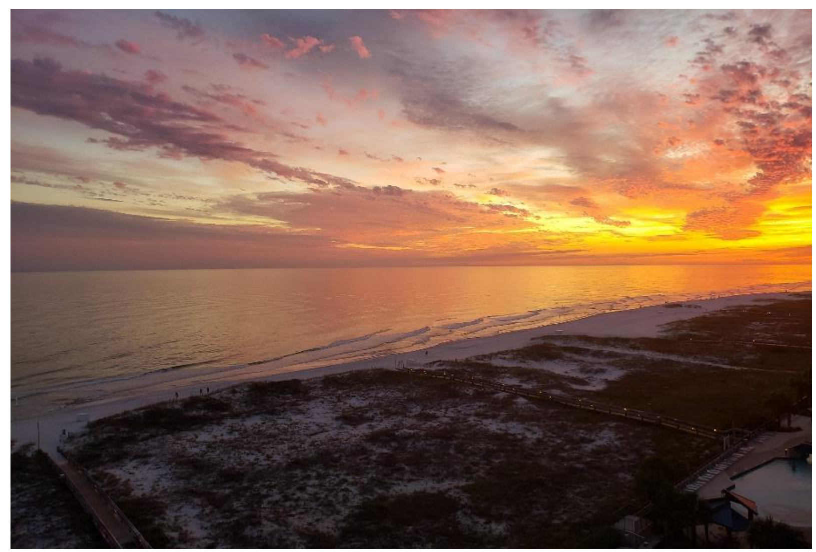
DMR Bureau of Public Health Growing Area Program

Growing Area Program Locations

Eastern Maine Program

- Located in Lamoine State Park
- Responsible for Growing Areas from eastern half of Penobscot Bay to U.S./Canadian Border
- Includes Islesboro and Isle Au Haut



Western Maine Program

- Located in Boothbay Harbor
- Responsible for Growing Areas from western Penobscot Bay to Maine/N.H. border
- Includes North Haven and Vinalhaven

Growing Area Program Responsibility

- **Water Quality**

- **Biotoxin**

Shellfish + Water Quality = Public Health Issue

Shellfish are:

- filter feeders of surrounding water
- concentrate pollutants
- frequently eaten raw or partially cooked
- stored live until cooked

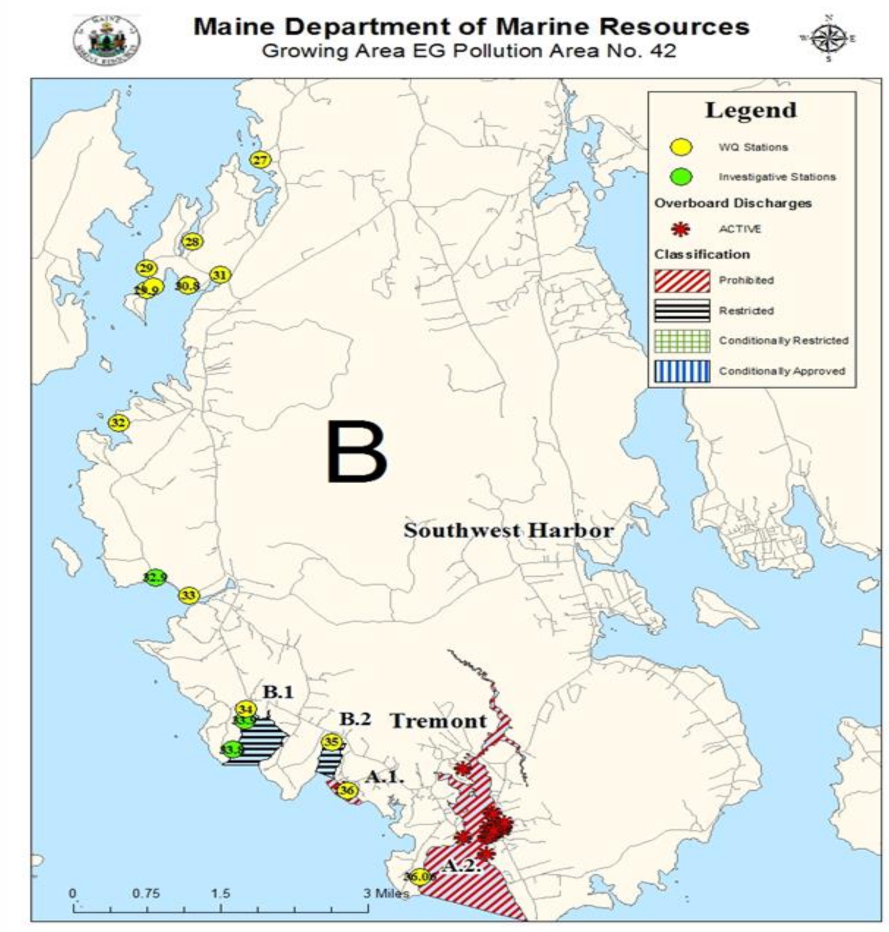



Water Quality Pollution Sources

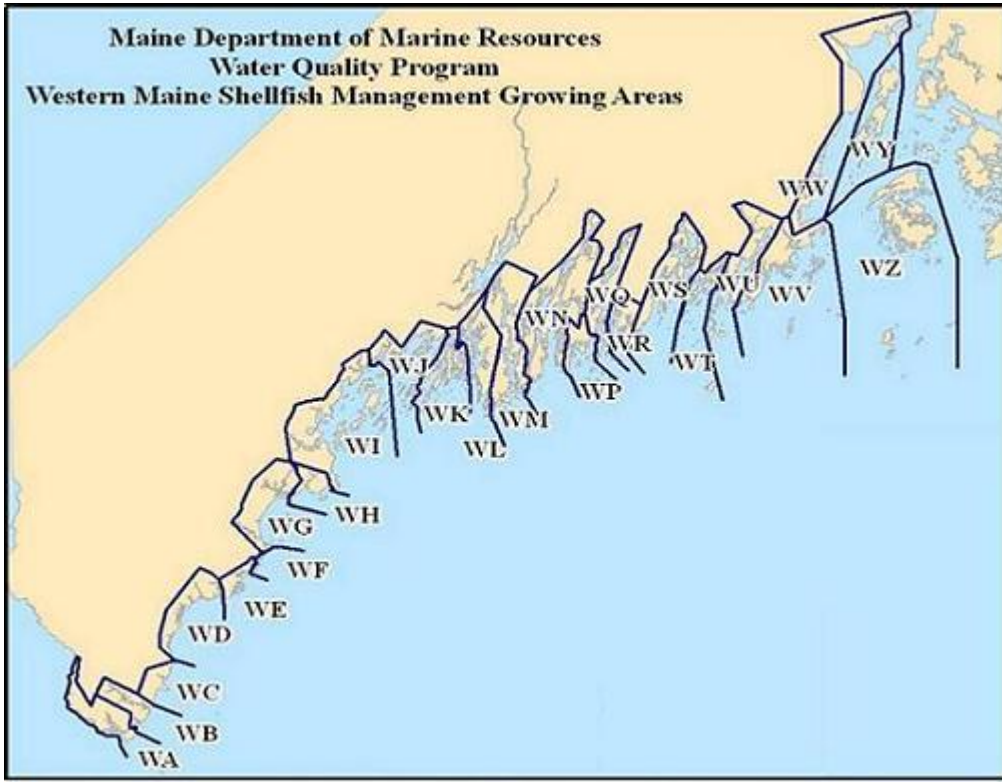
- Lack of WWTP – Jonesport
- 4 growing area shoreline surveys per year (EA, EU in 2022)
- OBDs – group and individual, a lot of ledge
- Failing septic in economically depressed areas
- Local LPI's not addressing problem septics
- Old or dysfunctional WWTPs – Machias
- Wildlife
- Pets

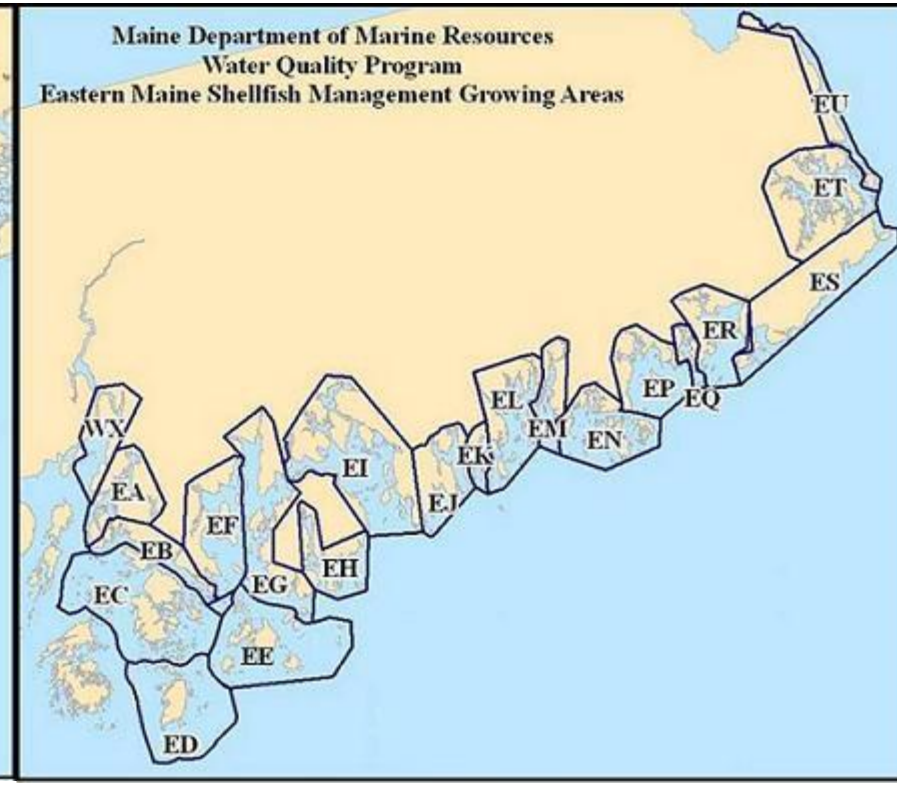
Overboard Discharges (ODBs)

- Topic of concern in 2024
- Many are residential properties, but large ones exist
- Historically used for wastewater discharges with no leach field substrate
- Are not discharges from vessels
- Program administered by Maine DEP
- No new permits issued
- All existing OBDs are grandfathered
- Many have been removed
- Remaining OBDs will be difficult to replace



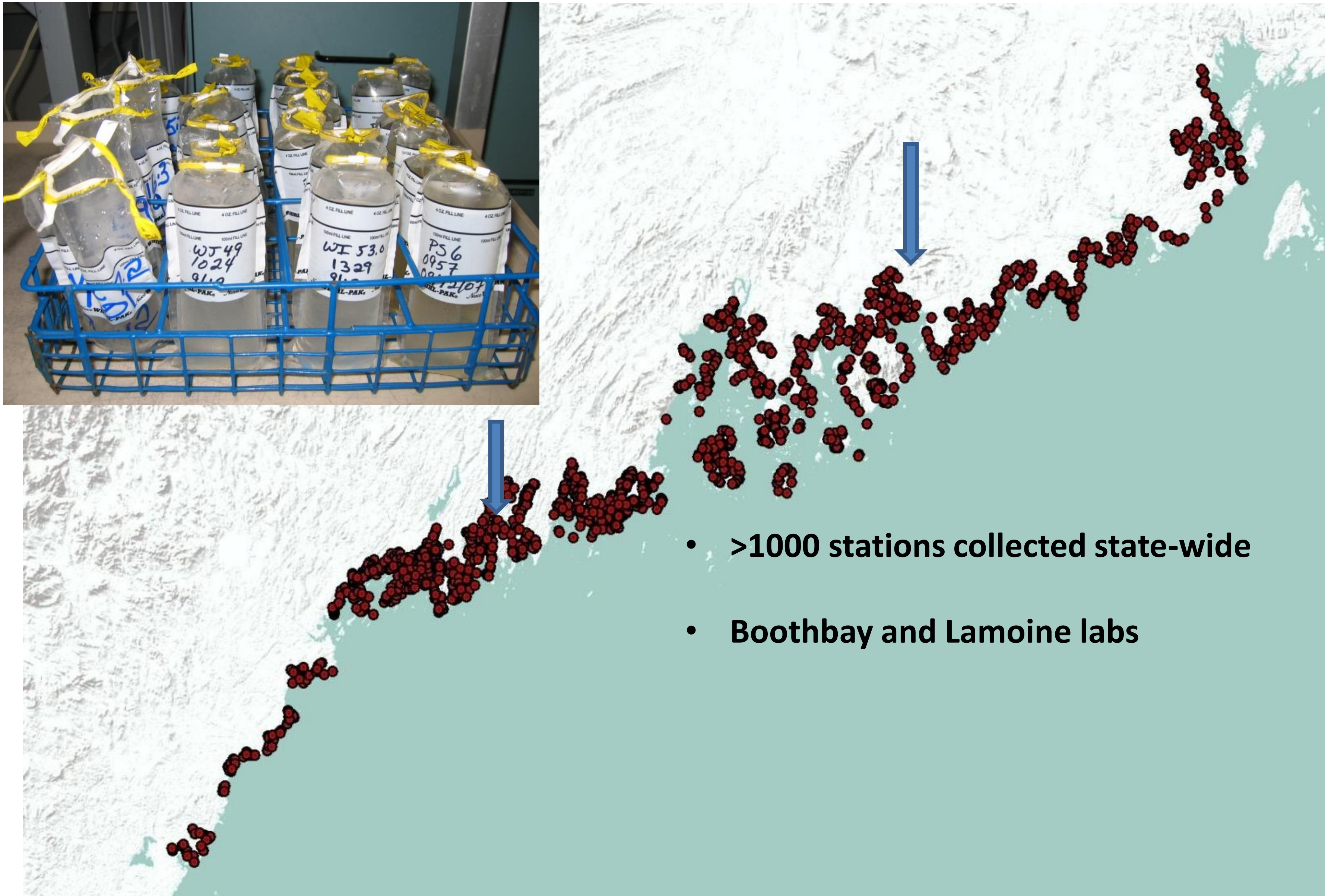
Shellfish Growing Areas of Maine





Program Goals: To protect shellfish consumers by ensuring the harvest, sale and distribution of shellfish come from safe sources while supporting Maine's shellfish industry.

Water Quality Stations



- >1000 stations collected state-wide
- Boothbay and Lamoine labs

Growing Area Classifications

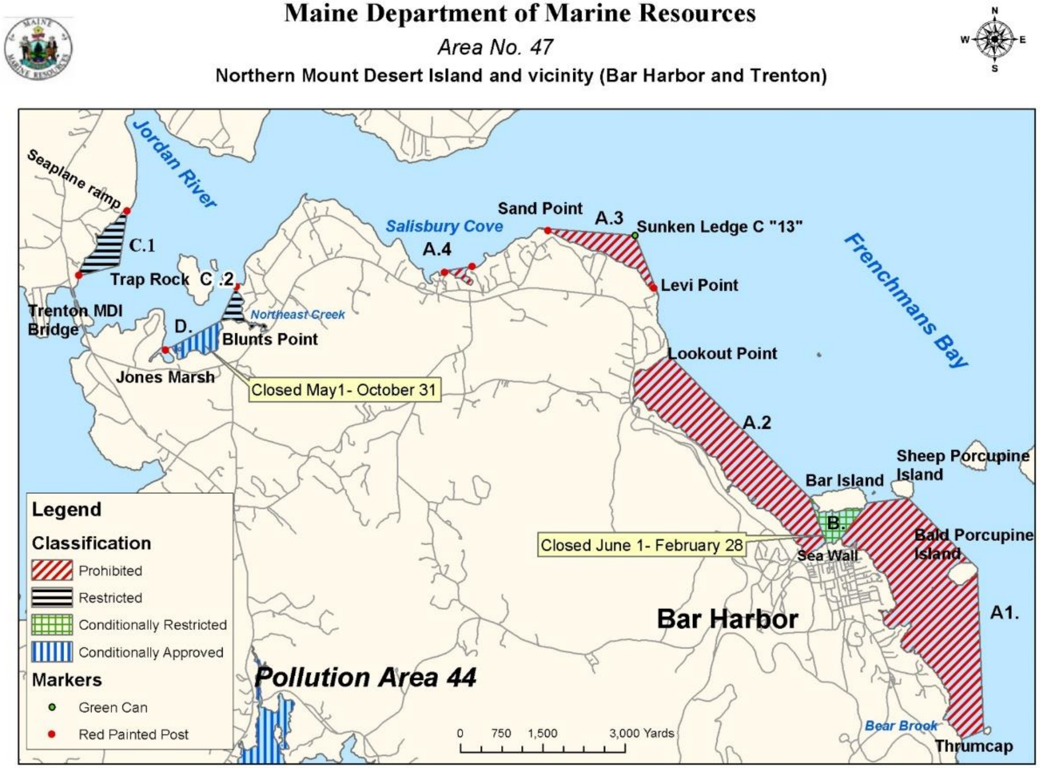
Approved: Areas open for direct market harvest

Conditionally Approved: Areas that meet approved standards under certain predetermined conditions

Restricted: Areas closed to harvest except for purposes of relay or depuration

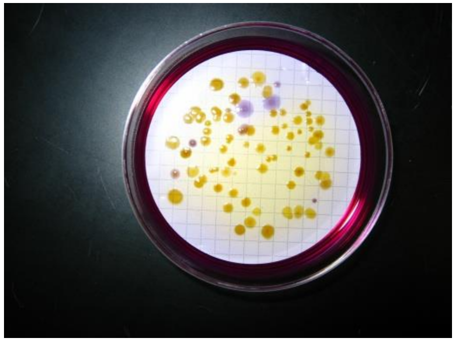
Conditionally Restricted: Areas that meet restricted standards except under certain predetermined conditions

Prohibited: Areas closed to harvesting except for depletion or seeding



Water Quality Sample Data

Membrane Filtration with mTEC auger

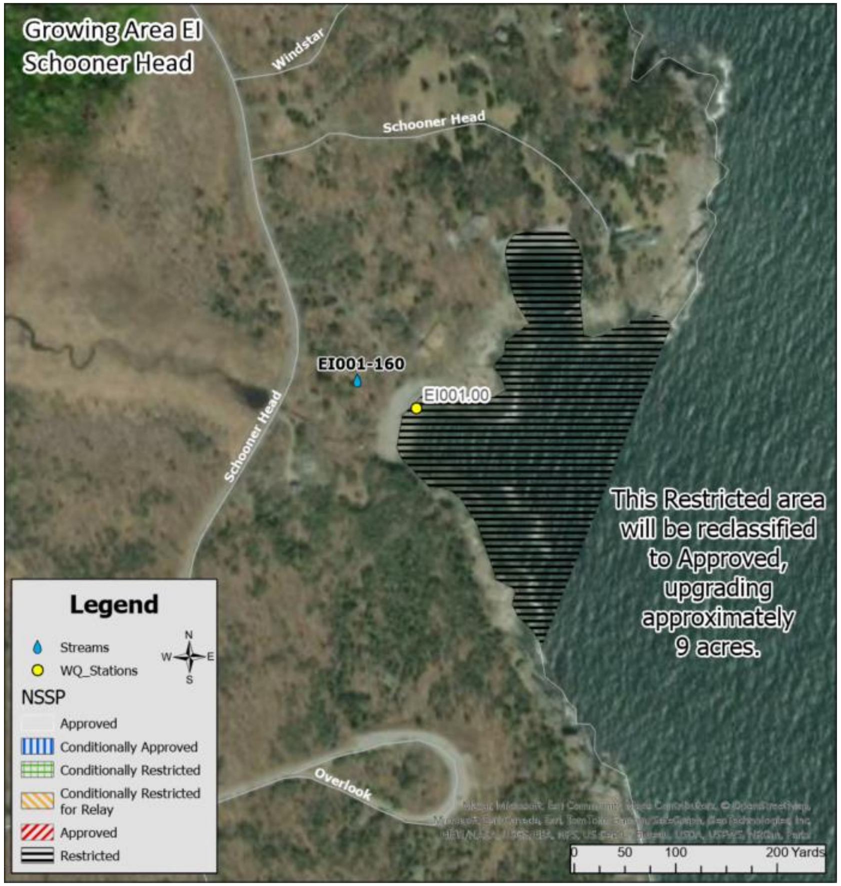


P90 calculation
End of year data
Most recent 30 samples
Generally, 5 years of data

Approved Standard < 31 CFU/100ml
Restricted Standard >31and <163 CFU/100ml
Prohibited >163 CFU/100ml

Harvest Area Reclassifications

- P90 scores calculated at end of calendar year
- Addendums to the Sanitary Survey written and approved or modified
- Classification change addendums sent to municipal officials, shellfish committee chair and shellfish warden
- All downgrades done first, then followed by upgrades
- Downgrade legal notices written approximately two weeks after addendum sent
- Upgrade legal notices written approximately 30 days after addendum sent



Water Quality Volunteer Opportunities

- Supply boat and operator for DMR staff
- Collect water samples
  - cannot be licensed shellfish harvester
  - may be shellfish warden
  - must be approved by DMR
  - must be certified annually

Shoreline Survey (Every 12 Years)

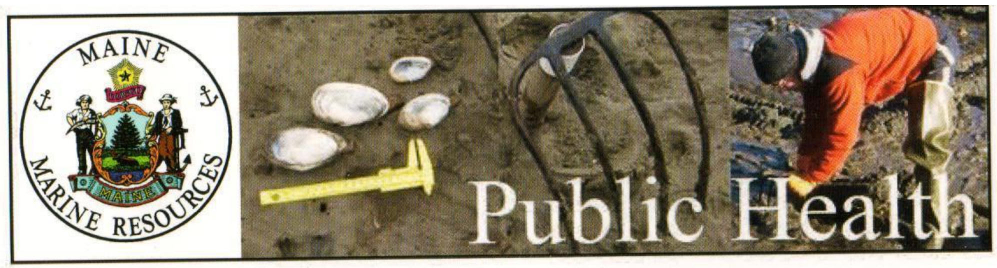
Routine Surveys

- Pollution source potential within 250 ft of shore
- Letter sent to Towns involved in March/April

- Majority are residential properties
- A purpose explanation left on doorknob of unoccupied buildings

- GIS Pollution Source Tracking Database

- Entire Growing Areas Completed



Dear Homeowner:

The Maine Department of Marine Resources (DMR) is conducting a shoreline survey in your town to properly classify shellfish harvest areas according to FDA guidelines. DMR staff are walking the shoreline and making observations about potential pollution sources to coastal waters and shellfish areas. The survey is intended to assist towns in remediation efforts and, if a problem is found, DMR staff will inform the town plumbing inspector or code enforcement officer.

If you have questions about DMR's shellfish classification program or the shoreline survey please do not hesitate to contact the DMR Shellfish Growing Area Program: for west of the Penobscot contact the Boothbay office at 207.633.9500, for east of the Penobscot contact the Lamoine office at 207.664.2394.

Shoreline Survey

Potential and Actual pollution

- Septic Systems
- Straight Pipes
- Streams
- Farms
- Marinas
- Wildlife

Submit Problem Forms to:

- Town LPI/CEO
- DEP
- DHHS
- DACF

Septic Problem Form

- Most important for Towns
- DMR does not remediate pollution sources
- Town LPI/CEO is required to investigate and use form for reporting
- Point pollution sources will result in real time closures
- Point source closures often last for years
  - LPI/CEO does not report back
  - Lack of remediation

SHORELINE SURVEY SEPTIC PROBLEM FORM

GASSID
LOT#
TAX
TOWN
OWNER

SURVEYED BY:
DATE SURVEYED:
DMR DATA ENTRY DATE:
ENTERED BY:

LAT/LON ____________________

PROBLEM DESCRIPTION:

PICTURE: Yes No

TOWN OFFICE SIGNATURE ______________________________ DATE __________

PLEASE FILL OUT INVESTIGATIVE RESULTS WITHIN 30 DAYS OF DATE RECEIVED AND EMAIL OR FAX A COPY OF THIS FORM TO: Brent Lawson, State Plumbing Inspector

Brent.Lawson@maine.gov or fax (207) 287-3165

INVESTIGATION RESULTS

☐ MALFUNCTION ☐ NO MALFUNCTION ☐ REPAIR

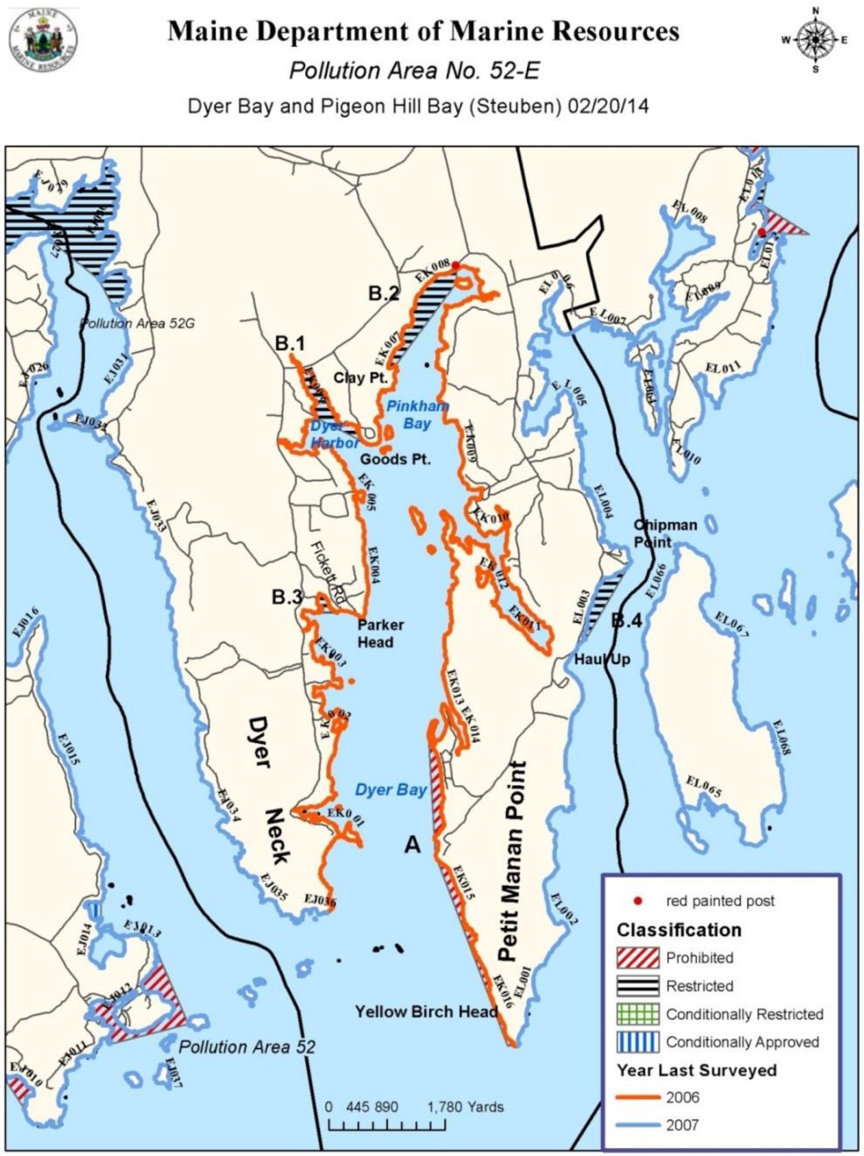
ONCE CORRECTIVE ACTION HAS BEEN CONFIRMED, PLEASE SEND COMPLETED FORM TO:
Brent Lawson, State Plumbing Inspector, 286 Water Street, 3rd Floor, 11 State House Station, Augusta, Maine 04333-0011.

CORRECTIVE ACTION TAKEN ☐ Corrective Action Has Been Completed, Description below

LPI/CEO SIGNATURE ______________________________ DATE __________

Please contact Brent Lawson with any further questions about this form at (207) 592-7376 email: Brent.Lawson@maine.gov

Shoreline Survey "Hot Spots" (Resource Areas)



Criteria

water quality is declining

priority resource area

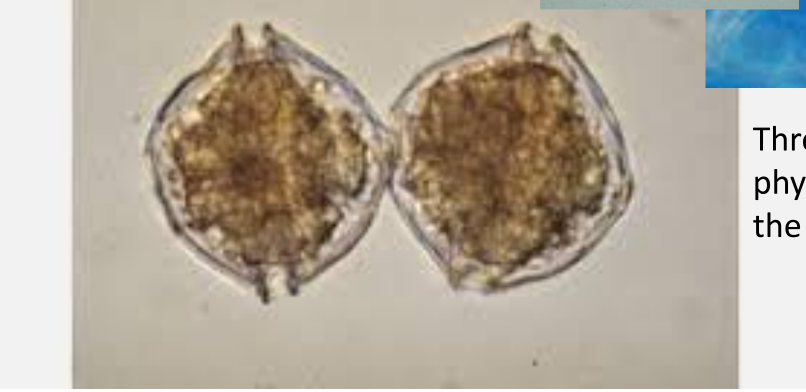
- Pollution source outside 250' or non-point
- DEP responsible for evaluating watershed point source situations
- Shellfish Committees, wardens, and volunteers
  - Pollution Type Testing (Microbial Source Tracking)
  - Watershed pollution surveys

Biotoxin

Marine biotoxin background

Some phytoplankton produce biotoxins intermittently or constantly

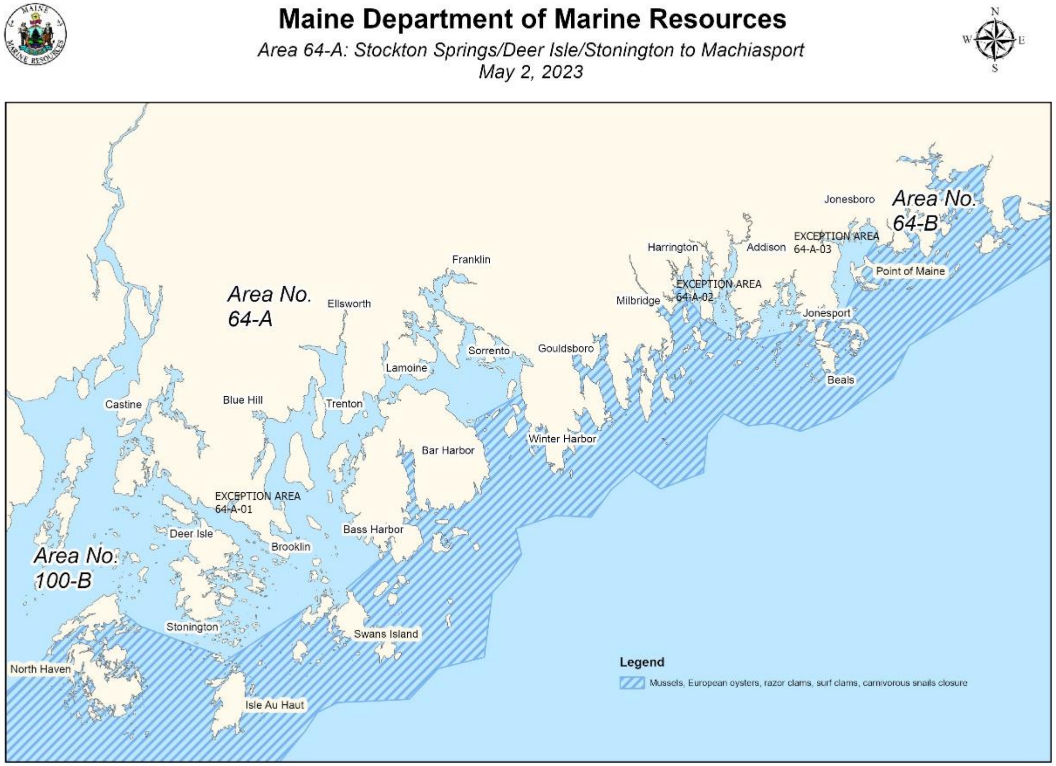
- Competing algae inhibition?
- Grazer or parasite defense?
- Toxin-assisted predation?



Three genera of toxic phytoplankton are common in the Gulf of Maine

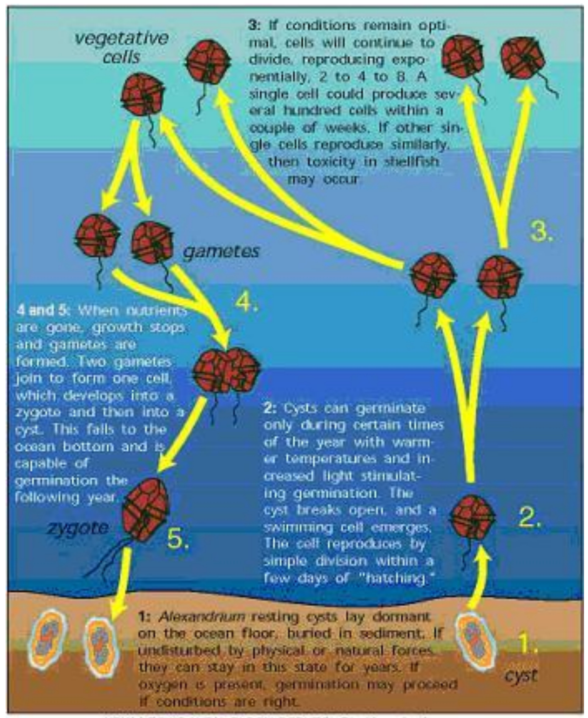
REGIONAL SHELLFISH CLOSURES IMPLENTED ANNUALLY IN MAY

- Closure for mussels, European oysters, razor clams, surf clams and carnivorous snails
- DMR does not have capacity to sample all areas of the coast
- Sample results will change closure boundaries and species
- Exception areas established in commercially viable areas
    - These areas sampled frequently using mussel tissue and phytoplankton analysis

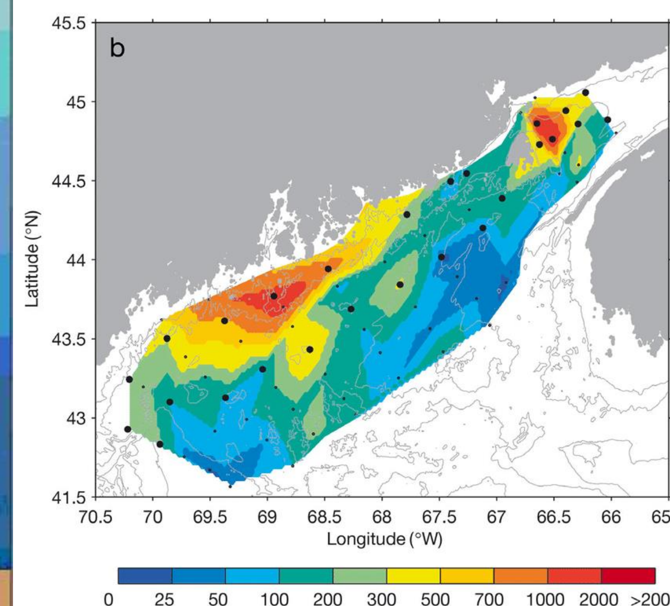


PARALYTIC SHELLFISH POISONING

- Saxitoxins produced by *Alexandrium* species
- Symptoms: tingling or numbness in face, hands, feet; weakness, slurred speech, difficulty swallowing, shortness of breath, nausea, vomiting, dizziness, headache and high blood pressure.
- Rapid onset: 30 minutes or less after eating shellfish
- Death from asphyxiation is rare but has occurred



HOW A TOXIC ALGAL BLOOM OCCURS—The life cycle of one cell. (Don Anderson, Woods Hole Oceanographic Institution)



Source: Don Anderson, Woods Hole Oceanographic Institution

PARALYTIC SHELLFISH POISONING

Alexandrium sp.

- Typically blooms May to August
- Blooms occur every year but length and toxicity vary
- Two large cyst beds in Gulf of Maine
- Some cysts germinate each spring
  - Based on oxygen, light, temp.
- Once germinated, prevailing winds and coastal currents direct path of blooms

PARALYTIC SHELLFISH POISONING – SAMPLING COMPLEXITIES

- New commercial markets= lack of historic data
  - Razor clams, whole scallops
- Expansion of aquaculture/wet storage
  - Untested areas, floating product vs intertidal testing, aquaculture species unavailable for wild harvest by staff
  - Led to development of MOU industry usage
- Decline of wild intertidal mussel populations
  - Usage of stocked traps
  - Usage of organisms attached to floating structures

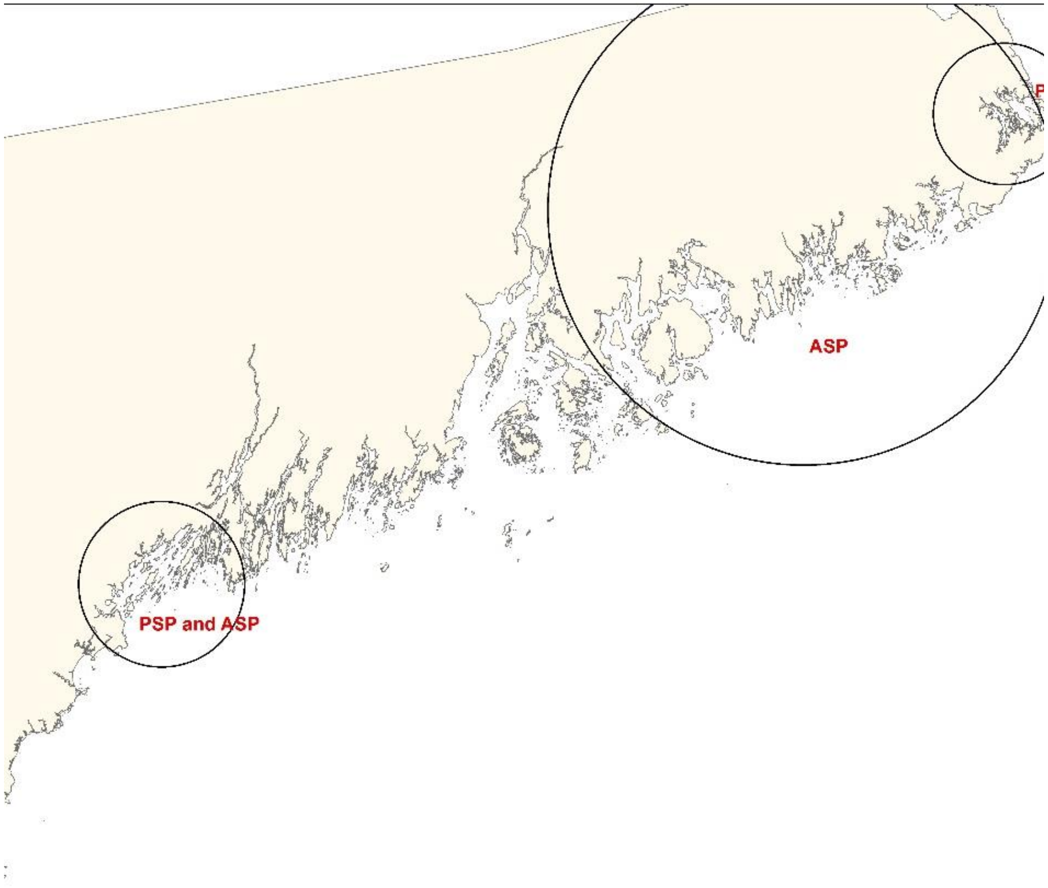
AMNESIC SHELLFISH POISONING

- Domoic acid produced by *Pseudo-nitzschia* species
- Acute exposure symptoms: nausea, diarrhea, headaches, seizures, confusion/disorientation, permanent short-term memory loss, coma or death.
- Chronic, low-level exposure symptoms: impairment of fetal development, memory deficits and kidney damage.
- Onset: within 24-48 hours after eating shellfish
- Rapid assimilation in shellfish tissue

AMNESIC SHELLFISH POISONING –NEW METHOD

- 2014: Transition from mouse bioassay to high-performance liquid chromatography with UV detector (HPLC-UV) at Bigelow
- 2017: HPLC-UV added at Boothbay Harbor DMR lab
- 2023: HPLC-UV added at Lamoine DMR Lab
  - Analytical method: quicker results, higher throughput, no mice, increased accuracy, lower limit of detection

Bigelow | Laboratory for Ocean Sciences



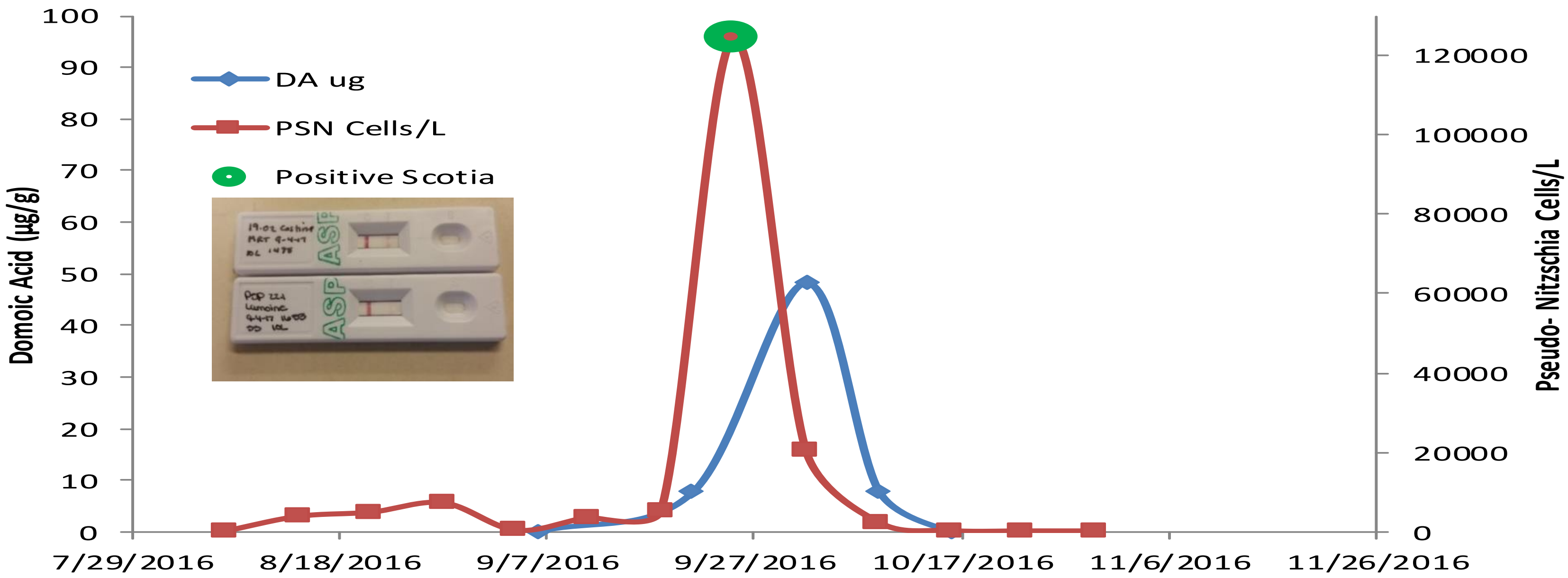
AMNESIC SHELLFISH POISONING – SAMPLING STRATEGY

- Blooms occur near-shore
  - First-detection stations on peninsulas and points are less useful
- To date, two identified highest risk areas
  - Increased monitoring in these areas
- Toxicity uptake rates by shellfish species are more similar
  - Closures tend to be for all species

AMNESIC SHELLFISH POISONING – SAMPLING STRATEGY

- Some *Pseudo-nitzschia* species are toxic, but those toxic species are not always producing toxin
  - No relationship between phytoplankton counts and shellfish toxicity
  - Sometimes toxicity in shellfish increases as bloom size decreases!
- As of 2016: Harmful* blooms occur ~June through **<u>January</u>**
  - Lab now runs almost year-round

Amnesic shellfish poisoning – The Big * of 2016/2017



ASP

2016: One week of mussel harvest, one lot of quahogs that were wet stored, wild harvested clams from 3 harvest days recalled

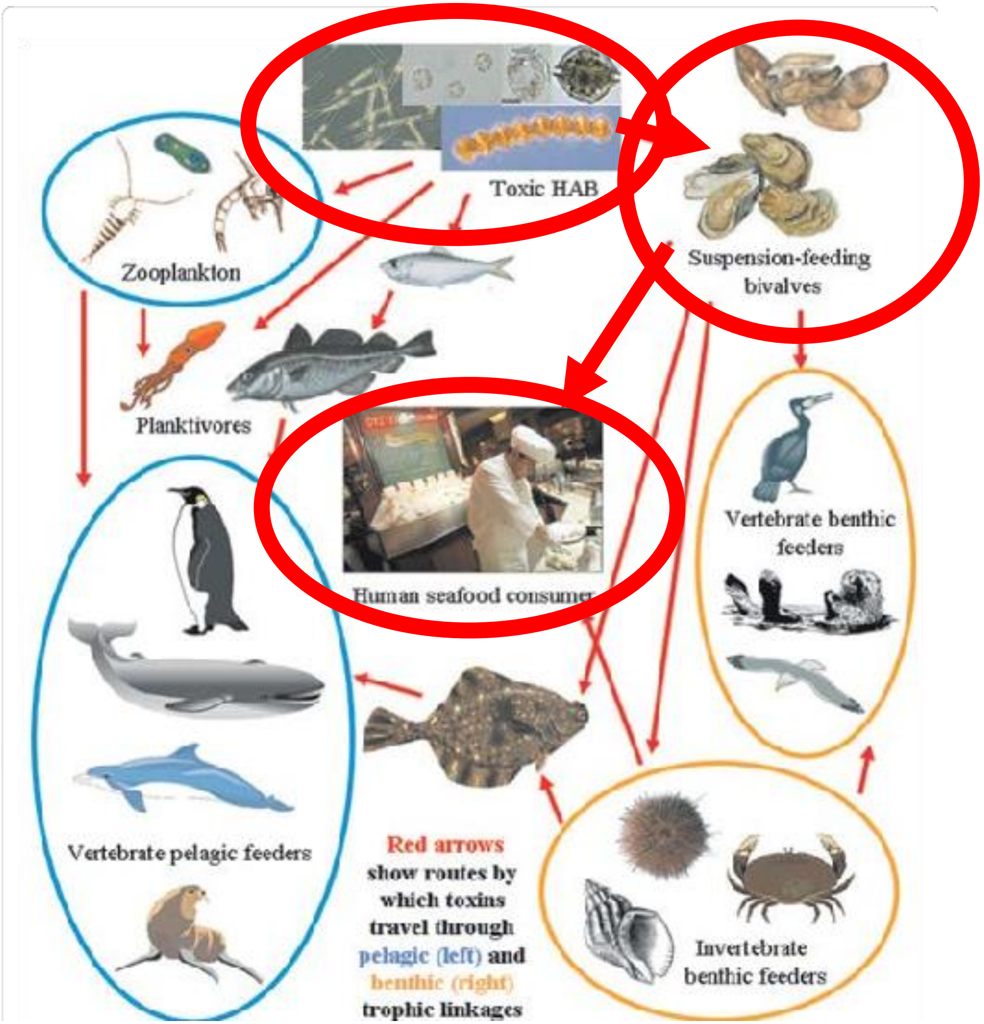
- Almost 11,000 lbs impacted
- 96% recovered and destroyed
- NO ILLNESSES

ASP

2017: Five days of mussel harvest recalled

- Almost 58,480 lbs impacted
- 98% recovered and destroyed
- NO ILLNESSES

Amnesic shellfish poisoning impacts



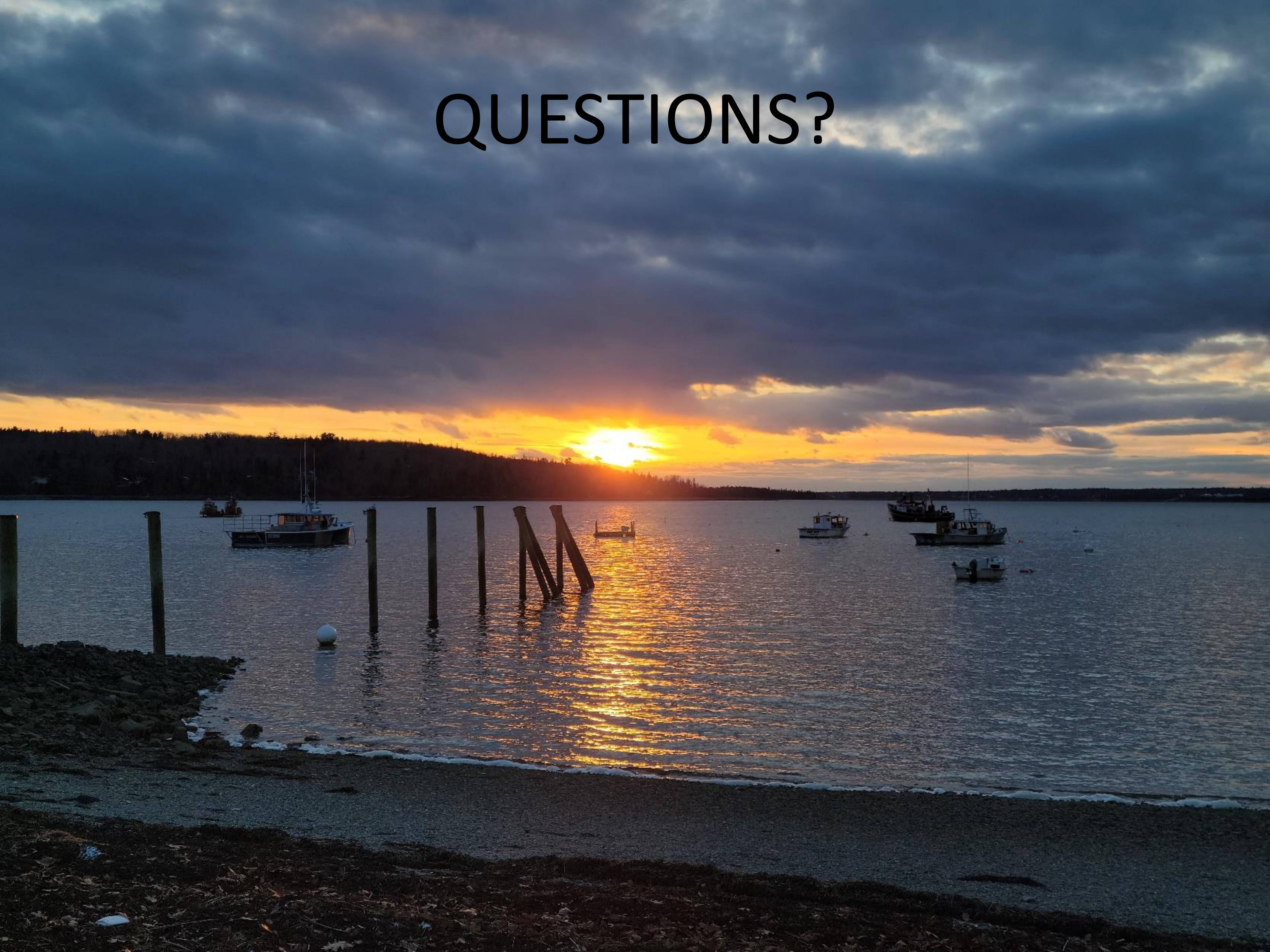
- Concern in Maine is primarily in human consumption of bivalve shellfish, *however, a significant Pseudo-nitzschia bloom could impact higher trophic levels*
  - Human consumption of other marine organisms (ex. west-coast Dungeness crabs)
  - Marine organism mortalities

DIARRHETIC SHELLFISH POISONING

- Okadaic acid and related congeners produced by *Dinophysis* species and *Prorocentrum lima*
- Not all *Dinophysis* species produce toxin and toxin-producers are not always producing toxin
- Symptoms: abdominal pain, nausea, vomiting, diarrhea, headache, fever, chills
- Rapid onset: 30 minutes to a few hours after eating shellfish
- No confirmed outbreaks due to American product
- Bloom season ~May through September

PUBLIC PARTICIPATION IN BIOTOXIN PROGRAM

- Volunteers collect phytoplankton weekly
  - Identify enumerate and report causative species
  - DMR supplies equipment
    - Microscope
    - Training
    - Counting slide
    - Collection equipment
- Volunteers collect biotoxin shellfish
  - Must be a shellfish warden or DMR approved official
  - Must fill out change of custody documents


QUESTIONS?