one station was reactivated (last sampled in 2004) over the past three years. There were six closures resulting from sewage spills at Falmouth and Yarmouth pump stations, one closure from a gasoline spill and one closure from a ruptured sewer line. Generally, there has been little change in water quality during the triennial reporting period, with most stations that are classified as approved and conditionally approved (open status) showing P90 calculations that are under 50 percent of the approved standard limit. Shoreline survey work was updated in 2010 for all areas that had been placed under an administrative closure in 2009. Portions of shoreline were reclassified from prohibited to approved and conditionally approved following the surveys. Upward classifications were completed for Chebeague Island (3), Falmouth (4) and Cumberland (4).

## Growing Area Description

The growing area 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 (Figures 1 and 2).

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 108 overboard discharges (OBDs) in Growing Area WI, all of which are located in prohibited areas.

## Current Classification(s)

Shellfish growing area WI currently has areas classified as:



### **Approved**

Great and Little Chebeague Islands, Chebeague (7 stations), WI 77, 83, 88, 90, 92, 93, 95

Cousins and Littlejohn Islands, Yarmouth (2 stations), WI 61 (New station with less than 30 data points) and 65.5

Yarmouth (1 station), WI 56.7

### **Conditionally Approved**

Falmouth Foreside, Falmouth (3 stations; seasonal marina area), WI 15, 17.5 and 25

Outside Cousins River, Yarmouth and Freeport (4 stations; conditional on Yarmouth WWTP), WI 55.5, 56, 58.5 and 58.8

Princes Point, Yarmouth (1 station; poor water quality), WI 33

Broad Cove, Cumberland and Yarmouth (2 new stations with less than 30 data points), WI 27 and 30; (1 station; poor water quality) WI 34

### **Conditionally Restricted**

Cousins River, Yarmouth and Freeport (6 stations; due to non-point source pollution and proximity to Yarmouth WWTP), WI 51, 51.5, 53, 54, 55, and 55.2

### **Restricted**

Falmouth Foreside, Falmouth (1 station; due to water quality exceeding the approved standard), WI 26

Cousins Island, Yarmouth (2 stations; due to water quality surpassing the approved standard), WI 71 and 74 (boundary with approved)

### **Prohibited**

Falmouth Foreside, Falmouth (1 station; seasonal marina area), WI 17

Bennett Cove, Chebeague Island (1 station; due to proximity to an OBD), WI 89

Bates Island (1 station; due to the presence of a straight pipe), WI 116

Royal River, Yarmouth (1 station), WI 48

Cousins Island, Yarmouth (4 stations; due to proximity to OBDs and WWTP outfall), WI 62, 63, 64 and 69

Princes Point, Yarmouth (4 stations; identified pollution sources) WI 36 (boundary), 38, 40 and 41

Please visit the DMR website to view legal notices:

[http://www.maine.gov/dmr/rm/public\\_health/closures/closedarea.htm#](http://www.maine.gov/dmr/rm/public_health/closures/closedarea.htm#)

### **Activity during Review Period**

#### **2008**

The following legal notice amendments occurred during the 2008 review year:



### **Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland)**

**March 7, 2008:** Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland), amended on November 6, 2006. This amendment reclassified the restricted area of Mussel Cove, Falmouth, to prohibited due to station WI 19 exceeding the restricted standard (WI 19 has a p90 of 284.9 and the restricted standard is 255); it also defined the closure line in Part B, across Mussel Cove, which was left out of the description for the conditional area. Survey work in the area had not revealed any point sources of pollution.

**November 14, 2008:** Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland), this amendment moved the boundary line between the seasonal conditional area and the restricted area due to water quality exceeding the approved standard in the open status, and therefore increases the size of the restricted area.

**December 31, 2008:** Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland), this amendment moved the restricted area in A. 1 to Area No. 14 because it was part of a new larger restricted area due to non-point source pollution and point source pollution.

### **Area No 14, Royal River, Cousins River, Cousins Island, Littlejohn Island (Yarmouth and Freeport)**

**February 29, 2008:** Area No. 14, Cumberland and Yarmouth Mainland, Royal River, Cousins River, Cousins Is, Littlejohn Is (Cumberland, Yarmouth and Freeport), this amendment returned the Broad Cove restricted area to the open status for depuration and relay; and returned the Yarmouth conditional areas to the open status.

**March 19, 2008:** Area No. 14, Cumberland and Yarmouth Mainland, Royal River, Cousins River, Cousins Is, Littlejohn Is (Cumberland, Yarmouth and Freeport), this amendment reclassified 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), this amendment changed the title of the rule, and reclassified Whites Cove (Yarmouth) from conditionally approved, to conditionally restricted for shellfish harvesting, due to water quality exceeding the approved standard.

**August 8, 2008:** Area No. 14, Royal River, Cousins River, and vicinity (Cumberland to Freeport), this amendment closed 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), this amendment opened the conditionally restricted and conditionally approved areas in the Royal River, Cousins River, and vicinity.

**December 31, 2008:** Area No. 14, Royal River, Cousins River, and vicinity (Cumberland to Freeport), this amendment created a larger restricted area because water quality exceeded approved standards due to point source (stormwater drains, industrial outfalls) and non-point source pollution (storm drains, cows, horses). The area was also expanded to include a portion of Falmouth.

**Area No. 500, Maine/New Hampshire Border to Maine/Canadian Border**, promulgated on September 7, 2008. This new emergency regulation closed the Maine coast due to heavy runoff from rainfall in conjunction with Tropical Storm Hannah. The area reopened, post flood closure, on September 13, 2008.

Stations WI 33 and 34 were reclassified from approved to restricted on March 19, 2008. Station WI 41 was reclassified from conditionally approved to conditionally restricted on June 6, 2008. WI 19, 20 and 21 were reclassified from restricted to prohibited on March 7, 2008. WI 25 and 26 were reclassified from conditionally approved to restricted on November 14, 2008. WI 26 was the 'next approved station' for the stations exceeding approved criteria in the open status for the conditionally approved area north of WI 25. Sample stations WI 27, 30, 33, 34 and 71 are part of a restricted area as of December 31, 2008 and were reclassified from approved to restricted. Station WI 27.5 on Sturdivant Island was deactivated on May 12, 2008

Stations WI 97, 98, 99 and 99.3 were deactivated on May 12, 2008 due to numerous septic problems and poor water quality and unwillingness by the town to fix the problems.

A drive through survey was conducted on November 13, 2008. New development and congregations of animals were noted and a marina inspection was conducted. The new development is described and evaluated in the new pollution sources section of this report. One OBD was removed (#1893) in 2008.

In the 2008 Royal River Youth Conservation Corps (YCC) Annual Report, there were several projects completed that may have a positive impact on water quality in the watershed. The crew and volunteers extended a past YCC-led riparian buffer planting at Old Town House Park, North Yarmouth. In just four days, the crew planted 600 trees and shrubs on 1.3 acres along the Royal River. As the plants become established, they will help filter runoff, provide wildlife habitat and enhance the river's floodplain. The YCC completed five projects in Yarmouth where the Royal River meets Casco Bay; the crew installed infiltration steps at Littlejohn Narrows Park, stenciled 256 storm drains throughout town, planted a shoreline buffer at Grist Mill Park, at Picnic Point, they planted 21 shrubs and perennials in the riparian zone to stabilize the bank and enhance understory buffer, in Pratt's Brook Park they closed off and naturalized an eroded shoreline trail and at Royal River Park they planted perennials and mulched an architectural rubble site.



The Yarmouth Transfer Station and capped landfill are on the shores of the marshes on Pratt's Brook. There are no trails on the property but there is a large composting facility which is near a steep slope to the marsh; the concern being any pet waste being in the compost and draining into the marsh after heavy rainfall. The area is classified prohibited due to an OBD which discharges to Pratt's Brook. If the OBD is ever removed, the composting facility drainage would require assessment as it is about 100ft from a gully that drains run off to the shore which is 650ft away.

The following incidences were reported to the Department in 2008:

On February 14, 2008, the Yarmouth WWTP Superintendent reported to the DMR that due to storm conditions Yarmouth had 2 overflows at pump stations when power lines came down as tree limbs snapped under the weight of ice and snow. Power was lost at 20 pump stations. The Princes Point pump station overflowed for approximately one hour, quantity unknown as there is not a flow meter at this station. The overflow occurred while the two portable generators were engaged all over town trying to keep pace with powerless stations with high level alarms. The Princes Point pump station was targeted for an upgrade in the spring of 2008, as part of a bond package approved by Yarmouth voters. Since this station receives flow from three down stream stations as well as low pressure flows from subdivisions, and due to its proximity to tidal waters, an in-place generator should be included in the upgrade. The Harbor pump station overflowed 4,242 gallons during the peak of the storm when it was simply inundated with snow melt runoff, rainfall and inflow and infiltration (I & I). The quantity was recorded on an OCM flow meter at the station. Subsequently, Area No. 14, Cumberland and Yarmouth Mainland, Royal River, Cousins River, Cousins Is, Littlejohn Is (Cumberland, Yarmouth and Freeport), was amended to close Broad Cove, and the Yarmouth conditional areas due to a sewage bypass.

The remnants of a hurricane/tropical storm dumped 4.77 inches of rain on September 7, 2008. The rain and runoff inundated the Yarmouth sewer system via I & I which caused an overflow at the Harbor Pump Station on Route 88 between 2am and 8am which discharged to the Royal River. There was more inflow to the station than it could physically pump to the WWTP utilizing the two force mains. A total of 20,438 gallons of rain, runoff and untreated sewage overflowed into the Royal River. The area was under a flood closure at the time. Area No. 500, Maine/New Hampshire Border to Maine/Canadian Border, promulgated on September 7, 2008. This emergency regulation closed the Maine coast due to heavy runoff from rainfall in conjunction with Tropical Storm Hannah. The area reopened, post flood closure, on September 13, 2008.

On December 15, 2008 at 10:50am, DMR received a call from the Falmouth Treatment Facility to report two pump station overflows. The overflows occurred on Friday December 12<sup>th</sup> at around 9:00am following an ice storm that occurred from Thursday night to Friday morning. DMR offices were closed on Friday morning due to power outages and tree limbs across the road. The first overflow occurred at the Middle Road pump station. An overflow of approximately ten gallons per minute flowed into the Presumpscot Estuary. The overflow lasted approximately ½ hour. The area is currently classified as prohibited. The second overflow occurred at the Underwood pump station. The overflow was approximately two gallons per



minute and lasted for less than an hour. The area was classified as conditionally approved based on a season and was open at the time (the closed status was from May 1 through November 14). No closure was put into place due to the small amount of overflow.

## **2009**

The following legal notice amendments occurred during the 2009 review year:

### **Area No. 13-A, Portland Area (Cape Elizabeth to Cumberland)**

**January 21, 2009:** Area No. 13-A, Portland Area (Cape Elizabeth to Falmouth), was amended to reclassify an area in Falmouth from "Conditionally Approved" and "Approved" to "Prohibited," due to lack of a recent shoreline survey.

### **Area No. 13-B, Great Chebeague, Bates, Long and Cliff Islands (Cumberland, Long Island, Portland)**

**January 22, 2009:** Area No. 13-B, Great Chebeague, Bates, Long and Cliff Islands (Cumberland, Long Island, Portland); amendment changed the title of the rule and reclassified Hope Island and most of Great Chebeague Island from "Approved" to "Prohibited," due to lack of a recent shoreline survey.

**May 21, 2009:** Area No. 13-B, Western Casco Bay (Long Island to Chebeague Island); amendment reclassified the Back Shore, a portion of Hamilton Beach, and a portion of Chandler Cove, Chebeague Island from prohibited to approved, due to a recent update in sanitary survey status.

**October 1, 2009:** The Department modified Area No. 13-B to reclassify the eastern shore of Chebeague Island from "prohibited" to "approved", due to the completion of a shoreline survey.

### **Area No 14, Royal River, Cousins River, Cousins Island, Littlejohn Island (Yarmouth and Freeport)**

**May 12, 2009:** Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), amendment reclassified 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 reclassified, combined and enlarged 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 reclassified a portion of the Princes Point area of Yarmouth from restricted to prohibited due to a malfunctioning septic system.



**May 27, 2009:** Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport); amendment reclassifies a 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 27, 2009:** Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport); amendment closes a portion of the Cousins River conditionally restricted area, due to a gasoline spill.

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

The following incidences were reported to the Department in 2009:

**June 22, 2009:** Falmouth WWTP reported that there was a pump station failure on a pump near Mill Creek; amount of sewage spilled was not known. The classification surrounding this pump station was reviewed by DMR staff. The entire shoreline surrounding this pump station is classified as prohibited and no additional closures were required.

**October 26, 2009:** a gasoline spill occurred on the Cousins River (conditionally restricted portion of the river) near the Muddy Rudder Restaurant on Rt 1, Yarmouth. The spill resulted from a car fire which was difficult to get under control. As a result of the fire some automobile fuel and oil spilled into the Cousins River. Foam that was used to put out the fire also spilled into the river. Foam and gasoline made their way into the marsh area at the Rt 1 location and made their way into the Cousins River. A closure was made on October 27, 2009. The area re-opened on November 14, 2009, following a negative sensory test of shellfish meats for gasoline and oil.

During the 2009 review year, the following station changes occurred: in March 2009, prohibited station WI 67 was deactivated due to its proximity to multiple OBDs that were not on the priority removal list. In June 2009, stations WI 19, 20 and 21 were deactivated; these prohibited stations were located in an area that had a long history of poor water quality and was not being considered for an upgrade in classification. No stations were activated or created during 2009.

## **2010**

The following legal notice amendments occurred during the 2010 review year:

### **Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth)**

**June 7, 2010:** Area No. 13-B, Western Casco Bay (Long Island to Chebeague Island); 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-A and 13-B, Western Casco Bay (Long Island to Chebeague Island), amendment repeals original amendment dated June 7, 2010. 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).

**December 20, 2010:** Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth), amended on September 9, 2010. 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.

**Area No 14, Royal River, Cousins River, Cousins Island, Littlejohn Island (Yarmouth and Freeport)**

**September 28, 2010:** Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), amended on November 13, 2009. 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), amended on September 28, 2010. 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), amended on October 11, 2010. 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) amended on October 13, 2010. 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.

Johnson's Cove, Chebeague Island, (locally known as the Crick's) was closed June 7, 2010, inside and shoreward of a line beginning at the south tip of Waldo Point, then running southwest to Jenks Point due to a malfunctioning septic on 194 John Small Road.

Lorraine Morris spoke with Claire Ross (Chebeague Island Harbormaster) on July 7, 2010, regarding the closure in Johnson's Cove. The malfunctioning septic has yet to be remediated.



In addition there were two other properties in the cove that came into question. Since the whole area was reclassified to prohibited on June 7 no action was required.

The following incidences were reported to the Department in 2010:

**October 11, 2010:** The Yarmouth WWTP on-call operator, Brian Leighton, reported to the DMR that there was a sewer line rupture on the Cousins River in Yarmouth next to Days Crabmeat on Route 1. MPO Tom Hale spoke to Brian Leighton of the Yarmouth Sanitation Department and was informed they called dig safe at 6am and began work at 8am. According to Mr. Leighton the leak was estimated to be about 1 gallon per hour with a total of 20 gallons of non-chlorinated sewage. The DEP Non-Compliance/Discharge Incident Report submitted by the Yarmouth WWTP described the event as a four inch pvc force main breach at a 45° fitting when a rubber gasket failed. Subsequently, Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), was amended on October 11, 2010. The 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 11, 2010** – Amy Fitzpatrick received an email from Sgt. Daryen Granata notifying her of a sewer pipe rupture in Yarmouth on the Cousins River at 5:04PM. The rupture was noticed at 3pm on Route 1 near Days Crabmeat in Yarmouth. The Yarmouth Sanitary District reported that the pipe was discharging an estimated 1 gallon/hour of untreated sewage.

**October 11, 2010** - The Commissioner of the Maine Department of Marine Resources amends the emergency DMR Chapter 95.03(L), Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), amended on October 11, 2010. 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 13, 2010** - The Commissioner of the Maine Department of Marine Resources amends the emergency DMR Chapter 95.03(L), Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport), amended on October 11, 2010. 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** - The Commissioner of the Maine Department of Marine Resources amends the emergency DMR Chapter 95.03(L), Area No. 14, Royal River, Cousins River, and vicinity (Falmouth to Freeport) amended on October 13, 2010. 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.

In February 2010, a new station (WI 28.5) was created, as 'restricted' status, to monitor for potential sources of non-point pollution over resource areas in Cumberland. Also in February,



station WI 29 was reactivated (last sampled 7-29-04, 'approved' status) as 'restricted' to monitor potential pollution from a storm drain at the end of Wildwood Boulevard. Both stations are recommended for sampling on an accelerated schedule in 2011. In April 2010, station WI 33 location was changed due to sampler safety.

### **Conditionally Managed Area(s) Activity**

There are two conditionally managed areas in Growing Area WI;

- 1) Falmouth Foreside town dock, conditionally approved stations WI 15, 17, 17.5 and 25.
- 2) Cousins River and Casco Bay outside the Cousins and Royal Rivers: WWTP conditional area, conditionally restricted stations WI 51, 51.5, 53, 54, 55, 55.2; conditionally approved stations 55.5 and 56, and 58.8.

The management plans for the WI conditional areas are in Appendix A and B. The WWTP conditional management plan requires reporting by the Yarmouth Wastewater Treatment Plant; this plan was last updated in December 9, 2009.

### **Documentation of Pollution Sources**

The following sections include information on pollution sources which do or may impact water quality in growing area WI. The section includes information on new pollution sources, identified over the past three review years, as well as updated reviews of existing pollution sources in this growing area. Pollution sources that are reviewed in this section include domestic waste, including both private inground systems and over board discharges (OBDs), marinas and mooring fields, stormwater and pollution from non-point sources (streams), farms and other agricultural activities, domestic animals and wildlife areas, and recreational areas.

### **Evaluation of New Pollution Sources (2008-2010)**

A drive through survey that was completed on November 13, 2008 revealed several new subdivisions that are listed and discussed below. There is a new subdivision that is just starting to be developed on the eastern shore of the Cousins River, and the large estate at Fogg Point was subdivided to allow for three additional homes, that were built in 2006-2007. The Cousins River is conditionally restricted but the Fogg Point area is conditionally approved and is monitored by sample stations WI 55.5, 56 and 58.8.

There is a new subdivision (Mission Hills Estates) of townhomes located on the Piscataqua River in North Yarmouth. This subdivision is a planned community of 15 Arts & Crafts style condos, with 500 ft of shoreline and walking trails. This area is classified as prohibited.

High Winds is a new 18 lot subdivision set on 56 acres on Broad Cove and Pittee Creek in Yarmouth (Figure 3). There is a private dock and established walking trails. The lots are furnished with public water and sewer and guest cottages are allowed to be built on the lots.



The shellfish flats surrounding this area were reclassified from approved to restricted on December 31, 2008, due to water quality no longer meeting the approved standard. The area surrounding this new subdivision does not have a nearby water quality monitoring station. The nearest station is WI 33, located on the opposite shore of Broad Cove. Broad Cove was reclassified from restricted to conditionally approved in the spring of 2010.

**Figure 3. High Winds, Yarmouth, ME Subdivision Plan**



Site plan courtesy of Coastal Property Development Inc. at <http://www.netmarkscom.com/coastalproperty/highwinds/siteplan.html>

The Ledges, is a 10-lot conservation subdivision that has been approved for construction in Falmouth, near the shores of the Presumpscot River. A 75-unit, Ridgewood Estates Subdivision in Falmouth is being built along a stream which flows to the Presumpscot River (Figure 4). Construction started in June 2007 and was completed in 2008. There is also a new 9-lot subdivision on Falmouth Foreside with deeded rights to sandy beach and deep water anchorage. The subdivision is located in a large prohibited area.



Figure 4. Ridgewood Estates, Falmouth, ME Subdivision Plan



Image courtesy of <http://www.ridgewoodestatesfalmouth.com/index.html>

Much of the shoreline in growing area WI has had an updated shoreline survey completed since the last triennial report for the area. Over the past two years, all of the shorelines in the towns of Chebeague, Falmouth and Cumberland have been updated. No surveys were conducted in 2008. Actual and potential problems identified as part of this recent (2009-2010) shoreline survey work are presented in Table 1; any remediation or enforcement action taken by the town and DMR to correct the problems and protect public health is noted in bold font in Table 1, along with the description of the problem. Updates to the status of the pollution (actual vs. potential, direct vs. indirect) based on remediation action are also noted in bold in the table. Locations of new actual and potential problems on Chebeague Is. and in Falmouth and Cumberland are presented in Figures 5 and 6, respectively. All problems were reported to codes enforcement officers of each respective town. Several identified potential problems are scheduled to have follow-up work by DMR and DEP. The results of this follow up work will be presented in the next Sanitary Survey report scheduled for 2012.

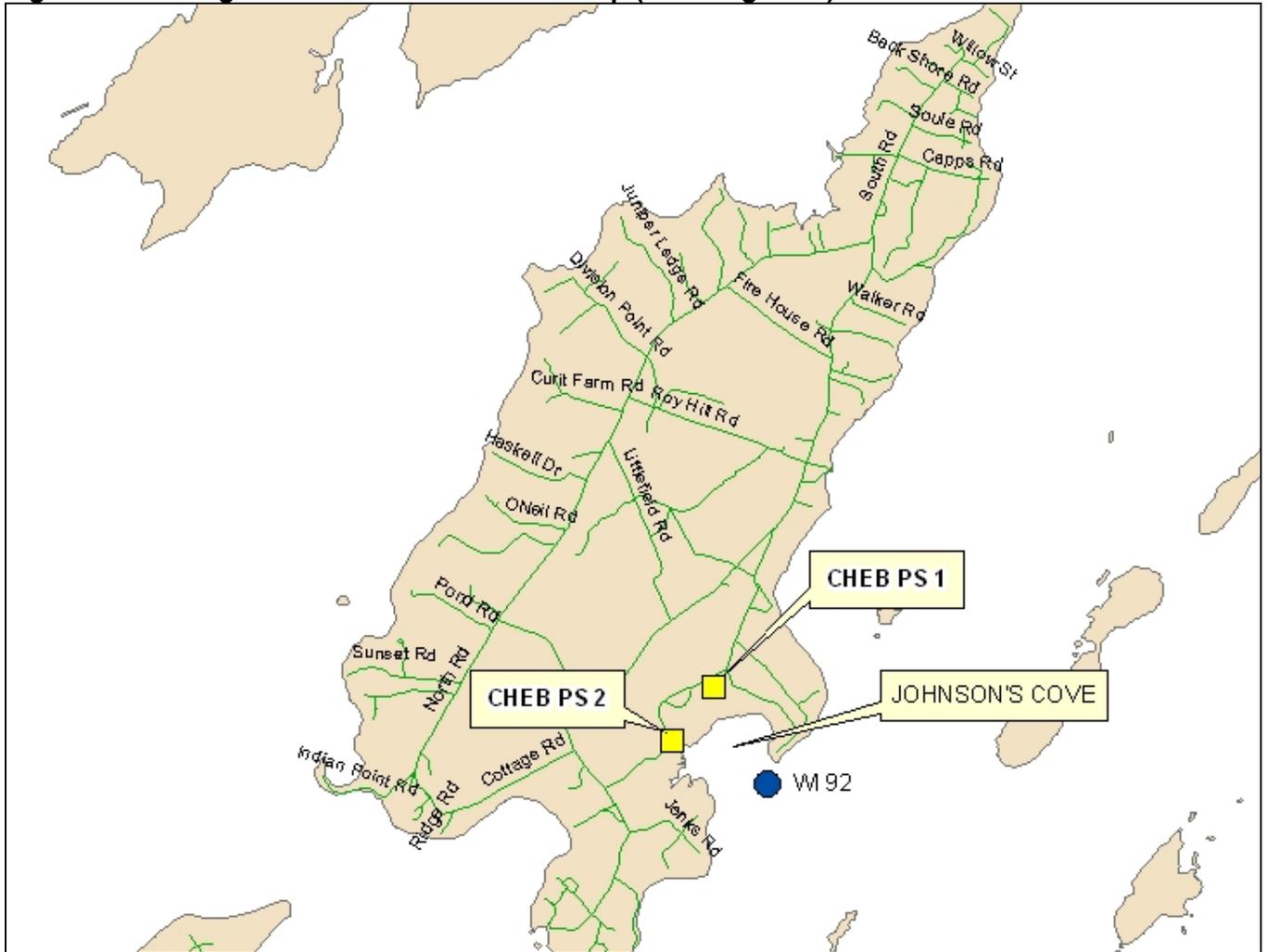


**Table 1. New Actual and Potential Pollution Sources, identified between 2008-2010**

| Town             | Pollution ID | Actual / Potential | Direct / Indirect | Pollution Description and Action Taken   | Survey Date |
|------------------|--------------|--------------------|-------------------|--|-------------|
| CHEBEAGUE ISLAND | CHEB PS 1    | A/P                | D/I               | Malfunctioning septic Johnson's Cove; <b>Not remediated. Cove closed 6/7/10.</b>                       | 8-Oct-09    |
|                  | CHEB PS 2    | A/P                | D/I               | Suspected septic problem Johnson's Cove; <b>LPI notified. Cove closed.</b>                             | 7-July-10   |
| CUMBERLAND       | CUMB PS 1    | A/P                | D/I               | Wet areas front lawn; <b>LPI determined groundwater from old drains.</b>                               | 30-July-10  |
|                  | CUMB PS 2    | A/P                | D/I               | Several wet areas; <b>LPI determined freshwater runoff.</b>  | 5-Aug-10    |
| FALMOUTH         | FALM PS 1    | A/P                | D/I               | Old system; <b>LPI informed.</b>   | 18-Oct-10   |
|                  | FALM PS 2    | A/P                | D/I               | Neighbor noticed septic odor few years ago, system near steep bank <25' from shore; <b>Remediated.</b> | 18-Oct-10   |
|                  | FALM PS 3    | A/P                | D/I               | 1931 system near steep bank <25' from shore; <b>Monitor closely.</b>                                   | 18-Oct-10   |
|                  | FALM PS 4    | A/P                | D/I               | 1951 system under large maple near steep bank <25' from shore; <b>Monitor closely.</b>                 | 18-Oct-10   |
|                  | FALM PS 5    | A/P                | D/I               | Strong septic odor, cesspool; <b>LPI informed.</b>   | 18-Oct-10   |
|                  | FALM PS 6    | A/P                | D/I               | Wet leach field close to stream; <b>LPI informed.</b>  | 21-Oct-10   |



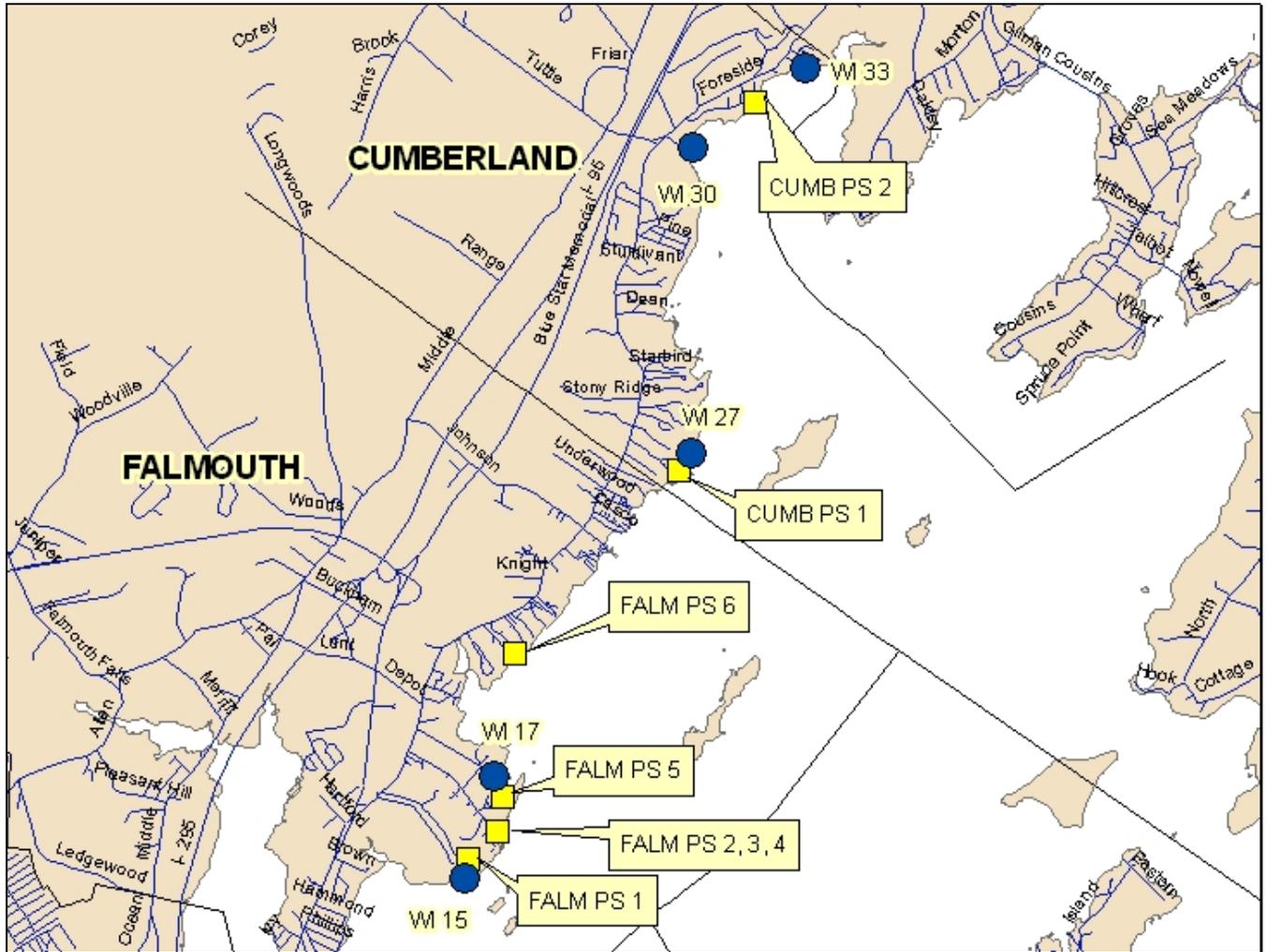
Figure 5. Growing Area WI Pollution Source Map (Chebeague Is.)\*



\* actual/indirect – potential/indirect (yellow blocks)



Figure 6. Growing Area WI Pollution Source Map (Falmouth and Cumberland)\*



\*actual/indirect – potential/indirect (yellow blocks)



### Re-Evaluation of Existing Pollution Sources

The following sections are a review of existing pollution sources in growing area WI. Pollution problems associated with domestic waste, including OBDs, which were identified prior to the last sanitary survey, are re-evaluated. Other pollution sources, which were present at the time of the last triennial review, are also reviewed. DMR conducted a shoreline survey in Yarmouth from 2004-2007. A Princes Point Road (Yarmouth) residential property was surveyed on November 8, 2007 and determined to have a potential malfunctioning sump pump drain. Water flowed from the drain pipe into a grassy gully leading to a storm drain. An email from the Yarmouth WWTP Chief Operator to Amy Fitzpatrick dated September 8, 2008 concluded the problem was from a non-point pollution source.

Table 2 contains all the actual and potential pollution which impact Growing Area WI either directly or indirectly as identified through shoreline survey work by the DMR or reported to the DMR by the towns. The malfunctioning septic systems and straight pipe complaints have been submitted to the Town Codes Enforcement officers for follow up. The pollution source map (Figure 7) shows the locations of the OBDs, wastewater outfalls, NPDES permitted outfalls and the actual/direct (red flags) and actual/indirect – potential/indirect (yellow flags).

**Table 2. Actual and Potential Pollution Sources in Growing Area WI**

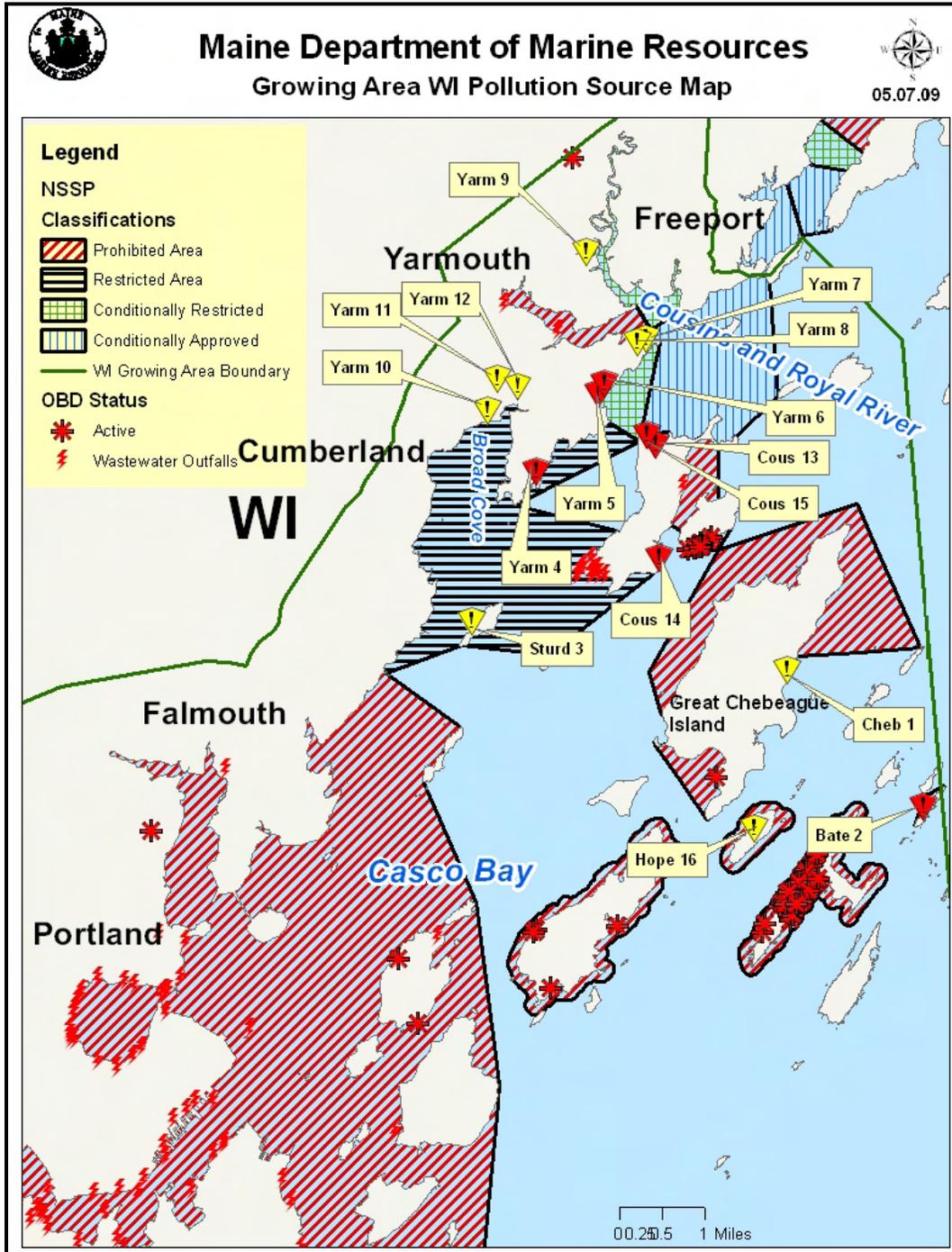
| Town              | Pollution ID | A or P | D or I | Pollution Description  | Survey Date                      |
|-------------------|--------------|--------|--------|--|----------------------------------|
| Great Chebeague   | Cheb 1       | P      | I      | Cesspool ≤ 25' from shore  | June 24, 2004                    |
| Bates Island      | Bate 2       | A      | D      | Straight Pipe; <b>Unresolved as of July 2011, harvesting prohibited.</b>   | September 11, 1997               |
| Sturdivant Island | Sturd 3      | P      | I      | Outhouse within 50' of shore; <b>Restricted.</b>                           | August 24, 2005                  |
| Yarmouth          | Yarm 4       | A      | D      | Malfunctioning septic system; <b>On town sewer.</b>                        | September 11, 2007               |
|                   | Yarm 5       | A      | D      | Malfunctioning septic system; <b>Remediated.</b>                           | July 7, 2004                     |
|                   | Yarm 6       | A      | D      | Straight pipe; <b>Vacant property.</b>                                     | July 7, 2004                     |
|                   | Yarm 7       | P      | I      | Hayfield; <b>Conditionally restricted due to Yarmouth WWTP.</b>            | June 4, 2005                     |
|                   | Yarm 8       | P      | I      | Highland Farm sheep; <b>Conditionally restricted due to Yarmouth WWTP.</b> |                                  |
|                   | Yarm 9       | A      | I      | Pet waste on stream/gully; <b>Conditionally restricted</b>                 | October 5, 2006/ re-visited June |



| Town           | Pollution ID | A or P | D or I | Pollution Description  | Survey Date                              |
|----------------|--------------|--------|--------|--|--|
|                |              |        |        |  | 6, 2007                                  |
|                | Yarm 10      | P      | D      | Cows in pasture; <b>Conditionally approved.</b>                    | November 13, 2008                        |
|                | Yarm 11      | P      | I      | Sheep; <b>Conditionally approved.</b>                              | November 13, 2008                        |
|                | Yarm 12      | P      | D      | Horses; <b>Conditionally approved.</b>                             | November 13, 2008                        |
| Cousins Island | Cous 13      | A      | D      | Cesspool abutting stream/gully; <b>New IG.</b>                     | July 9, 2007/re-visited November 7, 2007 |
|                | Cous 14      | A      | D      | Malfunctioning septic system; <b>Remediated.</b>                   | August 25, 2005                          |
|                | Cous 15      | A      | D      | Dog waste on beach; <b>Summer problem, conditionally approved.</b> | July 9, 2007                             |
| Hope Island    | Hope 16      | A      | I      | Animals pastured to shore edge; <b>Harvesting prohibited.</b>      | June 3, 2008                             |



Figure 7. Growing Area WI Pollution Source Map\*



\* actual/direct (red flags) and actual/indirect – potential/indirect (yellow flags)



**Domestic Waste**

There are 108 licensed overboard discharges (OBDs) in growing area WI (Table 3). All of the discharges are located in prohibited areas, and the smaller prohibited areas were determined by dilution calculations.

**Table 3. Licensed OBDs in WI**

| OBD ID | Location             | Receiving Waterbody | Flow (gpd)   | Acres Needed For Closure | Current Prohibited Acreage |       |
|--------|----------------------|---------------------|--------------|--------------------------|----------------------------|-------|
| 1929   | Cape Elizabeth       | Casco Bay           | 300          | 1.92                     | 17,437.64                  |       |
| 7124   |                      |                     | 450          | 2.88                     |                            |       |
| 1474   |                      |                     | 300          | 1.92                     |                            |       |
| 3157   |                      |                     | 500          | 3.20                     |                            |       |
| 3381   | Falmouth             | Presumpscot River   | 420          | 2.58                     |                            |       |
| 2314   | Great Diamond Island | Casco Bay           | 900          | 5.64                     |                            |       |
| 6931   |                      |                     | 35,000       | 219.22                   |                            |       |
|        |                      |                     | <b>TOTAL</b> | <b>237.36</b>            |                            |       |
| 7028   | Long Island          | Casco Bay           | 300          | 1.88                     |                            | 1,285 |
| 2385   |                      |                     | 360          | 2.25                     |                            |       |
| 7963   |                      |                     | 375          | 2.35                     |                            |       |
| 7773   |                      |                     | 1500         | 9.40                     |                            |       |
|        |                      |                     | <b>TOTAL</b> | <b>15.88</b>             |                            |       |
| 4666   | Cliff Island         | Casco Bay           | 315          | 1.97                     |                            | 1,285 |
| 2912   |                      |                     | 300          | 1.88                     |                            |       |
| 1891   |                      |                     | 300          | 1.88                     |                            |       |
| 1890   |                      |                     | 300          | 1.88                     |                            |       |
| 2934   |                      |                     | 300          | 1.88                     |                            |       |
| 3518   |                      |                     | 300          | 1.88                     |                            |       |
| 8120   |                      |                     | 300          | 1.88                     |                            |       |
| 1117   |                      |                     | 300          | 1.88                     |                            |       |
| 1116   |                      |                     | 300          | 1.88                     |                            |       |
| 3176   |                      |                     | 300          | 1.88                     |                            |       |
| 1435   |                      |                     | 300          | 1.88                     |                            |       |
| 7890   |                      |                     | 180          | 1.13                     |                            |       |
| 7897   |                      |                     | 450          | 2.82                     |                            |       |
| 1892   |                      |                     | 500          | 3.13                     |                            |       |
| 2463   |                      |                     | 300          | 1.88                     |                            |       |
| 2367   |                      |                     | 300          | 1.88                     |                            |       |
| 8041   |                      |                     | 300          | 1.88                     |                            |       |
| 8040   |                      |                     | 300          | 1.88                     |                            |       |
| 3215   |                      |                     | 300          | 1.88                     |                            |       |



| OBD ID | Location     | Receiving Waterbody | Flow (gpd)   | Acres Needed For Closure | Current Prohibited Acreage |
|--------|--------------|---------------------|--------------|--------------------------|----------------------------|
| 6405   |              |                     | 300          | 1.88                     |                            |
| 7860   |              |                     | 450          | 2.82                     |                            |
| 7733   |              |                     | 300          | 1.88                     |                            |
| 3746   |              |                     | 300          | 1.88                     |                            |
| 4529   |              |                     | 300          | 1.88                     |                            |
| 8203   |              |                     | 300          | 1.88                     |                            |
| 3197   |              |                     | 300          | 1.88                     |                            |
| 8047   |              |                     | 300          | 1.88                     |                            |
| 2125   |              |                     | 200          | 1.25                     |                            |
| 3205   |              |                     | 300          | 1.88                     |                            |
| 3207   |              |                     | 300          | 1.88                     |                            |
| 3148   |              |                     | 300          | 1.88                     |                            |
| 3178   |              |                     | 300          | 1.88                     |                            |
| 3301   |              |                     | 300          | 1.88                     |                            |
| 3200   |              |                     | 300          | 1.88                     |                            |
| 6728   |              |                     | 300          | 1.88                     |                            |
| 3196   |              |                     | 300          | 1.88                     |                            |
| 1386   |              |                     | 50           | .031                     |                            |
| 3949   |              |                     | 300          | 1.88                     |                            |
| 5191   |              |                     | 300          | 1.88                     |                            |
| 7704   | Cliff Island | Casco Bay           | 300          | 1.88                     |                            |
| 2098   |              |                     | 300          | 1.88                     |                            |
| 3177   |              |                     | 300          | 1.88                     |                            |
| 1976   |              |                     | 1300         | 8.14                     |                            |
| 3059   |              |                     | 300          | 1.88                     |                            |
| 4098   |              |                     | 300          | 1.88                     |                            |
| 2053   |              |                     | 200          | 1.25                     |                            |
| 3967   |              |                     | 300          | 1.88                     |                            |
| 3210   |              |                     | 300          | 1.88                     |                            |
| 8032   |              |                     | 200          | 1.25                     |                            |
| 7981   |              |                     | 300          | 1.88                     |                            |
| 3194   |              |                     | 300          | 1.88                     |                            |
| 1975   |              |                     | 300          | 1.88                     |                            |
| 1303   |              |                     | 300          | 1.88                     |                            |
| 7692   |              |                     | 300          | 1.88                     |                            |
| 3629   |              |                     | 400          | 2.51                     |                            |
| 7899   |              |                     | 300          | 1.88                     |                            |
| 4048   |              |                     | 300          | 1.88                     |                            |
|        |              |                     | <b>TOTAL</b> | <b>113.06</b>            | <b>769</b>                 |



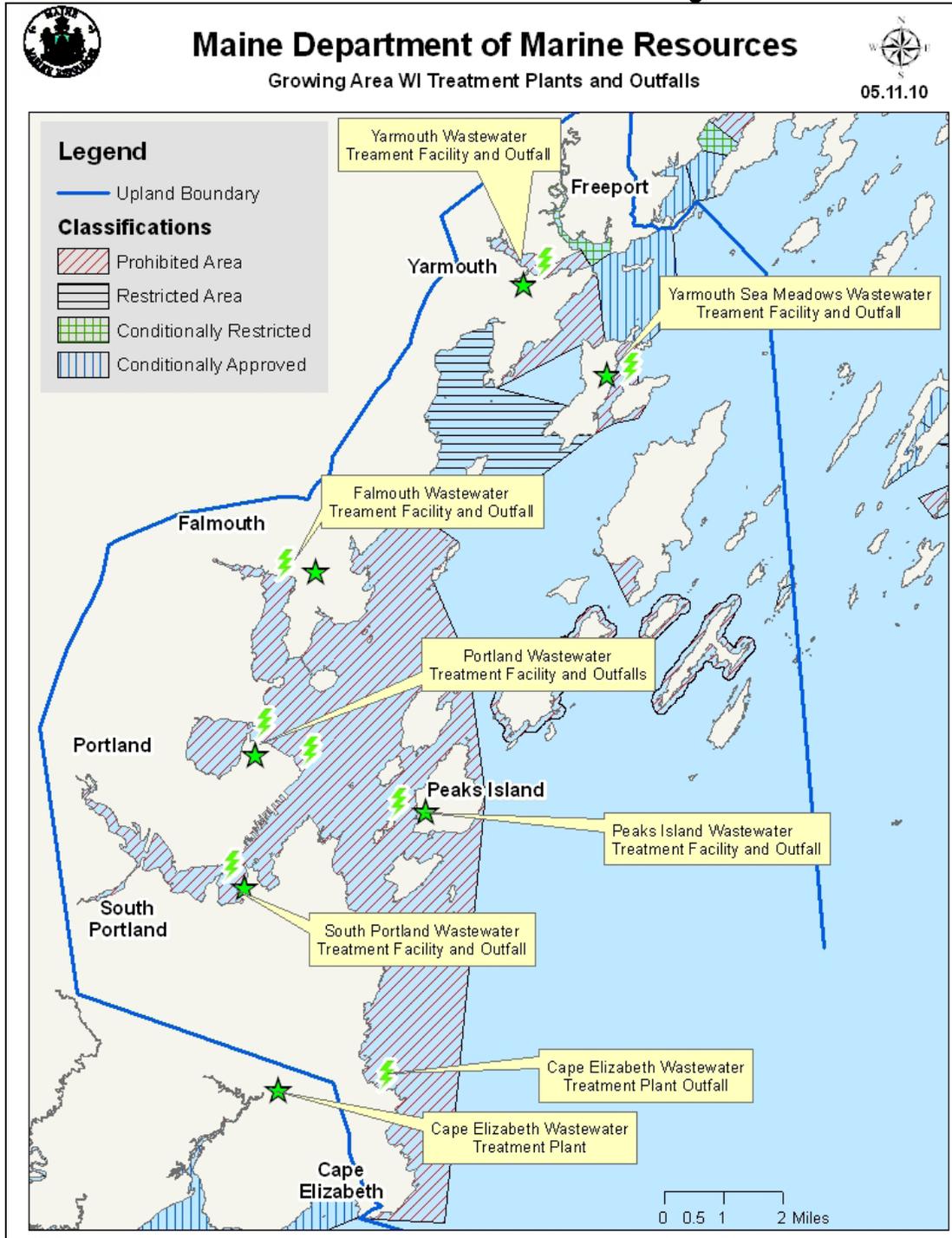
| OBD ID       | Location          | Receiving Waterbody        | Flow (gpd) | Acres Needed For Closure | Current Prohibited Acreage |
|--------------|-------------------|----------------------------|------------|--------------------------|----------------------------|
| 1461         | Great Chebeague   |                            | 300        | 1.92                     | 378                        |
| 1295         | Littlejohn Island | Casco Bay                  | 400        | 2.56                     |                            |
| 2555         |                   |                            | 300        | 1.92                     |                            |
| 0339         |                   |                            | 450        | 2.88                     |                            |
| 0988         |                   |                            | 300        | 1.92                     |                            |
| 1307         |                   |                            | 360        | 2.30                     |                            |
| 6812         |                   |                            | 300        | 1.92                     |                            |
| 3892         |                   |                            | 300        | 1.92                     |                            |
| 7389         |                   |                            | 300        | 1.92                     |                            |
| 7388         |                   |                            | 300        | 1.92                     |                            |
| 3000         |                   |                            | 300        | 1.92                     |                            |
| 1447         |                   |                            | 300        | 1.92                     |                            |
| <b>TOTAL</b> |                   |                            |            | <b>23.1</b>              | <b>77.95</b>               |
| 6128         | Yarmouth          | Pratts Brook/Cousins River | 300        | 1.88                     | 28                         |

**Municipal WWTP**

There are seven licensed wastewater treatment plants (WWTP) in growing area WI (Figure 8.) Portland Water District operates and maintains three of the seven WWTPs; Cape Elizabeth, Portland and Peaks Island. The Town of Yarmouth Water Pollution Control Department operates and maintains two of the seven WWTPs; Yarmouth and Sea Meadows (Cousins Island). The remaining two plants are operated and maintained by the Town of Falmouth (Richard B. Goodenow Wastewater Treatment Facility) and the City of South Portland, respectively.



Figure 8. Wastewater Treatment Plants and Outfalls in Growing Area WI

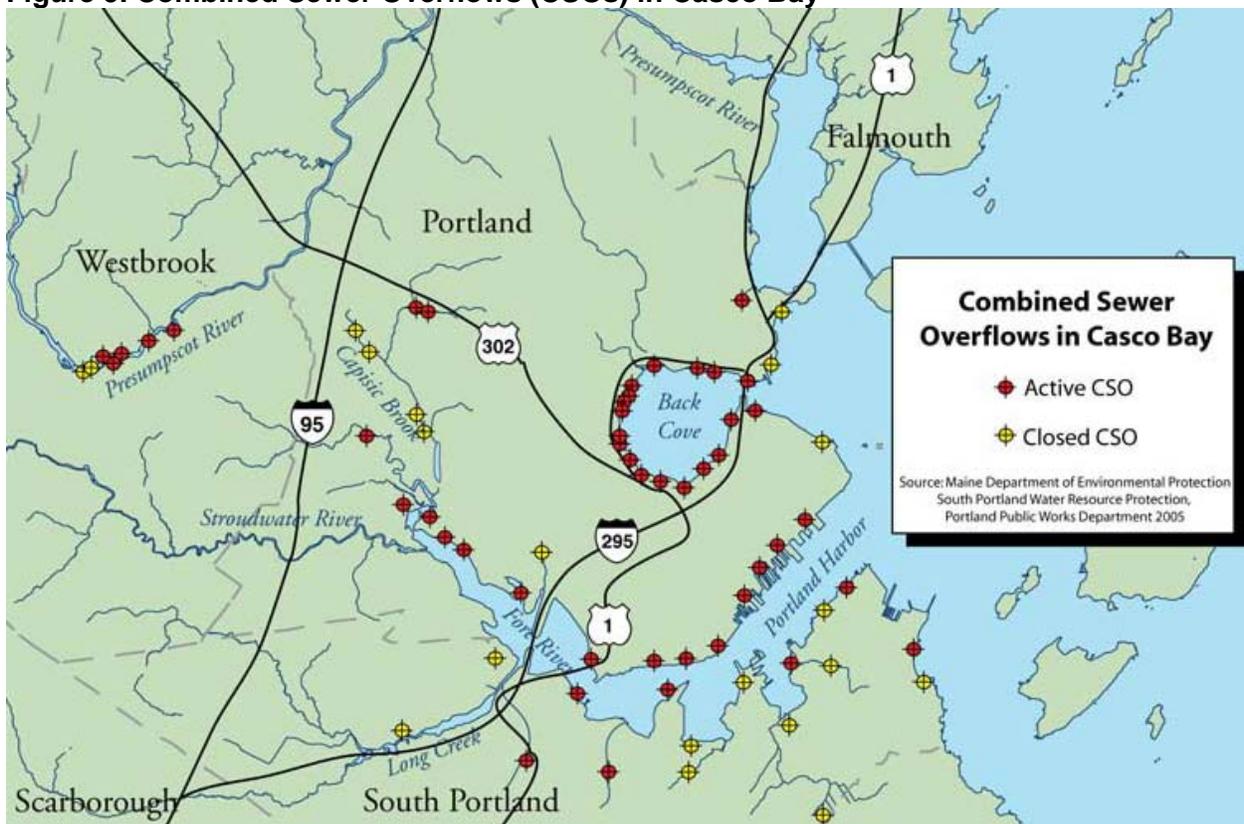




### Portland WWTP

The Portland WWTP was last reviewed on July 27, 2010. 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 (Figure 9). 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 and the nearest approved shellfish area is approximately three-quarters of a mile north. Details about the plant review can be found in the central files.

**Figure 9. Combined Sewer Overflows (CSOs) in Casco Bay**



### South Portland WWTP

The South Portland WWTP was last reviewed on August 11, 2010. 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 and the nearest approved shellfish area is approximately three-quarters of a mile north. Details about the plant review can be found in the central files.

#### Cape Elizabeth WWTP

The Cape Elizabeth WWTP was last reviewed on July 27, 2010. 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 and the nearest approved shellfish area is approximately three-quarters of a mile north. Details about the plant review can be found in the central files.

#### Falmouth WWTP

The Falmouth Wastewater Treatment Plant was last reviewed on July 16, 2010. 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 and the nearest approved shellfish area is approximately three-quarters of a mile north. 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 July 28, 2010. 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 CSO's 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 and the nearest approved shellfish area is approximately three-quarters of a mile north.

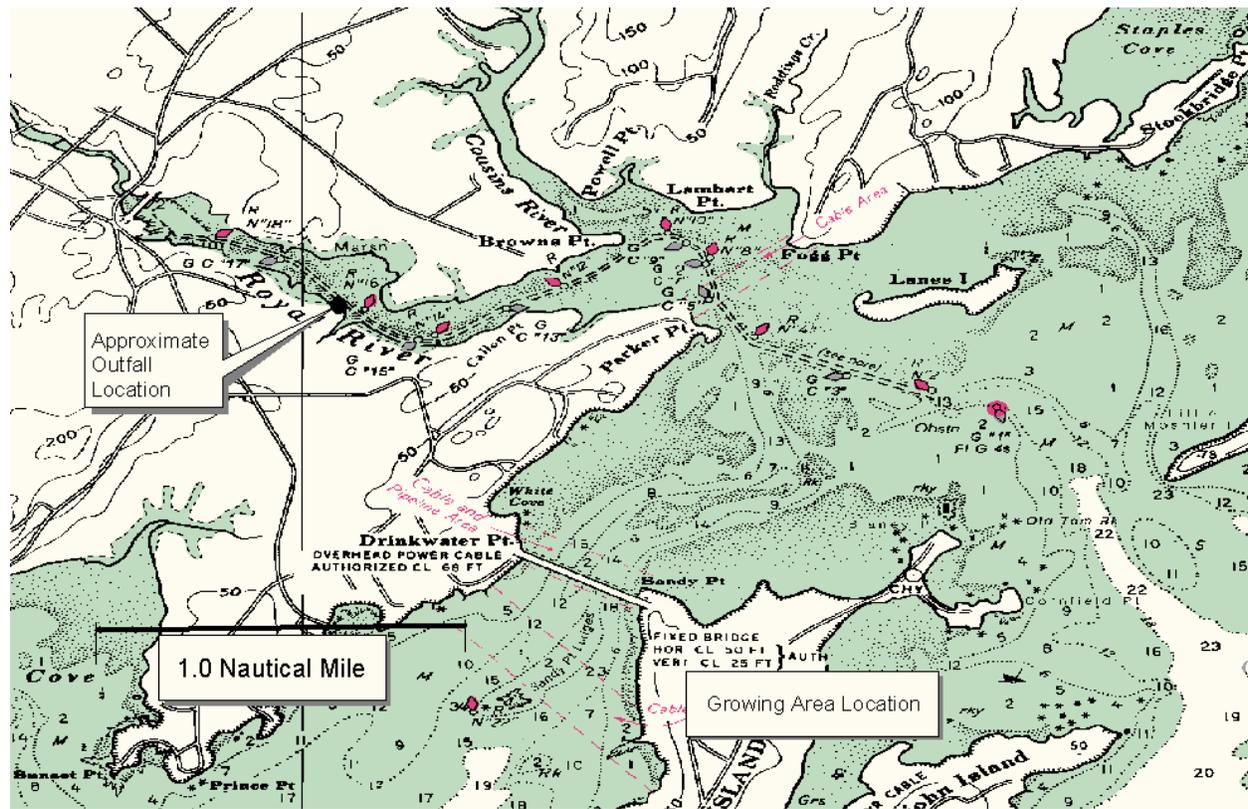
#### Yarmouth WWTP

A hydrographic dye study of the Yarmouth Waste Water Treatment Plant (WWTP) effluent was



conducted from May 18-28, 2010 assessing the dilution, time of travel, and dispersion of effluent in the Royal River, Cousins River, and offshore waters. The Yarmouth WWTP outfall is located on the southern shore of the Royal River approximately 1.1 nautical miles (nm) above the confluence of the Royal and Cousins River (Figure 10). The Royal River is located approximately 9 nm northeast of Portland, Maine. The 2010 study objectives were to: 1) determine the bacterial conditions that could arise under a short term lapse in treatment and disinfection; 2) determine the steady state bacterial conditions in the shellfish growing waters that could arise in the event of a long term elimination or lapse in disinfection; 3) assess the possible applicability of the CORMIX computer model for estimating dilutions in this study and other similar study areas; and 4) determine more accurately dye amounts to be used as well as the suitable placement of shellfish cages within the dilution ranges of approximately 100 – 10,000:1 (with most interest around 1000:1). Drogues and a short dye release assisted in determining suitable locations for the cages based on effluent dispersion/dilution within the area of interest. A dye injection was conducted over a ½ tidal cycle (approximately 12 hours) and a full tidal cycle suitable for approximating the steady state concentrations. Submersible fluorometers were placed at the 5 shellfish cage locations to continuously measure concentrations of dye throughout the 5-6 day study timeframe. Plume tracking was conducted to determine the extent of excursion of dye as well as the overall dilution of wastewater effluent within the Royal River. Shellfish deployed during the preliminary survey were collected at the end of the study for analysis (fecal coliform, MSC, NoV, adenovirus). Overall, this study will assist FDA in the understanding of the accumulation of pathogens in shellfish at various dilutions with respect to a wastewater effluent discharge. Additionally, this study will also seek to determine the extent of the effluent waste field and effluent dilution within the Royal River. The FDA-written draft report for this study has not been received by the DMR.

**Figure 10. Growing Area Location and Outfall Location**



**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.

Figure 11. W. F. Wyman Energy Center Outfall Map

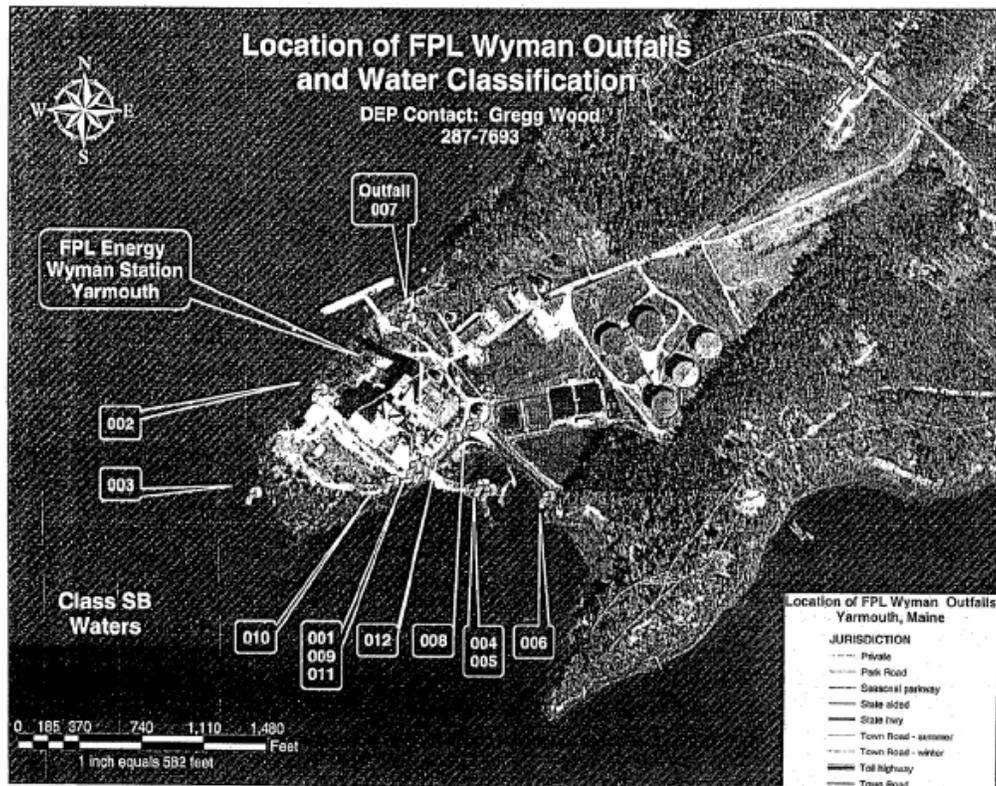


Figure courtesy of MEPDES permit at <http://www.epa.gov/npdescan/ME0000272FS.pdf>

The facility has been inspected 3 times during the review period (2008-2010). The DEP performed compliance inspections on May 1, 2008, May 2, 2009 and EPA and DEP performed a joint inspection on September 9, 2010. No violations were noted in discharge monitoring reports during the review period.



The plant is not discharging sanitary waste and under its permit must conduct toxics testing on sea urchins and mysid shrimp. A review of the toxics reports does not reveal any non compliance with the discharge permit and so there is no reported impact to human health. Since outfalls #001 and #003 are cooling waters and discharge heated water, sample station WI71 should be reviewed annually for water temperature due to the concern for *Vibrio parahaemolyticus* in warm waters. During the reporting period the water temperature at WI71 did not exceed 76° F. Based on the lack of sanitary waste discharge and water temperatures not being at levels to increase the growth of *Vibrio p.*, it is not a recommendation of this evaluation that any prohibited area needs to be promulgated for the area.

### **Marinas**

Under the NSSP, any shellfish growing area within the confines of a marina proper or mooring field is presumed to be contaminated for some period of time. Therefore, no growing area within the marina proper can be classified approved. The classifications available for marina areas are conditionally approved, conditionally restricted and prohibited. The microbiological and chemical contamination associated with marinas and marina facilities may result in the contamination of shellfish and sediments in the adjacent areas. The NSSP has developed a set of evaluation criteria to be used in determining if the shellfish growing areas adjacent to marinas and mooring fields are affected by contamination associated with sewage.

The NSSP defines 'marinas' as an area that has 10 or more boats. Each mooring field and marina in the growing area must be evaluated. Marina performance standards must be assessed annually utilizing the DMR developed evaluation form and a review of existing performance standards for those marinas that are in conditionally approved and conditionally restricted areas. The sanitary survey and triennial reviews require a marina inspection. A marina or mooring field that is in a conditional area must be inspected (and documented) prior to the area closing and opening to assure that the conditions of the management plan are met. Marina closure zone calculations are completed using the information from the inspection to input into a DMR model which was developed using the NSSP volumetric calculations.

The marina community in Maine only operates for a portion of the year due to adverse winter weather conditions. The management of marinas in Maine allows for shellfish growing areas to be available to harvesters for at least a portion of the year, to direct market harvest, by utilizing conditional area management plans.

### **Falmouth Foreside**

From an interview 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 harbor masters. 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 Royal River is classified prohibited due to the presence of the Yarmouth Wastewater Treatment Plant outfall and the prohibited area is 235 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.

### **Stormwater**

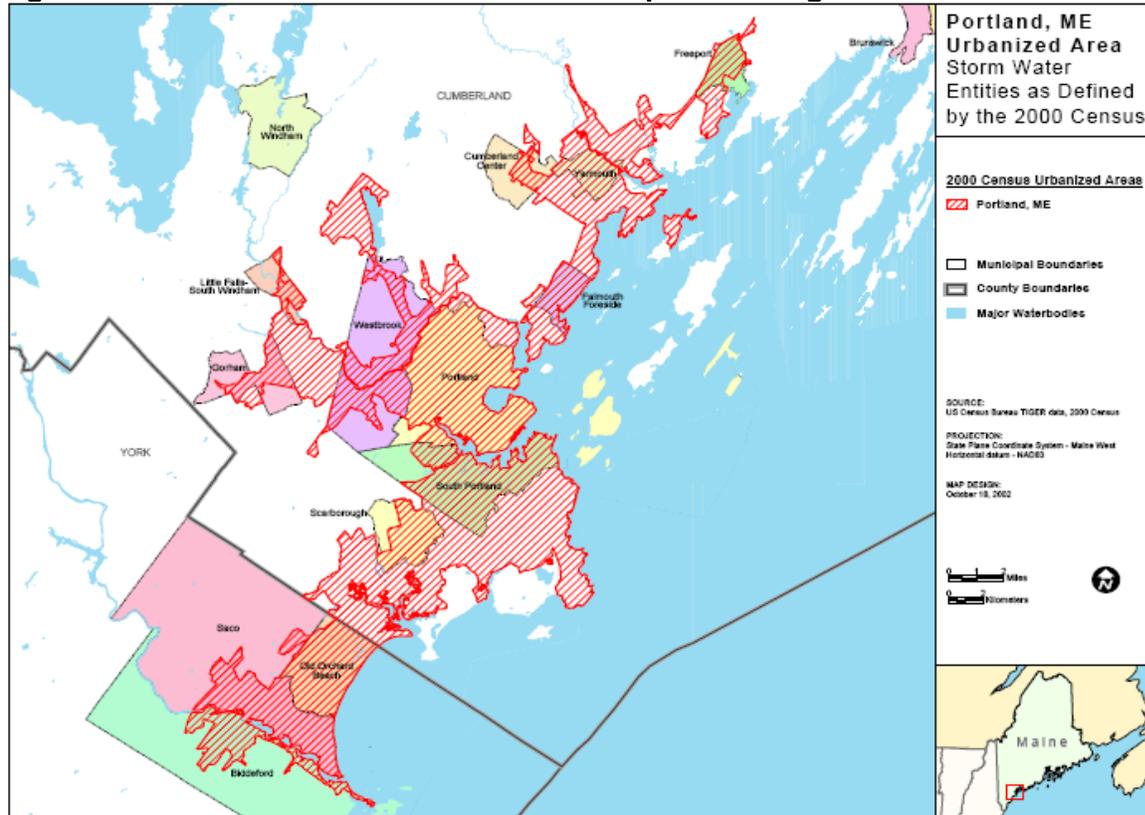
Stormwater runoff is generated from land surfaces and impervious areas including paved streets, parking lots, and building rooftops, during rainfall and snow melting events. This runoff can contain pollutants in quantities that can adversely affect water quality. Stormwater pollution is caused by the daily activities of people within the watershed. Rain and snowmelt water run off streets, lawns, farms, and construction and industrial sites and pick up fertilizers, dirt, pesticides, oil and grease, and many other pollutants on the way to rivers, lakes, and coastal waters. Stormwater runoff is a contributor to coastal water pollution, often termed "nonpoint source pollution". According to the EPA, because of impervious surfaces like pavement and rooftops, a typical town/city block generates more than 5 times more runoff than a woodland area of the same size.

The U.S. EPA promulgated Phase I of the stormwater management program in 1990 under the authority of the Clean Water Act. Under this program, permitting is required through the National Pollution Discharge Elimination System (NPDES). The Phase I program covered three categories of discharges: (1) "medium" and "large" Municipal Separate Storm Sewer Systems (MS4s) generally serving populations over 100,000, (2) construction activity disturbing 5 acres of land or greater and (3) ten categories of industrial activity.

Phase II of the stormwater management program is the next step in the EPA's effort to preserve, protect, and improve the Nation's surface water resources from polluted stormwater runoff. The Phase II program expands the Phase I program to include all urbanized areas and smaller construction sites. Although it is a federal program, the Phase II Stormwater permit is issued and regulated by the Maine DEP (Chapter 500 and 502). Under the MS4 regulations, a municipality must implement the following six Minimum Control Measures: (1) Public education and outreach, (2) Public participation, (3) Illicit discharge detection and elimination, (4) Construction site stormwater runoff control, (5) Post-construction stormwater management, and (6) Pollution prevention/good housekeeping. The permit requires the Town to develop a draft Stormwater Management Plan by September 3, 2003 that will establish measurable goals for each of the Minimum Control Measures. The town will also need to document the implementation of the Plan, and provide annual reports to the Maine DEP. Freeport, Yarmouth, Portland, South Portland, Cape Elizabeth, Cumberland and Falmouth are cities and towns within the WI boundary area regulated by the Phase II permit requirements (Figure 12).



Figure 12. EPA Urbanized Area Stormwater Map in Growing Area WI

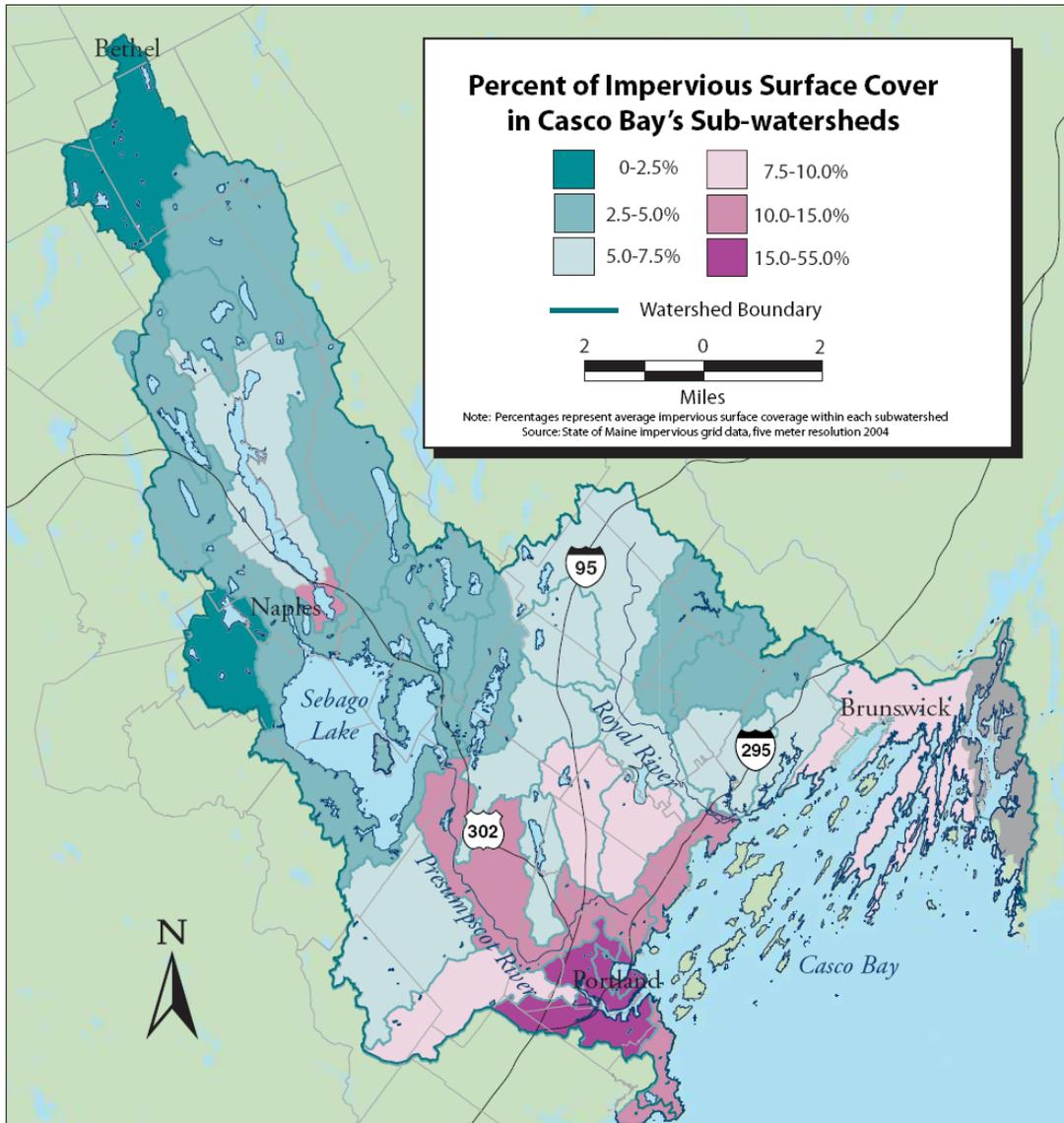


Map courtesy of US EPA at [http://www.epa.gov/npdes/pubs/ua\\_me\\_portland.pdf](http://www.epa.gov/npdes/pubs/ua_me_portland.pdf)

Maine DEP reports that there is a relationship between the percent impervious area of a watershed, and the water quality of the water body to which the watershed drains. "Imperviousness" refers to the area of roads, parking lots, sidewalks, rooftops, and other impermeable areas in the watershed. The percentage of the watershed that is impervious can be used as an indicator to measure the impact of land development on aquatic systems. Maine DEP has studied numerous streams in Maine in order to determine whether the effectiveness of the impervious cover is an indicator. In Maine, no streams with greater than 10% imperviousness that have been evaluated for attainment of aquatic life standards have met federal Clean Water Act standards and area considered "impaired". Two means of identifying "at risk" streams are by using monitoring data, when available, and by using the imperviousness of the watershed as an indicator. In broad terms, a stream is considered at risk if it is not currently meeting standards, or is at risk of degradation based upon the percent of its watershed that is impervious. Growth in watersheds below 10% can be expected to result in detrimental impacts on streams as imperviousness approaches 10%, unless steps are taken to control the quantity and quality impacts from stormwater runoff. According to the Casco Bay Estuary Partnership's 2005 State of the Bay report (using State of Maine 2004 data), all but the Freeport shore of the Cousins River in Growing Area WI is in the 10.0-15.0% impervious surface cover (Figure 13).



Figure 13. Impervious Surface Cover in Growing Area WI



Map courtesy of Casco Bay Estuary Partnership <http://www.cascobay.usm.maine.edu/pdfs/Indicator%202--Impervious.pdf>

Falmouth, Cumberland and Yarmouth shores have steep slopes down to open beaches. Runoff from the uplands flows down through grass gullies and partial culvert pipes to the beach, where it mixes with ocean water. The majority of the houses are connected to the town sewer system, so runoff is non-point in origin.



The town of Cumberland, in an effort to be in compliance with the National Pollution Discharge and Elimination System (NPDES) Phase II permitting program opted to meet the Illicit Discharge and Elimination portion of Phase II by mapping and inspecting the outfalls that lead into Casco Bay. Part of the project was to inventory stormwater features and to map the stormwater infrastructure which was completed in 2005. The inventory resulted in the documentation of 31 outfalls, 280 storm drains, 40 drain manholes and 126 culverts, among other things, such as catch basins and detention ponds.

The pesticide 2, 4-D is a commonly used herbicide for the control of broadleaf weeds. It is the primary ingredient in most 'weed and feed' lawn applications. It is water soluble and does not bind well to soil and is often detected in groundwater and stormwater runoff. The EPA levels for drinking water are 70ppb and the Hazard Analysis Critical Control Point (HACCP) guidelines for seafood are 1 ppm. The levels listed in the HACCP rule represent a tolerance and not a guideline or an action level. The measurable amount of 2,4-D (1.1ug/L) in the stormwater converted to ppm = .001 ppm or 1.1ppb. The levels found in the stormwater study to date do not meet the action levels issued in the HACCP code of federal regulations.

#### ***Non-Point Pollution Sources from Streams***

Streams are a source of fresh water in growing area WI in addition to snowmelt, overland runoff after rainfall and direct precipitation. Streams carry stormwater, snowmelt and groundwater into the coastal estuaries. Feces deposited on land can release pathogens into surface waters which are then carried to shellfish areas via runoff. Many freshwater streams empty into shellfish harvesting areas where fecal bacteria and viruses accumulate in sediments and can subsequently be re-suspended into the water column and therefore, filtered by the shellfish through respiration and feeding activities.

DMR collected stream samples from various sites on various dates from June 2008 through December 2010 in growing area WI (Figure 14). Table 4 shows the fecal coliform results of the stream samples. The flow rates for streams were estimated on the day of collection.

Stream flows in gallons per minute (gpm) were determined for streams sampled in 2008 and 2009 using a lightweight, portable flow meter. Stream flows during 2010 were qualitatively determined (due to time and personnel constraints) as low, medium or high. Stream station S1WI30 drains into the head of Broad Cove, Cumberland and Yarmouth across the cove from WI 33; both exceed the approved standard in 2008 and 2009 during the summer through early fall. Due to the intermittent seasonal pollution confirmed by DMR's accelerated sampling schedule during 2010, Broad Cove is classified as "conditionally approved," and closed to the harvest of shellfish from June 1 through October 31. Stream stations S1WI51, S2WI51, S3WI51 and S4WI51 are located in the Cousins River and Pratt's Brook north of Route One (Yarmouth and Freeport). Although the stream fecal scores met the approved standard, the station WI 51 P90 score exceeded the "restricted" standard, resulting in the "prohibited" classification north of Route One. Management recommended a classification of "conditionally restricted" below Route One; harvesting is prohibited without a special MDMR permit, and all of



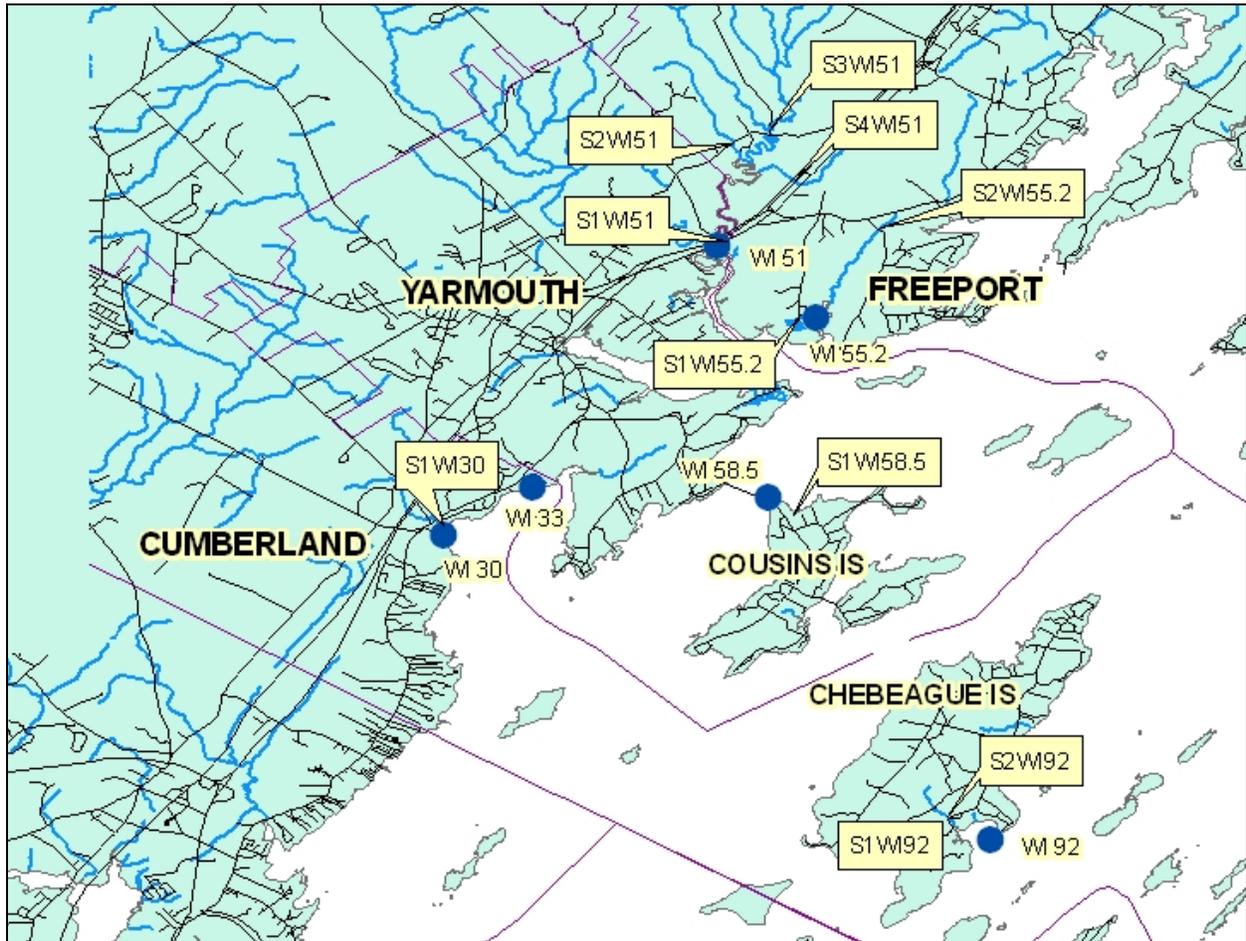
these areas will be completely closed to harvesting of any kind during any malfunction at the Yarmouth Wastewater Treatment Plant. Stream stations S1WI55.2 and S2WI55.2, based on one sample each collected April 8, 2009, also met the approved standard. The sampling station WI 55.2, however, consistently met the restricted standard and was classified as “conditionally restricted” due to the proximity to the Yarmouth wastewater treatment plant. Stream station S1WI58.5, sampled on June 15, 2009, exceeded the restricted standard (>200), however, the WI 58.5 P90 score met the approved standard. Station WI 58.5 is classified as “conditionally approved” due to the proximity to the Yarmouth wastewater treatment plant. Stream stations S1WI92 and S2WI92 were sampled once on June 3, 2008 and met the approved standard. Station WI 92 is classified as “approved”, however, Johnson’s Cove which is monitored by station WI 92 was downgraded from approved to prohibited in 2010 due to a malfunctioning septic system. Additional stream sampling must be done to determine the loading on the growing area WI. Based on the limited sampling at these stations, it is hard to make a determination on what the actual direct impact is on water quality

**Table 4. Stream Sample Results Collected From June 2008 through December 2010 in Growing Area WI.**

| Sample Date | Sample Station | Location                       | FC/100ml | Stream Flow (gpm) |
|-------------|----------------|--------------------------------|----------|-------------------|
| 6/3/2008    | S1WI092.00     | Chebeague Is.                  | 27       | 5                 |
|             | S2WI092.00     |                                | 2        |                   |
| 4/8/2009    | S1WI051.00     | Cousins R Yarmouth             | 6        | >500              |
|             | S1WI055.20     | Freeport                       | 5.5      | 50                |
|             | S2WI051.00     | Cousins R Yarmouth             | 14       | 15                |
|             | S2WI055.20     | Freeport                       | 9.1      | 30-40             |
|             | S3WI051.00     | Cousins River Yarmouth         | 12       | >200              |
|             | S4WI051.00     |                                | 2        | 15-20             |
| 6/15/2009   | S1WI030.00     | Cumberland Foreside Broad Cove | 160      | 100               |
|             | S1WI033.00     |                                | 320      | 50                |
|             | S1WI058.50     | Cousins Is.                    | >200     | 5                 |
| 4/6/2010    | S1WI030.00     | Cumberland Foreside Broad Cove | 4        | medium            |
| 6/8/2010    | S1WI030.00     |                                | 420      |                   |
| 6/28/2010   | S1WI030.00     |                                | >1600    | medium            |
| 7/14/2010   | S1WI030.00     |                                | 1480     |                   |
| 8/11/2010   | S1WI030.00     |                                | 580      | low               |
| 8/17/2010   | S1WI030.00     |                                | 1020     | low               |
| 9/8/2010    | S1WI030.00     |                                | 92       | low               |
| 9/29/2010   | S1WI030.00     |                                | 88       | low               |
| 12/16/2010  | S1WI030.00     |                                | <2       | high              |



Figure 14. Stream Sample Sites in Growing Area WI





**Agricultural Activities**

A drive through survey was conducted on November 13, 2008. As part of this triennial report, agricultural activities and waste were noted but not fully evaluated; activities included animal farms, concentrations of animals at non-commercial farms, slaughterhouses, feed lots, educational facilities, individual property owners' pets, kennels, vegetable and fruit farms, and landscaping businesses (Table 5 and Figure 15). Growing area WI has miles of pastoral farmland that is used for grazing, hay production and commercial vegetable and farms that provide landscape materials in the headwaters of the growing area.

**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. The area was reclassified from approved to restricted on December 31, 2008.

Dogs are walked on Sandy Beach on Cousins Island. During a drive-through survey in the area on July 7, 2010 it was noted that there were a lot of dog feces at the bottom of the path on the beach. It was observed that a very high percentage of the people who arrived at the beach had unleashed dogs.

September 9, 2010- During a drive-through survey of Potato Cove, Cousins Island, no dog waste was observed along the shore of Potato Cove; bags for dog waste are available at the parking lot. A port-a-potty is on site and looked well maintained. There is an intermittent stream/gully draining to the head of the cove, however, there was not enough flow to collect a stream sample for analysis. This area is currently classified as prohibited.

October 5, 2010: During a drive-through survey of Broad Cove shoreline, Cumberland, new construction activity was noted in the pasture at the head of the cove.

During sampling runs and other times driving through growing area WI deer and moose have been sighted on the marshes on the Cousins River north of Route 95.

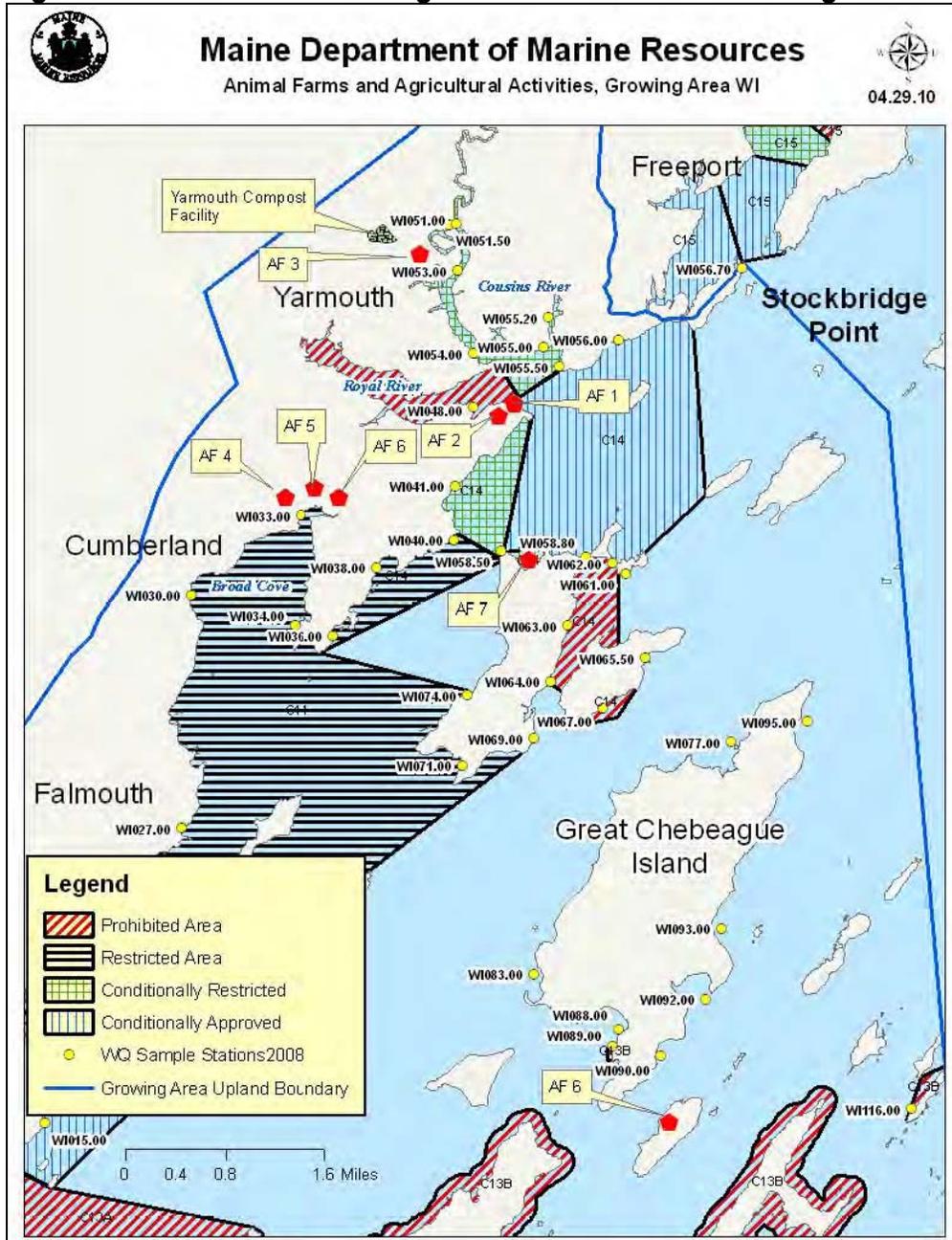
**Table 5. Animal Farms and Agricultural Activities, Growing Area WI, 2008-2010.**

| Town           | Pollution ID | Actual or Potential | Direct or Indirect | Pollution Description     | Survey Date       |
|----------------|--------------|---------------------|--------------------|---------------------------|-------------------|
| Yarmouth       | AF 1         | P                   | I                  | Hayfields                 | June 28, 2010     |
|                | AF 2         | P                   | I                  | Highland Farm sheep       |                   |
|                | AF 3         | A                   | I                  | Pet waste on stream/gully | November 13, 2008 |
|                | AF 4         | P                   | D                  | 10 Cows in pasture        |                   |
|                | AF 5         | P                   | I                  | 2 Sheep                   |                   |
|                | AF 6         | P                   | D                  | Horses                    |                   |
| Cousins Island | AF 7         | A                   | D                  | Dog waste on beach        | July 7, 2010      |



| Town        | Pollution ID | Actual or Potential | Direct or Indirect | Pollution Description          | Survey Date  |
|-------------|--------------|---------------------|--------------------|--------------------------------|--------------|
| Hope Island | AF 8         | A                   | I                  | Animals pastured to shore edge | June 3, 2008 |

Figure 15. Animal Farms and Agricultural Activities in Growing Area WI





**Conservation/Recreation Areas**

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. There are port-a-potties at the beach, however during a field visit on July 9, 2007 human excrement and toilet tissue were observed in the bushes behind the port-a-potty. The area was classified conditionally restricted until May 12, 2009, when it was reclassified as prohibited.

**Water Quality Review and Discussion**

Table 6 lists all active approved, restricted and prohibited stations in Growing Area WI, with their respective Geomean and P90 calculations for 2010. Please refer to Appendix C for a key to interpreting the headers on the columns of Table 6. The approved and restricted standards for each station are also displayed in Table 6. These standards will fluctuate yearly as a result of the DMR transition from a most probable number (MPN) fecal coliform test method to a membrane filtration (MF) method and are dependent on the number of samples analyzed by MPN versus MF. The total number of data points used in the calculations is displayed in the Count column and includes both MPN and MF values. The number of data points analyzed by MF is displayed in the MFCount column. This fluctuating standard will cease when all 30 data points have been analyzed by the MF method.

All approved and restricted stations met their NSSP standard at the end of 2010. Station WI 26 was reactivated on August 15, 2007 (last sampled 10/10/95) due to the expansion of the Sea Meadows sewage treatment plant prohibited area, requiring a new boundary station. All stations which serve as boundary stations (noted in table) met the approved standard at the end of 2009. Multiple restricted and prohibited stations also met the approved standard; these stations must remain classified as such due to their proximity to identified pollution sources (septic system malfunction, OBDs, wastewater treatment plant outfalls, etc), or due to variability of the water quality sample results in the datasets of stations. All restricted stations met the NSSP restricted standard.

**Table 6. Geometric Means and P90 Scores, Growing Area WI**

| Station  | Class       | Count | MFCCount | GM  | SDV  | MAX  | P90  | Appd_Std | Restr_Std | Min_Date   |
|----------|-------------|-------|----------|-----|------|------|------|----------|-----------|------------|
| WI017.00 | P           | 30    | 30       | 6.3 | 0.69 | 480  | 49.7 | 31       | 163       | 8/14/2007  |
| WI026.00 | R           | 30    | 25       | 5.1 | 0.54 | 160  | 25.9 | 33       | 177       | 2/15/2006  |
| WI034.00 | CA-boundary | 30    | 24       | 2.8 | 0.3  | 46   | 6.8  | 33       | 184       | 12/13/2005 |
| WI036.00 | P           | 30    | 18       | 3.1 | 0.39 | 93   | 9.8  | 37       | 208       | 7/24/2003  |
| WI038.00 | P           | 30    | 24       | 4.5 | 0.62 | 240  | 28.9 | 33       | 184       | 12/13/2005 |
| WI040.00 | P           | 30    | 18       | 5.2 | 0.6  | 460  | 31.2 | 37       | 208       | 5/13/2004  |
| WI041.00 | P           | 30    | 30       | 5.8 | 0.75 | 1700 | 54.2 | 31       | 163       | 6/10/2008  |



| Station  | Class | Count | MFCCount | GM  | SDV  | MAX  | P90  | Appd_Std | Restr_Std | Min_Date   |
|----------|-------|-------|----------|-----|------|------|------|----------|-----------|------------|
| WI048.00 | P     | 30    | 30       | 5   | 0.58 | 720  | 28.5 | 31       | 163       | 5/7/2008   |
| WI056.70 | A     | 30    | 30       | 2.8 | 0.37 | 120  | 8.5  | 31       | 163       | 3/5/2007   |
| WI061.00 | New   | 21    | 21       | 2.2 | 0.19 | 9.1  | 3.9  | 31       | 163       | 9/11/2007  |
| WI062.00 | P     | 30    | 29       | 2.5 | 0.33 | 72   | 6.7  | 31       | 166       | 5/10/2006  |
| WI063.00 | P     | 30    | 29       | 3.4 | 0.45 | 82   | 13.4 | 31       | 166       | 5/10/2006  |
| WI064.00 | P     | 30    | 30       | 3.6 | 0.42 | 33   | 12.7 | 31       | 163       | 10/11/2006 |
| WI065.50 | A     | 30    | 29       | 2.9 | 0.45 | 126  | 11.3 | 31       | 166       | 5/10/2006  |
| WI069.00 | P     | 30    | 27       | 2.7 | 0.3  | 33   | 6.7  | 32       | 173       | 5/10/2006  |
| WI071.00 | R     | 30    | 27       | 3.8 | 0.62 | 1700 | 24   | 32       | 173       | 5/10/2006  |
| WI074.00 | R     | 30    | 27       | 3   | 0.37 | 56   | 9.1  | 32       | 173       | 5/10/2006  |
| WI077.00 | A     | 30    | 27       | 4.1 | 0.63 | 580  | 26.6 | 32       | 173       | 4/25/2006  |
| WI083.00 | A     | 30    | 27       | 2.5 | 0.39 | 144  | 8.1  | 32       | 173       | 4/25/2006  |
| WI088.00 | A     | 30    | 29       | 3.5 | 0.55 | 146  | 18.6 | 31       | 166       | 4/25/2006  |
| WI089.00 | P     | 30    | 29       | 4   | 0.53 | 100  | 19.1 | 31       | 166       | 8/8/2006   |
| WI090.00 | A     | 30    | 27       | 2.3 | 0.29 | 64   | 5.5  | 32       | 173       | 4/25/2006  |
| WI092.00 | A     | 30    | 27       | 2.8 | 0.34 | 64   | 7.7  | 32       | 173       | 12/5/2005  |
| WI093.00 | A     | 30    | 27       | 2.4 | 0.35 | 140  | 6.8  | 32       | 173       | 4/25/2006  |
| WI095.00 | A     | 30    | 27       | 2.8 | 0.48 | 580  | 12   | 32       | 173       | 4/25/2006  |
| WI116.00 | P     | 30    | 24       | 2.1 | 0.11 | 6    | 3    | 33       | 184       | 11/14/2005 |

Table 7 lists all conditionally approved stations located in the Falmouth Marina area; data reflects the seasonal open status of November 15 to April 30. All conditionally approved stations met the NSSP approved standard in the open status. Station WI 17.5 has only 19 datapoints due to being reclassified from conditionally approved to prohibited in January 2009 (no shoreline survey); and reclassified back to conditionally approved in December 2010 following a shoreline survey during the summer of 2010. Table 8 lists all conditionally approved stations located in the Cumberland seasonal area; data reflects the seasonal open status of November 1 to May 31. All conditionally approved stations in Cumberland seasonal area met the NSSP approved standard in the open status

**Table 7. Geomean and P90-Seasonal Data Analysis for Falmouth Foreside Marina Seasonal Conditional Stations; Open November 15-April 30, 2010**

| Station  | Class       | Count | MFCCount | GM  | SDV  | MAX | P90  | Appd_Std | Restr_Std | Min_Date   |
|----------|-------------|-------|----------|-----|------|-----|------|----------|-----------|------------|
| WI015.00 | CA          | 30    | 16       | 4.2 | 0.42 | 43  | 15.1 | 38       | 216       | 3/10/2004  |
| WI017.50 | Reactivated | 19    | 15       | 3.8 | 0.42 | 104 | 13.6 | 34       | 185       | 1/9/2006   |
| WI025.00 | CA          | 30    | 14       | 3.4 | 0.29 | 23  | 8.3  | 39       | 225       | 11/18/2003 |

**Table 8. Geomean and P90-Seasonal Data Analysis for Cumberland Seasonal Conditional Stations; Open November 1- May 31, 2010**

| Station  | Class       | Count | MFCCount | GM  | SDV  | MAX | P90 | Appd_Std | Restr_Std | Min_Date  |
|----------|-------------|-------|----------|-----|------|-----|-----|----------|-----------|-----------|
| WI027.00 | CA          | 30    | 17       | 3.1 | 0.22 | 11  | 6.1 | 37       | 212       | 5/30/2000 |
| WI028.50 | New         | 7     | 7        | 1.9 | 0    | 1.9 | 1.9 | 31       | 163       | 2/16/2010 |
| WI029.00 | Reactivated | 14    | 7        | 2.4 | 0.11 | 3.6 | 3.3 | 38       | 221       | 5/7/1998  |



| Station  | Class       | Count | MFCCount | GM  | SDV  | MAX | P90  | Appd_Std | Restr_Std | Min_Date   |
|----------|-------------|-------|----------|-----|------|-----|------|----------|-----------|------------|
| WI030.00 | CA          | 30    | 17       | 3.2 | 0.35 | 86  | 9.1  | 37       | 212       | 5/30/2000  |
| WI033.00 | CA          | 30    | 17       | 4.4 | 0.53 | 460 | 21.6 | 37       | 212       | 12/22/1999 |
| WI034.00 | Reactivated | 28    | 12       | 3.2 | 0.28 | 46  | 7.5  | 40       | 230       | 11/12/1998 |

All stations were collected by systematic random sampling were collected the required number of times in 2010. Sampling effort is displayed in Table 9. Numerous stations were collected on an accelerated schedule in order to expand the dataset, as a flood station or to collect under varying conditions.

**Table 9. WI Samples Collected in 2010**

| Station  | Class | Adverse |      | Extra  |      | Random |      | Total | Comments                                    |
|----------|-------|---------|------|--------|------|--------|------|-------|---|
|          |       | Closed  | Open | Closed | Open | Closed | Open |       |   |
| WI015.00 | CA    |         |      |        | 2    |        |      | 2     | Reclassified from P to marina CA 12/20/2010 |
|          | P     |         |      | 2      |      | 6      |      | 8     |   |
| WI017.00 | P     |         |      | 4      |      | 6      |      | 10    |   |
| WI017.50 | CA    |         |      |        | 1    |        |      | 1     |   |
|          | P     |         |      | 3      |      | 6      |      | 9     |   |
| WI025.00 | CA    |         |      |        | 2    |        |      | 2     |   |
|          | P     |         |      | 2      |      | 6      |      | 8     |   |
| WI026.00 | R     |         |      |        |      |        | 6    | 6     |   |
| WI027.00 | CA    |         |      |        | 1    |        |      | 1     |   |
|          | R     |         | 2    |        | 3    |        | 6    | 11    |   |
| WI028.50 | CA    |         |      |        | 1    |        |      | 1     |   |
|          | R     |         |      |        | 6    |        | 6    | 12    |   |
| WI029.00 | CA    |         |      |        | 1    |        |      | 1     |   |
|          | R     |         |      |        | 5    |        | 6    | 11    |   |
| WI030.00 | CA    |         |      |        | 1    |        |      | 1     |   |
|          | R     | 3       | 3    |        | 6    |        | 6    | 18    |   |
| WI033.00 | CA    |         |      |        | 1    |        |      | 1     |   |
|          | R     |         | 2    |        | 5    |        | 6    | 13    |   |
| WI034.00 | R     |         |      |        |      |        | 6    | 6     |   |
| WI036.00 | P     |         |      |        |      | 6      |      | 6     |   |
| WI038.00 | P     |         |      |        |      | 6      |      | 6     |   |
| WI040.00 | P     |         |      |        |      | 6      |      | 6     |   |
| WI041.00 | P     |         |      |        |      | 12     |      | 12    |   |
| WI048.00 | P     | 1       |      |        |      | 12     |      | 13    |   |
| WI051.00 | CR    |         | 4    |        |      | 1      | 11   | 16    |   |
| WI051.50 | CR    |         | 4    |        |      | 1      | 11   | 16    |   |
| WI053.00 | CR    |         | 4    |        |      | 1      | 11   | 16    |   |
| WI054.00 | CR    |         | 4    |        |      | 1      | 11   | 16    |   |
| WI055.00 | CR    |         | 2    |        |      | 1      | 11   | 14    |   |
| WI055.20 | CR    |         | 3    |        |      | 1      | 11   | 15    |   |
| WI055.50 | CA    |         | 3    |        |      |        | 12   | 15    |   |
| WI056.00 | CA    | 18      |      |        |      |        | 12   | 30    |   |
| WI056.70 | A     |         |      |        |      |        | 7    | 7     |   |
| WI058.50 | CA    |         |      |        |      |        | 3    | 3     |   |
|          | P     |         |      |        |      | 9      |      | 9     |   |
| WI058.80 | CA    |         |      |        |      |        | 12   | 12    |   |



| Station  | Class | Adverse |      | Extra  |      | Random |      | Total | Comments |
|----------|-------|---------|------|--------|------|--------|------|-------|----------|
|          |       | Closed  | Open | Closed | Open | Closed | Open |       |          |
| WI061.00 | A     |         |      |        |      |        | 6    | 6     |          |
| WI062.00 | P     |         |      |        |      | 6      |      | 6     |          |
| WI063.00 | P     |         |      |        |      | 6      |      | 6     |          |
| WI064.00 | P     |         |      |        |      | 7      |      | 7     |          |
| 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     |         |      |        |      | 5      |      | 5     |          |

## Upward Classifications during Review Years

### Cousins Island

Water quality station WI 58.5 (Sandy Point) on Cousins Island was reclassified from prohibited to conditionally approved on September 28, 2010 (based on Yarmouth treatment plant operation). The area was reclassified from conditionally approved to prohibited in May 2008, due to documented dog feces on the beach, a poorly maintained portable toilet with the potential to impact the shoreline of Sandy Point, and a cesspool that was believed to be malfunctioning. In September 2010, the Yarmouth codes enforcement officer confirmed that the property that was identified as having a potential cesspool malfunction was actually an inground septic system with a leach field; the system was reported to be in good working condition, with the septic tank being routinely serviced by the town of Yarmouth. Also in September 2010, DMR conducted a survey of Sandy Point, specifically noting any dog waste, and the condition of the portable toilet that services the parking area for Sandy Point. No dog waste was present on the beach; bags for dog waste pick up as well as a trash can was available at the head of the trail that provides access to the beach. A sign requiring dog waste pick up on the beach was installed at the head of the trail. The portable toilet, located in the beach parking area (approximately 250 feet from shore), was well maintained and no human waste or trash was noted anywhere in the vicinity of the portable toilet.

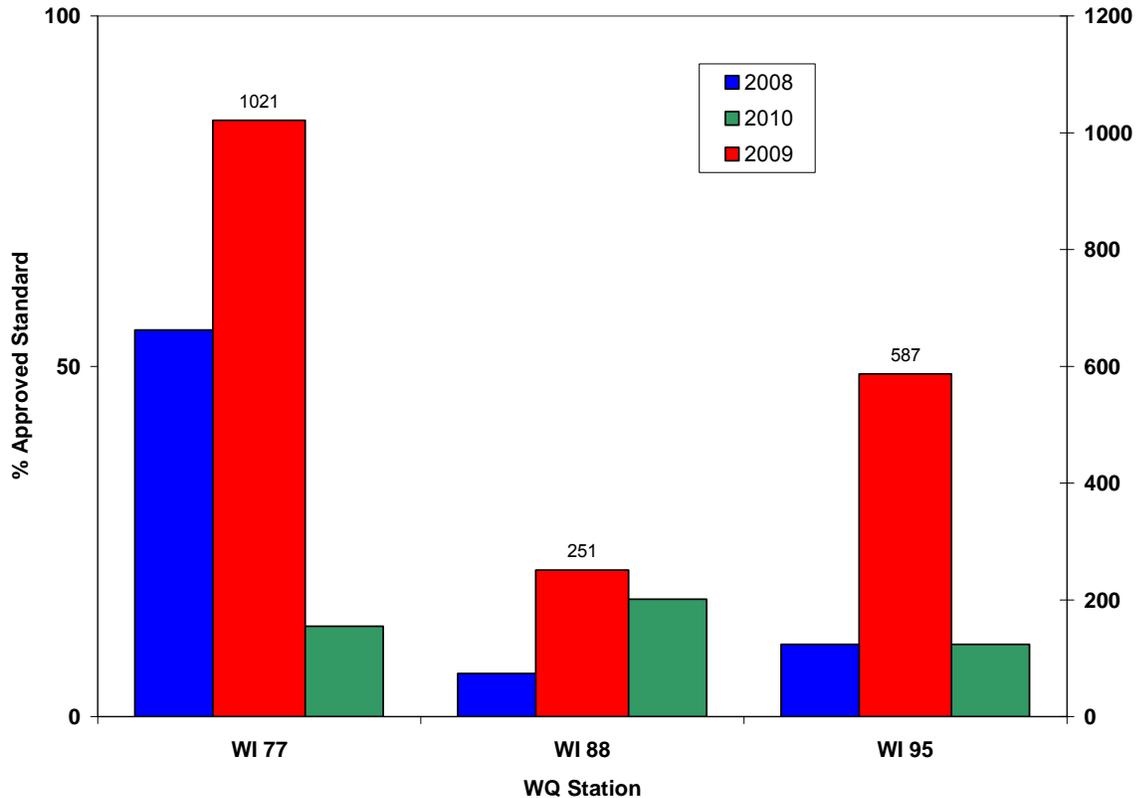
### Chebeague Island

Three water quality stations on Chebeague Island (WI 77, WI 88 and WI 95) were reclassified from prohibited to approved on May 21, 2009 following an updated shoreline survey. Figure 16 shows water quality trends over the review years with 2009 P90 scores extremely high



(secondary Y-axis). Stations WI 88 and WI 95 had 1.97 and 3.07 cumulative inches on a 72-hour rainfall, respectively, on July 8, 2009. Station WI 77 had 1.97 cumulative inches on a 72-hour rainfall on October 6, 2009.

**Figure 16. Chebeague Island Water Quality Trends, 2008-2010 (Year Round)**



**Falmouth Shoreline**

The Falmouth shoreline was reclassified from prohibited to conditionally approved on December 20, 2010 following a shoreline survey. Water quality in this area is monitored by stations WI 15, 17, 17.5, and 25. Station WI 26 is located outside the former marina conditional area boundary; this station has a history of poor water quality during the winter months, and is not being recommended for an upgrade in classification. Water quality in the marina conditionally approved area has met, and continues to meet the approved standard during the open status of November 15th to April 30<sup>th</sup> (Figure 17 and Table 10); station WI 26 does not meet the approved standard during the open status.



Figure 17. Falmouth Water Quality Trends, Open Status Data, 2007- Nov. 2010

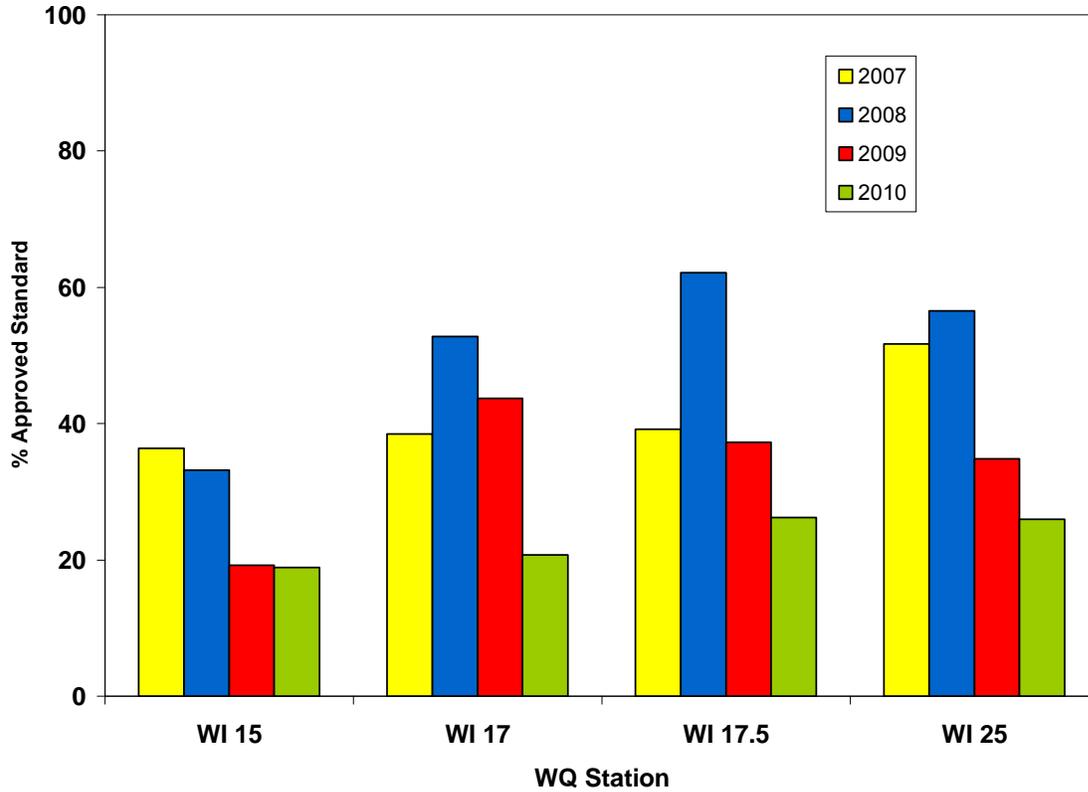


Table 10. Falmouth Water Quality Data, Proposed Open Status of Nov 15 to April 30

| Station  | Class | Count | MFCCount | GM   | SDV  | MAX  | P90   | Appd_Std | Restr_Std | Min_Date  |
|----------|-------|-------|----------|------|------|------|-------|----------|-----------|-----------|
| WI015.00 | CA    | 30    | 21       | 4.2  | 0.49 | 52   | 18.1  | 35       | 195       | 2/8/2005  |
| WI017.00 | CA    | 30    | 21       | 4    | 0.54 | 480  | 19.8  | 35       | 195       | 2/23/2005 |
| WI017.50 | CA    | 25    | 21       | 3.4  | 0.4  | 104  | 11.5  | 33       | 179       | 1/9/2006  |
| WI025.00 | CA    | 30    | 21       | 3.2  | 0.34 | 34   | 9.1   | 35       | 195       | 2/16/2005 |
| WI026.00 | R     | 29    | 11       | 13.4 | 0.78 | 1100 | 134.3 | 41       | 238       | 1/28/2003 |



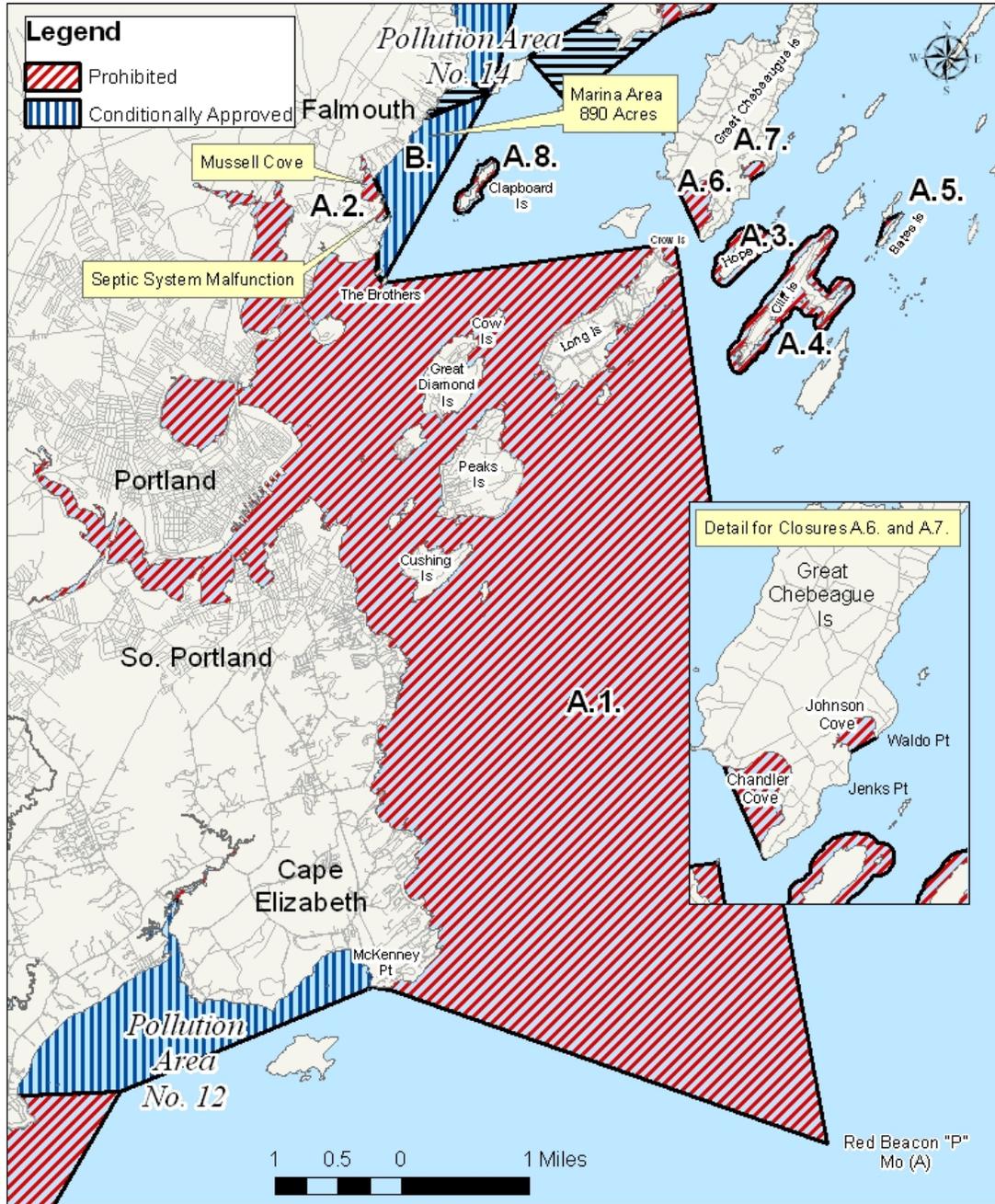
Figure 18. Falmouth Shoreline, with Classification Change (Section B)



### Maine Department of Marine Resources

12/16/10

Pollution Area No. 13, Western Casco Bay and Islands (Cape Elizabeth to Falmouth)





## Broad Cove and Cumberland Shoreline

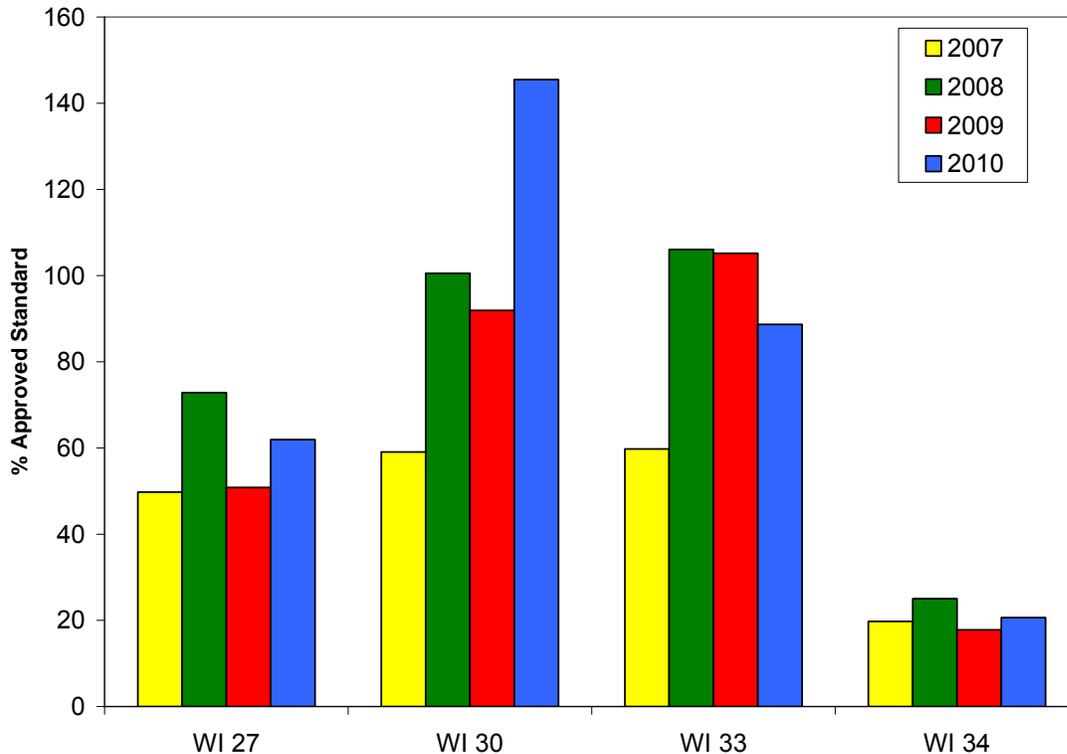
Broad Cove and the entire shoreline of Cumberland was downgraded from approved to restricted on December 31, 2008, due to water at station WI 30 quality not meeting the approved standard. Drive-through surveys during the reporting period noted new construction, in addition to cows, horses and sheep in pastures at the head of Broad Cove with little buffer between them and the shoreline (Figures 7 and 15). Stream data (Table 4) indicates high bacteria levels at WI 30 and WI 33 from June through September. In 2010, one additional sample station (WI 28.5) was established and one deactivated station was re-activated (WI 29) to better monitor the water quality in this area. Additional sampling effort was also initiated, to better assess the seasonal and rainfall impacts on water quality in this area.

Year round water quality trends over the past 4 years are presented in Figure 19. Stations WI 27 and WI 34 have consistently met water quality approved standard over the past four review years. However, stations WI 30 and 33 have not; water quality at these two stations surpassed the approved standard at the end of the 2008 review year. Station WI 30 continues to show declining water quality over the current review year. Tables 11 and 12 show individual data points for stations WI 30 and 33, over the last eight years of sample collection (2003-2010). Table 13 shows the 2010 data from new and recently re-activated stations (WI 28.5 and 29). Geometric means for each individual month are presented on the last line of each table. The grayed out months are the proposed closed status period; any samples collected after at least 0.5 inches of cumulative rainfall within 4 days of collection are highlighted in yellow. All monthly geometric means met the approved geometric mean standard of 14 in the proposed Open status months, except during the months of January for station WI 33. This station had a geometric mean of 20, based on only 1 sample collected. This area is susceptible to icing over, and therefore, the opportunity for sample collection or shellfish harvesting in the month of January is very limited.

A rainfall assessment was completed for stations WI 30 and 33; only data collected after more than 0.5 inches of cumulative rainfall, during the proposed open status was considered for this assessment. Since 2003, 7 samples were collected at station WI 30, and 10 samples were collected at station WI 33, that met this rainfall condition. For both stations, one sample out of the dataset surpassed the approved variability standard. Overall, the geometric means calculated for the two stations using the dataset limited to rainfall data were as follows: WI 30 had geometric mean of 5.8, and station WI 33 had a geometric mean of 6.9. Both geometric means were well under the approved geometric mean standard of 14.



**Figure 19. Broad Cove, Cumberland P90 Trends, 2007-2010 (Year Round)**



The Cumberland shoreline was re-surveyed by DMR with the assistance of the Cumberland police department on October 14, 2010. One potential pollution source was noted and reported to the town CEO for follow up; the CEO re-inspected the system and determined that it was functioning without a problem.

Based on the water quality assessment (Table 13) and the results of the most recent shoreline survey property inspections, it was recommended that Broad Cove and the Cumberland Shoreline be reclassified to conditionally approved based on season, with an open status from November 1 through May 31 (Figure 20). The reclassification was in effect on December 20, 2010. It is further recommended that station WI 28.5 and 29 be sampled on an accelerated schedule in 2011 and receive a further data assessment at the end of 2011. If these stations show similar water quality trends as station WI 27, then it is recommended that the southern portion of the Cumberland shoreline be evaluated for an upward classification to approved year round.



**Table 11. Station WI 30, Seasonal and Rainfall Assessment, 2003- 2010**

| Rain 3 day | Rain 4 day | Date      | Strat | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|------------|------------|-----------|-------|-----|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
|            | 1.14       | 29-May-03 | R     |     |     |     |     | 3.6 |      |      |     |      |     |     |     |
| 0.01       | 0.01       | 12-Jun-03 | R     |     |     |     |     |     | 43   |      |     |      |     |     |     |
| 0.27       | 0.27       | 24-Jul-03 | R     |     |     |     |     |     |      | 7.3  |     |      |     |     |     |
| 0          | 0          | 21-Aug-03 | R     |     |     |     |     |     |      |      | 3.6 |      |     |     |     |
|            |            | 11-Sep-03 | R     |     |     |     |     |     |      |      |     | 3.6  |     |     |     |
|            |            | 09-Oct-03 | R     |     |     |     |     |     |      |      |     |      | 2.9 |     |     |
|            | 0.06       | 13-May-04 | R     |     |     |     |     | 2.9 |      |      |     |      |     |     |     |
| 1.02       | 1.02       | 03-Jun-04 | R     |     |     |     |     |     | 3.6  |      |     |      |     |     |     |
| 0.19       | 0.19       | 01-Jul-04 | R     |     |     |     |     |     |      | 23   |     |      |     |     |     |
| 0.39       | 0.39       | 29-Jul-04 | R     |     |     |     |     |     |      | 43   |     |      |     |     |     |
|            |            | 16-Sep-04 | R     |     |     |     |     |     |      |      |     | 2.9  |     |     |     |
| 0.17       | 0.17       | 19-May-05 | R     |     |     |     |     | 2.9 |      |      |     |      |     |     |     |
| 1.82       | 1.82       | 16-Jun-05 | R     |     |     |     |     |     | 93   |      |     |      |     |     |     |
|            |            | 24-Aug-05 | R     |     |     |     |     |     |      |      | 2.9 |      |     |     |     |
|            |            | 13-Sep-05 | R     |     |     |     |     |     |      |      |     | 2.9  |     |     |     |
|            |            | 14-Nov-05 | R     |     |     |     |     |     |      |      |     |      |     | 2.9 |     |
| 0.04       | 0.04       | 29-Nov-05 | R     |     |     |     |     |     |      |      |     |      |     | 7.3 |     |
|            | 0.02       | 05-Dec-05 | R     |     |     |     |     |     |      |      |     |      |     |     | 2.9 |
| 0.35       | 0.35       | 30-Jan-06 | R     | 9.1 |     |     |     |     |      |      |     |      |     |     |     |
|            | 0.33       | 15-Feb-06 | R     |     | 2.9 |     |     |     |      |      |     |      |     |     |     |
|            |            | 22-Mar-06 | R     |     |     | 2.9 |     |     |      |      |     |      |     |     |     |
| 0.47       | 0.47       | 25-Apr-06 | R     |     |     |     | 2.9 |     |      |      |     |      |     |     |     |
|            |            | 08-Aug-06 | R     |     |     |     |     |     |      |      | 15  |      |     |     |     |
|            | 0.16       | 12-Sep-06 | R     |     |     |     |     |     |      |      |     | <2   |     |     |     |
|            | 0.23       | 11-Dec-06 | R     |     |     |     |     |     |      |      |     |      |     |     | <2  |
| 0.69       | 0.69       | 03-Jan-07 | R     | <2  |     |     |     |     |      |      |     |      |     |     |     |
|            |            | 07-Mar-07 | R     |     |     | <2  |     |     |      |      |     |      |     |     |     |
| 0.65       | 0.99       | 30-Apr-07 | R     |     |     |     | 15  |     |      |      |     |      |     |     |     |
|            |            | 19-Jun-07 | R     |     |     |     |     |     | <2   |      |     |      |     |     |     |
| 0.03       | 0.04       | 14-Aug-07 | R     |     |     |     |     |     |      |      | <2  |      |     |     |     |
|            |            | 24-Oct-07 | R     |     |     |     |     |     |      |      |     |      | 114 |     |     |
| 1.14       | 1.14       | 06-Feb-08 | R     |     | <2  |     |     |     |      |      |     |      |     |     |     |
| 1.68       | 1.69       | 09-Mar-08 | A     |     |     | <2  |     |     |      |      |     |      |     |     |     |
|            | 0.03       | 08-Apr-08 | R     |     |     |     | <2  |     |      |      |     |      |     |     |     |
| 0.26       | 0.26       | 04-Jun-08 | R     |     |     |     |     |     | 11   |      |     |      |     |     |     |
| 0.21       | 0.22       | 28-Jul-08 | R     |     |     |     |     |     |      | 16   |     |      |     |     |     |
| 0.22       | 0.22       | 16-Sep-08 | R     |     |     |     |     |     |      |      |     | 460  |     |     |     |
| 0.57       | 1.47       | 17-Nov-08 | R     |     |     |     |     |     |      |      |     |      |     | 7.3 |     |
| 0.4        | 0.43       | 04-Mar-09 | R     |     |     | <2  |     |     |      |      |     |      |     |     |     |
| 1.7        | 1.7        | 21-Apr-09 | R     |     |     |     | 86  |     |      |      |     |      |     |     |     |
|            | 0.4        | 10-Jun-09 | R     |     |     |     |     |     | 20   |      |     |      |     |     |     |



| Rain 3 day                    | Rain 4 day | Date      | Strat | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|-------------------------------|------------|-----------|-------|-----|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
|                               |            | 05-Aug-09 | R     |     |     |     |     |     |      |      | <2  |      |     |     |     |
|                               | 1.68       | 01-Sep-09 | A     |     |     |     |     |     |      |      |     | <2   |     |     |     |
|                               |            | 22-Sep-09 | R     |     |     |     |     |     |      |      |     | <2   |     |     |     |
|                               | 0.07       | 02-Nov-09 | R     |     |     |     |     |     |      |      |     |      |     | 4   |     |
| 0.06                          | 0.06       | 16-Feb-10 | R     |     | <2  |     |     |     |      |      |     |      |     |     |     |
| 0.08                          | 0.08       | 06-Apr-10 | R     |     |     |     | <2  |     |      |      |     |      |     |     |     |
|                               |            | 24-May-10 | R     |     |     |     |     | <2  |      |      |     |      |     |     |     |
|                               |            | 31-May-10 | E     |     |     |     |     | 4   |      |      |     |      |     |     |     |
| 1.04                          | 1.81       | 08-Jun-10 | A     |     |     |     |     |     | 4    |      |     |      |     |     |     |
| 0.55                          | 0.55       | 28-Jun-10 | A     |     |     |     |     |     | 680  |      |     |      |     |     |     |
| 2.28                          | 2.29       | 14-Jul-10 | A     |     |     |     |     |     |      | 220  |     |      |     |     |     |
| 0.1                           | 0.1        | 24-Aug-10 | R     |     |     |     |     |     |      |      | 36  |      |     |     |     |
|                               | 0.88       | 07-Sep-10 | E     |     |     |     |     |     |      |      |     | 160  |     |     |     |
|                               |            | 21-Sep-10 | E     |     |     |     |     |     |      |      |     | 4    |     |     |     |
| 0.02                          | 0.02       | 05-Oct-10 | E     |     |     |     |     |     |      |      |     |      | 7.3 |     |     |
| 0.2                           | 0.2        | 25-Oct-10 | R     |     |     |     |     |     |      |      |     |      | <2  |     |     |
|                               | 0.05       | 02-Nov-10 | E     |     |     |     |     |     |      |      |     |      |     | <2  |     |
|                               |            | 16-Nov-10 | E     |     |     |     |     |     |      |      |     |      |     | <2  |     |
|                               | 0.03       | 30-Nov-10 | E     |     |     |     |     |     |      |      |     |      |     | <2  |     |
| 0.24                          | 0.25       | 28-Dec-10 | E     |     |     |     |     |     |      |      |     |      |     |     | <2  |
| <b>Monthly Geometric Mean</b> |            |           |       | 4.2 | 2.2 | 2.1 | 6.7 | 2.8 | 18.9 | 30.3 | 5.2 | 7.3  | 8.2 | 3.3 | 2.3 |

**Table 12. Station WI 33, Seasonal and Rainfall Assessment, 2003- 2010**

| Rain 3 day | Rain 4 day | Date      | Strat | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|------------|------------|-----------|-------|-----|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
|            | 1.14       | 29-May-03 | R     |     |     |     |     | 3.6 |      |      |     |      |     |     |     |
| 0.01       | 0.01       | 12-Jun-03 | R     |     |     |     |     |     | 23   |      |     |      |     |     |     |
| 0.27       | 0.27       | 24-Jul-03 | R     |     |     |     |     |     |      | 9.1  |     |      |     |     |     |
| 0          | 0          | 21-Aug-03 | R     |     |     |     |     |     |      |      | 2.9 |      |     |     |     |
|            |            | 11-Sep-03 | R     |     |     |     |     |     |      |      |     | 2.9  |     |     |     |
|            |            | 09-Oct-03 | R     |     |     |     |     |     |      |      |     |      | 3.6 |     |     |
|            | 0.06       | 13-May-04 | R     |     |     |     |     | 2.9 |      |      |     |      |     |     |     |
| 1.02       | 1.02       | 03-Jun-04 | R     |     |     |     |     |     | 9.1  |      |     |      |     |     |     |
| 0.19       | 0.19       | 01-Jul-04 | R     |     |     |     |     |     |      | 43   |     |      |     |     |     |
| 0.92       | 0.92       | 12-Aug-04 | R     |     |     |     |     |     |      |      | 3.6 |      |     |     |     |
|            |            | 16-Sep-04 | R     |     |     |     |     |     |      |      |     | 9.1  |     |     |     |
|            |            | 07-Oct-04 | R     |     |     |     |     |     |      |      |     |      | 2.9 |     |     |
|            | 0.04       | 02-Jun-05 | R     |     |     |     |     |     | 3.6  |      |     |      |     |     |     |
| 1.82       | 1.82       | 16-Jun-05 | R     |     |     |     |     |     | 93   |      |     |      |     |     |     |



| Rain 3 day | Rain 4 day | Date      | Strat | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|------------|------------|-----------|-------|-----|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
| 0.17       | 0.17       | 11-Aug-05 | R     |     |     |     |     |     |      |      | 2.9 |      |     |     |     |
| 0.68       | 0.68       | 15-Sep-05 | R     |     |     |     |     |     |      |      |     | 23   |     |     |     |
|            |            | 06-Oct-05 | R     |     |     |     |     |     |      |      |     |      | 7.3 |     |     |
|            |            | 14-Dec-05 | R     |     |     |     |     |     |      |      |     |      |     |     | 3   |
|            |            | 08-Mar-06 | R     |     |     | 9.1 |     |     |      |      |     |      |     |     |     |
| 0.29       | 0.47       | 26-Apr-06 | R     |     |     |     | 2.9 |     |      |      |     |      |     |     |     |
| 1.05       | 1.05       | 10-May-06 | R     |     |     |     |     | 2.9 |      |      |     |      |     |     |     |
| 0.02       | 0.02       | 19-Jul-06 | R     |     |     |     |     |     |      | 9.1  |     |      |     |     |     |
| 0.21       | 0.21       | 11-Oct-06 | R     |     |     |     |     |     |      |      |     |      | <2  |     |     |
| 0.45       | 0.45       | 24-Oct-06 | R     |     |     |     |     |     |      |      |     |      | 40  |     |     |
| 0.69       | 0.69       | 03-Jan-07 | R     | 20  |     |     |     |     |      |      |     |      |     |     |     |
|            |            | 07-Mar-07 | R     |     |     | <2  |     |     |      |      |     |      |     |     |     |
| 0.65       | 0.99       | 30-Apr-07 | R     |     |     |     | 8   |     |      |      |     |      |     |     |     |
|            |            | 19-Jun-07 | R     |     |     |     |     |     | <2   |      |     |      |     |     |     |
| 0.03       | 0.04       | 14-Aug-07 | R     |     |     |     |     |     |      |      | <2  |      |     |     |     |
|            |            | 24-Oct-07 | R     |     |     |     |     |     |      |      |     |      | 29  |     |     |
| 1.14       | 1.14       | 06-Feb-08 | R     |     | 12  |     |     |     |      |      |     |      |     |     |     |
| 0.8        | 0.8        | 27-Feb-08 | A     |     | <2  |     |     |     |      |      |     |      |     |     |     |
| 0.97       | 0.97       | 05-Mar-08 | E     |     |     | <2  |     |     |      |      |     |      |     |     |     |
| 1.68       | 1.69       | 09-Mar-08 | A     |     |     | 4   |     |     |      |      |     |      |     |     |     |
|            | 0.03       | 08-Apr-08 | R     |     |     |     | <2  |     |      |      |     |      |     |     |     |
| 0.26       | 0.26       | 04-Jun-08 | R     |     |     |     |     |     | 8    |      |     |      |     |     |     |
| 3.01       | 3.02       | 04-Aug-08 | R     |     |     |     |     |     |      |      | 16  |      |     |     |     |
| 0.22       | 0.22       | 16-Sep-08 | R     |     |     |     |     |     |      |      |     | 160  |     |     |     |
| 0.57       | 1.47       | 17-Nov-08 | R     |     |     |     |     |     |      |      |     |      |     | 44  |     |
|            |            | 24-Mar-09 | R     |     |     | 2   |     |     |      |      |     |      |     |     |     |
| 1.7        | 1.7        | 21-Apr-09 | R     |     |     |     | 20  |     |      |      |     |      |     |     |     |
| 0.39       | 0.4        | 10-Jun-09 | R     |     |     |     |     |     | 4    |      |     |      |     |     |     |
| 3.14       | 3.16       | 25-Aug-09 | R     |     |     |     |     |     |      |      | 6   |      |     |     |     |
|            | 1.68       | 01-Sep-09 | A     |     |     |     |     |     |      |      |     | 2    |     |     |     |
| 0.06       | 0.07       | 02-Nov-09 | R     |     |     |     |     |     |      |      |     |      |     | <2  |     |
|            | 0.15       | 08-Dec-09 | R     |     |     |     |     |     |      |      |     |      |     |     | 4   |
| 0.08       | 0.08       | 06-Apr-10 | R     |     |     |     | <2  |     |      |      |     |      |     |     |     |
|            |            | 24-May-10 | R     |     |     |     |     | <2  |      |      |     |      |     |     |     |
|            |            | 31-May-10 | E     |     |     |     |     | 2   |      |      |     |      |     |     |     |
| 0.55       | 0.55       | 28-Jun-10 | A     |     |     |     |     |     | 28   |      |     |      |     |     |     |
| 2.28       | 2.29       | 14-Jul-10 | A     |     |     |     |     |     |      | 90   |     |      |     |     |     |
| 0.1        | 0.1        | 24-Aug-10 | R     |     |     |     |     |     |      |      | 4   |      |     |     |     |
|            | 0.88       | 07-Sep-10 | E     |     |     |     |     |     |      |      |     | 25   |     |     |     |
|            |            | 21-Sep-10 | E     |     |     |     |     |     |      |      |     | <2   |     |     |     |
|            |            | 05-Oct-10 | E     |     |     |     |     |     |      |      |     |      | 4   |     |     |
| 0.2        | 0.2        | 25-Oct-10 | R     |     |     |     |     |     |      |      |     |      | 3.6 |     |     |



| Rain 3 day                    | Rain 4 day | Date      | Strat | Jan       | Feb        | Mar        | Apr        | May        | June        | July      | Aug        | Sept       | Oct        | Nov        | Dec        |
|-------------------------------|------------|-----------|-------|-----------|------------|------------|------------|------------|-------------|-----------|------------|------------|------------|------------|------------|
| 0.04                          | 0.05       | 02-Nov-10 | E     |           |            |            |            |            |             |           |            |            |            | <2         |            |
|                               |            | 16-Nov-10 | E     |           |            |            |            |            |             |           |            |            |            | 2          |            |
|                               | 0.03       | 30-Nov-10 | E     |           |            |            |            |            |             |           |            |            |            | 2          |            |
| 0.24                          | 0.25       | 28-Dec-10 | E     |           |            |            |            |            |             |           |            |            |            |            | <2         |
| <b>Monthly Geometric Mean</b> |            |           |       | <b>20</b> | <b>4.8</b> | <b>3.1</b> | <b>4.4</b> | <b>2.8</b> | <b>10.2</b> | <b>24</b> | <b>4.2</b> | <b>9.9</b> | <b>6.3</b> | <b>3.6</b> | <b>3.5</b> |

**Table 13. Stations WI 28.5 and 29, Seasonal and Rainfall Assessment, 2010**

| Station  | Rain 3 day | Rain 4 day  | Date             | Strat    | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct      | Nov | Dec |
|----------|------------|-------------|------------------|----------|-----|-----|-----|-----|-----|------|------|-----|------|----------|-----|-----|
| WI028.50 | 0.06       | 0.06        | 16-Feb-10        | R        |     | <2  |     |     |     |      |      |     |      |          |     |     |
|          | 0.08       | 0.08        | 06-Apr-10        | R        |     |     |     | <2  |     |      |      |     |      |          |     |     |
|          | 0          | 0           | 24-May-10        | R        |     |     |     |     | <2  |      |      |     |      |          |     |     |
|          |            |             | 31-May-10        | E        |     |     |     |     | <2  |      |      |     |      |          |     |     |
|          | 0.1        | 0.1         | 24-Aug-10        | R        |     |     |     |     |     |      |      | <2  |      |          |     |     |
|          |            | <b>0.88</b> | <b>07-Sep-10</b> | <b>E</b> |     |     |     |     |     |      |      |     |      | <b>2</b> |     |     |
|          |            |             | 21-Sep-10        | E        |     |     |     |     |     |      |      |     |      | 14       |     |     |
|          | 0.02       | 0.02        | 05-Oct-10        | E        |     |     |     |     |     |      |      |     |      |          | 10  |     |
|          | 0.2        | 0.2         | 25-Oct-10        | R        |     |     |     |     |     |      |      |     |      |          | 4   |     |
|          | 0.04       | 0.05        | 02-Nov-10        | E        |     |     |     |     |     |      |      |     |      |          |     | <2  |
|          | 0.01       | 0.01        | 16-Nov-10        | E        |     |     |     |     |     |      |      |     |      |          |     | <2  |
|          |            | 0.03        | 30-Nov-10        | E        |     |     |     |     |     |      |      |     |      |          |     | <2  |
| 0.24     | 0.25       | 28-Dec-10   | E                |          |     |     |     |     |     |      |      |     |      |          | <2  |     |

|          |      |             |                  |          |  |    |  |    |    |  |  |    |  |           |    |    |
|----------|------|-------------|------------------|----------|--|----|--|----|----|--|--|----|--|-----------|----|----|
| WI029.00 | 0.06 | 0.06        | 16-Feb-10        | R        |  | <2 |  |    |    |  |  |    |  |           |    |    |
|          | 0.08 | 0.08        | 06-Apr-10        | R        |  |    |  | <2 |    |  |  |    |  |           |    |    |
|          | 0    | 0           | 24-May-10        | R        |  |    |  |    | <2 |  |  |    |  |           |    |    |
|          |      |             | 31-May-10        | E        |  |    |  |    | 2  |  |  |    |  |           |    |    |
|          | 0.1  | 0.1         | 24-Aug-10        | R        |  |    |  |    |    |  |  | <2 |  |           |    |    |
|          |      | <b>0.88</b> | <b>07-Sep-10</b> | <b>E</b> |  |    |  |    |    |  |  |    |  | <b>16</b> |    |    |
|          |      |             | 21-Sep-10        | E        |  |    |  |    |    |  |  |    |  | <2        |    |    |
|          | 0.02 | 0.02        | 05-Oct-10        | E        |  |    |  |    |    |  |  |    |  |           | 2  |    |
|          | 0.2  | 0.2         | 25-Oct-10        | R        |  |    |  |    |    |  |  |    |  |           | <2 |    |
|          | 0.04 | 0.05        | 02-Nov-10        | E        |  |    |  |    |    |  |  |    |  |           |    | <2 |
|          | 0.01 | 0.01        | 16-Nov-10        | E        |  |    |  |    |    |  |  |    |  |           |    | 2  |
|          |      | 0.03        | 30-Nov-10        | E        |  |    |  |    |    |  |  |    |  |           |    | <2 |
| 0.24     | 0.25 | 28-Dec-10   | E                |          |  |    |  |    |    |  |  |    |  |           | <2 |    |

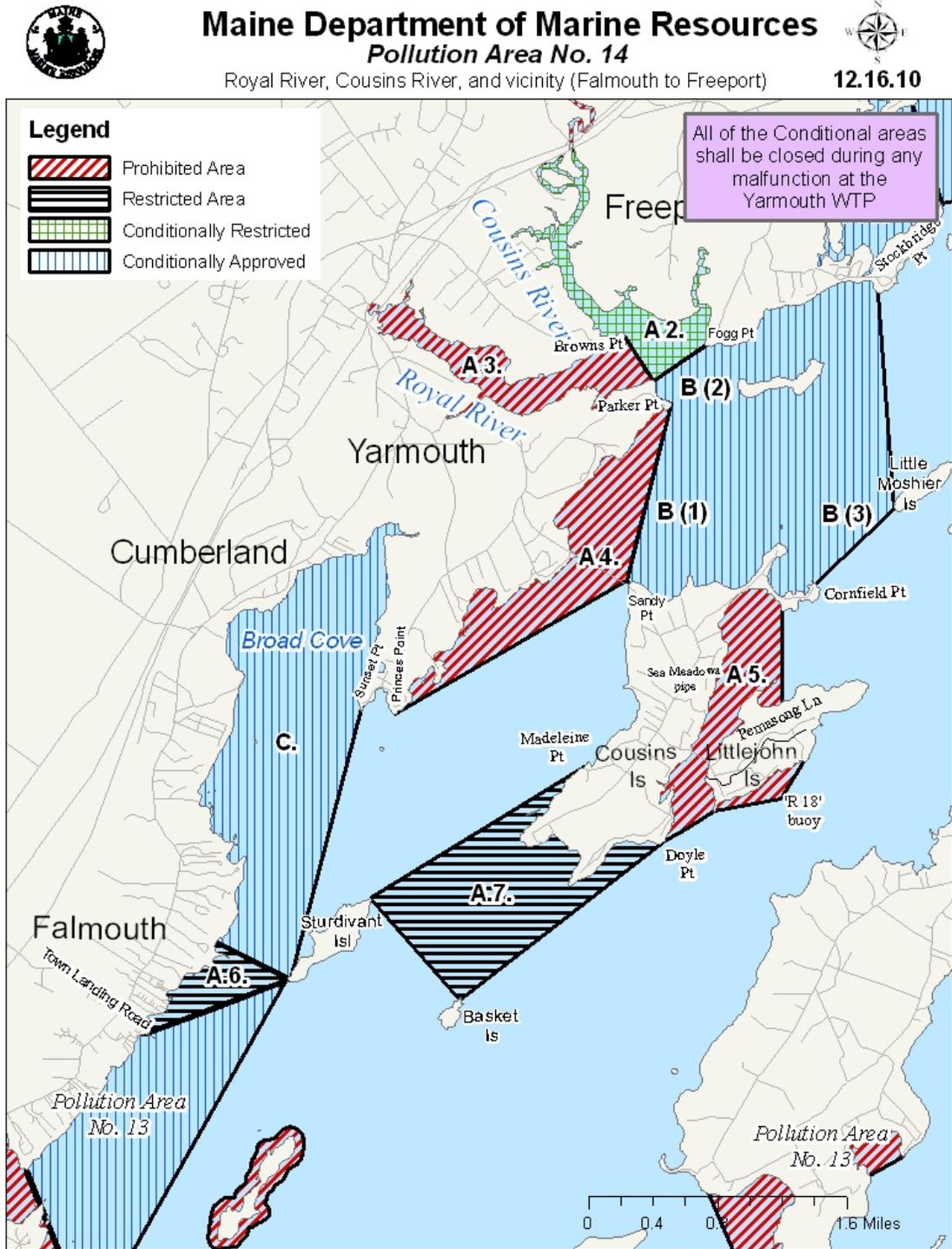


**Table 14. Cumberland Shore Stations, Geometric Means and P90 Scores, Nov. 1 to May 31**

| Station  | Class       | Count | MF Count | GM  | SDV  | MAX | P90  | Appd_Std | Restr_Std | Min_Date   |
|----------|-------------|-------|----------|-----|------|-----|------|----------|-----------|------------|
| WI027.00 | R           | 30    | 15       | 3.2 | 0.21 | 11  | 6.1  | 38       | 221       | 5/27/1999  |
| WI028.50 | New         | 5     | 5        | 1.9 | 0    | 1.9 | 1.9  | 31       | 163       | 2/16/2010  |
| WI029.00 | Reactivated | 12    | 5        | 2.5 | 0.11 | 3.6 | 3.5  | 40       | 232       | 5/7/1998   |
| WI030.00 | R           | 30    | 15       | 3.6 | 0.4  | 86  | 11.9 | 38       | 221       | 5/7/1998   |
| WI033.00 | R           | 29    | 15       | 4.7 | 0.53 | 460 | 22.8 | 38       | 218       | 11/12/1998 |



Figure 20. Cumberland, Broad Cove Classification Change (Section C)





## **Shoreline Survey Activity during Review Period (2008-2010)**

### **2008**

There was no shoreline activity during 2008.

### **2009**

On **May 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup> and 22<sup>nd</sup>, 2009**: DMR, along with the Chebeague Island shellfish warden/harbor master, surveyed 145 properties on the island, in areas that were classified as prohibited due to an expired shoreline survey. One cracked septic pipe was found and immediately repaired on the following day. No additional actual or potential problems were identified and the surveyed areas were reclassified from prohibited to approved on May 21, 2009.

On **May 18, 2009**, DEP conducted shoreline survey activities in the Pratt's Brook drainage area of the Cousins River. DEP staff inspected properties on Granite Street and East Main Street. One actual pollution problem was identified. The area north of U.S. Route 1 was reclassified from conditionally restricted to prohibited on May 27, 2009 due to the presence of the malfunctioning septic system.

On **September 16, 2009** a sanitary survey for Chebeague Island was conducted by DMR and Chebeague Island harbor master. A total of 42 properties were surveyed, located on Tax maps 103 and 102. There were no actual or potential problems identified.

On **October 8, 2009** a sanitary survey for Chebeague Island was conducted by DMR and Chebeague Island harbor master. A total of 47 properties were surveyed, located on tax maps 102 and 101. Two properties were identified as potential problems (possible septic system malfunctions). Both of these properties were brought to the attention of Chebeague Island's code officer after the survey was completed.

On **December 11, 2009** a drive through survey of Growing Area WI was conducted by DMR. No new pollution sources were noted at the time of this survey.

### **2010**

On **July 30, 2010** a sanitary survey for Cumberland was conducted by DMR and the Cumberland Police Department. A total of 18 properties were surveyed. One property was identified as a potential problem. A faint sewer odor was associated with several wet areas on the front lawn. The CEO determined the wet areas were groundwater from an old run-off drain. Cumberland highway department replaced the drain.

On **August 5, 2010** DMR and the Cumberland Police Department surveyed the remaining 15 Cumberland properties. One potential problem existed. Several wet areas were observed along the lower edge of elevated ground which was assumed to be the leach field (homeowner not at home to confirm). A run-off drain pipe was close by. A Cumberland police officer



contacted the code enforcement officer (CEO), Bill Longley, who made a site inspection mid-August. He determined that the wet areas were a result of freshwater run-off.

On **October 5, 2010** DMR conducted a drive-through survey of Broad Cove shoreline, Cumberland. New construction activity was noted in the pasture at the head of the cove.

**October 18, 21 and 25, 2010:** DMR staff and a member of the Falmouth Police Department completed a shoreline survey of the Falmouth shoreline. All properties which were not connected to the town sewer received and inspection of the waste disposal systems; all town sewer connections were confirmed with the Falmouth sewer district prior to the shoreline survey. A total of 31 properties (not on town sewer) were inspected; 3 were properties that were noted as either potential or actual problems, or properties with unknown waste disposal systems and were referred to the town licensed plumbing inspector (LPI) for follow up inspections. Of the three properties, only one was identified as an actual waste water disposal system malfunction. A comprehensive list of these actual and potential problems is presented in the "Identification of Pollution Sources" section of this report.

A marina inspection of the Falmouth municipal mooring field was also completed on September 22, 2010. The town Harbor Master provided information regarding number of moorings, mooring use and pump-out facilities at the town landing. Currently, there are 1,114 moorings; there are approximately 703 boats with heads (boats that are 24 ft or larger). A dilution calculation was completed to determine the size of the required closure surrounding the boats during the closed season; the required closure must be at least 543 acres. The size of the conditional area that is being recommended is 890 acres.

Based on the results of the survey, the area located north and south of the Falmouth town Landing (WI 25) is recommended for an upgrade to its former conditionally approved classification based on marina, with an open status from November 15 to April 30. Mussel Cove will remain classified as prohibited due to a history of high fecal coliform scores; the unnamed cove monitored by station WI 17 will remain classified as prohibited due to an identified septic system malfunction. The shoreline of Clapboard Island has not been surveyed; therefore the shoreline surrounding the island will remain prohibited.

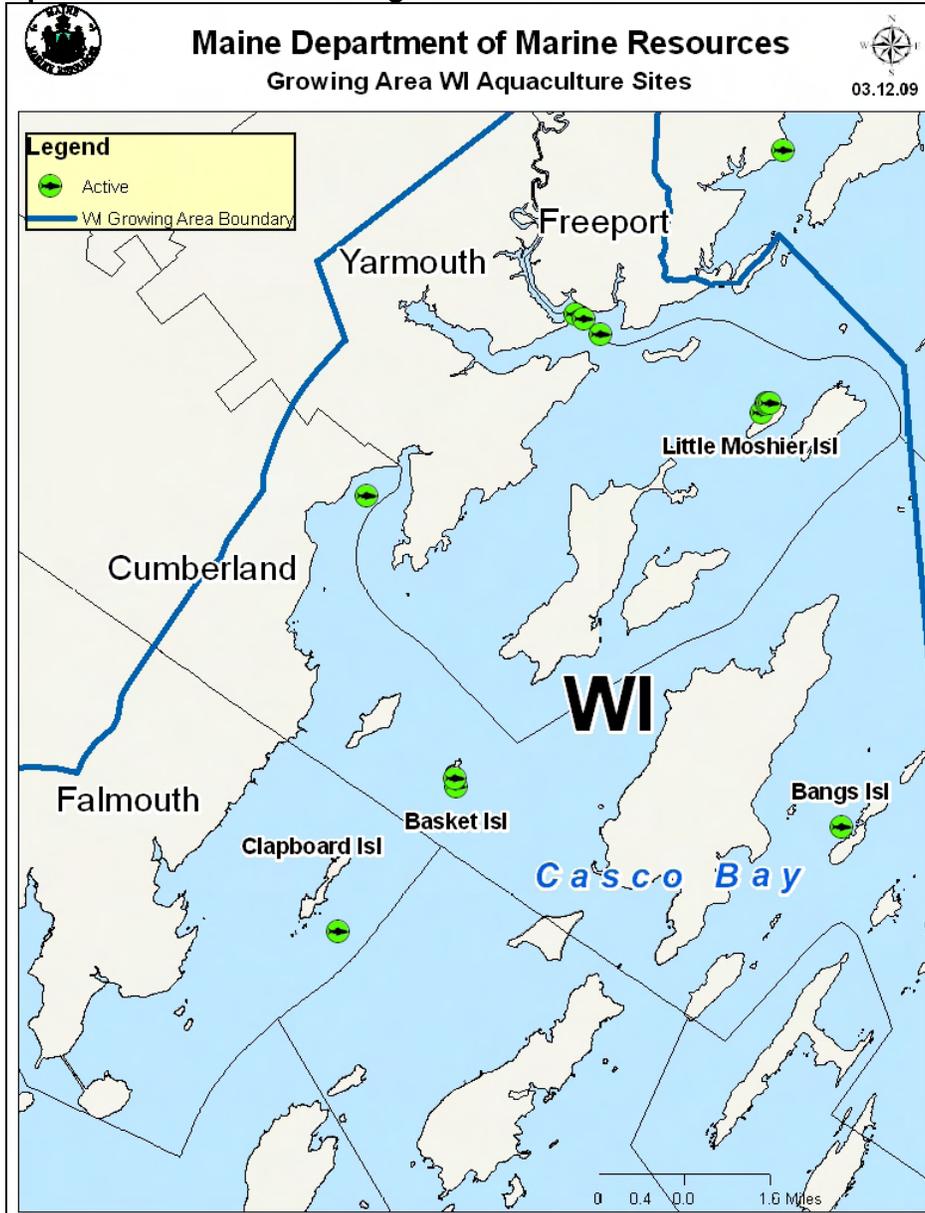
This upward classification assessment was reviewed and implemented on December 20, 2010.

### **Aquaculture/Wet Storage Activity**

There are twelve aquaculture lease, experimental lease or limited purpose aquaculture licensed sites in growing area WI (Figure 21). Details regarding the sites can be found on the DMR website at: <http://www.maine.gov/dmr/aquaculture/leaseinventory/cascobay.htm>



Figure 21. Aquaculture Sites in Growing Area WI





## Recommendation for Future Work

Actual and potential pollution sources identified through shoreline survey work from 2008-2010 were reported to the local codes enforcement officer for follow up.

Stream sampling and additional flow meter data will be scheduled prior to the next sanitary survey report in 2012.

Shoreline development and increased human activities are creating pressure on the nearshore area contributing to the decline in water quality through stormwater runoff and other non-point source pollution. The stormwater database requires improved communications with the WI towns.

Intensify searching for the pollution source impacting Broad Cove.

An updated emergency response plan needs to be developed and implemented for the Yarmouth Wastewater Treatment Plant.

The Wyman Station outfalls #001 and #003 are permitted to discharge heated water and sample station WI71 should continue to be reviewed annually for water temperature due to the concern for *Vibrio parahaemolyticus* (V.p.) in warm waters.

## References

DMR legal notices [http://www.maine.gov/dmr/rm/public\\_health/closures/closedarea.htm#](http://www.maine.gov/dmr/rm/public_health/closures/closedarea.htm#)

Coastal Property Development Inc.  
<http://www.netmarkscom.com/coastalproperty/highwinds/siteplan.html>

Ridgewood Estates Subdivision <http://www.ridgewoodestatesfalmouth.com/index.html>

MEPDES <http://www.epa.gov/npdescan/ME0000272FS.pdf>

US EPA [http://www.epa.gov/npdes/pubs/ua\\_me\\_portland.pdf](http://www.epa.gov/npdes/pubs/ua_me_portland.pdf)

Casco Bay Estuary Partnership <http://www.cascobay.usm.maine.edu/pdfs/Indicator%2002--Impervious.pdf>

DMR <http://www.maine.gov/dmr/aquaculture/leaseinventory/cascobay.htm>



## Appendix A. Annual Review of Conditional Area Management Plan – Falmouth Foreside

### Falmouth Foreside Conditional Area, Area No. 13-A, Growing Area WI

#### Scope

Falmouth Foreside was a conditionally approved area due to the seasonal presence of boats at the Falmouth Foreside docks. Falmouth Foreside, monitored by stations WI 15, 17, 17.5, and 25, was classified conditionally approved based on information from observations of the harbor and an interview with the harbormaster regarding the presence or absence of 10 or more boats. It was determined that there were fewer than 10 boats being used in the conditional area from November 1 through April 30. This area is conditionally open for shellfish harvesting from November 15 through April 30.

#### Compliance with management plan

The Falmouth Foreside seasonal marina area was visited on November 10, 2010 to confirm that the boats were out of the water and could not impact water quality when the area opened on November 15, 2010. It was also visited on April 21, 2010 to confirm there were fewer than 10 boats with heads not yet in the water.

#### Adequacy of reporting and cooperation of involved persons

This management plan requires reporting by DMR personnel regarding seasonal visits to the marina, prior to the closure and reopening of the conditional area.

#### Compliance with approved growing area criteria

The annual review seasonal data analysis showed that the conditionally approved stations in Falmouth Foreside met approved standards during the open season in 2008-2010 (Table 3 1, 2, and 3).

**Table 1. Geomean and P90-Seasonal Data Analysis for Falmouth Foreside Marina Seasonal Conditional Stations; Open November 15 – April 30, 2008**

| STATION  | CLASS | CNT | MFCNT | GM  | SDV  | MAX | P90  | APPD_STD | RESTR_STD |
|----------|-------|-----|-------|-----|------|-----|------|----------|-----------|
| WI015.00 | CA    | 30  | 13    | 4.4 | 0.42 | 43  | 15.4 | 40       | 230       |
| WI017.00 | CA    | 30  | 13    | 4.4 | 0.53 | 480 | 21.1 | 40       | 230       |
| WI017.50 | CA    | 17  | 13    | 4.2 | 0.44 | 104 | 15.3 | 35       | 188       |
| WI025.00 | CA    | 30  | 13    | 3.6 | 0.29 | 23  | 8.3  | 40       | 230       |



**Table 2. Geomean and P90-Seasonal Data Analysis for Falmouth Foreside Marina Seasonal Conditional Stations; Open November 15 – April 30, 2009**

| STATION  | CLASS | CNT | MFCNT | GM  | SDV  | MAX | P90  | APPD_STD | RESTR_STD |
|----------|-------|-----|-------|-----|------|-----|------|----------|-----------|
| WI015.00 | CA    | 30  | 14    | 4.3 | 0.42 | 43  | 15.3 | 39       | 225       |
| WI017.00 | CA    | 30  | 13    | 4.4 | 0.52 | 480 | 21.1 | 40       | 230       |
| WI017.50 | CA    | 18  | 14    | 3.9 | 0.43 | 104 | 14.4 | 34       | 186       |
| WI025.00 | CA    | 30  | 14    | 3.5 | 0.29 | 23  | 8.2  | 39       | 225       |

**Table 3. Geomean and P90-Seasonal Data Analysis for Falmouth Foreside Marina Seasonal Conditional Stations; Open November 15 – April 30, 2010**

| STATION  | CLASS | CNT | MFCNT | GM  | SDV  | MAX | P90  | APPD_STD | RESTR_STD |
|----------|-------|-----|-------|-----|------|-----|------|----------|-----------|
| WI015.00 | CA    | 30  | 16    | 4.2 | 0.42 | 43  | 15.1 | 38       | 216       |
| WI017.00 | CA    | 30  | 13    | 4.4 | 0.52 | 480 | 21.1 | 40       | 230       |
| WI017.50 | CA    | 19  | 15    | 3.8 | 0.42 | 104 | 13.6 | 34       | 185       |
| WI025.00 | CA    | 30  | 16    | 3.4 | 0.28 | 23  | 7.9  | 38       | 216       |

### Water sampling compliance history

This conditional area management plan requires the monitoring stations to be sampled a minimum of six times when the area is in the open status. All stations in the Falmouth Foreside conditional area were collected 6 times when in the open status in 2007 and 2008.

### Analysis-Recommendations

The area was reclassified from conditionally approved to prohibited on January 21, 2009 due to lacking of a recent shoreline survey. Due to polluted stormwater runoff in the area and lack of shoreline survey there are no recommendations for changes to the current classification (prohibited) at this time.



## Appendix B. Annual Review of Conditional Area Management Plan – Cousins River

### Cousins River Conditional Area, Area No. 14, Growing Area WI

#### Scope

The Cousins River is conditionally restricted based on the proper functioning of the Yarmouth Wastewater Treatment Plant. The river itself is classified conditionally restricted and the area outside the river, between Winslow Park in Freeport, the north end of Cousins Island, and the bridge from Yarmouth mainland to Cousins Island, is classified conditionally approved.

#### Compliance with management plan

The area closed 3 times in 2008; April 14, 2008 with reopening on February 29, 2008, closed August 8, 2008 and reopened August 27, 2008 and closed September 7, 2008 and reopened September 13, 2008. The emergency response plan was not followed on September 7, 2008 but the area was under a flood closure. The area closed on October 11, 2010 due to a ruptured sewer line and reopened on October 29, 2010 (Table 1).

**Table 1. Yarmouth WWTP Closure/Re-opening Activity for 2008 and 2010**

| Date Closed<br>Flood=F<br>Treatment<br>Plant=P | Emergency<br>Response<br>Plan<br>Followed | Date area<br>sampled:<br>P=Pass   | # Days<br>closed | Date Opened           | Comments   |
|--|---|---|------------------|-----------------------|--|
| April 14, 2008                                 | Yes                                       | April 26, 2008 –<br>Clams = P<br>April 27, 2008 –<br>Water = P  | 29               | May 13, 2008          |  |
| August 8, 2008                                 | Yes                                       | August 24, 2008 –<br>Clams and Water<br>=P  | 19               | August 27, 2008       |  |
| September 7,<br>2008 =F                        | No  | September 9 and<br>12, 2008 as part of<br>flood sample run;<br>stations WI 27 and<br>56 only sampled<br>for water | 6                | September 13,<br>2008 | Emergency Response Plan<br>not updated since 2003. The<br>plant did email DMR on<br>September 8, 2008 but the<br>DMR employee was on<br>vacation and did not follow up<br>until September 22, 2008<br>after the flood closure had<br>lifted. |
| October<br>11,2010=P                           | Yes                                       | October 25,2010-<br>water = P   | 18               | October 29,<br>2010   |  |



**Adequacy of reporting and cooperation of involved persons**

The emergency response plan with the Yarmouth Wastewater Treatment Plant must be updated to clarify the responsibilities of the parties involved. The plant is very cooperative and communicates well with the Department but without an updated emergency response plan and employee turnover at the plant, new employees are not aware that there is an emergency response plan. Three out of four closures were implemented when the emergency response plan was carried out. September 7, 2008 was included in a flood closure but notification did not happen until after the flood closure had lifted due to a DMR employee on vacation when the email notification came in on September 8, 2008.

**Compliance with approved growing area criteria**

The annual review open status data analysis showed that the conditionally approved and conditionally restricted stations in the Cousins River and surrounding area met approved and restricted standards, respectively during the open status in 2008-2010 (Tables 2, 3 and 4).

**Table 2. Geomean and P90- Open Status Data Analysis for Cousins River Area WWTP Conditional Stations for 2008**

| STATION  | CLASS | CNT | MFCNT | GM  | SDV  | MAX  | P90  | APPD_STD | RESTR_STD |
|----------|-------|-----|-------|-----|------|------|------|----------|-----------|
| WI041.00 | P     | 30  | 25    | 4.8 | 0.57 | 100  | 25.5 | 33       | 180       |
| WI051.00 | CR    | 30  | 25    | 7.4 | 0.75 | 1000 | 66.9 | 33       | 180       |
| WI051.50 | New   | 18  | 18    | 4.7 | 0.48 | 72   | 20   |          |           |
| WI053.00 | CR    | 30  | 26    | 6   | 0.79 | 1200 | 60.6 | 33       | 177       |
| WI054.00 | CR    | 30  | 27    | 7.2 | 0.8  | 1100 | 75.9 | 32       | 173       |
| WI055.00 | New   | 19  | 19    | 3.3 | 0.29 | 13   | 7.8  |          |           |
| WI055.20 | New   | 19  | 19    | 6.5 | 0.44 | 35   | 23.7 |          |           |
| WI055.50 | CA    | 30  | 28    | 4.2 | 0.43 | 75   | 15   | 32       | 170       |
| WI056.00 | CA    | 30  | 27    | 4.3 | 0.45 | 74   | 16   | 32       | 173       |
| WI058.50 | P     | 30  | 23    | 5.2 | 0.6  | 148  | 30   | 34       | 188       |
| WI058.80 | New   | 18  | 18    | 3.4 | 0.59 | 560  | 19.7 |          |           |



**Table 3. Geomean and P90- Open Status Data Analysis for Cousins River Area WWTP Conditional Stations for 2009**

| STATION  | CLASS | CNT | MFCNT | GM  | SDV  | MAX  | P90  | APPD_STD | RESTR_STD |
|----------|-------|-----|-------|-----|------|------|------|----------|-----------|
| WI041.00 | P     | 30  | 29    | 4.4 | 0.57 | 100  | 24.2 | 31       | 166       |
| WI051.00 | CR    | 30  | 30    | 4.6 | 0.67 | 1700 | 33.5 | 31       | 163       |
| WI051.50 | CR    | 30  | 30    | 5.8 | 0.67 | 1700 | 42.6 | 31       | 163       |
| WI053.00 | CR    | 30  | 30    | 5   | 0.75 | 1700 | 47.3 | 31       | 163       |
| WI054.00 | CR    | 30  | 30    | 4.2 | 0.64 | 1160 | 28   | 31       | 163       |
| WI055.00 | CR    | 30  | 30    | 4   | 0.57 | 760  | 21.5 | 31       | 163       |
| WI055.20 | CR    | 30  | 30    | 7   | 0.66 | 1700 | 50   | 31       | 163       |
| WI055.50 | CA    | 30  | 30    | 3.7 | 0.61 | 760  | 23.3 | 31       | 163       |
| WI056.00 | CA    | 30  | 30    | 3.3 | 0.42 | 42   | 11.7 | 31       | 163       |
| WI058.50 | CA    | 30  | 27    | 4.3 | 0.59 | 148  | 25.6 | 32       | 173       |
| WI058.80 | CA    | 30  | 30    | 3.2 | 0.54 | 560  | 16.1 | 31       | 163       |

**Table 4. Geomean and P90- Open Status Data Analysis for Cousins River Area WWTP Conditional Stations for 2010**

| STATION  | CLASS | CNT | MFCNT | GM  | SDV  | MAX  | P90  | APPD_STD | RESTR_STD |
|----------|-------|-----|-------|-----|------|------|------|----------|-----------|
| WI041.00 | P     | 30  | 29    | 4.4 | 0.57 | 100  | 24.2 | 31       | 166       |
| WI051.00 | CR    | 30  | 30    | 3.7 | 0.61 | 1700 | 22.8 | 31       | 163       |
| WI051.50 | CR    | 30  | 30    | 6   | 0.71 | 1700 | 49.3 | 31       | 163       |
| WI053.00 | CR    | 30  | 30    | 4   | 0.62 | 1700 | 25.2 | 31       | 163       |
| WI054.00 | CR    | 30  | 30    | 3.6 | 0.61 | 1160 | 22.4 | 31       | 163       |
| WI055.00 | CR    | 30  | 30    | 4.6 | 0.62 | 760  | 29.2 | 31       | 163       |
| WI055.20 | CR    | 30  | 30    | 6.7 | 0.72 | 1700 | 57.6 | 31       | 163       |
| WI055.50 | CA    | 30  | 30    | 4.1 | 0.64 | 760  | 27.8 | 31       | 163       |
| WI056.00 | CA    | 30  | 30    | 3.5 | 0.44 | 42   | 13.3 | 31       | 163       |
| WI058.50 | CA    | 30  | 30    | 3.6 | 0.55 | 148  | 18.4 | 31       | 163       |
| WI058.80 | CA    | 30  | 30    | 2.8 | 0.39 | 34   | 9.2  | 31       | 163       |

**Water sampling compliance history**

This conditional area management plan requires the monitoring stations to be sampled a minimum of six times when the area is in the open status. All stations in the Cousins River WWTP conditional area were collected 6 times when in the open status in 2008-2010.

**Analysis-Recommendations**

The emergency response plan must be updated annually with the plant.



## Appendix C. 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 = 90<sup>th</sup> percentile

APPD\_STD = the 90<sup>th</sup> 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 90<sup>th</sup> percentile, at or below which the station would meet restricted criteria.