GROWING AREA ES

Cross Island-Cape Wash, Cutler to Mowry Point, Lubec

Sanitary Survey Report

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Contents

Executive Summary

This is a Sanitary Survey report for Growing Area ES in Washington County written in compliance with the requirements of the 2019 Model Ordinance and the National Shellfish Sanitation Program. No areas are being considered for either upgrades or downgrades based on this survey. There were no new actual or potential pollution sources found during the 2020 survey. One station ES 17 was deactivated due to access and one station ES 17.1 was reactivated to take the place of ES 17. Water quality has remained consistent overall with some improvement in water quality shown at station ES 22. The next sanitary survey is due in 2033 and the next triennial is in 2024.

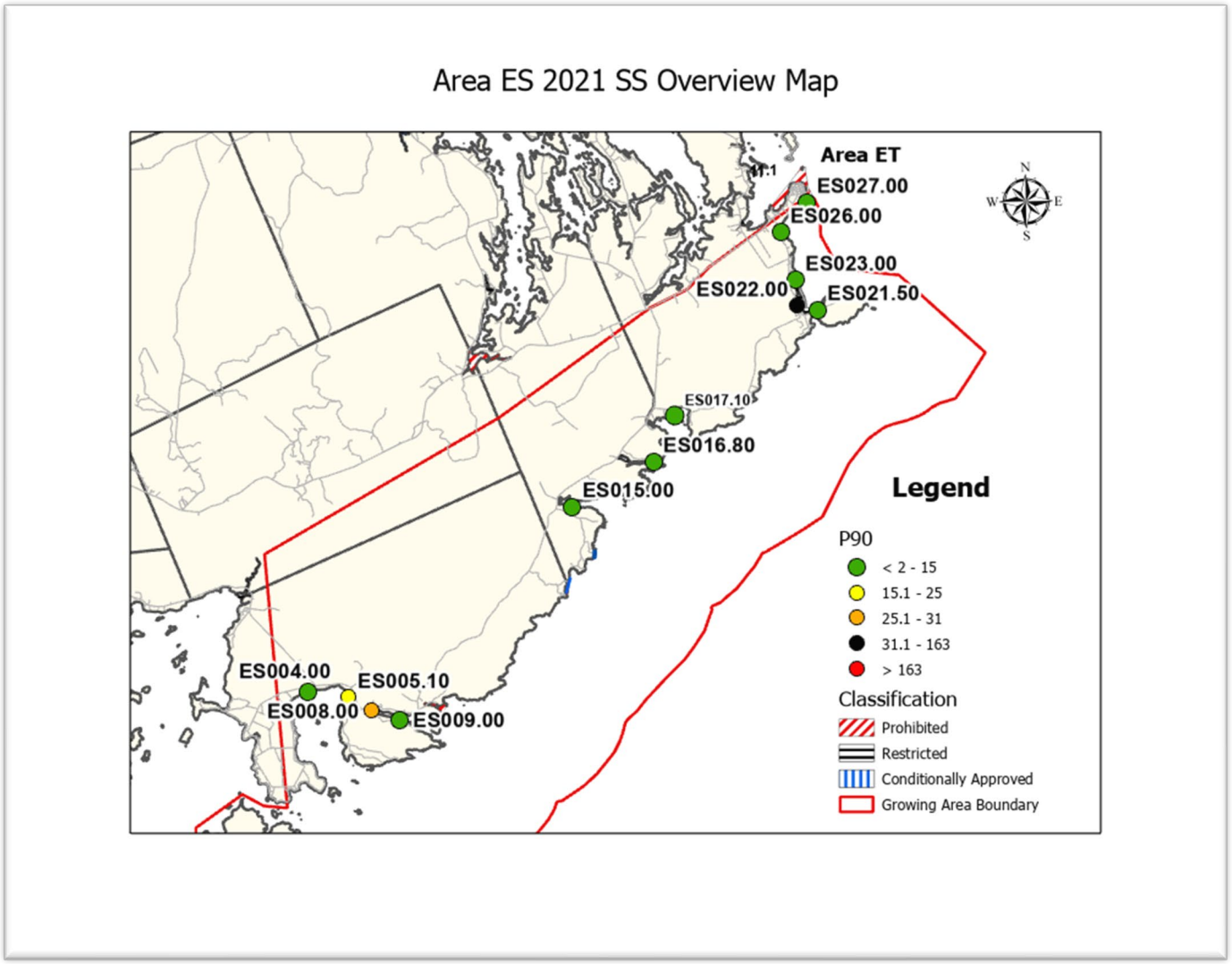
Description of Growing Area

Growing area ES encompasses approximately 108 square miles and extends from the eastern end of Cape Wash, Cutler to Mowry Point on the southwest side of Lubec Channel. This area includes all of the Bold Coast from Cutler (pop-505), Trescott (pop-300), and the southwest portion of Lubec (pop-314) (2018 Census report). Development along these shores is spotty with clusters of homes separated by undeveloped land. Heavier development is found at the head of the harbors and rivers. The shoreline is typical of the convoluted shoreline of this section of Maine, with a series of shallow harbors with muddy and gravel bottoms separated by rock-bound points of land and a bold shoreline. There are four licensed overboard discharges (OBDs) in this area. There is one WWTP located in area ET which is right on the northeast boundary of area ES. This plant discharges into a Prohibited area located in growing area ET.

Shellfish Growing Area ES includes all the shores, flats, and coves stretching from Cross Island-Cape Wash, Cutler to Mowry Point, Lubec. The upland cover is primarily deciduous, with some evergreens and wetland forest with minimal development This is a rural area with a sparse population. Freshwater influence along these shores is predominately from numerous brooks and small streams throughout the growing area.

There are no shellfish aquaculture leases or shellfish Limited Purpose Aquaculture permits (LPAs) in this growing area. There are no wet storage permits issued to certified shellfish dealers in this area. There are two finfish aquaculture sites in area ES. Below is the map with Pollution Area boundaries and 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 ES 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. A GPS point is

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 ES, Pollution Map A

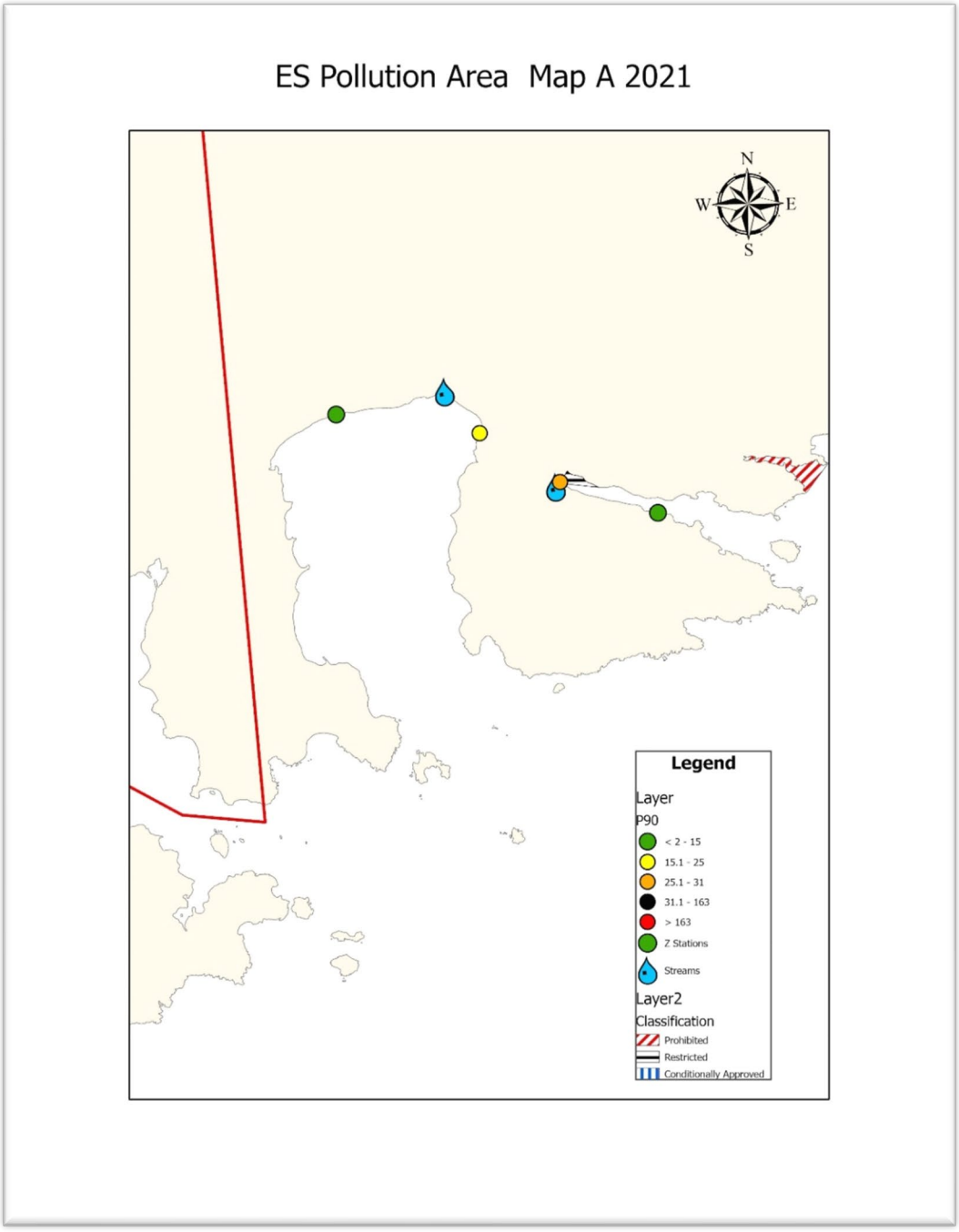


Figure 3. Growing Area ES Pollution Map B

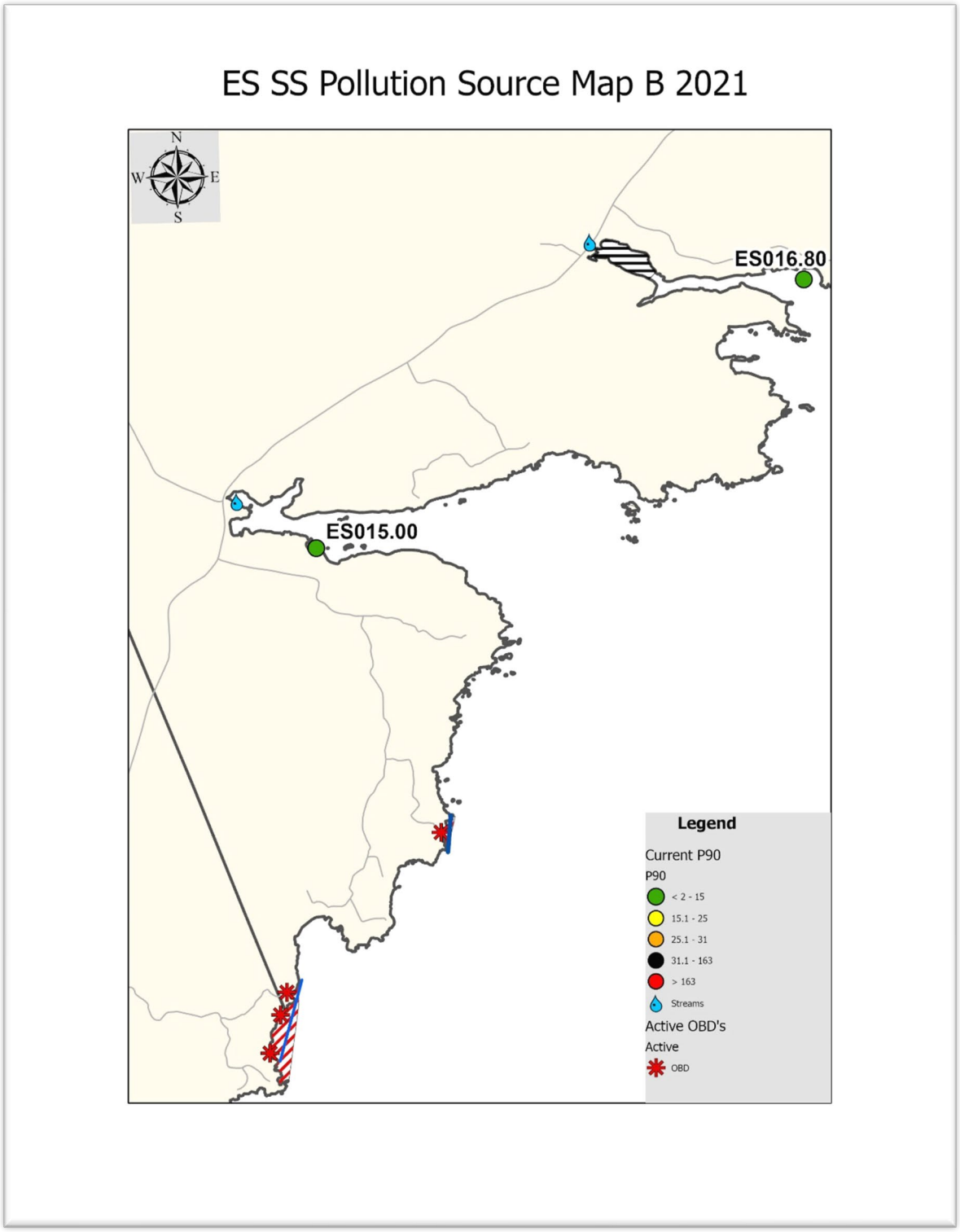
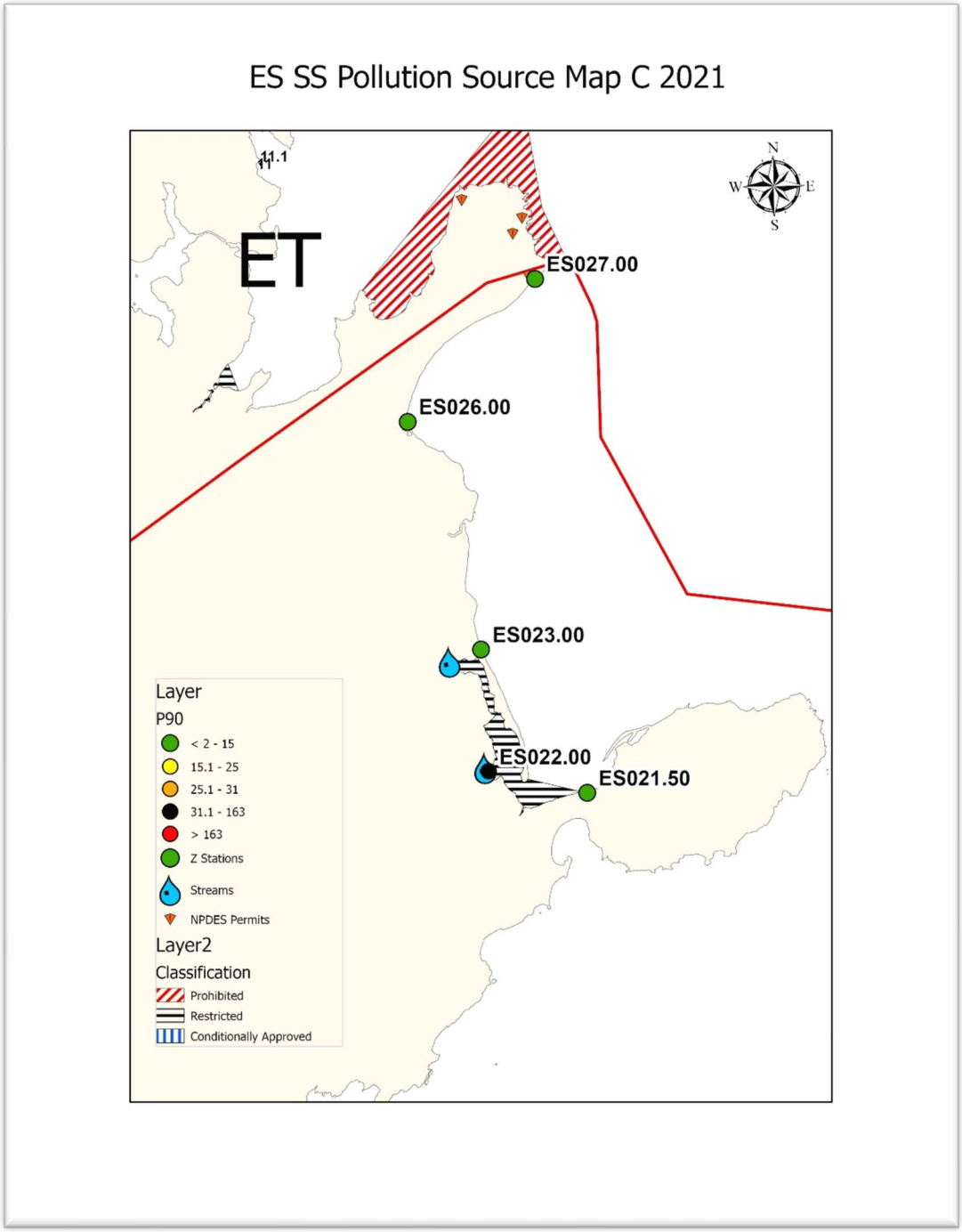


Figure 4. Growing Area ES, Pollution Map C



State and Federal Licensed Waste Discharge Permits

Overboard Discharges (OBDs)

There are 4 overboard discharges (OBDs) that discharge their treated effluent into the waters of Growing Area ES.

National Pollutant Discharge Elimination System (NPDES)

There are three NPDES discharge permits in this area including finfish aquaculture, process water, or any other licensed permit.

There are no wastewater treatment plants/facilities (WWTP/WWTF) in the growing area ES. The Lubec WWTP facility is in growing area ET, adjacent to area ES, and discharges into area ET. Some of the WWTP dilution zones extend into area ES.

Table 1. NPDES Permits Area ES

Pollution Area	Permit Id	Type	Facility	Water Body
ES Approved	MEG130027	Salmon Aquaculture	Cooke Aquaculture	Atlantic Ocean
ES Approved	MEG130025	Salmon Aquaculture	Cooke Aquaculture	Atlantic Ocean
ES Approved	ME0002097	Process and cooling water	Cutler Navy Base	Little Machias Bay
ET Approved	ME0102016	WWTP	Lubec	Lubec Channel in area ET
ES P2	7824	OBD	Cutler	Atlantic Ocean
ES P2	4466	OBD	Cutler	Atlantic Ocean
ES P1	5199	OBD	Trescott	Atlantic Ocean
ES P2	3386	OBD	Cutler	Atlantic Ocean

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.

Industrial Pollution

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

Small individual storage tanks for gasoline and diesel were noted at two locations in the growing area. These tanks are near the shore. Tanks have containment walls and booms in the event of an accidental leak in the 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 on 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 Little River, (Cutler), and Baileys Mistake, (Trescott). The mooring areas are used by commercial vessels generally making day long fishing trips and are not considered to be potential pollution risks. These are not common overnight stopping areas for recreational boaters and are not identified as pollution risks due to the number of boats and types of usage. Water quality samples sites in the mooring areas meet approved standards.

Stormwater

Stormwater 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, stormwater pollution is caused by the daily activities of people within the watershed. Currently, polluted stormwater is the largest source of water quality problems in the United States.

The primary method to control stormwater discharges is the use of best management practices (BMPs). Also, most major stormwater discharges are considered point sources and require coverage under an NPDES permit. In 1990, under the authority of the Clean Water Act, the U.S. EPA promulgated Phase I of its stormwater 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 5 acres of land or greater, and (3) ten categories of industrial activity. In 1999, US EPA issued Phase II of the stormwater 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 stormwater runoff control, (5) Post-construction stormwater 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 stormwater from 30 Maine municipalities is regulated under the Phase II Small MS4 General Permit however, no municipalities located within the boundaries of growing area ES fall under these regulations. Additionally, the Maine Storm Water Management Law provides stormwater standards for projects located in organized areas that include one acre or more of a disturbed area (Maine DEP 2009).

There are no wastewater treatment plants or combined sewer overflow points within Growing Area ES. This area is primarily rural with no stormwater management other than a few small culverts at key points under low-lying roads.

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 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 ES. A total of 45 samples were taken from freshwater streams during the review period

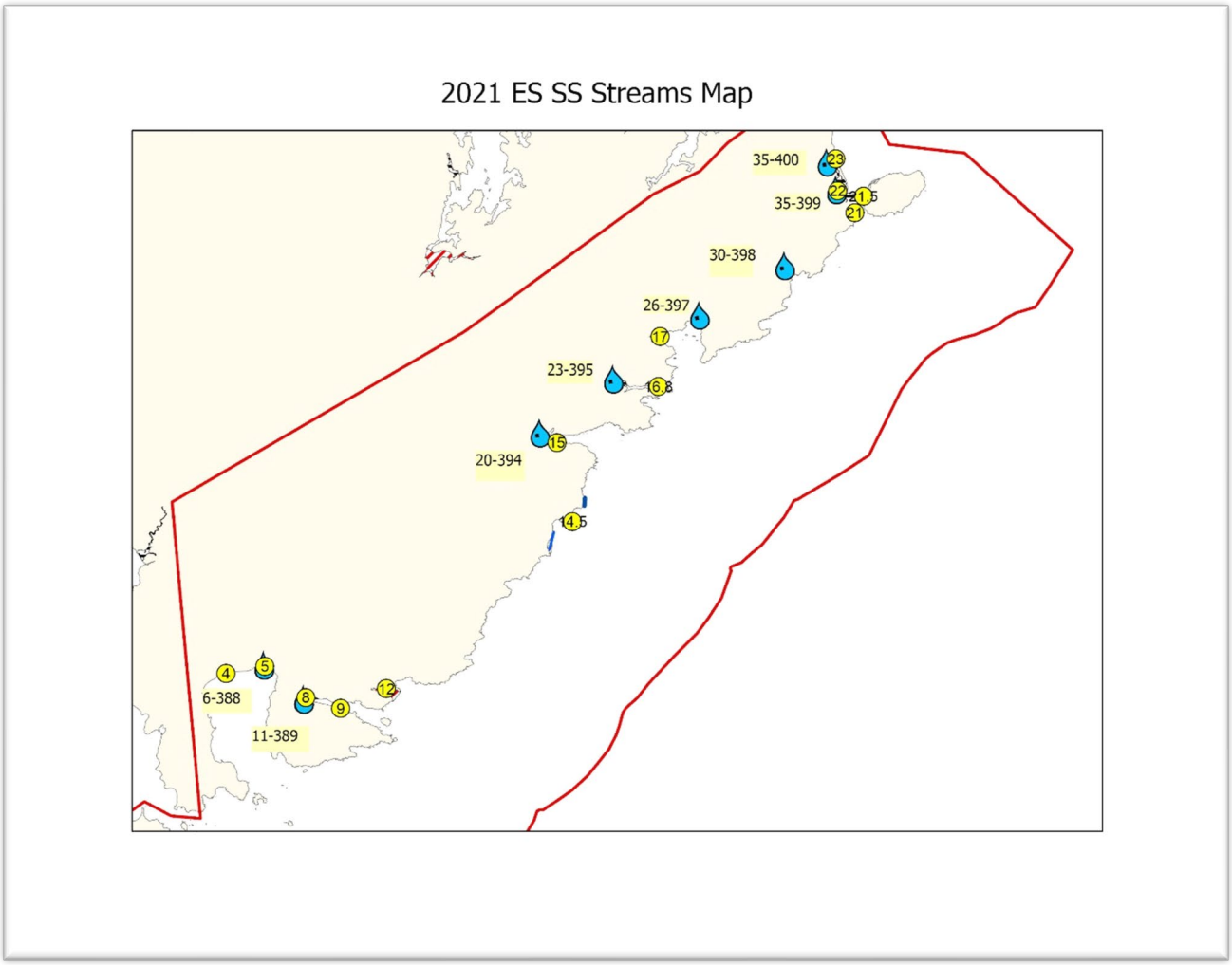
Table 2. Stream Samples in Growing Area ES 2015-2021; Scores > 163 CFU/100ml are highlighted in yellow.

Pollution Area	Location ID	Sample Date	Pollution Type	Score
ES Approved	ES006-388	30-Jun-15	Stream	20
ES Approved	ES006-388	12-Jun-17	Stream	29
ES R3	ES011-389	30-Jun-15	Stream	10
ES R3	ES011-389	11-May-16	Stream	1.9
ES R3	ES011-389	06-Jun-16	Stream	800
ES R3	ES011-389	22-Jun-16	Stream	18
ES R3	ES011-389	11-Jul-16	Stream	20
ES R3	ES011-389	17-Aug-16	Stream	1700

Pollution Area	Location ID	Sample Date	Pollution Type	Score
ES R3	ES011-389	24-Aug-16	Stream	200
ES R3	ES011-389	12-Sep-16	Stream	440
ES R3	ES011-389	21-Sep-16	Stream	98
ES R3	ES011-389	17-Oct-16	Stream	6
ES R3	ES011-389	14-Feb-18	Stream	1.9
ES R3	ES011-389	28-Aug-18	Stream	300
ES R3	ES011-389	26-Jul-21	Stream	54
ES Approved	ES020-394	30-Jun-15	Stream	25
ES Approved	ES020-394	14-Feb-18	Stream	6
ES Approved	ES020-394	28-Aug-18	Stream	82
ES Approved	ES020-394	26-Jul-21	Stream	88
ES R2	ES023-395	30-Jun-15	Stream	1.9
ES R2	ES023-395	14-Feb-18	Stream	15
ES R2	ES023-395	28-Aug-18	Stream	27
ES R2	ES023-395	26-Jul-21	Stream	72
ES Approved	ES026-397	30-Jun-15	Stream	35
ES Approved	ES030-398	30-Jun-15	Stream	48
ES Approved	ES030-398	26-Jul-21	Stream	86
ES R1	ES035-399	30-Jun-15	Stream	5.5
ES R1	ES035-399	11-May-16	Stream	1.9
ES R1	ES035-399	06-Jun-16	Stream	1700
ES R1	ES035-399	22-Jun-16	Stream	120
ES R1	ES035-399	12-Sep-16	Stream	600
ES R1	ES035-399	21-Sep-16	Stream	320
ES R1	ES035-399	14-Feb-18	Stream	1.9
ES R1	ES035-399	19-Apr-18	Stream	7.3
ES R1	ES035-399	28-Aug-18	Stream	136
ES R1	ES035-399	27-Jul-21	Stream	116
ES R1	ES035-400	30-Jun-15	Stream	280
ES R1	ES035-400	11-May-16	Stream	184
ES R1	ES035-400	06-Jun-16	Stream	760
ES R1	ES035-400	22-Jun-16	Stream	1360

Pollution Area	Location ID	Sample Date	Pollution Type	Score
ES R1	ES035-400	17-Aug-16	Stream	1700
ES R1	ES035-400	14-Feb-18	Stream	160
ES R1	ES035-400	19-Apr-18	Stream	1.9
ES R1	ES035-400	28-Aug-18	Stream	1700
ES R1	ES035-400	27-Jul-21	Stream	74

Figure 5. Area ES Stream Map 2021



Agricultural Activities

There are no large-scale agriculture activities in Growing Area ES. Smaller farms are encouraged to follow best management practices to help avoid the effects animal waste and agricultural pollutants can have on water quality. And no impact was noted during the survey

Domestic Animals and 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, muskrats, 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 to the growing area's water quality, such occurrences are very difficult to document.

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 in 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 a 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 ES is primarily a rural area with recreation areas limited to small-town parks with no septic facilities and hiking trails that have porta-potties located far from the shore at the parking areas. The town of Cutler maintains a small picnic area on the Little River, there are no septic facilities. There is also some conservation land with hiking trails located all along the Bold Coast. This is strictly a day-use hiking trail area that has no impact on the waters of the growing area. Quoddy Light State park is in south Lubec and has septic facilities located well away from the shore. There was no threat to water quality observed during the 2021 survey. Although there are a few gravel beaches in the area, swimming in the ocean in this area is relatively rare, as the water temperatures rarely exceed 65°F. Recreation areas in ES are not considered to be impacting shellfish harvest areas.

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 ES 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 ES.

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 watershed based on similar characteristics and then models how rainfall and associated pollution are 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. The 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, the 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

Streamflow in Maine exhibits seasonal variation, with the highest flows occurring in the spring (due to snowmelt, spring rains, and low evapotranspiration) and the mid-to-late fall (due to fall rains and low evapotranspiration). Many small streams discharge into the growing area and these streams are discussed in the section about nonpoint source pollution.

Hydrographic Influence

Water circulation along the “Bold Coast” is dominated by tides. The tidal range in this area is 18 feet. Tides are caused by the gravitational effects of the moon and sun on the ocean; other influences are heavy rainfall, low barometric pressure, and strong onshore winds which will increase tides. Tide levels fluctuate during the month based on the positions of the sun, moon, and earth. These fluctuations and the speed and direction of the tidal currents constantly change during a tidal cycle. Tidal currents have the greatest energy when water is pushed in and out of bays and channels during the highest and lowest tide levels. Growing area ES 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 high and low tides are 50 minutes later each day.

Water Quality Studies

Map of Sampling Stations

Most marine fecal pollution in 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 changes in water quality and the program accepts the estimated 90th percentile (P90) as the standard to measure the variance of a data set.

There are presently 12 active water sampling sites in Growing Area ES. It is recognized that access, icing, and safety considerations prevent some stations from being sampled on scheduled dates. Currently, all stations in Growing Area ES meet their current NSSP classification standard. No stations failed to meet their standards at end of the year 2020.

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. The percent change in P90 from 2020 to 2021 was calculated and only three stations showed a substantial increase in P90 score (Table 4). None of the stations that showed a substantial percentage of increase in P90 score are in danger of failing to meet their classification standards. Two water quality stations that have shown a substantial percentage decline in P90 (EP21 and EP29) now meet the standard for approved harvest. Overall the water quality in growing area ES appears to be improving or remaining constant.

Table 3. 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	P90	Min_Date
ES004.00	A	30	2.7	0.35	92	7.8	7/11/2017
ES005.10	A	30	3.5	0.43	42	12.6	11/6/2018
ES008.00	A	30	3.7	0.42	52	12.9	7/12/2017
ES009.00	A	30	3	0.44	86	11.3	5/23/2017
ES015.00	A	30	2.3	0.23	22	4.6	7/12/2017
ES016.80	A	30	2.8	0.4	48	9.5	7/12/2017
ES017.10	A	30	2.6	0.25	15	5.6	10/10/2018
ES021.50	A	30	3.2	0.38	72	10	8/20/2018
ES023.00	A	30	2.8	0.4	60	9.2	5/23/2017
ES026.00	A	30	3.7	0.48	98	15.7	10/23/2018
ES027.00	A	30	3	0.37	54	9	10/23/2018
ES022.00	R	30	6.4	0.63	260	42	6/6/2017

Table 4. Percent change in P90 2020-2021; Positive numbers show decline negative numbers indicate improvement.

Station	2021P90	2020P90	%Change
ES004.00	7.8	11.4	-32
ES005.10	12.6	16.8	-25
ES008.00	12.9	25.8	-50
ES009.00	11.3	10.8	4.6
ES015.00	4.6	7.4	-38

Station	2021P90	2020P90	%Change
ES016.80	9.5	7.4	28
ES017.10	5.6	4.5	24
ES021.50	10	8.5	18
ES023.00	9.2	10.2	-10
ES026.00	15.7	12.1	30
ES027.00	9	7	29
ES022.00	42	61	-31

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

Three are no Conditionally Approved areas in this growing area.

Recommendation for Future Work

Water quality station ES 22 (Minzey's Place) has shown improving water quality and will be put on accelerated sampling once a month to help determine if there is a seasonal component to the intermittent pollution. No stations in growing area ES required a downgrade due to the end of the year 2021 P90 scores.

Table 5. Count table of samples collected in growing area ES during the 2021 season.

Station	Class	Closed	Open	Samples Needed	Total	Comments
ES004.00	A		7	6	7	
ES005.10	A		7	6	7	
ES008.00	A		7	6	7	
ES009.00	A	3	7	6	10	flood
ES015.00	A		7	6	7	
ES016.80	A	3	7	6	10	flood

Station	Class	Closed	Open	Samples Needed	Total	Comments
ES017.10	A		8	6	8	
ES021.50	A		7	6	7	
ES022.00	R		6	6	6	
ES023.00	A		7	6	7	
ES026.00	A		7	6	7	
ES027.00	A		7	6	7	

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

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, the Approved standard is 31, Restricted standard is 163
Min_Date = oldest date sampled included in the calculations.