GROWING AREA WH

Spurwink River Area
Towns of Scarborough and Cape Elizabeth

Sanitary Survey Report

2010 - 2021

Final

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October 2022

Sanitary Survey Officer signature: _____ Date:_____10/11/22_____

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Executive Summary

This is a Sanitary Survey report for Growing Area WH written in compliance with the requirements of the 2019 Model Ordinance and the National Shellfish Sanitation Program. Triennial reports for Growing Area WH were completed in 2012, 2015, and 2018. There is one classification change planned for 2022. The Kettle Cove seasonal conditional area will be upgraded to Approved. There were no actual pollution sources found during routine shoreline survey. Access was denied at one property. Water quality has remained consistent overall with water quality improving in Kettle Cove during the 2021 sampling season. The next sanitary survey is due in 2033 and the next triennial in 2024.

Description of Growing Area

Growing Area WH includes the shores, flats, and waters of the towns of Scarborough and Cape Elizabeth and is located between Prouts Neck, Scarborough and McKenney Point, Cape Elizabeth. The growing area has public sandy beaches, an island preserve, Richmond Island, that is accessible on foot at low tide, and a stretch of tidal river, Spurwink River. The towns of Scarborough and Cape Elizabeth are located in Cumberland County, approximately 10 miles from the nearest major city of Portland, Maine.

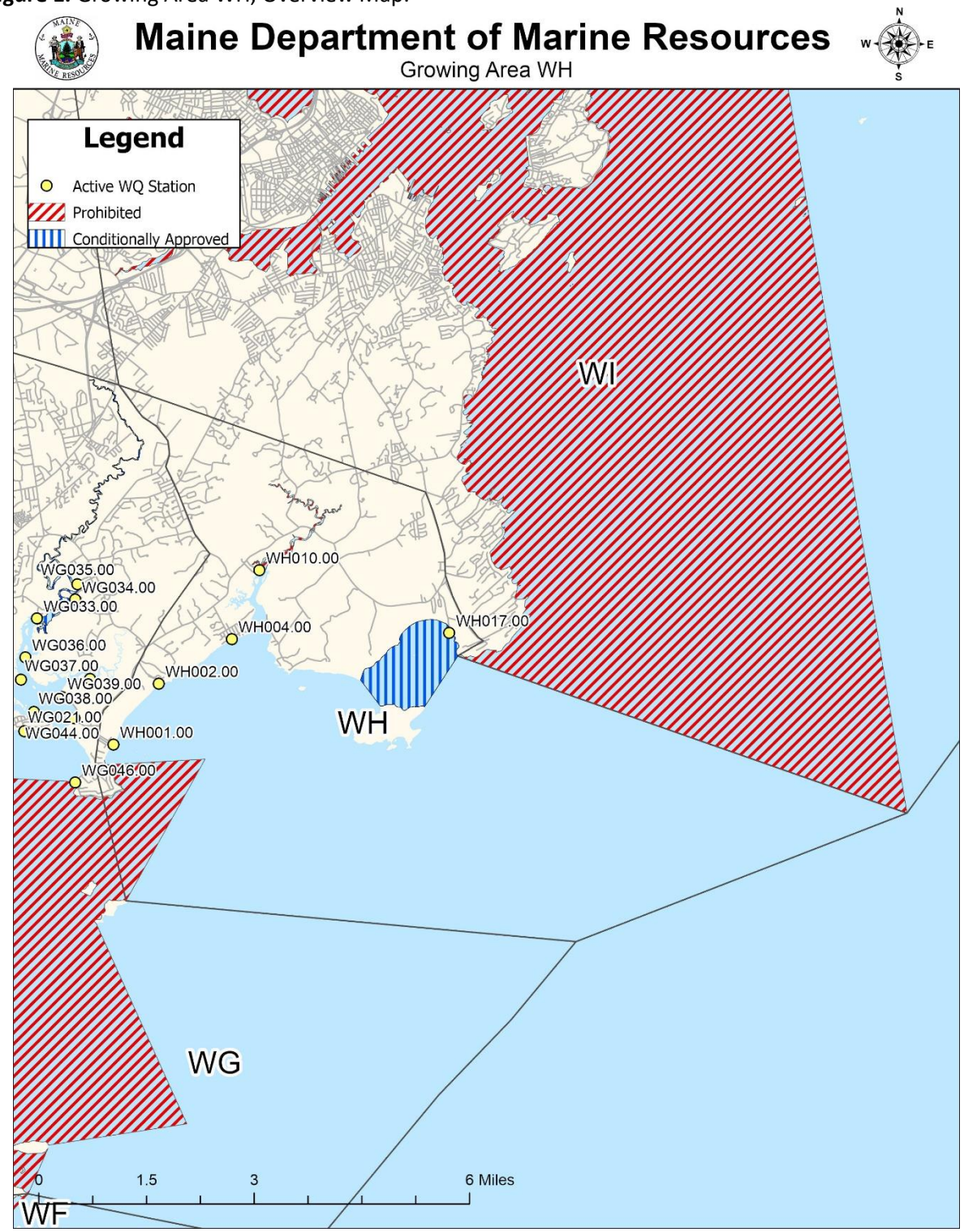
There are three popular sandy beaches that include Scarborough Beach and Higgins Beach in the town of Scarborough, and Crescent Beach in Cape Elizabeth. The shoreline is typical of this part of Maine, with rockbound points and shoreline separating shallow coves and a harbor, Richmond Island Harbor. Fresh water influence comes from rainfall and two upland streams: Willow Brook and Pollack Creek. The Spurwink River is a tidal embayment. Non-point pollution comes from the increase in shore usage during the summer months and from wildlife in the tidal marshland at the head of the Spurwink River.

The Scarborough Sanitary District facility is located in Growing Area WG, but the associated outfall is located to the southeast of Prouts Neck in Growing Area WH. The Cape Elizabeth wastewater treatment facility is located within Growing Area WH, but the outfall is located within Growing Area WI.

In Growing Area WH, there are eight Kelp Limited Purpose Aquaculture permits (LPAs) and seven shellfish LPAs. There are no wet storage permits issued. There are no active overboard discharges (OBDs) within Growing Area WH.

Below is a map, Figure 1, showing active water quality stations within Growing Area boundaries. Closures within the growing area can be found in legal notices in DMR central files or on the DMR website.

Figure 1. Growing Area WH, Overview Map.



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 WH, Pollution Map A.

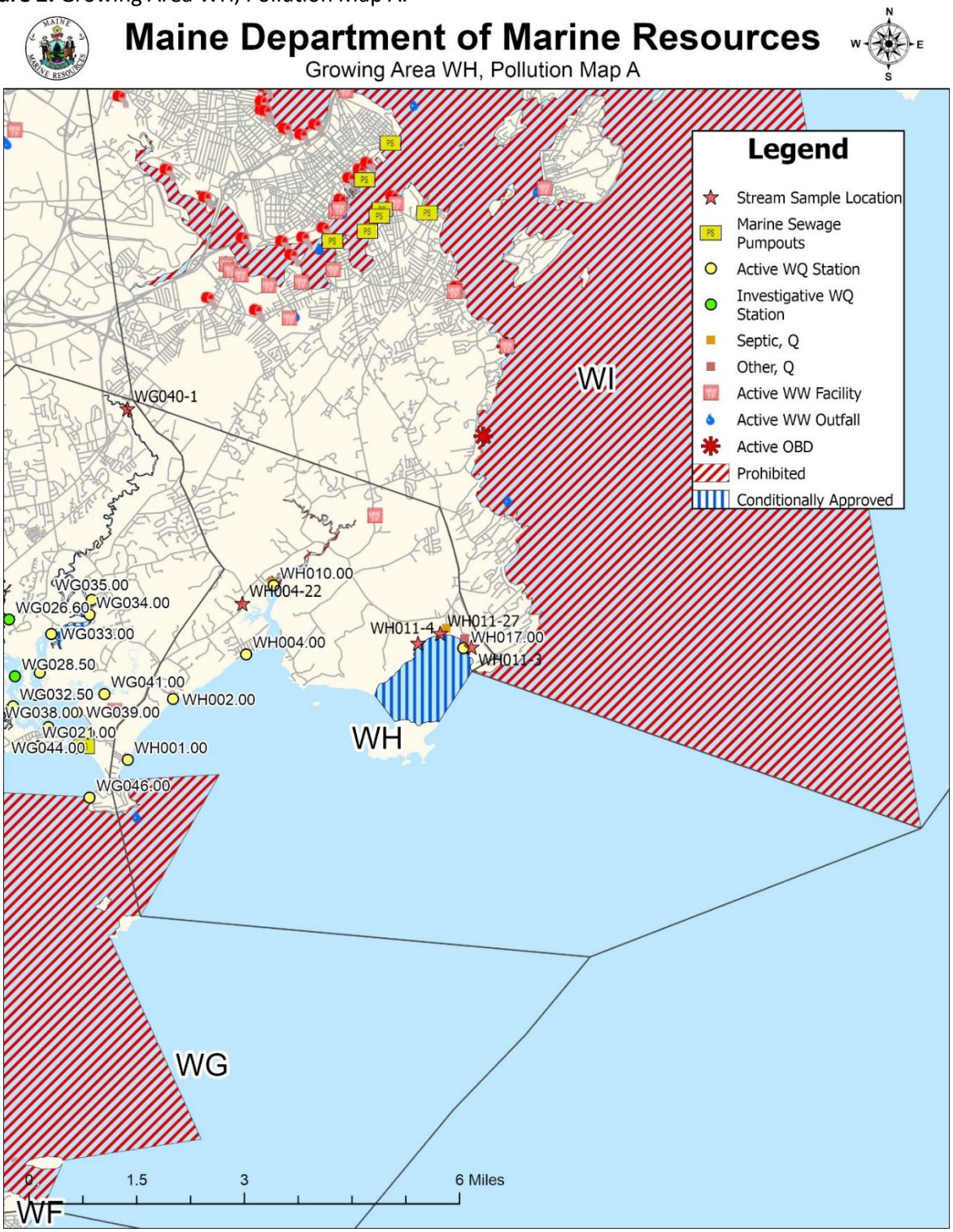
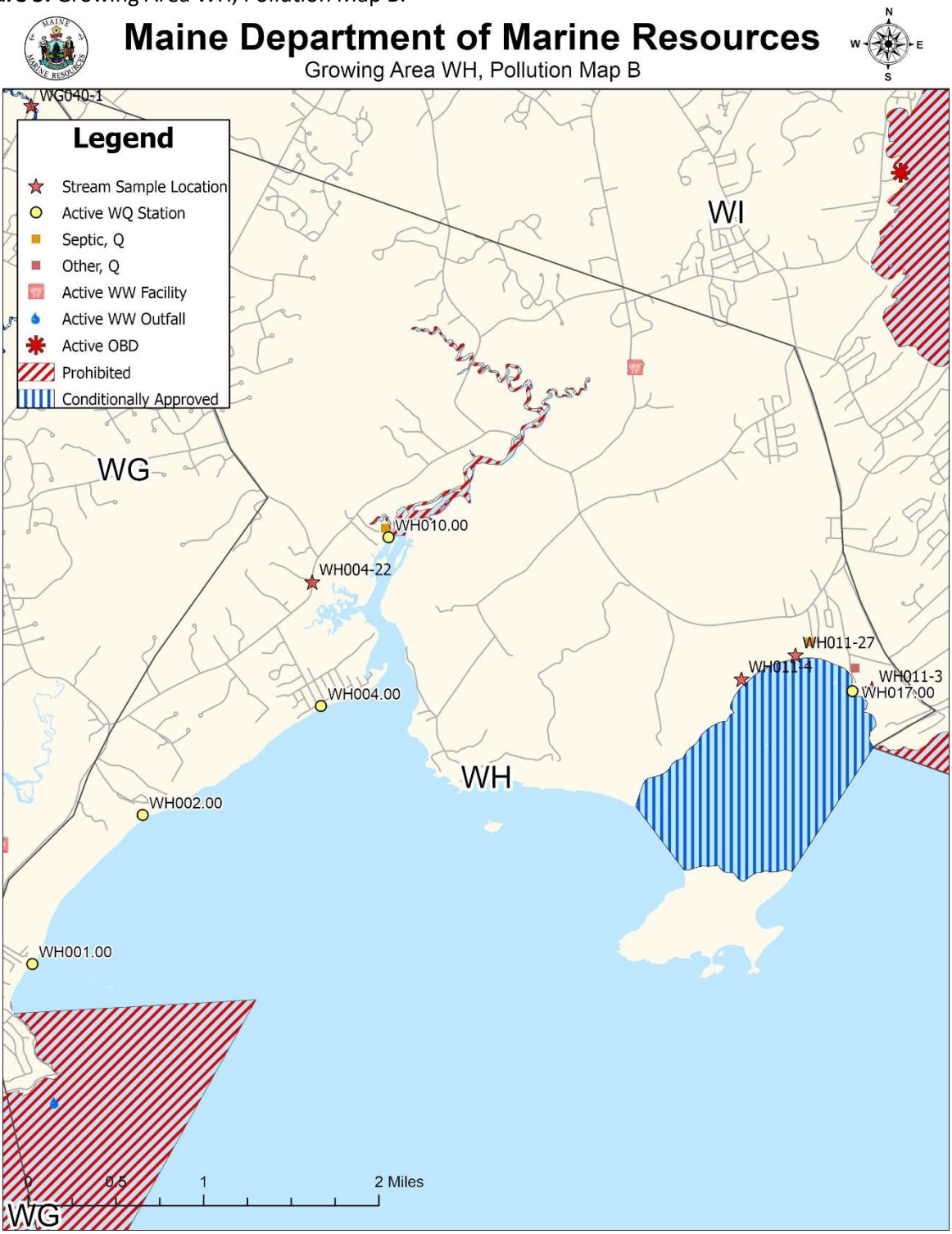


Figure 3. Growing Area WH, Pollution Map B.



State and Federal Licensed Waste Discharge Permits

Overboard Discharges (OBDs)

There are no active overboard discharges (OBDs) in Growing Area WH (Figures 2 and 3). There were no OBDs reported removed for the report year of 2021.

National Pollutant Discharge Elimination System (NPDES)

Table 1. NPDES Permitted Discharges.

Growing Area Section	Permit ID	Type	Facility	Receiving Waterbody
WG (A)	ME0102059	WWTF Facility	Scarborough SD WWTF	N/A
WH (P2)	ME0102059	WWTF Outfall	Scarborough SD WWTF	Atlantic Ocean
WH (P1)	ME0102121	WWTF Facility	Cape Elizabeth WWTF	N/A
WI (P9)	ME0102121	WWTF Outfall	Cape Elizabeth WWTF	Atlantic Ocean

There is one facility and one outfall located in Growing Area WH (Table 1). The Scarborough SD WWTF is located in Growing Area WG, but the outfall is located in Growing Area WH. The Cape Elizabeth WWTF is located in Growing Area WH, but the outfall is located in Growing Area WI. There is also a pump station in the northern part of Cape Elizabeth that pumps sewage to South Portland (owned by Portland Water District). This is documented in the South Portland WWTP review in Growing Area WI. Since 2017, the WWTP inspection reports have been available in DMR central files.

Scarborough WWTF: The facility is located within Growing Area WG, but the outfall is located within Growing Area WH off Prouts Neck. The plant has a monthly average flow of 2.5 million gallons per day (MGD). Treated effluent is discharged 800 feet offshore on the south end of Prouts Neck into an average depth of 56 feet of water. The WWTP dilution calculation using 2.5 MGD with a fecal load of 1.4 x 10^5 colonies/100 ml discharging into 56 feet of water requires 1,370 acres to be Prohibited. The current prohibited area around the outfall is appropriate at approximately 2,300 acres. Details about the plant review can be found in the central files.

Cape Elizabeth WWTF: The facility is located with Growing Area WH, but the outfall is located within Growing Area WI. This is a secondary treatment plant operated by the Portland Water District. The average daily flow is 0.3 MGD. The outfall is located in Peabbles Cove in 4 feet of water at mean low tide with an 8.89 foot mean range of tide. This facility has no combined sewer overflow points. There is only seasonal disinfection from May 15 through September 30. The WWTP dilution calculation using 0.3 MGD with a fecal load of 1.4 x 10^5 colonies/100 ml discharging into 12.89 feet of water (average depth) requires 715 acres to be Prohibited. The current prohibited area is appropriate at approximately 38,349 acres in size. Details about the plant review can be found in the central files.

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 no known residential pollution sources in Growing Area WH.

Industrial Pollution

There are no known sources of industrial pollution in Growing Area WH.

Marinas

There are no marinas located in Growing Area WH.

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 EI 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).

No specific impact from storm water has been identified in Growing Area WH.

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 a source of non-point discharge into Growing Area WH. A total of 113 samples were taken from freshwater streams during the review period (Table 2, Figures 2 and 3). Streams associated with consistently high scores are monitored to determine if they affect the water quality of growing area waters.

Table 2. Stream Samples in Growing Area WH.

Scores > 163 cfu/100ml are highlighted in red

Growing Area Section	Location ID	Sample Date	Pollution Type	Score	Salinity
A	WH003-2	10/1/2012	Stream	1.9	31
A	WH003-2	10/1/2014	Stream	2	29
A	WH003-2	10/14/2014	Stream	2	30
A	WH003-24	10/1/2014	Stream	5.5	2
A	WH003-24	10/14/2014	Stream	4	5
A	WH003-24	8/4/2015	Stream	2	30
A	WH003-24	8/24/2015	Stream	8	0
A	WH003-24	8/31/2015	Stream	82	29
A	WH004-1	10/1/2012	Stream	98	0
A	WH004-1	10/1/2014	Stream	660	4
A	WH004-1	10/14/2014	Stream	1600	2
A	WH004-1	8/4/2015	Stream	88	8
A	WH004-1	8/24/2015	Stream	154	0
A	WH004-1	8/31/2015	Stream	1020	22
A	WH004-1	10/25/2017	Stream	1700	3

Growing Area Section	Location ID	Sample Date	Pollution Type	Score	Salinity
A	WH004-1	12/11/2017	Stream	42	4
A	WH004-1	4/26/2018	Stream	110	3
A	WH004-1	5/9/2018	Stream	78	0
A	WH004-1	9/7/2018	Stream	180	3
A	WH004-1	10/30/2018	Stream	82	0
A	WH004-1	7/29/2020	Stream	820	22
A	WH004-1	8/19/2020	Stream	1700	0
A	WH004-1	9/15/2020	Stream	360	22
A	WH004-1	11/4/2020	Stream	380	0
A	WH004-22	8/4/2015	Stream	2	0
A	WH004-22	8/24/2015	Stream	44	0
A	WH004-22	8/31/2015	Stream	15	0
A	WH004-22	10/25/2017	Stream	1700	0
A	WH004-22	12/11/2017	Stream	4	4
A	WH004-22	4/26/2018	Stream	64	0
A	WH004-22	9/7/2018	Stream	100	5
A	WH004-22	10/30/2018	Stream	108	0
A	WH004-22	11/4/2020	Stream	29	0
A	WH005-24	8/31/2013	Stream	12	30
A	WH005-24	10/1/2014	Stream	6	30
A	WH005-24	10/14/2014	Stream	2	30
A	WH005-24	8/4/2015	Stream	4	30
A	WH005-24	8/31/2015	Stream	12	30
P1	WH005-25	8/31/2013	Stream	760	14
P1	WH005-25	10/1/2014	Stream	18	2
P1	WH005-25	10/14/2014	Stream	88	2
P1	WH005-25	8/4/2015	Stream	560	4
P1	WH005-25	8/24/2015	Stream	460	0
P1	WH005-25	8/31/2015	Stream	760	14
P1	WH005-25	10/25/2017	Stream	1700	5
P1	WH005-25	12/11/2017	Stream	11	8
P1	WH005-26	8/31/2013	Stream	540	0
P1	WH005-26	10/1/2014	Stream	180	0
P1	WH005-26	10/14/2014	Stream	1600	0
P1	WH005-26	8/4/2015	Stream	1700	0

Growing Area Section	Location ID	Sample Date	Pollution Type	Score	Salinity
P1	WH005-26	8/24/2015	Stream	82	0
P1	WH005-26	8/31/2015	Stream	540	0
P1	WH005-26	12/11/2017	Stream	76	4
P1	WH005-26	11/4/2020	Stream	140	0
P1	WH005-27	10/1/2014	Stream	56	24
P1	WH005-27	10/14/2014	Stream	4	29
P1	WH006-28	10/1/2014	Stream	2	20
P1	WH006-28	10/14/2014	Stream	2	25
P1	WH007-1	7/29/2020	Stream	30	2
P1	WH007-1	8/19/2020	Stream	92	0
P1	WH007-1	9/15/2020	Stream	25	0
P1	WH007-1	11/4/2020	Stream	180	0
P1	WH007-3	7/29/2020	Stream	50	3
P1	WH007-3	8/19/2020	Stream	940	0
P1	WH007-3	9/15/2020	Stream	13	0
P1	WH007-3	11/4/2020	Stream	152	0
P1	WH008-1	7/29/2020	Stream	420	2
P1	WH008-1	9/15/2020	Stream	340	0
P1	WH008-1	11/4/2020	Stream	76	0
P1	WH008-2	7/29/2020	Stream	136	18
P1	WH008-2	9/15/2020	Stream	320	13
P1	WH008-2	11/4/2020	Stream	280	0
P1	WH008-3	7/29/2020	Stream	220	2
P1	WH008-3	9/15/2020	Stream	260	0
P1	WH008-3	11/4/2020	Stream	500	0
P1	WH011-27	4/26/2018	Stream	82	0
P1	WH011-27	5/9/2018	Stream	18	0
P1	WH011-27	9/17/2018	Stream	320	6
P1	WH011-27	10/30/2018	Stream	260	14
P1	WH011-27	7/29/2020	Stream	102	3
P1	WH011-27	8/19/2020	Stream	320	0
P1	WH011-27	11/4/2020	Stream	70	0
P1	WH011-27	4/20/2021	Stream	2	0
P1	WH011-27	9/29/2021	Stream	50	0
P1	WH011-27	10/26/2021	Stream	620	0

Growing Area Section	Location ID	Sample Date	Pollution Type	Score	Salinity
P1	WH011-28	4/26/2018	Stream	32	0
P1	WH011-28	5/9/2018	Stream	42	2
P1	WH011-28	9/17/2018	Stream	320	4
P1	WH011-28	10/30/2018	Stream	66	0
P1	WH011-3	10/1/2012	Stream	420	0
P1	WH011-3	10/1/2014	Stream	25	0
P1	WH011-3	10/14/2014	Stream	24	0
P1	WH011-3	10/25/2017	Stream	1700	0
P1	WH011-3	12/11/2017	Stream	30	4
P1	WH011-3	11/4/2020	Stream	14	0
P1	WH011-30	4/26/2018	Stream	106	0
P1	WH011-30	5/9/2018	Stream	46	3
P1	WH011-30	9/17/2018	Stream	740	4
P1	WH011-30	10/30/2018	Stream	480	0
P1	WH011-4	10/1/2012	Stream	840	0
P1	WH011-4	10/1/2014	Stream	34	0
P1	WH011-4	10/14/2014	Stream	31	0
P1	WH011-4	10/25/2017	Stream	320	3
P1	WH011-4	4/26/2018	Stream	80	0
P1	WH011-4	5/9/2018	Stream	60	0
P1	WH011-4	9/17/2018	Stream	260	4
P1	WH011-4	10/30/2018	Stream	96	0
P1	WH011-4	7/29/2020	Stream	460	2
P1	WH011-4	8/19/2020	Stream	1700	24
P1	WH011-4	11/4/2020	Stream	46	0
P1	WH011-4	4/20/2021	Stream	1.9	0
P1	WH011-4	9/29/2021	Stream	82	0
P1	WH011-4	10/26/2021	Stream	220	0

Agricultural Activities

There are no large-scale agricultural activities in Growing Area WH. One property is a horse farm near the Spurwink River. All pastures were more than 200 feet from shore and there were no manure piles in

violation of code. 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. No small farms appear to be directly impacting the growing area.

Domestic Animals and Wildlife Activity

The Spurwink River provides 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, and others. Mammals living within the growing area include dogs, cats, whitetail deer, muskrat, squirrels, chipmunks, rabbits, mice, bats, skunks, raccoons, and others. Migratory waterfowl numbers begin to increase in the early autumn months and typically peak in late fall. Although large numbers of birds can pose a threat to the growing area water quality, such occurrences are very difficult to document. Water quality is monitored in these areas and all stations currently meet NSSP requirements.

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

The concern for actual or potential pollution from recreational areas is because many of them allow dogs and some have bathroom facilities. Activities at the recreational areas may contribute to water quality problems by placing added pressure on the watershed. For instance, they may contribute to erosion (trails, building footbridges, etc.), dog waste not picked up may accumulate and wash off after rainfall, new trails may be put into areas that didn't have human activity before and they may put added pressure on wildlife to congregate in other places where we may see water quality decline.

Growing area WH is heavily used by recreational folks, especially during the summer months. There are three beaches; Higgins, Scarborough, and Crescent Beach. Higgins Beach is a popular surfing beach year-round and a popular swimming beach seasonally. Scarborough and Crescent Beaches are popular swimming beaches in the summer months.

The Rachel Carson National Wildlife Refuge also maintains 520 acres in the Spurwink Marsh. Public access is located north of the Route 77 Bridge. This is a popular recreational fishing area.

Water quality is monitored in these areas and all stations currently meet NSSP requirements.

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 mean tidal range for the southern

Maine coastline is nine 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

Precipitation is generally not evenly distributed throughout the year. Spring and fall tend to be the wetter times of the year. 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 WH.

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

The Spurwink River is a five-mile stretch of tidal estuary. The flow is tidal with very little freshwater input. The northern portion is classified as Prohibited and the lower half is classified as Approved. This river is monitored regularly by water quality station WH010.00.

Hydrographic Influence

Water circulation in southern Maine is dominated by tides. The tidal range is nine feet. Tides are caused by the gravitational effects of the moon and sun on the ocean. Other influences are heavy rainfall, low barometric pressure, and strong onshore winds which will increase tides. Tide levels fluctuate during the month based on the positions of the sun, moon, and earth. These fluctuations and the speed and direction of the tidal currents constantly change during a tidal cycle. Tidal currents have the greatest energy when water is pushed in and out of bays and channels during the highest and lowest tide levels.

Water Quality Studies

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 were five active water sampling stations and no investigative stations in Growing Area WH during the 2021 sampling year. Sampling stations are shown in the overview maps in Figures 1-3. It is recognized that access, icing, and safety considerations prevent some stations from being sampled on scheduled dates. Currently, all stations in Growing Area WH meet their current NSSP classification standard.

Water Quality Discussion and Classification Determination

P90s for all active stations were calculated and all stations meet their classification standards (Table 3). P90 calculations for stations with a minimum of 30 samples.

Table 3. P90s for Approved, Restricted, and Prohibited stations.

Station	Class	Count	GM	SDV	MAX	P90	Min_Date
WH001.00	A	30	2.4	0.27	31	5.5	1/24/2018
WH002.00	A	30	3	0.51	320	13.5	1/24/2018
WH004.00	A	30	4.5	0.52	114	21	1/24/2018
WH010.00	A	30	3.7	0.61	1520	23	1/24/2018

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

Kettle Cove Seasonal Conditional Area

Kettle Cove is located in Cape Elizabeth. It is classified as Conditionally Approved based on season with an open status of October 1st through July 31st. The boundary description in the legal notice is as follows: "east of the Richmond Island break water; AND north of a line beginning at East Point running northeast to McKenney Point." Water quality in the area is monitored by station WH017.00. Marine Patrol and/or local Shellfish Wardens monitor illegal harvesting activity for this area during the closed period. This conditional area continues to follow the management plan.

Table 4. P90 for Kettle Cove Seasonal Conditional Area.

Station	Class	Count	GM	SDV	MAX	P90	Min_Date
WH017.00	CA	30	3.4	0.51	440	16	5/4/2016

Recommendations for Future Work

No stations in Growing Area WH require a downgrade due to end of year 2021 P90 scores. The Kettle Cove seasonal conditional area is going to be upgraded to Approved during 2022. All stations met or exceeded their required sample count.

Table 5. Count Table, Growing Area WH, 2021.

Station	Class	C	O	X	Total	Samples Required	Comments
WH001.00	A		6		6	6	
WH002.00	A		6		6	6	
WH004.00	A		6		6	6	
WH010.00	A		6		6	6	
WH017.00	CA	1	6		7	6	

References

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

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

United State Census; https://www.census.gov/quickfacts/ME.

United States Environmental Protection Agency; https://www.epa.gov/

WH Sanitary Survey Report; 2009. DMR central files.

WH Triennial Report; 2018. DMR central files.

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

Reference Material

An interactive map is available on the DMR website for reference. This map includes water quality station locations, end of year P90 scores, current classifications, and other information. https://www.maine.gov/dmr/shellfish-sanitation-management/maps/index.html