



GROWING AREA EH

Seawall to Otter Cove, including Southwest and Northeast Harbors, Somes Sound, Somes Harbor, and the Cranberry Islands

Sanitary Survey Report

2013 - 2021

Final

Hannah Horecka, Scientist I

Sanitary Survey Officer signature: _____

A handwritten signature in cursive script that reads "David W. Miller".

Date: 6/2/22



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Executive Summary

This is a Sanitary Survey report for Growing Area EH in Hancock County written in compliance with the requirements of the 2019 Model Ordinance and the National Shellfish Sanitation Program. One pollution area in Growing Area EH will be reviewed for a possible upgrade in 2022; Gary Moore Cove (Mount Desert). There were no new actual or potential pollution sources found. Access was denied at one property. Water quality has remained consistent overall with some improvement in water quality. The next sanitary survey is due in 2033 and the next triennial in 2024.

Description of Growing Area

Growing Area EH stretches along the southern shore of Mount Desert Island from Seawall to Otter Cove, including the Cranberry Islands in Hancock County. This area includes the towns of Southwest Harbor (pop. 1,756), Mount Desert (pop. 2,146), Cranberry Isles (pop. 160), and Bar Harbor (pop. 5,089) (2010 Census). The area is primarily rural with the largest population concentrations in Southwest Harbor, Somesville, and Northeast Harbor, all with many seasonal residents (June-September). Development along the shoreline is spotty with clusters of homes separated by undeveloped land. There are Four Wastewater Treatment Plants (WWTPs) that are located at Southwest Harbor, Somesville, Northeast Harbor, and Seal Harbor. There are 11 licensed overboard discharges (OBD's), one OBD was reported removed during the 2021 season on Sutton Island, Cranberry Isles.

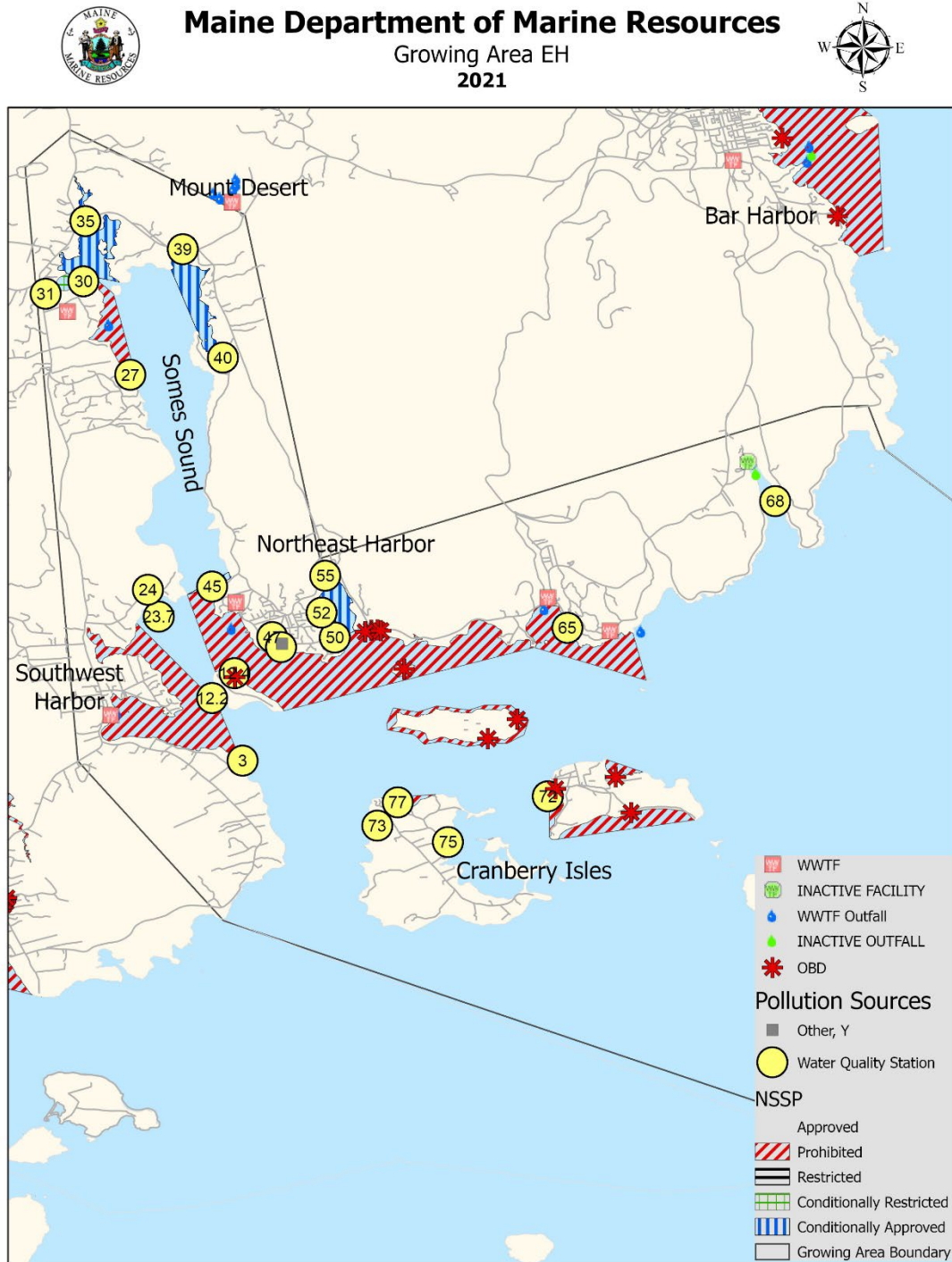
The upland cover is primarily deciduous, with some evergreens and wetland forest with minimal development. Freshwater influence along these shores is predominately from numerous small streams throughout the Growing Area. There are no large rivers or lakes impacting the area. Wildlife in the area includes migrating birds, various rodents, deer, harbor seals, etcetera.

There is one shellfish aquaculture lease, and seven shellfish Limited Purpose Aquaculture permits (LPAs) in this growing area. There are no wet storage permits issued to certified shellfish dealers in this area.

Below is the map with growing area boundaries. Closures within the growing area can be found in legal notices in DMR central files on the DMR website.



Figure 1. Growing Area EH Overview Map with Active Water Stations





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 2-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 EH, Inset Map A

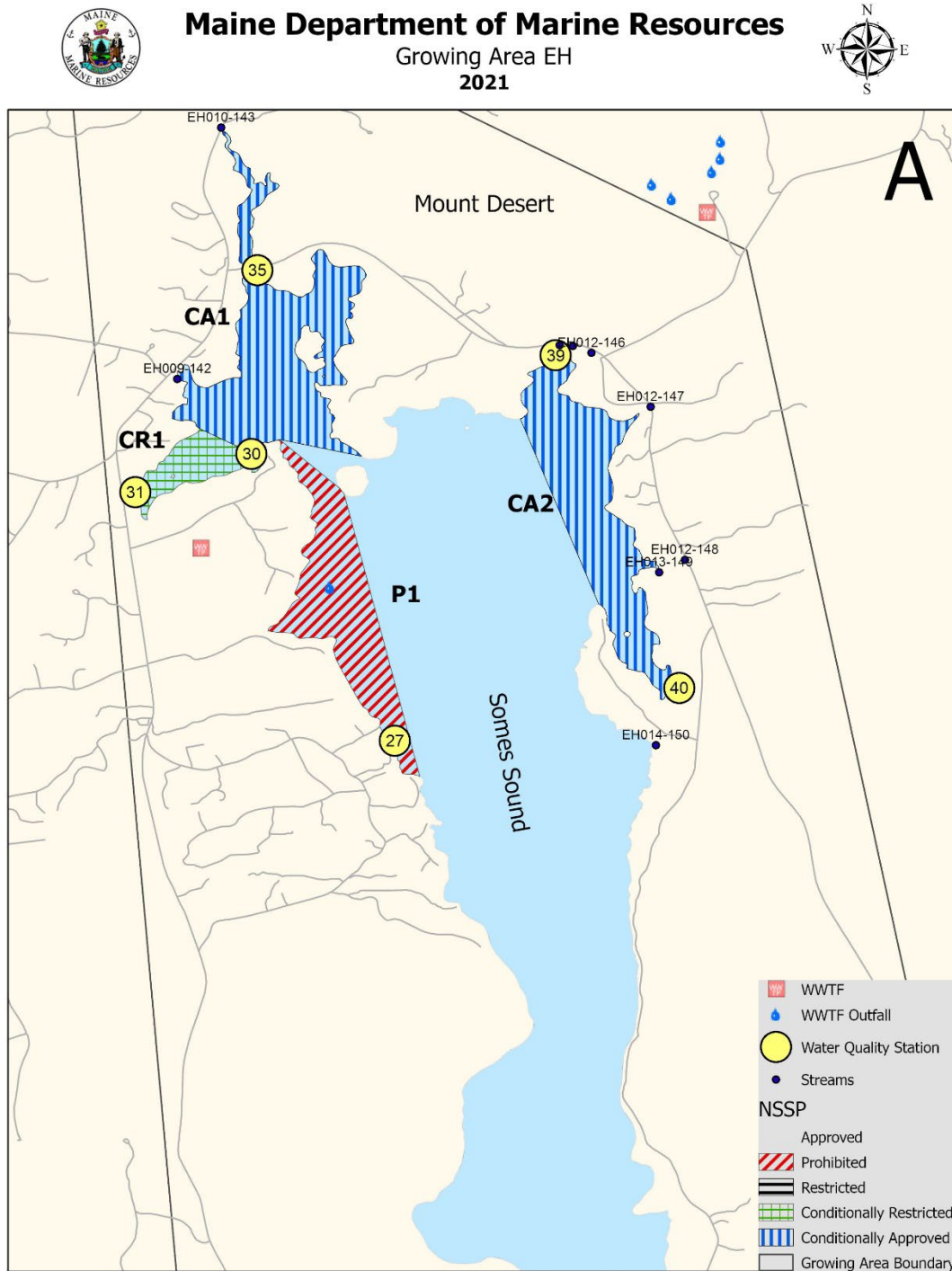
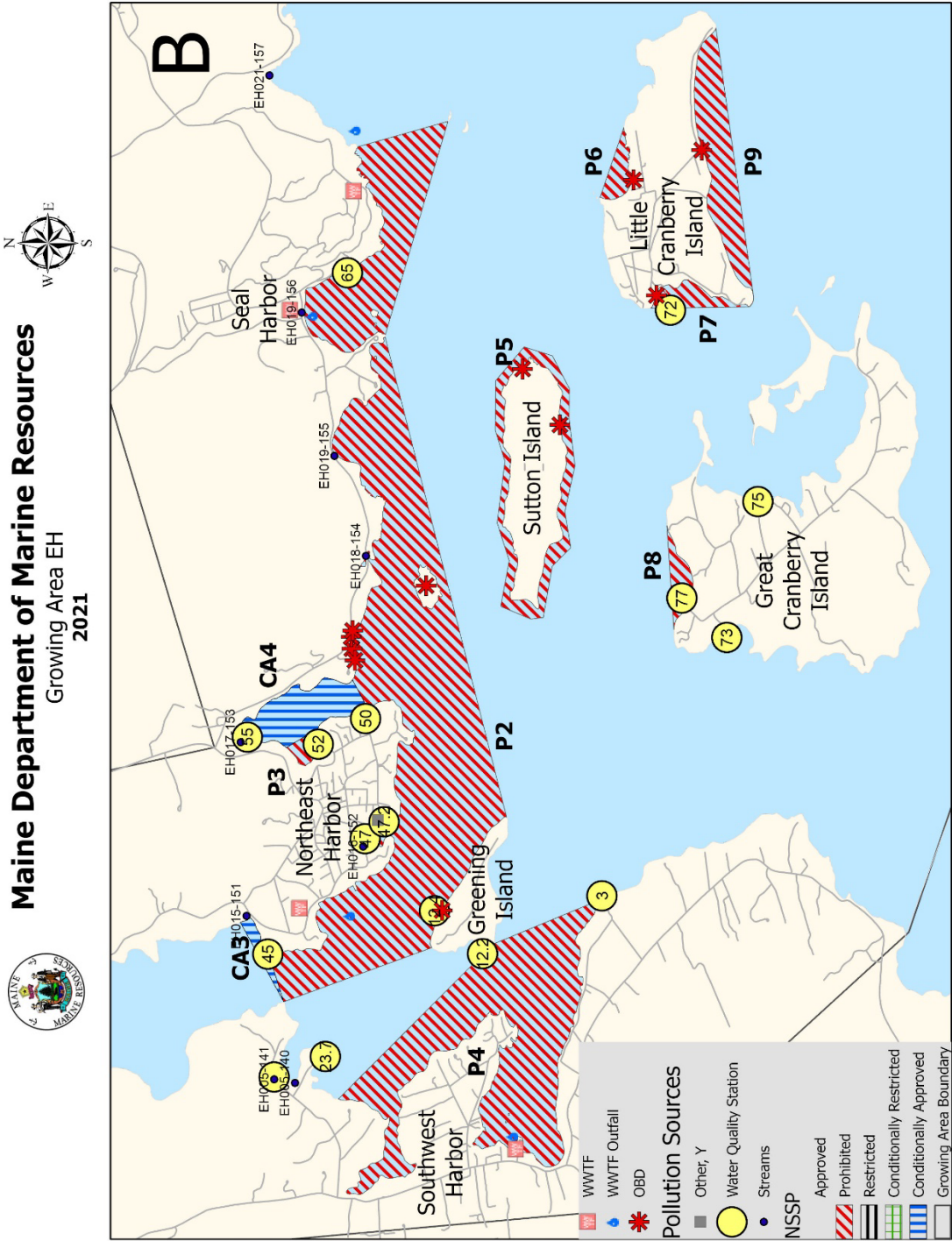




Figure 3. Growing Area EH, Pollution Map B





State and Federal Licensed Waste Discharge Permits

Overboard Discharges (OBDs)

There are 11 overboard discharges (OBDs) that discharge their treated effluent into the waters of Growing Area EH. One OBD discharges into the waters around Greening Island, four OBDs are on the eastern shore near the mouth of Northeast Harbor, one OBD on Bear Island, two on Sutton Island, and three on Little Cranberry Island (Figure 3). One OBD was reported removed from Sutton Island in 2021, and a total of five OBDs have been removed since 2012.

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 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 EH (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 (OBDs)

Closure Area	OBD ID #	Location	Receiving Waterbody	Flow (gpd)	Acres Needed for Closure	Current Prohibited Acreage
P2	1533	Southwest Harbor	Western Way	300	7.7	1416 acres
P2	2312	Mount Desert	Northeast Harbor	540	12.7	1416 acres
P2	1838	Mount Desert	Northeast Harbor	450	10.6	1416 acres
P2	2308	Mount Desert	Northeast Harbor	450	10.6	1416 acres
P2	3404	Mount Desert	Northeast Harbor	300	7.1	1416 acres
P2	2370	Cranberry Isles	Eastern Way	500	13.9	1416 acres
P5	2392	Cranberry Isles	Atlantic Ocean at Sutton Island	360	8.2	110 acres
P5	7891	Cranberry Isles	Gilley Thorofare	300	8.8	110 acres
P6	5914	Cranberry Isles	Eastern Way	540	8.4	24 acres
P7	2186	Cranberry Isles	Hadlock Cove	600	11.9	31 acres
P9	7257	Cranberry Isles	Atlantic Ocean	300	10.9	141 acres

National Pollutant Discharge Elimination System (NPDES)

Table 2. NPDES Permitted Discharges

Closure Area	Permit ID	Type	Facility	Waterbody
P4	ME0100641	WWTF	Southwest Harbor Water & Sewer District POTW	Atlantic Ocean
P1	ME0102547	WWTF	Somesville Wastewater Treatment Facility	Atlantic Ocean
P2	ME0101346	WWTF	Mount Desert Northeast Wastewater Treatment Facility	Atlantic Ocean
P2	ME0102555	WWTF	Seal Harbor Wastewater Treatment Facility	Atlantic Ocean
P3	MEG170003	Antifouling Paint Contaminated Vessel Wash Water	Morris Yachts, Inc.	Northeast Harbor

There are four wastewater treatment plants/facilities (WWTP/WWTF) in growing area EH. Since 2017 the WWTP inspection reports have been available in DMR central files. The plants are in Southwest Harbor, Somesville, Northeast Harbor, and Seal Harbor. These facilities discharge into Prohibited Areas that are larger in area than the calculated dilution zones for the effluent.



Southwest Harbor-

The plant is a secondary treatment system that discharges into Southwest Harbor (Class SB). Influent is domestic. There is no industrial flow to the facility. Licensed monthly average flow is 0.375 million gallons per day (MGD). The facility cannot accept transported wastes.

The wastewater treatment facility provides secondary treatment via two aeration basins that are fitted with bubble diffusers. Wastewater is then conveyed to two rectangular clarifiers. Following clarification, the flow goes to a chlorine contact chamber with dechlorination capabilities. Regular maintenance is done with daily checks\repairs. Sludge is sent to the Ellsworth Wastewater Treatment Facility for processing. There is approximately 10 miles of collection system piping with three (3) pump stations. None of these pumps bypass or overflow. There are no combined sewer overflows. Effluent is discharged through a 16" diameter concrete pipe into the ocean tidewaters of Southwest Harbor. The end of the pipe is fitted with a 16" cast iron diffuser and is located six (6) feet below mean low water. The regulation Prohibited closure size exceeds the computed effluent dilution zone (dilution calculation = 288 acres / closure size 576 acres).

Somesville-

The plant is a secondary treatment system that discharges into Somes Harbor (Class SB). Influent is domestic. There is no industrial flow to the facility. Licensed monthly average flow is 0.08 million gallons per day (MGD). The facility cannot accept transported wastes.

The wastewater treatment facility provides secondary treatment via an extended aeration activated sludge process. Wastewater is then conveyed to two 26' diameter clarifiers. Following clarification, the flow goes into an ultraviolet (UV) light disinfection reactor. There is a parallel 4,500 gallon chlorine contact chamber used as backup to the UV system. Regular maintenance is done with daily checks\repairs. Sludge is processed using an anoxic selector reactor, a 13,000 gallon sludge thickening reactor, and 63,000 gallon aerobic digester. Solids from the aerobic digester are hauled away for disposal. There is approximately 2.7 miles of collection system piping with three (3) pump stations, all with back-up power sources. None of these pumps bypass or overflow. There are no combined sewer overflows. Effluent is discharged through a 1,700' long, 8" diameter asbestos cement outfall sewer that connects to 300' of HDPE pipe. The HDPE pipe extends into Somes Harbor approximately 60' past the low water mark. The end of the pipe is fitted with seven diffuser ports and one outlet port, and is submerged three (3) feet below mean low water. The regulation Prohibited closure size exceeds the computed effluent dilution zone (dilution calculation = 31 acres / closure size 125 acres).



Northeast Harbor-

The plant is a secondary treatment system that discharges into Atlantic Ocean (Class SB) at Mount Desert (Northeast Harbor). Influent is domestic. There is no industrial flow to the facility. Licensed monthly average flow is 0.33 million gallons per day (MGD). The facility cannot accept transported wastes.

The wastewater treatment facility provides secondary treatment via mechanical grinding for influent screening before moving into a wet well of two basins, then to one of two aeration chambers for extended diffused aeration. The second aeration chamber is for high flow management or aerobic treatment of sludge during winter months. Wastewater is then conveyed to a circular secondary clarifier. Following clarification, the flow goes to a chlorine contact chamber for disinfection using sodium hypochlorite, followed by sodium bisulfite for dechlorination. Regular maintenance is done with daily checks\repairs. Sludge is processed with a 5,200 gallon scum tank, 44,000 gallon sludge thickener, 100,000 gallon sludge digester, and two 15 horsepower return sludge pumps. Sludge from the digester is hauled to the Ellsworth WWTF for dewatering. There is approximately 7.25 miles of collection system piping with five (5) pump stations. The Sea Street Pumpstation has a bypass into inner Northeast Harbor. There are no combined sewer overflows. Effluent is discharged into the Atlantic Ocean through a 16" diameter outfall pipe that extends 540' beyond the low tide mark. The end of the pipe is fitted with a diffuser with seven 2" ports, one 6" outlet port, and is located 5.6' below mean low water. The regulation Prohibited closure size exceeds the computed effluent dilution zone (dilution calculation = 145 acres / closure size 1416 acres).

Seal Harbor-

The plant is a secondary treatment system that discharges into Seal Harbor (Class SB). Influent is domestic. There is no industrial flow to the facility. Licensed monthly average flow is 0.250 million gallons per day (MGD). The facility cannot accept transported wastes.

The wastewater treatment facility provides secondary treatment via a pre-aeration reactor, a bar rack and/or mechanical grinder, and an anoxic selector reactor or two aeration basins. Wastewater is then conveyed to two 30' diameter circular clarifiers. Following clarification, the flow goes into a UV disinfection reactor where it is bypassed into a chlorine contact chamber using sodium hypochlorite, followed by sodium bisulfite for dechlorination. Regular maintenance is done with daily checks\repairs. Sludge is processed using a 1,060 gallon scum tank, a 11,000 gallon sludge decant reactor, a 75,000 gallon sludge digester, and three 7.5-horsepower return sludge pumps. Sludge from the digester is hauled to the Ellsworth WWTF for dewatering. There is approximately 3.5 miles of collection system piping with four (4) pump stations. None of these pumps bypass or overflow. There are no combined sewer overflows. Effluent is discharged through a 12" diameter outfall pipe into the ocean tidewaters of the Atlantic Ocean at Seal Harbor (Mount Desert). The pipe extends 1100' into the harbor with diffuser ports at the end. The regulation Prohibited closure size exceeds the computed effluent dilution zone (dilution calculation = 256 acres / closure size 1416 acres).



Table 3. Growing area EH WWTP Dilution Calculations.

	Southwest Harbor	Somesville	Northeast Harbor	Seal Harbor
FC/100ml	140,000	140,000	140,000	140,000
Discharge Rate (gallons/hour)	15625	3333.333333	13750	10416.66667
Time of Discharge (hr)	12	12	12	12
Mean water depth (ft)	20	40	35	15
FC per hour	8.28E+10	1.77E+10	7.29E+10	5.52E+10
FC per 12 hr	9.94E+11	2.12E+11	8.74E+11	6.62E+11
ml to dilute to 14FC/100ml	7.10E+12	1.51E+12	6.25E+12	4.73E+12
ft ³ to dilute to 14FC/100ml	2.51E+08	5.35E+07	2.21E+08	1.67E+08
Acres	288	31	145	256

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. Table 4 shows all new and pre-existing pollution sources in area EH that are considered discharges into the Growing Area and effect water quality.

Table 4. Growing Area EH Residential Pollution Sources.

Closure Area	Location ID	Date Surveyed	Direct or Indirect	Problem	Description	Town
P2	EH016-157	2016	Direct	Y	Small (1.5") black pipe exiting side of bank and runs across mudflat toward mouth of Gilpatrick Cove	Mount Desert

Industrial Pollution

There are no major industrial pollution sites in growing area EH such as chemical plants, steel mills, shipyards, or refineries. None of the small industries (small boat builders and boat storage yards, and wildlife nature boat tour businesses) were identified as pollution sources during the 2021 survey. All the shellfish areas adjacent to the businesses meet their present area classifications.

Small individual storage tanks for gasoline and diesel were not recorded in open areas of the growing area but may be located at busy marinas which are enclosed in Prohibited areas. These tanks are often near the shore. Tanks have containment walls and booms in the event of an accidental leak in a tank or spillage when unloading. The oil response team from the Maine DEP contacts Maine Marine Resources when a spill occurs, and a decision will be made whether a shellfish closure is necessary.



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. Small mooring fields are scattered throughout the growing area with the largest number (groups of 10 or more moorings) of boats in Southwest Harbor, Mount Desert, and the Cranberry Isles. There are four boat pump out facilities in Southwest Harbor (Hinckley Company, Great Harbor Marina, and two at Southwest Boat Marine), one in Somes Sound (Abel's Pumpout Float), and two in Northeast Harbor (Clifton Dock and Mount Desert Town Dock).

Marinas at Southwest Harbor (Southwest Harbor), Gilpatrick Cove (Northeast Harbor, Mount Desert), Spurling Cove (Great Cranberry Island), and Hadlock Cove (Little Cranberry Island) are all popular cruising destinations and are enclosed in Prohibited areas. Marinas at Somes Harbor (Somesville, Mount Desert) and Somes Sound between the Marine Railway and Sargent Cove (Somesville, Mount Desert) are contained in marina Conditional Areas that are closed May 1 through September 30 while the marina is in operation. Water quality sample sites in the mooring area meet the appropriate classification criteria when in the open status. A portion of the marina in Northeast Harbor operates year round and is contained in a Prohibited area. The rest of the marina area operates seasonally and is contained in a Conditional area that is closed May 1 through October 31 while the marina is in operation. Based on the numbers of live-aboard boats, areas classified Conditionally Approved or Prohibited are classified correctly to protect public health.

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 EH 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 stormwater pipes and ditches of varying diameters were identified during the shoreline surveys. The town of Southwest Harbor and the village of Northeast Harbor in Mount Desert have stormwater systems that drain into large Prohibited areas that include wastewater treatment plant outfalls and boat moorings. Elevated water quality samples in Gilpatrick Cove of Northeast Harbor (Mount Desert) on 8/8/2007 and 10/3/2007 prompted an investigation of stormwater culverts in the cove. Two culverts on the eastern shore tested positive for optical brighteners. A strong septic odor and evidence of septic waste were observed at the mouth of the stormwater culvert closer to the yacht club on the eastern shore of Gilpatrick Cove. The town was notified of the cross connection with the stormwater system on 11/1/2007. Following interest by the local shellfish committee, DMR conducted optical brightener testing and visual observations in the summer of 2016 which confirmed the cross connection had not been resolved. In September of 2018 the stormwater system was videoed, and the cross connection was identified. The cross connection was confirmed with dye testing and more video. On October 16, 2018, the cross connection was corrected by a local contractor and the Highway Department crew. Since that issue was resolved, no specific impact from the storm drains has been identified. Water sampling stations on the margins of these closures meet approved standards.

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 EH. A total of 51 samples were taken from freshwater streams during the review period (Table 5, Figures 2-3).



Streams associated with consistently high scores are monitored to determine if they affect the water quality of growing area waters. No streams in growing area EH show consistently elevated levels of bacterial pollution.

Table 5. Stream Samples in Growing Area EH 2013-2021; Scores > 163 cfu/100ml are highlighted in red.

Closure Area	Location ID	Sample Date	Pollution Type	Score cfu/100ml
A	EH005-140	5/3/2018	Stream	<2
A	EH005-140	10/26/2021	Stream	2
A	EH005-141	5/3/2018	Stream	<2
A	EH005-141	8/22/2018	Stream	16
A	EH005-141	10/26/2021	Stream	28
CA1	EH009-142	5/3/2018	Stream	<2
CA1	EH009-142	10/26/2021	Stream	6
CA1	EH010-143	5/3/2018	Stream	4
CA1	EH010-143	8/22/2018	Stream	100
CA1	EH010-143	10/26/2021	Stream	22
CA2	EH012-144	12/21/2016	Stream	<2
CA2	EH012-144	5/3/2018	Stream	<2
CA2	EH012-144	8/22/2018	Stream	22
CA2	EH012-144	10/26/2021	Stream	2
CA2	EH012-145	12/21/2016	Stream	<2
CA2	EH012-145	5/3/2018	Stream	<2
CA2	EH012-145	10/26/2021	Stream	<2
CA2	EH012-146	5/3/2018	Stream	<2
CA2	EH012-146	10/26/2021	Stream	<2
CA2	EH012-147	5/3/2018	Stream	22
CA2	EH012-147	8/22/2018	Stream	16
CA2	EH012-147	10/26/2021	Stream	2
CA2	EH012-148	12/20/2016	Stream	31
CA2	EH012-148	5/3/2018	Stream	42
CA2	EH012-148	8/22/2018	Stream	7.3
CA2	EH012-148	10/26/2021	Stream	4
CA2	EH013-149	12/20/2016	Stream	6
CA2	EH013-149	5/3/2018	Stream	<2
CA2	EH013-149	8/22/2018	Stream	15
CA2	EH013-149	10/26/2021	Stream	2
A	EH014-150	12/20/2016	Stream	<2
A	EH014-150	5/3/2018	Stream	<2



Closure Area	Location ID	Sample Date	Pollution Type	Score cfu/100ml
A	EH014-150	10/26/2021	Stream	2
CA3	EH015-151	12/20/2016	Stream	27
CA3	EH015-151	8/22/2018	Stream	300
CA3	EH015-151	10/26/2021	Stream	46
P2	EH016-152	12/20/2016	Stream	78
P2	EH016-155	6/15/2016	Stream	4
P2	EH016-156	6/15/2016	Stream	84
CA4	EH017-153	12/20/2016	Stream	22
CA4	EH017-153	10/26/2021	Stream	4
P2	EH018-154	12/20/2016	Stream	20
P2	EH018-154	8/22/2018	Stream	35
P2	EH019-155	12/20/2016	Stream	15
P2	EH019-155	8/22/2018	Stream	4
P2	EH019-156	12/20/2016	Stream	76
P2	EH019-156	8/22/2018	Stream	66
A	EH021-157	8/22/2018	Stream	64
A	EH022-158	7/17/2017	Stream	2
A	EH022-158	8/22/2018	Stream	4
A	EH024-159	7/17/2017	Stream	2

Agricultural Activities

There are no large-scale agriculture activities in Growing Area EH. Smaller farms were not noted along the shoreline but may be present in the drainage areas associated with growing area streams. Pollution from small agriculture operations can be introduced into the growing area as nonpoint source pollution transported by runoff from large rainfall or snowmelt events. Smaller farms are encouraged to follow best management practices to help avoid effects animal waste and agricultural pollutants can have on water quality. None of the small farms appeared to be directly impacting the growing area during the 2021 shoreline survey.

Wildlife Activity

The salt marshes and mudflats of the growing area provide valuable habitat to a variety of 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.

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

Growing area EH includes the southern edge of Mount Desert Island, Somes Sound, and the Cranberry Islands. The entire growing area is heavily used by recreational users year-round. There are several day-use beaches and picnic areas including Acadia National Park, Northeast Harbor Marina, and Seal Harbor Beach. Dogs are allowed in these areas and signs are posted saying they are to be leashed and their feces collected and carried out. There are commercial campgrounds in Mount Desert on the west side of Somes sound and in Somes Harbor. These areas are monitored by routine water sampling sites. Neither of these campgrounds have shown any impact on water quality. Although there are a few sand and gravel beaches in the area, swimming in the ocean in this area is relatively rare, as the water temperatures rarely exceed 65°F.

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 9 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.

Rainfall

The mean annual precipitation in growing area EH is approximately 44 inches and the precipitation is not evenly distributed throughout the year. The wettest months are generally April and November while August is typically the driest month. 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. No rainfall areas have been identified in growing area EH.



Maine DMR is working collaboratively with the University of Maine on a statewide coastal project determining how various watershed characteristics influence fecal contamination of marine waters during rainfall events. This research clusters watersheds based on similar characteristics then models how rainfall and associated pollution is distributed. The model is being refined to incorporate margin watershed influences.

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

Stream flow in Maine exhibits seasonal variation, with the highest flows occurring in the spring (due to snowmelt, spring rains, and low evapo-transpiration) and the mid-to late fall (due to fall rains and low evapo-transpiration). There are no large river discharges into growing area EH. There are many small streams that discharge into the growing area and these streams are discussed in the section about nonpoint source pollution.

Hydrographic Influence

Water circulation in growing area EH is dominated by tides. 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 EH 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

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 presently 24 active water sampling sites in Growing Area EH and no investigative stations which do not currently have enough data to calculate a P90. It is recognized that access, icing, and safety considerations prevent some stations from being sampled on scheduled dates. Currently all stations in Growing Area EH meet their current NSSP classification standard. One water quality station (EH 45) now has water quality that meets approved standards and will be evaluated for an upgrade in 2022.

Water Quality Discussion and Classification Determination

P90s for all active stations with a minimum of 30 samples were calculated and all stations meet their classification standards (Tables 6, 7). No stations in growing area EH showed a significant decline in P90 calculation. Overall, the water quality in growing area EH appears to be improving or remaining constant.

Table 6. 2021 year end P90 calculations for stations classified as Approved, Restricted, or Prohibited with a minimum of 30 samples. Geomeans and P90s not meeting current classifications are highlighted in red.

Station	Class	Count	GM	SDV	MAX	P90	Min Date
EH003.00	A	30	2.5	0.27	25.5	5.6	8/7/2017
EH012.20	A	30	2	0.11	6	2.9	6/7/2017
EH012.40	P	30	1.9	0.09	6	2.5	6/7/2017
EH023.70	A	30	3	0.39	66	9.7	11/29/2017
EH024.00	A	30	2.4	0.31	76	6.1	10/11/2018
EH027.00	P	30	2.5	0.35	84	7.3	6/14/2017
EH044.50	A	30	4.6	0.46	36	18.1	4/4/2016
EH047.00	P	30	2.9	0.38	42	9	6/28/2017
EH047.20	P	30	2.8	0.38	52	8.9	6/28/2017
EH052.00	P	30	3.2	0.39	36	10.5	6/28/2017
EH065.00	P	30	2.7	0.37	76	8.3	6/28/2017
EH068.00	A	30	2.7	0.4	108	9.1	6/28/2017
EH072.00	P	30	2	0.09	4	2.7	6/7/2017
EH073.00	A	30	1.9	0.05	3.6	2.2	6/7/2017
EH075.00	A	30	1.9	0	2	1.9	6/7/2017
EH077.00	P	30	1.9	0.05	4	2.3	6/7/2017

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

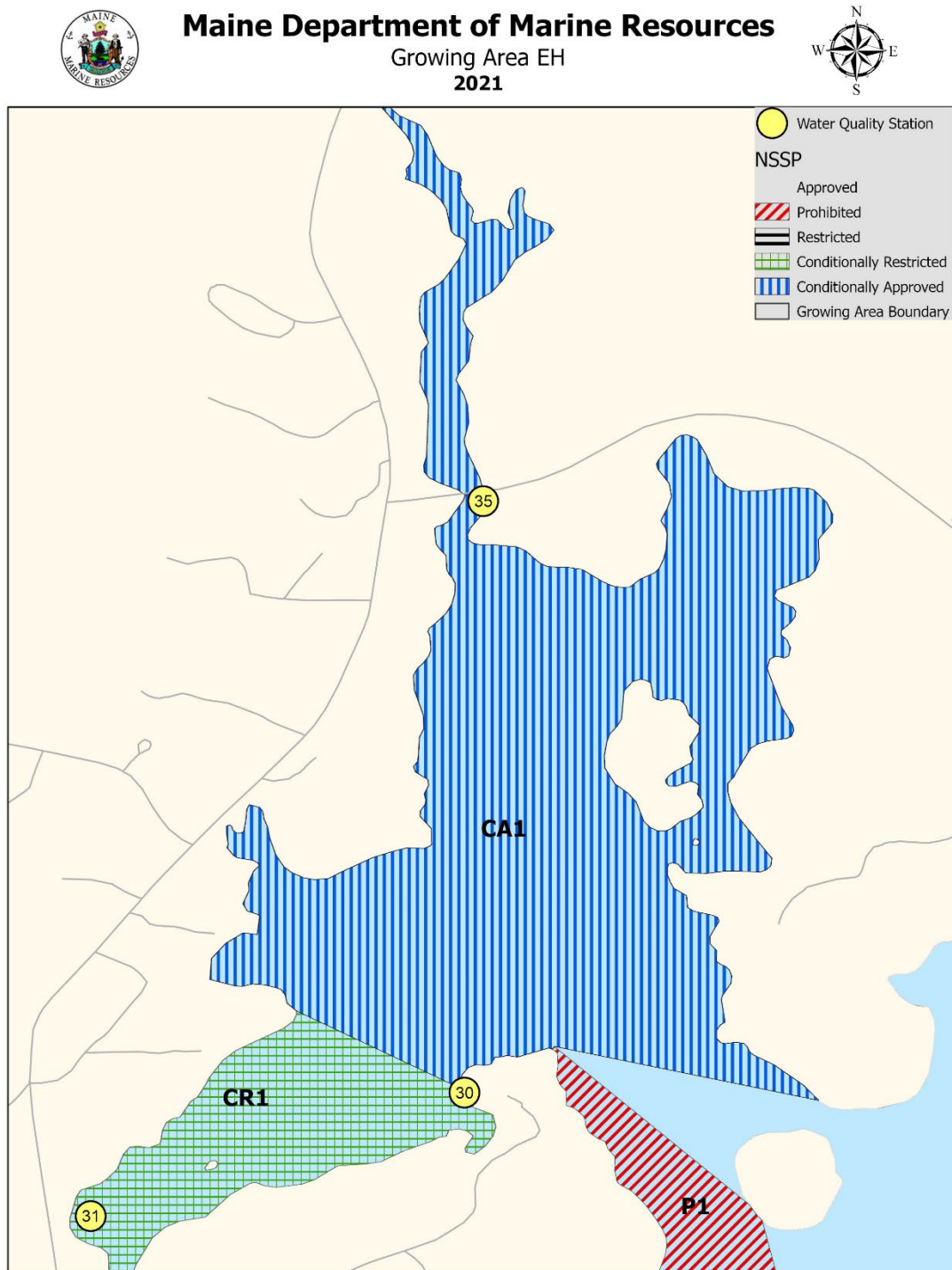
Annual Review of Somes Harbor and Mason Point, Somesville Conditional Area Management Plan

Scope

Growing Area section EH(CA1 and CR1) in Somes Harbor in Mount Desert is classified as Conditionally Approved and Conditionally Restricted seasonally and is in the open status from October 1 to April 30). The Conditionally Approved area is north of a line beginning at the northern tip of Mason Point and running east to the tip of Squantum Point; AND east of a line beginning at the western tip of Mason Point, then running northwest to the southeastern tip of the prominent point of land on the opposite shore. The Conditionally Restricted area is south and west of a line beginning at the western tip of Mason Point, then running northwest to the southeastern tip of the prominent point of land on the opposite shore. These areas are classified as Conditionally Approved and Conditionally Restricted respectively based on marina operation and water quality. This Conditional Area is monitored by water quality stations EH30, EH31, and EH35.



Figure 4. Some Harbor Conditionally Approved and Mason Point Conditionally Restricted areas





Compliance with management plan

The Somes Harbor and Mason Point Conditional Areas remains in compliance with the current conditional area management plan (CAMP). The marina is not operating during the open status and does not pose a risk to public health. See CAMP annual reviews for information on annual compliance with the current CAMP.

Adequacy of reporting and cooperation of involved persons

No reporting is required for these Conditional Areas.

Compliance with restricted growing area criteria

The area continues to meet the criteria for Approved or Restricted harvest respectively during the open status of October 1 through April 30 based on P90 calculations (EH30 at 5.8 cfu/100ml; EH31 at 34.8 cfu/100ml; EH35 at 20.4 cfu/100ml) during the open status and no other known sources of pollution in the area.

Water sampling compliance history

Water samples are collected at least monthly during the open status and throughout the year (Table 8). The P90 value meets the standard for Approved harvest during the open status (Table 7).

Analysis-Recommendations

The Somes Harbor and Mason Point conditional areas continue to meet the standards for seasonal Approved or Restricted harvest respectively during the open status and remains in compliance with the CAMP. Recommend continued water quality monitoring and open communication with the harbor master to ensure continued compliance with the CAMP.

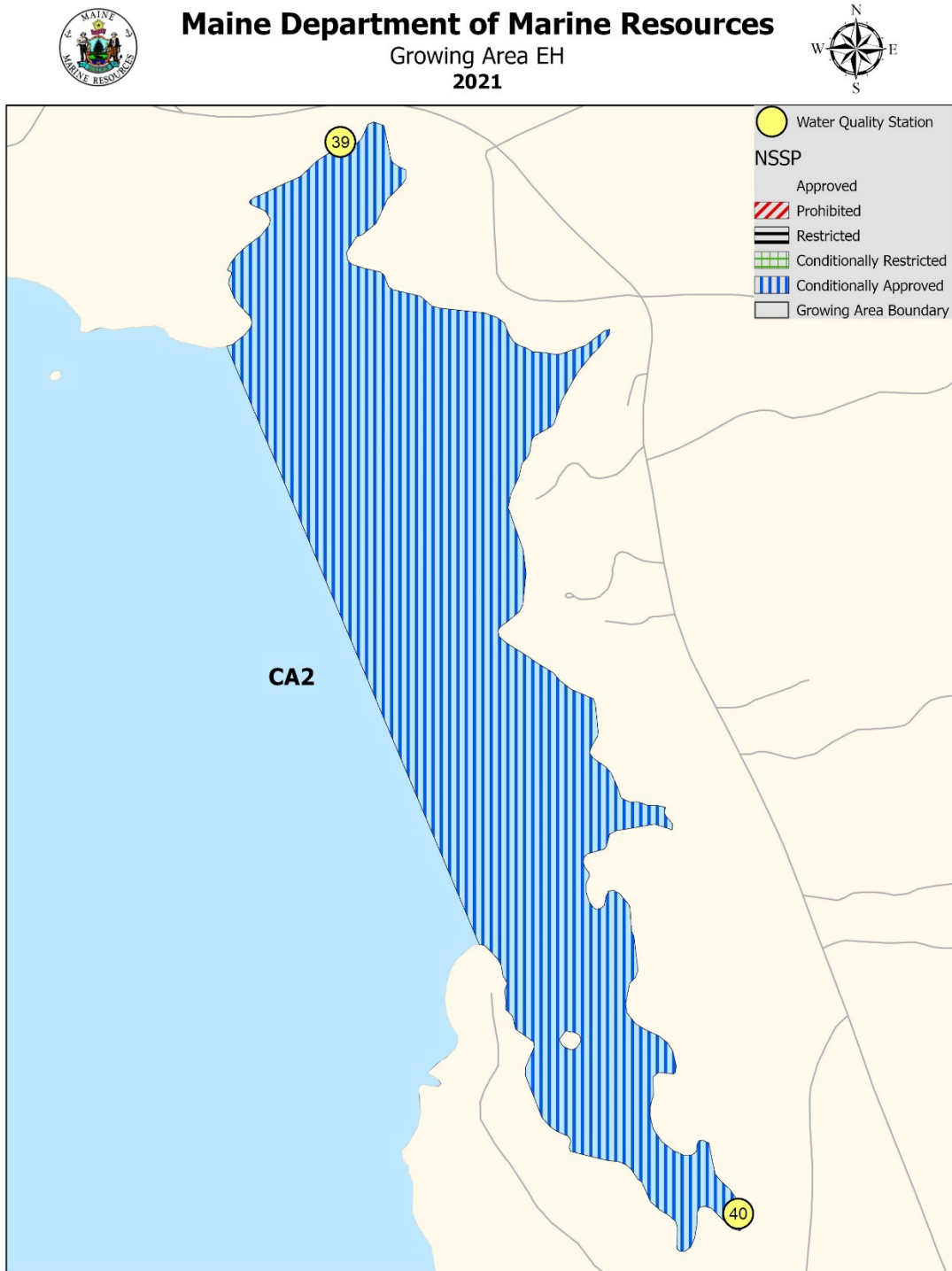
Annual Review of Sargent Cove to Marine Railway, Mount Desert Conditional Area Management Plan

Scope

Growing Area section EH(CA2) Sargent Cove to Marine Railway in Mount Desert is classified as Conditionally Approved seasonally with the open status for harvest from October 1 through April 30 (Figure 5). This area is east of a line beginning at a red painted post on the tip of land, approximately 320 yards southwest of the Marine Railway, that forms the mouth of an unnamed cove and running southeast to the northwest tip of land at the mouth of Sargent Cove. This area is classified as Conditionally Approved based on marina operation. This Conditional Area is monitored by water quality stations EH39 and EH40.



Figure 5. Sargent Cove to Marine Railway Conditionally Approved area





Compliance with management plan

The Sargent Cove to Marine Railway Conditional Area remains in compliance with the current conditional area management plan (CAMP). The marina is not operating during the open status and does not pose a risk to public health. See CAMP annual reviews for information on annual compliance with the current CAMP.

Adequacy of reporting and cooperation of involved persons

No reporting is required for this Conditional Area.

Compliance with restricted growing area criteria

The area continues to meet the criteria for Approved harvest during the open status of October 1 through April 30 based on P90 calculations (EH39 at 9.4 cfu/100ml; EH40 at 12.3 cfu/100ml) during the open status and no other known sources of pollution in the area.

Water sampling compliance history

Water samples are collected at least monthly during the open status and throughout the year (Table 8). The P90 value meets approved standards during the open status (Table 7).

Analysis-Recommendations

The Sargent Cove to Marine Railway Conditionally Approved area continues to meet approved standards during the open status and remains in compliance with the CAMP. Recommend continued water quality monitoring and open communication with the harbor master to ensure continued compliance with the CAMP.

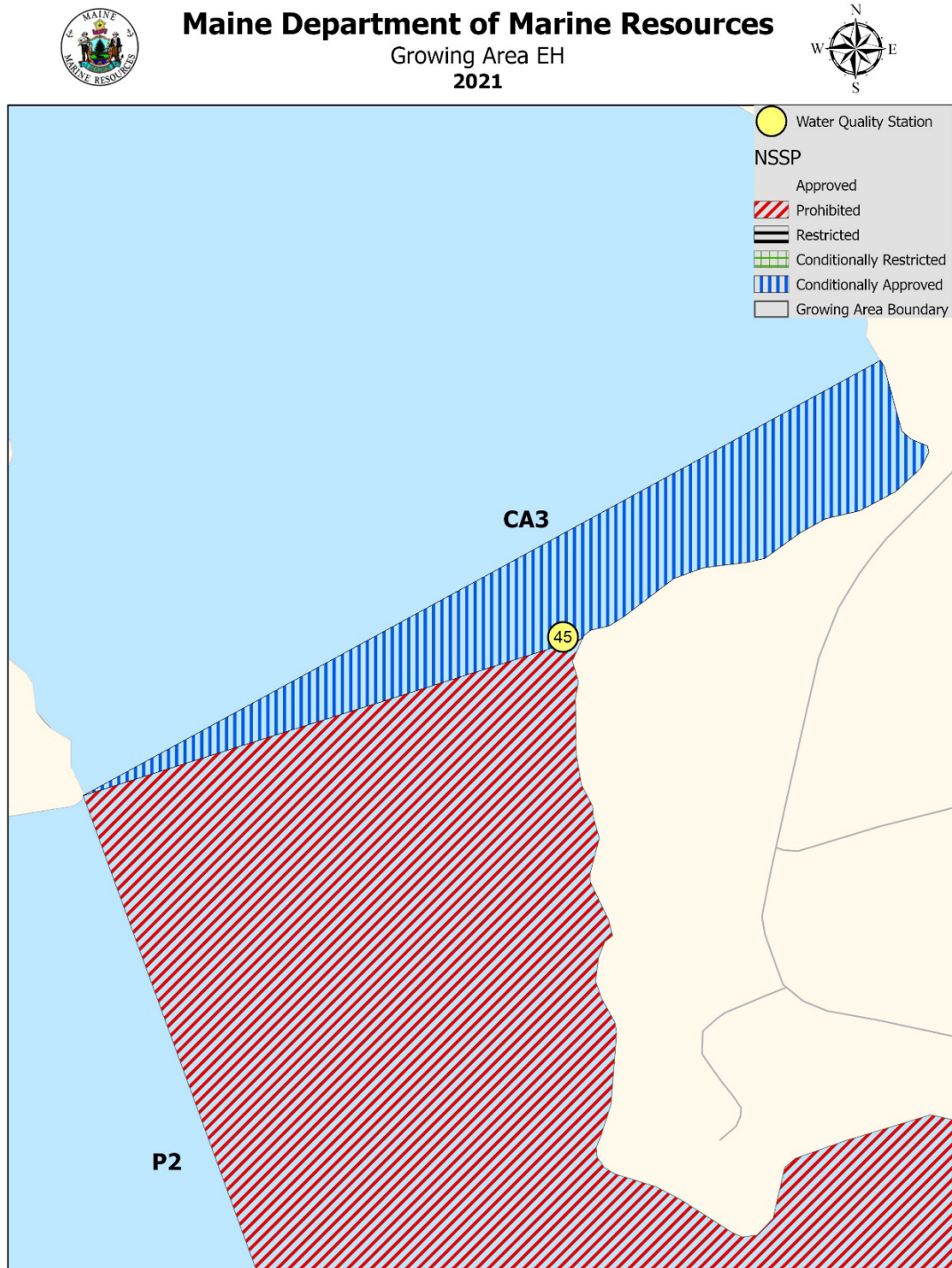
Annual Review of Gary Moore Cove, Mount Desert Conditional Area Management Plan

Scope

Growing Area section EH(CA3) Gary Moore Cove in Mount Desert is classified as Conditionally Approved seasonally with the open status for harvest from December 1 through May 31 (Figure 6). This area is south of a line beginning at the base of a pier on the shore approximately 120 yards north of the mouth of Hadlock Brook running southwest to the eastern tip of Fernald Point; AND north of a line beginning the eastern tip of Fernald point running northeast to the tip of an unnamed point of land approximately 380 yards southwest of the mouth of Hadlock Brook. This area is classified as Conditionally Approved based on season. This Conditional Area is monitored by water quality station EH45.



Figure 6. Gary Moore Cove Conditionally Approved area





Compliance with management plan

The Gary Moore Cove Conditional Area remains in compliance with the current conditional area management plan (CAMP). Bacterial levels meet Approved standards during the open status. See CAMP annual reviews for information on annual compliance with the current CAMP.

Adequacy of reporting and cooperation of involved persons

No reporting is required for this Conditional Area.

Compliance with restricted growing area criteria

The area continues to meet the criteria for Approved harvest during the open status of December 1 through May 31 based on P90 calculations (EH45 at 6.7 cfu/100ml) during the open status and no other known sources of pollution in the area.

Water sampling compliance history

Water samples are collected at least monthly during the open status and throughout the year (Table 8). The P90 value meets approved standards during the open status (Table 7).

Analysis-Recommendations

The Gary Moore Cove Conditionally Approved area now meets approved standards year round. Recommend evaluating for an upgrade in 2022.

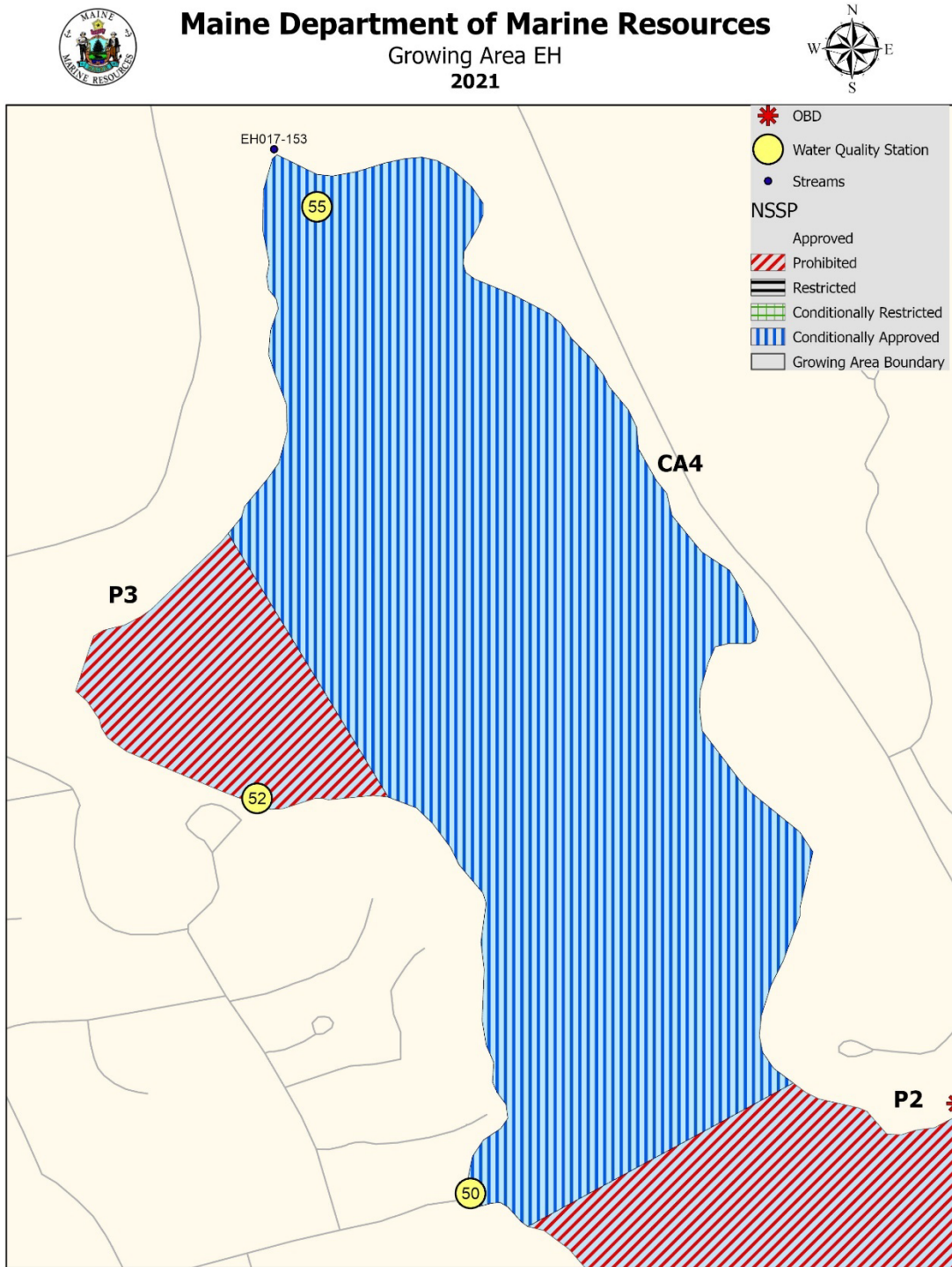
Annual Review of Northeast Harbor, Mount Desert Conditional Area Management Plan

Scope

Growing Area EH(CA4) Northeast Harbor in Mount Desert is classified as Conditionally Approved seasonally with the open status for harvest from November 1 through April 30 (Figure 7). This area is north of a line across the mouth of the harbor beginning at the base of a private pier approximately 175 yards south of the Clifton Dock, running northeast to the base of a private pier on the opposite shore AND east of a line beginning at an unnamed point of land approximately 150 yards east of the harbor boat launch ramp, then running north to the base of the third private pier north of the marina. This area is classified as Conditionally Approved based on marina operation. This Conditional Area is monitored by water quality stations EH50 and EH55.



Figure 7. Northeast Harbor Conditionally Approved area





Compliance with management plan

The Northeast Harbor Conditional Area remains in compliance with the current conditional area management plan (CAMP). The marina is not operating during the open status and does not pose a risk to public health. See CAMP annual reviews for information on annual compliance with the current CAMP.

Adequacy of reporting and cooperation of involved persons

No reporting is required for this Conditional Area.

Compliance with restricted growing area criteria

The area continues to meet the criteria for Approved harvest during the open status of November 1 through April 30 based on P90 calculations (EH50 at 5.3 cfu/100ml; EH55 at 18.5 cfu/100ml) during the open status and no other known sources of pollution in the area.

Water sampling compliance history

Water samples are collected at least monthly during the open status and throughout the year (Table 8). The P90 value meets approved standards during the open status (Table 7).

Analysis-Recommendations

The Northeast Harbor Conditionally Approved area continues to meet the standards for seasonal Approved harvest during the open status and remains in compliance with the CAMP. Recommend continued water quality monitoring and open communication with the harbor master to ensure continued compliance with the CAMP.

Table 7. P90s for Conditional Area stations calculated using data from the open status. Geomeans and P90s not meeting current classifications are highlighted in red.

Station	Class	Count	GM	SDV	MAX	P90	Min_Date
EH030.00	CA	30	2.6	0.26	16	5.8	12/4/2017
EH031.00	CR	30	5.6	0.61	760	34.8	11/6/2017
EH035.00	CA	30	4.5	0.5	84	20.4	12/4/2017
EH039.00	CA	30	3	0.37	60	9.4	11/6/2017
EH040.00	CA	30	3.3	0.44	100	12.3	11/6/2017
EH045.00	CA	30	2.6	0.32	40	6.7	3/25/2015
EH050.00	CA	30	2.4	0.26	16	5.3	1/4/2017
EH055.00	CA	30	3.8	0.53	200	18.5	1/4/2017

Recommendation for Future Work

Water quality station EH45 (Gary Moore Cove) meets the standard year-round for Approved harvest at end of year 2021 and will be evaluated for a possible upgrade in 2022. No stations in growing area EH required a downgrade due to end of year 2021 P90 scores.



Table 8. Count table of samples collected in growing area EH during the 2021 season.

Station	Class	Closed	Open	Total	Samples Required	Comments
EH003.00	A		8	8	6	
EH012.20	A		6	6	6	
EH012.40	P	6		6	6	
EH023.70	A	4	8	12	6	Flood station
EH024.00	A		9	9	6	
EH027.00	P	8		8	6	
EH030.00	CA	3	7	10	7	
EH031.00	CR	4	7	11	7	
EH035.00	CA	3	7	10	7	
EH039.00	CA	4	6	10	7	
EH040.00	CA	4	6	10	7	
EH045.00	CA	6	6	12	6	
EH047.00	P	8		8	6	
EH047.20	P	8		8	6	
EH050.00	CA	3	6	9	6	
EH052.00	P	8		8	6	
EH055.00	CA	3	6	9	6	
EH065.00	P	8		8	6	
EH068.00	A		8	8	6	
EH072.00	P	6		6	6	
EH073.00	A		6	6	6	
EH075.00	A		6	6	6	
EH077.00	P	6		6	6	

References

National Shellfish Sanitation Program: Guide for the Control of Molluscan Shellfish, 2015 Revision;

Tide and Wind data, GOMOSS Internet site, West Penobscot Bay Buoy, 2001-2003.

Climatic and hydrographic information, US Coast Guard Coastal Pilot, 2005 edition

U.S. Food and Drug Administration (2001). Applied Concepts in Sanitation Surveys of Shellfish Growing Areas: Course #FD2042 (Training Manual), Volumes I and II.

Town information, 2007-2008 Maine Municipal Directory, Maine Municipal Association, Augusta, Maine 04330



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

Data Layers, Maine Office of GIS, Augusta, Maine

Rainfall data, National Weather Service, Caribou, Maine

Maine Combined Sewer Overflow 2016 Status Report, Maine Department of Environmental Protection, April 2017



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