Maine Department of Marine Resources
Public Health Division

Growing Area Classification Program

Topics

- Maine Shellfish Industry Overview
- Program overview
- Issues
- Classification trends
- What impacts water quality in Maine?
- Review topics

Maine Shellfish Industry Overview

Types of Shellfish, Landings and Harvesting Practices

Types of Shellfish Harvested in Maine

- Mussels [*Mytilus edulis*]
- Soft-shelled clams [*Mya arenaria*]
- Quahogs [*Mercenaria mercenaria]*
- Mahogany Quahogs [*Artica islandica*]
- Surf Clams [*Spisula solidissima*]
- Razor Clams [*Ensis directus*]
- American oysters [*Crassostrea virginica]*
- European oysters [*Ostrea edulis*]

Landings Figures for Maine Shellfish

Preliminary 2006 Figures, DMR

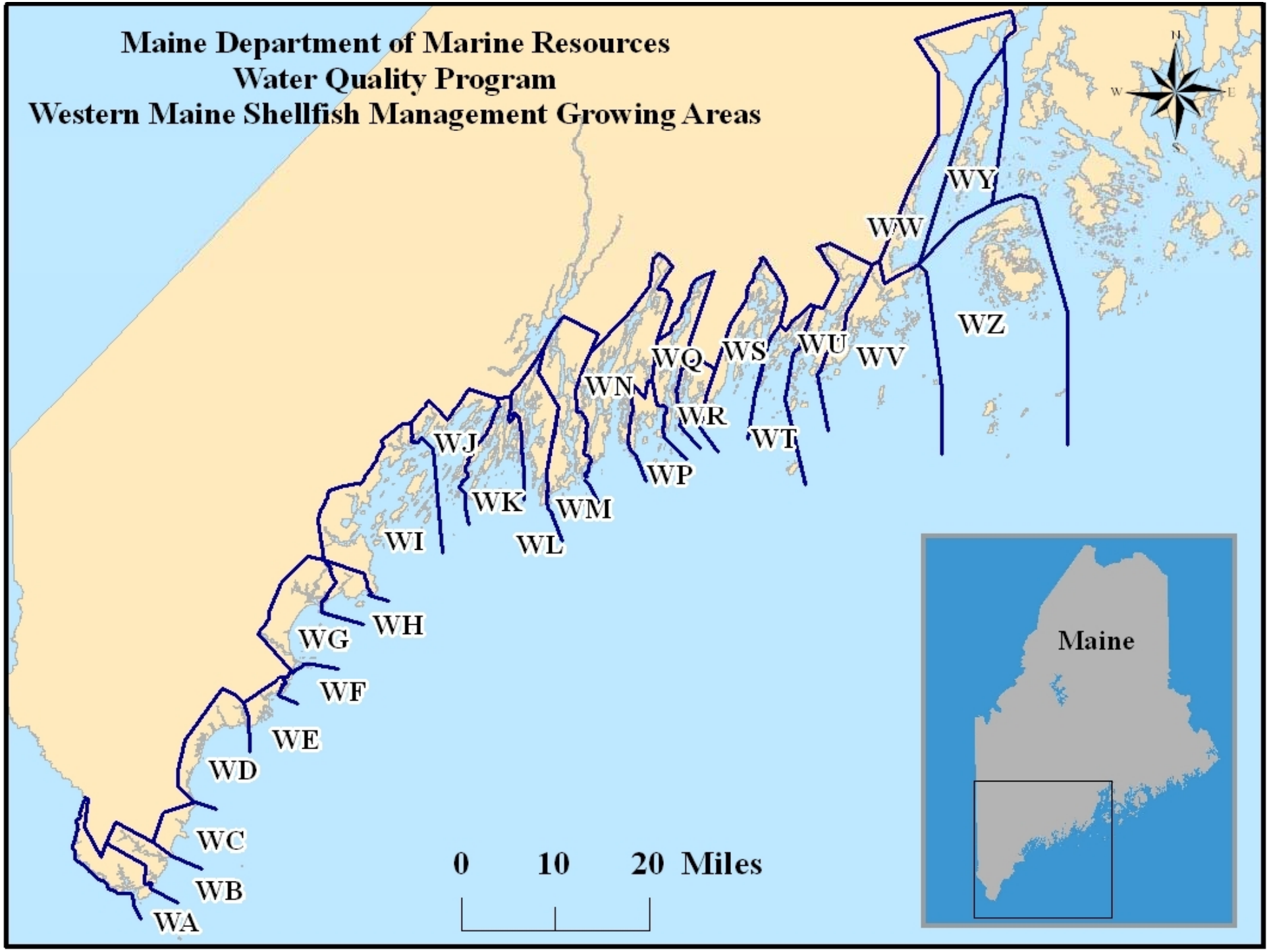
Species	Live Pounds	Value
Mussels	16,982,514	$2,618,847
Soft-shelled clams	**9,150,112**	**$13,165,097**
Mahogany Quahogs	10,012,106	$20,607,888
Quahogs	363,639	$364,843
Oysters	691,357	$1,407,057

Scenes of our local working waterfront

Photos Courtesy of Dana Corbett

Photo courtesy of Times Record

Growing Area Classification Program Overview


Maine Department of Marine Resources
Water Quality Program
Western Maine Shellfish Management Growing Areas
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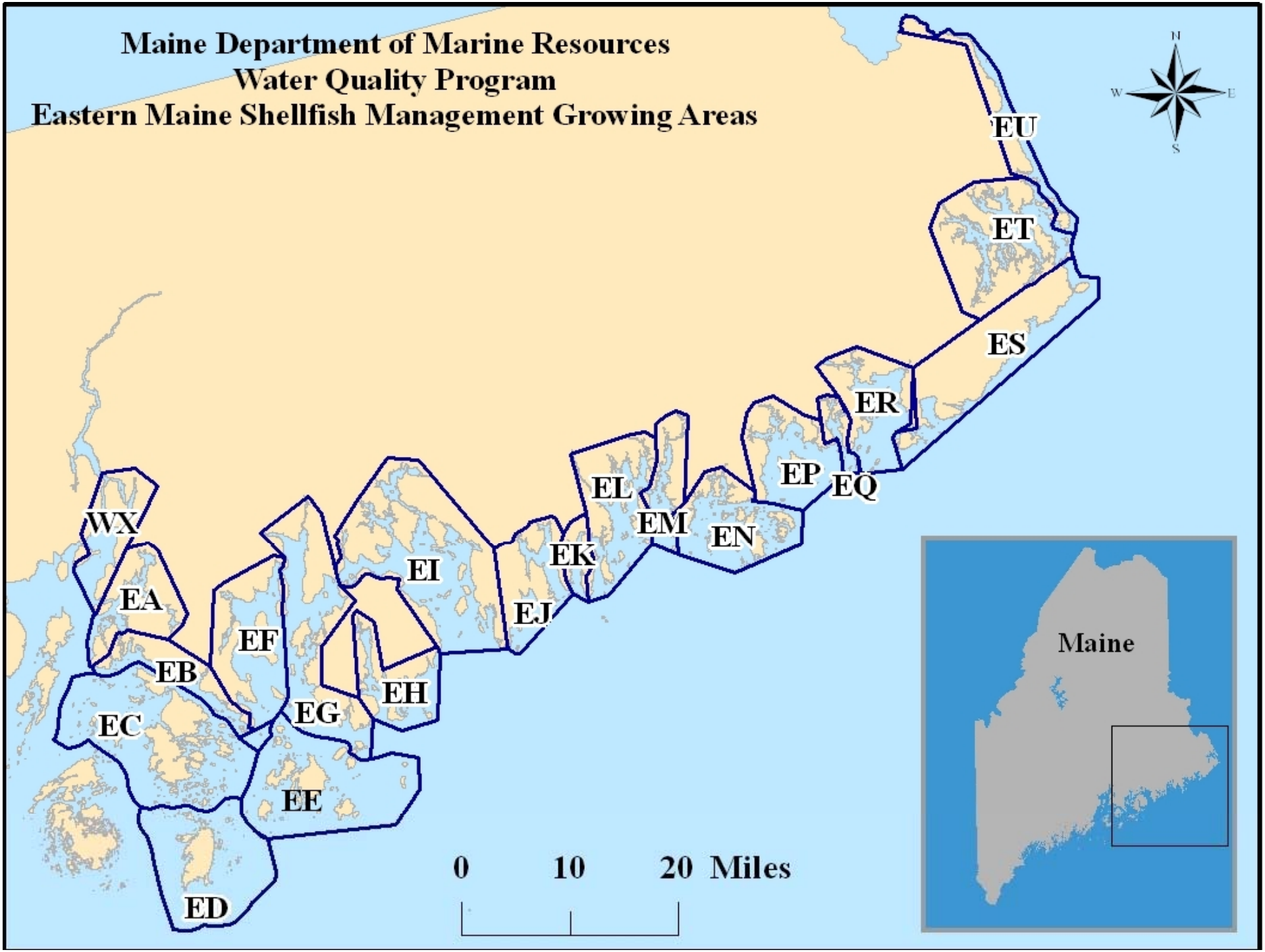
Maine Department of Marine Resources
Water Quality Program
Eastern Maine Shellfish Management Growing Areas
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Maine

Staffing and Facilities

DMR Water Quality Program

Field Collection

January through December

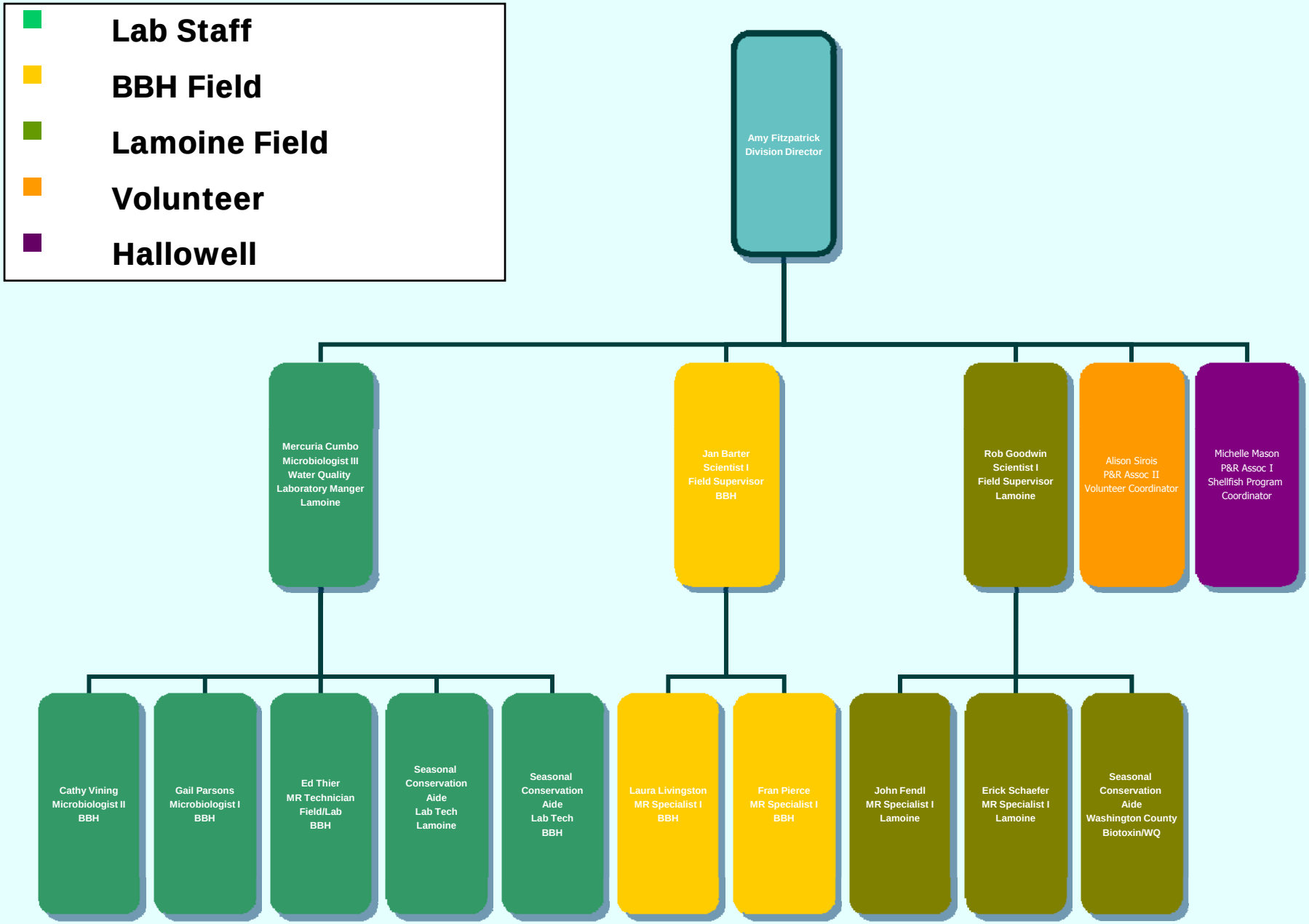
Monday, Tuesday, Wednesday

5 Runs per week

Lab Processing Tuesday-Friday

48 hour processing time using Membrane Filtration Method

WQ Labs	Boothbay	Lamoine
Total Active Stations	816	647
Total Runs (20- 25 stations)	36	30


Lab Staff
BBH Field
Lamoine Field
Volunteer
Hallowell
Amy Fitzpatrick
Division Director
Mercuria Cumbo
Microbiologist III
Water Quality
Laboratory Manger
Lamoine
Jan Barter
Scientist I
Field Supervisor
BBH
Rob Goodwin
Scientist I
Field Supervisor
Lamoine
Alison Sirois
P&R Assoc II
Volunteer Coordinator
Michelle Mason
P&R Assoc I
Shellfish Program
Coordinator
Cathy Vining
Microbiologist II
BBH
Gail Parsons
Microbiologist I
BBH
Ed Thier
MR Technician
Field/Lab
BBH
Seasonal
Conservation
Aide
Lab Tech
Lamoine
Seasonal
Conservation
Aide
Lab Tech
BBH
Laura Livingston
MR Specialist I
BBH
Fran Pierce
MR Specialist I
BBH
John Fendl
MR Specialist I
Lamoine
Erick Schaefer
MR Specialist I
Lamoine
Seasonal
Conservation
Aide
Washington County
Biotoxin/WQ

Staff Responsibilities

- Jan – WL, WM, WN, WQ, WR and WS; ~1,177 miles
- Laura – WA, WB, WC,WD,WE,WF,WG,WH,WI,WJ ,WK; ~893 miles
- Fran – WP, WT, WU, WV, WW, WY, WZ; ~871 miles

! **Responsibilities include: sampling, surveying, report writing, data entry and analysis, map making, taking part in special projects (hydrographic studies, meeting with industry and municipalities**

- Rob - WX, EB, EI, EJ, EN, EQ, ER, ES, ET ; ~1,194 miles
- John - EC, EE, EH, EK, EL, EP; ~762 miles
- Erick - EA, ED, EF, EG, EM, EU; ~521 miles

! Lamoine field staff each work one day a week in the laboratory and general building maintenance

"Maine is the largest of the six New England States. With a total area of 33,215 square miles, its borders can nearly accommodate the combined areas of the remaining five. Maine's jagged Atlantic shoreline is the longest of any state on the East Coast."

Brandes, Kathleen M. Maine Handbook. Chico (California): Moon Publications, Inc. 1998.

The Maine coast, including the islands, is ~5,347 linear miles

The BBH staff is responsible for 2,941 miles; the Lamoine staff for 2,406

Water Sampling Strategy and Design: Systematic Random Sampling

- **All active stations 6 samples/year/station**

  In addition all Conditionally Approved Areas a minimum of 6 samples/year/open status

- **Minimum of 30 sample scores to calculate geomean and P90 (3 to 5 years of data)**

- **Scheduled a year in advance**

- **No deviation from sample date other than for an emergency! Rescheduling done as soon as possible.**

SRS vs. APC Sampling

DMR uses SRS to monitor and classify areas in conjunction with detailed shoreline survey and pollution source sampling.

WHY SRS and not APC?

From a time management viewpoint, SRS is the most effective way to conduct sampling. It is assumed we will collect enough samples during adverse conditions to properly classify using SRS collected samples.

Schedule Uncertainties

When stations or runs need to be added/changed to the schedule.

Flood Closures: All scheduled runs are dropped and flood sampling stations are sampled until closure is lifted. Random runs effected need to be rescheduled

Missed Stations: Due to access, safety, tide, ice- Make up dates need to be rescheduled and runs adjusted to fit in.

Conditional Re-openings: When scores don't meet approved classification.

Emergencies: Inclement weather (boat runs) or staff illnesses

Lab Closures: Due to snow storms or other state shut down

Rainfall Conditional Areas

- We currently have 3 areas managed on rainfall
  - Medomak River (≥1”/24hr)
  - St. George River (≥1.5”/24hrs)
  - Atkins Bay, Phippsburg (on the Kennebec River) (≥ 1.5”/24hrs, season 10/1-5/14)

Example of Time Required to Manage a Rainfall Conditional Area

Area in the Closed status for 139 days in 2006

Date Closed Flood=F Rain>1.5=R	Additional rainfall events ≥1.5 inches in 24 hours	Date area sampled: (Water samples only)	# Days closed	Date Opened	Open from (date-date)	# days open	Comments
12/27/05 R		1/9/06	14	1/11/06	1/11-1/15?	4	
1/15/06 R		1/29/06	16 or 14	1/31/06	1/31-2/4	4	weekend closure1/15/06 legal notice dated 1/17/06
2/4/06 R		2/15/06	15	2/19/06	2/19-6/4	105	weekend closure 2/4/06 legal notice dated 2/6/06 First weekend opening
6/4/06 R 6/8/06 F flood closure dated6/8/06	reported on 6/8/06 at 0900 >1.50" rain 6/30/06, at 1130 ≥ 1.50" rain	6/4/06 random run 6/11/06 flood samples 6/12/06 flood samples 6/13/06 flood samples 6/18/06 CA samples 6/22/06CA samples 6/26/06CA samples 6/28/06 CA samples 7/9/06 random run 7/11/06 CA samples 7/17/06 CA samples 7/19/06 CA samples	47	7/21/06	7/21-10/12	93	weekend closure6/4/06 legal notice dated 6/5/06
10/12/06 R 10/28/06 F 11/9/06 R	10/21 1.36" 11/9 1.70" 10/28 2.47"	10/24, 10/25, 10/30F 10/31F 11/1F, 11/2F 11/5, 11/28	48	11/29	11/29-		

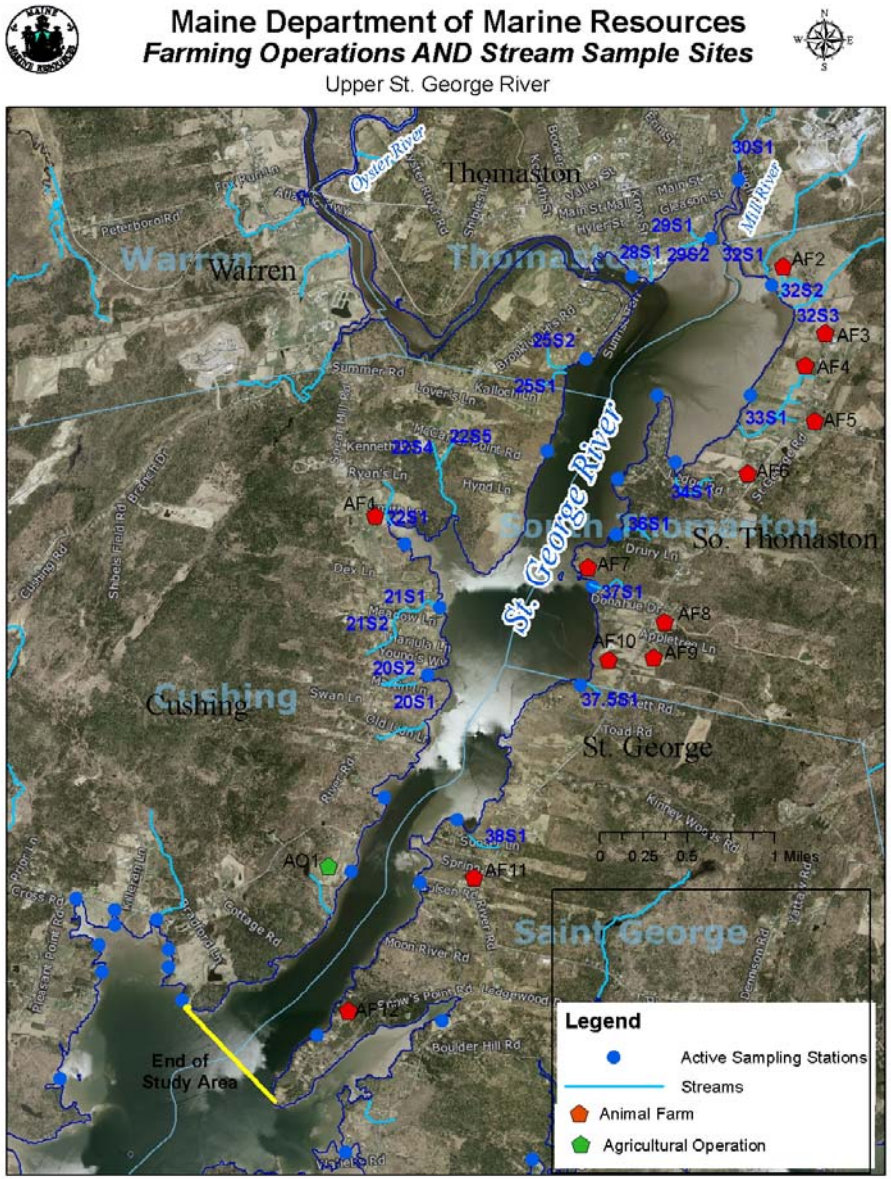
Sampling

- Land vs. boat
- Station location
- Pollution source sampling

Land vs. Boats

- We sample by land because our pollution comes from the land and we are monitoring the pollution that may come from those sources.
- Additionally, our primary resource (soft-shell clams, aquaculture leases, etc.) are in the intertidal zone and so we sample by land so that we sample to water that the shellfish are/will be siphoning.
- Land sampling allows effective year round sampling. Winter months adds problems sampling by boat from sea ice, frequent rough water and launch ramp access.
- We conduct boat sampling on 6 of the random runs. These areas are island shores, sections of the coast with difficult access and mid-water sample sites.
- We have two boats in the project. Lamoine 24' Eastern; BBH 22' Pursuit
- DMR boating policy requires annual training, two people per boat per run.

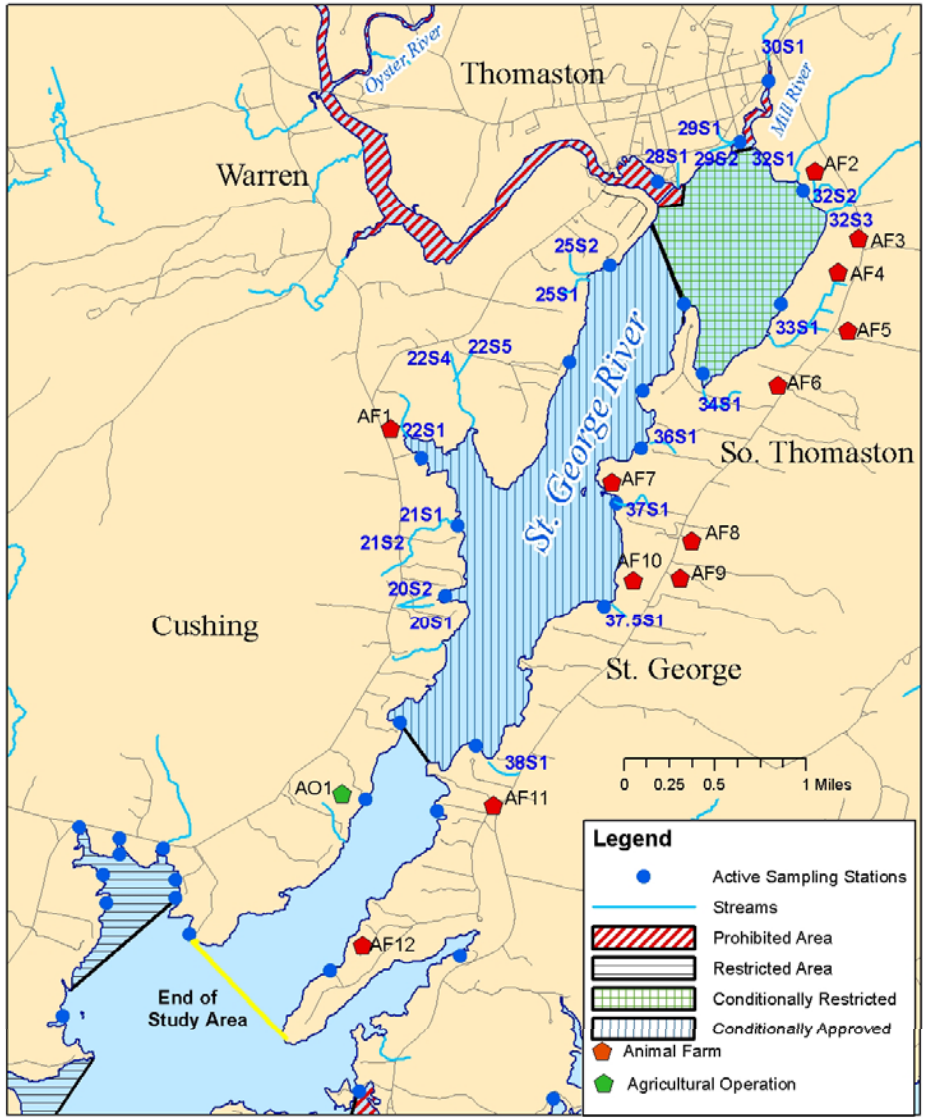
Sample Location



Maine Department of Marine Resources

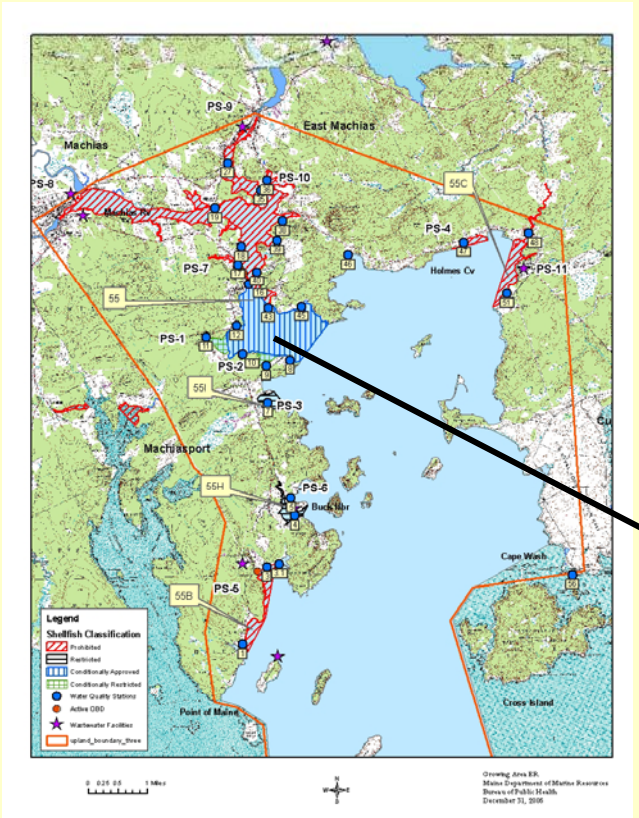
Farming Operations AND Stream Sample Sites

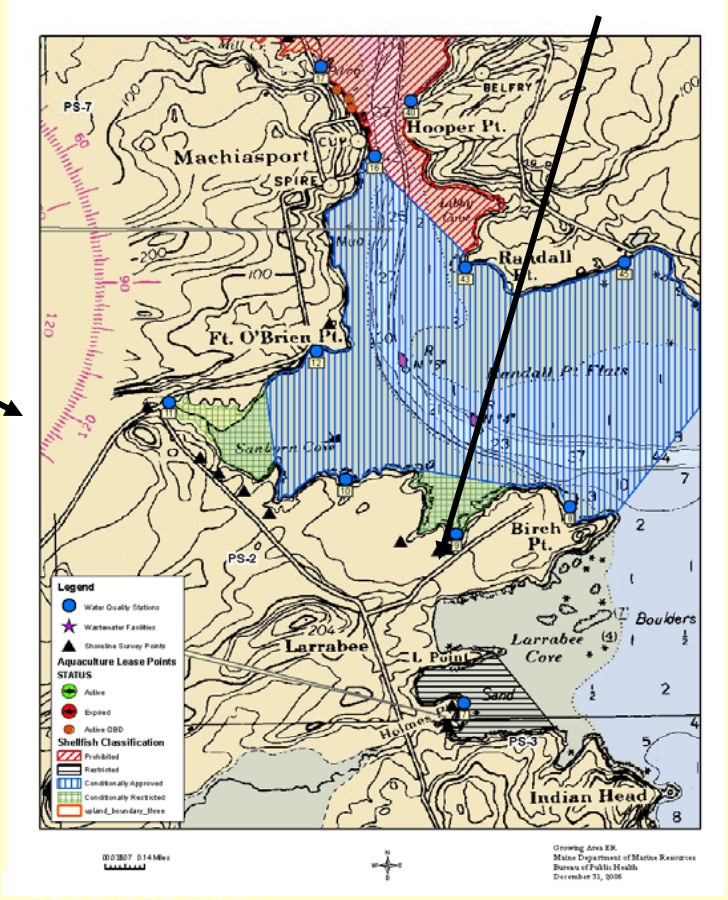
Upper St. George River



Pollution Source Sampling

SLS_ID	DATE	FECAL	REMARKS	FLOW GPM	RUNOFF
ER00198.00	7/20/2004	240	? MS seep into cove, very low flow, need to resample after rainfall, Berry property	10	Low
ER00198.00	8/4/2004	93	? MS seep into cove, very low flow, need to resample after rainfall, Berry property	10	Low
ER00198.00	9/7/2004	1200	? MS seep into cove, very low flow, some recent steady rainfall, Berry property	10	Medium
ER00198.00	11/20/2006	1700	? MS seep into cove, very low flow, some recent steady rainfall, Berry property	12	Medium
ER00198.00	11/28/2006	124	? MS seep into cove, very low flow, some recent steady rainfall, Berry property	10	Medium
ER00198.00	12/11/2006	76	? MS seep into cove, very low flow, some recent steady rainfall, Berry property	10	Low
ER00198.00	12/21/2006	33	Berry ditch.	<1	Low





Volunteer Program Overview

Volunteers

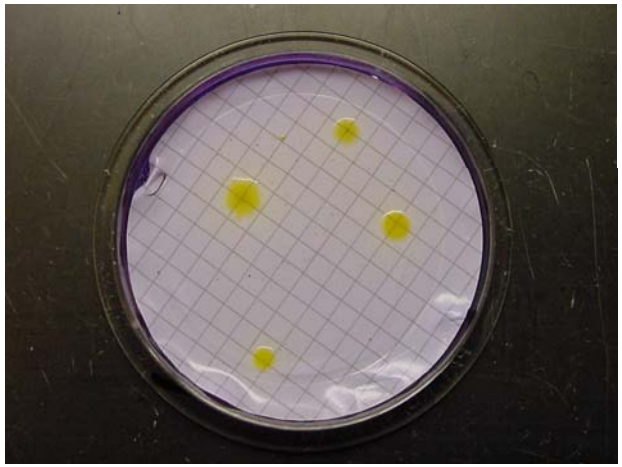
- Currently there are 86 WQ volunteers.
- 12 M.R.S.A. §6691 A commercial shellfish license holder who complies with the shellfish sanitation program's quality assurance and quality control training and certification requirements as administered by the department may serve as a volunteer water quality sampler for the department.
- Annual mandatory training in aseptic technique, site certification with specialist or scientist responsible for the area, basics of the program, understanding the SOP and quality control/quality assurance in the field.
- Some volunteers are allowed to perform shoreline survey work and do pollution source sampling.

Use of Volunteers

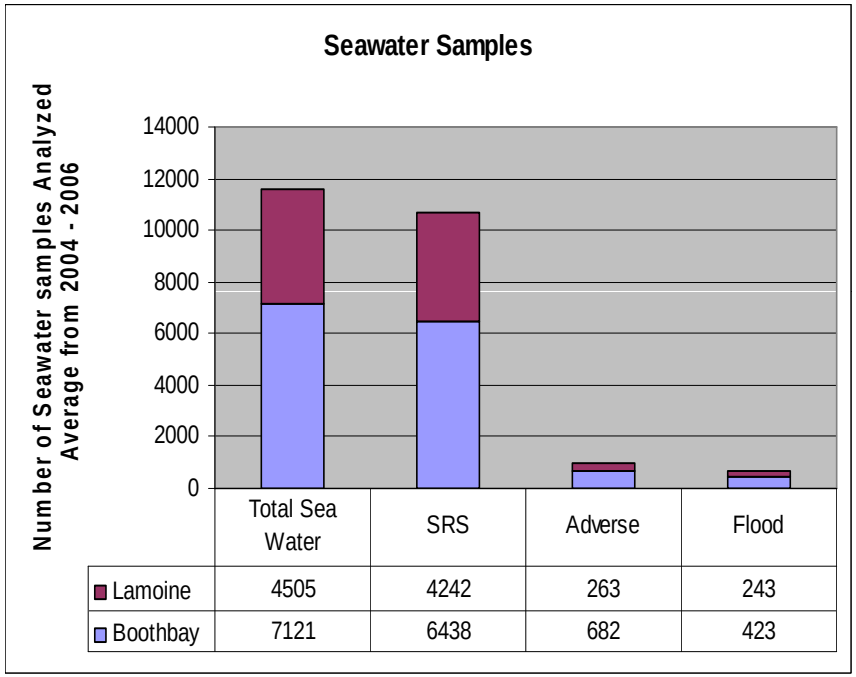
- In the past 2 years there has been a tremendous improvement in standardization/training/oversight/quality and commitment of volunteers
- Reliability – missed stations, not following SOP, making decisions that they are not qualified to make
- Commitment – availability of municipal shellfish wardens; some only sample seasonally; some only want to collect 2 or 3 samples in a run
- QA/QC
- Level of oversight; vols are not "free", the amount of time, training and oversight exceeds that of a regular staff member
- Limiting factors; i.e. laboratory space (more people collecting but not enough staff to run all the samples), staff to pick up samples after collection, value of additional data without a reason for collection

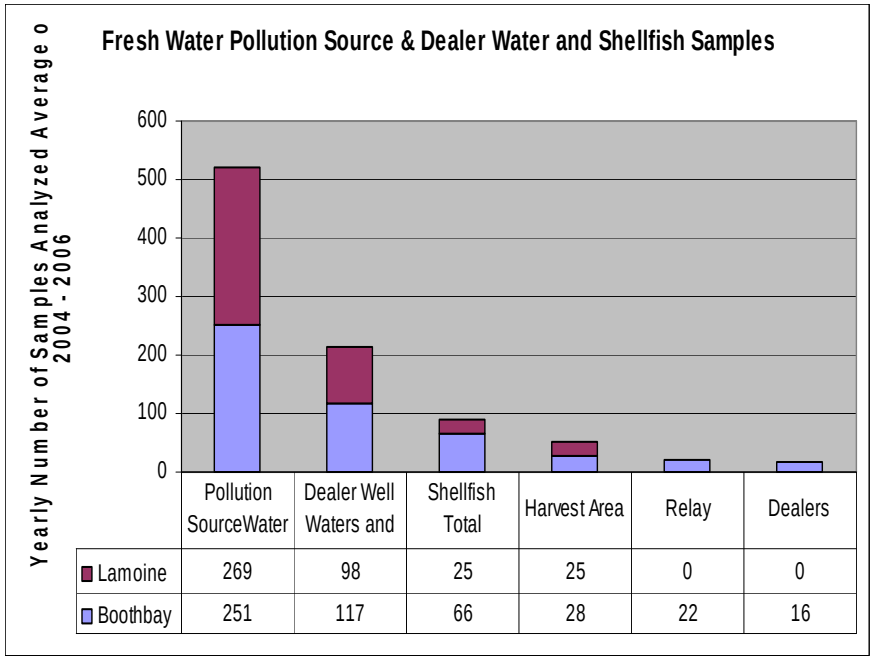
Laboratories

- Two Laboratories – Boothbay & Lamoine
- Membrane Filtration – mTEC Agar
  - Seawater & Pollution Source
- Shellfish Testing & Shellfish Dealer well waters & process Water as needed
- Lab Capability – 30 to 100 samples per day



Samples Analyzed





Issues

- Classification Trends
- Salinity
- Flood Closures
- Rainfall Conditional Areas
- Coastal Development
- Tourism

Maine's SOP Addresses-

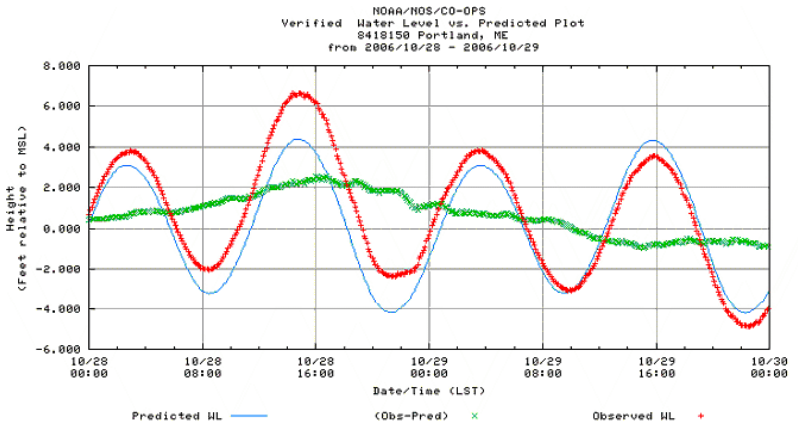
- Authorization of the Public Health Division to Administer the Maine Program
- Program Requirements Addressed in the "Guide for the Control of Molluscan Shellfish".
- Scheduling
- Sample Station Locations
- Sampling Depths and Low Tide Sampling Restrictions
- Sampling at All-Tides Requirements
- Methods of Sampling (boat and land)
- Conditional Area Sampling
- Flood Events
- Outlines Scientific Methods Used to Determine Impacts of Pollution and Growing Area Classifications
- Data Analysis
- Shoreline Survey Criteria
- Laboratory Methods and Sample Handling
- The Use of Volunteers
- Definitions of Terms
- Safety

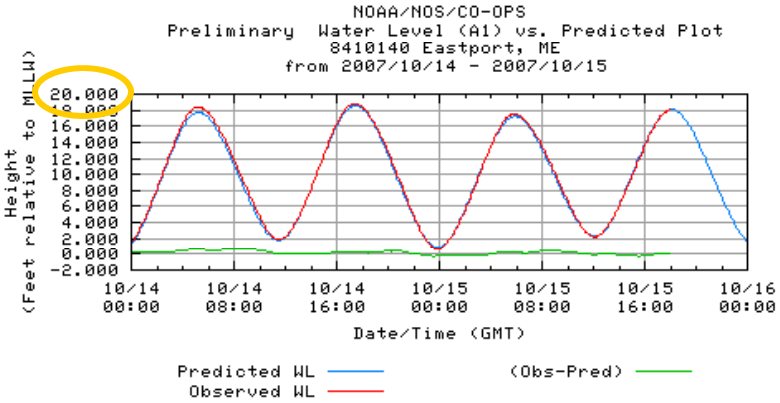
Maine's Sampling Challenges

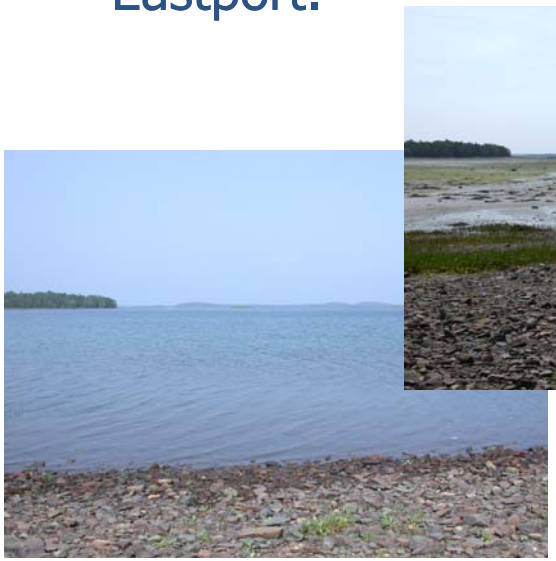
- Miles of coastline
- Islands
- Extensive tidal range
- Staffing
- Weather

Maine Tidal Range

- The tidal range increases as you go from west to east along the coast of Maine; starting with a range of ~ 9 feet in Kittery, it reaches ~ 19 feet in Eastport.

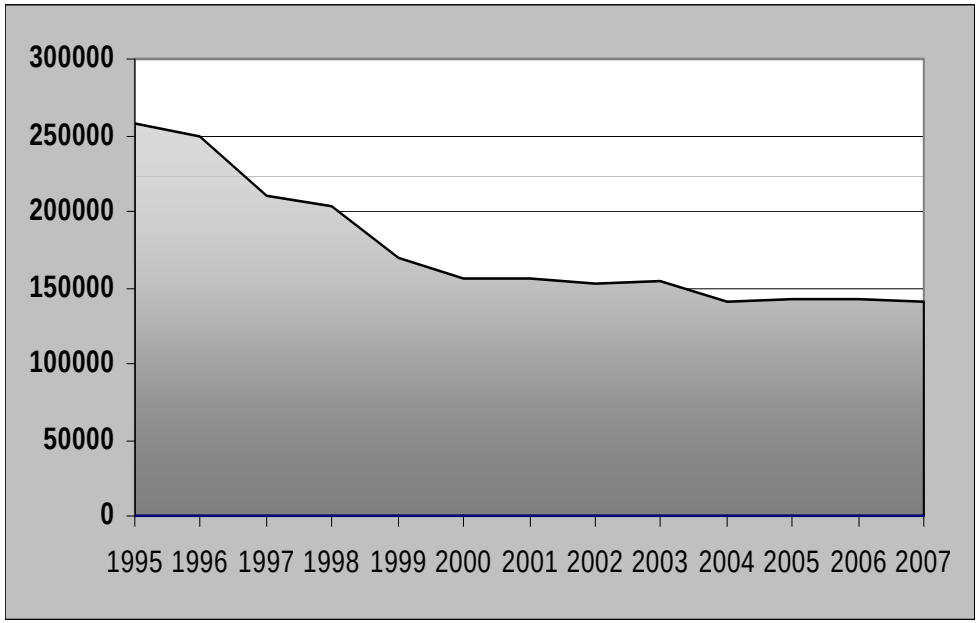






Carrying Place Cove, Eastport

Acreage Figures



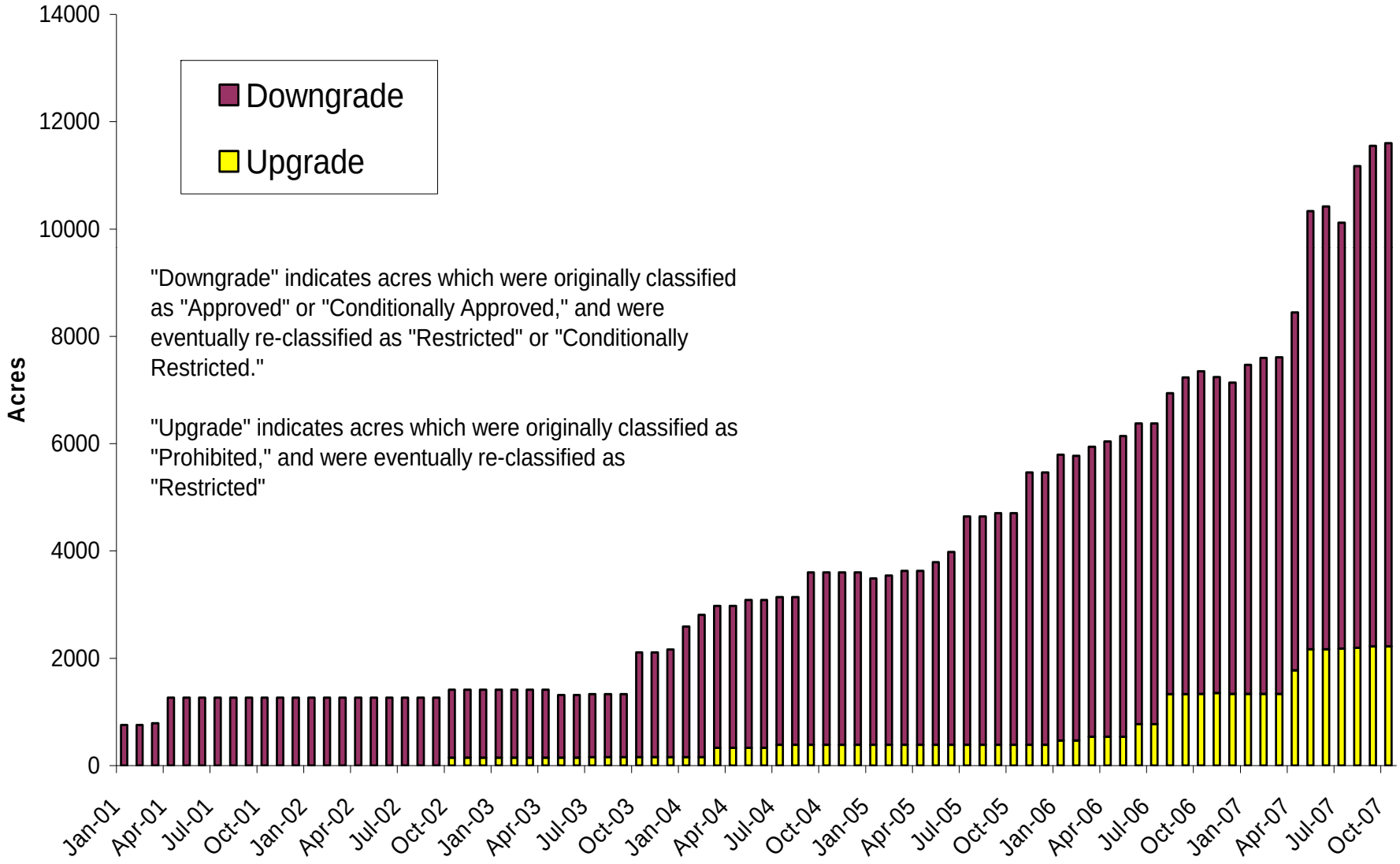
Total Prohibited Acres 1995-2007

Total Acreage (including only Maine state waters) = ~1,855,588 acres

Total acreage of growing areas classified in Maine as of October 12, 2007:

- Prohibited = 140,446 acres
- Restricted = 10,668 acres
- Conditionally Restricted = 1,415 acres
- Conditionally Approved = 24,030 acres
- Approved = 1,679,029 acres

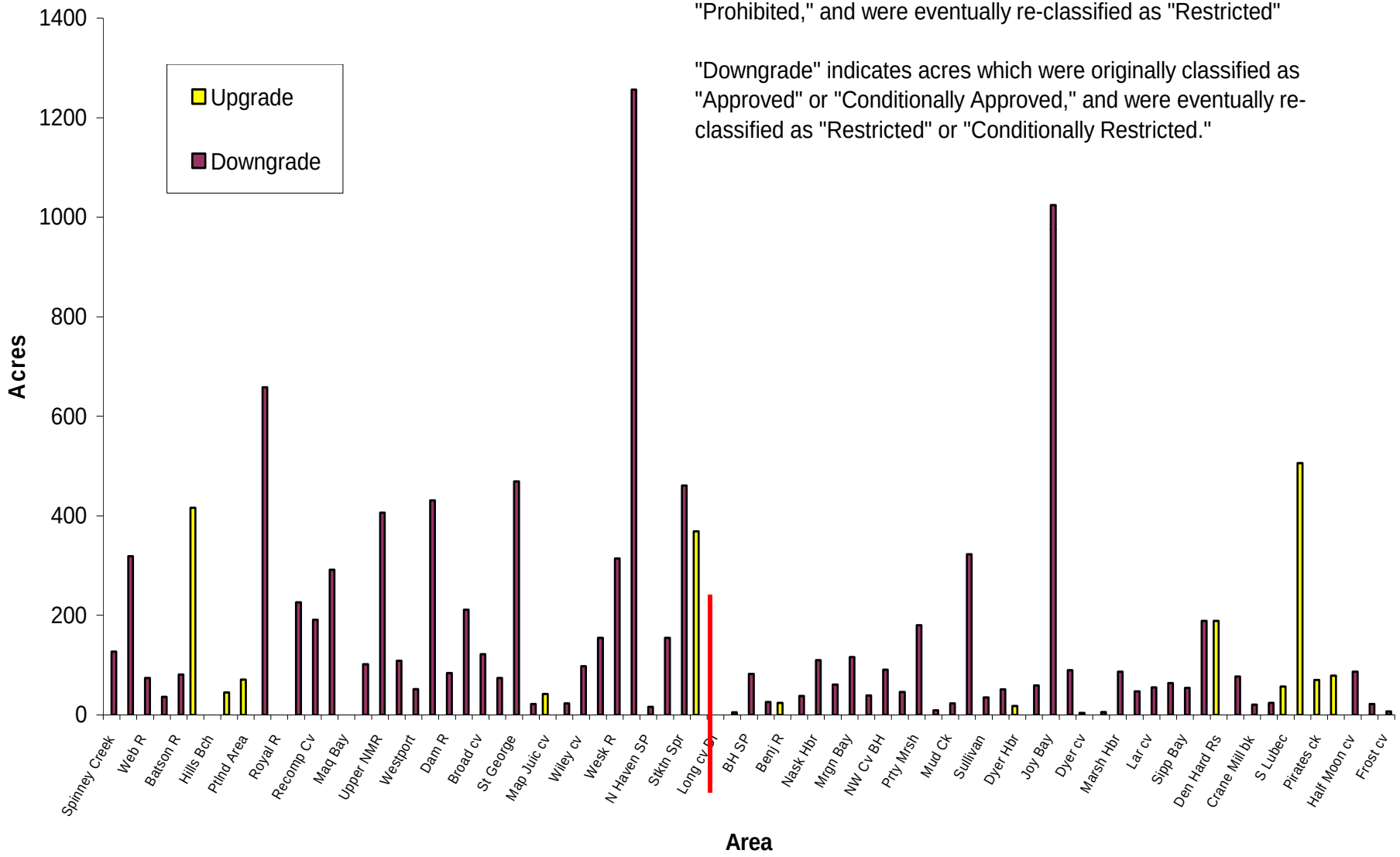
Restricted Areas in Maine
Downgrade vs. Upgrade 2001 - 2007



2007 Restricted Areas in Maine
Upgrade vs. Downgrade, West to East

"Upgrade" indicates acres which were originally classified as "Prohibited," and were eventually re-classified as "Restricted"

"Downgrade" indicates acres which were originally classified as "Approved" or "Conditionally Approved," and were eventually re-classified as "Restricted" or "Conditionally Restricted."



Possible Reasons for Trend Changes

- Approved areas that reclassified due to poor water quality
  - Result of using SRS to classify and restricting data analysis and decisions based on only 30 data points and not looking at the conditions that were represented by the 30 data points.
  - 2005 & 2006 were very wet years – SRS sampling caught more rainfall samples; we didn't do any additional sampling
  - All tide sampling – rather than just higher tide may have contributed (result of industry/ISSC investigation in 2000).
  - The changes to SRS sampling in Boothbay – that is the effort to have samples collected on the day scheduled – this may have contributed – samples may have been collected during more inclement weather rather than just fair weather.
  - Results of FDA annual evaluations of seasonal conditional areas that are not classified properly.
  - New FDA Regional Shellfish Specialist who performs more thorough reviews.
  - 2003 policy implemented to do internal peer reviews of reports

Possible Reasons for Trend Changes cont.

- Prohibited areas that were reclassified as restricted
  - This was the aftermath of industry complaint and ISSC/FDA investigation – classifying restricted instead of prohibited if met restricted standards
  - Areas not properly classified given data and shoreline survey information.

Rainfall History

Maine Emergency Management Agency Ten Wettest Years on Record

RANK	PRECIPITATION	YEAR
1st	**66.45 INCHES**	**2005**
2ND	66.33 INCHES	1983
3RD	61.15 INCHES	1979
4TH	**60.86 INCHES**	**2006**
5TH	59.24 INCHES	1888
6TH	58.39 INCHES	1996
7TH	58.07 INCHES	1933
8TH	57.63 INCHES	1977
9TH	57.14 INCHES	1991
10TH	56.04 INCHES	1951

NORMAL 45.83 INCHES ----

Flood Closure History 1999-2007

1999 – 2 flood closures
2000 – 1 event that happened in stages; closed 4/23, opened 4/28
2001 – 1 event that closed the whole state; closed 3/23, opened 3/28
2002 – 1 event that closed small portion of midcoast; closed 9/16, opened 9/20
2003 – no flood closures
2004 – 2 events; first western Maine; closed 4/2, opened 4/8 second entire state; closed 8/13, opened 8/27
2005 – 8 events all ≥ 5" [most toxic
2006 – 3 events
2007 – 3 events (to date)

All SRS runs must be cancelled in order to sample flood stations within the closure area. There are 112 flood sample stations statewide; 60 in BBH and 52 in Lamoine. The flood sample station results must return to approved standards in approved/conditionally approve areas and restricted standards in restricted/conditionally restricted areas in order for the flood closure (or portions thereof) to return to open status. Ideally, we would have enough staff to continue SRS runs during a flood event to gain pertinent data to determine how areas are reacting, but we do not have the staff or resources to cont

Salinity

- Soft shell clams and oysters are normally found in sand and mud, and are most abundant in the upper half-tide level near river mouths or heads of bays where low salinity water occurs.

[http://wdfw.wa.gov/fish/shelfish/beachreg/1clam.htm]

- 1989-2007 the DMR collected 236,842 samples and of those samples 2.7% had a salinity <5ppt and 1.2% had a salinity of 0ppt.
- 2003-2007 the DMR collected 52,439 samples and 3.4% had salinities <5ppt and 2.1% had salinities of 0ppt.

Salinity

- There may be times after rainfall and during periods of high run off when random samples are collected that have low salinities but shellfish are living and thriving in those areas. If the conditions were not favorable for shellfish settlement and growth, then there would be no shellfish.

Salinity and Soft Shelled Clams

- **Temperature:**
  Soft-Shell Clams will pump from 37º F to 80º F with little difference in pumping rates
- **Salinity:**
  Soft-Shell Clams will live in a salinity range from 7.5 ppt to 34 ppt.
- **Pumping Rates:**
  Soft-Shell clams will sharply reduce pumping at salinities of 8 ppt and stop pumping below 4 ppt.
- **Salinity Stress Points:**
  Tolerance for sudden salinity change on Soft-Shell clams relative to pumping rates (Stress Point) decreases geographically from south to north. Stress point for Medomak River, Maine is 22 to 24 ppt.
- **Salinity Acclimation:**
  The greater drop in salinity change, the longer time Soft-Shell clams take to resume normal pumping rates. Lower water temperatures also slow salinity acclimation.
- **Time/Temperature Acclimation Period:**
  At 60º F and a 31 ppt to 17 ppt salinity dilution Soft-Shell clams acclimate around 36 hours. At 43º F at the same dilution Soft-Shell clams take around 120 hours.
- **Salinity Wedges/Subduction:**
  Seawater under normal climate conditions is subducted under fresh water flows causing salinity wedges. Subtidal clams will remain at normal pumping rates however intertidal clams in the upper tidal zone have a higher metabolic rate and tend to have a greater tolerance to temperature change and remain pumping. It is unknown about salinity change for inter-tidal clams.

Shellfish, Seawater & Salinity Summer 2007

Shellfish	Seawater	Salinity
MPN/100 grams	**CFU/100mls**	**‰**
3500	**>1600**	**4**
20	<2	30
490	160	25
270	4	28
2400	6	28
<18	<2	30
1100	26	30
490	54	22

What Impacts Water Quality In Maine?

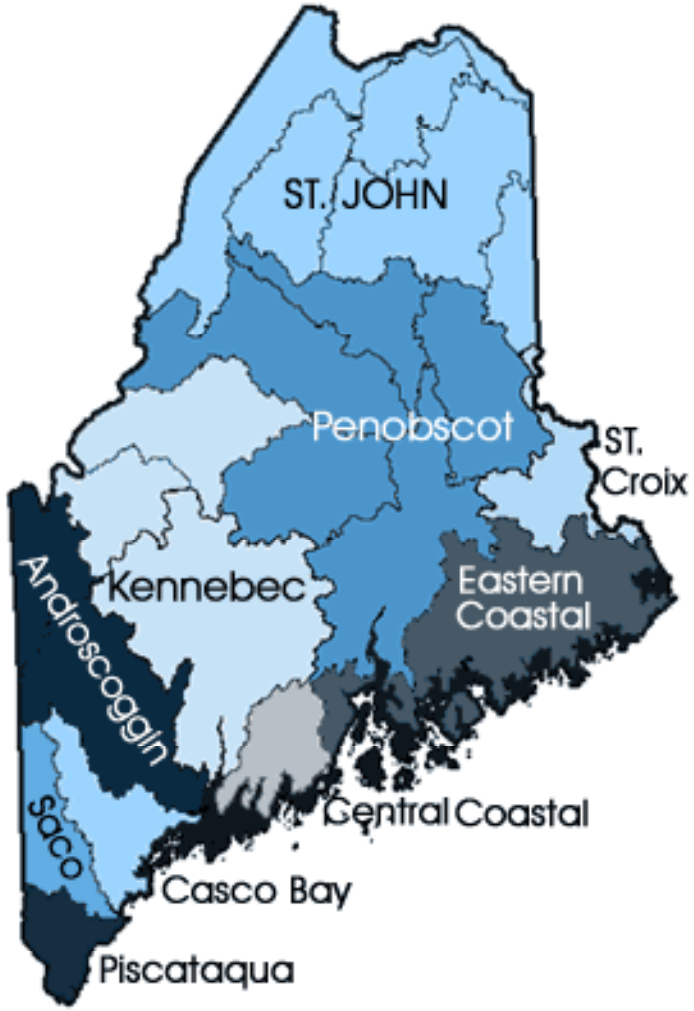
Major Components of the WQ Program that Impact Growing Area Classifications

- Marinas
- Licensed Overboard Discharges
- Wastewater Treatment Plants
- Failing Residential Septic Systems
- Holding Tanks
- Agriculture
- Toxins, Fuels and Heavy Metals
- Marine Biotoxins

What types of pollution do we deal with?

- Increase in cruise ships, boating and boating facilities, docks/piers/wharves, marinas and moorings
- Increase in smaller cruise ships in smaller harbors
- Increase in non-point pollution; impervious surfaces
- Decrease in Overboard Discharges (OBD)
- Increase in 'gentleman farmers' in the coastal zone.
- Decrease in commercial farming activities.
- Unknown number of malfunctioning septic systems; whether hydrogeological (inadequate soils) or hydraulic (surface breakouts) – some septic systems are located within the water table or submerged at high tide.
- Animal waste
- Increase in coastal population and increasing trend from seasonal to year-round homes in coastal communities; tourism.

Maine Watersheds



Maine's Coastal Watersheds: Protect Our Coastal Resources

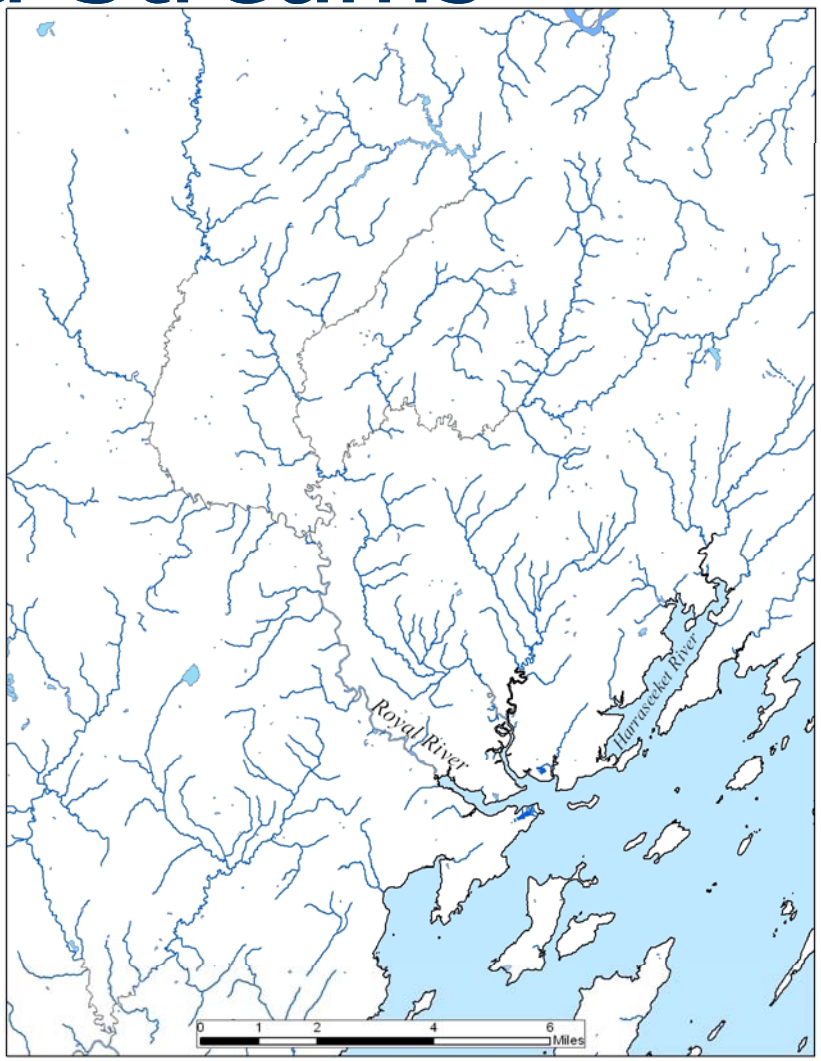
Approximately 73% of Maine's 1.25 million residents live on the coast. The number of Maine coastal residents grows every day, with 50,000 new residents over the last decade. Along with population growth, come the impacts of development. Polluted runoff (also called "nonpoint source pollution") from roads, parking lots, lawns and eroded areas threaten the clean water quality that is so important to our coastal resources and quality of life.

http://www.maine.gov/spo/mcp/projects/living_downstream.php

Maine's coastal wetlands are one of the most important environments to the people of Maine. In fact, 540,000 people or 43 % of the population of Maine live in the 144 coastal towns of Maine that comprise only 12 % of the area of the state (Maine State Planning Office 1997).

Rivers and Streams

- 5,000 **rivers and streams:** covering more than 31,000 miles
- 6000 Lakes and Ponds
- 144 sample stations (out of 1511) are within 300’ of a stream [15 are within 100’]



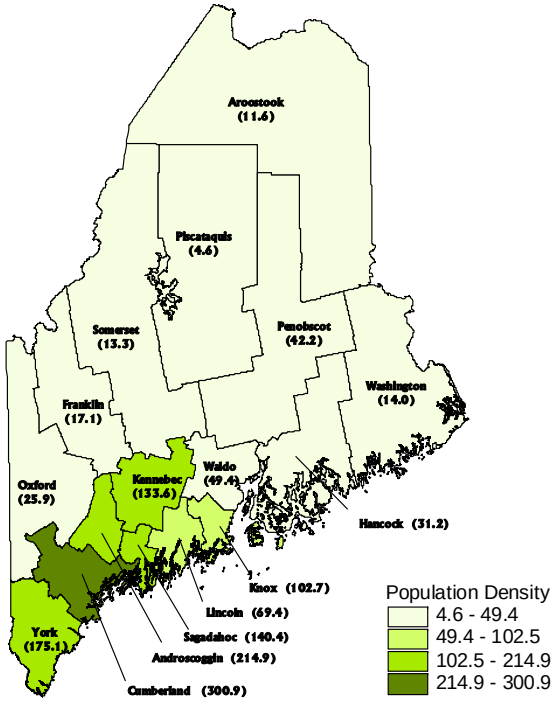
Stormwater Runoff

Stormwater runoff is one of the largest contributors to water quality violations in urban and urbanizing areas of Maine (**See Maine 303(d) list and TMDL information at http://www.state.me.us/dep/blwq/docmonitoring/impairedwaters/).**

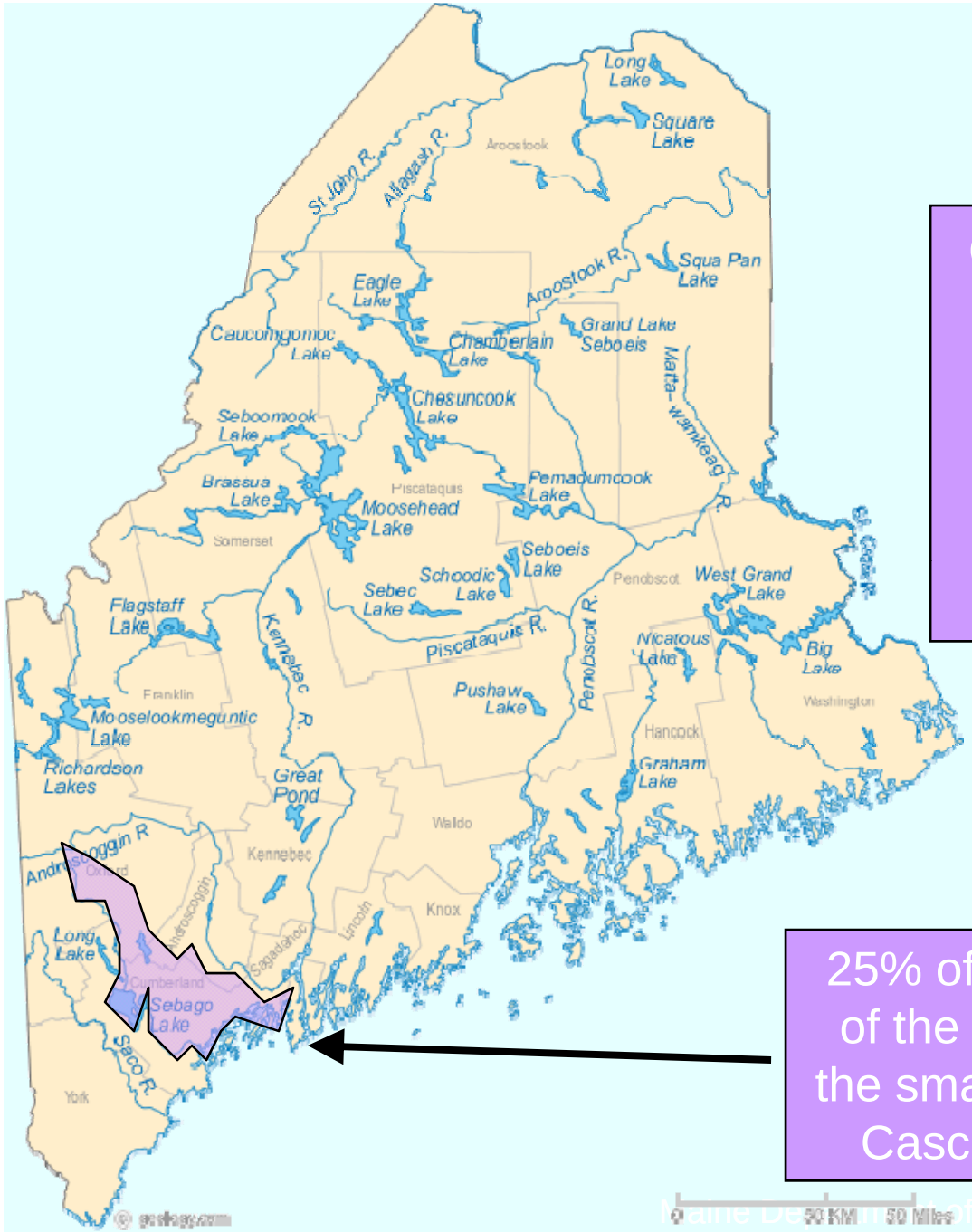
According to the US EPA, polluted storm water runoff is a leading cause of impairment to the nearly 40% of surveyed U.S. water bodies which do not meet water quality standards (US EPA, 1995).

A Model Stormwater Utility for the State of Maine, *Horsley Witten Group*
90 Route 6ASandwich, MA 02563

Population Density



Source: Maine Department of Human Services, Bureau of Health, Office of Data, Research and Vital Statistics, December 17, 1999.



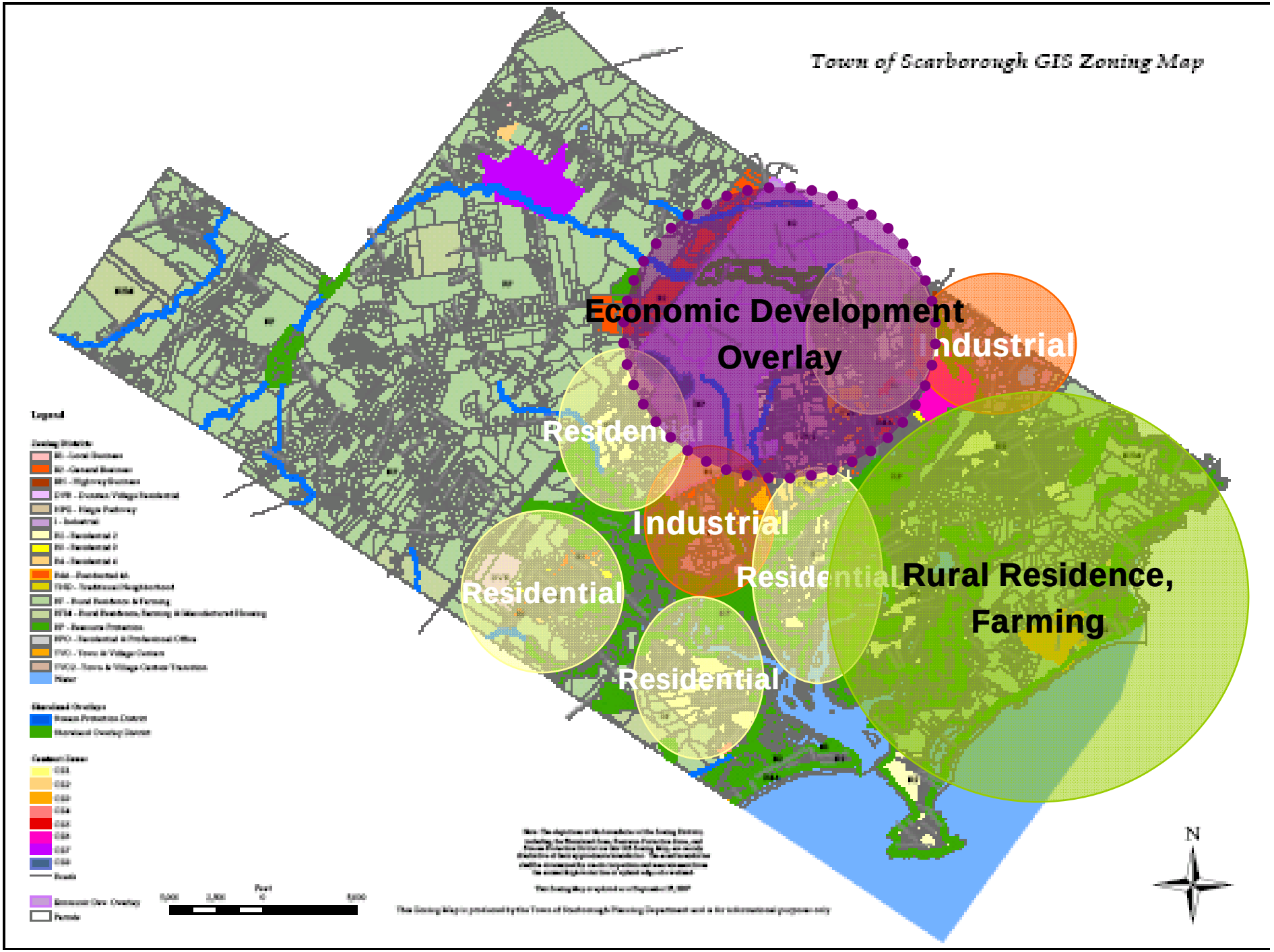
Over 20,000 square miles of watershed land drains into Maine's coastal area through dozens of major rivers and hundreds of minor rivers.

25% of the entire population of the state of Maine live in the small area drained by the Casco Bay watershed….

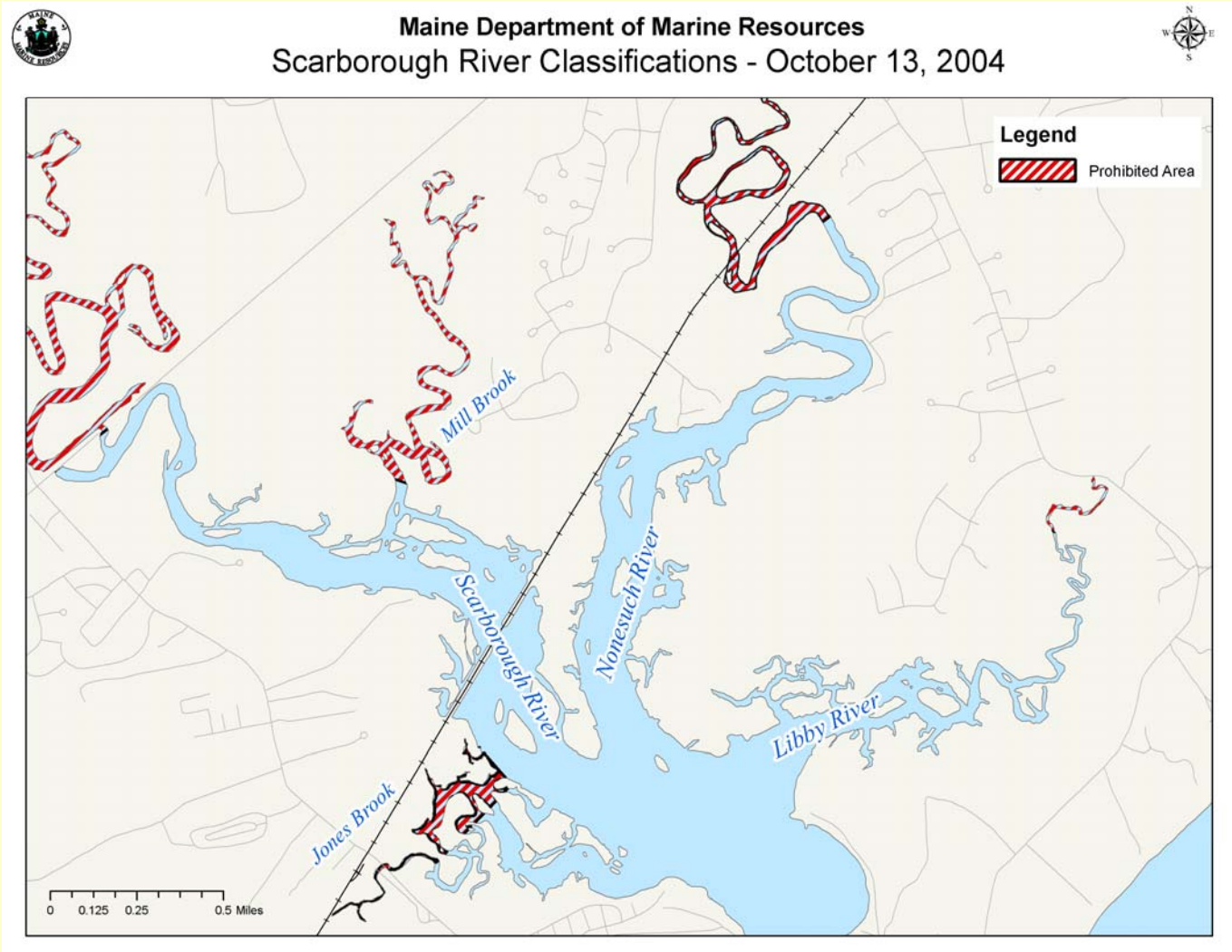
Example of Coastal Growth

Town of Scarborough Annual Town Reports 2001, 2002, 2005 and 2006

Approvals	FY'00-'01	FY'01-'02	FY'02-'03	FY'03-04	FY'04-'05	FY'05-'06
Single Family Lots	48	63	No data available	21	265	24
Commercial lots	No data available	14	No data available	No data available	No data available	No data available
Industrial sq.ft.	195,863	62,440	No data available	78,812	540,750	177,579

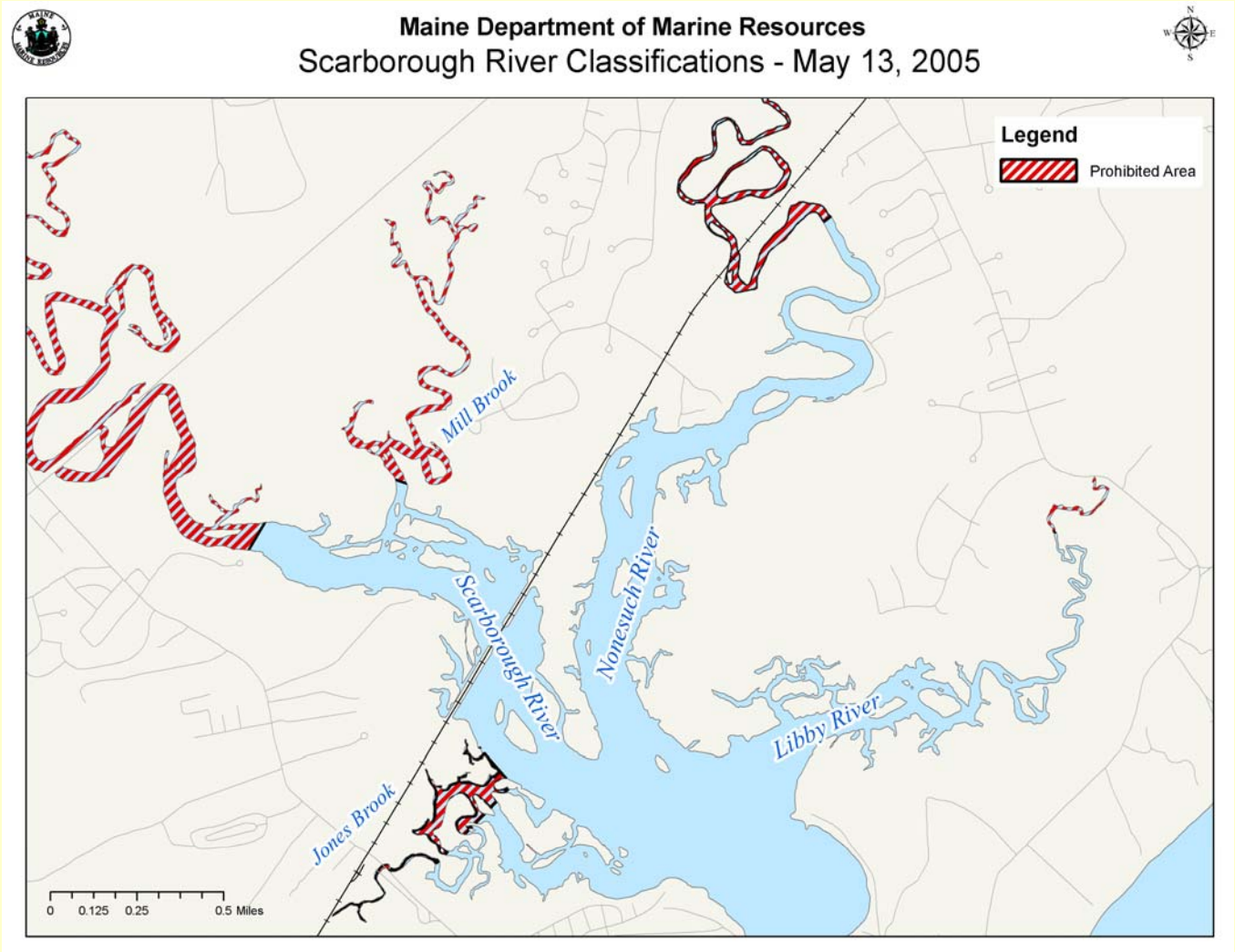

Town of Scarborough GIS Zoning Map
Economic Development Overlay
Industrial
Residential
Industrial
Residential
Residential
Rural Residence, Farming
N

Changes in the Scarborough River classifications over the last three years…



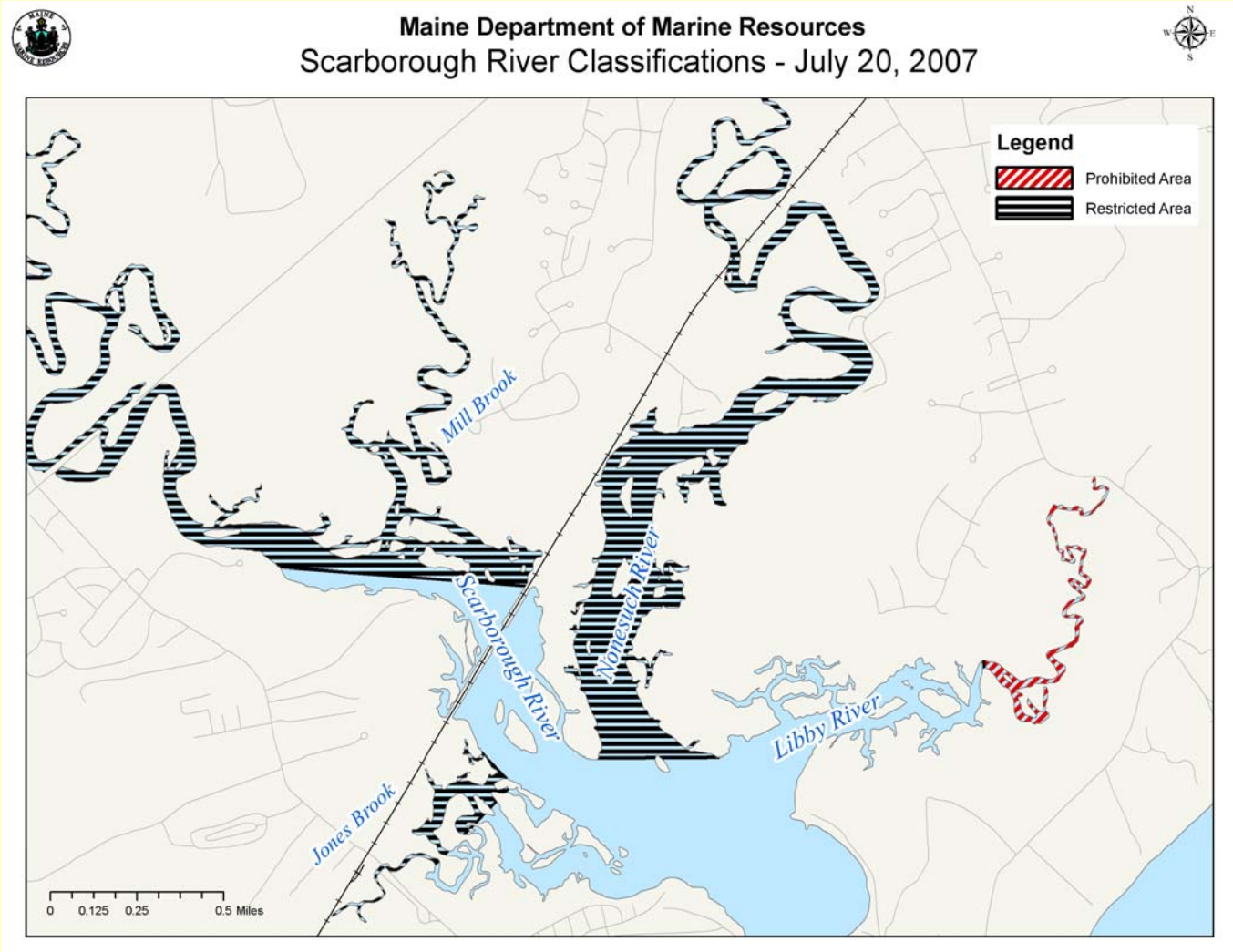
October 2004

Changes in the Scarborough River classifications over the last three years…



May 2005

Changes in the Scarborough River classifications over the last three years…



July 2007

Tourism

- Freeport is the number one tourist destination in Maine (for residents and out-of-state tourists) with 3.5 million visitors spending over $300,000,000 annually. The Freeport Economic Development Corporation ("FEDC") http://www.freeportecon.com/

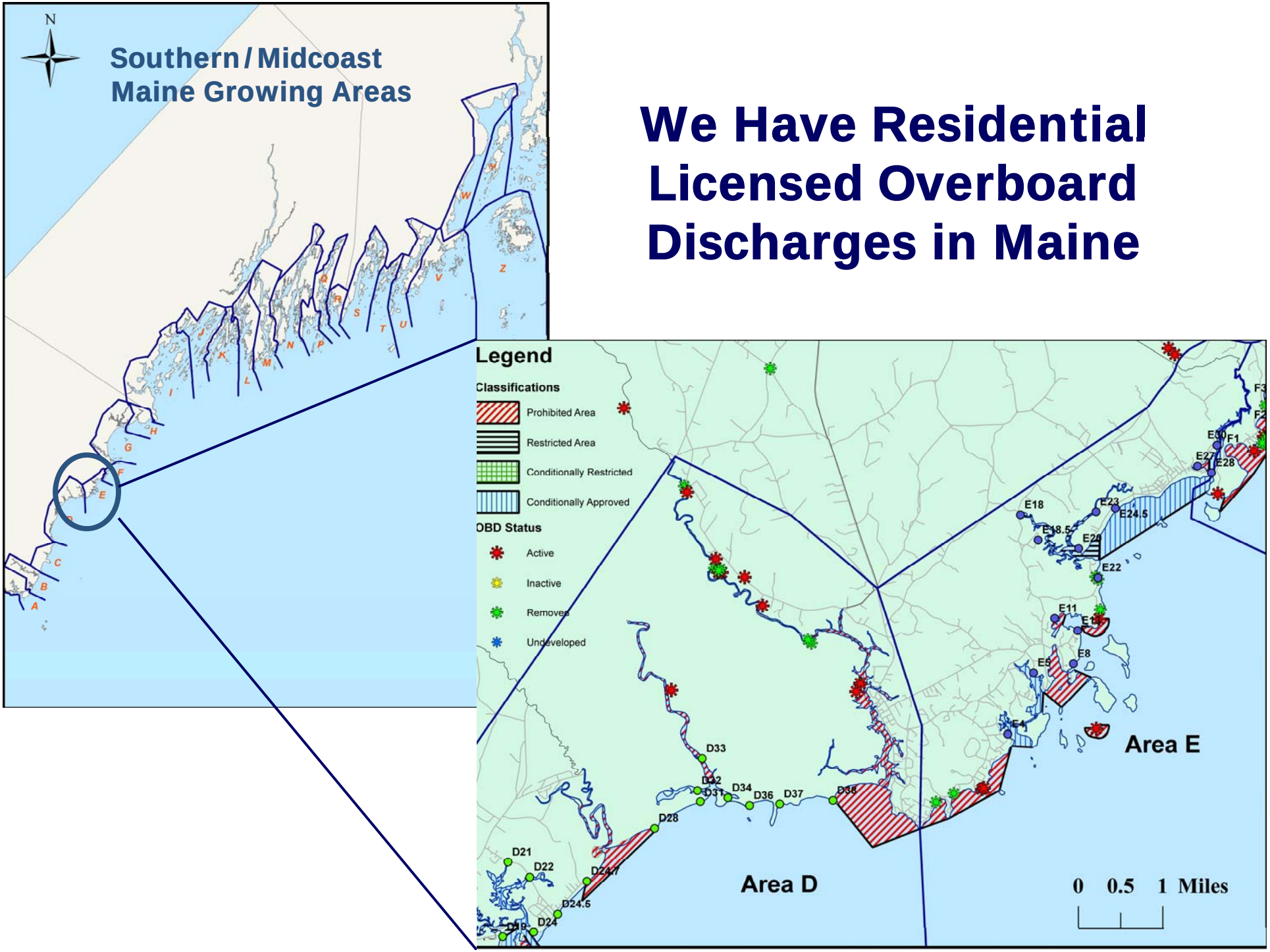
- Acadia National Park - 2.5 million annually in 2002
  Intelligent Transportation Systems Joint Program Office (ITS JPO) of the U.S. Department of Transportation (U.S. DOT) has developed this ITS Benefits Database.

- Today's 45 million yearly tourist trips are more than four times the number reported for 1972/73, ..summer coastal congestion was already considered a serious problem. [The average yearly increase has been nearly 5%.] Our 26 million non-resident visitors are eight times the 1972/73 number. .. The coast's diverse and closely-spaced attractions play well in this era of growing general **tourism**. The **coastal** problem, as all know who live there, continues to be severe summer congestion – the danger that we are "loving it to death." …Maine has no coherent state or regional strategy for growth management, and shoehorning 22 million tourists into a narrow strip of land for ninety days each year inevitably has consequences. These include the obvious: crowded parking lots, boat ramps, beaches, restaurants, and public rest rooms,.. **VACATIONLAND: TOURISM IN MAINE'S EXPANDING SERVICE ECONOMY** muskie.usm.**maine**.edu/changing**maine**/lectures/VailLec.pdf

Coastal Watersheds on the Nonpoint Source Priority Watershed List

The Priority Coastal Watersheds	
Nonpoint Source Priority Watershed	**Reason(s) for Listing**
Piscataqua River Estuary	toxics, commercial resource value, medium ecological value
Spruce Creek	commercial marine resource value, Stormwater rule
York River Estuary	low dissolved oxygen, commercial resource value, medium ecological value
Ogunquit River Estuary	bacteria, low dissolved oxygen, shellfish, medium ecological value
Webhannet River Estuary	bacteria, low dissolved oxygen, shellfish, stormwater rule
Scarborough River Estuary	bacteria, toxics, commercial marine resource value, high ecological value
Royal River Estuary	bacteria, commercial marine resource value, medium ecological value
Cousins River Estuary	bacteria, commercial marine resource value, medium ecological value
Harraseeket River Estuary	bacteria, commercial marine resource value, medium ecological value
Maquoit Bay	bacteria, commercial marine resource value, medium ecological value
New Meadows River Estuary	bacteria, low dissolved oxygen levels, commercial marine resource value, high ecological value
Medomak River Estuary	bacteria, low dissolved oxygen levels, commercial marine resource value, high ecological value
St. George River Estuary	bacteria, low dissolved oxygen levels, commercial marine resource value, high ecological value
Weskeag River	bacteria, low dissolved oxygen levels, shellfish; stormwater rule
Rockland Harbor	bacteria, toxics, commercial marine resource value, medium ecological value
Union River Estuary	bacteria, commercial marine resource value, medium ecological value
Machias River Estuary	bacteria, commercial marine resources, high ecological value

We Have Residential Licensed Overboard Discharges in Maine

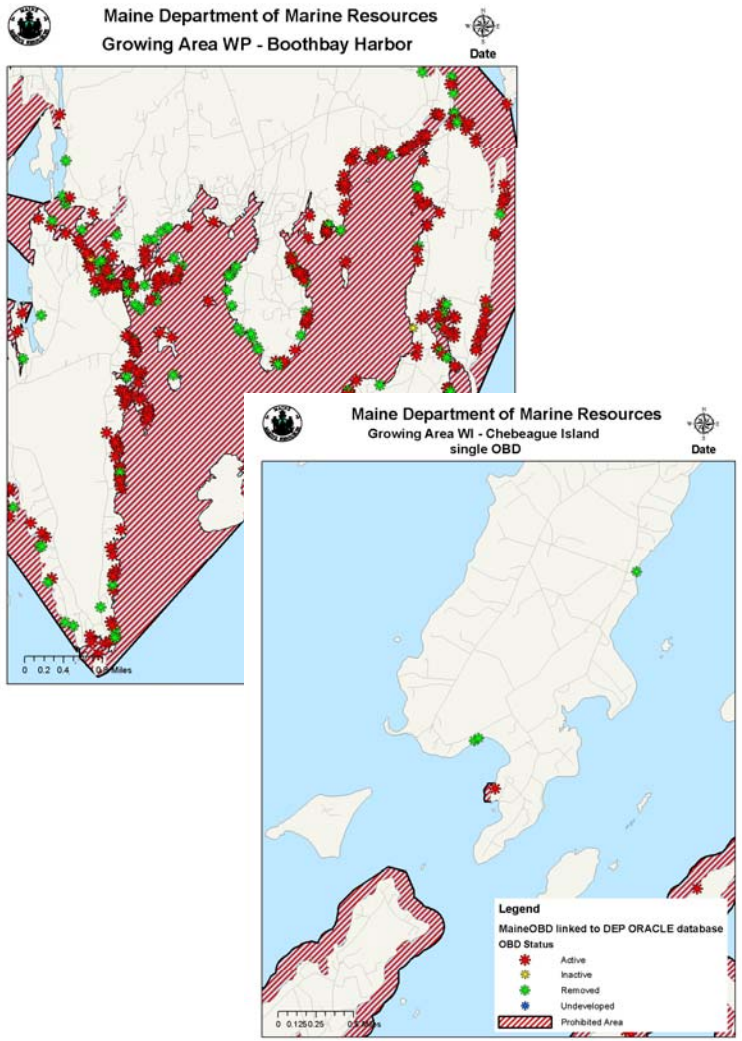


Overboard Discharges (OBDs)

- 1,289 OBDs within 2 miles of the coast
- All discharging into coastal waters; required to have prohibited areas around them
- DMR uses dilution calculations and must place enforceable (Marine Patrol) boundaries around them; lines of sight.

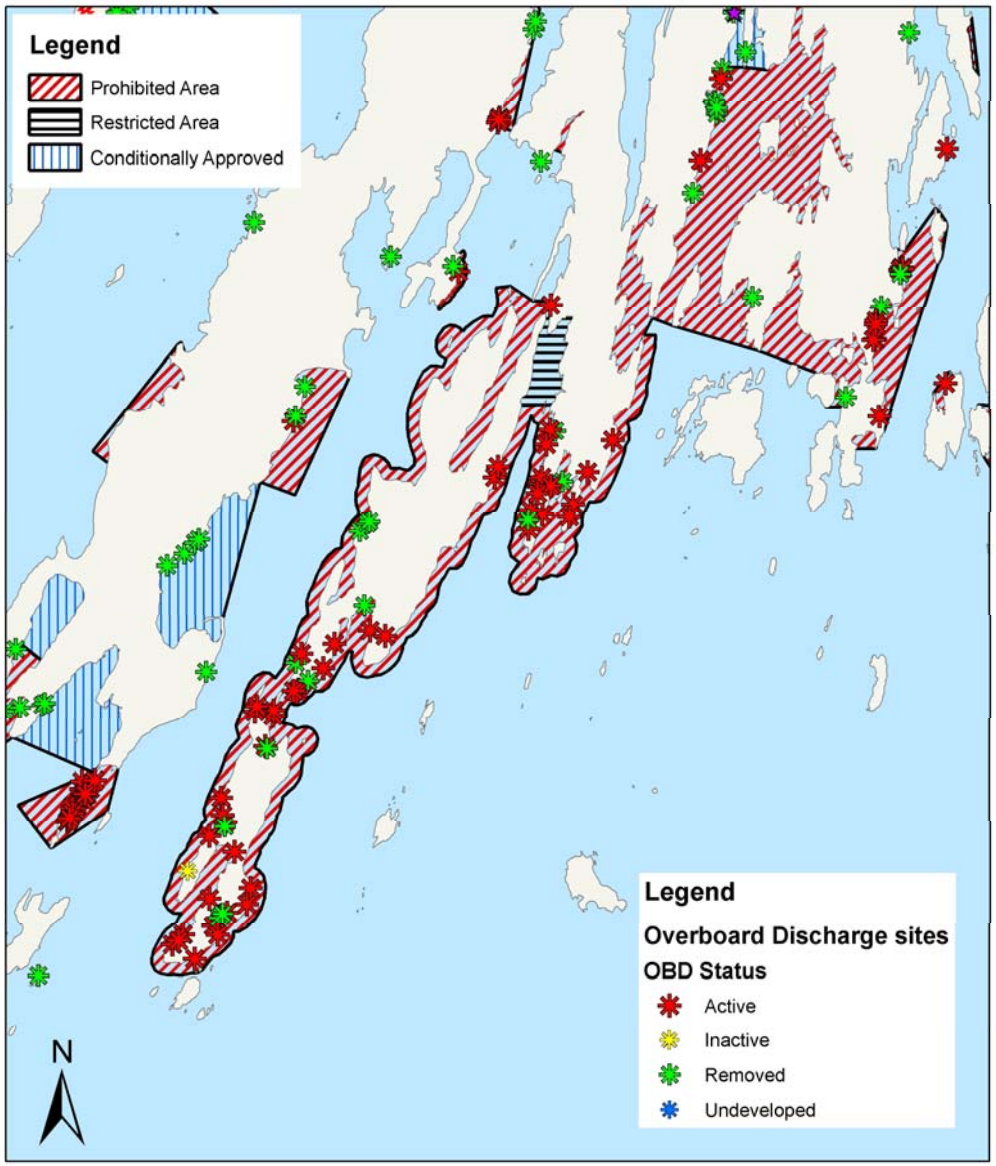
Licensed Overboard Discharge Removals

- During the 1990-Early 2000 Period, many of the residential licensed discharges were removed under the Maine-DEP Removal Program.
- "easy, inexpensive fixes" that resulted in many acres being re-classified from Prohibited to a higher classification.
- 800 within 2 miles of the coast have been removed. There are currently 1,374 active discharges within the state with 1,289 within 2 miles of the coast.
- Many of the remaining discharges are in areas that have replacement design issues or are very expensive to replace.
- ALL active discharges require Prohibited areas enclosing them.



Maine Department of Marine Resources

Harpswell area Overboard Discharge sites (OBDs)



In this relatively small area in Harpswell, there are

more than 100 active OBDs

along the shoreline…

WINTER ADVERSITIES

- HEAVY SNOWS- ICE
- UN-PLOWED ROADS IN REMOTE AREAS
- SEA ICE OVERLAYING SAMPLING AND HARVEST AREAS
- EXTREME COLD EXPOSURE

Not a new problem..

In a Report to Congress: The Molluscan Shellfish Industries and Water Quality: Problems and Opportunities by NOAA/NMFS, September 1977 the #1 Principal Finding was Competition for the Coastal Zone. Specifically: "Competition for the coastal zone is one of the major causes for many problems of the shellfish industry. The relatively small size of the industry compared to its chief competitors (urban development, industry, recreation) and lack of public awareness result in a low priority given to the shellfish industry when economic assessments of the coastal area are made. The industry is facing a continuously decreasing resource base due to environmental changes and pollution from competing users.

A continuing problem…

- "The Maine Healthy Beaches program experienced 147 advisories and closures on 44 beaches in 2006. In the 2005 season, there were 86 advisories and closures on 43 beaches. Factors potentially contributing to the 2006 increase include: heavier rainfall than last season, severe flooding in coastal areas,… The MHB Program has been assisting towns with further assessment of the freshwater tributaries contributing to poor beach water quality and identification of pollution sources." (Maine Health Beaches 2006 Annual Report)

Shellfish Management Areas That Will Be Field Reviewed

- Maquoit Bay
- Harraseeket River
- St. George River
- Machias Bay