



**GROWING AREA WQ
Damariscotta River
Boothbay, Edgecomb, Newcastle, Damariscotta and Bristol**

Sanitary Survey Report

Report Date: 2012

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APPROVAL

_____ Date: _____
Print name signature



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Figure 1. Area WQ Overview Map

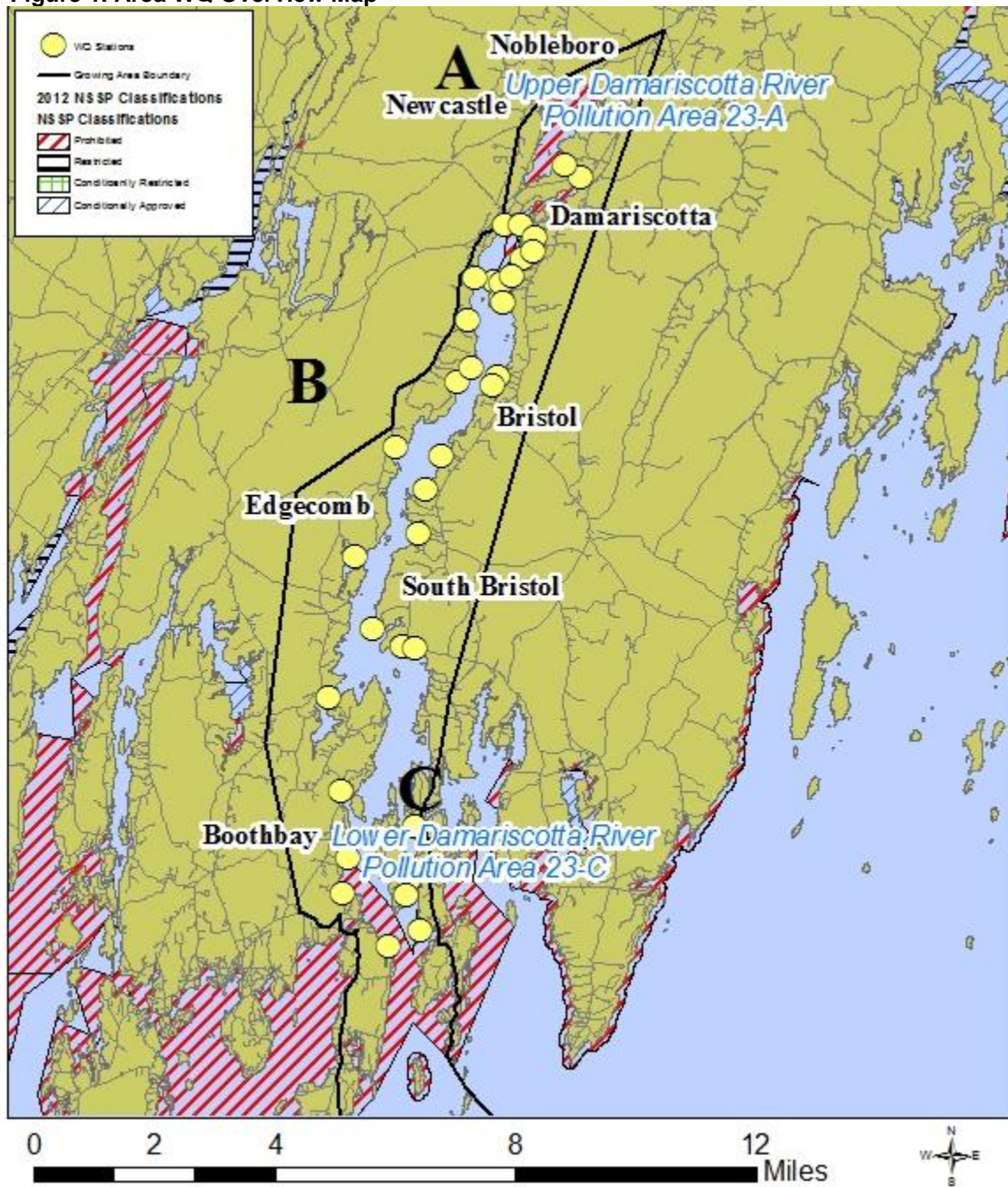




Figure 2. Map A, Pollution Area 23A, Upper Damariscotta River

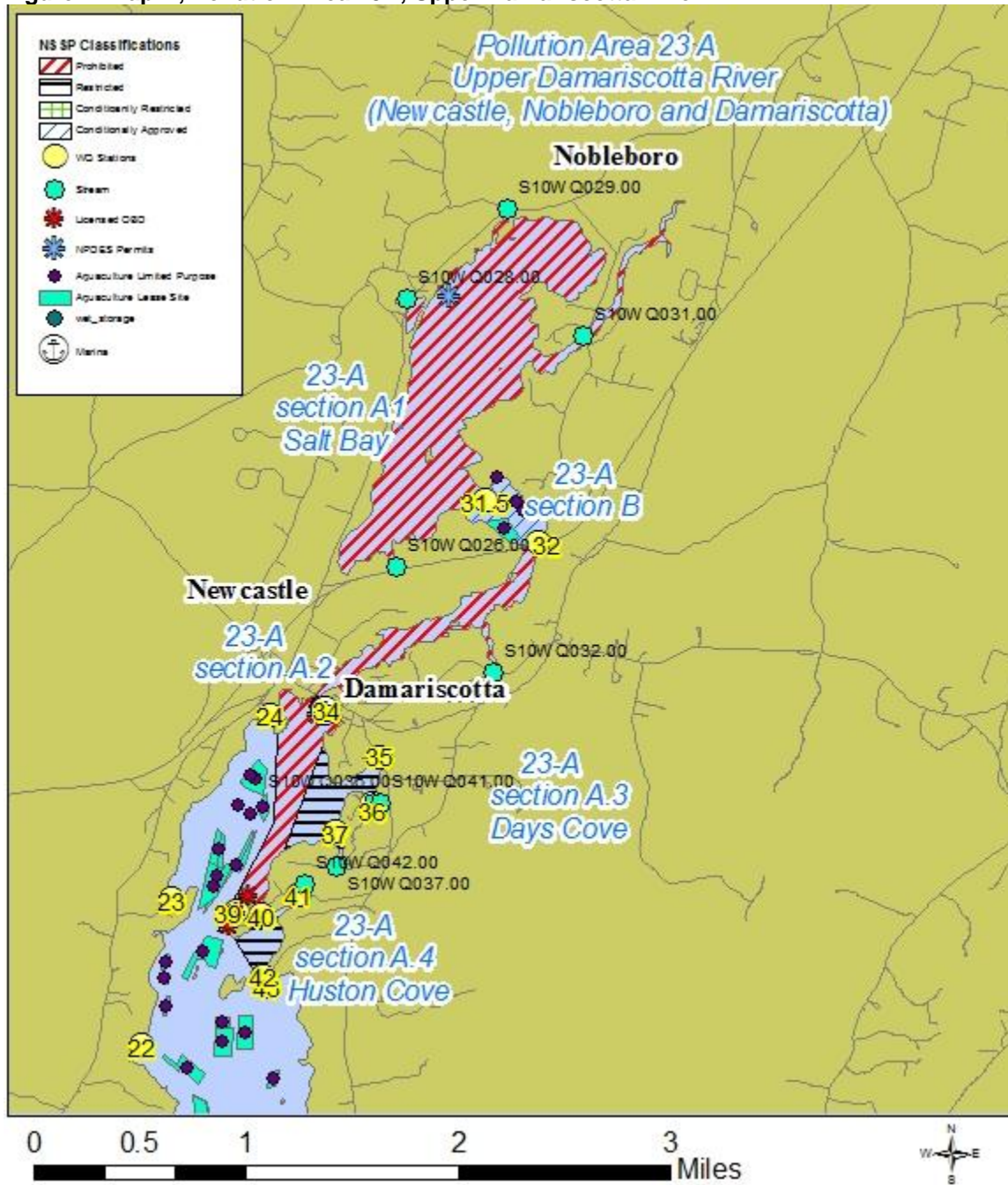




Figure 3. Map B, Middle of Damariscotta River, Sampling Stations

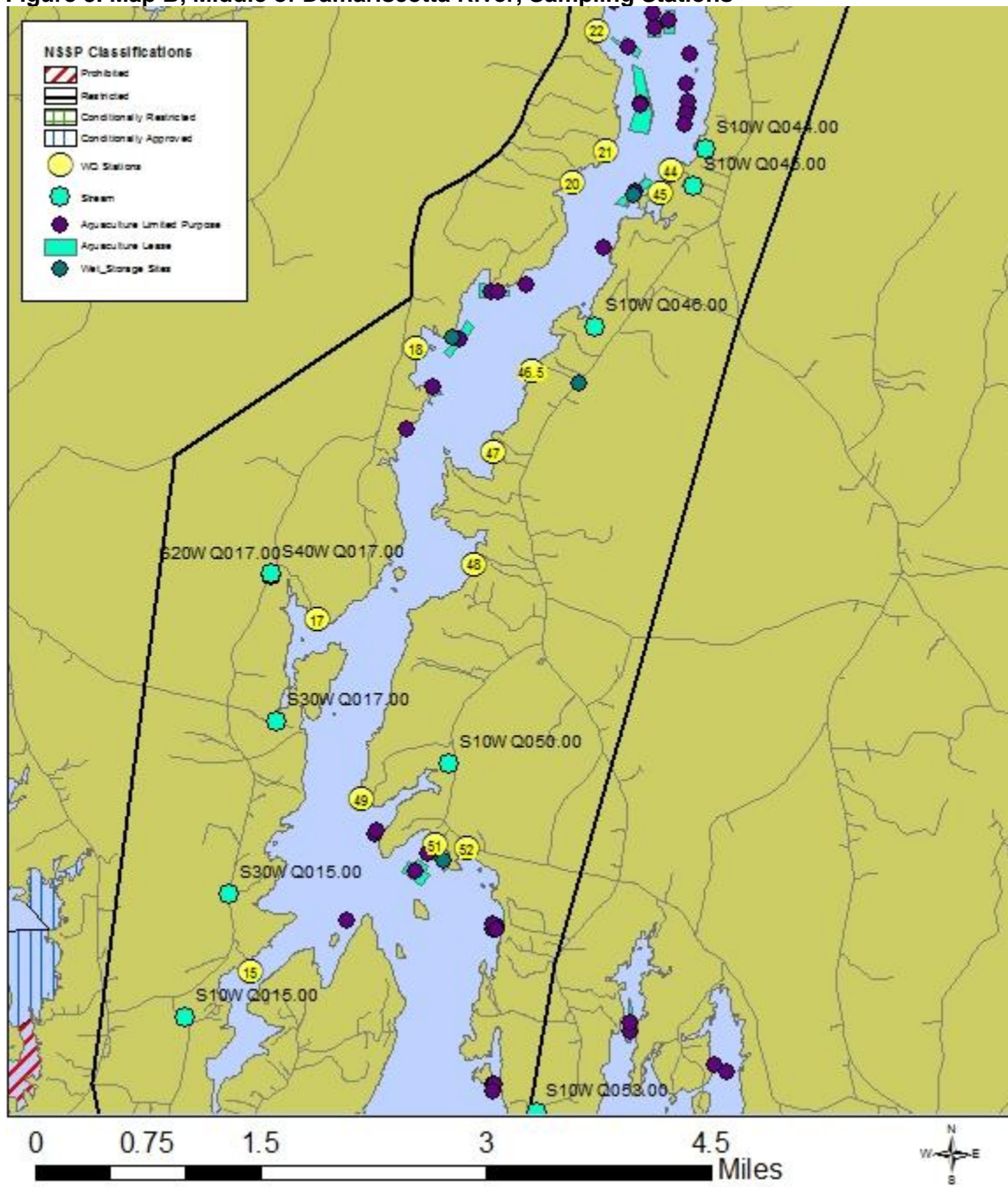
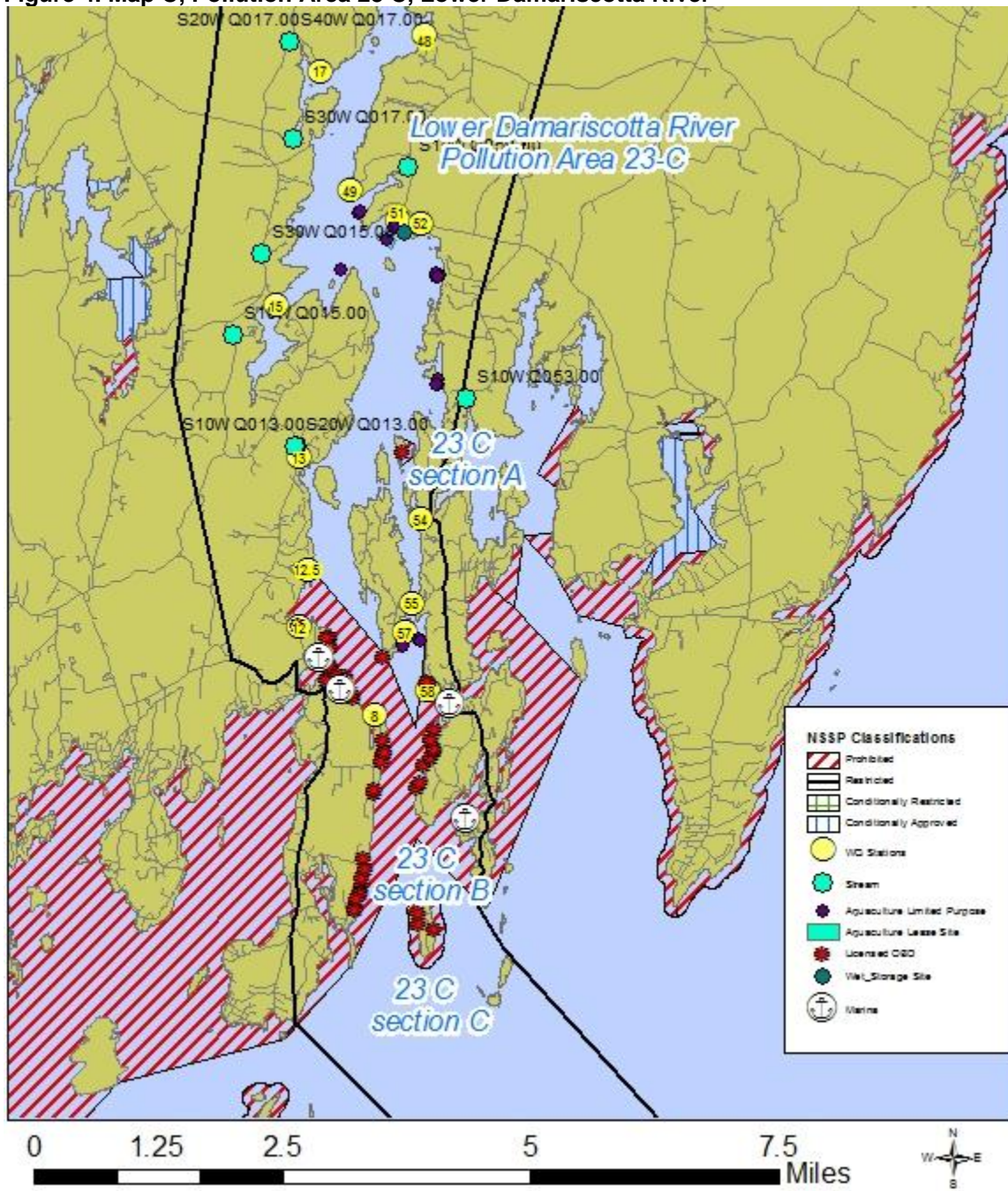




Figure 4. Map C, Pollution Area 23 C, Lower Damariscotta River





Executive Summary

This is a sanitary survey report for growing area WQ written in compliance with the requirements of the 2009 Model Ordinance and the National Shellfish Sanitation Program. The last twelve year sanitary survey report was completed in 2003. The next triennial report is due in 2015 and the next sanitary survey report is due in 2024. This sanitary survey report reviews shoreline survey information which was compiled during the 2012 survey of the growing area. There have been no classification changes in the Damariscotta River since 2008.

On May 3, 2010 sampling station WQ 8 was reactivated to monitor water quality in a small cove inside of Farnham Point, East Boothbay.

Growing Area Description

Growing area WQ is located in mid-coast Maine, and lies between Linekin Neck, in Boothbay and Shipley Point, on Rutherford Island, South Bristol (Figure 1). The area is comprised of the Damariscotta River and Great Salt Bay. The towns that fall within the boundary of this growing area include Boothbay, Edgecomb, Newcastle, Damariscotta, Bristol and South Bristol. There are two municipal treatment facilities in this growing area. The largest is the Great Salt Bay Sanitary District (Damariscotta facility) which is located in the town of Damariscotta. This facility is a lagoon system with no discharge points into the Damariscotta River. The Great Salt Bay Sanitary District Mills facility is a smaller facility that is located in the outlying residential section of Damariscotta Mills. This facility is a secondary treatment facility which serves a population of sixty residences. Additional potential pollution sources in area WQ include 76 active licensed over board discharge systems (OBDs) and numerous private in-ground systems. Five OBDs were removed in 2012 and two OBDs were removed in 2011. There are also several outhouses, chemical toilets or composting toilets at seasonal properties. There are multiple marine related businesses and mooring areas for both commercial fishing boats and pleasure boats located in growing area WQ. There are no seasonal conditional management plans in effect for any marina or mooring field in growing area WQ. With the exception of the 15 moorings that serve customers at Riverside Boatyard, the marine related businesses and mooring fields are located in areas that are classified as prohibited. There are also several piers which provide support for local fishing activities. These are predominantly located in the prohibited areas of East Boothbay and Bristol. A detailed boundary description for growing area WQ can be found in DMR central files.



History of Growing Area

The following Pollution Area activity occurred in the last six years (2007-2012).

Activity in 2007:

March 1, 2007: Pollution Area No. 23-A (formerly No. 24-A), This amendment reclassified a portion of the restricted area in Great Salt Bay as conditionally approved based on the proper function of the Great Salt Bay Mills Facility. The reason for this reclassification was based on improved water quality scores at sample stations WQ31.5 and WQ32.0. Due to this change, sample station WQ 32.0 was reclassified from conditionally restricted to conditionally approved.

March 3, 2007: Pollution Area No. 23-C (formerly 24-A) The closure boundary line was moved in order to monitor the extent of the restricted area water quality impact in an area which is currently classified as prohibited due to a presence of over board discharges (OBDs), marinas and boatyards. As a result of this boundary line move, station WQ 12.50 was reclassified from approved to prohibited.

April 6, 2007: Pollution Area No. 23-A (formerly No. 24-A) The upper portion of the Damariscotta River was closed due to a sewage spill from a pump station for the Great Salt Bay Sewage Treatment Plant (STP), which occurred on April 6, 2007. The closure included approved, conditionally approved and restricted areas in the Upper portion of the river. Water samples were collected from this area on April 29, 2007, fecal coliform scores from all stations met their current classification standard, and the closure was repealed on May 2, 2007.

July 5, 2007: Pollution Area No. 23-A (formerly No. 24-A) The restricted and conditionally approved areas were closed due to an oil spill, which occurred on July 2, 2007 in Damariscotta. Clam meats were collected and analyzed using sensory analysis ("sniff test"). The closure for the approved and restricted areas was repealed on July 7, 2007; the closure for the conditionally approved area was repealed in July 13, 2007.

Activity in 2008:

March 27, 2008: Area No. 24-C, Lower Damariscotta River (Boothbay, South Bristol), This amendment changed the title to Area No. 23-C, Lower Damariscotta River (Boothbay, South Bristol); and combined the repealed areas described in Area No. 25-J and Area No. 25-E; the amendment also included a portion of Area No. 25-A, and the remainder of Area No. 25-A was moved to Area No. 24-B. This amendment also better defined points of sight for enforcement purposes. There were no major classification changes in this rule.

July 11, 2008: Area No. 23-C, Lower Damariscotta River (Boothbay, South Bristol), This amendment closed a portion of the Damariscotta River due to an oil spill. The area that closed was described as: south of a line formed by the overhead power cable that runs from the Back Narrows shore of Boothbay to the west side of Fort Island; then continues due east from the south tip of Fort Island to the immediate opposite shore.

August 12, 2008: Area No. 23-C, Lower Damariscotta River (Boothbay, South Bristol), This amendment opened the portion of the Damariscotta River, which was closed as a result of an oil spill.



August 13, 2008: Area No. 23-C, Lower Damariscotta River (Boothbay, South Bristol), amended on August 12, 2008. This amendment was an administrative correction to add the language for the prohibited area around Inner Heron Island to the rule.

Activity in 2009:

There were no classification changes in 2009.

Activity in 2010:

There were no classification changes in 2010.

Station WQ8 was reactivated on May 3, 2010 to monitor water quality in the small cove west of Farnham Point, East Boothbay.

Activity in 2011:

There were no classification changes in 2011.

Activity in 2012:

There were no classification changes in 2012.

Current Classification(s)

The following legal notices describe the shellfish classification boundaries in Shellfish Growing Area WS and can be found on the DMR website at:

http://www.maine.gov/dmr/rm/public_health/closures/closedarea.htm#

Pollution Area 24 A Upper Damariscotta River (Newcastle, Nobleboro and Damariscotta)

Pollution Area 23 C Lower Damariscotta River (Boothbay and South Bristol)

Conditionally Managed Areas

There is one conditional area located in growing area WQ:

Pollution Area No. 23-A: Damariscotta River Conditional Area; due to Great Salt Bay Mills treatment facility; Stations WQ 31.5 and 32. A copy of the management plan for this conditional area can be found in DMR central files; this plan was revised to include the new Public Health Division pollution event hotline reporting phone number.

A review of this management plan can be found in Appendix A.

Pollution Sources Survey

The following sections include information on pollution sources which do or may impact water quality in growing area WQ. This section includes information on pollution sources, identified during the 2012 shoreline survey conducted by staff from The Department of Marine Resources (DMR) in the towns of Boothbay, Edgecomb, Newcastle, Nobleboro, Damariscotta, Bristol and South Bristol. In 2012 the DMR Public Health Program started using a new method for documenting shoreline surveys and recording pollution sources in the growing area. The shore within the growing area is broken into two mile, 500ft wide segments. Each segment is given a growing area shoreline survey (GASS) identification number.



DMR staff takes coordinates of every waste disposal system within 500 feet of the shore. Each pollution source is identified by the GASS identification number that the pollution source was found on. All of the coordinates are downloaded into the new shoreline survey database and staff has the ability to query for just the actual pollution sources that were identified during the survey of the area. All pollution sources are reported to the local plumbing inspector (LPI) responsible for the town the pollution source was identified in. The DMR notifies LPIs of septic malfunctions on a new septic problem report form that plumbing inspectors are expected to sign upon receipt. After the property has been visited by the LPI they are expected to send a copy of the form with their findings to The Department of Health and Human Services documenting the course of action toward remediation of the pollution source.

Sources of pollution reviewed in this section may include domestic or industrial waste, discharges from boats, run-off from manure piles in agricultural areas, streams that have consistently elevated scores and anything that could cause impairment of the waters of the growing area. Five septic problem forms were submitted. The septic problem forms were submitted to the plumbing inspector responsible for the area. All of the problem forms noted potential pollution sources. The potential pollution sources noted include: one potential unlicensed overboard discharge in Boothbay (this turned out to be a pool drain), a potential grey water discharge and two tanks perched on a steep drop-off which appears to be eroding away in Edgecomb, a holding tank in South Bristol with no power to the tank pump, and a drainage pipe in South Bristol that heads toward the shore and then disappears into the woods. No actual pollution sources were identified during the survey of the river. With the exception of the Boothbay LPI, none of the LPIs which received problem forms have provided updated information on their findings.



Domestic Waste (IG Systems and OBDs)

The majority of buildings in growing area WQ have private waste disposal systems, including inground septic systems, holding tanks, composting or incinerating toilets, and outhouses. Individual septic systems are the principal form of residential wastewater treatment in the towns in WQ. Properties in the area around the village of Damariscotta are served by municipal treatment at the Damariscotta Sanitary District treatment facility and the Great Salt Bay WWTP. The Damariscotta facility serves a population of approximately 3000 residents. The Great Salt Bay Mills facility serves approximately 60 dwellings (150 residents) and handles 1500 gallons per day.

The shoreline survey of shellfish growing area WQ took place in the summer and fall of 2012. The survey was conducted by DMR staff members. Properties within the town center of Damariscotta were not inspected because they are on the town sewer and this portion of town will remain classified as prohibited. During the shoreline survey properties are classified as actual or potential pollution sources based on the findings of the survey. Any property categorized as an actual pollution source, has a known malfunction or pollution source on the property. Any property categorized as a potential pollution source has a pollution source that is considered at risk of malfunctioning in the near future. An impact assessment is made for all of the pollution sources. Impact is assessed as being either direct or indirect. Any pollution source that is categorized as an actual, direct (A/D) pollution source is considered capable of impacting the waters of the growing area. All actual and potential pollution sources that have not been fixed before the next triennial review of the growing area will be re-inspected as part of the triennial review process.



Licensed Overboard Discharges

There are 76 active licensed overboard discharges (OBDs) in growing area WQ (Figures 2 and 4). An overboard discharge (OBD) is the discharge of wastewater from residential, commercial, and publicly owned facilities to Maine's streams, rivers lakes, and the ocean. Commercial and residential discharges of sanitary waste have been regulated since the mid-1970's when most direct discharges of untreated waste were banned. Between 1974 and 1987 most of the "straight pipes" were connected to publicly-owned treatment works or replaced with standard septic systems. Overboard discharge treatment systems were installed for those properties that were unable to connect to publicly-owned treatment works or unable to install a septic system because of poor soil conditions or small lot sizes.

All overboard discharge systems include a process to clarify the wastewater and disinfect it prior to discharge. There are two general types of treatment systems; mechanical package plants and sand filters. OBDs are licensed and inspected by the Maine Department of Environmental Protection (DEP). At each inspection, DEP looks for tags on each treatment unit identifying the service contractor and the last date of service. If an OBD is not properly maintained, or if the OBD malfunctions, it has the potential to directly discharge untreated wastewater to the shore; therefore, preventative closures are implemented surrounding every OBD located in the growing area. The size of each closure is determined based on a dilution calculation, using the permitted flow rate of the OBD, and the depth of the receiving water that each OBD discharges to; the fecal concentration used for this dilution calculation is 1.4×10^5 fc/100 ml. All closures are of adequate size to protect public health.

Two overboard discharges were removed in 2011 (highlighted in yellow); five OBDs were removed in 2012 (highlighted in blue).

Table 1. Active Licensed Overboard Discharges with Required Closure Acreage

DEP_ID	FLOW RATE (GPD)	OBD Type	Receiving Water	Deceiving Water Depth (ft)	Required Closure (acres)	Actual Closure (acres)
001519	500	M	DAMARISCOTTA RIVER	10	1.5	>6
002278	450	M	DAMARISCOTTA RIVER	10	1.2	
002851	300	M	DAMARISCOTTA RIVER	10	0.9	
Total Area – Upper River					3.6	
007279	500	P	DAMARISCOTTA RIVER	6	2.6	12
001848	500	S	DAMARISCOTTA RIVER	35	0.4	>20
001686	500	M	CHRISTMAS COVE	15	1	
001753	600	S	CHRISTMAS COVE	15	1.2	
001756	300	S	CHRISTMAS COVE	15	0.6	
001881	300	M	CHRISTMAS COVE	15	0.6	
001996	1100	S	CHRISTMAS COVE	15	2.3	
002272	450	S	CHRISTMAS COVE	15	0.9	
007789	300	M	CHRISTMAS COVE	15	0.6	
007988	450	M	CHRISTMAS COVE	15	0.9	



DEP_ID	FLOW RATE (GPD)	OBD Type	Receiving Water	Deceiving Water Depth (ft)	Required Closure (acres)	Actual Closure (acres)
005092	360	S	CHRISTMAS COVE	15	0.7	
Total Area-Christmas Cove					8.8	>100
001317	900	M	DAMARISCOTTA RIVER	12	2.3	
001518	500	M	DAMARISCOTTA RIVER	12	1.3	
001748	300	S	DAMARISCOTTA RIVER	12	0.8	
001749	300	M	DAMARISCOTTA RIVER	12	0.8	
001879	300	M	DAMARISCOTTA RIVER	12	0.8	
001969	450	M	DAMARISCOTTA RIVER	12	1.2	
002057	660	S	DAMARISCOTTA RIVER	12	1.7	
002231	4600	M	DAMARISCOTTA RIVER	12	11.8	
002265	300	S	DAMARISCOTTA RIVER	12	0.8	
002319	300	M	DAMARISCOTTA RIVER	12	0.8	
002364	2250	M	DAMARISCOTTA RIVER	12	5.8	
002434	480	S	DAMARISCOTTA RIVER	12	1.2	
002509	540	M	DAMARISCOTTA RIVER	12	1.4	
002610	420	M	DAMARISCOTTA RIVER	12	1.1	
003016	360	S	DAMARISCOTTA RIVER	12	0.9	
003042	300	S	DAMARISCOTTA RIVER	12	0.8	
003363	300	S	DAMARISCOTTA RIVER	12	0.8	
003589	300	M	DAMARISCOTTA RIVER	12	0.8	
003724	400	M	DAMARISCOTTA RIVER	12	1	
003753	780	X	DAMARISCOTTA RIVER	12	2	
004000	300	S	DAMARISCOTTA RIVER	12	0.8	
004343	315	S	DAMARISCOTTA RIVER	12	0.8	
004661	300	M	DAMARISCOTTA RIVER	12	0.8	
004892	300	S	DAMARISCOTTA RIVER	12	0.8	
005137	315	S	DAMARISCOTTA RIVER	12	0.8	
005138	300	S	DAMARISCOTTA RIVER	12	0.8	
006129	1250	M	DAMARISCOTTA RIVER	12	3.2	
006131	300	M	DAMARISCOTTA RIVER	12	0.8	
006157	300	M	DAMARISCOTTA RIVER	12	0.8	
006219	450	M	DAMARISCOTTA RIVER	12	1.2	
006598	300	S	DAMARISCOTTA RIVER	12	0.8	
006698	300	S	DAMARISCOTTA RIVER	12	0.8	
006700	450	M	DAMARISCOTTA RIVER	12	1.2	
006965	300	M	DAMARISCOTTA RIVER	12	0.8	
007208	300	S	DAMARISCOTTA RIVER	12	0.8	
007283	300	S	DAMARISCOTTA RIVER	12	0.8	
007898	360	M	DAMARISCOTTA RIVER	12	0.9	
004542	900	S	DAMARISCOTTA RIVER	12	2.3	
Total Area- Damariscotta River					57.3	>1000



DEP_ID	FLOW RATE (GPD)	OBD Type	Receiving Water	Deceiving Water Depth (ft)	Required Closure (acres)	Actual Closure (acres)
002795	300	M	GLEN COVE/LITTLE RIVER	6	1.5	
003439	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
004579	300	M	GLEN COVE/LITTLE RIVER	6	1.5	
006951	300	M	GLEN COVE/LITTLE RIVER	6	1.5	
003062	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
003125	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
001418	630	M	GLEN COVE/LITTLE RIVER	6	3.2	
001316	360	M	GLEN COVE/LITTLE RIVER	6	1.8	
001664	480	S	GLEN COVE/LITTLE RIVER	6	2.5	
001737	400	S	GLEN COVE/LITTLE RIVER	6	2	
002427	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
002484	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
002733	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
003648	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
004819	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
006783	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
007263	300	S	GLEN COVE/LITTLE RIVER	6	1.5	
001942	630	S	OCEAN HARBOR	6	3.2	
Total Area- Glen Cove/Little River/Ocean Harbor					32.2	>100
002951	300	S	MILL POND	6	1.5	
003279	300	S	MILL POND	6	1.5	
004056	300	S	MILL POND	6	1.5	
005327	150	S	MILL POND	6	0.75	
002134	300	S	MILL POND	6	1.5	
001956	300	S	MILL POND	6	1.5	
Total Area- Mill Pond					8.25	22
001880	300	S	SOUTH BRISTOL GUT	12	0.8	
006215	300	S	SOUTH BRISTOL GUT	12	0.8	
007700	400	M	SOUTH BRISTOL GUT	12	1	
001684	300	M	THE GUT	12	0.8	
006216	100	P	THE GUT	12	0.3	
007656	300	M	THE GUT (JOHNS BAY)	12	0.8	
002315	300	M	ATLANTIC OCEAN THE GUT	15	0.6	
Total Area- the Gut					5.1	> 12



Municipal WWTP

There are two municipal wastewater treatment plants in this growing area (Figure 3). The Great Salt Bay Damariscotta Mills facility has an outfall located in Great Salt Bay, in a large prohibited area. The Great Salt Bay Sanitary District (GSBSD) is a lagoon system with an outfall located within a prohibited area in downtown Damariscotta adjacent to the municipal parking lot boat launch.

The Great Salt Bay Damariscotta Mills (GSBDM) treatment facility is a secondary sand filter treatment system that serves a population of approximately 60 dwellings or roughly 150 people which handles 1500 gallons per day. All customers have individual septic tanks and the plant only receives the gray water from its customers; the sewer district maintains all customers' septic tanks. The GSBDM facility has 3 pump stations which are alarmed; none have the ability to overflow or bypass. The average daily flow of this plant is 6,000 gallons per day (GPD); the average wet weather flow is 19,176 GPD. There are no combined sewer outfalls (CSO) at this facility, and stormwater drains are separate from those of the treatment system. Prior to discharging to the Great Salt Bay, the plant chlorinates the effluent, with a contact time of 4 hours. The depth of receiving water at the location of the outfall pipe is 2.5 ft at mean low water, and 7 ft at high tide. The plant is staffed from 7 am to 3 pm, five days a week and a staff member is on call at night and on weekends. Tanks are pumped every three years on a rotating basis. Wastewater collected from the tanks is pumped to two 106 foot by 52 foot sand filter beds that are operated in alternating mode. The effluent is then chlorinated prior to being pumped approximately 500 feet through a 4" polyethylene outfall pipe to the main channel of the Damariscotta River Estuary. The final 50 feet of the pipe is a diffuser with fifteen half-inch perforations which enhance mixing with the receiving waters. There is approximately six feet of water over the pipe at mean low water.

In 1999, an effluent dye study for the Mills facility was conducted by Bigelow lab, in order to determine the effluent dilution from the Mills. The study tracked the wastewater plume, as it moved through the Great Salt Bay. The study was conducted after a significant precipitation event, with effluent discharge flows of 12,000 GPD. The results of the study showed that the effluent is highly diluted in Great Salt Bay, with most areas of the bay exhibiting dilution rates between 1:1000 and 1:10,000 or greater at both low and high tidal stages; no significant differences were established between the tidal stages (Phinney, 1999). Currently, the majority of Great Salt Bay is classified as Prohibited (450 acres), with an additional 42 acres in the southernmost part of the Bay (just North of Rt 1) classified as Conditionally Approved, based on the performance at the Mills Facility. Areas located south of Route 1 are classified as Prohibited. In 2009, an equal mix dilution calculation was completed by DMR to confirm that the closure size surrounding the Mills facility outfall is of adequate size to protect public health. For this calculation, the 2009 average wet weather flow of 19,176 GPD, average depth at mean tide of 4.7 ft and a fecal concentration of 1.4×10^5 FC/100 ml was used. Assuming equal dilution, the required closure size is 125.2 acres; the actual closure is approximately 450 acres. The current closure surrounding the Mills Facility is adequate to protect public health.

The Great Salt Bay Sanitary District (GSBSD) is a secondary treatment lagoon system, which serves a population of approximately 3000 residents from the towns of Newcastle and Damariscotta. The GSBSD has six collection system pumping stations; no bypasses or overflows are present on any of the pumping stations. There are three lagoons on site at the facility, one with a 4 million gallon capacity, and two with 2 million gallon capacity. The wastewater is retained in the lagoons for a total of six weeks. In 2009, the average daily flow of the plant was 0.157 million gallons per day (MGD); the extreme wet weather flow is approximately 0.414 MGD. The plant has no bypass capability and due to its large holding capacity,



the plant can shut down for more than two weeks with maximum inflow rate, if needed. The effluent is chlorinated, with a contact time of 50 minutes, prior to being pumped 1.5 miles to the outfall located at the Damariscotta town landing. The depth of the receiving waters at the outfall is 10 feet. The plant is staffed from 7 am to 3 pm, five days a week and a staff member is on call at night and on weekends. In late 2012, the lagoons were cleaned, inspected and patched and a new aeration system was installed. Sludge was hauled to New England Organics. In 2011 the Days Cove pump station had a new 100,000 gallon generator installed and two new 600GPM Flyt Pumps were also installed. The old generator that had been at this pump station was set up at the GSBSD main facility to be used for back-up power.

The size of the current prohibited area surrounding the outfall of the GSBSD was confirmed through a dilution study, conducted by the EPA in 1995. This study was conducted under normal flow conditions, of 124,000 GPD. Based on the results of this study the 1000:1 dilution line was achieved within 300 ft of the effluent pipe; the size of the current prohibited area's outer edge extends approximately 1,300 ft from the outfall. In 2009, an equal mix dilution calculation was completed by DMR to confirm that the closure size surrounding this wastewater treatment facility outfall is of adequate size to protect public health. For this calculation, the 2009 average wet weather flow of 414,000 GPD, average depth at mean tide of 10 ft and a fecal concentration of 1.4×10^4 FC/100 ml was used. Assuming equal mixing dilution, the required closure size is 127 acres; the actual closure surrounding this outfall is approximately 170 acres. The current closure surrounding this facility is adequate for the protection of public health.

There has been one WWTP related closure in recent years, as a result of a sewage overflow caused by an obstruction at a manhole located at the Newcastle end of the bridge in Damariscotta, occurring on April 6, 2007. The closure encompassed approved, conditionally approved and restricted areas in the upper portion of the river. Water samples were collected from this area on April 29, 2007, fecal coliform scores from all stations met their current classification standard, and the closure was repealed on May 2, 2007.

Industrial Pollution

There are no major industries in shellfish growing area WQ. Both shores of the Damariscotta River are very rural. Several businesses are located in the town center of Damariscotta and boat yard operations are located in the towns of East Boothbay and Bristol within a large prohibited zone in the lower portion of the river. Businesses within the growing area that are required to have National Pollution Discharge Elimination permits (NPDE) are shown in table 2.

Table 2. NPDES Permitted Sites

Pollution Area No.	License No	Type	Facility	Location	Notes
23C	MEU250659	unknown	Christmas Cove LP	South Bristol	No information Available
23A	ME0102768	Snow Dump Site	Damariscotta Snow Dump	Damariscotta	Still Active
23C	MEG170004	Shipyards	Gamage Shipyards	South Bristol	Still Active
23A	ME0102431	WWTP	Great Salt Bay Sanitary Dist.	Nobleboro	Still Active
23A	ME0101516	WWTP	Great Salt Bay WWTF	Damariscotta	Still Active
23C	ME0037001	Restaurant	Lobsterman's Wharf	East Boothbay	Still Active



Pollution Area No.	License No	Type	Facility	Location	Notes
23C	ME0023272	Fish Processing	S. Bristol Wharf Seafood Processing	South Bristol	Still Active
23C	ME0037133	Marina	Ocean Pt. Marina	East Boothbay	Still Active

Marinas and Mooring Fields

There are multiple marinas and mooring areas for both commercial fishing boats and pleasure boats located in growing area WQ. There are no seasonal conditional management plans in effect for any marina or mooring field in growing area WQ. With the exception of the moorings at Riverside Boatyard, the marinas, boat yards and mooring fields are located in areas that are classified as prohibited. As a result of the current review, no changes to area classifications are recommended.

Ocean Point Marina is located in the lower Damariscotta River, East Boothbay. This marina offers 71 slips and 15 moorings for seasonal rental, from May throughout September. According to the marina operator, 60 boats are large enough to have on-board toilets; however, no boats are lived on during the summer. The marina offers on-shore sanitary facilities, as well as a boat pump out facility; the pump-out facility is operational. The marina also provides fuel services, and has 16,000 gallons of fuel on site, stored in double walled tanks, enclosed in cement. This facility has a NPDES permit for their antifouling paint wash water which is contained in a catch basin. This marina is located within a large prohibited area (>350 acres), and no additional closures are recommended at this time.

Across the river in the town of Bristol, is the Gamage Yard. The Gamage Yard is a yacht storage and repair facility. The yard has 28 slips available for boats from 12-35 feet in length and there are two larger slips available for bigger yachts. There are 12 moorings at this site. This facility has two fuel tanks that are located 175 feet from the shore (2000 gallon diesel tank and a 2000 gallon gasoline). Both of these tanks are double walled tanks. A portable marine waste pump out is available for customers to use. This facility has a NPDES OBD permit for antifouling paint wash water. The yard does not provide on shore sanitary facilities; however a porta potty is available for yard customers to use. This boatyard is located within a large prohibited area (>350 acres), and no additional closures are recommended at this time.

Spar Shed Marina, is located in Little River, East Boothbay, on the lower Damariscotta River. This marina operates from May to October, and offers 7 slips and 6 rental moorings for sailboats and powerboats. No pump-out facilities are available at this marina. On average, there are approximately 6 boats moored at this facility that are large enough to have on-board toilets. This facility is located within a large prohibited area (>100 acres), and no additional closures are recommended at this time.

Coveside Marina, located in Christmas Cove, South Bristol is a seasonal marina, providing 11 moorings to day sailors and working boats. The marina provides sanitary facilities on shore; the marina has a pump out facility, however it is not operational. While all the boats moored at this marina may be large enough to have on-board toilets, none of the boats are live aboards. This marina is located in a large prohibited area (> 100 acres); no additional closures are surrounding this marina are recommended at this time.



Riverside Boatyard, is a working boatyard on the upper Damariscotta River in Newcastle, that provides 15 moorings for pleasure power and sail boats, located in an area that is classified approved. This facility is not a marina, and does not provide any sanitary or pump out facilities. The boatyard does provide marine fuel; with a 300 gallon doubled walled gasoline tank located approximately 300 feet from the water. While all of the boats moored at the moorings may be large enough to have on-board toilets, none of the boats are live aboards. The moorings service boats that are being worked on at the boatyard. This facility is not considered a public health threat, and no closures are recommended at this time.

The Damariscotta town landing is located in Damariscotta village, inside the prohibited area surrounding the Great Salt Bay Sanitary District outfall. The town landing provides slip space for dinghies, 12 feet or less in length, from April through November. No overnight tie up is allowed. There are no moorings available, and boats are permitted to anchor during daylight hours only. The town landing policies are enforced by the town Harbor Master. There are no sanitary or pump-out facilities available at the town landing. This municipal landing is not considered a threat to public health and no additional closures are recommended at this time.

Little River Lobster Company, located in the lower Damariscotta River, is a commercial fishing dock that provides gas and diesel. This facility is located inside a prohibited area, and does not require an additional closure.

Adjacent to the Ocean Point Marina facility in East Boothbay are the Hodgdon Yacht Yard and the Washburn and Doughty Yard. Hodgdon Yachts builds multi-million dollar mega-yachts inside two large (200 + feet) sheds. The Washburn and Doughty facility builds large off-shore tugs and ferries. The Washburn and Doughty facility is several hundred feet long. Both of these facilities are required to follow strict OSHA standards. No dock space or moorings are available for cruising boats at these facilities.

Stormwater

Stormwater enters the upper Damariscotta River by way of stormwater drains along the Damariscotta and Newcastle waterfront. Runoff from these towns eventually makes its way to the shore through many of these storm water lines. The Damariscotta village has a stormwater management system that is separate from the municipal sewage system. The Damariscotta village stormwater system discharges untreated stormwater directly into the Damariscotta River. The shellfish areas surrounding Damariscotta village are classified as prohibited and restricted. There are no shellfish areas that are approved for shellfish harvesting in the vicinity of municipal stormwater discharge points.



Figure 5. Stream Locations

Non-Point Pollution Sources (streams, etc)

Numerous small streams can be found along both shores of the Damariscotta River, and many of these streams were sampled as part of the 2012 shoreline survey of the area (Figures 2, 3 and 4, and Table 3). Many of the streams enter the shore near DMR’s established water sampling stations. The stream sample site numbers are associated with the proximity of the stream to the closest water sampling station. The classification of the water body that each stream drains into is also shown in Table 3.

Several streams received elevated fecal scores, however most streams received a combination of low and elevated scores (Table 3). The streams with the most elevated scores (230 FC/100 ML or higher) are highlighted in yellow. All of the sites that have elevated scores and are located in an approved area should be sampled again in 2013 under a variety of conditions.

Table 3. 2012 Stream Samples, Growing Area WQ

Town	Pollution Area	Stream	GASS ID	Area	Date	Fecal	Class
Damariscotta	23A	S1WQ31.5	WQ25?	Oyster Creek	8/22/2012	122	P
Damariscotta	23A	S2WQ31.5	WQ25?	NW corner GSB	8/22/2012	146	P
GSB Nobleboro	23A	PS1 WQ23	WQ23?	GSB	8/22/2012	42	P
GSB Nobleboro	23A	S1WQ29	WQ23	GSB	9/19/2012	>1600	P
GSB Nobleboro	23A	S1WQ31.0	WQ24	GSB	9/19/2012	320	P
Damariscotta	23A	S1WQ32	WQ27	Above Damariscotta Bridge	9/19/2012	>1600	P
Damariscotta	23A	S1WQ37	WQ28	Days Cove	9/19/2012	>1600	R
Bristol	XXXX	S1WQ44	WQ30	North of Prentiss Cove	9/19/2012	340	A
Bristol	XXXX	S1WQ45	WQ30	North of Prentiss Cove	9/19/2012	>1600	A
South Bristol	XXXX	S1WQ46	WQ31	Wiley Cove	9/19/2012	1120	A
South Bristol	XXXX	S1WQ50	WQ34	Lawes Cove	9/19/2012	>1600	A
Boothbay	23C	S1WQ13	WQ8	Fort Island	9/19/2012	300	A
Boothbay	XXXX	S3WQ15	WQ13	Burnham Cove	9/19/2012	106	A



Town	Pollution Area	Stream	GASS ID	Area	Date	Fecal	Class
Edgecomb	XXXX	S4WQ17	WQ15	Salt Marsh Cove	9/19/2012	600	A
Edgecomb	XXXX	S5WQ17	WQ15??	Salt Marsh Cove	9/19/2012	640	A
GSB Nobleboro	23A	S1WQ28	WQ23	GSB	9/19/2012	100	P
Newcastle	23A	S1WQ26	WQ21	GSB	9/19/2012	>1600	P
Damariscotta	23A	S1WQ42	WQ28	Huston Cove	9/19/2012	>1600	R
Boothbay	XXXX	PS1WQ17	WQ15	Salt Marsh Cove	10/22/2012	19	A
Boothbay	23C	PS1WQ13	WQ8	Fort Island	10/31/2012	152	A
Boothbay	XXXX	PS1WQ15	WQ12		10/31/2012	106	A
Boothbay	XXXX	PS3WQ15	WQ13		10/31/2012	70	A
Edgecomb	XXXX	PS1WQ17	WQ17		10/31/2012	96	A
Edgecomb	XXXX	PS1WQ18	WQ17		10/31/2012	40	A
Damariscotta	23A	PS1WQ42	WQ29	Huston Cove	10/31/2012	120	R
Damariscotta	XXXX	PS1WQ44	WQ30		10/31/2012	40	A
Bristol	XXXX	S1WQ45	WQ30		10/31/2012	27	A
South Bristol	XXXX	S1WQ46	WQ32?		10/31/2012	96	A
South Bristol	XXXX	S1WQ50	WQ34		10/31/2012	22	A
Edgecomb	XXXX	PS2WQ17	WQ14		11/1/2012	12	A
Edgecomb	XXXX	PS3WQ17	WQ14		11/1/2012	36	A



Agricultural Activities

Farms and domestic animals can have an adverse impact on water quality if animal waste is not properly managed and disposed of. There are no large scale agricultural operations located on the shore of the Damariscotta River. However, there are four areas that have animals pastured nearby the shore that deserve mention. On the west side of the river there is a family farm consisting of 8 goats, 2 llama, 6 sheep and approximately 20 free range chickens. This site is >500 feet from the shore; a stream flows, through the property and eventually goes under the River Road to the shore. The stream (PS1WQ17) was sampled twice in 2012 and received a score of 19FC/100ml and 96FC/100ml. Sample station WQ 17 is located in the same cove as the stream. This site has a current P90 score of 2.9FC/100ml indicating there is no adverse impact from this farm or stream. There is one horse grazed north of station WQ 46.5, approximately 400 feet from shore. Station WQ 46.5 is classified as approved and has a P90 calculation of 3.9 FC/100 ml, indicating no adverse impact from this pasture. There are several horses pastured approximately 50 feet from the shore, in the vicinity of station WQ 51; the horse barn is located across the road, greater than 500 feet from the shoreline. The P90 of station WQ 51 is 3.1 FC/100 ml, indicating no adverse impact from this pasture. There is a family farm on the shore by station WQ 57. There are two horses pastured at this property, within 25 feet of the water at the pastures edge; the horse barn is situated approximately 200 feet from shore and there is periodically a manure pile at the side of the barn. No run-off from the manure pile to the shore has been observed. Station WQ 57 is an approved station with a P90 calculation of 7 FC/100 ml, indicating no adverse impact from this pasture.

Conservation/Recreation Areas (beaches, trails, etc.)

There are ten distinct conservation areas within Growing Area WQ totaling approximately 833 acres of undeveloped land. All of the areas allow dog walking and other human activities but have limited or no sanitary pollution facilities available to the public. Many of the areas have specifications on camping; however these areas are not closely monitored. Most of the conservation parcels are located on the shores of areas that are classified as approved; there is no indication that water quality is adversely affected by the presence of the conservation parcels or by human or animal activities within these conservation/preserve areas.

In addition to conservation parcels, there are seven state owned islands that are used for nesting by colonial water birds and are a portion of the Coast of Maine Wildlife Management Area. Trespass to these areas is prohibited during specific periods (typically early spring through July or August) unless written permission is obtained from the Regional Wildlife Biologist.

Hydrographic and Meteorological Assessment

Tides

In order to investigate the frequency of elevated scores (those that surpass the variability standard) at various tidal stages, a tidal assessment for all stations in growing area WQ was completed (Table 4). For this assessment, all Systematic Random Sampling data collected between 2000 and 2012 were grouped by tidal stage (ebb vs. flood); geometric means and P90 scores were calculated using this data grouping. The specific tidal intervals that were grouped into the ebbing tide stage are ebb, high ebb, low, and low ebb. Tidal intervals that were grouped in the flood tide stage were flood, high flood, high and low flood. Several stations showed differences by tidal stage. Seven stations exceeded the P90 standard on an ebbing



tide and two stations exceeded the standard on a flood tide stage. The two restricted stations that exceeded the P90 standard on an ebb tide stage also exceeded the P90 standard on flood tide stages suggesting that the elevated scores are not tide related but caused by pollution in the immediate area. No approved stations showed impact which caused the scores to surpass the P90 during either tide stage; however approved station WQ17, and conditional stations WQ31.5 and 32 appear to show a greater impact during ebb tide stages. Station WQ 17 is located in Salt Marsh Cove and stations WQ 31.5 and 32 are located in Great Salt Bay.

Table 4. Ebb and Flood Tide Stage Impact, 2000-2012

Station	Class	Ebb Tide						Flood Tide					
		Count	GM	MAX	P90	Appd_Std	Restr_Std	Count	GM	MAX	P90	Appd_Std	Restr_Std
WQ008.00	P	21	3.7	93	12.4	42	252	30	2.8	43	6.2	41	239
WQ012.00	P	30	7.8	1200	78.7	37	212	30	2.6	240	8.5	34	187
WQ012.50	P	30	4	460	19.1	38	216	30	2.3	27	4.5	34	187
WQ013.00	A	30	6.1	460	36.5	38	221	30	3.6	46	13.2	33	184
WQ015.00	A	25	3.4	23	9.2	38	218	30	3.6	460	19.4	32	176
WQ017.00	A	24	3.5	460	19.6	38	215	30	2.2	8	3.7	32	176
WQ018.00	A	30	2.8	9.1	5	42	244	30	2.6	43	7.6	31	166
WQ020.00	A	30	2.8	9.1	4.2	44	260	30	2.3	28	5.5	31	163
WQ021.00	A	30	2.9	15	5.2	42	249	30	2.4	18	4.9	31	163
WQ022.00	A	30	3.2	93	8.3	42	249	30	2.9	360	12.8	31	163
WQ023.00	A	30	4.2	43	13.2	42	244	30	2.4	18.2	4.5	31	166
WQ024.00	A	30	3.2	23	7	41	239	30	3.5	22	9.5	31	169
WQ031.50	CA	23	4.8	93	22.9	37	206	30	3.5	36	10.5	31	163
WQ032.00	CA	30	5.2	93	21.2	40	235	30	2.9	24	7.5	31	163
WQ034.00	P	24	11.6	1100	118.3	43	257	30	3.3	16	6.9	31	163
WQ035.00	R	27	18.6	1560	207	45	267	30	7.9	140	54.7	31	163
WQ036.00	R	25	11.9	1200	156.9	44	265	30	9.5	1700	81.2	31	163
WQ037.00	R	30	12.9	1700	206	44	260	30	3.8	50	10.9	31	163
WQ039.00	P	30	5.3	460	31.4	43	254	30	2.6	27	6.9	31	163
WQ040.00	R	30	13.4	1100	194.1	42	249	30	3.5	280	17.4	31	163
WQ041.00	R	28	12.7	1200	141	42	252	30	5.3	620	27.7	31	163
WQ042.00	R	30	4	240	17.6	42	244	30	2.9	36	8.2	31	166
WQ043.00	A	30	3	43	9.2	39	225	30	2.2	8	3.4	33	180
WQ044.00	A	30	4	112	14.8	36	203	30	3	43	7.1	36	199
WQ045.00	A	30	3	56	8.3	36	203	30	2.7	23	6.2	36	199
WQ046.50	A	30	2.7	68	7	36	203	30	2.7	240	8.8	36	199
WQ047.00	A	30	2.7	56	7.4	36	203	30	2.9	36	7.6	36	199
WQ048.00	A	30	2.5	20	4.8	36	199	30	2.5	12	4.2	36	203



Station	Class	Ebb Tide						Flood Tide					
		Count	GM	MAX	P90	Appd_Std	Restr_Std	Count	GM	MAX	P90	Appd_Std	Restr_Std
WQ049.00	A	30	2.4	8	3.6	37	212	30	2.2	9.1	3.4	35	191
WQ051.00	A	30	2.3	4	3.2	37	208	30	2.3	6	3.5	35	195
WQ052.00	A	30	4.3	340	23	36	203	30	5.6	150	30.7	36	199
WQ054.00	A	30	3	55	7.7	37	208	30	2.3	8	3.6	35	195
WQ055.00	A	30	2.5	8	4.1	37	212	30	2.9	38	8.1	35	191
WQ057.00	A	30	2.4	4	3.5	38	216	30	2.7	160	7.8	35	191
WQ058.00	P	30	2.3	3.6	3.1	38	216	30	2.4	9.1	4.3	34	187

Winds

Wind direction can have an impact on the water quality in an area if the wind is found to be predominantly blowing from an area associated with large concentrations of pollutants such as industries or large farming operations bordering on the shore. The Department of Marine Resources started collecting wind direction data in March of 2005. The direction the wind is blowing is noted on the sample collection field sheet at each sample site during the collection of the random run. Using data collected from 2008-2012, the percentage of samples collected at each of the wind directions was placed on a pie chart (Figure 9) to illustrate which wind directions were most frequently noted on the field sheet. The predominant wind direction noted was a calm condition (40%) which is little to no wind at all. The next most common wind direction noted is a southerly direction (14.1%). The wind blew from a northerly direction 6% of the time. The pie chart in Figure 10 shows the percentage of elevated scores associated with the various wind directions.

Figure 6. Wind Direction Growing Area WQ 2008-2012

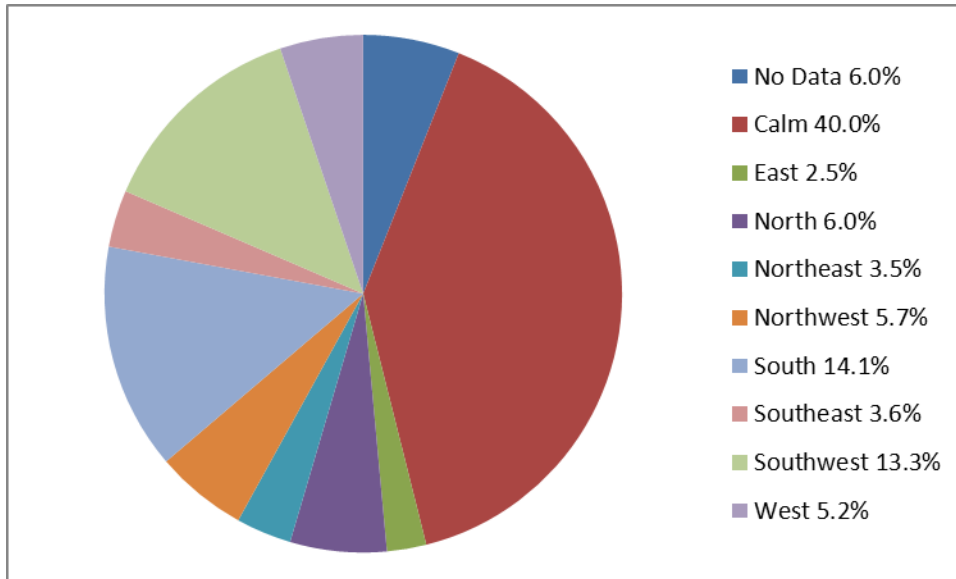
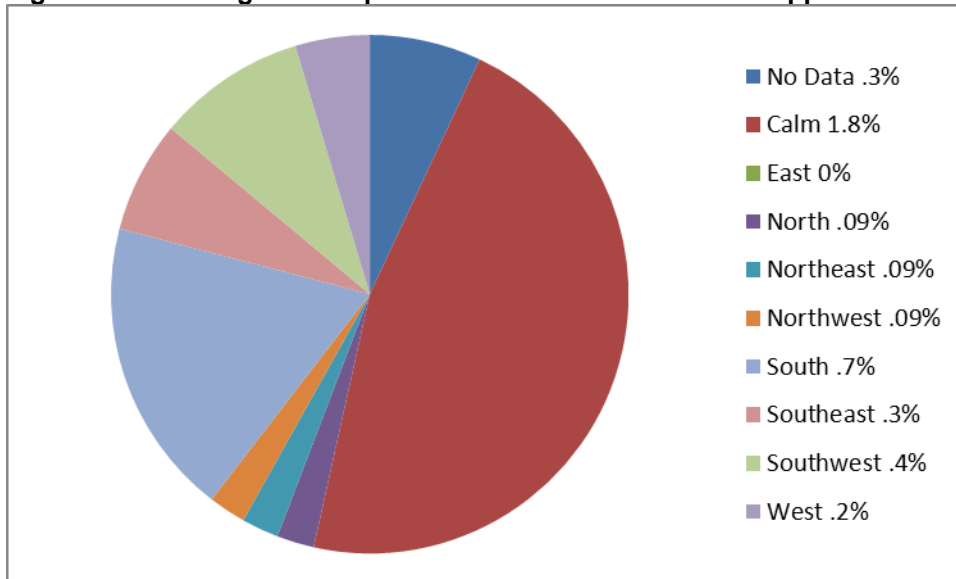


Figure 7. Percentage of Samples with Score at or Above the Approved Standard, 2008-2012





River Discharge

The Damariscotta River is a 19 mile long tidal river that begins at the outlet of Damariscotta Lake at Damariscotta Mills. From the lake’s outlet the river drops 50 feet over .1 miles through Damariscotta Mills before reaching tidewater at Great Salt Bay. The river is navigable for nearly the entire nineteen miles or up to the bridge between Newcastle and Nobleboro. The river contains many bends and twists as it makes its way southward and current can be strong at some of the narrow sections. The Department of Marine Resources has not conducted any hydrographic studies on the Damariscotta River. In 1999, an effluent dye study for the Mills facility was conducted by Bigelow labs, in order to determine the effluent dilution from the Mills. The study tracked the wastewater plume, as it moved through the Great Salt Bay. The study was conducted after a significant precipitation event, with effluent discharge flows of 12, 000 GPD. The results of the study showed that the effluent is highly diluted in the Salt Bay, with most areas of the bay exhibiting dilution rates between 1:1000 and 1:10,000 or greater at both low and high tidal stages; no significant differences were established between the tidal stages (Phinney, 1999). Currently, the majority of Great Salt Bay is classified as prohibited (450 acres), with an additional 42 acres in the southernmost part of the Bay (just North of Rt 1) classified as conditionally approved, based on the performance at the Mills Facility.

The size of the current prohibited area (1000:1 dilution) surrounding the outfall of the GSBSD was confirmed through a dilution study, conducted by the EPA in 1995. This study was conducted under normal flow conditions, of 124,000 GPD. Based on the results of this study the 1000:1 dilution line was achieved within 300 ft of the effluent pipe; the size of the current prohibited area’s outer edge extends approximately 1,300 ft from the outfall. In 2009, an equal mix dilution calculation was completed by DMR to confirm that the closure size surrounding this wastewater treatment facility outfall is of adequate size to protect public health. For this calculation, the 2009 average wet weather flow of 414,000 GPD, average depth at mean tide of 10 ft and a fecal concentration of 1.4×10^4 FC/100 ml was used. Assuming equal mixing dilution, the required closure size is 127 acres; the actual closure surrounding this outfall is approximately 170 acres.

Water Quality Review

Table 5 lists all active, approved, restricted and prohibited stations in Growing Area WQ, with their respective Geomean and P90 calculations for 2012. Please refer to Appendix C for a key to interpreting the headers on the columns of Table 5. All approved and restricted stations have continued to meet their NSSP classification standard. No changes in classification are needed at this time.

Table 5. Geometric Mean and P90 Scores Growing Area WQ

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WQ008.00	P	30	17	2.6	0.3	93	6.4	37	212	7/15/2003
WQ012.00	P	30	30	2.3	0.21	16	4.4	31	163	1/9/2008
WQ012.50	P	30	30	2.3	0.27	27	5.1	31	163	1/9/2008
WQ013.00	A	30	30	3.7	0.52	72	17	31	163	1/9/2008
WQ015.00	A	30	30	2.7	0.32	42	7	31	163	1/9/2008
WQ017.00	A	30	30	2	0.12	6	2.9	31	163	1/9/2008
WQ018.00	A	30	30	2.3	0.28	20	5.4	31	163	1/9/2008



Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WQ020.00	A	30	30	2.3	0.28	28	5.5	31	163	1/9/2008
WQ021.00	A	30	30	2.4	0.24	18	4.9	31	163	1/9/2008
WQ022.00	A	30	30	2.8	0.49	360	12	31	163	1/9/2008
WQ023.00	A	30	30	2.6	0.28	38	6.2	31	163	3/4/2008
WQ024.00	A	30	30	3.2	0.31	22	8.1	31	163	1/9/2008
WQ031.50	CA	30	30	3.5	0.36	36	11	31	163	7/7/2010
WQ032.00	CA	30	30	2.9	0.32	24	7.5	31	163	7/7/2010
WQ034.00	P	30	30	2.8	0.21	8	5.3	31	163	1/8/2008
WQ035.00	R	30	30	8.6	0.74	1560	78	31	163	1/8/2008
WQ036.00	R	30	30	10	0.76	1700	98	31	163	1/8/2008
WQ037.00	R	30	30	3.9	0.56	1700	21	31	163	1/8/2008
WQ039.00	P	30	30	2.6	0.33	35	7	31	163	1/8/2008
WQ040.00	R	30	30	3.9	0.66	500	28	31	163	1/8/2008
WQ041.00	R	30	30	6.1	0.66	620	43	31	163	1/8/2008
WQ042.00	R	30	30	3	0.38	36	9.3	31	163	1/8/2008
WQ043.00	A	30	30	2	0.12	8	2.9	31	163	1/9/2008
WQ044.00	A	30	30	3.3	0.45	112	13	31	163	1/9/2008
WQ045.00	A	30	30	2.6	0.37	56	8.1	31	163	1/9/2008
WQ046.50	A	30	30	2.1	0.2	15	3.9	31	163	1/9/2008
WQ047.00	A	30	30	2.5	0.36	56	7.6	31	163	1/9/2008
WQ048.00	A	30	30	2.2	0.21	20	4.2	31	163	5/6/2008
WQ049.00	A	30	30	1.9	0	2	1.9	31	163	1/9/2008
WQ051.00	A	30	30	2.1	0.12	6	3.1	31	163	1/9/2008
WQ052.00	A	30	30	4.4	0.6	340	26	31	163	1/9/2008
WQ054.00	A	30	30	2.4	0.33	55	6.6	31	163	1/9/2008
WQ055.00	A	30	30	2.5	0.32	38	6.6	31	163	1/9/2008
WQ057.00	A	30	30	2.4	0.36	160	7	31	163	10/22/2007
WQ058.00	P	30	30	2	0.12	8	2.9	31	163	1/9/2008

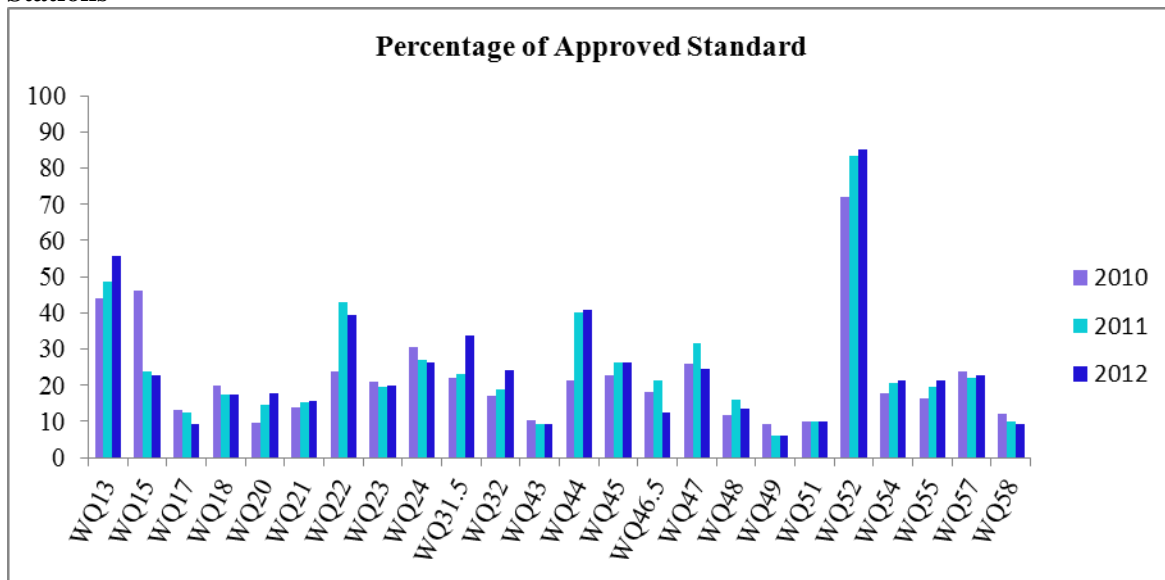
Water Quality Discussion and Classification Determination

Figure 8 shows the P90 scores, expressed as a percent of the approved standard, for approved stations and conditionally approved stations in growing area WQ over the past three review years. During the transition from MPN to MF analysis method, the approved standard will decrease every year, until all samples have been analyzed by the MF method. In order to show the trend of the P90 value over the years, the calculated P90 scores are expressed as a percentage of the standard; any station showing the 2012 column on or above 100 percent does not meet the approved classification standard. Most approved stations showed some variation in water quality among the three review years; however the majority of



the stations remained well below the standard with the exception of station WQ52. While this station is still below the standard, it has been trending upward which indicates a decline in water quality. Upward trends at this site may be attributed to the station’s location which is at the head of a cove that receives a large volume of fresh water from Clark Cove Pond which drains into the area. Station WQ13 is also trending upward but remains below 60% of the standard. This site is also influenced by fresh water. Stream site PS1WQ13 flows into the head of the cove which is just above this station’s sample site. The stream was sampled twice in 2012 and received a score of 300FC/100ml on September 19th and a score of 152FC/100ml on October 31st. Conditionally approved stations WQ31.5 and WQ32 are also shown in this grouping because these stations are conditional on the operations at the Damariscotta Mills Treatment Facility, however there is no seasonal component to the classification. The facility has not had any kind of malfunction for over five years. Both of these stations show an upward trend in 2012 but have continued to receive P90 scores that are at or below 35% of the standard. The remaining stations have continued to receive P90 scores that are below 50% of the approved standard.

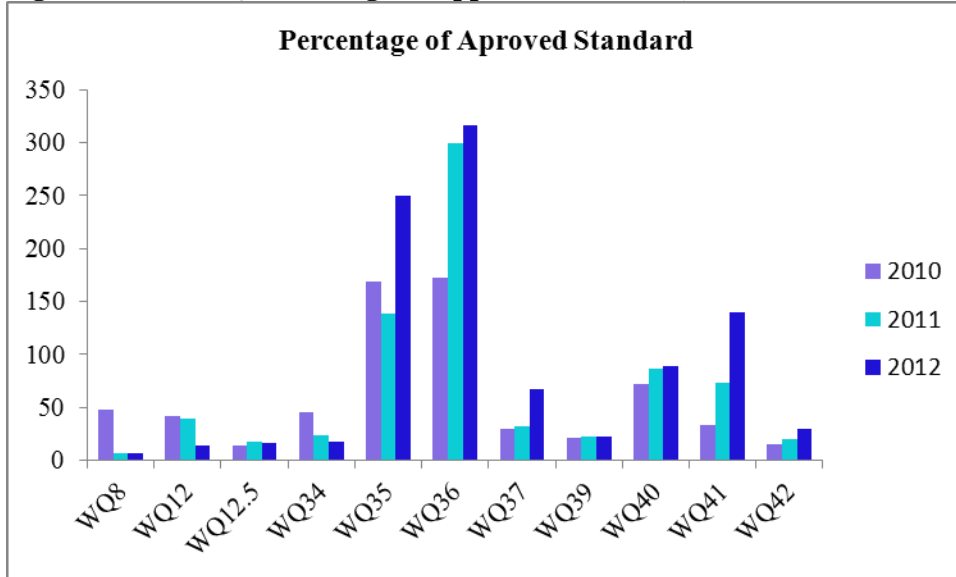
Figure 8. Area WQ Percentage of Approved Standard, Approved and Conditionally Approved Stations



The trend chart for the restricted and prohibited stations is shown in figure 9. These stations are shown based on the approved standard because many of these sites are at or below 50% of the approved standard. Stations WQ8, 12, 12.5, 34, 39 and 42 all have P90 scores below 50% of the approved standard. Restricted stations WQ35 and 36 are located in Days Cove, in the upper Damariscotta River. These stations have continued to be the most elevated stations in the growing area and have been trending upward in 2012. It is not known what is causing the elevated scores in this area. Fresh water influence is probably contributing to the scores. Station WQ37 which is farther out in the same cove area has a P90 score that meets approved standards. Restricted station WQ41 also has been trending upward. This site is located in Huston Cove. Water quality at the head of this cove has continued to be poor. The area has been surveyed several times and no pollution sources have been found. Stream site PS1WQ42 flows into the head of the cove. This site was sampled on September 19, 2012 and received a score of >1600FC/100ml. It was sampled again on October 31, 2012 and received a score of 120FC/100ml. Additional stream work needs to be done in this area.



Figure 9. Area WQ Percentage of Approved Standard, Restricted and Prohibited Stations



A seasonal and rainfall impact assessment was completed for the approved stations that are showing a deteriorating trend in water quality. Table 7 shows results from random and extra samples collected between 2008 and 2012. The data points are sorted by month and by cumulative rainfall amount; scores that exceeded the P90 standard are hi-lighted in yellow. Rain 3 refers to cumulative rainfall occurring on the date of sample collection and two days prior to the sample date; Rain 4 refers to cumulative rainfall 3 days prior, plus the day of sample collection. The salinity on the date of sample collection is also shown (Sal). Station WQ 13 is located inside of Fort Island in the town of Boothbay. This location has a stream located at the head of the cove, just beyond the sample site. The table shows that the area has had a number of dates with low salinities however the elevated scores aren't always associated with the lower salinities or the dates with more rainfall and the scores do not appear to be associated with a season but seem to be fairly random and have occurred over a variety of years.

Table 6. Station WQ13, Pivot Table

Rain 3	Rain 4	Date	Sal	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov
0	0	09/08/09	30									1.9		
0	0	07/20/11	30							1.9				
0	0	05/21/12	24					46						
0	0	07/23/12	30							1.9				
0	0.24	08/18/08	31								1.9			
0	0.9	05/20/09	30					1.9						
0.01	0.01	01/09/08	23	18										
0.01	0.01	02/17/09	31		1.9									
0.01	0.01	08/11/09	30								1.9			
0.01	0.01	02/06/12	30		1.9									



Rain 3	Rain 4	Date	Sal	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov
0.02	0.99	08/31/11	30								2			
0.03	0.25	08/15/12	30								27			
0.03	0.56	09/27/10	31									1.9		
0.05	0.74	03/04/08	12			34								
0.06	0.59	10/18/11	30										2	
0.08	0.08	04/03/12	31				1.9							
0.11	0.11	05/04/10	30					1.9						
0.12	0.12	10/14/08	30										1.9	
0.12	0.12	08/09/10	30								2			
0.12	0.12	02/23/11	30		1.9									
0.15	0.15	06/22/10	31						1.9					
0.16	1.23	10/03/12	27										10	
0.24	0.24	11/22/10	30											2
0.37	0.37	10/14/09	30										72	
0.44	0.44	04/12/11	30				1.9							
0.54	0.54	06/01/11	20						35					
0.95	0.95	03/15/10	30			1.9								
0.98	1.02	05/06/08	24					1.9						
1.11	1.11	07/01/08	31							1.9				
1.38	1.71	04/01/09	8				4							

Table 7 shows the rainfall and seasonal assessment for station WQ 52. This site is located approximately 150 feet from where Clark Cove Pond flows under the road onto the shore. The salinity values are often low at this site. There are three elevated scores that occurred during the summer months (June, July and August) however the scores are from three different years and don't show a strong association with rainfall events. Again, the scores appear to be random and there is no strong association with rainfall or season.

Table 7. Station WQ52, Pivot Table

Rain 3	Rain 4	Date	Sal	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
0	0	09/08/09	24									8		
0	0	07/20/11	30							1.9				
0	0	05/21/12	17					1.9						
0	0	07/23/12	30							6				
0	0.24	08/18/08	26								6			
0	0.9	05/20/09	28					2						
0.01	0.01	01/09/08	12	5.5										
0.01	0.01	02/17/09	30		1.9									
0.01	0.01	08/11/09	25								2			
0.01	0.01	02/06/12	30		1.9									
0.02	0.99	08/31/11	30								2			
0.03	0.25	08/15/12	30								11			
0.03	0.56	09/27/10	30									1.9		



Rain 3	Rain 4	Date	Sal	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
0.05	0.74	03/04/08	20			1.9								
0.06	0.59	10/18/11	18										16	
0.08	0.08	04/03/12	30				1.9							
0.11	0.11	05/04/10	25					1.9						
0.12	0.12	10/14/08	28										1.9	
0.12	0.12	08/09/10	25								136			
0.12	0.12	02/23/11	28		1.9									
0.15	0.15	06/22/10	28						2					
0.16	1.23	10/03/12	27										18	
0.24	0.24	11/22/10	14											10
0.37	0.37	10/14/09	30										1.9	
0.44	0.44	04/12/11	20				1.9							
0.54	0.54	06/01/11	15						340					
0.95	0.95	03/15/10	28			1.9								
0.98	1.02	05/06/08	16					2						
1.11	1.11	07/01/08	23							56				
1.38	1.71	04/01/09	16				1.9							

Aquaculture/Wet Storage Activity

The Damariscotta River is one of the most important rivers in the state of Maine for aquaculture production. Lease sites can be found all along the river from Great Salt Bay in the upper river to the shores of South Bristol and Boothbay in the lower portion of the river. In 2012 there were 22 regular lease sites which are considered active for a minimum period from 3-10 years and there were 21 limited purpose lease sites which are one year lease sites. The majority of the sites are for raising oysters. One site is for mussels and there are some experimental sites that are raising razor clams. There are 3 wet storage sites on the Damariscotta River (figures 3 and 4). A list of current aquaculture leases with information on each operation can be accessed on the DMR website at:

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



Conclusion

Growing area WQ continues to have good water quality, with the majority of the growing area maintaining the approved classification. No stations showed significant upward trends in 2012. With the exception of licensed overboard discharge systems, no actual pollution sources were identified during the 2012 shoreline survey of the area. The management plan for the Damariscotta Mills Wastewater treatment facility continues to be adequate to protect public health; there were no closures of the conditionally approved areas during the review period due to a malfunction at the Mills facility. Currently, all closures surrounding pollution sources, including wastewater treatment outfalls and OBDs are of adequate size to protect public health. No changes in classifications are proposed or required at this time.

Recommendation for Future Work

Additional stream sampling should be done for all streams that received elevated scores during the 2012 survey of the area.



Appendix A. Upper Damariscotta River, Annual Review of Conditional Area Management Plan, 2012

Conditional Area Management Plan – 2012 Annual Review Growing Area WQ: Great Salt Bay WWTP (Mills Facility)

Scope:

A portion of Growing Area WQ is classified as conditionally approved, based on the proper functioning of the Great Salt Bay WWTP. The area shall be closed during any failure event at the Great Salt Bay WWP (Mills Facility). Water quality at this conditional area is currently monitored by stations, WQ 31.5 and 32, and must be sampled monthly throughout its open status.

Great Salt Bay Sanitary District Wastewater Treatment Facility serves approximately 40 customers (60 persons) in Damariscotta Mills. The Mills Facility provides secondary treatment of wastewater via settling in individual tanks and biological treatment through a covered sand filter bed system. This facility is not authorized to receive septage waste. Wastewater collected from the individual septic tanks is pumped to two 106 foot by 52 foot sand filter beds that are operated in the alternating mode. The effluent is then chlorinated (sodium hypochlorite) prior to discharge into the Great Salt Bay. There are 3 pump stations located at Mill Pond at the Bridge (Lakeside), Bayview at the intersection of Ladds Rd and Bayview Rd, and at the plant (influent pumps to the sand filters). All pump stations are equipped with automated alarms which allow for 24 hour monitoring of potential system malfunctions due to power failure, equipment breakdown, or high water.

The conditional area is described below:

The WWTP conditionally approved portion of the Damariscotta River is described as: That portion of the upper Damariscotta River in Great Salt Bay located south of a line running between two unnamed points of land, locally known as The Narrows, located approximately 600 yards north of Route 1 bridge, AND the area immediately north of the Route 1 bridge.

Compliance with management plan:

The wastewater treatment facility has met compliance criteria that include lack of mechanical failures and effective sewage treatment during conditionally open periods. There are 3 pumping stations located at Mill Pond at the Bridge (Lakeside), Bayview at the intersection of Ladds Rd and Bayview Rd, and at the plant (influent pumps to the sand filters). All pump stations are equipped with automated alarms which allow for 24 hour monitoring of potential system malfunctions due to power failure, equipment breakdown, or high water. In case of a power outage, there is a single phase mobile generator as standby power. Reporting of noncompliance events was in accordance with the management plan with closures enacted immediately upon DMR notification.

Adequacy of reporting and cooperation of involved persons:

Review of WWTP and DMR records show management plan violations have historically been reported by the municipal treatment plant staff to the Department of Marine Resources public health laboratory staff within acceptable time limits and with adequate detail to initiate action. There were no violations in



2012. The effectiveness of this management plan is excellent due to the close working relationship between the treatment plant staff, local law enforcement agencies and the Maine Department of Marine Resources. In the event of a violation, Maine Marine Patrol officers alert local shellfish harvesters to any regulation changes. Legal closure of the area is automatically enacted immediately at the time of notification, with written regulation repeal and promulgation the responsibility of the on duty staff or on call staff.

No anecdotal evidence (failing water testing criteria, shoreline survey, and reported illness) suggests that a public health risk exists when the treatment plant is operating correctly.

Compliance with approved growing area criteria:

All stations within the conditional approved area met approved status (Table 1).

Table 1. WQ, Great Salt Bay WWTP Conditional Area, Geometric Mean, Count and P90 (2012)

Station	Class	Count	MFCCount	GM	SDV	MAX	P90	Appd_Std	Restr_Std	Min_Date
WQ031.50	CA	30	30	3.5	0.36	36	10.5	31	163	7/7/2010
WQ032.00	CA	30	30	2.9	0.32	24	7.5	31	163	7/7/2010

Field inspection of critical pollution sources:

The pollution sources influencing the conditional area are the outfall pipe and pump stations from the Great Salt Bay Wastewater Treatment Facility. It is not possible for wastewater to bypass the plant. Annual sewage treatment plant and licensed overboard discharge operation standards are reviewed by the Maine Department of Environmental Protection (DEP). There is an ongoing cooperative review of the treatment plant operation by the Department of Marine Resources and Maine DEP based on annual inspection documents, site visit and DEP inspector interviews.

Water sampling compliance history:

Conditional area sampling is done monthly during open and approved status (Table 2). Monitoring stations are part of a monthly scheduled sampling run.

Analysis-recommendations:

The above review of the management plan indicates an effective operation and enforcement of this management plan.

Table 2. WQ, Great Salt Bay WWTP Conditional Management Area; Water Sampling Compliance History

Station	Class	Adverse	Random		Total	Comments
		Closed	Closed	Open		
WQ031.50	CA			12	12	sampled monthly
WQ032.00	CA			12	12	



Water sampling compliance history

Table 31 shows the 2012 sampling effort for growing area WQ. The 2012 flood sampling effort has been excluded from the sample count table. All conditionally approved stations were sampled 12 times in the open status in 2012.

Table 8. Growing Area WQ 2012 Sampling Effort

Station	Class	Random		Total	Comments
		Closed	Open		
WQ008.00	P	6		6	
WQ012.00	P	6		6	
WQ012.50	P	6		6	
WQ013.00	A		6	6	
WQ015.00	A		6	6	
WQ017.00	A		6	6	
WQ018.00	A		6	6	
WQ020.00	A		6	6	
WQ021.00	A		6	6	
WQ022.00	A		6	6	
WQ023.00	A		6	6	
WQ024.00	A		6	6	
WQ031.50	CA		12	12	WWTP
WQ032.00	CA		12	12	WWTP
WQ034.00	P	6		6	
WQ035.00	R		6	6	
WQ036.00	R		6	6	
WQ037.00	R		6	6	
WQ039.00	P	6		6	
WQ040.00	R		6	6	
WQ041.00	R		6	6	
WQ042.00	R		6	6	
WQ043.00	A		6	6	
WQ044.00	A		6	6	
WQ045.00	A		6	6	
WQ046.50	A		6	6	
WQ047.00	A		6	6	
WQ048.00	A		6	6	
WQ049.00	A		6	6	
WQ051.00	A		6	6	



Station	Class	Random		Total	Comments
		Closed	Open		
WQ052.00	A		6	6	
WQ054.00	A		6	6	
WQ055.00	A		6	6	
WQ057.00	A		6	6	
WQ058.00	P	6		6	



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 = 90th percentile

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

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