

# **GROWING AREA WZ**

Vinalhaven, North Haven, and Matinicus Isle

Sanitary Survey Report

#### 2011 - 2022

Final

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Sanitary Survey Officer signature: \_\_\_\_\_\_ Date:\_\_\_\_\_ Date:\_\_\_\_\_\_ Date:\_\_\_\_\_\_



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# **Executive Summary**

This is a Sanitary Survey report for Growing Area WZ in Knox County written in compliance with the requirements of the 2019 Model Ordinance and the National Shellfish Sanitation Program. One growing area section in growing area WZ, the Salt Pond in North Haven, will receive a downgrade in 2023. There were eight new actual or potential pollution sources found resulting in four new prohibited areas during the twelve year period. Access was denied at three properties. Two downgrades, both in North Haven, occurred during the survey year. Wooster Cove (WZ 34) was reclassified from Approved to Restricted and the Salt Pond (WZ038.95) closure period for 1" rainfall was extended from nine days to 14 days. Water quality in numerous parts of the growing area have degraded over the review period, while water quality in a few areas within WZ have improved. The last sanitary survey was completed in 2010; triennial reports were completed in 2013, 2016, and 2019. The next sanitary survey is due in 2034 and the next triennial in 2025.

# **Description of Growing Area**

Growing Area WZ encompasses roughly 350 square miles between the islands of Vinalhaven (pop. 1,279), and North Haven (pop. 417), which are located at the mouth of the Penobscot Bay, as well as Matinicus (pop. 53) and surrounding smaller islands (2020 Census). The largest population concentration is in Vinalhaven. The total population of both Vinalhaven and North Haven increases in the summer months since both islands have many seasonal residents (June-September). Development along the shoreline is spotty with clusters of homes separated by undeveloped land. There are two wastewater treatment plants (WWTPs); one located on Vinalhaven, and the other on North Haven. There are seven licensed overboard discharges (OBDs). One OBD was removed on Vinalhaven in 2022. There are no large industries on either island. Most residents earn their living lobstering or caretaking the many seasonal dwellings on both islands. There are no marinas on either of the islands but there are areas that contain moorings which are utilized by both cruising and work boats. There are also several coves that are suitable for anchoring.

Shellfish Growing Area WZ includes all the shores, flats, and coves located on the islands of Vinalhaven, North Haven, Matinicus, Ragged Island, and the surrounding smaller islands. Matinicus and Ragged Islands are permanently classified as Prohibited for all shellfish harvesting. The Matinicus and Ragged Island closure is an administrative closure due to the islands being too far from shore for staff to easily access and manage on a routine basis. The upland cover is primarily deciduous, some evergreens and wetland forest with minimal development. Freshwater influence along these shores is predominately from numerous brooks, small streams and a large pond on North Haven 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. Substantial numbers of rafted ducks are seen in the fall.

There is one shellfish aquaculture lease, and six active shellfish Limited Purpose Aquaculture permits (LPAs) in this growing area, as well as twenty active kelp LPAs. 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 WZ 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 WZ, Inset Map A







## Figure 3. Growing Area WZ, Inset Map B





## Figure 4. Growing Area WZ, Inset Map C





## State and Federal Licensed Waste Discharge Permits

### **Overboard Discharges (OBDs)**

There are seven active overboard discharges (OBDs) that discharge their treated effluent into the waters of growing area WZ. Six OBDs discharge into the waters off Vinalhaven and one OBD discharges into the waters off Matinicus. One OBD was removed from Indian Creek in Vinalhaven in 2022, and a total of ten OBDs have been removed from the growing area over the past twelve review years.

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 WZ (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 1.4X10<sup>5</sup> colony forming units (CFU) /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.

Growing Area Section	OBD ID #	Location	Receiving Waterbody	Flow (gpd)	Acres Needed for Closure	Current Prohibited Acreage
P7	1035	Vinalhaven	Old Harbor	300	1.3	1557
P7	1905	Vinalhaven	Carvers Harbor	300	1.8	1557
P7	2081	Vinalhaven	Carvers Pond	300	1.8	1557
P7	3229	Vinalhaven	Old Harbor	270	1.2	1557
P7	6877	Vinalhaven	Old Harbor	300	1.3	1557
P7	7036	Vinalhaven	The Reach	300	1.0	1557
P8	8121	Matinicus Isle	Matinicus Harbor	75	0.23	2127

## Table 1. Overboard Discharges (OBDs).

## National Pollutant Discharge Elimination System (NPDES)

 Table 2. NPDES Permitted Discharges

Growing Area Section	Permit ID	Туре	Facility	Waterbody
P2	ME0101907	Minor Outfall	North Haven WWTF	Fox Island Thoroughfare
P7	ME0102491	Minor Outfall	Vinalhaven WWTF	Atlantic Ocean
P2	North Haven Pier	Marine Sewage Pumpout	North Haven	Fox Island Thoroughfare
P1	Pulpit Float	Marine Sewage Pumpout	North Haven	Pulpit Harbor

There are two wastewater treatment facilities (WWTF) in growing area WZ. Since 2017 the WWTP inspection reports have been available in DMR central files. There is one on North Haven and another on Vinalhaven. These facilities discharge into Prohibited Areas that are larger in area than the calculated dilution zones for the effluent (Table 3).

## North Haven Wastewater Treatment Facility-



The North Haven Wastewater Treatment Facility, MEPDES permit issued 2019, is a small municipal, primary treatment facility that serves approximately 330 residents in the winter and 1,200 in the summer. It does not receive any flow from industrial sources or septage from individual septic systems. This plant is designed for an average daily flow of 40,000 gallons per day (GPD). The outfall is a pipe eight inches in diameter, located in the Fox Island Thorofare, in approximately 18 feet of water. The plant provides a primary level of treatment via flow measurement, screening, primary screening, primary settling, chlorination, and dechlorination. The outfall pipe is iron and has a two-port diffuser. Septage and primary clarifier sludge are applied to approved land spreading site on the island.

The regulation Prohibited closure size (P2: 6,303 acres) exceeds the required 682 acres effluent dilution zone needed to meet Approved area standards, as well as the two acres closure required for viral dilution in to a Conditionally Restricted area. This dilution calculation is based on the permitted average daily flow of 40,000 GPD, the average receiving water depth of 18 feet, and a bacteria load of 1,400,000 CFU/100mL (Table 3).

## Vinalhaven Wastewater Treatment Facility-

The Vinalhaven Wastewater Treatment Facility, MEPDES permit issued 2017, is a UV treatment facility that serves approximately 450 residents. The facility became operational in 2003 and it is permitted to discharge up to 129,000 GPD of secondary treated wastewater to the Atlantic Ocean off Vinalhaven. The outfall for this facility enters Carvers Harbor just south of the Maine State Ferry Terminal, in Grimes Park. The outfall extends approximately 330 feet offshore to a multi-port diffuser. The average depth of receiving waters at the outfall is 26 feet.

The regulation Prohibited closure size (P7: 1,557 acres) exceeds the required 1,522 acres effluent dilution zone needed to meet Approved area standards. The dilution calculation is based on the permitted average daily flow of 129,000 GPD, the average receiving water depth of 26 feet, and a bacteria load of 1,400,000 CFU/100mL (Table 3).

	North Haven WWTF	Vinalhaven WWTF
FC/100mL	1,400,000	1,400,000
Average Daily Flow (GPD)	40,000	129,000
Average Depth of Receiving Water (ft)	18	26
Required Dilution Zone to Meet Approved Standards (acres)	682	1,522
Actual Prohibited Closure Size (acres)	6,303	1,557

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### 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 WZ that are considered discharges into the Growing Area and effect water quality. While Figures 3 and 4 show two pollutions sources in Approved areas, both surveyed in 2015, one is over 250 feet from shore and the other is a grey water discharge which is not considered a sanitation problem.

**Table 4.** Growing Area WZ Residential Pollution Sources. \*Sites surveyed in 2021 are pending assignment of permanent location IDs; tax map and lot number are recorded in substitution.

Growing Area Section	Location ID	Date Surveyed	Direct or Indirect	Problem	Description	Town
P2	WZ009-4	8/18/2015	Indirect	Y	Bad LF breakout ~ 100 ft. from shore SW side of house; WQ station WZ54	North Haven
P1	WZ021-10	8/25/2015	Indirect	Y	Dead Horse farm, off Cabotville Road. LF W, behind house and barn in high grass. Large puddle of bl	North Haven
Ρ2	WZ003- 384	8/20/2015	Indirect	Y	Failing holding tank, intersection of Indian Point and Bull Rock. Town has outstanding problem form	North Haven
A	WZ082-93	10/9/2015	Indirect	Y	Grange: Grey Water outfall N side from kitchen sink. Possible OH attached.	Vinalhaven
A	WZ106-2	10/5/2015	Indirect	Y	>250' to shore. Pipe joint separated 75' in front of house. Leads to HT another 30' away w possible	Vinalhaven
P5	010-029*	10/21/2021	Indirect	Y	Outhouse left of house roughly 80 feet from shore	Vinalhaven



Growing Area Section	Location ID	Date Surveyed	Direct or Indirect	Problem	Description	Town
P4	009-042*	10/21/2021	Indirect	Y	Outhouse right of deck within 70 feet of water	Vinalhaven
P6	010-012*	10/21/2021	Indirect	Y	Possible outhouse to close to shore	Vinalhaven
Р3	009-053*	11/10/2021	Indirect	Y	Broken tank cover could allow water intrusion	Vinalhaven

## **Industrial Pollution**

There are no major industrial pollution sites in growing area WZ such as chemical plants, steel mills, ship yards, or refineries.

### Marinas

The marina community in Maine only operates for a portion of the year due to adverse winter weather conditions. There are no areas managed as marinas on North Haven or Vinalhaven. However, both islands do have areas frequented by cruising boats in the summer months. On North Haven, Pulpit Harbor, portions of the Fox Island Thorofare and Kent Cove are popular sites for cruising boats to anchor. Moorings are available in Pulpit Harbor and the Fox Island Thorofare. On Vinalhaven, Long Cove, Perry Creek, Seal Cove, Winter Harbor and Seal Bay are all popular anchorages. None of these areas have moorings available for overnight use. All these areas have limited space available due to the depth of the water and the configuration of the surrounding shore. Pulpit Harbor and the Thorofare have the most space available; both areas are classified as Prohibited. Carvers Harbor, Vinalhaven has a large mooring area that is used mainly by commercial fishing boats. Cruising boats will occasionally go into Carvers Harbor to purchase groceries or visit the town center but there is limited space available, and they are not encouraged to anchor in the harbor. Perry Creek, Seal Cove and Winter Harbor have limited space available due to the water depth and the configuration of the coves. It is unlikely that there would be a concentration of over ten cruising boats in any of these coves. These areas are classified appropriately based on marina and mooring field policies.

## 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 WZ.

## **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 WZ. A total of 134 samples were taken from freshwater streams during the review period (Table 5, Figures 2-4). Streams associated with consistently high scores are monitored to determine if they affect the water quality of growing area waters.

**Table 5.** Stream Samples in Growing Area WZ 2011-2022; Scores > 163 CFU/100ml are highlighted inred.

Growing Area Section	Location ID	Sample Date	Pollution Type	Raw Score
R9	WZ099-122	5/22/2012	Stream	32
R9	WZ099-78	5/22/2012	Stream	50



Growing Area Section	Location ID	Sample Date	Pollution Type	Raw Score
P2	WZ108-79	5/22/2012	Stream	64
P2	WZ110-80	5/22/2012	Stream	68
Α	WZ072-81	5/23/2012	Stream	2
R6	WZ084-82	5/23/2012	Stream	68
А	WZ086-83	5/23/2012	Stream	12
A	WZ088-84	5/23/2012	Stream	4
R7	WZ089-85	5/23/2012	Stream	15
R8	WZ092-123	5/23/2012	Stream	72
R8	WZ092-86	5/23/2012	Stream	44
R8	WZ093-124	5/23/2012	Stream	76
R8	WZ093-87	5/23/2012	Stream	20
А	WZ082-58	10/27/2015	Stream	35
P2	WZ003-127	5/3/2016	Stream	88
P2	WZ003-94	5/3/2016	Stream	156
P2	WZ004-128	5/3/2016	Stream	160
P2	WZ004-134	5/3/2016	Stream	152
P2	WZ004-95	5/3/2016	Stream	116
P2	WZ005-129	5/3/2016	Stream	12
P2	WZ005-96	5/3/2016	Stream	40
P2	WZ005-97	5/3/2016	Stream	8
P2	WZ006-354	5/3/2016	Stream	260
P2	WZ006-98	5/3/2016	Stream	600
R3	WZ011-88	5/3/2016	Stream	400
R3	WZ011-89	5/3/2016	Stream	880
R3	WZ011-90	5/3/2016	Stream	<2
P2	WZ014-126	5/3/2016	Stream	12
А	WZ024-93	5/3/2016	Stream	1.9
А	WZ024-99	5/3/2016	Stream	88
P2	WZ012-125	5/4/2016	Stream	38
P2	WZ012-91	5/4/2016	Stream	<2
А	WZ024-93	5/4/2016	Stream	<2
А	WZ072-81	5/4/2016	Stream	2
А	WZ082-58	5/4/2016	Stream	2
R6	WZ084-82	5/4/2016	Stream	24
A	WZ086-83	5/4/2016	Stream	<2
A	WZ088-84	5/4/2016	Stream	4
R8	WZ093-124	5/4/2016	Stream	600
R9	WZ099-122	5/4/2016	Stream	48
R9	WZ099-78	5/4/2016	Stream	380
P2	WZ108-79	5/4/2016	Stream	11



Growing Area Section	Location ID	Sample Date	Pollution Type	Raw Score
P2	WZ110-80	5/4/2016	Stream	38
R7	WZ089-85	5/5/2016	Stream	2
R8	WZ092-123	5/5/2016	Stream	126
R8	WZ092-86	5/5/2016	Stream	5.5
А	WZ072-81	7/19/2016	Stream	36
А	WZ082-58	7/19/2016	Stream	40
R6	WZ084-82	7/19/2016	Stream	140
А	WZ086-83	7/19/2016	Stream	>1600
R8	WZ092-123	7/19/2016	Stream	>1600
R9	WZ099-122	7/19/2016	Stream	580
R9	WZ099-78	7/19/2016	Stream	580
P2	WZ108-79	7/19/2016	Stream	240
P2	WZ110-80	7/19/2016	Stream	20
А	WZ072-81	7/20/2016	Stream	36
А	WZ082-58	7/20/2016	Stream	40
P2	WZ003-127	7/27/2016	Stream	>1600
P2	WZ003-94	7/27/2016	Stream	1400
P2	WZ004-128	7/27/2016	Stream	700
P2	WZ004-134	7/27/2016	Stream	1240
P2	WZ004-95	7/27/2016	Stream	>1600
P2	WZ005-96	7/27/2016	Stream	>1600
P2	WZ005-97	7/27/2016	Stream	30
P2	WZ006-354	7/27/2016	Stream	720
R3	WZ011-89	7/27/2016	Stream	1540
R3	WZ011-90	7/27/2016	Stream	820
P2	WZ012-125	7/27/2016	Stream	520
P2	WZ014-126	7/27/2016	Stream	124
A	WZ024-99	7/27/2016	Stream	740
A	WZ072-81	8/24/2016	Stream	1560
A	WZ082-58	8/24/2016	Stream	380
R6	WZ084-82	8/24/2016	Stream	660
R8	WZ092-123	8/24/2016	Stream	1300
R8	WZ092-86	8/24/2016	Stream	400
R8	WZ093-124	8/24/2016	Stream	1420
R8	WZ093-87	8/24/2016	Stream	580
R9	WZ099-122	8/24/2016	Stream	500
R9	WZ099-78	8/24/2016	Stream	240
P2	WZ108-79	8/24/2016	Stream	780
P2	WZ110-80	8/24/2016	Stream	6
R8	WZ092-123	9/26/2016	Stream	62



Growing Area Section	Location ID	Sample Date	Pollution Type	Raw Score
R9	WZ099-78	9/26/2016	Stream	220
P2	WZ004-134	9/28/2016	Stream	780
P2	WZ006-354	9/28/2016	Stream	620
P2	WZ006-98	9/28/2016	Stream	15
P2	WZ004-128	10/12/2016	Stream	1300
P2	WZ004-134	10/12/2016	Stream	1140
P2	WZ004-95	10/12/2016	Stream	780
P2	WZ005-96	10/12/2016	Stream	580
R3	WZ011-90	10/12/2016	Stream	>1600
А	WZ024-99	10/12/2016	Stream	>1600
A	WZ072-81	10/31/2016	Stream	820
А	WZ082-58	10/31/2016	Stream	800
А	WZ086-83	10/31/2016	Stream	120
R8	WZ092-123	10/31/2016	Stream	124
R8	WZ092-86	10/31/2016	Stream	200
R8	WZ093-124	10/31/2016	Stream	130
R9	WZ099-122	10/31/2016	Stream	240
R9	WZ099-78	10/31/2016	Stream	280
P2	WZ108-79	10/31/2016	Stream	120
P2	WZ110-80	10/31/2016	Stream	320
R6	WZ084-82	11/1/2016	Stream	300
R8	WZ092-86	9/13/2017	Stream	29
R9	WZ099-78	4/26/2021	Stream	40
P2	WZ110-80	4/26/2021	Stream	2
R4	WZ-VH4	4/26/2021	Stream	18
А	WZ-VH1	4/27/2021	Stream	<2
А	WZ024-99	4/28/2021	Stream	<2
P2	WZ-NH3	4/28/2021	Stream	<2
CA1	WZ-NH5	4/28/2021	Stream	42
R9	WZ099-78	5/10/2021	Stream	520
P2	WZ110-80	5/10/2021	Stream	<2
А	WZ-VH1	5/10/2021	Stream	14
R4	WZ-VH4	5/10/2021	Stream	2
А	WZ024-99	5/25/2021	Stream	15
P2	WZ-NH3	5/25/2021	Stream	9.1
CA1	WZ-NH5	5/25/2021	Stream	24
R9	WZ099-78	9/22/2021	Stream	88
P2	WZ110-80	9/22/2021	Stream	44
R9	WZ099-78	10/5/2021	Stream	82
P2	WZ110-80	10/5/2021	Stream	22



Growing Area Section	Location ID	Sample Date	Pollution Type	Raw Score
А	WZ-VH1	10/5/2021	Stream	38
R4	WZ-VH4	10/5/2021	Stream	4
А	WZ024-99	10/6/2021	Stream	31
P2	WZ-NH3	10/6/2021	Stream	22
CA1	WZ-NH5	10/6/2021	Stream	92
А	WZ-VH1	10/15/2021	Stream	22
А	WZ024-99	11/8/2021	Stream	13
P2	WZ-NH3	11/8/2021	Stream	22
R9	WZ099-78	5/16/2022	Stream	540
R9	WZ099-78	6/14/2022	Stream	>1600
R9	WZ099-78	10/11/2022	Stream	8
R9	WZ099-78	10/26/2022	Stream	31

#### **Agricultural Activities**

There are no large-scale agricultural facilities on or near the shoreline of growing area WZ. However, there are several small farms that have the potential to impact water quality along the shoreline of this growing area. Animal farms on North Haven and Vinalhaven generally consist of small family run farms. Many of these farm sites are nothing more than fields used for pasturing animals such as sheep. Often the fields are not owned by the animal owners, but permission has been obtained to allow the animals to graze in the field. On both islands, the animal grazing locations and the number and type of animals can change from year to year.

Between 2013, 2014, and 2018 shoreline and hot spot surveys, three different areas were noted as having farm animals on North Haven and four different areas were noted as having farm animals on Vinalhaven. The largest animal operation on Vinalhaven is located above Long Cove. The residents are aware of best farm practices and were very concerned about proper farm management and doing whatever is necessary to help the shellfish resources in the area. Turner Farm on North Haven is another notable farm operation. During a 2014 survey, only 10 goats were visible, but other livestock such as pigs, chickens, and cows can also be found on the farm variably. Manure on all farms is stored away from the shore and most have significant pasture area with a wooded buffer zones along the shore. None of the farming areas identified during the shoreline surveys were determined to be a problem. There are no resource areas being managed based on farming or agricultural activities.

#### 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, 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 Cubby Hole is a shorebird and wading bird habitat in Vinalhaven; this area is classified as Prohibited.

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

Both Vinalhaven and North Haven in shellfish growing area WZ have large tracts of land set aside for public use. On North Haven, Mullens Head Park encompasses all of Mullen Head on the east side of the island. This park is open to the public for daytime use only. No camping is allowed. The park consists of large beach areas and grassy trails. Outhouses are available at several locations around the park. The DMR has two sample sites at Mullen Head Park (WZ 43 and WZ44). Both sites have P90 scores that meet their current classifications (approved and restricted respectfully). There are also some smaller public areas that are open for daytime use consisting of trails and public beaches. These sites do not have outhouses available because they do not get the same volume of traffic as the Mullen Head Park.

On Vinalhaven there are numerous large parcels of vacant land that have been set aside for public use. None of the public lands on Vinalhaven have outhouse facilities and camping is not allowed at any of them. All the town parks and nature preserves are open for daytime use only. Town parks are in the following areas: Perry Creek, The Basin, Indian Creek, Lanes Island, Seal Bay, Arey Neck, Isle au Haut Mountain, Booths Quarry Road, Middle Mountain, Browns Head Lighthouse, Zekes Point Road and on several surrounding islands. In addition to the areas noted, there are many more parcels that are under easement to either the Maine Coast Heritage Trust, the Vinalhaven Land Trust or a Vinalhaven town easement. No adverse impact has been observed at any of the public land areas on Vinalhaven.

#### 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 located in Pulpit Harbor, North Haven, indicates a mean tidal range of 9.85 ft. The mean tidal range for most of Maine is nine feet to 13 feet. Currents in the area are predominantly driven by the tides. There are no resources areas being managed based on tide in growing area WZ.



#### Rainfall

The mean annual precipitation in growing area WZ is approximately 56 inches and the precipitation is not evenly distributed throughout the year (National Weather Service). The wettest months are generally April and October while July 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 during a storm event. 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 during a storm event. These areas are considered rainfall conditional areas and are Conditionally Approved generally based on the one-inch closure trigger. There is one seasonal rainfall conditional area in growing area WZ. The North Haven Salt Pond (CA1) has shown elevated fecal coliform scores after 1" or more of rain during a storm event between the months of May and November. Between May 1<sup>st</sup> and November 30<sup>th</sup>, this area closes for a 14 day period following 1" of rain.

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 islands of North Haven and Vinalhaven are located in the middle of Penobscot Bay. There are no river systems nearby the islands, however, river systems are located along the mainland shores which discharge into Penobscot Bay. The rivers that are geographically closest to growing area WZ, the Ducktrap River and the Weskeag River, are 11 miles from the closest point of North Haven and Vinalhaven. Due to the broad expanse of open ocean surrounding the islands and the distance between the islands and the river systems, it is unlikely that river discharge has a pollutant impact on the water quality in growing area WZ.



### **Hydrographic Influence**

Water movement in growing area WZ is predominantly influenced by tides. The area is subject to a semidiurnal tidal cycle with two high tides and two low tides per day. Daily tidal cycle is 12 hours and mean high tide is a little over ten feet with spring tides potentially exceeding 12 feet. 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**

#### **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 90<sup>th</sup> percentile (P90) as the standard to measure variance of a data set.

There were 44 active water sampling sites and zero investigative stations in growing area WZ in the 2022 sampling year. It is recognized that access, icing, and safety considerations prevent some stations from being sampled on scheduled dates. Currently, all but one station in growing area WZ meet their current NSSP classification standard. The station that is not meeting classification is WZ038.95, which is in the Salt Pond on North Haven, will require a downgrade in 2023.

#### Water Quality Discussion and Classification Determination

P90s for all active stations with a minimum of 30 samples were calculated and all but one station met their classification standards (Tables 6, 7). Station WZ038.95 did not meet its conditional classification and will be downgraded. The percent change in P90 from 2021 to 2022 was calculated and 70 percent of stations saw an increase in P90 score. The average increase was 14.1 points. While overall water quality appears to be degrading, a large portion of this growing area is already classified as either Prohibited or Restricted, and most of the stations that saw an increase in scores were already within a Prohibited or Restricted area. Of the 31 stations that saw an increase, only 10 were Approved or Conditionally Approved. The average increase in score for the Approved or Conditionally Approved stations was only 2.9 points. The increase in scores did not threaten the current classification of most stations were small. None of the Approved or Restricted stations are approaching the threshold where a classification change would be necessary. 23 percent of stations saw a decrease in P90 score with an average decrease of 11.4 points, while 7% saw no net change.



Station	Class	Count	GM	SDV	MAX	<b>P90</b>	Min_Date
WZ005.00	А	30	3.3	0.33	22	8.9	5/14/2018
WZ005.90	А	30	2.8	0.39	92	9.1	5/14/2018
WZ010.50	А	30	2.9	0.4	62	9.7	5/14/2018
WZ013.00	А	30	3.1	0.33	33	8.5	5/15/2018
WZ014.00	А	30	2.7	0.32	27	7.2	6/27/2018
WZ015.00	А	30	5.2	0.49	46	22.6	6/27/2018
WZ016.00	А	30	3.4	0.35	35	9.8	11/26/2018
WZ017.50	А	30	3.1	0.34	56	8.5	6/27/2018
WZ035.00	А	30	3.1	0.46	240	12.2	4/18/2018
WZ041.00	А	30	3.5	0.48	120	14.9	4/18/2018
WZ042.00	А	30	2.4	0.32	32	6.4	4/18/2018
WZ043.00	А	30	2.3	0.26	28	5.2	5/30/2018
WZ056.00	А	30	1.9	0	2	1.9	4/18/2018
WZ057.00	А	30	1.9	0	2	1.9	4/18/2018
WZ003.00	Р	30	10.9	0.68	200	83.3	5/14/2018
WZ004.30	Р	30	4.1	0.55	200	21.2	5/14/2018
WZ014.50	Р	30	4.5	0.55	500	23.4	6/27/2018
WZ029.00	Р	30	20.4	0.77	900	199.4	4/18/2018
WZ030.00	Р	30	3.2	0.52	300	15.1	5/30/2018
WZ033.00	Р	30	3.4	0.52	300	16	4/18/2018
WZ040.00	Р	30	3.1	0.4	82	10.1	4/18/2018
WZ046.00	Р	30	30.9	0.88	1700	415.8	4/18/2018
WZ006.00	R	30	9.2	0.76	440	89.1	5/14/2018
WZ007.00	R	30	8.1	0.76	1700	77.2	5/14/2018
WZ008.00	R	30	5.4	0.72	1140	46.7	5/14/2018
WZ009.00	R	30	6.3	0.62	200	40.4	5/14/2018
WZ009.50	R	30	5.9	0.67	680	43.2	11/26/2018
WZ011.00	R	30	7.6	0.68	600	57.3	5/14/2018
WZ012.00	R	30	7	0.71	800	57.6	5/14/2018
WZ015.50	R	30	4.4	0.56	480	23.5	10/17/2017

Table 6. P90 calculations for stations with a minimum of 30 samples. Geomeans and P90s not meeting current classifications are highlighted in red.



Station	Class	Count	GM	SDV	MAX	<b>P90</b>	Min_Date
WZ018.00	R	30	5.1	0.72	960	43.1	6/27/2018
WZ019.00	R	30	6.3	0.79	1700	66.5	6/27/2018
WZ020.00	R	30	4.7	0.57	460	25.5	6/27/2018
WZ021.00	R	30	2.7	0.45	420	10.3	6/27/2018
WZ022.00	R	30	5.2	0.54	320	26.1	5/15/2018
WZ026.00	R	30	8.9	0.63	158	57.8	4/18/2018
WZ027.00	R	30	12.6	0.6	400	75.8	4/18/2018
WZ028.00	R	30	3.7	0.36	24	11	5/30/2018
WZ031.00	R	30	6.4	0.71	800	53.1	5/30/2018
WZ034.00	R	30	4.1	0.76	1700	38.9	4/18/2018
WZ038.80	R	30	5.8	0.56	400	31.2	4/18/2018
WZ044.00	R	30	5.2	0.61	260	32.2	5/30/2018

Station	Class	Count	GM	SDV	MAX	<b>P90</b>	Min_Date
WZ038.90	CA	30	5.8	0.56	100	30.4	12/13/2016
WZ038.95	CA	30	5.9	0.59	340	34.1	5/23/2016

**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 CA1 Salt Pond, North Haven Conditional Area Management Plan

#### Scope

Growing area section WZ CA1 on the Salt Pond in North Haven is classified as Conditionally Approved based on seasonal rainfall and will close for harvest if rainfall meets or exceeds 1" during a storm event between May 1<sup>st</sup> and November 30<sup>th</sup> (Figure 5). The Salt Pond will remain closed for a minimum of 14 days following a rainfall event producing 1" or more of rain to allow for proper flushing. This area begins east of a line formed by the Dam Road Bridge and encompasses all waters within. This Conditional Area is monitored by water quality stations WZ038.90 and WZ038.95.

#### Figure 5. CA1 Salt Pond, North Haven Conditionally Approved area





#### Compliance with management plan

The Salt Pond is Conditionally Approved and is closed for shellfish harvest when rainfall meets or exceeds 1" during a storm event between May 1<sup>st</sup> and November 30<sup>th</sup>. See CAMP annual reviews for information on annual compliance with the current CAMP.

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

If a conditional area closure must be implemented due to rainfall, the management plan for this conditional area uses online automatic rainfall data collected from active weather station gauges in the area.

#### Compliance with approved growing area criteria



Stations WZ038.90 and WZ038.95 monitor this area. In the western part of the Salt Pond, station WZ038.90 met the approved standard during the open period, however, WS038.95 in the eastern part of the area did not.

 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
WZ038.90	CA	30	5.8	0.56	100	30.4	12/13/2016
WZ038.95	CA	30	5.9	0.59	340	34.1	5/23/2016

### Water sampling compliance history

Conditional area sampling was done during both the open and adverse (closed) periods. The monitoring stations were part of random scheduled sampling runs. Both stations were sampled a minimum of six times while in the Open status.

### **Analysis-Recommendations**

The North Haven Salt Pond Conditionally Approved area will require a downgrade in 2023 due to the eastern portion of the area not meeting the conditionally approved standard. It is recommended that the rainfall threshold be reduced from 1" of rain to 0.75" of rain during a rainfall event between May 1<sup>st</sup> and November 30<sup>th</sup>. The restricted area (R1) to the west of the Salt Pond, known as Mill Stream, could be upgraded to Conditionally Approved based on the same seasonal 0.75" rainfall threshold condition.

## **Recommendation for Future Work**

Growing area WZ will require one downgrade in the North Haven Salt Pond (CA1: WZ038.90, WZ038.95), and to the west of the Salt Pond, Mill Stream (R1, WZ038.80) should be evaluated for an upgrade in 2023. Mill stream is currently a restricted area, however, its P90 score is below the approved standard. Reducing the rainfall threshold from 1" to 0.75" in CA 1 and upgrading R1 to the same conditionally approved stipulations would allow for practical management and account for the water quality in this area being sensitive to rainfall amounts under 1".

Table 8. Count table of samples collected in growing area WZ during the 2022 season
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Station	Class	С	0	Total	Samples Required	Comments
WZ003.00	Р	6		6	6	
WZ004.30	Р	6		6	6	
WZ005.00	А		6	6	6	
WZ005.90	А		6	6	6	



					Samples	
Station	Class	С	0	Total	Required	Comments
WZ006.00	R		6	6	6	
WZ007.00	R		6	6	6	
WZ008.00	R		6	6	6	
WZ009.00	R		6	6	6	
WZ009.50	R		6	6	6	
WZ010.50	А		6	6	6	
WZ011.00	R		6	6	6	
WZ012.00	R		6	6	6	
WZ013.00	А		6	6	6	
WZ014.00	А		6	6	6	
WZ014.50	Р	6		6	6	
WZ015.00	А		6	6	6	
WZ015.50	R		6	6	6	
WZ016.00	Α		6	6	6	
WZ017.50	Α		6	6	6	
WZ018.00	R		6	6	6	
WZ019.00	R		6	6	6	
WZ020.00	R		6	6	6	
WZ021.00	R		6	6	6	
WZ022.00	R		6	6	6	
WZ026.00	R		6	6	6	
WZ027.00	R		6	6	6	
WZ028.00	R		6	6	6	
WZ029.00	Р	6		6	6	
WZ030.00	Р	6		6	6	
WZ031.00	R		6	6	6	
WZ033.00	Р	6		6	6	
WZ034.00	Α		2	6	C	Down and d to D C/28/22
WZ034.00	R		4	0	0	Dowligraded to K 6/28/22
WZ035.00	Α		6	6	6	
WZ038.80	R		6	6	6	
WZ038.90	CA	1	6	7	6	
WZ038.95	CA	1	6	7	6	
WZ040.00	Р	6		6	6	
WZ041.00	A		6	6	6	
WZ042.00	Α		6	6	6	
WZ043.00	Α		6	6	6	
WZ044.00	R		6	6	6	



Station	Class	С	0	Total	Samples Required	Comments
WZ046.00	Р	6		6	6	
WZ056.00	А		6	6	6	
WZ057.00	А		6	6	6	

### References

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

Tide data, NOAA Tides & Currents Internet site, Station: Pulpit Harbor, Peneobscot Bay ME Datums

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

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

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

WZ Sanitary Survey Report; 2010. 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. <u>Shellfish</u> <u>Closures and Aquaculture Leases Map | Department of Marine Resources (maine.gov)</u>