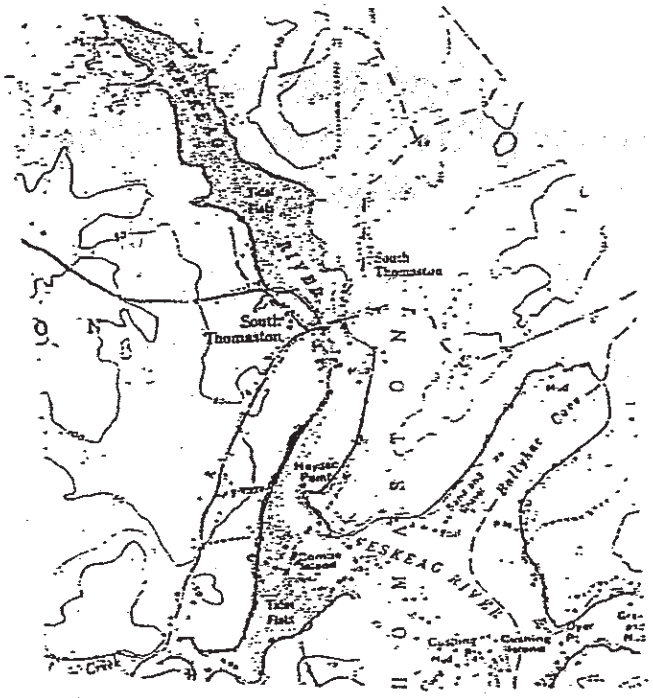
Appendix A:
The Wesaweskeag River Watershed Survey Project Report

WESKEAG RIVER WATERSHED

SURVEY PROJECT



GEORGES RIVER REGIONAL SHELLFISH MANAGEMENT COMMITTEE

GEORGES RIVER CLAMMERS ASSOCIATION

MAINE COASTAL PROGRAM / STATE PLANNING OFFICE

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

APRIL 1996 - MAY 1997

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Acknowledgments

The following people were instrumental in carrying out the tasks necessary to complete the project and deserve special recognition:

Watershed Surveyors include the following members of the Georges River Clammers Association and the Georges River Shellfish Management Committee:

Volunteer	Town
Jim Bradbury	Cushing
Scott Tilton	St. George
Joshua Tilton	St. George
Gary Peters	Cushing
Maynard (Bud) Philbrook	Cushing
Dwayne A. Hunt	Thomaston
Jim Taylor	Cushing
Paul Wilson	Thomaston
Peter Betts	Thomaston
Greg Faultingham	Cushing
David Taylor	Cushing
Keith Feyler	Cushing

Other volunteers include **Peter Hope** who worked in compiling maps, landowner names and photocopying.

Technical Staff

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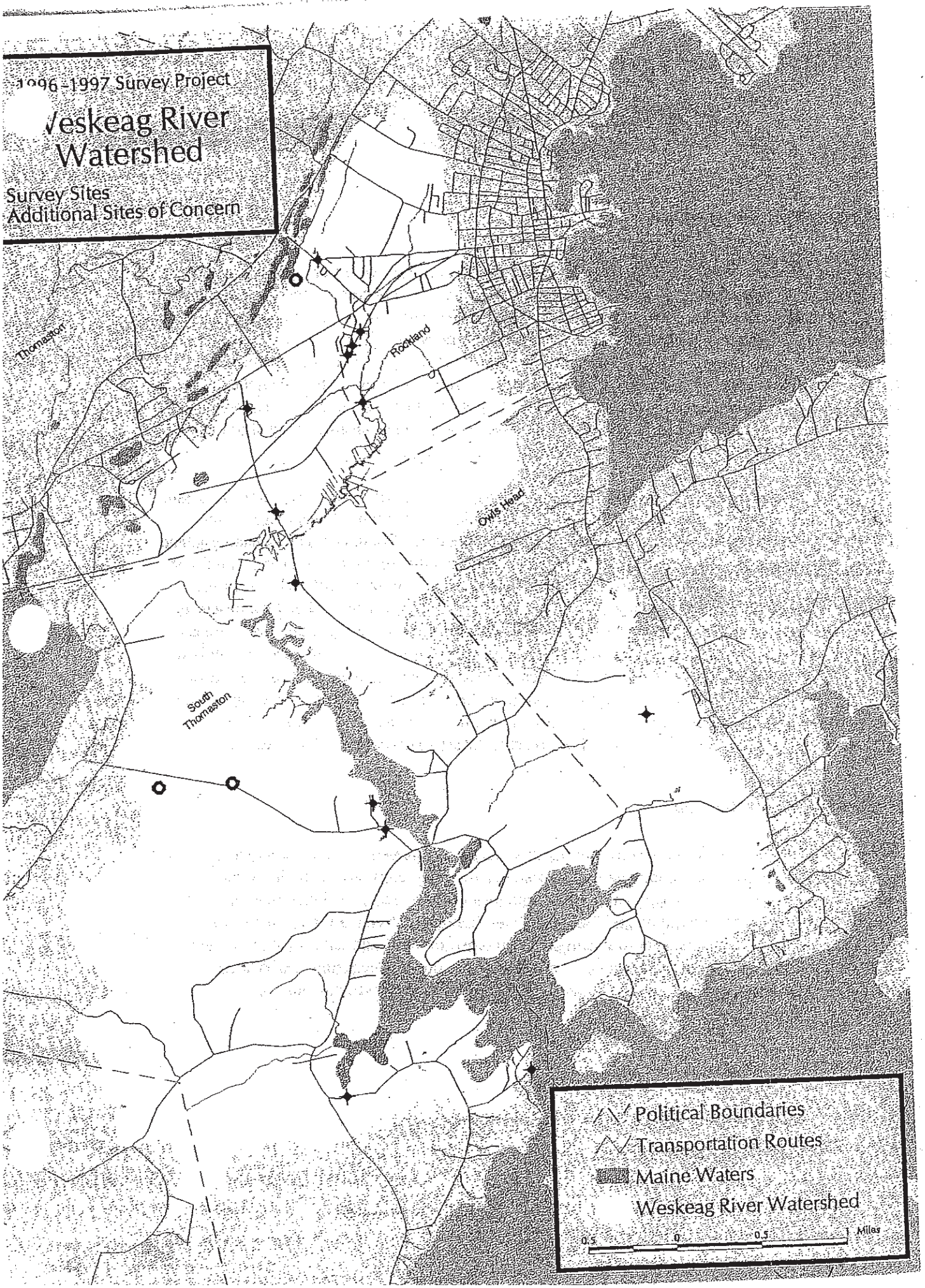
Mary Thompson, District Conservationist USDA Natural Resource Conservation Service

Paul Anderson, Department of Marine Resources

Bill Laflamme, Maine Department of Environmental Protection

FUNDING FOR THE LOCAL SURVEY WORK, COORDINATION AND TRAINING WAS PROVIDED BY THE MAINE COASTAL PROGRAM / STATE PLANNING OFFICE THROUGH FUNDING FROM THE FEDERAL OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT / NOAA UNDER THE COASTAL ZONE MANAGEMENT ACT OF 1972


1996 - 1997 Survey Project
Weskeag River Watershed
Survey Sites
Additional Sites of Concern
Thomaston
Rockland
Owls Head
South Thomaston
Political Boundaries
Transportation Routes
Maine Waters
Weskeag River Watershed
0.5
0
0.5
Miles

Watershed Survey Report
Weskeag River

Watershed Overview

The Weskeag River watershed is a total of 11 square miles in size with portions of it located in Thomaston, So. Thomaston, Rockland and Owls Head. The headwaters of the river begin in Rockland as Marsh Brook. The upper portion of the watershed contains several agricultural fields and a moderate amount of development including the Maine Central Railroad line, a landing strip and commercial and residential structures. Several major roadways including portions of Routes 1 & 73, Thomaston Street and Buttermilk Lane bisect the watershed. The lower portion of the watershed contains the Knox County Regional Airport and scattered residential development with more concentrated development being located along shorefront areas.

The river itself has over 10 tributaries including Sharkeyville Creek. The lower portion of the river contains 3 major coves which include the area which Sharkeyville Creek empties into, Ballyhac Cove and Nabby Cove. The lower river also includes Coombs Island, Cushing Island and Spaulding Island. The river contains many shellfish producing tidal flats which, until last year, were entirely closed to harvesting. **The Weskeag is one of seven tidal rivers/creeks considered coastal wetlands most at risk from new development under the Department of Environmental Protection's Stormwater Management Rules.** In rating these rivers/creeks, the DEP considers, among other factors, potential future growth in the watershed, and existing indicators of water quality degradation. Limited monitoring data indicates that oxygen levels in some areas of the river have been found to be low. (See Appendix A for monitoring results). Oxygen levels of 5 parts per million or less are known to stress marine organisms. Levels as low as 4.7 have been measured in the upper reaches (Marsh Brook) of the Weskeag.

Survey Description

The purpose of the survey was mainly for shellfish area management. Both a watershed survey and a shoreline survey were conducted. The watershed survey consisted of dividing the watershed into 4 survey areas and using local volunteers of the George's River Regional Shellfish Management Committee and Georges River Clammers Association as surveyors. A follow-up to the watershed survey was completed in April of 1997 and additional sites were identified during this process. Volunteers and personnel from the Department of Marine Resources also examined six separate areas in the shoreline survey (see Appendix B for shoreline survey results).

Site List

Sector A

A-1) Westbrook Street, South Thomaston - West Side of Weskeag River culvert Leading to wetland: Sediment and other pollutants coming from culvert inlet/outlet and town road.

A-2) Mill Pond Lane off of Westbrook Street, South Thomaston: Shoulder, ditch and inlet and outlet erosion on tributary to Weskeag River. Erosion occurring on tributary within 100 yards of river.

A-3) Buttermilk Lane on eastern shore of Marsh Brook/Weskeag River located along Tyler Wildlife Management Area, South Thomaston: Cultivated fields within 50 yards of river. Several parcels totaling 2 to 3 acres maybe contributing bacteria, nutrients and sediment. May also be the source of a report of large siltation plume observed during storm events when flying over river.

Sector B.

B-1) Major area of unstabilized soil at Knox County Municipal Airport, Owls Head. Several acres in size.

Sector C

C-1) Waterman's Beach Road in South Thomaston near Pole #121-2 and guard rails. Bacteria, sediment and nutrients from shoulder erosion of town road, livestock grazing next to stream and wetland area and old debris on hillside.

C-2) Eroding dirt roadway in Pleasant Beach area located directly across from Spaulding Island.(Although this site is technically not in the Weskeag watershed, its proximity to the mouth of the river and the ability of eroded materials from the site to impact the river as a result of tidal action, poses a threat to the river's resources)

Sector D

D-1) Pleasant Street, Rockland, railroad tracks behind Pleasant Gardens:
Industrial runoff from railroad tracks, debris and old car parts in wetland.
Wetland contains rust stained water.

D-2) Along railroad tracks behind Pleasant Gardens in Rockland near Tuttle Shoe Barn
Residential and industrial runoff as well as old cars and debris such as railroad ties are discharging toxics and nutrients into stream.
Oily sheen seen on water.

D-3) Corner of Upper Pleasant and Park Streets in Rockland. Debris dump next to pond. City end of Rockland Dump. Runoff possibly contaminating pond with toxics, bacteria, nutrients and sediment.

D-4) Along Thomaston Street where Marsh Brook crosses in Rockland: Ditching and Road crossing eroding into Marsh Brook, contributing nutrients and sediment

D-5) Farm on Thomaston Street near intersection with Buttermilk Lane in Thomaston drains directly into Marsh Brook. Possible bacterial and nutrient contamination. Livestock observed grazing.

D-6) Behind Pleasant Gardens in Rockland: failing granite culvert under railroad tracks contributing to siltation of a tributary to Marsh Brook. Flooding also results from the culvert problem which contributes other pollutants associated with residential development.

D-7) Old Dump Site and unstabilized area in and adjacent to the Transfer Station in Thomaston, near where Buttermilk Lane intersects Route 1: This site is directly on the banks of a tributary to Marsh Brook possibly contributing nutrients, bacteria, sediment and toxics to this stream.

In addition to sites identified in the survey and follow-up, a new logging operation and housing development were observed in Sector A and an existing junkyard off of Westbrook Street was also identified.

Pollutants of Concern

The primary pollutants of concern with regard to coastal estuaries like the Weskeag are pathogens, nutrients, toxics and sediments.

Pathogens are bacteria or viruses from sewage and animal wastes that are responsible for the closure of shellfish areas and swimming areas. Sewage enters coastal waters from malfunctioning septic systems, publicly owned treatment plants, overboard discharge systems, combined sewer overflows and discharges from boats. Pollution from animal wastes is primarily generated from agricultural activities, such as spreading manure to fertilize fields, but is also generated by pets and wildlife.

Nutrients include a number of different elements such as hydrogen, carbon, sulfur , nitrogen and phosphorous. While nutrients are needed by organisms to survive, too many nutrients can cause problems. One such problem is algae blooms, which can cause oxygen depletion leading to massive fish and shellfish kills, closure of shellfish beds, floating scums and foul odors. **Nitrogen** is generally the primary limiting nutrient for growth of algae in marine waters. Nitrogen enters coastal waters from agricultural sites, residential areas and wastewater and sewage.

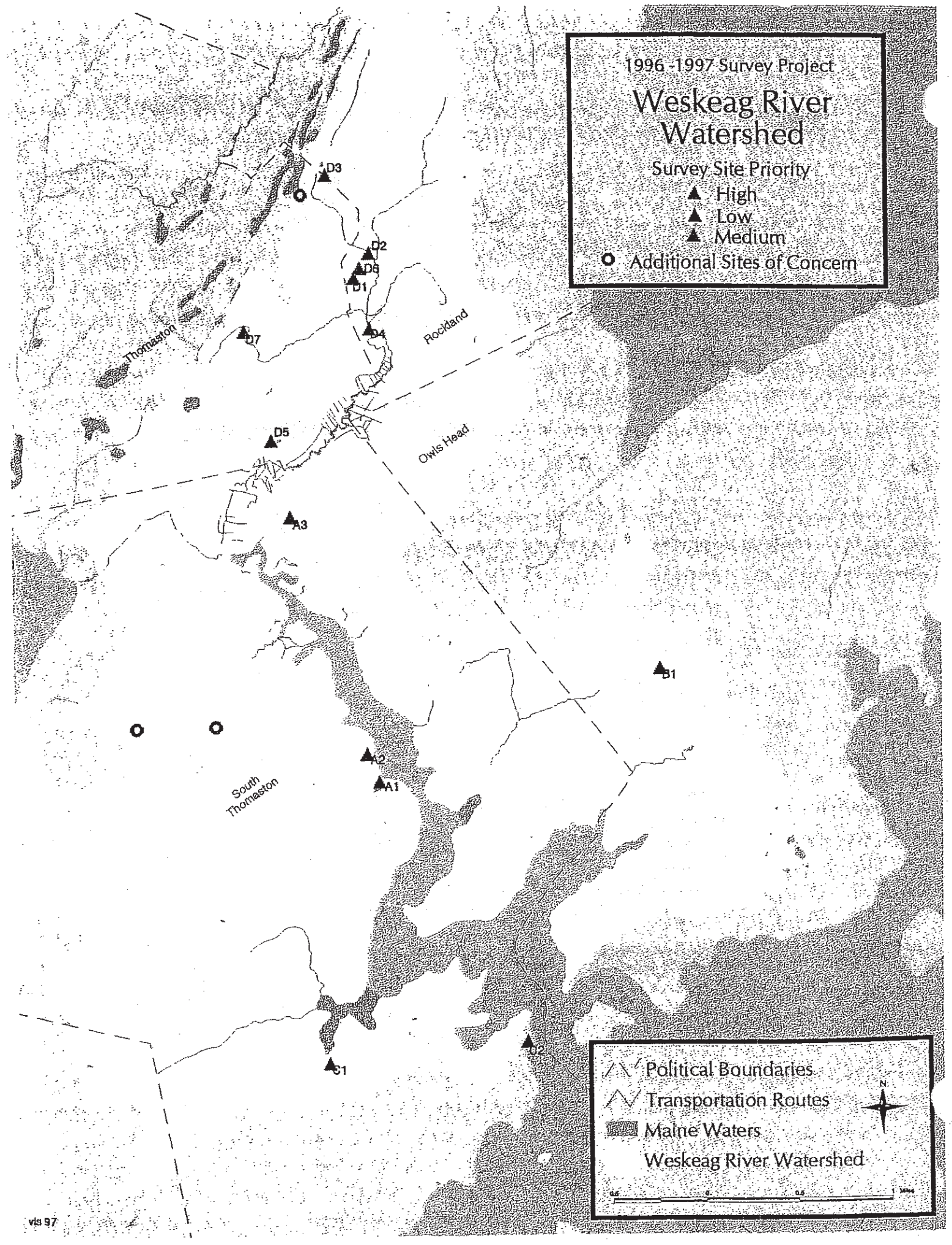
Toxics are chemicals that can kill and severely limit the reproduction of marine organisms. Toxics in the marine environment include heavy metals like lead, mercury, arsenic, cadmium, silver, nickel, selenium, chromium, zinc, and copper. Metals can be transported into waterbodies by vehicle emissions, industrial processes and improper use and disposal of paints and pesticides. Metals also occur naturally in rocks and minerals and can leach into the environment over time. Soil disturbance can accelerate the release of metals into marine waters. Petroleum products, PCBs, chlorinated pesticides and dioxins are also toxic in

Maine's marine environment. Landfills and illegal disposal sites are primary sources of these contaminants. The contaminants accumulate in bottom sediments and are consumed by bottom feeding organisms, inhibiting their growth, reproduction and immune systems.

Sediments (sand, silt and other soil particles) suspended and transported in streams and estuarine waters are harmful in that they block sunlight, cover fish spawning areas and food supplies, raise water temperature, (reducing oxygen levels) clog the feeding apparatus of filter feeders (like clams and mussels) and damage fish gills.

POLLUTANT SOURCES
Tip Sheet

	POLLUTANTS				
Source	Bacteria	Toxics	Nutrients	Sediment	Other
URBAN, COMMERCIAL, RESIDENTIAL:					
Impervious areas w/o buffers or treatment	X	X	X	X	X
Construction Site			X	X	
Septic System	X		X		
Lawn		X	X		
Driveway			X	X	
Industrial Runoff		X	X		X
Commercial Runoff		X	X		X
Gas/Service Station		X			
Golf Course Runoff		X	X	X	
Shoreline Erosion				X	
ROADS:					
Ditch Erosion			X	X	
Shoulder Erosion			X	X	
Surface Erosion			X	X	
Unstable Culvert			X	X	
Unstable Stream Crossing			X	X	
AGRICULTURE:					
Livestock Grazing	X		X	X	
Tilled Fields			X	X	
Manure/Fertilizer Spreading	X	X	X		
Manure Storage	X	X	X		
MARINAS:					
Boat Maintenance		X	X		
Waste Discharge	X				
Impervious Areas	X	X	X		
Fueling Area		X			


1996 -1997 Survey Project
Weskeag River Watershed
Survey Site Priority
High
Low
Medium
Additional Sites of Concern
D3
D2
D6
D1
D7
D4
D5
A3
A2
A1
B1
C1
C2
Thomaston
Rockland
Owls Head
South Thomaston
Political Boundaries
Transportation Routes
Maine Waters
Weskeag River Watershed
N
vis 97

Data Analysis

The sites identified during the survey and in the follow-up to the survey are prioritized below. Prioritization was based on a number of factors including the ability of the site to potentially contaminate the resource, the proximity of the site to the resource, the size of the affected area, whether there was any opportunity to filter pollutants from the site, etc.

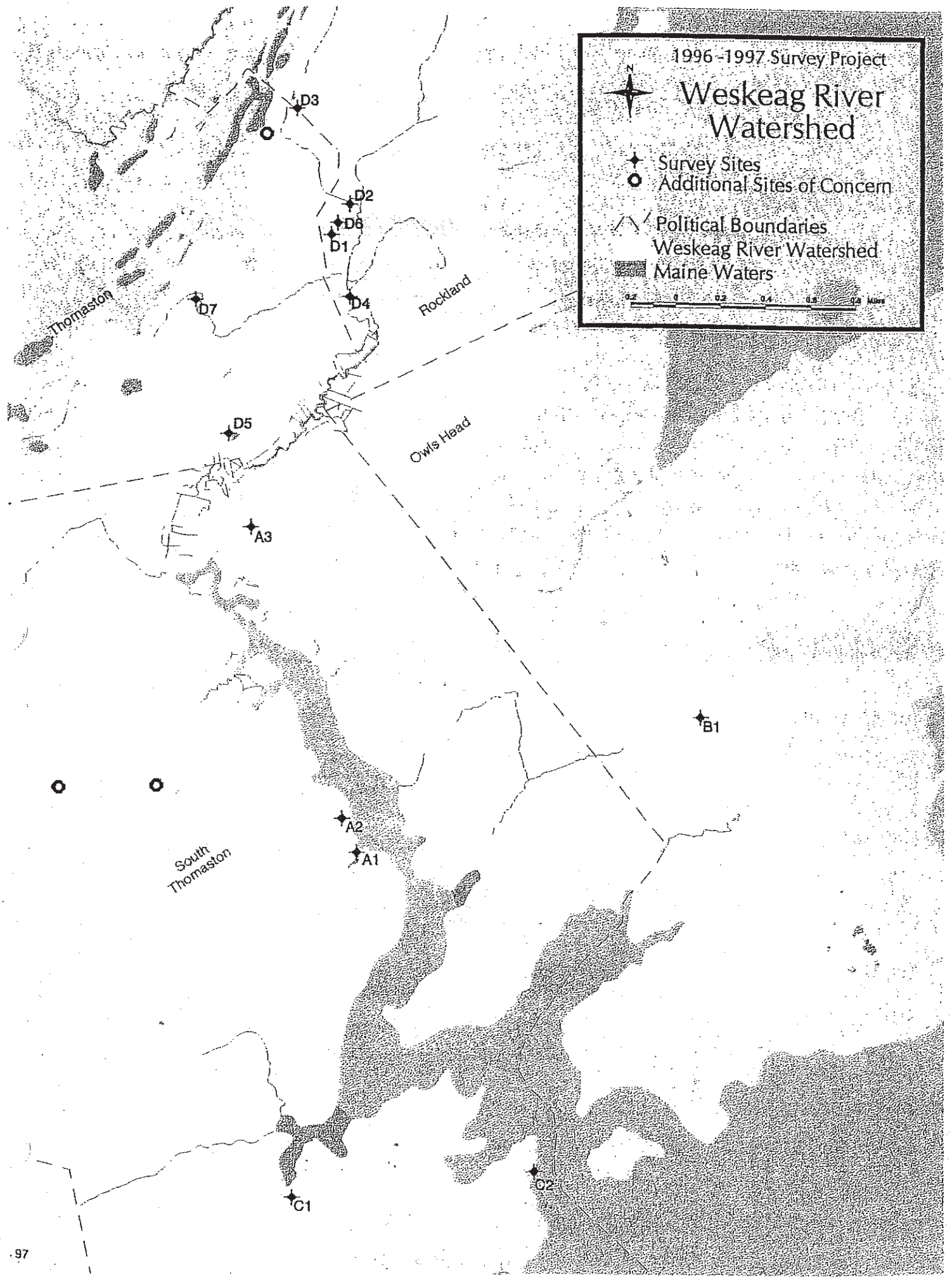
High Priority Sites	Medium Priority Sites	Low Priority Sites
(A-3) Buttermilk Lane on eastern shore of Marsh Brook/Weskeag River located along Tyler Wildlife Management Area, South Thomaston: Cultivated fields within 50 yards of river. Several parcels totaling 2 to 3 acres maybe contributing bacteria, nutrients and sediment. May also be the source of a report of large siltation plume observed during storm events when flying over river	(D-2) Along railroad tracks behind Pleasant Gardens in Rockland near Tuttle Shoe Barn: Residential and industrial runoff as well as old cars and debris such as railroad ties are discharging toxics and nutrients into stream. Oily sheen seen on water.	(D-5) Farm on Thomaston Street near intersection with Buttermilk Lane in Thomaston drains directly into Marsh Brook. Possible bacterial and nutrient contamination. Livestock observed grazing
(A-2) Mill Pond Lane off of Westbrook Street, South Thomaston: Shoulder, ditch and inlet and outlet erosion on tributary to Weskeag River. Erosion occurring on tributary within 100 yards of river.	(D-6) Behind Pleasant Gardens in Rockland: Failing granite culvert under railroad tracks contributing to siltation of a tributary to Marsh Brook. Flooding also results from the culvert problem which contributes other pollutants associated with residential development.	(D-1) Pleasant Street, Rockland, railroad tracks behind Pleasant Gardens: Industrial runoff from railroad tracks, debris and old car parts in wetland. Wetland contains rust stained water.
(B-1) Major area of unstabilized soil at Knox County Municipal Airport, Owls Head. Several acres in size	(D-3) Corner of Upper Pleasant and Park Streets in Rockland: Debris dump next to pond. City end of Rockland Dump. Runoff possibly contaminating pond with toxics, bacteria, nutrients and sediment.	
D-4) Along Thomaston Street where Marsh Brook crosses in Rockland: Ditching and Road crossing eroding into Marsh Brook, contributing nutrients and sediment	(D-7) Old Dump Site and unstabilized area in and adjacent to the Transfer Station in Thomaston, near where Buttermilk Lane intersects Route 1. This site is directly on the banks of a tributary to Marsh Brook possibly contributing nutrients, bacteria, sediment and toxics to this stream.	
(C-1) Waterman's Beach Road in Thomaston near Pole #121-2 and guard rails, Bacteria Sediment and nutrients from shoulder erosion of town road, livestock grazing next to stream and wetland area and old debris on hillside	(C-2) Eroding dirt roadway in Pleasant Beach, area located directly across from Spaulding Island.	
(A-1) Westbrook Street, South Thomaston - West Side of Weskeag River Culvert Leading to wetland: Sediment and other pollutants coming from culvert inlet/outlet and Town road		

Number of Problem Types By Priority			
	High	**Medium**	**Low**
Commercial & Residential Industrial		4	1
Roads	4	1	
Agriculture	1		1
Construction Sites	1		

The highest priority sites that were found include 4 roadway areas, an agricultural area and a construction site. The roadway areas consisted primarily of unstabilized ditches and crossings which discharged directly into tributary streams of Marsh Brook and the Weskeag River. The majority of these were located on town roads with only one being on a private road. Although no direct evidence of sedimentation was observed at the agricultural site, its size and slope, and its proximity to Marsh Brook make it a likely source of sediment and nutrients. The construction site's size was the major factor in making this site a high priority. Expansion of the airport is currently ongoing and a large area of disturbed soil has not been stabilized.

Medium priority sites were dominated by commercial, residential and industrial areas. These included several debris dumps near tributaries and a failing culvert under a railroad bed. These sites were rated as medium priority primarily due their distance from the resource and the ability of wetlands near these sites to provide some treatment.

Low priority sites tended to be of small size, were quite a distance from the resource, and had factors that provided potential treatment.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D6
D7
A1
A2
A3
B1
C1
C2
Thomaston
Rockland
Owls Head
South Thomaston

General Recommendations for Problem Sites

The following table contains general recommendations for correction of problem sites discovered through the survey:

Site	Type of Problem	Recommendations	Priority
A-3	Buttermilk Lane on eastern shore of Marsh Brook/Weskeag River located along Tyler Wildlife Management Area, South Thomaston: Cultivated fields within 50 yards of river. Several parcels totaling 2 to 3 acres may be contributing bacteria, nutrients and sediment. May also be the source of a report of large siltation plume observed during storm events when flying over river	Use of fertilizer on fields should be evaluated and vegetated buffers established between fields and Marsh Brook	High
A-2	Mill Pond Lane off of Westbrook Street, South Thomaston: Shoulder, ditch and inlet and outlet erosion on tributary to Weskeag River. Erosion occurring on tributary within 100 yards of river.	Ditch area should be properly stabilized with vegetation or lined with rock. Culvert inlet and outlet should also be riprapped.	High
B-1	Major area of unstabilized soil at Knox County Municipal Airport, Owls Head. Several acres in size	Area should be temporarily mulched during construction and permanently stabilized with vegetation when construction is completed.	High
D-4	Along Thomaston Street where Marsh Brook crosses in Rockland: Ditching and road crossing eroding into Marsh Brook, contributing nutrients and sediment	Ditch area should be properly stabilized with vegetation or lined with rock. Bridge should also be repaired to prevent further discharge into the brook.	High
C-1	Waterman's Beach Road in Thomaston near Pole #121-2 and guard rails. Bacteria, sediment and nutrients from shoulder erosion of town road, livestock grazing next to stream and wetland area, and old debris on hillside	Stabilize road shoulders, establish vegetated buffer between pasture and stream and remove and properly dispose of discarded debris	High
A-1	Westbrook Street, South Thomaston - West Side of Weskeag River Culvert Leading to wetland: Sediment and other pollutants coming from culvert inlet/outlet and Town road	Stabilize road shoulders and inlet and outlet of culvert. Determine and correct source of pond sedimentation	High

Site	Type of Problem	Recommendations	Priority
D-2	Along railroad tracks behind Pleasant Gardens in Rockland near Tuttle Shoe Barn: Residential and industrial runoff as well as old cars and debris such as railroad ties are discharging toxics and nutrients into stream. Oily sheen seen on water.	Remove old cars and debris and establish a vegetative buffer along stream	Medium
D-6	Behind Pleasant Gardens in Rockland, failing granite culvert under railroad tracks contributing to siltation of a tributary to Marsh Brook. Flooding also results from the culvert problem which contributes other pollutants associated with residential development.	Repair culvert, establish vegetative buffer along stream in residential area.	Medium
D-3	Corner of Upper Pleasant and Park Streets in Rockland. Debris dump next to pond. City end of Rockland Dump. Runoff possibly contaminating pond with toxics, bacteria?, nutrients and sediment.	Remove debris and stabilize or properly close out dump site.	Medium
C-2	Eroding dirt roadway in Pleasant Beach area, located directly across from Spaulding Island.	Install waterbars to direct water to vegetated areas	
D-7	Old Dump Site and unstabilized area in and adjacent to the Transfer Station in Thomaston, near where Buttermilk Lane intersects Route 1. This site is directly on the banks of a tributary to Marsh Brook possibly contributing nutrients, bacteria, sediment and toxics to this stream.	Properly close out disposal area and stabilize disturbed areas. Remove visible debris adjacent to stream.	Medium
D-5	Farm on Thomaston Street near intersection with Buttermilk Lane in Thomaston drains directly into Marsh Brook. Possible bacterial and nutrient contamination. Livestock observed grazing	Establish vegetative buffer between pasture and brook.	Low
D-1	Pleasant Street, Rockland, railroad tracks behind Pleasant Gardens Industrial runoff from railroad tracks, debris and old car parts in wetland Wetland contains rust stained water.	Remove debris and old car parts from wetland area and dispose of them properly.	Low

Time Record

Task	Hours
Steering committee meetings	30 (est.)
Gathering Data	25 (est.)
Publicizing Survey	15 (est.)
Survey Fieldwork	36.5
Other	16 (est.)
TOTAL	122.5 Hours

Next Steps

Conducting a watershed survey is only the initial step in protecting the Weskeag River. Subsequent follow-up is crucial if the health of the river is to be maintained and ultimately improved. Clean-up of existing NPS sources will help to minimize the current discharge of toxics, nutrients, sediments and pathogens. Planning and monitoring of future development is also needed to minimize future sources. In addition, monitoring of the river's water quality and educating residents of the watershed to provide a sensitivity to nonpoint source issues is also critical to the success of protection efforts.

The first step in dealing with polluted runoff flowing to the Weskeag is to reduce or eliminate existing sources in the watershed. This will require some sort of funding as well as the interest and cooperation of individual landowners and municipalities. Section 319(h) of the Clean Water Act is an excellent source of funds to deal with these existing pollution sources. The Environmental Protection Agency administers this grant program which, through the Maine Department of Environmental Protection, funds implementation projects that address prevention, control or abatement of nonpoint sources of pollution. There are two types of projects for the Weskeag watershed which could be funded under this program: a **watershed project** and a **demonstration project**. A watershed project is a project directed at achieving prevention or reduction of major identified nonpoint sources affecting water quality in the watershed by implementing measures which improve impaired water resources. Demonstration projects are a practical method to encourage and accelerate NPS implementation when new technology or approaches have been developed or where existing technology has not been accepted in the area. These two types of projects are usually implemented over a one to two year period. Two year projects are recommended due to Maine's short construction season.

As was evidenced by the additional sites found during the follow-up phase of the survey, the Weskeag River watershed is constantly changing. New developments are being constructed, logging operations are being conducted, agricultural fields go in and out of production, etc. Portions of recently opened shellfish harvesting areas may be threatened in the future due to this ever changing land use. However, this doesn't have to happen if proper precautions are

taken through **watershed planning** to ensure that proposed development is properly located and constructed. Municipalities can amend their land use ordinances to ensure protection of important areas needed to maintain the water quality of the river as well as include provisions to address management of stormwater and proper erosion control on new development sites and logging operations. Assistance on amending ordinances is available from the local regional planning commission and the Department of Environmental Protection. Ardent administration and enforcement of the plumbing code to ensure proper installation and functioning of septic systems will also help to minimize bacterial contamination along with close monitoring of agricultural activity.

As previously indicated, it is important to note that this survey is just the initial step in protecting the Weskeag. Periodic future surveys which target all pollutants of concern are necessary to maintain the health of the river and its resources. In addition to bacteria and toxics, particular attention should be paid to nutrients and sediments since the river has impaired oxygen levels. It is of limited use to identify and correct all sources of bacteria and toxics if a massive die-off of shellfish occurs due to oxygen depletion caused by nutrients and sediments. This situation is not unprecedented in Maine in that a massive shellfish die-off occurred in Maquoit Bay in the 1980s which was attributed to low oxygen levels Since only limited data is available on oxygen levels in the Weskeag, **it is recommended that future monitoring continue in an effort to obtain more complete data and as a basis to determine the success of pollution abatement efforts.**

Sensitizing local residents of the watershed to the effects of nonpoint source pollution is absolutely critical if efforts to protect and improve the Weskeag are to succeed. Major restoration and clean-up efforts are of limited value if the cumulative effects of minor activities conducted by residents contribute greater impacts. Information on ways individuals can maintain the health of the river as well as information on the benefits of a clean river needs to be communicated. The use of newspaper articles and other media are an effective means. A yearly festival or fair to celebrate successful clean-up efforts is another means to get the word out. Pamphlets, posters, workshops and mailings or a combination of these also work well.

Effective corrective action of existing problem conditions, close monitoring of water quality and of new development, and educating residents of the watershed is necessary if areas of the Weskeag river are to remain open to shellfish harvesting and additional currently closed areas, opened for future harvesting activities. The cooperation of the Georges River Regional Shellfish Management Committee, the Georges River Clammers Association, municipal officials, the local Soil & Water Conservation District, the Natural Resource Conservation Service, the Department of Marine Resources and local landowners is crucial for future protection of the Weskeag. By working together, sharing information and making a commitment to the protection of this resource it will remain a productive and outstanding asset to Maine's mid-coast area for years to come.

Appendix A

Weskeag Sampling Results

The following includes water quality monitoring data and a sampling location map which results from sampling completed by personnel of the Maine Department of Environmental Protection in 1990. The data represents two days of sampling work completed at various locations along the Weskeag. The data contains several abbreviations which are defined below:

D.O. - is dissolved oxygen. This parameter is measured in parts per million (PPM) and is the amount of oxygen dissolved in the water. The later in the day the sample is taken the more dissolved oxygen it should contain due plant respiration. A level of 5 ppm or below is known to stress marine organisms

% SAT - is percent oxygen saturation in the water

TEMP. - is temperature measured in Celsius

CND. - is conductivity measured in micro ohms

SAL. - is salinity measured in parts per thousand (PPT)

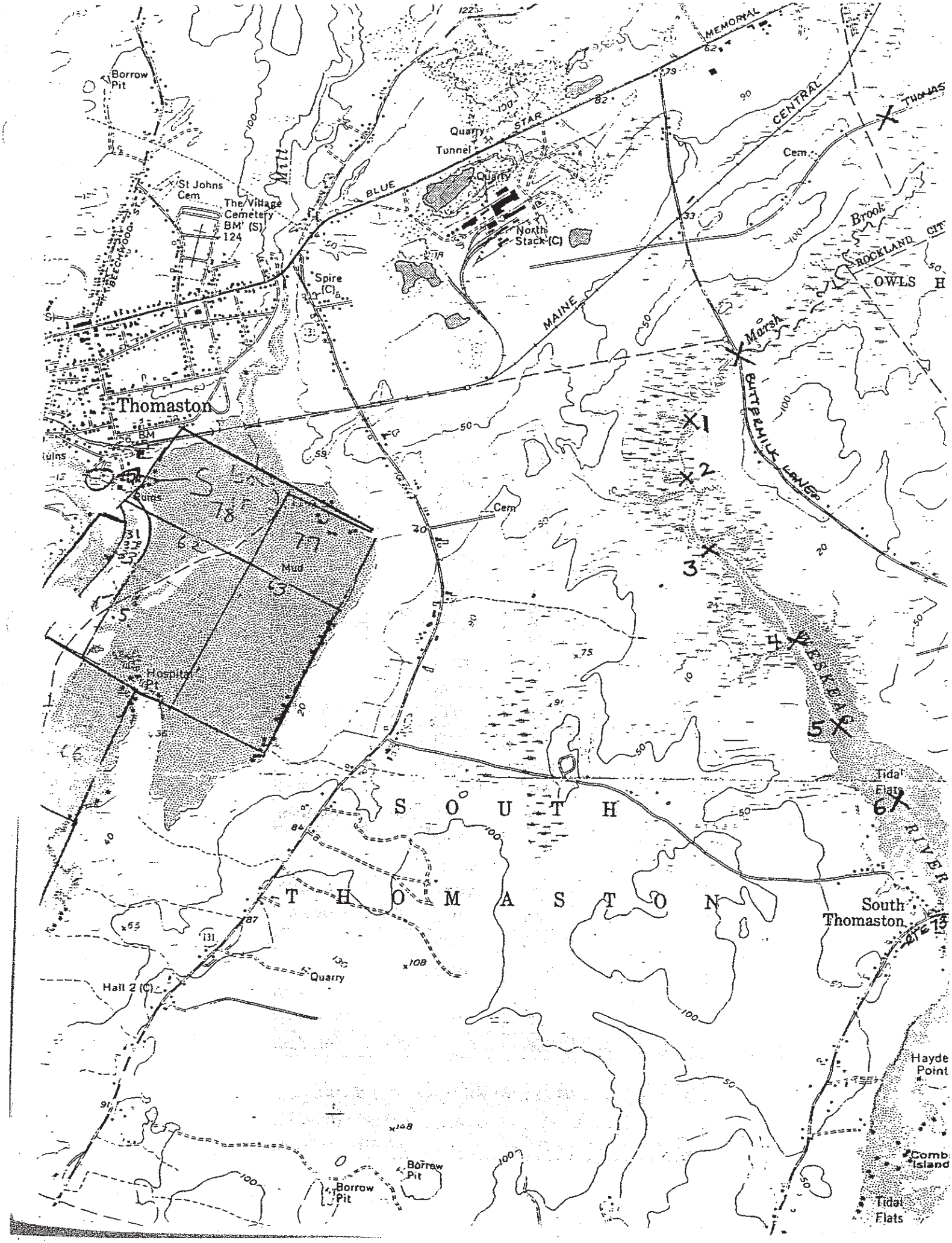
0M, 1M, 2M - is the depth the sample was taken at. 0M means at the surface, 1M means at 1 meter, etc.

Weskeag Estuary
Date: August 30, 1990
Tide: Low @ 1:30pm **Weather: sunny**

STATION	TIME		0M	1M	2M
Thomaston Street	11:26	D.O.	6.4		
		% SAT.	72		
		TEMP.	21.5		
		CND.	600		
Buttermilk Lane	11:37	D.O.	8.7		
		% SAT.	108		
		TEMP.	24.6		
		SAL.	7		
Buttermilk Lane	12:54	D.O.	10.1		
		% SAT.	127		
		TEMP.	25.5		
		SAL.	6		
WKE 1	1:00	D.O.	6.4	4.7	
		% SAT.	82	61	
		TEMP.	25.5	23.2	
		SAL.	9.5	21	
WKE 2	1:20	D.O.	5		
		% SAT.	66		
		TEMP.	25		
		SAL.	17		
WKE 3	1:28	D.O.	5.3		
		% SAT.	71		
		TEMP.	26		
		SAL.	19.5		
WKE 4	1:44	D.O.	7.4		
		% SAT.	101		
		TEMP.	27		
		SAL.	20.5		
WKE 5	1:55	D.O.	8		
		% SAT.	108		
		TEMP.	25.5		
		SAL.	22		
WKE 6	2:05	D.O.	8.7		
		% SAT.	118		
		TEMP.	24.5		
		SAL.	23.5		
ROUTE 73	2:30	D.O.	9.25		
		% SAT.	123		
		TEMP.	23.8		
		SAL.	23.2		

Weskeag Estuary
Date: September 5, 1990
Tide: Low @ 11:51 am High @ 5:48 pm

STATION	TIME		0M	1M	2M
Thomaston Street	8:21	D.O.	4.7		
		% SAT.	44		
		TEMP.	12.5		
		SAL.	0.07		
Thomaston Street	1:50	D.O.	8.45		
		% SAT.	90		
		TEMP.	18.3		
		SAL.	0.7		
Buttermilk Lane	7:53	D.O.	6.2		
		% SAT.	66		
		TEMP.	16.5		
		SAL.	7.8		
Buttermilk Lane	2:00	D.O.	6.2		
		% SAT.	77		
		TEMP.	18.6		
		SAL.	25.4		
Route 73	8:09	D.O.	8.2		
		% SAT.	87		
		TEMP.	16.4		
		SAL.	29		
Route 73	2:15	D.O.	9.9		
		% SAT.	118		
		TEMP.	16		
		SAL.	27		



Borrow Pit
St Johns Cem
The Village Cemetery BM' (S) 124
BEECHWOOD ST
Mill
Quarry
Tunnel
Quarry
BLUE STAR MEMORIAL
North Stack (C)
Spire (C)
MAINE CENTRAL
Cem
Brook
ROCKLAND CIT
OWLS H
Marsh
BUTTERMILK LANE
Thomaston
BM
Ruins
Cem
Mud
Hospital Pt
WESKEAG RIVER
Tidal Flats
S O U T H
T H O M A S T O N
South Thomaston
Quarry
Hall 2 (C)
Hayde Point
Comb Island
Tidal Flats
Borrow Pit
Borrow Pit

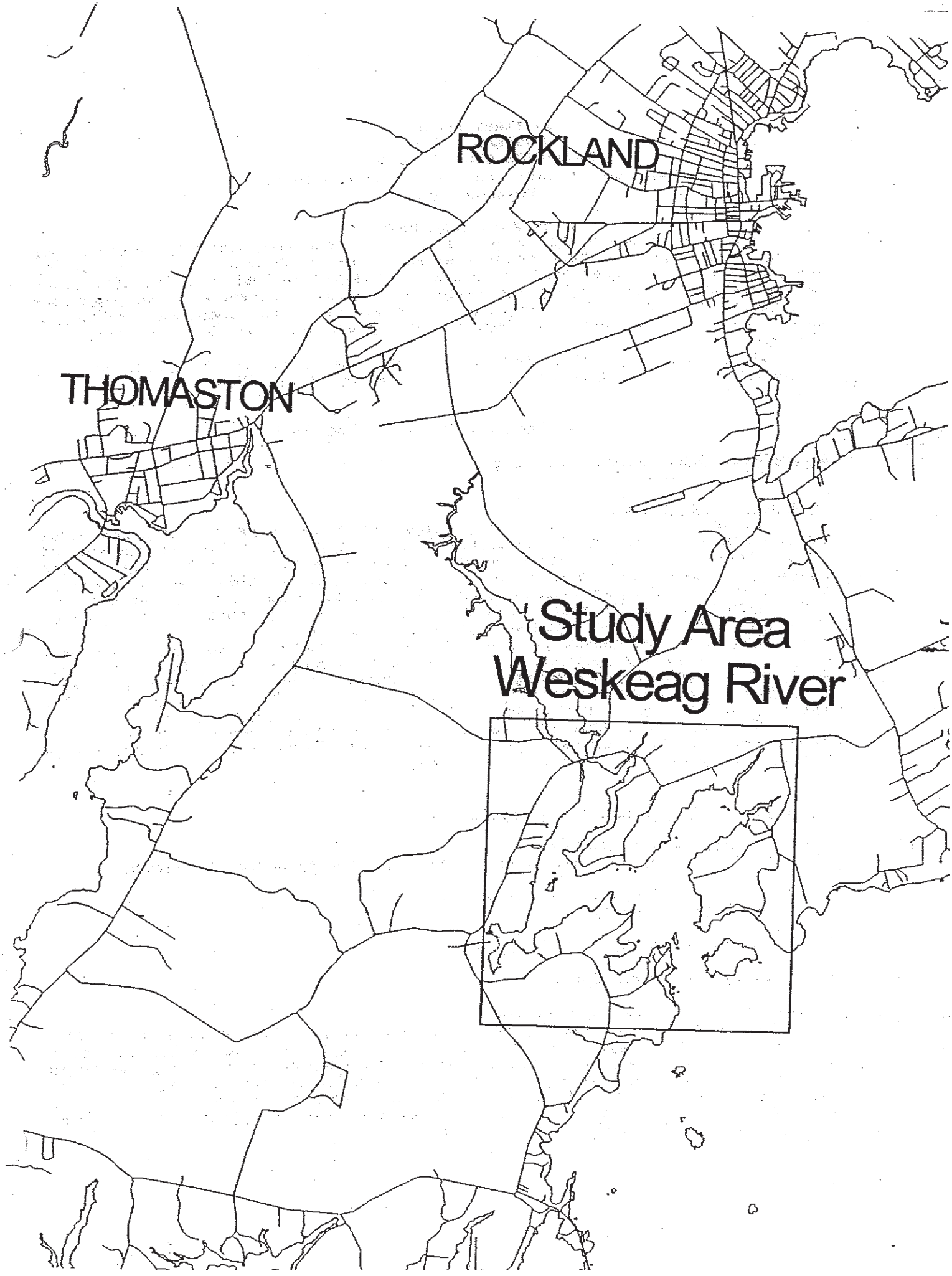
Appendix B

STATE OF MAINE
DEPARTMENT OF MARINE RESOURCES
PUBLIC HEALTH DIVISION
McKown Point Road
West Boothbay Harbor, Maine 04575
(207) 633-9500

SANITARY SURVEY REPORT

Weskeag River
SHELLFISH GROWING AREA V

COMPILED BY
PAUL ANDERSON AND FRAN PIERCE
WITH ASSISTANCE FROM
THE GEORGES RIVER REGIONAL SHELLFISH COMMITTEE
NOVEMBER 1996


ROCKLAND
THOMASTON
Study Area
Weskeag River

SANITARY SURVEY
WESKEAG RIVER
SHELLFISH GROWING AREA V
Compiled by Paul Anderson and Fran Pierce
November 1996

I. EXECUTIVE SUMMARY

This area lies in the townships of South Thomaston and Owls Head in Knox County. This area has been classified as closed prohibited to the taking of shellfish since at least 1989. It was last surveyed in 1989 by Laura Livingston of the Maine Department of Marine Resources. Follow up survey work was conducted in October 1996 by Paul Anderson and Fran Pierce of the Department of Marine Resources with assistance from members of the Georges River Regional Shellfish Committee.

As a result of this shoreline survey, portions of the river will be reclassified as open approved for the harvesting of shellfish.

II. DESCRIPTION OF GROWING AREA

A. Location map showing growing area.

See attached map

B. Description of Area

The shoreline covered in this report stretches from the un-named point north of Thorndike Point on the southern mouth of the river, in the township of South Thomaston, to Dyer Point on the northeastern mouth of the river in the township of Owls Head in Knox County. The shoreline in this area consists of large mudflats with marsh grass along the upper portions of the river and some rocky shore towards the mouth. Soft shell clam habitat is found on both sides of the river form the South Thomaston bridge to the mouth.

Freshwater influences include: the large stream that flows through the vast marsh in the uppermost portion of the river and the many smaller streams that can be found throughout the growing area. The streams inside the survey area were visited and evaluated microbiologically. A summary of the stream sample results can be found in the Pollution Source Survey section of this report.

All dwellings within 500 feet of the shore were surveyed. Descriptions of properties with questionable septic systems can be found in the Pollution Source Survey section of this sanitary survey report.

C. History of growing area classification

1. Date of last survey
This area was last surveyed in 1989 and 1990 by Laura Livingston.

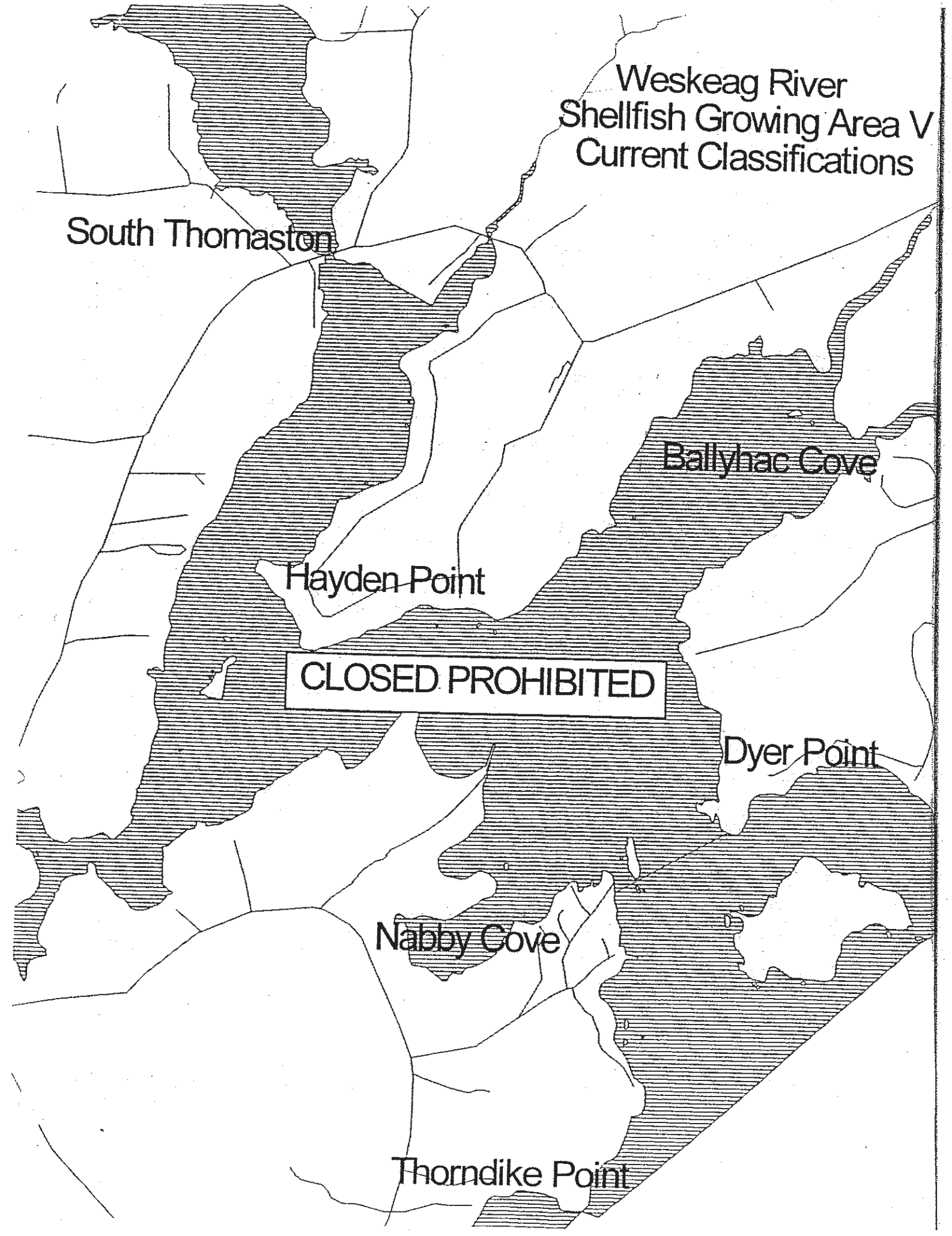
2. Previous classification map
See attached map(s)

SHORELINE SURVEY - OCTOBER 1996

III. POLLUTION SOURCE SURVEY

A. Summary of sources and Location

This area was surveyed by Paul Anderson and Fran Pierce in October 1996. A total of 160 dwellings were inspected and the septic systems evaluated. There are no municipal treatment facilities on the Weskeag River. No overboard discharges or straight pipes were found during the survey. According to The Department Of Enviromental Protection, the last liscenced overboard discharge was removed in 1994. The shoreline survey revealed several point and non-point sources of pollution which are itemized below.


Weskeag River
Shellfish Growing Area V
Current Classifications
South Thomaston
Ballyhac Cove
Hayden Point
CLOSED PROHIBITED
Dyer Point
Nabby Cove
Thorndike Point

B.Identification and Evaluation of Pollution Sources
1.Domestic Wastes
a.Septic Tanks

The majority of the dwellings on the Weskeag River have individual in ground septic systems. Three outhouses were observed and all were found to be in satifactory condition. One business was using a peat raised bed system.

The following dwellings were found to be pollution sources. All of these sites were visited with the local plumbing inspectors. Please refer to the Pollution Source Map for a visual reference for locations of these dwellings.

Pollution Sources:

1.White clapboard summer house owned by Fenderson family, South Thomaston tax map page 6, lot#21. This dwelling has a very old holding tank 10 feet from the shore with a cast iron septic overflow pipe coming out of the bank directly under the tank. This dwelling has already had a site evaluation done and the new septic will be going in either this fall, or in the spring of 1996.

2.Cow pasture (see agricultural waste section)

3. Natural shingled ranch with deck on front, owned by David Mahoney, tax map page 14, lot#20. The holding tank for this house is sunken into the ground on an elevated slope approx 65 feet above the shore. Directly behind the tank, leading to the shore, a gully has formed that transports septic waste to the shore from the tank overflow. This system will be replaced in the fall of 1996 or the spring of 1997.

4. White farmhouse owned by Dianne Atwood, South Thomaston tax map page 15, lot #30. This dwelling has a failing septic system on the northwest side that is running all over the yard. This system will be replaced in the spring of 1997.

5. Small camp with cistern and outhouse owned by Robert Nash, Owls Head tax map page1, lot#30. This dwelling has a grey water discharge that enters into a swale that leads to the shore. The outhouse at this site was well maintained and located a safe distance from the shore.

6. Three dwellings on the shore owned by Everett Jones, Owls Head tax map page 1, lot#28. Two of the dwellings are located close to the shore and are in a bad state of disrepair. Both of these dwellings have malfunctioning septic systems. The third dwelling is a trailer that also has a questionable septic system.

Closure lines will be drawn around all of these dwellings.

Liscensed Overboard Discharge Systems:

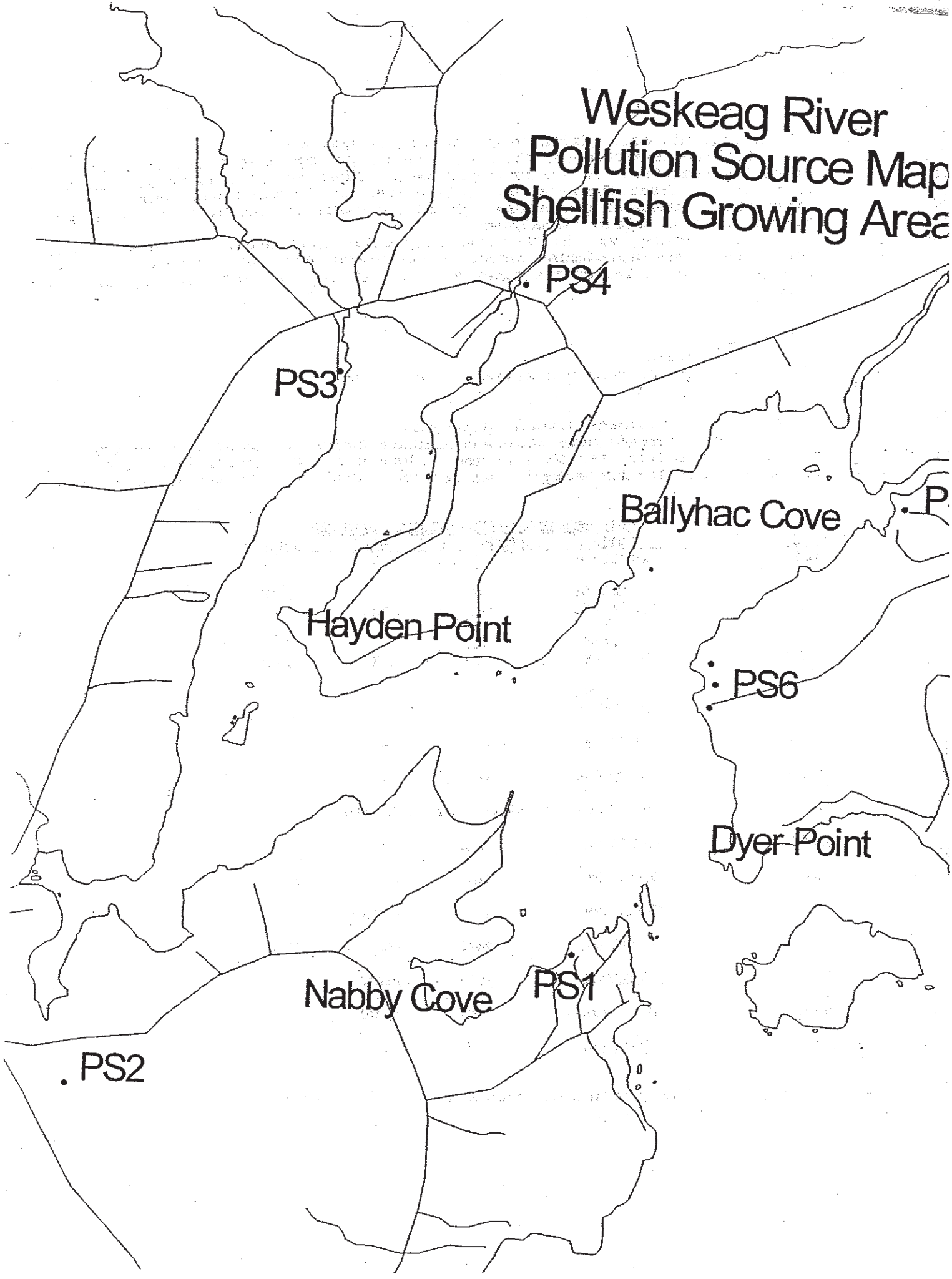
There are no liscensed overboard discharges on the Weskeag River. The last overboard discharge was removed in 1994. The shoreline survey of the river revealed that there are no straight pipe discharge systems.

b.Treatment Plants

There are no municipal treatment facilities on the Weskeag River.

c.Marinas

There are no marinas on the Weskeag River. In the upper river there is a public launching ramp and float. Approximately 4 moorings are located nearby. These moorings are used by small fishing boats that fish for lobster outside the river. One other mooring was observed nearby water sampling station #48.5.


Weskeag River
Pollution Source Map
Shellfish Growing Area
PS4
PS3
Ballyhac Cove
Hayden Point
PS6
Dyer Point
Nabby Cove
PS1
PS2

d. Recreational areas, fishing and hunting camps, etc.

With the exception of the public launching ramp, the shore-front property of the Weskeag River is all privately owned. There are no public camp sites or parks in this area. There is a wildlife area in the upper-most portion of the river that is managed by the Dept. Of Inland Fisheries and Wildlife. Hunting is allowed, but no camping is allowed.

Deer hunting was in the past, a popular sport along the river. Recent developement has caused many hunters to go elsewhere to hunt. However, deer were observed at two sites on the river so it is likely that some hunting does take place.

2.Stormwater

a.Combined Sewers

There are no combined sewers in this area.

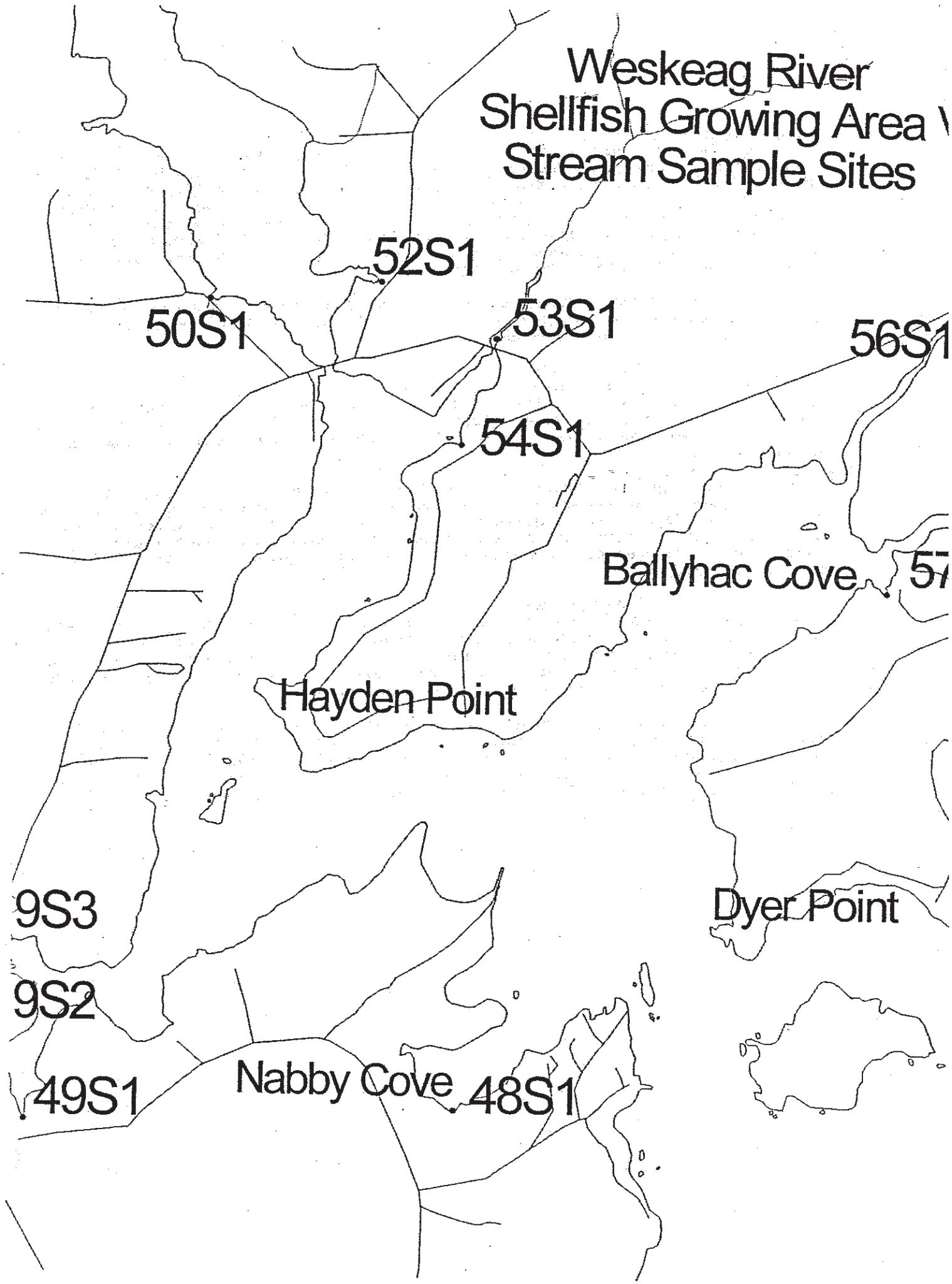
b.Locations of drainage ditches, pipes,runoff

Several streams were noted and sampled during the shoreline survey. The table below itimizes these streams along with the microbiologic quality of the water. See the accompanying map for the locations of these streams on the river.

1996 WESKEAG RIVER STREAM SAMPLES

LOCATION#	DATE	SCORE A-1	FLOW	IMPACT
48S1	10/11/96	9.1	7	I/P
49S1	9/22/96	93		I/P
49S1	10/23/96	9.1	>100	I/P
49S2	9/22/96	43		I/P
49S2	10/23/96	43	>150	I/P
49S3	9/22/96	43		I/P
49S3	10/23/96	23	>150	I/P
50S1	9/23/96	93	5	I/P
*51S1	10/11/96	460	>80	D/A
51S2	10/11/96	NO FLOW - DID NOT SAMPLE		
52S1	10/11/96	9.1	10	I/P
53S1	10/11/96	43	<5	I/P
53S2	10/11/96	43	>100	I/P
54S1	10/11/96	240	<5	D/A
56S1	10/11/96	150	>100	I/P
56S2	10/11/96	93	>100	I/P
57S1	10/11/96	93	7	I/P

* Stream # 51S1 is outside of study area at the R. Waldo Tyler wildlife area.


Weskeag River
Shellfish Growing Area
Stream Sample Sites
52S1
50S1
53S1
56S1
54S1
Ballyhac Cove
Hayden Point
9S3
Dyer Point
9S2
49S1
Nabby Cove
48S1

3.Agricultural Waste

At the very head of the river there is a large marsh and wooded area of approximately 900 acres. The marsh is known as The R. Waldo Tyler Wildlife Area. The wildlife area has been managed by Inland Fisheries and Wildlife since 1968. The wildlife area is open for some public use, hunting is allowed, but no camping is allowed. There are no figures availabe for the numbers of birds and wild animals that migrate through the area each year. This area is within the portion of the river that will remain closed to the harvesting of shellfish and was therefore not included in the shoreline survey.

Three small family owned farms consisting of one or two horses were noted during the survey. One cow farm of approxx. 20 cows was noted. A description of each of these farms is listed below:

Western Shore

1.At the head of Nabby Cove at the residence owned by John Snow Sr., South Thomaston tax map page 6, lot#41.1, one horse was observed grazing in a pasture approxx 800 feet from the shore. Just below the pasture on the shore there is a seasonal stream. The stream was visited twice, but there was no flow during either visit.

2.Cow pasture owned by Herbert Grierson, South Thomaston tax map page 10, lots# 14 and 18 (see pollution source map for location of this pasture (PS2)). The cows at this site are allowed to graze in two seperate pastures. One pasture borders on a stream that enters into a large tidal area. The stream (49S1) was sampled twice. The A-1 scores for this stream were both quite good at: 93 on 9/22/96 and 9.1 on 10/23/96.

Eastern Shore

1.On the eastern shore, above the South Thomaston bridge, at the George Kittredge residence, there is a horse pasture that slopes down to the shore. This pasture is located on South Thomaston tax map page15, lot#7. Two horses graze in the large field at this site. There is a very small stream that enters the river below the pasture. The stream was not flowing on 10/11/96.

2.At the Dianne Atwood residence, South Thomaston tax map page 15, lot#30 one horse was observed grazing in the lawn area around the failing septic system. There is a stream below this site. The stream (53S2) was sampled on 10/11/96 and received an A1 score of 43. This stream is within the area that will remain closed because of the failing septic system.

IV. HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

A. Tides

The tides on the coast of Maine are diurnal in nature. The mean tidal range in this area is between 11.4 and -1.8 feet. These numbers will vary from their predicted values depending on meteorlogical conditions. The mean tide in this area is about 9.2 feet.

B. Rainfall

According to the Coastal Pilot, there is an average of about 42.9 inches of precipitation in the mid-coast area yearly. The monthly average is 3.6 inches with the maximum average precipitation occurring in November, at 4.90 inches and the lowest average occurring in July, at 2.54 inches.

Rainfall is monitored locally at the Thomaston Treatment Facility. Precipitation data is included in the appdendix of this report. An analysis of the data indicates that the area is subject to normal effects from non-point runoff and that no particularly significant impact is associated with precipitation in the proposed approved areas.

C. Winds

The Coast Pilot states that the prevailing winds during the warmer months are from the south and southwest and during the colder months from the northwest through the northeast. The mean wind speeds are greatest during the months of April and May. The lowest mean wind speeds are recorded during the month of August.

This does not appear to have any significant effect on the water quality in this area.

D. River discharges

The Weskeag River is a relatively small and winding river system. The river becomes a narrow strip at low tide with maximum depths of 9 feet. There are no municipal sewage treatment facilities or marinas on the Weskeag River. Water quality stations in the upper portions of the river have shown significant improvements in the past few years and most of these stations now meet open approved classification standards. Outer portions of the river near the mouth, receive good water circulation and the water quality scores have remained consistantly good.

Numerous small streams can be found along the shore on both sides of the river. These streams have been sampled and evaluated as potential pollution sources (see Pollution Sources section B).

E. Summary

The combination of hydrographic characteristics discussed above may contribute to the water quality of the survey area, therefore having some impact on the safety of the shellfish harvested in the area. Tidal and wind factors may play some part in the dispersion and dilution of pollutants. However, given the orientation of the shoreline and the shallow narrow channel at low tide it is likely that this river system flushes the majority of its' water with each tidal cycle. It is important to evaluate the local water quality in the context of these various hydrographic characters prior to making any judgements. Appropriate changes in classification are proposed with this sanitary survey.

V. WATER QUALITY STUDIES

A. Map of sampling stations
See attached map

B. Sampling plan and justification
The Weskeag river is sampled following a random sampling format. Water quality stations have been placed along the river at sites nearby streams and areas of local development. Station #48.5 was added to the list of sampling stations in 1994 in an effort to better monitor the water as it flowed around the bend in the river at Birch Point. Station #48.5 currently has a total of 17 samples. All of the other stations on the river have the required 30 samples/station.

C. Sample Data analysis and Presentation

STATION	N	GM	P90	*CLASSIFICATION
48	30	5.2	17.7	OPEN APPROVED
48.5	16	5.4	14.5	OPEN APPROVED**
49	30	8.3	36.2	OPEN APPROVED
50	30	6.7	24.6	OPEN APPROVED
50.5	30	10.8	43.5	PROHIBITED
52	30	10.8	63.6	PROHIBITED
53	30	5.4	14.8	PROHIBITED
54	30	8.4	45.1	PROHIBITED
55	30	7.5	40.5	OPEN APPROVED
57	30	10.3	52.0	PROHIBITED
58	30	6.6	24.7	PROHIBITED

* classification as a result of this Sanitary Survey Report
** Station 48.5 was added in 1994

This area was in the past, sampled following an adverse sampling plan but was changed to a random sampling format in 1994. The stations in this area have been sampled at least 30 times in the last six years.

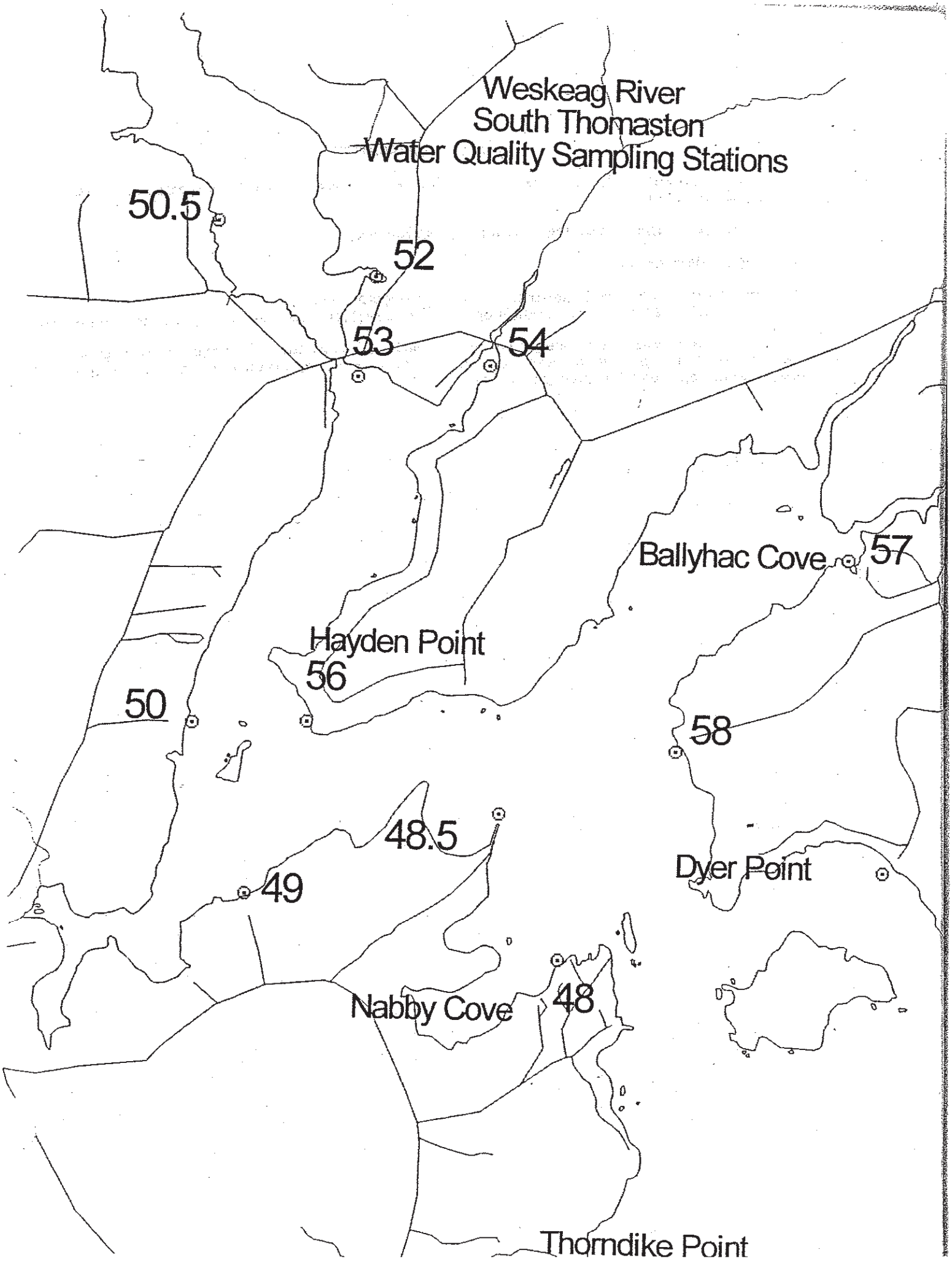
VI. DISCUSSION

A discussion of how actual or potential polution sources, wind, tide, rainfall, etc. affect or may affect water quality:

All of the factors that could contribute to poor water quality in this growing area were evaluated. As a result of the evaluation of the Weskeag River, in shellfish growing area V, and the compilation of this sanitary survey report, changes were made in the classification of this growing area.

Areas that were found to be exposed to any threat of pollution will be properly classified and evaluated with municipal officials.

No additional areas will be re-opened until all identified failing septic systems have been fixed and the water quality meets open approved standards.


Weskeag River
South Thomaston
Water Quality Sampling Stations
50.5
52
53
54
Ballyhac Cove
57
Hayden Point
56
50
58
48.5
49
Dyer Point
Nabby Cove
48
Thorndike Point

VII. CONCLUSIONS

A. Map showing classification (closure lines, lines separating various classifications)

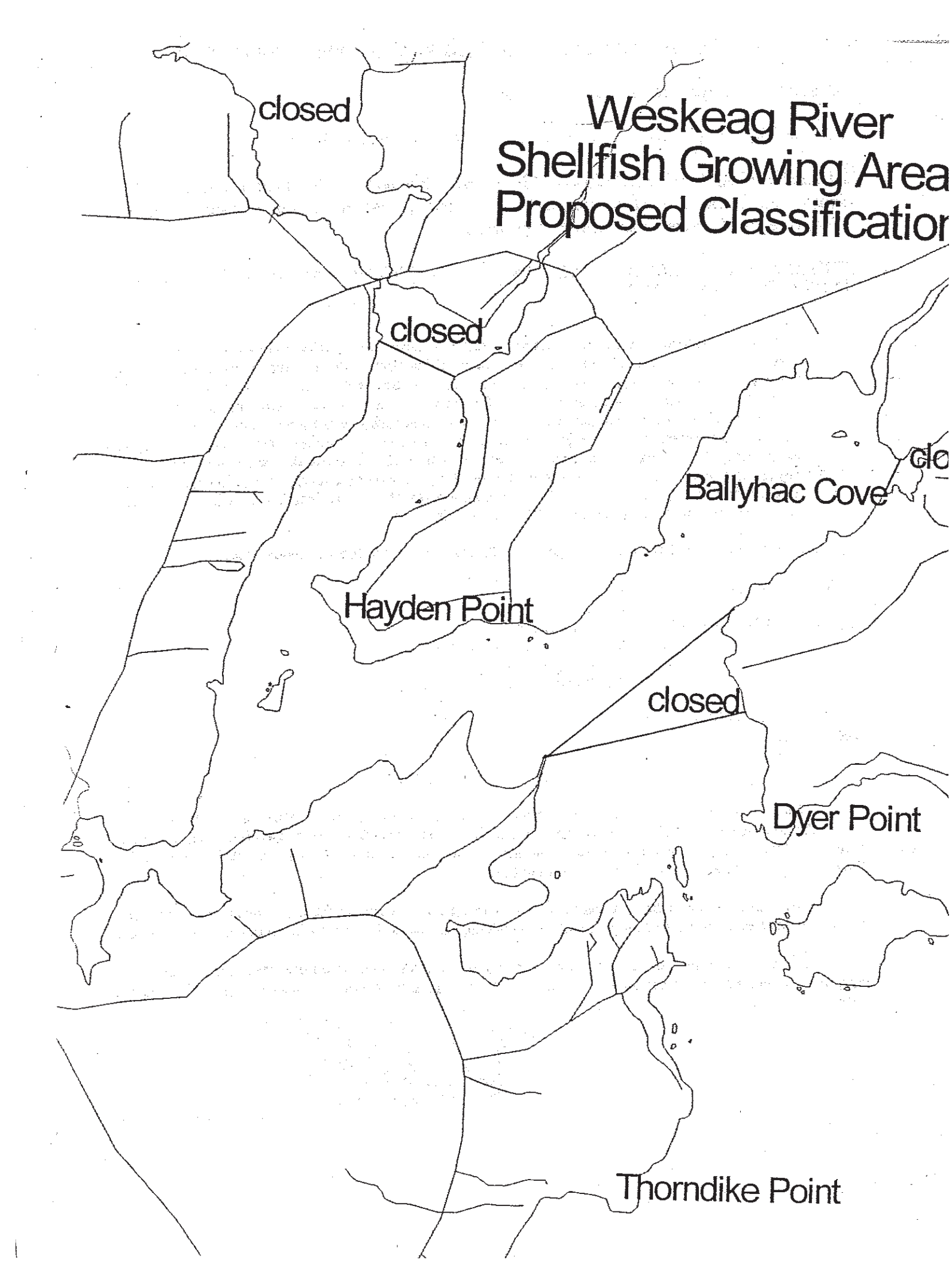
See attached Proposed Classification map

B. Legal description

D. Recommendations for sanitary survey improvement

1. This area will continue to be sampled following a random sampling format.

2. Areas that are required to remain closed due to mafunctioning septic systems will be opened as soon as the systems are replaced and the water quality meets open approved classification.


Weskeag River
Shellfish Growing Area
Proposed Classificatior
closed
closed
Ballyhac Cove
clo
Hayden Point
closed
Dyer Point
Thorndike Point

NOTICE OF EMERGENCY RULE REPEAL AND PROMULGATION

AGENCY: Department of Marine Resources

STATUTORY AUTHORITY: 12 M.R.S.A. Sections 6172 and 6192

RULE REPEAL AND PROMULGATION: DMR Regulation 95.05 J, Closed Area No. 28-B, Spruce Head Island, South Thomaston to Spaulding Island, Owls Head, promulgated on March 11, 1996, is repealed and replaced with the following rule:

TEXT OF RULE: DMR Regulation 95.05 J, Closed Area No. 28-B, Spruce Head Island, South Thomaston to Thorndike Point, South Thomaston.

1. Effective immediately, because of pollution, it shall be unlawful, to dig, take or possess any clams, mussels, oysters or quahogs from the shores, flats and waters of Seal Harbor that lie inside (northeasterly) of a line beginning at a red painted post located on the western shore of Seal Harbor. This stake is situated on the shore about 400 yards south of the northern end of Seal Harbor at the town line. From this stake the line runs southerly to the northern end of Slins Island; then running southeasterly to the southern tip of Burnt Island; then running northeasterly to the navigation target on the eastern end of Spruce Head Island; AND inshore and westerly of a line beginning at the northeastern most point on Spruce Head Island and running northwesterly to the northeastern most tip of Elwell Point; then running northerly to the northern tip of the next prominent (unnamed) point; then running northerly to the easternmost tip of Waterman Point; then running northeasterly to the unnamed point 350 yards north of Thorndike Point.

Violation of any provision of this regulation shall be a Class D Crime (12 M.R.S.A. Section 6204).

EFFECTIVE DATE: December 6, 1996

AGENCY CONTACT PERSON: Paul S. Anderson
Department of Marine Resources
McKown Point Road
West Boothbay Harbor, Maine 04575

THE COURIER GAZETTE
December 12, 1996

STATEMENT OF FACT AND POLICY

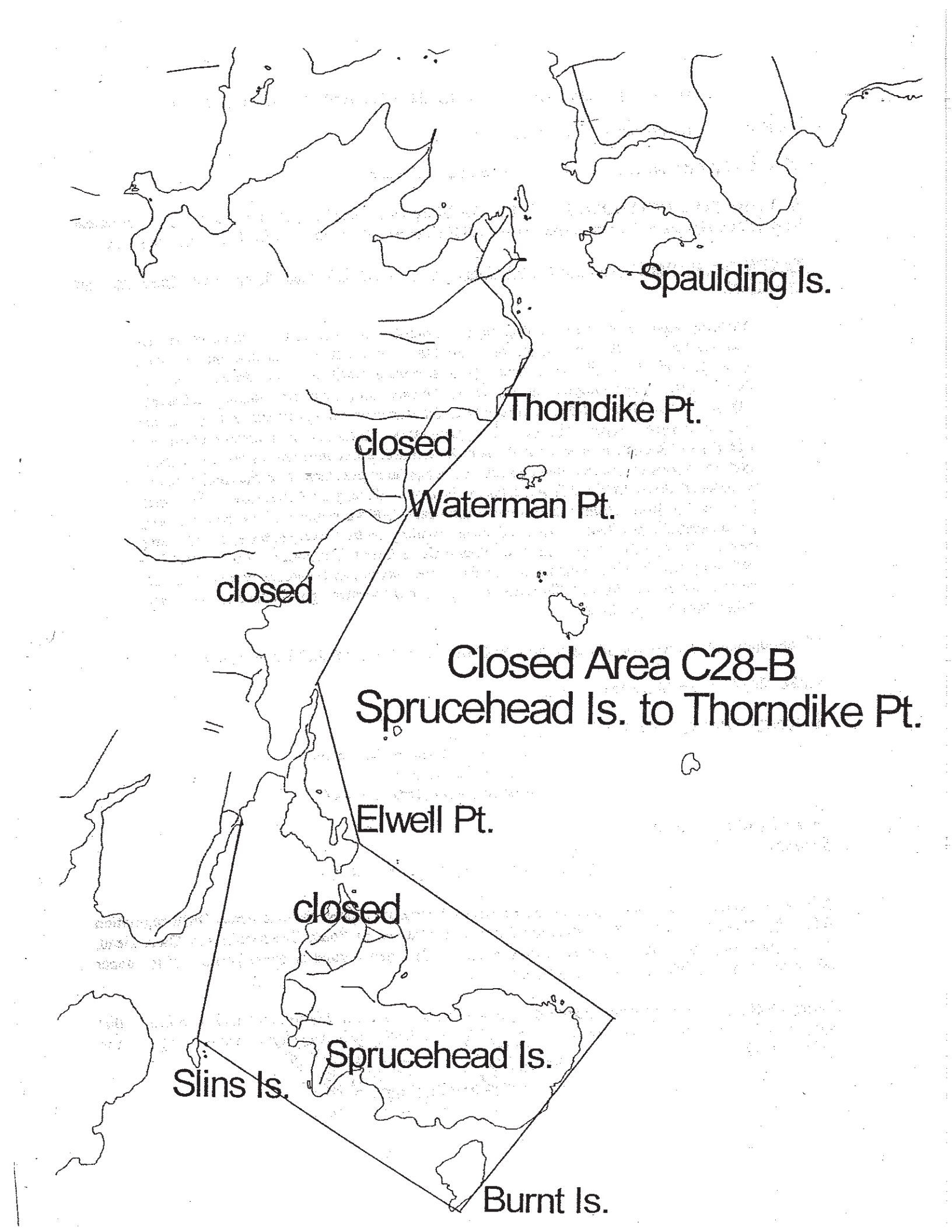
The Commissioner of the Maine Department of Marine Resources repeals the emergency DMR Regulation 95.05 J, Closed Area No. 28-B, Spruce Head Island, South Thomaston to Spaulding Island, Owls Head promulgated on March 11, 1996, and replaces it with a new rule. This new rule, in combination with Closed Area 28-I promlugated on December 6, 1996, opens the mouth of the Weskeag River.

Department personnel have sampled and surveyed the flats and waters in this area and have determined that shellfish in this area are no longer subject to biological pollution and can be harvested without threat to public Health.

However, the intertidal area to the south and west of Thorndike Point to Spruce Head must remain closed because of pollution. This closure prohibits the harvest of clams, mussels, oysters and quahogs to protect the public health.

E. PENN ESTABROOK
DEPUTY COMMISSIONER

Z:\CLOSURES\AREAS.CL\28-96L.WPD


Spaulding Is.
Thorndike Pt.
closed
Waterman Pt.
closed
Closed Area C28-B
Sprucehead Is. to Thorndike Pt.
Elwell Pt.
closed
Sprucehead Is.
Slins Is.
Burnt Is.

NOTICE OF EMERGENCY RULE REPEAL AND PROMULGATION

AGENCY: Department of Marine Resources

STATUTORY AUTHORITY: 12 M.R.S.A. Sections 6172 and 6192

RULE REPEAL AND PROMULGATION: DMR Regulation 95.05 FF, Closed Area No. 28-I, Weskeag River, South Thomaston, promulgated May 9, 1989, is repealed and replaced with the following rule:

TEXT OF RULE: DMR Regulation 95.05 FF, Closed Area No. 28-I, Weskeag River, South Thomaston and Owls Head.

1. Effective immediately because of pollution it shall be unlawful to dig, take or posses any clams, quahogs, oysters, or mussels taken from the shores, flats and waters of the following three portions of the Weskeag River: (1)That portion north of a line drawn across the Weskeag River, beginning at a red painted post located on the western shore approximately 300 yards south of the bridge at Spruce Head Rd. thence running due east to a red painted post on an un-named point of land on the opposite shore; AND (2)The southeastern tributary of Ballyhac Cove, in the town of Owls Head, located inside of a line drawn from a red painted post on the northern shore, running south to a red painted post located on the small point on the opposite shore; AND (3)That portion at the mouth of Ballyhac Cove between two lines. The first line drawn from a red painted post located 700 yards north of the most westerly prominence of Dyer Point, Owls Head, thence running southwesterly to the end of the long pier on the opposite shore, north of Nabby Cove, South Thomaston. The second line beginning at the above mentioned pier on the western shore thence running easterly to an un-named point of land located 300 yards north of the most westerly prominence of Dyer Point in the town of Owls Head.

Violation of any provision of this regulation shall be a Class D Crime(12M.R.S.A. Section 6204)

EFFECTIVE DATE: December 6, 1996

AGENCY CONTACT PERSON: Paul Anderson
Department of Marine Resources
McKown Point Road
West Boothbay Harbor, ME 04575

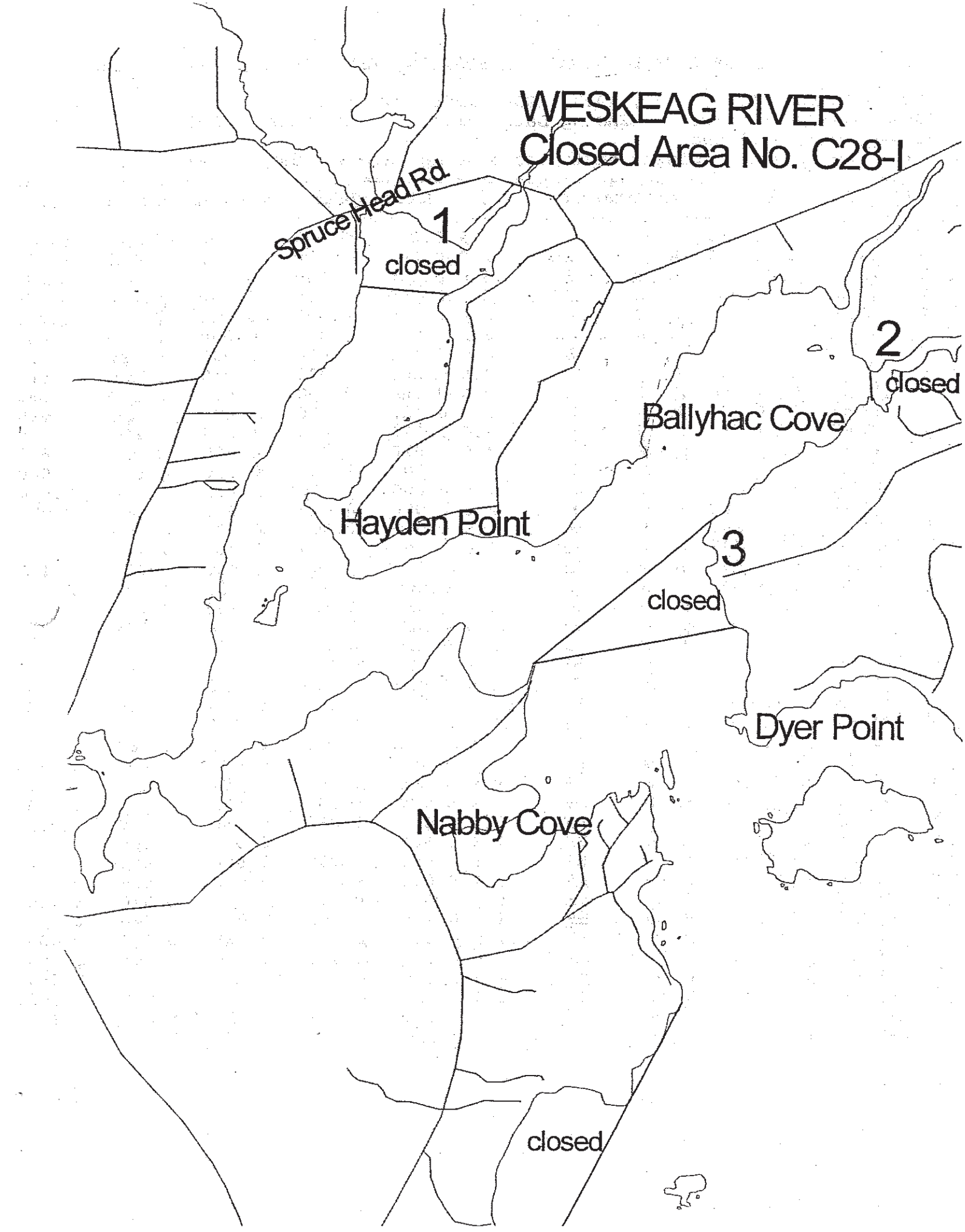
THE COURIER GAZETTE
December 12, 1996

STATEMENT OF FACT AND POLICY

The commissioner of the Maine Department of Marine Resources repeals the emergency DMR regulation 95.05FF, Closed Area No. 28-I, Weskeag River in the towns of South Thomaston and Owls Head, promulgated on May 9, 1989, and enacts a new regulation. This new regulation opens portions of the upper Weskeag River, Ballyhac Cove and Nabby Cove.

Department personnel have sampled and surveyed the flats and waters in this area and have determined that shellfish in these areas are no longer subject to biological pollution and can be harvested without threat to public health.

E. PENN ESTABROOK
DEPUTY COMMISSIONER


WESKEAG RIVER
Closed Area No. C28-I
Spruce Head Rd.
1
closed
2
closed
Ballyhac Cove
Hayden Point
3
closed
Dyer Point
Nabby Cove
closed

FOR THE YEARS 1991, 1992, 1993, 1994, 1995, AND 1995
Starting Date: 01/01 Ending Date: 12/31 Rainfile: RNWROC
Category AF excluded
***** in rainfall columns indicates missing rainfall data *****

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
V 48.00	01/04/91	A	R	F	2.9	0.000	0.000	0.000	0.000	0.280
V 48.00	02/12/91	A	O	HE	2.9	0.000	0.000	0.000	0.000	0.250
V 48.00	03/13/91	A	O	E	3.6	0.000	0.000	0.000	0.000	0.000
V 48.00	04/02/91	A	O	HF	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	05/23/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	06/27/91	A	N	H	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	07/09/91	A	P	E	93.0	0.030	0.080	0.080	0.130	0.130
V 48.00	07/11/91	A	P	H	3.6	0.000	0.000	0.030	0.080	0.080
V 48.00	08/12/91	A	P	H	3.6	0.000	2.390	2.880	2.880	2.880
V 48.00	06/09/92	A	W	E	2.9	0.120	0.120	1.470	1.790	1.800
V 48.00	06/15/92	A	W	E	3.6	1.670	1.670	1.670	1.670	1.670
V 48.00	06/29/92	A	W	E	3.6	0.010	0.010	0.030	0.030	0.610
V 48.00	08/25/92	A	O	H	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	06/08/93	A	O	F	2.9	0.000	1.750	1.830	1.830	1.830
V 48.00	07/07/93	A	O	F	3.6	0.000	0.000	0.000	0.050	0.050
V 48.00	08/02/93	A	O	H	3.6	0.000	0.000	0.020	0.070	0.110
V 48.00	09/29/93	A	P	HF	3.6	0.000	1.380	2.260	2.260	2.260
V 48.00	10/04/93	A	P	HF	2.9	0.300	0.450	0.450	0.450	0.450
V 48.00	11/22/93	A	N	E	2.9	0.000	0.050	1.630	1.630	2.
V 48.00	12/06/93	A	P	F	15.0	0.630	1.350	1.350	1.350	1.
V 48.00	04/27/94	R	N	HE	2.9	0.330	0.550	0.550	0.550	0.550
V 48.00	05/27/94	R	N	HF	2.9	0.000	0.000	0.320	0.340	0.340
V 48.00	06/15/94	R	O	HF	2.9	0.000	0.070	0.540	0.540	0.540
V 48.00	07/14/94	R	W	F	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	08/09/94	R	O	F	21.0	0.000	0.000	0.000	0.360	0.360
V 48.00	09/29/94	A	P	LF	43.0	0.080	1.710	1.710	1.880	8.230
V 48.00	10/02/94	A	O	E	2.9	0.000	0.000	0.000	0.080	1.710
V 48.00	10/03/94	R	O	H	9.1	0.000	0.000	0.000	0.000	0.080
V 48.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 48.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 48.00	05/26/95	R	O	HF	2.9	0.000	0.060	0.060	0.060	0.310
V 48.00	05/26/95	R	O	HF	2.9	0.000	0.060	0.060	0.060	0.310
V 48.00	06/22/95	R	O	HE	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	06/22/95	R	O	HE	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	07/25/95	R	O	HE	9.1	0.000	0.000	0.000	0.040	0.150
V 48.00	07/25/95	R	O	HE	9.1	0.000	0.000	0.000	0.040	0.150
V 48.00	08/30/95	R	O	HF	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	08/30/95	R	O	HF	2.9	0.000	0.000	0.000	0.000	0.000
V 48.00	09/20/95	R	O	H	2.9	0.000	0.000	1.050	1.050	1.050
V 48.00	09/20/95	R	O	H	2.9	0.000	0.000	1.050	1.050	1.050
V 48.00	11/15/95	R	F	F	93.0	4.030	4.030	4.490	5.390	5.391
V 48.00	11/15/95	R	F	F	93.0	4.030	4.030	4.490	5.390	5.391

TATION 48.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
AL: :AMPLES	42	4.9	7.1	0.0	23.6	18.0
FLOOD TIDES	20	5.7	10.0	0.0	27.5	27.2
HIGH TIDES	25	3.4	0.0	0.0	2.0	5.5
EBB TIDES	14	4.6	7.1	0.0	23.0	15.3
LOW TIDES	1	43.0	0.0	0.0		
RAIN3 >= 0.5	14	6.8	14.3	0.0	31.7	37.7
RAIN3 >= 1.0	12	7.8	16.7	0.0	33.4	46.7

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
V 48.50	05/27/94	R	N	HF	15.0	0.000	0.000	0.320	0.340	0.340
V 48.50	07/14/94	R	O	F	2.9	0.000	0.000	0.000	0.000	0.000
V 48.50	08/09/94	R	O	F	3.6	0.000	0.000	0.000	0.360	0.360
V 48.50	10/03/94	R	O	H	23.0	0.000	0.000	0.000	0.000	0.080
V 48.50	04/28/95	R	N	HF	3.6	0.000	0.001	0.001	0.001	0.001
V 48.50	04/28/95	R	N	HF	3.6	0.000	0.001	0.001	0.001	0.001
V 48.50	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V 48.50	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V 48.50	06/22/95	R	O	HE	3.6	0.000	0.000	0.000	0.000	0.000
V 48.50	06/22/95	R	O	HE	3.6	0.000	0.000	0.000	0.000	0.000
V 48.50	07/25/95	R	O	HE	23.0	0.000	0.000	0.000	0.040	0.150
V 48.50	07/25/95	R	O	HE	23.0	0.000	0.000	0.000	0.040	0.150
48.50	08/30/95	R	O	H	2.9	0.000	0.000	0.000	0.000	0.000
48.50	08/30/95	R	O	H	2.9	0.000	0.000	0.000	0.000	0.000
48.50	09/20/95	R	O	H	2.9	0.000	0.000	1.050	1.050	1.050
'8.50	09/20/95	R	O	H	2.9	0.000	0.000	1.050	1.050	1.050

STATION 48.50	COUNT	GEO MEAN	%>49	%>300	STD	P90
ALL SAMPLES	16	5.1	0.0	0.0	7.9	14.8
FLOOD TIDES	5	4.6	0.0	0.0	4.6	
HIGH TIDES	14	5.4	0.0	0.0	8.3	16.7
EBB TIDES	4	9.1	0.0	0.0	9.7	
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	2	2.9	0.0	0.0		
RAIN3 >= 1.0	2	2.9	0.0	0.0		

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
49.00	01/04/91	A	R	F	2.9	0.000	0.000	0.000	0.000	0.280
49.00	02/12/91	A	O	HE	3.6	0.000	0.000	0.000	0.000	0.250
49.00	03/13/91	A	O	E	3.6	0.000	0.000	0.000	0.000	0.000
49.00	04/02/91	A	O	H	2.9	0.000	0.000	0.000	0.000	0.000
49.00	05/23/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.000
49.00	06/27/91	A	N	H	2.9	0.000	0.000	0.000	0.000	0.000
49.00	07/09/91	A	P	E	23.0	0.030	0.080	0.080	0.130	0.130
49.00	07/11/91	A	P	H	15.0	0.000	0.000	0.030	0.080	0.080
49.00	06/09/92	A	W	E	3.6	0.120	0.120	1.470	1.790	1.800
49.00	06/15/92	A	O	E	3.6	1.670	1.670	1.670	1.670	1.670
49.00	08/25/92	A	O	H	9.1	0.000	0.000	0.000	0.000	0.000
49.00	06/08/93	A	O	F	43.0	0.000	1.750	1.830	1.830	1.830
9.00	07/07/93	A	O	HF	7.3	0.000	0.000	0.000	0.050	0.050
49.00	08/02/93	A	O	H	3.6	0.000	0.000	0.020	0.070	0.110
49.00	09/29/93	A	P	H	15.0	0.000	1.380	2.260	2.260	2.260
49.00	10/04/93	A	P	HF	2.9	0.300	0.450	0.450	0.450	0.450

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAI
V 49.00	11/22/93	A	W	E	9.1	0.000	0.050	1.630	1.630	2.190
V 49.00	12/06/93	A	P	F	75.0	0.630	1.350	1.350	1.350	1.350
V 49.00	04/27/94	R	N	HE	2.9	0.330	0.550	0.550	0.550	0.550
V 49.00	05/27/94	R	N	HF	43.0	0.000	0.000	0.320	0.340	0.340
V 49.00	06/15/94	R	O	HF	2.9	0.000	0.070	0.540	0.540	0.540
V 49.00	07/14/94	R	O	HF	2.9	0.000	0.000	0.000	0.000	0.000
V 49.00	08/09/94	R	O	F	3.6	0.000	0.000	0.000	0.360	0.360
V 49.00	10/03/94	R	N	H	23.0	0.000	0.000	0.000	0.000	0.080
V 49.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 49.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 49.00	05/26/95	R	O	H	3.6	0.000	0.060	0.060	0.060	0.310
V 49.00	05/26/95	R	O	H	3.6	0.000	0.060	0.060	0.060	0.310
V 49.00	06/22/95	R	O	HE	2.9	0.000	0.000	0.000	0.000	0.000
V 49.00	06/22/95	R	O	HE	2.9	0.000	0.000	0.000	0.000	0.000
V 49.00	07/25/95	R	O	HE	2.9	0.000	0.000	0.000	0.040	0.150
V 49.00	07/25/95	R	O	HE	2.9	0.000	0.000	0.000	0.040	0.150
V 49.00	08/30/95	R	O	H	15.0	0.000	0.000	0.000	0.000	0.000
V 49.00	08/30/95	R	O	H	15.0	0.000	0.000	0.000	0.000	0.000
V 49.00	09/20/95	R	N	H	2.9	0.000	0.000	1.050	1.050	1.050
V 49.00	09/20/95	R	N	H	2.9	0.000	0.000	1.050	1.050	1.050

STATION 49.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
ALL SAMPLES	36	5.7	2.8	0.0	14.9	19.2
FLOOD TIDES	11	7.1	9.1	0.0	23.7	36.5
H I TIDES	26	5.0	0.0	0.0	9.0	14.2
EBB TIDES	12	4.1	0.0	0.0	5.6	9.0
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	10	7.2	10.0	0.0	22.9	
RAIN3 >= 1.0	8	9.1	12.5	0.0	24.5	

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
V 50.00	01/04/91	A	R	F	2.9	0.000	0.000	0.000	0.000	0.280
V 50.00	02/12/91	A	O	HE	3.6	0.000	0.000	0.000	0.000	0.250
V 50.00	03/13/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V 50.00	04/02/91	A	O	H	2.9	0.000	0.000	0.000	0.000	0.000
V 50.00	05/23/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V 50.00	06/27/91	A	N	H	2.9	0.000	0.000	0.000	0.000	0.000
V 50.00	07/09/91	A	P	E	150.0	0.030	0.080	0.080	0.130	0.130
V 50.00	07/11/91	A	P	H	23.0	0.000	0.000	0.030	0.080	0.080
V 50.00	06/09/92	A	N	E	2.9	0.120	0.120	1.470	1.790	1.800
V 50.00	06/15/92	A	O	E	9.1	1.670	1.670	1.670	1.670	1.670
V 50.00	06/29/92	A	P	HE	9.1	0.010	0.010	0.030	0.030	0.610
V 50.00	06/08/93	A	N	F	23.0	0.000	1.750	1.830	1.830	1.830
V 50.00	07/07/93	A	O	HF	3.6	0.000	0.000	0.000	0.050	0.050
V 50.00	08/02/93	A	N	H	9.1	0.000	0.000	0.020	0.070	0.110
V 50.00	09/29/93	A	P	H	2.9	0.000	1.380	2.260	2.260	2.260
V 50.00	10/04/93	A	P	HF	3.6	0.300	0.450	0.450	0.450	0.[illegible]
V 50.00	11/22/93	A	N	HE	3.6	0.000	0.050	1.630	1.630	2.[illegible]
V 50.00	12/06/93	A	P	F	15.0	0.630	1.350	1.350	1.350	1.350
V 50.00	04/27/94	R	N	HE	2.9	0.330	0.550	0.550	0.550	0.550
V 50.00	05/27/94	R	N	HF	3.6	0.000	0.000	0.320	0.340	0.340
V 50.00	06/15/94	R	N	HF	2.9	0.000	0.070	0.540	0.540	0.540
V 50.00	07/14/94	R	N	HF	2.9	0.000	0.000	0.000	0.000	0.000

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RA
V 0.00	08/09/94	R	O	F	23.0	0.000	0.000	0.000	0.360	0
V 50.00	10/03/94	R	N	H	21.0	0.000	0.000	0.000	0.000	0
V 50.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0
V 50.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0
V 50.00	05/26/95	R	N	H	3.6	0.000	0.060	0.060	0.060	0
V 50.00	05/26/95	R	N	H	3.6	0.000	0.060	0.060	0.060	0
V 50.00	06/22/95	R	N	HE	2.9	0.000	0.000	0.000	0.000	0
V 50.00	06/22/95	R	N	HE	2.9	0.000	0.000	0.000	0.000	0
V 50.00	07/25/95	R	O	HE	3.6	0.000	0.000	0.000	0.000	0
V 50.00	07/25/95	R	O	HE	3.6	0.000	0.000	0.000	0.040	0
V 50.00	08/30/95	R	O	H	3.6	0.000	0.000	0.000	0.040	0
V 50.00	08/30/95	R	O	H	3.6	0.000	0.000	0.000	0.000	0
V 50.00	09/20/95	R	NH	HE	9.1	0.000	0.000	0.000	0.000	0
V 50.00	09/20/95	R	NH	HE	9.1	0.000	0.000	1.050	1.050	1.0
V 50.00	09/20/95	R	NH	HE	9.1	0.000	0.000	1.050	1.050	1.0

STATION 50.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
ALL SAMPLES	36	5.3	2.8	0.0	24.4	16.9
FLOOD TIDES	11	5.2	0.0	0.0	7.9	15.5
HIGH TIDES	27	4.4	0.0	0.0	5.1	9.4
EBB TIDES	15	5.4	6.7	0.0	36.3	20.2
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	10	6.1	0.0	0.0	6.3	
RAIN3 >= 1.0	8	7.3	0.0	0.0	6.5	

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-
V 50.50	01/04/91	A	R	F	2.9	0.000	0.000	0.000	0.000	0.28
V 50.50	02/12/91	A	O	HE	3.6	0.000	0.000	0.000	0.000	0.25
V 50.50	03/13/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.00
V 50.50	04/02/91	A	O	H	2.9	0.000	0.000	0.000	0.000	0.00
V 50.50	05/23/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.00
V 50.50	07/09/91	A	P	HE	23.0	0.030	0.080	0.080	0.130	0.13
V 50.50	07/11/91	A	P	HF	43.0	0.000	0.000	0.030	0.080	0.08
V 50.50	08/12/91	A	P	H	23.0	0.000	2.390	2.880	2.880	2.88
V 50.50	12/09/91	A	R	H	3.6	0.050	0.480	0.510	0.610	0.61
V 50.50	06/29/92	A	P	HE	23.0	0.010	0.010	0.030	0.030	0.61
V 50.50	06/08/93	A	O	F	23.0	0.000	1.750	1.830	1.830	1.83
V 50.50	07/07/93	A	W	HF	2.9	0.000	0.000	0.000	0.050	0.05
V 50.50	08/02/93	A	W	HF	23.0	0.000	0.000	0.020	0.070	0.11
V 50.50	09/29/93	A	P	H	73.0	0.000	1.380	2.260	2.260	2.26
V 50.50	10/04/93	A	P	F	3.6	0.300	0.450	0.450	0.450	0.450
V 50.50	11/22/93	A	W	HE	9.1	0.000	0.050	1.630	1.630	2.190
V 50.50	12/06/93	A	P	HF	20.0	0.630	1.350	1.350	1.350	1.350
V 50.50	04/27/94	R	W	HE	2.9	0.330	0.550	0.550	0.550	0.550
V 50.50	05/27/94	R	N	HF	9.1	0.000	0.000	0.320	0.340	0.340
V 50.50	06/15/94	R	O	HF	3.6	0.000	0.070	0.540	0.540	0.540
V 50.50	07/14/94	R	N	HF	43.0	0.000	0.000	0.000	0.000	0.000
50.50	08/09/94	R	O	F	15.0	0.000	0.000	0.000	0.360	0.360
50.50	10/03/94	R	W	H	9.1	0.000	0.000	0.000	0.000	0.080
50.50	04/28/95	R	N	HE	2.9	0.000	0.001	0.001	0.001	0.001
V 50.50	04/28/95	R	N	HE	2.9	0.000	0.001	0.001	0.001	0.001
V 50.50	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V 50.50	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V 50.50	06/22/95	R	O	H	2.9	0.000	0.000	0.000	0.000	0.000

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-
\ 50.50	06/22/95	R	O	H	2.9	0.000	0.000	0.000	0.000	0.00
V 50.50	07/25/95	R	O	HF	15.0	0.000	0.000	0.000	0.040	0.15
V 50.50	07/25/95	R	O	HF	15.0	0.000	0.000	0.000	0.040	0.15
V 50.50	08/30/95	R	O	H	43.0	0.000	0.000	0.000	0.000	0.00
V 50.50	08/30/95	R	O	H	43.0	0.000	0.000	0.000	0.000	0.00
V 50.50	09/20/95	R	N	HE	2.9	0.000	0.000	1.050	1.050	1.05
V 50.50	09/20/95	R	N	HE	2.9	0.000	0.000	1.050	1.050	1.05

STATION 50.50	COUNT	GEO MEAN	%>49	%>300	STD	P90
ALL SAMPLES	35	8.0	2.9	0.0	16.5	32.2
FLOOD TIDES	13	11.6	0.0	0.0	13.2	39.6
HIGH TIDES	29	8.6	3.4	0.0	17.5	35.9
EBB TIDES	11	4.8	0.0	0.0	7.7	13.8
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	10	8.6	10.0	0.0	20.6	
RAIN3 >= 1.0	7	12.9	14.3	0.0	22.4	

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
V 52.00	01/04/91	A	R	F	2.9	0.000	0.000	0.000	0.000	0.280
V 52.00	02/12/91	A	N	HE	9.1	0.000	0.000	0.000	0.000	0.
V 52.00	03/13/91	A	N	E	2.9	0.000	0.000	0.000	0.000	0.
V 52.00	04/02/91	A	N	H	2.9	0.000	0.000	0.000	0.000	0.
V 52.00	05/23/91	A	O	HE	2.9	0.000	0.000	0.000	0.000	0.000
V 52.00	07/09/91	A	P	HE	240.0	0.030	0.080	0.080	0.130	0.130
V 52.00	07/11/91	A	P	HF	43.0	0.000	0.000	0.030	0.080	0.080
V 52.00	08/12/91	A	P	HF	9.1	0.000	2.390	2.880	2.880	2.880
V 52.00	06/29/92	A	P	H	9.1	0.010	0.010	0.030	0.030	0.610
V 52.00	06/08/93	A	O	F	23.0	0.000	1.750	1.830	1.830	1.830
V 52.00	07/07/93	A	O	HF	9.3	0.000	0.000	0.000	0.050	0.050
V 52.00	08/02/93	A	O	HF	9.1	0.000	0.000	0.020	0.070	0.110
V 52.00	09/29/93	A	P	H	93.0	0.000	1.380	2.260	2.260	2.260
V 52.00	10/04/93	A	P	F	3.6	0.300	0.450	0.450	0.450	0.450
V 52.00	11/22/93	A	W	HE	93.0	0.000	0.050	1.630	1.630	2.190
V 52.00	12/06/93	A	P	F	7.3	0.630	1.350	1.350	1.350	1.350
V 52.00	04/27/94	R	N	HE	93.0	0.330	0.550	0.550	0.550	0.550
V 52.00	05/27/94	R	N	HF	2.9	0.000	0.000	0.320	0.340	0.340
V 52.00	06/15/94	R	O	F	2.9	0.000	0.070	0.540	0.540	0.540
V 52.00	07/14/94	R	O	F	2.9	0.000	0.000	0.000	0.000	0.000
V 52.00	08/09/94	R	O	HF	23.0	0.000	0.000	0.000	0.360	0.360
V 52.00	10/03/94	R	N	HE	9.1	0.000	0.000	0.000	0.000	0.080
V 52.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 52.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 52.00	05/26/95	R	O	H	3.6	0.000	0.060	0.060	0.060	0.310
V 52.00	05/26/95	R	O	H	3.6	0.000	0.060	0.060	0.060	0.310
V 52.00	06/22/95	R	O	HE	3.6	0.000	0.000	0.000	0.000	0.000
V 52.00	06/22/95	R	O	HE	3.6	0.000	0.000	0.000	0.000	0.0
V 52.00	07/25/95	R	O	HF	3.6	0.000	0.000	0.000	0.040	0.1
V 52.00	07/25/95	R	O	HF	3.6	0.000	0.000	0.000	0.040	0.150
V 52.00	08/30/95	R	O	HF	23.0	0.000	0.000	0.000	0.000	0.000
V 52.00	08/30/95	R	O	HF	23.0	0.000	0.000	0.000	0.000	0.000
V 52.00	09/20/95	R	NW	HE	2.9	0.000	0.000	1.050	1.050	1.050
V 52.00	09/20/95	R	NW	HE	2.9	0.000	0.000	1.050	1.050	1.050

STATION 52.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
ALL SAMPLES	34	8.1	11.8	0.0	45.6	40.6
FLOOD TIDES	18	7.1	0.0	0.0	11.0	23.3
HIGH TIDES	27	9.4	14.8	0.0	50.2	51.1
EBB TIDES	11	10.4	27.3	0.0	71.1	85.0
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	9	14.6	33.3	0.0	40.5	
RAIN3 >= 1.0	7	14.1	28.6	0.0	38.4	

	STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
V	53.00	01/04/91	A	R	F	2.9	0.000	0.000	0.000	0.000	0.280
V	53.00	02/12/91	A	O	HE	2.9	0.000	0.000	0.000	0.000	0.250
V	53.00	03/13/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V	53.00	04/02/91	A	O	H	2.9	0.000	0.000	0.000	0.000	0.000
V	53.00	05/23/91	A	O	HE	3.6	0.000	0.000	0.000	0.000	0.000
V	53.00	06/27/91	A	N	HF	3.6	0.000	0.000	0.000	0.000	0.000
V	53.00	07/09/91	A	P	HE	93.0	0.030	0.080	0.080	0.130	0.130
V	53.00	07/11/91	A	P	HF	93.0	0.000	0.000	0.030	0.080	0.080
V	53.00	08/12/91	A	P	HF	23.0	0.000	2.390	2.880	2.880	2.880
V	53.00	06/09/92	A	W	LE	2.9	0.120	0.120	1.470	1.790	1.800
V	53.00	06/15/92	A	W	E	3.6	1.670	1.670	1.670	1.670	1.670
V	53.00	06/29/92	A	P	H	3.6	0.010	0.010	0.030	0.030	0.610
V	53.00	08/25/92	A	O	HE	9.1	0.000	0.000	0.000	0.000	0.000
	53.00	06/08/93	A	O	F	3.6	0.000	1.750	1.830	1.830	1.830
	53.00	07/07/93	A	O	HF	9.1	0.000	0.000	0.000	0.050	0.050
V	3.00	08/02/93	A	O	HF	2.9	0.000	0.000	0.020	0.070	0.110
V	53.00	09/29/93	A	P	H	15.0	0.000	1.380	2.260	2.260	2.260
V	53.00	10/04/93	A	P	F	3.6	0.300	0.450	0.450	0.450	0.450
V	53.00	11/22/93	A	N	E	93.0	0.000	0.050	1.630	1.630	2.190
V	53.00	12/06/93	A	P	HF	9.1	0.630	1.350	1.350	1.350	1.350
V	53.00	03/23/94	A	P	F	23.0	2.650	2.780	2.780	2.780	2.780
V	53.00	04/27/94	R	N	HE	3.6	0.330	0.550	0.550	0.550	0.550
V	53.00	05/27/94	R	N	HF	2.9	0.000	0.000	0.320	0.340	0.340
V	53.00	06/15/94	R	O	F	2.9	0.000	0.070	0.540	0.540	0.540
V	53.00	07/14/94	R	O	F	9.1	0.000	0.000	0.000	0.000	0.000
V	53.00	08/09/94	R	O	HF	3.6	0.000	0.000	0.000	0.360	0.360
V	53.00	10/03/94	R	N	HE	3.6	0.000	0.000	0.000	0.000	0.080
V	53.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V	53.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V	53.00	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V	53.00	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V	53.00	06/22/95	R	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V	53.00	06/22/95	R	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V	53.00	07/25/95	R	O	HF	9.1	0.000	0.000	0.000	0.040	0.150
V	53.00	07/25/95	R	O	HF	9.1	0.000	0.000	0.000	0.040	0.150
V	53.00	08/30/95	R	O	HF	2.9	0.000	0.000	0.000	0.000	0.000
V	53.00	08/30/95	R	O	HF	2.9	0.000	0.000	0.000	0.000	0.000
V	53.00	09/20/95	R	O	HE	2.9	0.000	0.000	1.050	1.050	1.050
	53.00	09/20/95	R	O	HE	2.9	0.000	0.000	1.050	1.050	1.050

STATION 53.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
SAMPLES	39	5.5	7.7	0.0	23.8	20.2
FLOOD TIDES	20	5.9	5.0	0.0	19.7	19.7
HIGH TIDES	27	5.6	7.4	0.0	23.3	19.9
EBB TIDES	14	5.5	14.3	0.0	31.3	26.1
LOW TIDES	1	2.9	0.0	0.0		
RAIN3 >= 0.5	12	7.3	8.3	0.0	24.5	30.9
RAIN3 >= 1.0	10	8.6	10.0	0.0	26.2	

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-
V 54.00	01/04/91	A	R	HF	2.9	0.000	0.000	0.000	0.000	0.28
V 54.00	02/12/91	A	O	H	3.6	0.000	0.000	0.000	0.000	0.25
V 54.00	03/13/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.00
V 54.00	04/02/91	A	O	H	2.9	0.000	0.000	0.000	0.000	0.00
V 54.00	05/23/91	A	O	HE	3.6	0.000	0.000	0.000	0.000	0.00
V 54.00	06/27/91	A	N	HF	2.9	0.000	0.000	0.000	0.000	0.00
V 54.00	07/09/91	A	P	HE	460.0	0.030	0.080	0.080	0.130	0.13
V 54.00	07/11/91	A	P	HF	43.0	0.000	0.000	0.030	0.080	0.08
V 54.00	06/29/92	A	P	H	23.0	0.010	0.010	0.030	0.030	0.61
V 54.00	08/25/92	A	O	HE	3.6	0.000	0.000	0.000	0.000	0.00
V 54.00	06/08/93	A	O	F	9.1	0.000	1.750	1.830	1.830	1.83
V 54.00	07/07/93	A	O	F	9.1	0.000	0.000	0.000	0.050	0.05
V 54.00	08/02/93	A	O	HF	43.0	0.000	0.000	0.020	0.070	0.1
V 54.00	09/29/93	A	P	H	23.0	0.000	1.380	2.260	2.260	2
V 54.00	10/04/93	A	P	F	3.6	0.300	0.450	0.450	0.450	0.
V 54.00	11/22/93	A	N	HE	9.1	0.000	0.050	1.630	1.630	2.190
V 54.00	12/06/93	A	P	HF	43.0	0.630	1.350	1.350	1.350	1.350
V 54.00	04/27/94	R	N	HE	3.6	0.330	0.550	0.550	0.550	0.550
V 54.00	05/27/94	R	N	HF	3.6	0.000	0.000	0.320	0.340	0.340
V 54.00	06/15/94	R	O	F	2.9	0.000	0.070	0.540	0.540	0.540
V 54.00	07/14/94	R	O	F	3.6	0.000	0.000	0.000	0.000	0.000
V 54.00	08/09/94	R	O	HF	2.9	0.000	0.000	0.000	0.360	0.360
V 54.00	10/03/94	R	N	HE	43.0	0.000	0.000	0.000	0.000	0.080
V 54.00	04/28/95	R	N	HF	3.6	0.000	0.001	0.001	0.001	0.001
V 54.00	04/28/95	R	N	HF	3.6	0.000	0.001	0.001	0.001	0.001
V 54.00	05/26/95	R	O	H	3.6	0.000	0.060	0.060	0.060	0.310
V 54.00	05/26/95	R	O	H	3.6	0.000	0.060	0.060	0.060	0.310
V 54.00	06/22/95	R	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V 54.00	06/22/95	R	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V 54.00	07/25/95	R	O	HF	2.9	0.000	0.000	0.000	0.040	0.150
V 54.00	07/25/95	R	O	HF	2.9	0.000	0.000	0.000	0.040	0.150
V 54.00	08/30/95	R	O	HF	7.3	0.000	0.000	0.000	0.000	0.000
V 54.00	08/30/95	R	O	HF	7.3	0.000	0.000	0.000	0.000	0.000
V 54.00	09/20/95	R	N	HE	2.9	0.000	0.000	1.050	1.050	1.050
V 54.00	09/20/95	R	N	HE	2.9	0.000	0.000	1.050	1.050	1.050

STATION 54.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
ALL SAMPLES	35	6.4	2.9	2.9	76.1	28.8
FLOOD TIDES	18	6.1	0.0	0.0	14.5	21.1
HIGH TIDES	27	7.3	3.7	3.7	85.9	37.7
EBB TIDES	11	6.9	9.1	9.1	130.5	52.0
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	8	7.2	0.0	0.0	13.3	
RAIN3 >= 1.0	6	9.4	0.0	0.0	14.2	

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
V 55.00	01/04/91	A	R	HF	3.6	0.000	0.000	0.000	0.000	0.280
V 55.00	02/12/91	A	O	H	3.6	0.000	0.000	0.000	0.000	0.250
V 55.00	03/13/91	A	O	E	3.6	0.000	0.000	0.000	0.000	0.000
V 55.00	04/02/91	A	O	H	2.9	0.000	0.000	0.000	0.000	0.000
V 55.00	05/23/91	A	O	HE	9.1	0.000	0.000	0.000	0.000	0.000
V 55.00	06/27/91	A	N	H	3.6	0.000	0.000	0.000	0.000	0.000
V 55.00	07/09/91	A	P	HE	1100.0	0.030	0.080	0.080	0.130	0.130
V 55.00	07/11/91	A	P	HF	23.0	0.000	0.000	0.030	0.080	0.080
V 55.00	08/12/91	A	P	HF	23.0	0.000	2.390	2.880	2.880	2.880
V 55.00	06/09/92	A	W	E	2.9	0.120	0.120	1.470	1.790	1.800
V 55.00	06/15/92	A	O	E	2.9	1.670	1.670	1.670	1.670	1.670
V 55.00	06/29/92	A	P	H	9.1	0.010	0.010	0.030	0.030	0.610
V 55.00	08/25/92	A	O	HE	43.0	0.000	0.000	0.000	0.000	0.000
55.00	06/08/93	A	O	HF	3.6	0.000	1.750	1.830	1.830	1.830
55.00	07/07/93	A	O	F	9.1	0.000	0.000	0.000	0.050	0.050
V 55.00	08/02/93	A	O	HF	3.6	0.000	0.000	0.020	0.070	0.110
V 55.00	09/29/93	A	P	H	20.0	0.000	1.380	2.260	2.260	2.260
V 55.00	10/04/93	A	P	F	2.9	0.300	0.450	0.450	0.450	0.450
V 55.00	11/22/93	A	O	HE	2.9	0.000	0.050	1.630	1.630	2.190
V 55.00	12/06/93	A	P	HF	23.0	0.630	1.350	1.350	1.350	1.350
V 55.00	04/27/94	R	N	HE	2.9	0.330	0.550	0.550	0.550	0.550
V 55.00	05/27/94	R	N	HF	43.0	0.000	0.000	0.320	0.340	0.340
V 55.00	06/15/94	R	O	F	2.9	0.000	0.070	0.540	0.540	0.540
V 55.00	07/14/94	R	O	F	2.9	0.000	0.000	0.000	0.000	0.000
V 55.00	08/09/94	R	O	HF	3.6	0.000	0.000	0.000	0.360	0.360
V 55.00	10/03/94	R	N	HE	3.6	0.000	0.000	0.000	0.000	0.080
V 55.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 55.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 55.00	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V 55.00	05/26/95	R	O	H	2.9	0.000	0.060	0.060	0.060	0.310
V 55.00	06/22/95	R	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V 55.00	06/22/95	R	O	E	2.9	0.000	0.000	0.000	0.000	0.000
V 55.00	07/25/95	R	O	HF	9.1	0.000	0.000	0.000	0.040	0.150
V 55.00	07/25/95	R	O	HF	9.1	0.000	0.000	0.000	0.040	0.150
V 55.00	08/30/95	R	O	HF	15.0	0.000	0.000	0.000	0.000	0.000
V 55.00	08/30/95	R	O	HF	15.0	0.000	0.000	0.000	0.000	0.000
V 55.00	09/20/95	R	N	HE	3.6	0.000	0.000	1.050	1.050	1.050
V 55.00	09/20/95	R	N	HE	3.6	0.000	0.000	1.050	1.050	1.050

STATION 55.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
A SAMPLES	38	6.5	2.6	2.6	175.0	30.3
FLOOD TIDES	18	7.2	0.0	0.0	10.7	23.3
HIGH TIDES	29	8.0	3.4	3.4	199.1	41.8
EBB TIDES	13	6.6	7.7	7.7	291.4	56.9
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	11	5.3	0.0	0.0	8.4	16.7
RAIN3 >= 1.0	9	6.1	0.0	0.0	8.9	

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-4
V 57.00	01/04/91	A	R	HF	2.9	0.000	0.000	0.000	0.000	0.280
V 57.00	02/12/91	A	O	H	2.9	0.000	0.000	0.000	0.000	0.250
V 57.00	03/13/91	A	O	E	3.6	0.000	0.000	0.000	0.000	0.000
V 57.00	04/01/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.710
V 57.00	05/23/91	A	O	E	9.1	0.000	0.000	0.000	0.000	0.000
V 57.00	06/27/91	A	N	HE	3.6	0.000	0.000	0.000	0.000	0.000
V 57.00	07/09/91	A	P	E	43.0	0.030	0.080	0.080	0.130	0.130
V 57.00	07/11/91	A	P	H	9.1	0.000	0.000	0.030	0.080	0.080
V 57.00	08/12/91	A	P	HF	43.0	0.000	2.390	2.880	2.880	2.880
V 57.00	06/15/92	A	O	E	3.6	1.670	1.670	1.670	1.670	1.670
V 57.00	06/29/92	A	P	H	150.0	0.010	0.010	0.030	0.030	0.610
V 57.00	08/25/92	A	O	HE	7.3	0.000	0.000	0.000	0.000	0.000
V 57.00	06/08/93	A	O	HF	2.9	0.000	1.750	1.830	1.830	1.
V 57.00	07/07/93	A	O	F	3.6	0.000	0.000	0.000	0.050	0.
V 57.00	08/02/93	A	O	HF	23.0	0.000	0.000	0.020	0.070	0.110
V 57.00	09/29/93	A	P	HE	93.0	0.000	1.380	2.260	2.260	2.260
V 57.00	10/04/93	A	P	F	7.3	0.300	0.450	0.450	0.450	0.450
V 57.00	12/06/93	A	P	HF	3.6	0.630	1.350	1.350	1.350	1.350
V 57.00	04/27/94	R	N	HE	3.6	0.330	0.550	0.550	0.550	0.550
V 57.00	05/27/94	R	N	H	9.1	0.000	0.000	0.320	0.340	0.340
V 57.00	06/15/94	R	O	F	9.1	0.000	0.070	0.540	0.540	0.540
V 57.00	07/14/94	R	W	F	3.6	0.000	0.000	0.000	0.000	0.000
V 57.00	08/09/94	R	O	H	15.0	0.000	0.000	0.000	0.360	0.360
V 57.00	10/03/94	R	N	HE	23.0	0.000	0.000	0.000	0.000	0.080
V 57.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 57.00	04/28/95	R	N	HF	2.9	0.000	0.001	0.001	0.001	0.001
V 57.00	05/26/95	R	O	HE	240.0	0.000	0.060	0.060	0.060	0.310
V 57.00	05/26/95	R	O	HE	240.0	0.000	0.060	0.060	0.060	0.310
V 57.00	06/22/95	R	O	E	3.6	0.000	0.000	0.000	0.000	0.000
V 57.00	06/22/95	R	O	E	3.6	0.000	0.000	0.000	0.000	0.000
V 57.00	07/25/95	R	O	H	3.6	0.000	0.000	0.000	0.040	0.150
V 57.00	07/25/95	R	O	H	3.6	0.000	0.000	0.000	0.040	0.150
V 57.00	08/30/95	R	O	F	23.0	0.000	0.000	0.000	0.000	0.000
V 57.00	08/30/95	R	O	F	23.0	0.000	0.000	0.000	0.000	0.000
V 57.00	09/20/95	R	NH	HE	2.9	0.000	0.000	1.050	1.050	1.050
V 57.00	09/20/95	R	NH	HE	2.9	0.000	0.000	1.050	1.050	1.050

STATION 57.00

	COUNT	GEO MEAN	%>49	%>300	STD	P90
ALL SAMPLES	36	8.9	11.1	0.0	58.6	49.1
FLOOD TIDES	13	7.1	0.0	0.0	12.1	25.0
HIGH TIDES	23	10.2	17.4	0.0	70.8	72.6
EBB TIDES	16	10.4	18.8	0.0	77.9	79.0
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	9	7.0	11.1	0.0	29.1	
RAIN3 >= 1.0	7	7.4	14.3	0.0	32.2	

STATION	COLDATE	CAT	COND	TIDE	COL	RAIN	RAIN-1	RAIN-2	RAIN-3	RAIN-
V 58.00	01/04/91	A	R	HF	93.0	0.000	0.000	0.000	0.000	0.28
V 58.00	02/12/91	A	O	H	3.0	0.000	0.000	0.000	0.000	0.25
V 58.00	03/13/91	A	O	E	3.6	0.000	0.000	0.000	0.000	0.00
V 58.00	04/01/91	A	O	E	3.6	0.000	0.000	0.000	0.000	0.71
V 58.00	05/23/91	A	O	E	2.9	0.000	0.000	0.000	0.000	0.00
V 58.00	06/27/91	A	N	HE	2.9	0.000	0.000	0.000	0.000	0.00
V 58.00	07/09/91	A	H	E	43.0	0.030	0.080	0.080	0.130	0.13
V 58.00	07/11/91	A	P	H	23.0	0.000	0.000	0.030	0.080	0.08
V 58.00	08/12/91	A	P	HF	23.0	0.000	2.390	2.880	2.880	2.88
V 58.00	06/15/92	A	W	HE	2.9	1.670	1.670	1.670	1.670	1.67
V 58.00	06/29/92	A	P	HF	2.9	0.010	0.010	0.030	0.030	0.61
V 58.00	08/25/92	A	W	HE	3.6	0.000	0.000	0.000	0.000	0.00
V 58.00	06/08/93	A	O	HF	2.9	0.000	1.750	1.830	1.830	1.83
V 58.00	07/07/93	A	O	F	3.6	0.000	0.000	0.000	0.050	0.05
V 58.00	08/02/93	A	O	F	3.6	0.000	0.000	0.020	0.070	0.11
V 58.00	09/29/93	A	P	HE	15.0	0.000	1.380	2.260	2.260	2.26
V 58.00	10/04/93	A	P	F	3.6	0.300	0.450	0.450	0.450	0.45
V 58.00	11/22/93	A	W	E	15.0	0.000	0.050	1.630	1.630	2.19
V 58.00	12/06/93	A	P	HF	3.0	0.630	1.350	1.350	1.350	1.35
V 58.00	04/27/94	R	O	H	2.9	0.330	0.550	0.550	0.550	0.55
V 58.00	05/27/94	R	N	H	23.0	0.000	0.000	0.320	0.340	0.34
V 58.00	06/15/94	R	O	F	3.6	0.000	0.070	0.540	0.540	0.54
V 58.00	07/14/94	R	W	F	3.6	0.000	0.000	0.000	0.000	0.00
V 58.00	08/09/94	R	O	H	93.0	0.000	0.000	0.000	0.360	0.36
V 58.00	10/03/94	R	O	HE	23.0	0.000	0.000	0.000	0.000	0.08
V 58.00	04/28/95	R	N	H	2.9	0.000	0.001	0.001	0.001	0.00
V 58.00	04/28/95	R	N	H	2.9	0.000	0.001	0.001	0.001	0.00
V 58.00	05/26/95	R	W	HE	43.0	0.000	0.060	0.060	0.060	0.31
V 58.00	05/26/95	R	W	HE	43.0	0.000	0.060	0.060	0.060	0.31
V 58.00	06/22/95	R	W	E	2.9	0.000	0.000	0.000	0.000	0.00
V 58.00	06/22/95	R	W	E	2.9	0.000	0.000	0.000	0.000	0.00
V 58.00	07/25/95	R	O	H	3.6	0.000	0.000	0.000	0.040	0.15
V 58.00	07/25/95	R	O	H	3.6	0.000	0.000	0.000	0.040	0.15
V 58.00	08/30/95	R	O	F	3.6	0.000	0.000	0.000	0.000	0.00
V 58.00	08/30/95	R	O	F	3.6	0.000	0.000	0.000	0.000	0.00
V 58.00	09/20/95	R	H	E	3.6	0.000	0.000	1.050	1.050	1.05
V 58.00	09/20/95	R	H	E	3.6	0.000	0.000	1.050	1.050	1.05

STATION 58.00	COUNT	GEO MEAN	%>49	%>300	STD	P90
A SAMPLES	37	6.5	5.4	0.0	22.3	26.9
FLOOD TIDES	12	5.2	8.3	0.0	24.9	19.9
HIGH TIDES	21	8.7	9.5	0.0	26.9	44.7
EBB TIDES	16	7.2	0.0	0.0	15.3	29.1
LOW TIDES	0	0.0	0.0	0.0		
RAIN3 >= 0.5	10	5.3	0.0	0.0	6.9	
RAIN3 >= 1.0	8	6.0	0.0	0.0	7.4	

***** END OF REPORT. 384 RECORDS EXTRACTED. ****