



GROWING AREA WW
Towns of
Lincolnville, Northport, Searsport, and Stockton Springs

2009-2020
Sanitary Survey Report

Final

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2021

Sanitary Survey Officer signature: 

Date: 8/11/22



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Executive Summary

This is a Sanitary Survey report for Growing Area WW in Knox and Waldo Counties written in compliance with the requirements of the 2019 Model Ordinance and the National Shellfish Sanitation Program. The last Sanitary Survey was written in 2009. Triennials were written in 2012, 2015 and 2018. The next Sanitary Survey is due in 2032 and the next triennial is due in 2023. There are no areas being evaluated for upgrade or downgrade in 2021. There were 179 properties visited during shoreline survey operations. No actual or potential disposal problems were found. Access was not denied at any properties and no problem forms were filed.

Description of Growing Area

Shellfish Growing Area WW includes the area from the tip of Owls Head (at Owls Head lighthouse) to the southern tip of Rocky Point, Cape Jellison. The following towns are included in this growing area: Owls Head (population 1,504), Rockland (population 6,936), Rockport (population 3,644), Camden (population 5,232), Northport (population 1,550), Belfast (population 6,938), Searsport (population 2,649), and Stockton Springs (population 1,533). Rockland and Belfast are the largest population centers and are the only two cities in the Growing Area according to the most recent census. Land use in the area is dominated by year-round residential properties. Some seasonal properties remain but many of the seasonal properties are being converted to year-round use throughout the area. There is still a large influx of people in the summer months (May-September). Several towns in the growing area are popular boating and tourist destinations. Ferry access to some of the State's largest inhabited islands is located in Rockland and Lincolnville. The islands themselves are not located in Growing Area WW. The coastline in this region is rocky coast separating small coves and harbors which contain mud or rocky beach areas. Development along the shoreline is spotty with clusters of homes separated by undeveloped land. Portions of this growing area historically contained large soft-shell clam populations. Much of the coastline of Growing Area WW is classified as Prohibited due to outfalls, the prior presence of numerous overboard discharges, marina and mooring areas as well as waste treatment facilities and industrial discharges.

There are six wastewater treatment plants (WWTP/WWTF) located in Belfast, Camden, Lincolnville, Northport, Rockland, and Searsport. There are four active, licensed overboard discharges (OBDs). No OBDs were removed during the 2020 review year.

The Ducktrap River (Lincolnville) and the Passagassawakeag River (Belfast and Searsport) both flow onto the shores of Shellfish growing area WW. The Penobscot River enters Penobscot Bay along the eastern shores of Stockton Springs (Growing Area WX) and passes by Fort Point before entering Penobscot Bay where it mixes with ocean waters. The Penobscot River does not flow directly onto the shores of shellfish growing area WW. The Penobscot River is the largest of the three rivers and it contributes the greatest amount of fresh water to Penobscot Bay. Wildlife in the area includes resident and migrating birds, various rodents, deer, harbor seals, etcetera. Substantial numbers of rafted ducks are seen in the fall.

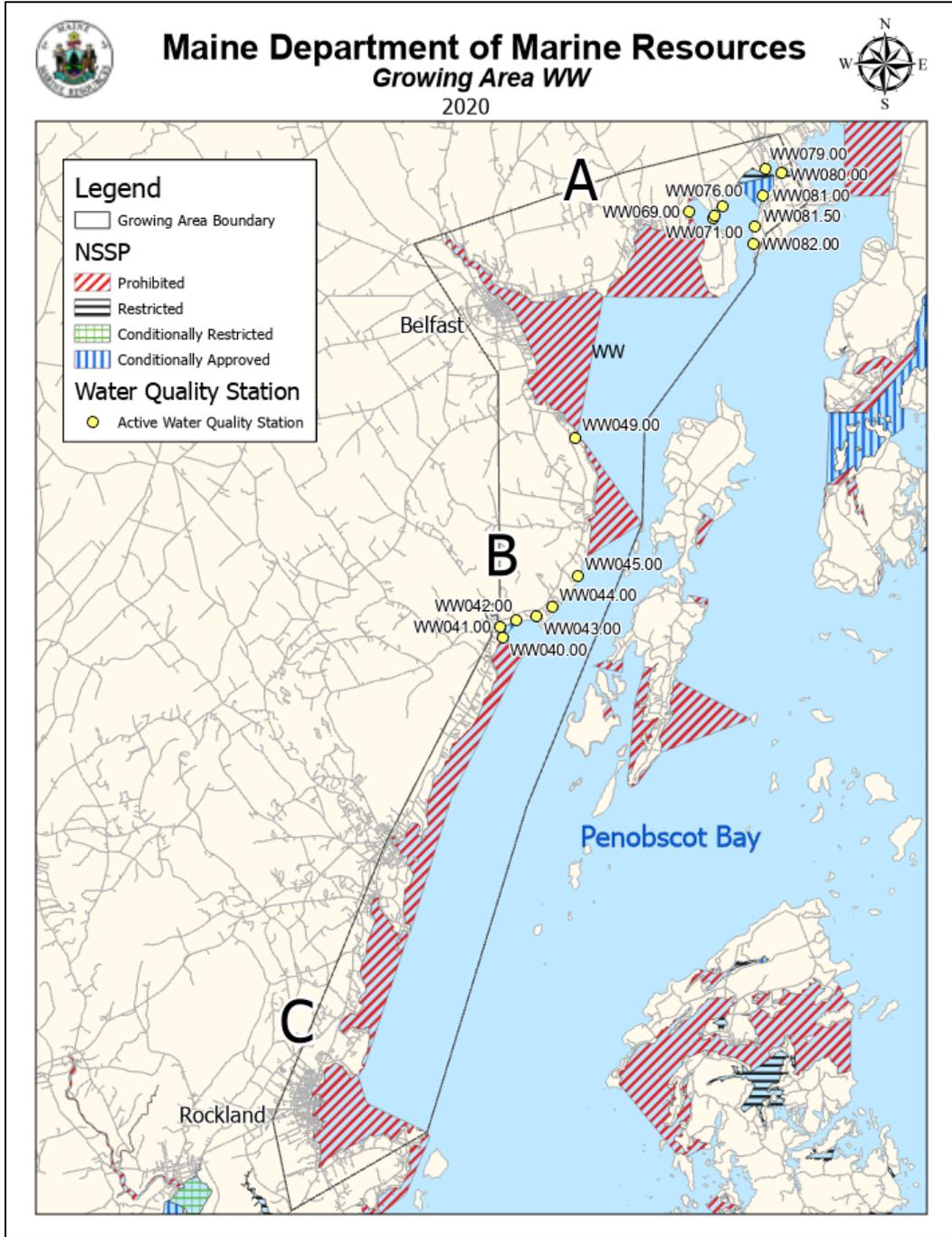
There are very few agricultural operations nearby the shore. Shore front properties are predominantly occupied by private residences and businesses. In Northport, there is a cat boarding facility. In Stockton Springs there is a small animal farm with a few horses. Growing Area WW has four industrial facilities that discharge into the growing area in Searsport and Rockland. Sprague Energy is a loading and storage facility for petroleum products located in Searsport. Irving Oil also has a fuel loading and storage facility in Searsport. GAC Chemical, also in Searsport, is a chemical production facility. In Rockland, Dragon



Cement discharges non-contact cooling water and Dupont Nutrition discharges contact and non-contact cooling water.

There are two shellfish aquaculture leases and nineteen shellfish Limited Purpose Aquaculture permits (LPA). A land-based salmon aquaculture facility that would discharge into Penobscot Bay is being proposed. Activities associated with leases and LPAs are monitored in accordance with the 2019 Model Ordinance.

Figure 1. Growing Area WW overview and station locations





History of Growing Area Classification

Reclassification addendums to the sanitary survey report are in the DMR central files

Pollution Sources Survey

Summary of Sources and Location

The growing area shoreline is divided into two-mile segments that are identified using unique Growing Area Shoreline Survey Identification (GASSID) numbers. All properties and potential pollution sources within 250 feet of the shoreline are identified and inspected. The inspection includes a property description, physical address, location of the septic system and any other relevant potential or actual pollution sources. A GPS point to identify the source location(s) and the data are entered electronically in the field and stored in DMR central files.



Figure 2. Growing Area WW, Map A

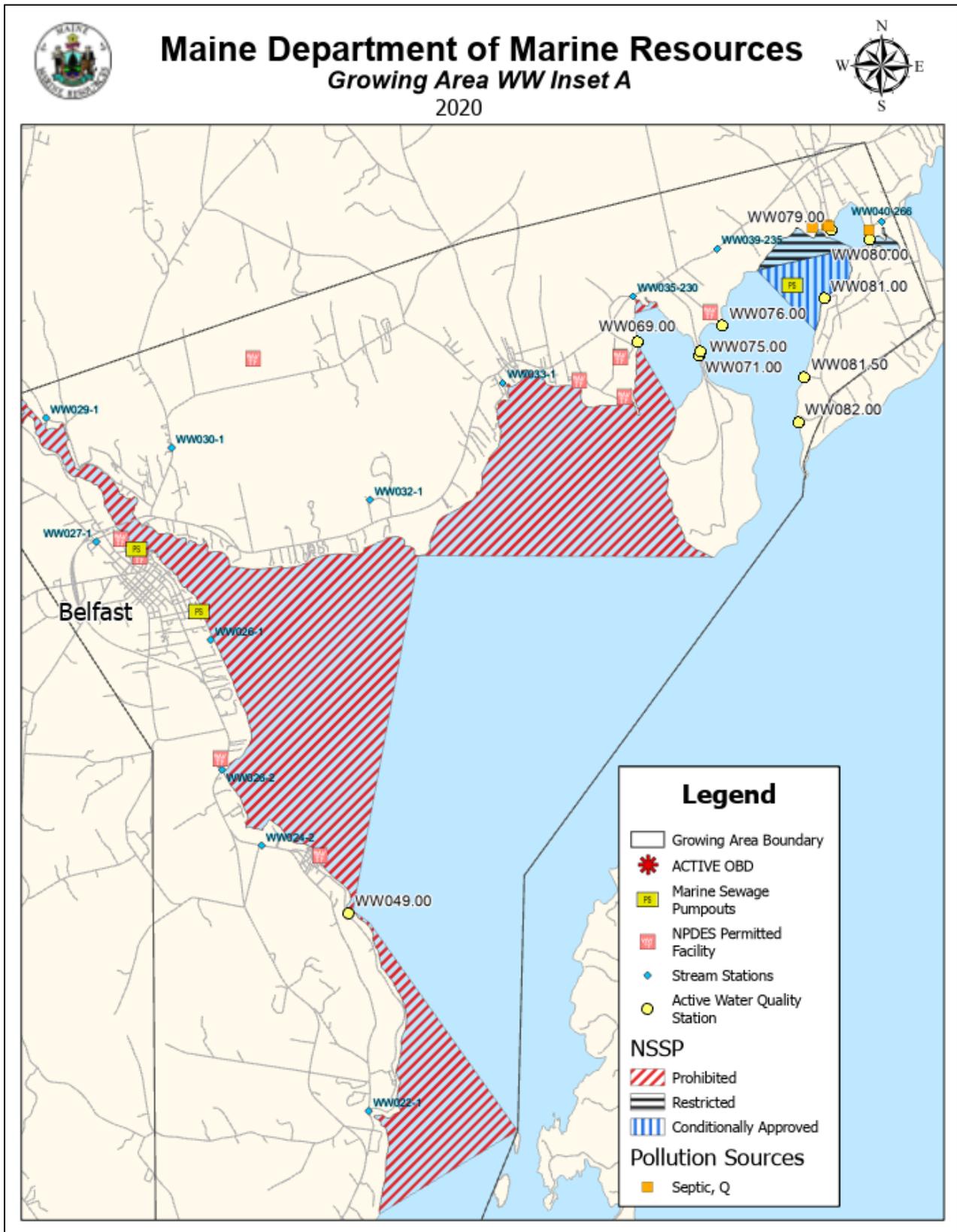




Figure 3. Growing Area WW, Map B

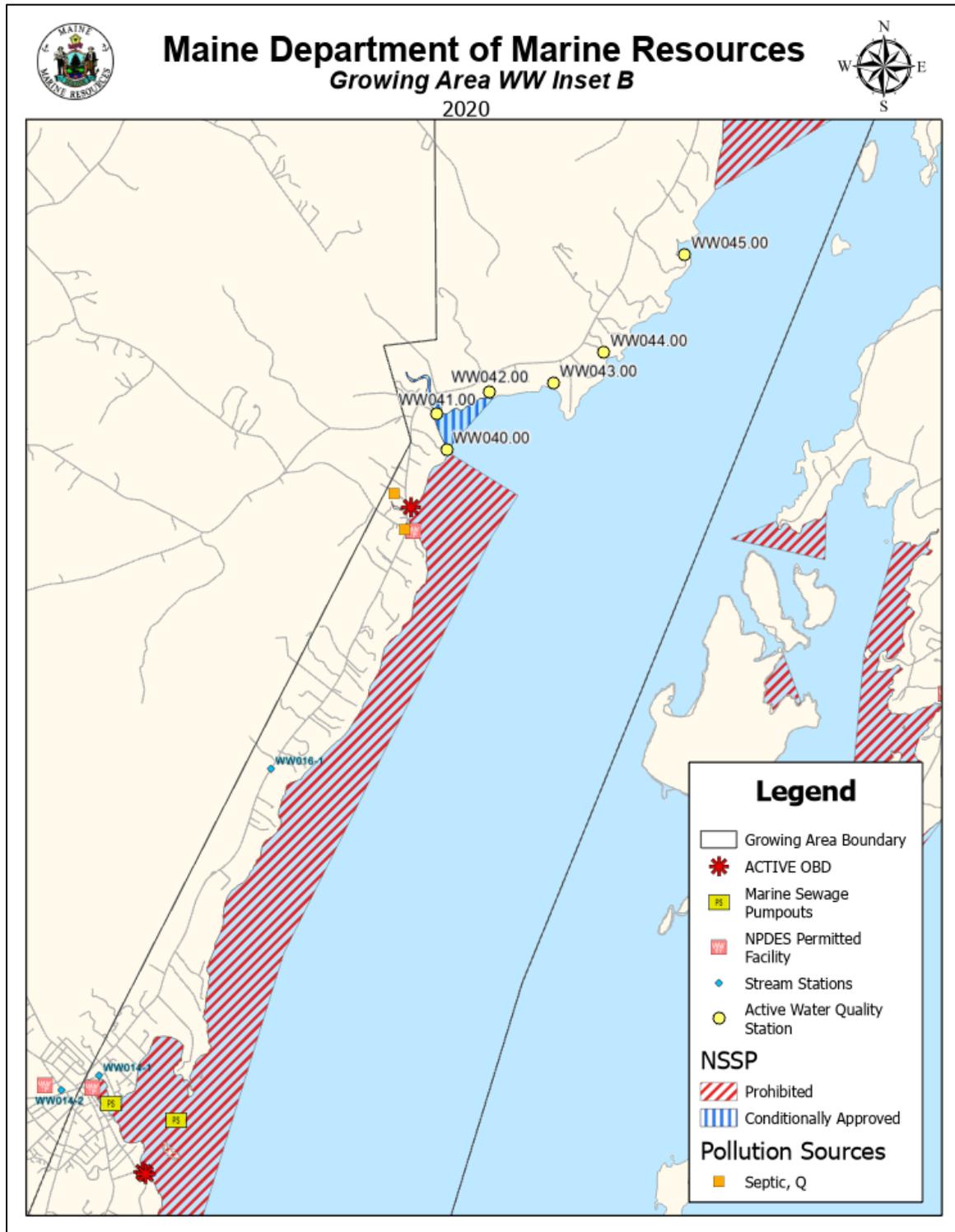
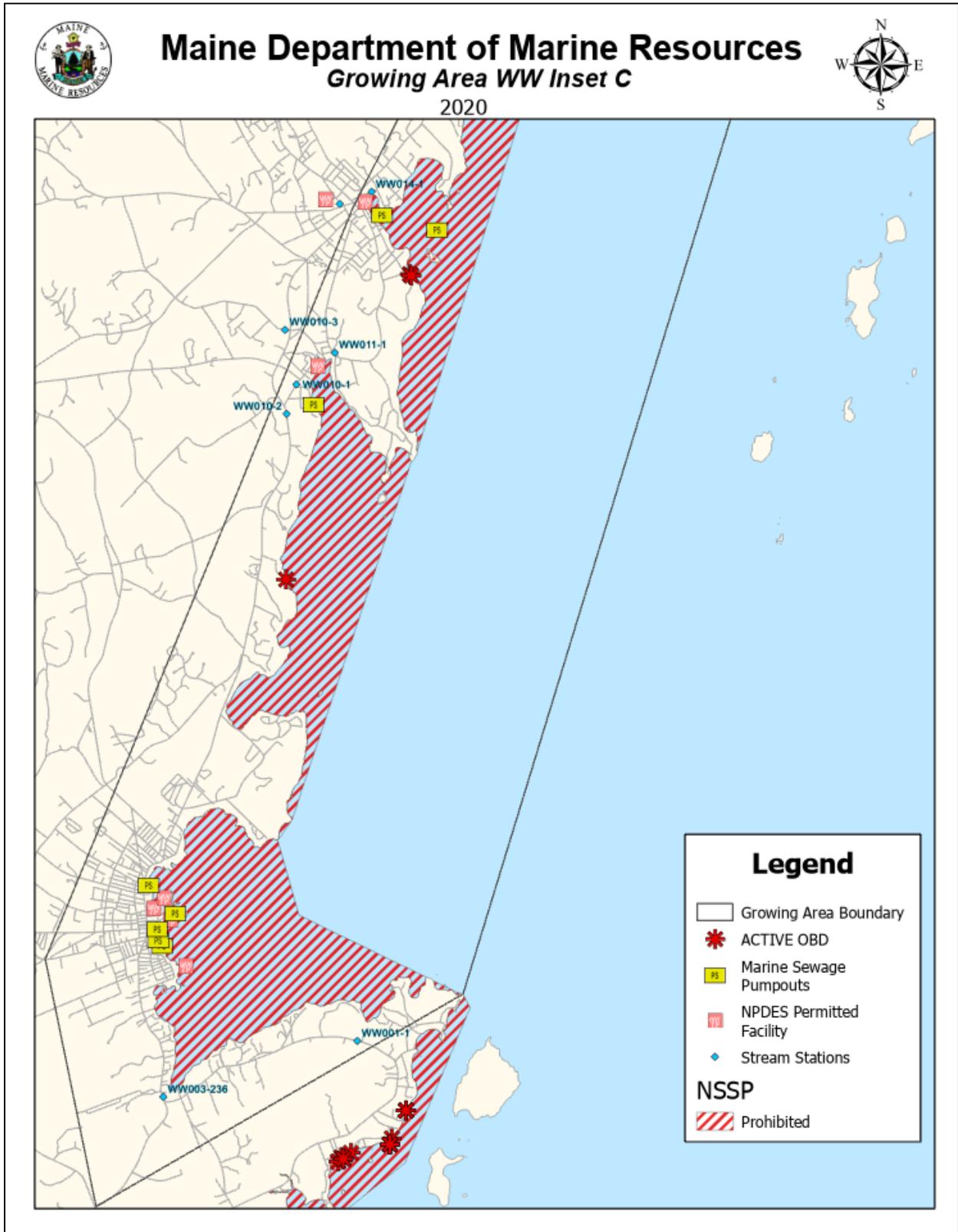




Figure 4. Growing Area WW, Map C





State and Federal Licensed Waste Discharge Permits

Overboard Discharges (OBDs)

There are four overboard discharges (OBDs) that discharge treated effluent into the waters of Growing Area WW. An active OBD is located in both Rockport and Lincolnville and two OBDs are located in Camden. A total of ten OBDs were reported removed during the twelve-year review period. No OBDs were reported removed in 2020.

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

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. Sand filter systems consist of a septic tank and a sand filter. In such systems, the wastewater is first directed to a holding tank where the wastewater solids are settled out and undergo partial microbial digestion. The partially treated wastewater then flows from the tank into a sand filter, consisting of distribution pipes, layers of stone and filter sand, and collection pipes within a plastic liner. The wastewater is biologically treated as it filters down through the sand and is then collected and discharged to a disinfection unit. Mechanical package plants consist of a tank, where waste is mechanically broken up, mixed and aerated; mechanical systems require electric power, and must have an operating alarm on a separate electrical circuit that will activate if the treatment unit malfunctions due to a power failure. The aerated treated wastewater is held in a calm condition for a time, allowing for solids to settle and for the waste to be partially digested by naturally occurring bacteria. The clarified water from the tank is then pumped off the top into a disinfection unit. There are two types of disinfection units, UV and chlorinators (most common). In a chlorinator, the treated water contacts chlorine tablets and remains in a tank for at least 20 minutes where bacteria and other pathogens are killed. The treated and disinfected water is discharged from the disinfection unit to below the low water mark of the receiving waterbody (the ocean, a river, or a stream) via an outfall pipe.

OBDs are licensed and inspected by the Maine Department of Environmental Protection. 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 growing area EI (Table 1). The size of each closure is determined based on a dilution, using the permitted flow rate of the OBD (in gallons per day, GPD), 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. Single OBD systems associated with more than one residence will have multiple permit IDs. All current closures are of adequate size to protect public health.



Table 1. Overboard Discharges (OBD)

Growing Area Section	DEP ID	TOWN	FLOW	RECEIVING WATER BODY	Depth of Water	Required Closure	Actual Closure Size (acres)
			(GPD)			(acres)	
P5	5097	Rockport	360	W Penobscot Bay	30	0.4	Entire Shore - 5,753 acres
P5	7827	Camden	800	Penobscot Bay	12	2	
P5	2835	Camden	630	Penobscot Bay	12	1.6	
P5	3140	Lincolnville	600	Lincolnville Harbor	12	1.5	

National Pollutant Discharge Elimination System (NPDES)

Table 2. NPDES Permitted Discharges

Growing Area Section	Permit ID	Type	Facility/Town	Water Body
WWP6	MEG210009	Snow Dump	Snow Dump, Rockland	Rockland Harbor
WWP6	ME0000400	Minor Outfall	Dupont Nutrition	Rockland Harbor
WWP6	ME0100595	WWTP	Rockland WWTF	Rockland Harbor
WWP6	ME0036994	Minor Outfall	Dragon Products Company, LLC	Rockland Harbor
WWP5	MEG210010	Snow Dump	Snow Dump, Rockport	Rockport Harbor
WWP5	ME0100137	WWTP	Town of Camden	Camden Harbor
WWP5	ME0102857	WWTP	Lincolnville Beach Sanitary Facility, Lincolnville	Penobscot Bay
WWP5	MEG210005	Snow Dump	Snow Dump, Camden	Atlantic Ocean
WWP3	ME0023043	Minor Outfall	McCrumb LLC, Belfast	Passagassawakeag River
WWP3	ME0100901	WWTP	Northport Village Corp, Northport	Belfast Harbor
WWP3	ME0101532	WWTP	Belfast WWTP	Passagassawakeag River
WWP2	ME0101966	WWTP	Town of Searsport	Penobscot Bay
WW A	ME0001830	Minor Outfall (cooling water)	General Alum New England Corp, Searsport	Penobscot Bay
WWP2	ME0021181	Minor Outfall	Irving Oil Terminals, INC, Searsport	Penobscot Bay
WWP2	ME0002461	Minor Outfall	Irving Oil Terminals, INC, Searsport	Penobscot Bay
WWP2	ME0002208	Minor Outfall	Sprague Energy Corporation	Penobscot Bay
WWP3	ME0002771	Minor Outfall- Finfish Aquaculture	Nordic Aquafarms INC	Penobscot Bay

There are six wastewater treatment plants/ facilities (WWTP/WWTF) in Growing Area WW. Since 2017 the WWTP inspection reports have been available in DMR central files. They are located in Belfast,



Camden, Lincolnville, Rockland, Northport, and Searsport. These facilities discharge into Prohibited Areas that are larger in area than the required effluent dilution zone.

City of Belfast Wastewater Treatment Facility (MEPDES ID#ME0101532)

The City of Belfast Wastewater Treatment Facility is a secondary treatment activated sludge facility that serves a population of approximately 5000 residential and commercial properties around the city of Belfast. The facility is authorized to discharge a monthly average flow of up to 1.49 million gallons per day (MGD) of secondary treated wastewater from a publicly owned treatment works (POTW) and an unspecified quantity of untreated excess combined sanitary and storm water wastewater from two combined sewer overflow points (CSO) to the Atlantic Ocean at the Condon Street pump station in Belfast Harbor and Miller Street pump station. The outfall is located west of the Belfast town dock and launching ramp. The outfall pipe is a 16-inch diameter reinforced concrete pipe. The pipe is located approximately 40 feet out into the harbor and is at a depth of approximately 18 feet at mean low water. The pipe is not fitted with diffusers. The required prohibited area is 1,988 acres. The current closure is 4,089 acres.

Town of Camden Water Pollution Control Facility (MEPDES ID#ME0100137)

The Camden Water Pollution Control Facility is a secondary treatment activated sludge facility that serves a population of approximately 4000 residential and commercial properties within the towns of Camden and portions of Rockport. The Facility is authorized the discharge of up to a monthly average flow of 1.2 million gallons per day (MGD) of secondary treated sanitary waste waters from the publicly owned treatment works facility to Camden Harbor. The facilities' collection system is approximately 17 miles in length, has seven pump stations and is a separated system with no combined sewer overflows (CSOs). During extended periods of wet weather, the facility receives significant inflow and infiltration. The operators of the facility are aware that wet weather can impact the quality of the effluent. The facility has a Wet Weather Operations Plan that dictates how they prepare for and operate during storm events. The outfall is a 24-inch iron pipe which extends approximately 250 feet from the Camden public landing into Camden Harbor. The diffuser consists of three cast iron ports. Two of the ports measure 12 inches in diameter and the third port measures 8 inches. The depth of the receiving waters at low tide is 12 feet and at high tide it is as much as 24 feet. The required closure zone for this facility is 2,166 acres. There is over 7,600 acres of Prohibited shoreline between Owls Head and Lincolnville providing adequate dilution for the Camden Pollution Control Facility discharge as well as the other regulated discharges in the region.

Lincolnville Sewer District (MEPDES ID#ME0102857)

In 2019 the Lincolnville Beach Sanitary District upgraded its facility and transferred ownership to the Lincolnville Sewer District. The upgraded system is an activated sludge package treatment plant and is permitted to discharge a monthly average of 25,000 gallons per day (GPD) of secondary treated wastewater to the Atlantic Ocean. The new facility has biological treatment that uses a biologically active filter for treatment. The system consists of several stages including two anoxic/equalization tanks, a reactor tank, and an effluent clear well tank. Additional processes include ultraviolet disinfection. The existing three-inch HDPE outfall pipe has been reused. The outfall pipe extends to out to receiving waters with a mean low water depth of 10 feet. The outfall consists of a three-inch HDPE pipe with multi-port diffuser that will discharge 25,000 gpd into West Penobscot Bay. The required closure zone for this area is 52 acres. There is over 400 acres of Prohibited shoreline in the immediate area providing adequate dilution for the Lincolnville Beach Sanitary District discharge as well as the other regulated discharges in the region.

***Rockland Pollution Control Facility Permit (MEPDES ID#ME0100595)***

The Rockland Pollution Control Facility is an activated sludge system with a total volume of 1.475 million gallons. A separate wet weather system consisting of a wet weather wet well pumping station, a vortex separator and chlorination contact chamber. The facility is authorized to discharge an unregulated quantity of excess combined sanitary and storm water wastewater to Rockland Harbor. The plant discharges a monthly average flow of 2.6MGD. There have been no CSO events since 2004. There is now one emergency bypass point to Rockland Harbor at the Park Street Pump Station; however, no emergency bypasses have taken place. The facility serves a population of 3000 residents in the town of Rockland and portions of the towns of Owls Head and Rockport. The outfall consists of 160 feet of pipe with 24 eight-inch diffusers to Rockland Harbor. The average depth of the receiving waters is 15 feet at mean low tide and about 26 feet at high tide. The required closure zone for this facility is 3,990 acres. There is over 7,600 acres of Prohibited shoreline between Owls Head and Lincolnville providing adequate dilution for the Rockland Pollution Control Facility discharge as well as the other regulated discharges in the region.

Northport Village Corporation Wastewater Treatment Facility (MEPDES ID# ME0100901)

The Northport Village Corporation Wastewater Treatment Facility provides a primary level of treatment. The facility serves a population of 150 residents year-round which peaks to 700 residents during the summer months. The facility is allowed to discharge a volume of 63,000 gallons of wastewater per day. The facility does not receive any flow from industrial sources. Sludge is disposed of off-site by a contractor in Belfast. The outfall is 175 feet out from the tidal low water mark and is located at the Northport Village (Bayside) town dock. The depth of the receiving waters is about 20 feet at high tide and 9 feet at low tide. The prohibited area required for this area is 129 acres. The current closure is 1216 acres.

Town of Searsport Wastewater Treatment Plant (MEPDES ID#ME101966)

The Town of Searsport Wastewater Treatment Plant is licensed to discharge up to 200,000 gallons per day (GPD) of primary treated sanitary wastewater to Penobscot Bay, in Searsport, Maine. The facility receives waste waters generated by residential and commercial entities within the town of Searsport and currently serves a population of approximately 2300. The facility does not receive any wastewater from industrial sources. Sludge is dewatered and taken to a composting facility in Unity, Maine. The sewer collection system is a separated system and is not known to contain any combined sewer overflows (CSOs). All wastewater generated at the facility is discharged to the Searsport Harbor by way of a 10-inch diameter PVC pipe. The outfall extends out into the harbor approximately 1200 feet from the edge of the shore off of Trundy Road, Searsport. The outfall discharges at a depth of 20 feet at high tide and 12 feet at low tide. The required prohibited area is 341 acres. The current closure is 2,547 acres.



Table 3. Growing Area WW WWTP Dilution Calculations

	Belfast	Camden	Lincolntonville	Rockland	Northport	Searsport
FC/100ml	140,000	140,000	140,000	140,000	140,000	140,000
Discharge Rate (gallons/day)	1,490,000	1,200,000	25,000	2,600,000	63,000	200,000
Mean water depth (ft)	23	17	15	20	15	18
ml to dilute to 14 FC/100ml	5.64E+11	4.54E+11	9.46E+09	9.84E+11	2.38E+10	7.57E+10
Ft ³ to dilute to 14 FC/100ml	1.99E+09	1.60E+09	3.34E+07	3.48E+09	8.42E+07	2.67E+08
ACRES	1,988	2,166	52	3,990	129	341

Residential

All residential pollution sources are reported to the local plumbing inspector (LPI). Once the system has been documented as being fixed, staff members from DMR can re-assess the water quality data and shoreline survey information to determine if the area is safe for shellfish harvest. There are not currently any outstanding septic problems in Growing Area WW.

Industrial Pollution

Industries that are located nearby shellfish areas available for harvest include: Sprague Energy, Irving Oil, and GAC Chemical, all in Searsport. Dupont Nutrition and Dragon Cement Products are located in Rockland and McCrumb LLC is located in Belfast. All of these facilities have NPDES permits (National Pollutant Discharge Elimination System) allowing each facility to discharge processing and or treated run-off wastewater. The operation of each of these facilities is discussed below.

Sprague Energy

Sprague Energy is a vessel loading and storage facility for unloading petroleum products including #2 oil, #6 oil, Kerosene, Diesel and a variety of bulk products such as salt, windmill parts, coal etc. Three men oversee the loading operations monitoring vessel hook-ups and transfer lines and security. All vessels are boomed prior to offloading. The facility conducts “spill response drills” each year to assure that the facility is prepared for an unexpected spill of a petroleum product. The Environmental Protection Agency (EPA) also conducts unscheduled “buoy drills” every five years. These drills are mock oil spill drills to check the facility’s oil spill response time. The facility had a spill on December 4, 2010 that was a contained spill. The petroleum off-loading lines are contained inside concrete pipes in order to contain any release of product during line hook up and transfer. No product was released to the ground or shore during this spill.

This facility has four discharge points located west of the docks. Two discharge points are from the tank farm. Discharges from this area first go through an oil and water separator and then the water is discharged overboard. There are also two discharge points west of the docks that drain parking lot run-off. These discharges do not go through the controlled water separator process. The storm water and



controlled water discharges are monitored by staff from the Department of Environmental Protection (DEP) Bangor office. The DEP tests for presence of oil, grease, benzene, and solids.

The vessel channel area (in the immediate vicinity of Mack Point, Searsport) is dredged as needed. The last time the area was dredged was in 2008. In 2000, the Maine Department of Transportation (MEDOT) called for a study of Searsport Harbor with the possibility of deepening the existing 35-foot-deep channel in support of possible increased port activities at the terminal facilities at Mack Point, Searsport. Different phases of the project have been ongoing since 2004. Preparation of the draft feasibility report will be completed in 2010 with public review planned for 2011. The vessel channel area is inside a shellfish closure area of over 3,000 acres.

Irving Oil

Irving Oil also has a fuel loading and storage facility at Mack Point, Searsport. This facility handles gas, diesel, kerosene, and heating oil. The Irving oil facility consists of 15 storage tanks with the largest tank capacity of 175,000 barrels and the smallest tank capacity of 475 barrels. The overall capacity at this facility is 1.2 million barrels. Transfer of petroleum products to the tanks is managed by three Sprague Energy employees that are contracted by Irving Oil to oversee the loading process. Irving Oil's pipelines are not contained in cement pipes. Part of the pipeline is underground, and part is above ground.

This facility has three discharge points located west of the docks. Two of the discharge points are located at least 100 yards south of water sampling station WW69 and the third discharge point is located nearby the Sprague facility. All of these discharges go through a controlled oil and water separator and then the water is discharged overboard. The discharge points are sampled quarterly, and the results are recorded on the DEP, "DMR" forms. This facility has not had any oil spills or non-compliance issues in at least eight-10 years.

The Irving Oil facility employs eight employees. The septic wastewater at this facility is managed by two in-ground systems. One of these in ground systems is four years old and the other system was installed in the 1960s. The newer system is located the closest to Long Cove but is inside the gate at the facility. The older system is located closer to the Sprague facility. Neither of these systems were able to be inspected at the time of the survey. Waters adjacent to both the Irving Oil and Sprague facilities will remain classified as Prohibited to protect public health.

To view the emergency oil spill response plan for areas in the Penobscot Bay Region go to the following web site:

<http://www.maine.gov/dep/rwm/emergspillresp/regcphoto.htm>

The oil spill response strategy for the Mack Point Facility is as follows:

Strategy Implementation

For discharge from offloading ship, or after incoming tide, place 2,500 feet of harbor boom from pier at Mack Pt. to Sears Island to contain oil in Long Cove. If there is a threat to water from land side of the terminal, place 600' of boom around Sprague stormwater outfall and 1,500' of boom around Irving stormwater outfall. Any discharge to water to the west of the pier or on an outgoing tide will require deployment of a vessel and skimmer to contain oil.

Site Access Access terminal from Route 1, Searsport



Staging Areas Mack Point Marine Terminal (Sprague/Irving)

Collection Points Long Cove, open water skimming and/or containment at stormwater outfalls

General Alum - GAC Chemical

GAC Chemical is located in Searsport. This facility produces the following chemicals: Liquid Alum, Sodium Aluminates, Ammonium Sulphate, Sodium Hypochlorite, and Ammonium Hydroxide. They also homogenize animal and vegetable oils and do agricultural blending of urea solids. All of the processing at this facility is close looped to ensure that there is no possible discharge of product. The only possible spill point is during loading of product. Two spills of sulfuric acid took place in February of 2010. Both of these spills occurred inside the cement containment. No product spilled directly on the ground. The facility has sixteen Hazmat trained staff members available to assist with any spill of product. GAC Chemical has one test site for sampling runoff from the facility. The test site is located north of the DMR water sample site (WW76). Samples are collected monthly and the results are recorded on the Department of Environmental Protection DMR forms. The testing is done to check total suspended solids, ammonia and pH.

There is one NPDE permitted discharge from the facility. A volume of 30,000 gallons of non-contact cooling water is discharged at this site. The discharge outfall is located 150 feet off the point at the same location that DMR sample station WW 76 is sampled.

GAC Chemical employs 55 employees. Septic waste is treated on site in a new (2010) leach field located on the left side of the road, before the entrance gate.

Dragon Products Company

Dragon Products produces Portland and masonry cement for large construction projects. They are permitted to discharge 113,000 gpd of non-contact cooling waters and treated condensate waters from a cement transfer facility to the Atlantic Ocean in Rockland Harbor. The facility itself is over two miles from the shore.

Dupont Nutrition

Dupont Nutrition runs a carrageenan plant located on the water in Rockland Harbor. Carrageenan is a food additive that is extracted from red seaweed. They are permitted to discharge up to 12.1 million gallons per day (MGD) of contact and non-contact cooling water and storm water through three outfall points in Rockland Harbor.

Penobscot McCrum LLC

Penobscot McCrum is a potato product processing facility. The Belfast facility is a producer of frozen potato products. They are permitted to discharge 0.1 million gallons per day (MGD) of treated process water from potato processing to the Passagassawakeag River in Belfast.



Marinas

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. There are several marinas and mooring areas in Growing Area WW. There is one marina conditional area which is located in Stockton Springs. Other centers of boating activity that include significant mooring fields and marine services are located in Rockland, Rockport, Camden, and Belfast. There is a smaller mooring field in Lincolnville that does not have any marine services. All of these areas are currently within large Prohibited areas that also include licensed discharges such as WWTPs and OBDs. These Prohibited areas are calculated to be large enough to protect public health.

Stockton Springs Marina Conditional Area

Stockton Harbor had in the past been mainly used by local commercial fishing boats. After the condominiums were built and a marine ramp and dock for public access were built along the waterfront, the number of moorings in the harbor increased dramatically. The marina in Stockton Springs Harbor is in a Conditionally Approved area based on the open season of the marina. The area is closed to shellfish harvest from May 1 through November 15. The most recent evaluation of the marina conducted with the harbor master in 2018 determined that there were 120 moorings and six slips. The harbor master indicated that only about three boats have people who liveaboard them. The VIMS 50/50 rule was used on the entire capacity of the mooring field and slips. Based on 126 boats with two people aboard the VIMS rule assumes a mooring field occupancy of 63 boats. The average depth in the marina area is 15 feet. Using a fecal concentration of 2.0×10^9 a management area of 49 acres is required. There is currently over 270 acres in the management area. This is at least partly because the mooring field is large and spread out.

Storm water

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

The primary method to control storm water discharges is the use of best management practices (BMPs). In addition, most major storm water discharges are considered point sources and require coverage under a NPDES permit. In 1990, under authority of the Clean Water Act, the U.S. EPA promulgated Phase I of its storm water management program, requiring permitting 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 five acres of land or greater, and (3) ten categories of industrial activity. In 1999, US EPA issued Phase II of the storm water management program, expanding the Phase I program to include all urbanized areas and smaller construction sites.

Although it is a federal program, EPA has delegated its authority to the Maine DEP to administer the Phase II Small MS4 General Permit. Under the Small MS4 GP, each 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 storm water runoff control, (5) Post-construction storm water management, and (6) Pollution prevention/good housekeeping. The permit requires each city or town to develop a draft Storm Water Management Plan that establishes measurable goals for each of the Minimum Control Measures. The City or Town must document the implementation of the Plan, and provide annual reports to the Maine DEP. Currently the discharge of storm water from 30 Maine municipalities is regulated under the Phase II Small MS4 General Permit however, no municipalities located within the boundaries of Growing Area WW fall under these regulations. Additionally, the Maine Storm Water Management Law provides storm water standards for projects located in organized areas that include one acre of more of disturbed area (Maine DEP 2009).

Along roadways several storm waterpipes and ditches of varying diameters were identified during the shoreline surveys. The towns of Rockland, Camden, Northport, Lincolnville, and Belfast have storm water systems that drain into large Prohibited areas that include wastewater treatment plant outfalls, licensed discharge outfalls and boat moorings. These towns also utilize licensed snow farm dump areas to allow for the melting of municipal snow piles. Water sampling stations on the margins of these closures meet Approved standards. No specific impact from the storm drains has been identified.

Non-Point Pollution Sources

Non-point source (NPS) pollution is water pollution affecting a water body from diffuse sources, such as polluted runoff from agricultural areas draining into a river, significant rainfall, high river flows or astronomical high tides. Nonpoint source pollution can be contrasted with point source pollution, where discharges occur to a body of water at a sole location, such as discharges from a chemical factory, urban runoff from a roadway storm drain or from ships at sea. NPS may derive from various sources with no specific solution to rectify the problem, making it difficult to regulate. Freshwater streams, drainage from rainstorm runoff and tidal creeks are the major source of non-point discharge into Growing Area WW. Streams associated with consistently high scores may be monitored to determine if they affect the water quality of growing area waters. A total of 107 samples were taken from freshwater streams during the review period.

Table 4 Stream Samples in Growing Area WW 2009-2020; Scores > 163 cfu/100ml are highlighted in red. The first three numbers in the Location ID indicate the GASSID where the stream sample was collected.

Location ID	Sample Date	Sample Type	Raw Score
WW008-77	17-Mar-09	Stream	1.9
WW008-78	17-Apr-18	Stream	106
WW020-28	17-Apr-18	Stream	46
WW021-17	17-Apr-18	Stream	86
WW024-1	17-Apr-18	Stream	16
WW039-234	17-Apr-18	Stream	9.1
WW040-264	17-Apr-18	Stream	98
WW040-265	17-Apr-18	Stream	480
WW040-264	16-May-18	Stream	56
WW040-265	16-May-18	Stream	160



Location ID	Sample Date	Sample Type	Raw Score
WW039-233	16-May-18	Stream	15
WW039-234	16-May-18	Stream	8
WW035-229	16-May-18	Stream	130
WW024-1	16-May-18	Stream	5.5
WW021-17	16-May-18	Stream	8
WW021-18	16-May-18	Stream	4
WW020-28	16-May-18	Stream	2
WW020-27	16-May-18	Stream	2
WW008-78	16-May-18	Stream	96
WW020-28	18-Sep-18	Stream	32
WW021-17	18-Sep-18	Stream	500
WW024-1	18-Sep-18	Stream	100
WW039-234	18-Sep-18	Stream	56
WW008-78	18-Sep-18	Stream	1700
WW039-233	18-Sep-18	Stream	52
WW040-265	18-Sep-18	Stream	60
WW040-264	18-Sep-18	Stream	94
WW039-233	15-Oct-18	Stream	8
WW039-234	15-Oct-18	Stream	6
WW024-1	15-Oct-18	Stream	74
WW021-17	15-Oct-18	Stream	50
WW020-28	15-Oct-18	Stream	22
WW008-78	15-Oct-18	Stream	142
WW003-236	19-Aug-20	Stream	1700
WW010-2	19-Aug-20	Stream	32
WW010-1	19-Aug-20	Stream	1700
WW010-3	19-Aug-20	Stream	60
WW014-2	19-Aug-20	Stream	32
WW014-1	19-Aug-20	Stream	1700
WW016-1	19-Aug-20	Stream	66
WW035-230	01-Sep-20	Stream	46
WW035-230	01-Sep-20	Stream	46
WW022-1	01-Sep-20	Stream	25
WW024-2	01-Sep-20	Stream	1580
WW026-2	01-Sep-20	Stream	2
WW026-1	01-Sep-20	Stream	64
WW027-1	01-Sep-20	Stream	132
WW028-1	01-Sep-20	Stream	40
WW028-2	01-Sep-20	Stream	1260
WW029-1	01-Sep-20	Stream	82



Location ID	Sample Date	Sample Type	Raw Score
WW039-235	01-Sep-20	Stream	340
WW032-1	01-Sep-20	Stream	24
WW033-1	01-Sep-20	Stream	136
WW003-236	16-Sep-20	Stream	21.8
WW010-3	16-Sep-20	Stream	74
WW014-2	16-Sep-20	Stream	680
WW016-1	16-Sep-20	Stream	7.3
WW028-1	22-Sep-20	Stream	160
WW029-1	22-Sep-20	Stream	120
WW030-1	22-Sep-20	Stream	9
WW032-1	22-Sep-20	Stream	1.9
WW040-266	22-Sep-20	Stream	1.9
WW001-1	19-Oct-20	Stream	1380
WW003-236	19-Oct-20	Stream	1.9
WW010-2	19-Oct-20	Stream	1.9
WW010-1	19-Oct-20	Stream	1.9
WW010-3	19-Oct-20	Stream	80
WW011-1	19-Oct-20	Stream	136
WW014-1	19-Oct-20	Stream	136
WW014-2	19-Oct-20	Stream	400
WW016-1	19-Oct-20	Stream	29
WW022-1	26-Oct-20	Stream	6
WW024-2	26-Oct-20	Stream	14
WW026-2	26-Oct-20	Stream	2
WW026-1	26-Oct-20	Stream	4
WW027-1	26-Oct-20	Stream	300
WW028-1	26-Oct-20	Stream	44
WW028-2	26-Oct-20	Stream	132
WW029-1	26-Oct-20	Stream	82
WW030-1	26-Oct-20	Stream	6
WW032-1	26-Oct-20	Stream	4
WW033-1	26-Oct-20	Stream	35
WW039-235	26-Oct-20	Stream	11
WW040-266	26-Oct-20	Stream	1.9
WW035-230	26-Oct-20	Stream	40
WW001-1	23-Nov-20	Stream	900
WW003-236	23-Nov-20	Stream	500
WW010-2	23-Nov-20	Stream	122
WW010-1	23-Nov-20	Stream	260
WW010-3	23-Nov-20	Stream	54



Location ID	Sample Date	Sample Type	Raw Score
WW011-1	23-Nov-20	Stream	41
WW014-2	23-Nov-20	Stream	440
WW014-1	23-Nov-20	Stream	340
WW022-1	01-Dec-20	Stream	120
WW024-2	01-Dec-20	Stream	260
WW026-2	01-Dec-20	Stream	560
WW026-1	01-Dec-20	Stream	1700
WW027-1	01-Dec-20	Stream	780
WW028-1	01-Dec-20	Stream	1700
WW028-2	01-Dec-20	Stream	220
WW029-1	01-Dec-20	Stream	1700
WW030-1	01-Dec-20	Stream	160
WW032-1	01-Dec-20	Stream	300
WW033-1	01-Dec-20	Stream	300
WW039-235	01-Dec-20	Stream	740
WW040-266	01-Dec-20	Stream	320
WW035-230	01-Dec-20	Stream	700

Agricultural Activities

There are no large-scale agriculture activities along the shoreline of Growing Area WW. Shore front properties are predominantly occupied by private residences and businesses. There are three animal operations in areas that were surveyed that are near the shore. In Northport, there is a cat boarding facility. This facility boards up to 30 cats in a building attached to a private residence 250 feet from the shore. Cat waste is disposed of properly. A site visit from DEP and DACF was conducted in 2018 after a complaint from the public. It was determined that although cat waste was being disposed of over 300 feet from the shore, it was being disposed of adjacent to streams that discharge into the growing area. Changes to disposal procedures were implemented to better protect public health. This facility also has horses with a pasture area and barn that are at least 300 feet from the shore at the closest point. Sampling station WW 43 is sampled directly below this facility. A post on the facilities website in 2020 indicated that the business would be permanently closing and ceasing operations at the beginning of 2021.

In the town of Searsport, there is an animal farm that boards horses. This facility is located north of Route 1, over 2000 feet from the shore. This animal operation was not visited at the time of the survey of the area. It is not considered a pollution risk to the growing area due to its distance from the shore. In Stockton Springs, there is a small animal farm with only a few horses. The horses are 200 feet from the shore. The property owner was not home at the time of inspection. No manure pile was visible, and the property appeared well managed and neat.

Wildlife Activity

Much of the shoreline of Growing Area WW is wooded except for more developed urban areas around larger towns and population centers. Many properties along the shoreline have large lawns and fields that lead to the water. These areas are popular for deer, migrating birds and other wildlife. Commonly



observed bird species include a variety of gulls, sea and inland ducks, cormorants, geese, great blue herons, egrets, swans, and others. Mammals living within the growing area include dogs, cats, whitetail deer, muskrat, squirrels, chipmunks, rabbits, moles, mice, bats, shrews, weasels, skunks, raccoons, and others. Maine Inland Fish and Wildlife surveys indicate that migratory waterfowl numbers begin to increase in the early autumn months, and typically peak in late fall or early winter. Although large numbers of birds can, in theory, pose a threat the growing area water quality, such occurrences are very difficult to document. The mouth of Ducktrap River in Lincolnville is Conditionally Approved based on seasonal high scores. Elevated scores may be associated with wildlife activity along the shores of the river.

Recreation Areas (parks, beaches, trails, campgrounds, etc.)

There are several recreational areas located along the shores of Shellfish growing area WW. Public recreation areas can occasionally become pollution sources for shellfish resource areas. If the recreational area has little supervision, trash, domestic animal waste and human waste can be found which could impact the nearby water quality in the area. In Lincolnville, the Ducktrap River watershed is a protected watershed that is now managed by the Coastal Mountains Land Trust in partnership with the Ducktrap Coalition. These two groups now have 80% of the river's riparian lands in conservation.

The Ducktrap River is a popular recreational area for kayakers and canoeists. The land abutting the river has trails for hiking and cross-country skiing. There is a public beach at the mouth of the river that attracts swimmers, and sunbathers. There is a sign at the entrance to the parking area explaining how the beach area can be used. All dogs are expected to be on a leash and dog waste is expected to be picked up and disposed of properly. Trash is expected to be disposed of by the individuals using the area; no camping is allowed. This area has in the past had problems with dog waste. In recent years the beach area has been monitored and surveyed by the Healthy Beaches program and Department of Marine Resources.

Sears Island is another recreational area that is open for public use. In the past the public could drive onto the island and camp anywhere on the island for an unlimited time. The water quality at the sampling stations around the island deteriorated due to the garbage and human and animal waste that was being left along the shores of the island. Discussions with the town resulted in a permanent fence being installed at the island end of the Sears Island causeway that would allow for foot traffic only. The fence put an end to the camping on the island, but it didn't stop people from walking their dogs on the island which resulted in dog waste being left along the shores of the island and on the causeway. A member of the Searsport shellfish group has put effort into resolving the dog waste issue in an effort to bring the water quality scores back to meeting approved standards. Dog waste trash barrels were installed at the fence and signs were put up explaining the importance of cleaning up after your dog. The trash barrels are well maintained and emptied as needed. This extra effort has resulted in water quality once again meeting approved standards.



Hydrographic and Meteorological Assessment

Tides

Coastal Maine experiences a mixed, semi-diurnal tide, with diurnal inequalities that are more pronounced on spring tides. Except for very few isolated areas with extensive saltwater marshes, tides are not considered to be contributors to fecal contamination. The National Oceanic and Atmospheric Administration data for a station at Eastport indicate a mean tidal range of 18.35 ft. The mean tidal range for most of Maine is nine feet to 13 feet. Unlike areas with small diurnal tides, this extreme volume exchange results in significant bacterial dilutions. Currents in the area are predominantly driven by the tides.

A tide assessment was completed to determine if tide stage has an impact on water quality scores in the area. Stations WW79 and WW80 are located in Stockton Springs Harbor. These stations may show an impact from flooding tide stages. The town of Stockton Springs had a private water quality study done of Stockton Harbor (2007/2008). During this study, several sites in Stockton Harbor had water samples tested using ribotyping to determine what the primary source of bacteria in the harbor water was. The results of this study revealed that in 22% of the samples, gulls were the primary source followed by human at 16%, pet sources 2% and livestock 1%. Stations WW 79 and WW 80 are both located at the head of a large mudflat area that is frequented by at times by a large number of gulls. At flood tide stages, the gull waste may be getting pushed toward the shore where sample collection takes place.

Rainfall

Rainfall can affect water quality by contributing to increased over-land run-off as well as to higher flow rates in streams. As these fresh water sources enter the marine system, they are mixed with salt water. Any pollution transported by these fresh water sources may be diluted throughout the mixing process (assuming that the salt water itself is not contaminated with fecal matter). The ratio of salt/freshwater dilution to achieve approved water quality standards is largely determined by the volume of the fresh water entering the marine system, the concentration of the pollutant in the fresh water source and the depth of the receiving saltwater body. Much of the precipitation in the winter comes as snow and may affect runoff rates in spring upon melting. Flood closures are implemented when areas receive greater than two inches of rainfall in a twenty-four-hour period. Rainfall is monitored by numerous rain gauges located along the entire Maine coast and reported primarily through the Weather Underground website. Some areas of Maine have documented fecal influences resulting from rainfall of greater than one inch in a twenty-four-hour period. These areas are considered rainfall conditional areas and are Conditionally Approved based on the one-inch closure trigger.

The mean annual precipitation in Growing Area WW is approximately 49 inches. Precipitation is not distributed evenly throughout the year. In general April through November are the wettest months and August is often the driest month. No rainfall areas have been identified in Growing Area WW.

Winds

Migratory weather systems cause winds that frequently change in strength and direction. Gulf of Maine winds are generally westerly, but often take on a northerly component in winter and a southerly one in



summer. Strongest winds are generated by lows and cold fronts in fall and winter and by fronts and thunderstorms during spring and summer. Extreme winds are usually associated with a hurricane or severe nor'easter and can reach 125 knots. In Maine, wind is not a contributor to fecal pollution because marine currents are primarily influenced by the size and duration of the normal tidal cycle.

River Discharge

Ducktrap River (Lincolnville) and the Passagassawakeag River (Belfast and Searsport) both flow onto the shores of Shellfish growing area WW. The Penobscot River enters Penobscot Bay along the eastern shores of Stockton Springs (Growing Area WX) and passes by Fort Point before entering Penobscot Bay where it mixes with ocean waters. The Penobscot River does not flow directly onto the shores of shellfish growing area WW. The Penobscot River is the largest of the three rivers and it contributes the greatest amount of fresh water to Penobscot Bay. The USGS monitors river flow on both the Penobscot and Ducktrap Rivers. The USGS does not monitor river flow on the Passagassawakeag River. All of these river systems contribute considerable amounts of fresh water to their surrounding water bodies. In springtime during periods of snow melt and heavy precipitation, fresh water entering Penobscot Bay will cause periods of lower salinity and could also contribute to the transport of fecal coliform bacteria as it is washed from the land to the sea.

The Passagassawakeag River is a small river system that is approximately 16 miles long. It flows from the outlet of Lake Passagassawakeag in Brooks and flows south and east to the waterfront in Belfast, Maine. Due to licensed discharges and the usage of the Belfast waterfront the Passagassawakeag is classified as Prohibited as far inland as the City Point Road crossing.

The Penobscot River drains an area of 6,422 square miles. The discharge rate and river height are monitored by the USGS, which maintains a flow gauge at West Enfield, Maine. Discharge rates vary by year (depending on precipitation/snow melt on each given year), as well as by month. During the review period, the average annual daily discharge has ranged from 7,414 to 16,137 cfs, with 2011, having the highest flow rate; and 2012 having the lowest. Years with high average flow rates correspond to years that received the most precipitation. Discharge rates can also vary daily, depending on the daily changes in precipitation amounts.

Ducktrap River, in the town of Lincolnville is a relatively small river system that drains an area of 14.4 square miles. The discharge rate and river height are monitored by the USGS, which maintains a flow gauge at Ducktrap River near Lincolnville Maine. During the review period the average annual daily discharge has ranged from 26 to 48 cfs, with 2010 having the highest flow rates and 2016 having the lowest. The greatest monthly discharge rate tends to occur during April and the lowest rates in July, August, and September. April is by far the wettest month and this is most likely due to the combination of snow melt and precipitation.

Hydrographic Influence

Water circulation in Penobscot Bay is dominated by tides. The tidal range in Penobscot Bay is as high as 13.5 feet. Tides are caused by the gravitational effects of the moon and sun on the ocean; other influences are heavy rainfall, low barometric pressure and strong onshore winds which will increase tides. Tide levels fluctuate during the month based on the positions of the sun, moon, and earth. These fluctuations and the speed and direction of the tidal currents constantly change during a tidal cycle.



Tidal currents have the greatest energy when water is pushed in and out of bays and channels during the highest and lowest tide levels. Growing area WW is subject to a semidiurnal tidal cycle with two high tides and two low tides per day. The tidal cycle is 12 hours and 25 minutes long, so that high and low tides are 50 minutes later each day.

Water Quality Studies

Map of Sampling Stations

Refer to maps in overview section

Most marine fecal pollution of Maine waters comes from non-point sources. DMR uses Systematic Random Sampling (SRS) to monitor this influence and uses a pre-established schedule at an adequate frequency to capture all meteorological, hydrographic and/or other pollution events that trigger non-point pollution contribution. Using SRS will detect intermittent and unfavorable change in water quality and the program accepts the estimated 90th percentile (P90) as the standard to measure variance of a data set.

There are currently 16 active water sampling stations in Growing Area WW. Icing and safety considerations prevent some stations from being sampled on scheduled dates. All stations in Growing Area WW currently meet their respective NSSP classification standard. All stations have a calculated P90 that are within the approved standard of 31 cfu/100ml (while in the open status for Conditionally Approved stations).

Water Quality Discussion and Classification Determination

P90s for all active stations were calculated and all stations meet their respective classification standards. Between 2019 and 2020 there were six stations that saw an increase in calculated P90 score and ten stations that saw a decrease in calculated P90 score. The maximum increase in P90 score for any station in the Growing Area was five cfu/100ml. No stations require a downgrade in 2020 and no stations are being considered for upgrade in 2020. Overall water quality is remaining consistent.

Table 5. P90 calculations for active stations in Growing Area WW.

Station	Class	Count	GM	SDV	MAX	P90	Min_Date
WW040.00	A	30	3.6	0.41	54	12.6	2/8/2016
WW042.00	A	30	3.7	0.43	55	13.2	2/8/2016
WW043.00	A	30	2.7	0.32	26	7.2	2/8/2016
WW044.00	A	30	3.5	0.51	360	15.9	2/8/2016
WW045.00	A	30	2.9	0.44	68	11.1	4/27/2016
WW049.00	P	30	3.3	0.47	200	13.5	2/8/2016
WW069.00	A	30	3.7	0.45	38	14	2/8/2016
WW071.00	A	30	3.5	0.34	25	9.8	2/8/2016
WW075.00	A	30	2.9	0.44	82	10.9	2/8/2016
WW076.00	A	30	2.5	0.33	106	6.7	2/8/2016
WW079.00	A	30	2.6	0.24	11	5.4	2/8/2016



Station	Class	Count	GM	SDV	MAX	P90	Min_Date
WW080.00	A	30	4.2	0.47	74	16.8	2/8/2016
WW081.50	A	30	3	0.41	74	10.3	4/27/2016
WW082.00	A	30	2.6	0.25	24	5.7	2/8/2016

CA1 - Closed 5/1-11/15

Station	Class	Count	GM	SDV	MAX	P90	Min_Date
WW081.00	CA	30	2.7	0.3	18	6.5	4/16/2014

CA2 - Open 5/1-9/30 (closed 10/1-4/30)

Station	Class	Count	GM	SDV	MAX	P90	Min_Date
WW041.00	CA	30	6	0.53	140	29.1	7/29/2013

Emergency Closures: The reports summarizing emergency closures such as flood and biotoxin closures for the entire state are in the DMR central files.

Reclassifications: Reclassification addendums to the sanitary survey report are in the DMR central files.

CAMP Reviews, Inspection Reports, and Performance Standards

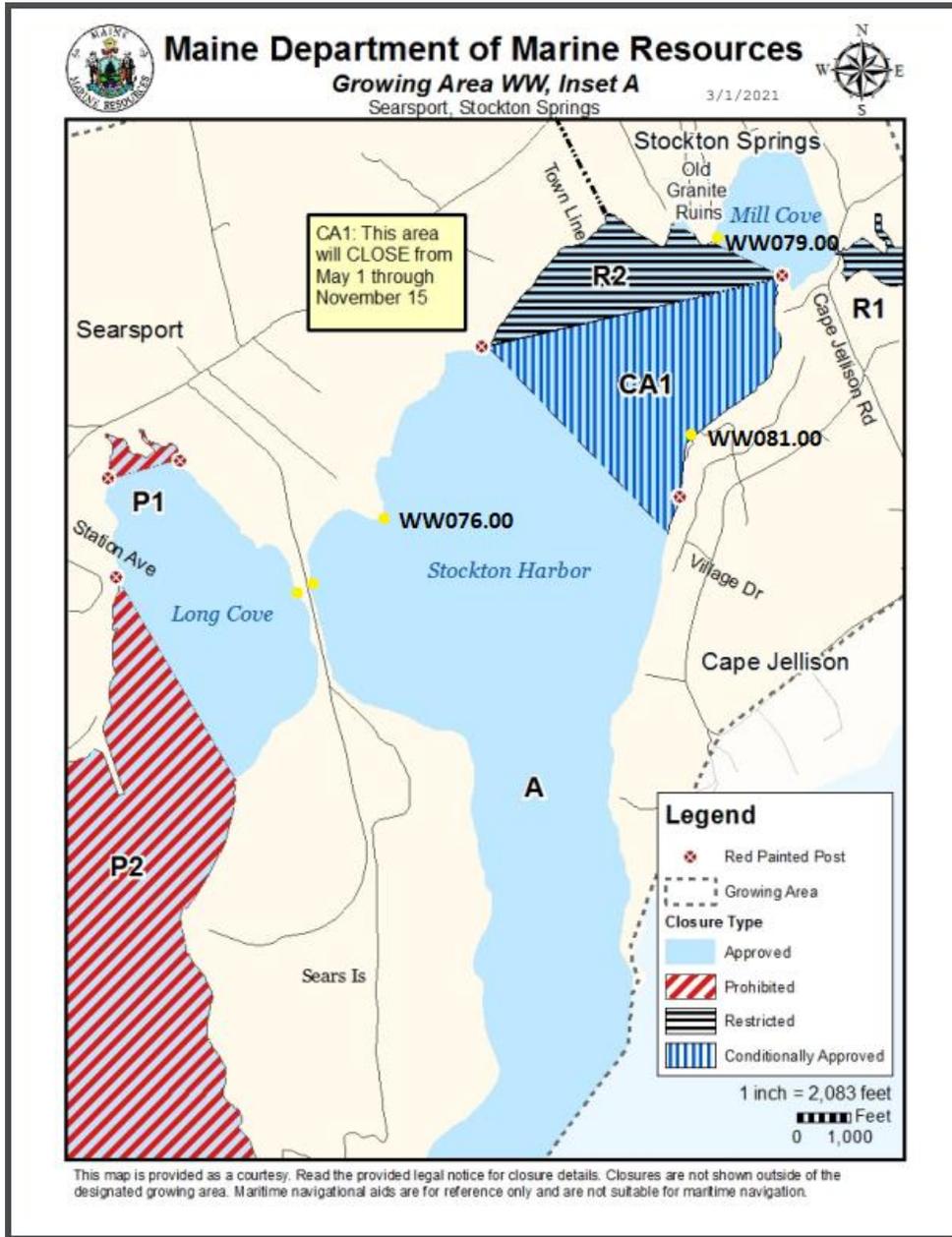
Annual Review of WW CA1, Stockton Springs Marina Conditional Area Management Plan

Scope

Stockton Harbor, Stockton Springs is closed from May 1 through November 15 due to the presence of boats with heads at the Stockton Harbor Marina and the increase in boating seasonal boating activity. This area is northeast of a line beginning at a red painted post located on the shore of Stockton Harbor(Searsport), approximately 0.6 miles southwest of the Searsport/Stockton Springs town line, then running southeast to a red painted post located on the Cape Jellison shore (Stockton Springs), beyond the end of Village Drive; AND south of a line beginning at a red painted post located on the shore of Stockton Harbor (Searsport), approximately 0.6 miles southwest of the Searsport/Stockton Springs town line, then running east-northeast to a red painted post located on a prominent unnamed point of land southwest of the causeway to Cape Jellison (Stockton Springs). Due to the presence of a marina and increased seasonal boating activities, it shall be closed to the harvest of clams, quahogs, oysters, mussels and whole or roe-on scallops from May 1 through November 15. The water quality station that monitors this area is WW81 with WW76 as the nearest boundary station.



Figure 5 WW CA1 Stockton Springs Marina Conditionally Approved area



Adequacy of reporting and cooperation of involved persons

The management plan for this area does not require reporting. Staff conducts an interview with the harbor master every three years to ensure the management plan follows marina activities.



Compliance with approved growing area criteria:

The area is monitored by station WW 81; station WW 76 serves as the boundary station between the conditional area and the approved area to the south. Both stations meet approved criteria based on geometric means and P90 values during the open period.

Water sampling compliance history

At least six samples are collected annually from WW81 with at least three samples collected while the area is in the open status.

Analysis, Recommendations

The Stockton Springs Conditionally Approved area continues to meet the standards for harvest during the open status and remains in compliance with the CAMP. Recommend continued water quality sampling and communication with the harbor master to ensure continued compliance of the CAMP.

Annual Review of WW CA2, Ducktrap River Seasonal Conditionally Approved Area

Scope

The mouth of the Ducktrap River (Lincolnville) is Conditionally Approved based on season; it closes October 1st to April 30th (Figure 1). The closure extends from a prominent pier at the end of Harbor Drive, northeast to a prominent rock outcropping on the opposite shore just southwest of Fire Road 3 to include all shoreline and tidal areas of the Ducktrap River. Elevated scores throughout the spring and fall are from an unknown source. The shoreline is a known recreational area so pet feces could be contributing to high scores. The area is monitored by station WW041.00 with WW040.00 and WW042.00 serving as boundary stations.

Adequacy of reporting and cooperation of involved persons

The management plan for this area does not require reporting.

Compliance with Growing Area criteria

The area continues to meet the criteria for harvest during the open season of May 1 to November 30 based on calculated P90 score.

Water Sampling Compliance History

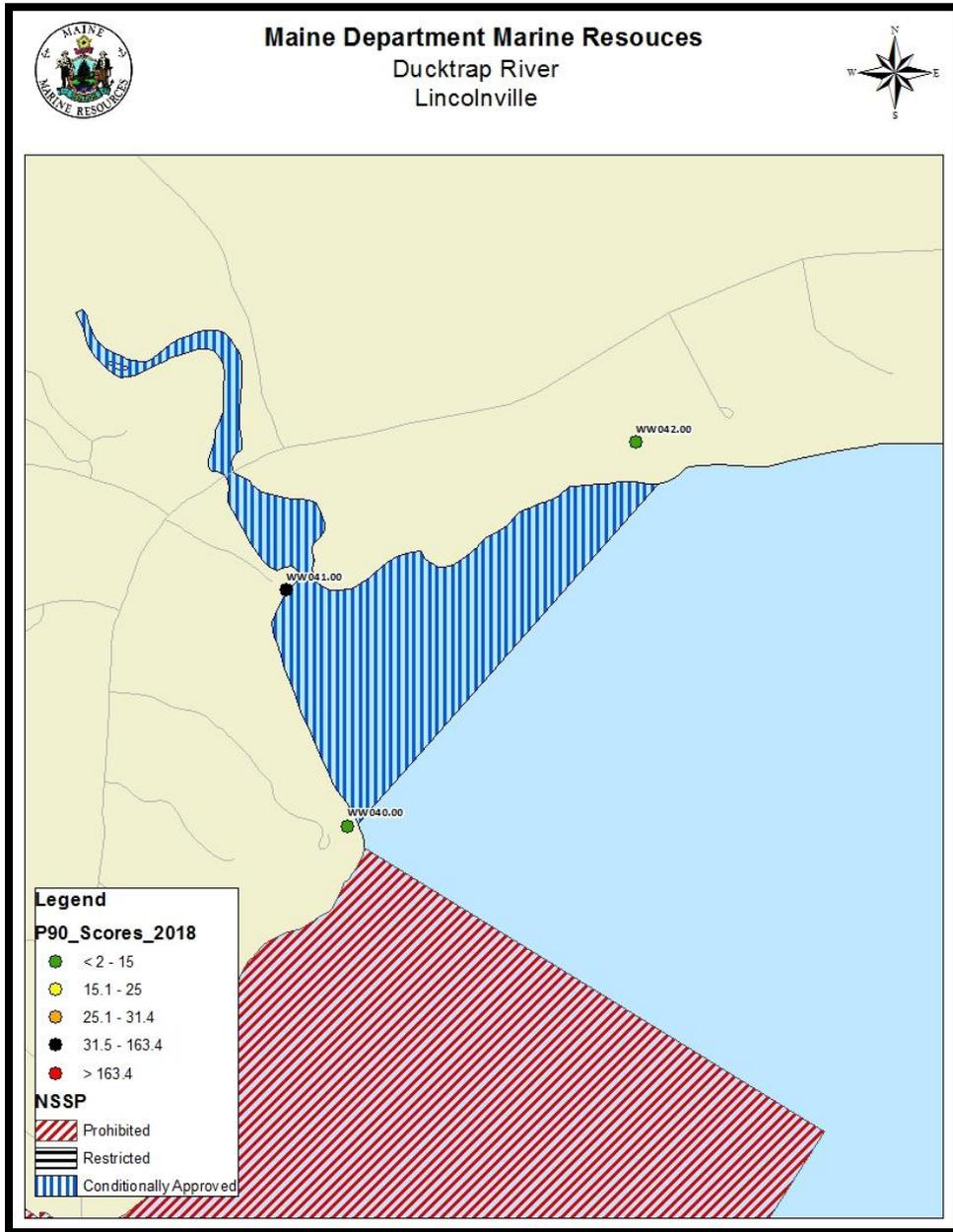
Water samples are collected at least six times per year while the area is in the open status. The P90 value meets the Approved standard during the open status.

Analysis-Recommendations

The Ducktrap River Conditionally Approved area continues to meet the standards for harvest during the open status and remains in compliance with the CAMP. Recommend continued water quality monitoring. Increased P90 scores may be related to increased river flow.



Figure 6. WW CA2, Ducktrap River Seasonal Conditionally Approved Area





Recommendations for future work

No stations in Growing Area WW require a downgrade in 2020 and no stations are being evaluated for an upgrade.

The University of Maine is currently working on a model for WWTP discharge and dilution. Penobscot Bay is intended to be one of the study areas. This work could be utilized to create new conditional areas in the vicinity of WWTPs as well as potentially decrease the Prohibited area of some WWTPS.

Increased scores in the Ducktrap River may be related to increased flow from the river. This potential correlation could be looked at more closely.

Much of the WW shoreline is Prohibited due to licensed discharges and the historical presence of OBDs. Most of these OBDs have now been removed. It may be possible to upgrade and open portions of the WW shoreline to shellfish harvest if inactive stations are reactivated and shoreline survey is updated and doesn't find any problems.

Table 6. Count table of samples collected in Growing Area WW during the 2020 season.

Active Stations	Class	Strategy			Samples		Comments
		Adverse Closed	Random Closed	Open	Collected	Required	
WW040.00	A			6	6	6	
WW041.00	CA	2		5	7	5*	*Required count is five due to being open five months
WW042.00	A			6	6	6	
WW043.00	A			6	6	6	
WW044.00	A			6	6	6	
WW045.00	A			6	6	6	
WW049.00	P		6		6	6	
WW069.00	A			6	6	6	
WW070.00	P		1		1		Deactivated
WW071.00	A			6	6	6	
WW075.00	A			6	6	6	
WW076.00	A			6	6	6	
WW078.00	R			1	1		Deactivated
WW079.00	A			6	6	6	
WW080.00	A			6	6	6	
WW081.00	CA	4		3	7	6	
WW081.50	A			6	6	6	
WW082.00	A			6	6	6	



References

National Shellfish Sanitation Program: Guide for the Control of Molluscan Shellfish, 2019 Revision.

Tide Data, USHarbors.com Internet site

Licensed discharge information, Maine Department of Environmental Protection, Augusta, Maine

Data Layers, Maine Office of GIS, Augusta, Maine

Rainfall data, National Weather Service

Rainfall data, Weather Underground

Town and Population data, <https://www.maine.gov/dafs/economist/census-information>

Dragon Products, <https://www.penbaypilot.com/article/dragon-products-announces-cement-plant-back-business-following-devastating-fire/118930>, <https://www.giantcement.com/dragon>, <https://www.cemnet.com/News/story/171272/dragon-products-to-stop-rockland-rail-terminal-shipments.html>,

Dupont Nutrition, <https://www.mainebiz.biz/article/dowdupont-completes-purchase-of-fmc-plant-in-rockland>,

Penobscot McCrum, https://www.dnb.com/business-directory/company-profiles.penobscot_mccrum_llc.1e52bc3feb41c9ae39655e8171075f55.html, <https://www.buzzfile.com/business/Penobscot-McCrum-LLC-207-338-4360>,

Annual Rainfall, <https://www.bestplaces.net/climate/city/maine/rockland#:~:text=Rockland%2C%20Maine%20gets%2050%20inches,inches%20of%20snow%20per%20year.>,

Additional river data, <https://naturalatlas.com/rivers/passagassawakeag-999760>,

Penobscot Tidal Range, https://halseyburgund.com/docs/hburgund_thesis95.pdf,

Appendix A.

Key to Water Quality Table Headers

Station = water quality monitoring station

Class = classification assigned to the station; Prohibited (P), Restricted (R), Conditionally Restricted (CR), Conditionally Approved (CA) and Approved (A).

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

GM = 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, Approved standard is 31, Restricted standard is 163

Min_Date = oldest date sampled included in the calculations.

X = investigative station