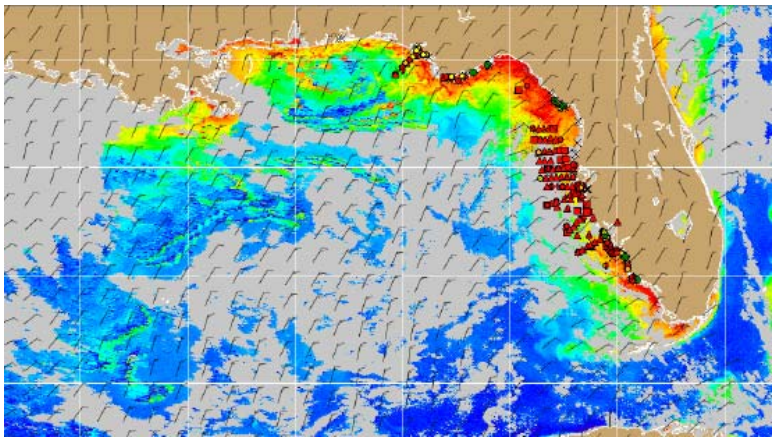
Red Tide Management For Shellfish Harvesting Areas



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Presented by: Joe Shields III 05-11-2006

Florida Department of Agriculture and Consumer Services

Outline

- Florida molluscan shellfish control program
- Interstate Shellfish Sanitation Conference
- Marine biotoxins, *Karenia brevis (K.b.)*
- NSSP requirements for *K.b.* monitoring
- Apalachicola Bay System *K.b.* sampling stations
- Red tide case study: Area 1611 West
- Red tide illness outcomes

I. Florida Molluscan Shellfish Control Program

- To provide maximum utilization of molluscan shellfish resources (oysters, clams, and mussels).
- To reduce the risk of shellfish-borne illness.
- To ensure that shellfish harvested in Florida are safe and wholesome.
- To safeguard the public and support Florida's agricultural economy.

Harvest Area Closures

- Many areas are never open to shellfish harvesting.
- Harvest areas that are open are temporarily closed on a routine basis and/or due to emergency conditions (such as *K.b*.).
- Harvest area classifications and closures apply to both commercial and recreational harvest.
- It is a criminal violation to harvest oysters, clams, or mussels from any area that is not properly classified and in the open status.
- Criminal penalties apply to both commercial and recreational harvesters.

Harvest Area Reopening

- Harvest areas that have been temporarily closed are reopened when test results verify that molluscan shellfish in the area are safe for human consumption.

NOTE: Molluscan shellfish harvest area closure and reopening do not apply to crabs, shrimp, lobsters, or fish.

II. Interstate Shellfish Sanitation Conference (ISSC)

- Because shellfish harvested from polluted water may cause human illness, sanitary control of the shellfish industry is necessary.
- Florida is a founding member of the ISSC, a voluntary cooperative association of states, the U.S. Food and Drug Administration, National Marine Fisheries Service, U.S. Environmental Protection Agency and the shellfish industry.
- The ISSC is the entity that modifies the National Shellfish Sanitation Program (NSSP), which provides the uniform standards and guidelines for shellfish safety.

III. Marine Biotoxins

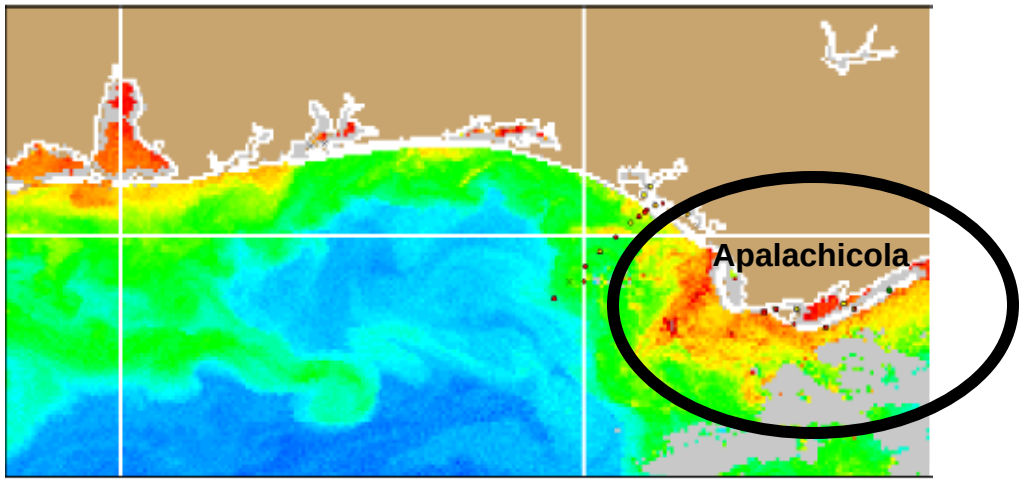
- *Karenia brevis* (Brevetoxin):
  - Is a toxic dinoflagellate associated with Florida saltwater discoloration, fish kills, **neurotoxic shellfish poisoning**, and an airborne respiratory irritant in sea spray
    - Respiratory irritation can occur when concentrations increase above normal background levels of 1,000 cells per liter
    - **Concentrations as low as 5,000 cells per liter cause shellfish to become toxic when exposed long enough**
    - Concentrations at 250,000 cells per liter can cause fish kills
      (50 times greater than a level which causes toxic shellfish)
    - Concentrations >1,000,000 cells per liter can cause seawater discoloration

IV. National Shellfish Sanitation Program (NSSP) Requirements for Brevetoxin

- Marine Biotoxin Monitoring

-Initiated when fish-kills, discolored waters, and/or respiratory irritation are present and/or reported in or near a Shellfish Harvesting Area

-Initiated when satellite imagery suggests potential bloom in or near a Shellfish Harvesting Area



NSSP Requirements for Brevetoxin (continued)

- Where, When, and How:
  - Samples shall be collected from indicator stations at intervals determined by the State Shellfish Authority
  - Water samples are collected at indicator stations (off-shore and near shore) to determine if concentrations are above 5,000 cells per liter
  - Meat samples are collected in areas where marine biotoxins are likely to occur in shellfish

NSSP Requirements for Brevetoxin (continued)

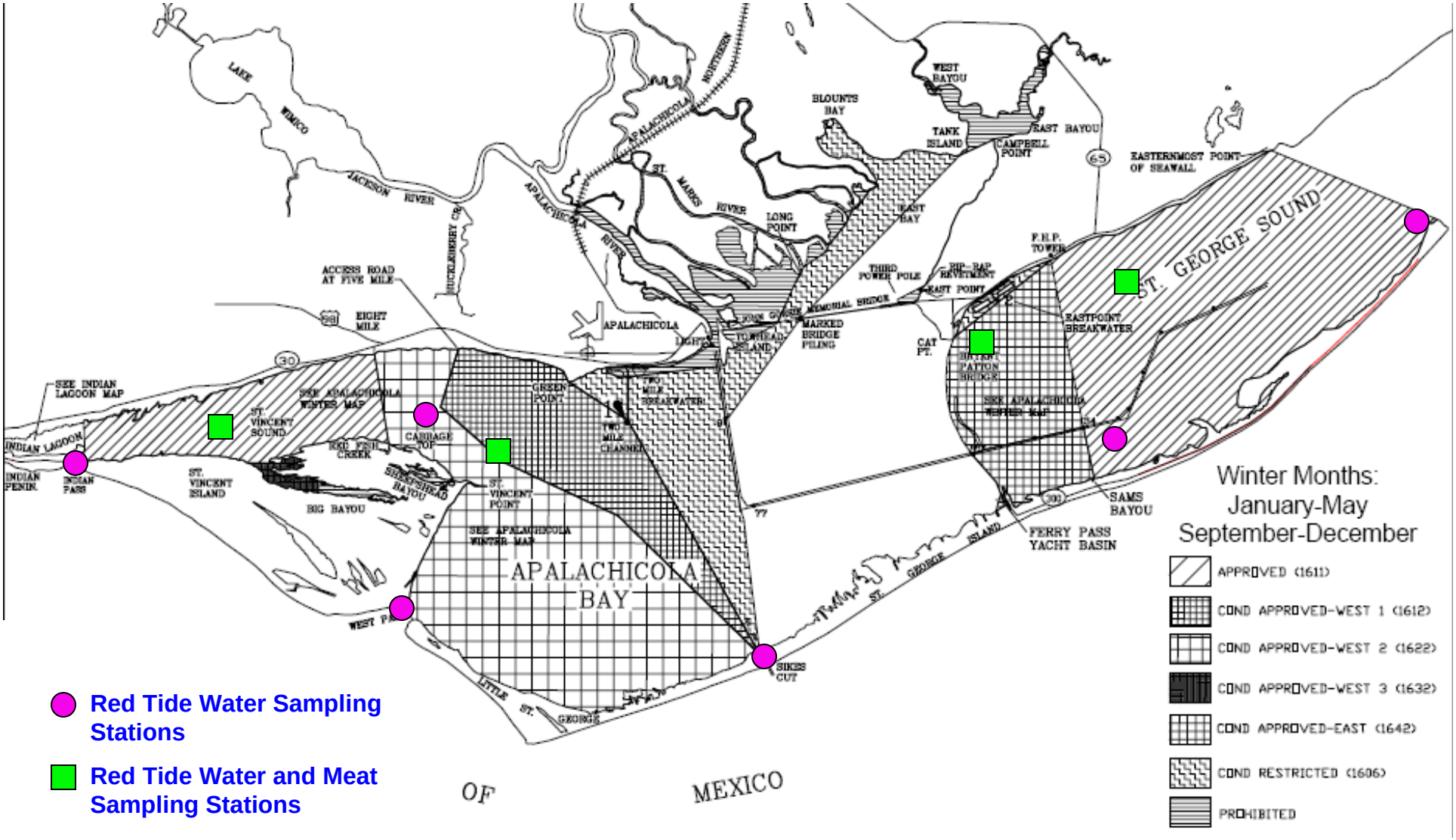
- Any water sample resulting in >5,000 cells per liter of the red tide organism *Karenia brevis* requires a closure of the entire Shellfish Harvesting Area
- Monitoring of red tide water sampling stations continues until <5,000 cells per liter are achieved at all stations
- Then meat sampling begins and continues until levels of toxicity are <20 mouse units per 100 grams
- When both: (1) all water samples are <5,000 cells per liter and (2) all meat samples are <20 mouse units per 100 grams, then re-opening of the area can be initiated

V. Example of Red Tide Water and Meat Sampling Stations for the Apalachicola Bay System

Apalachicola Bay #16

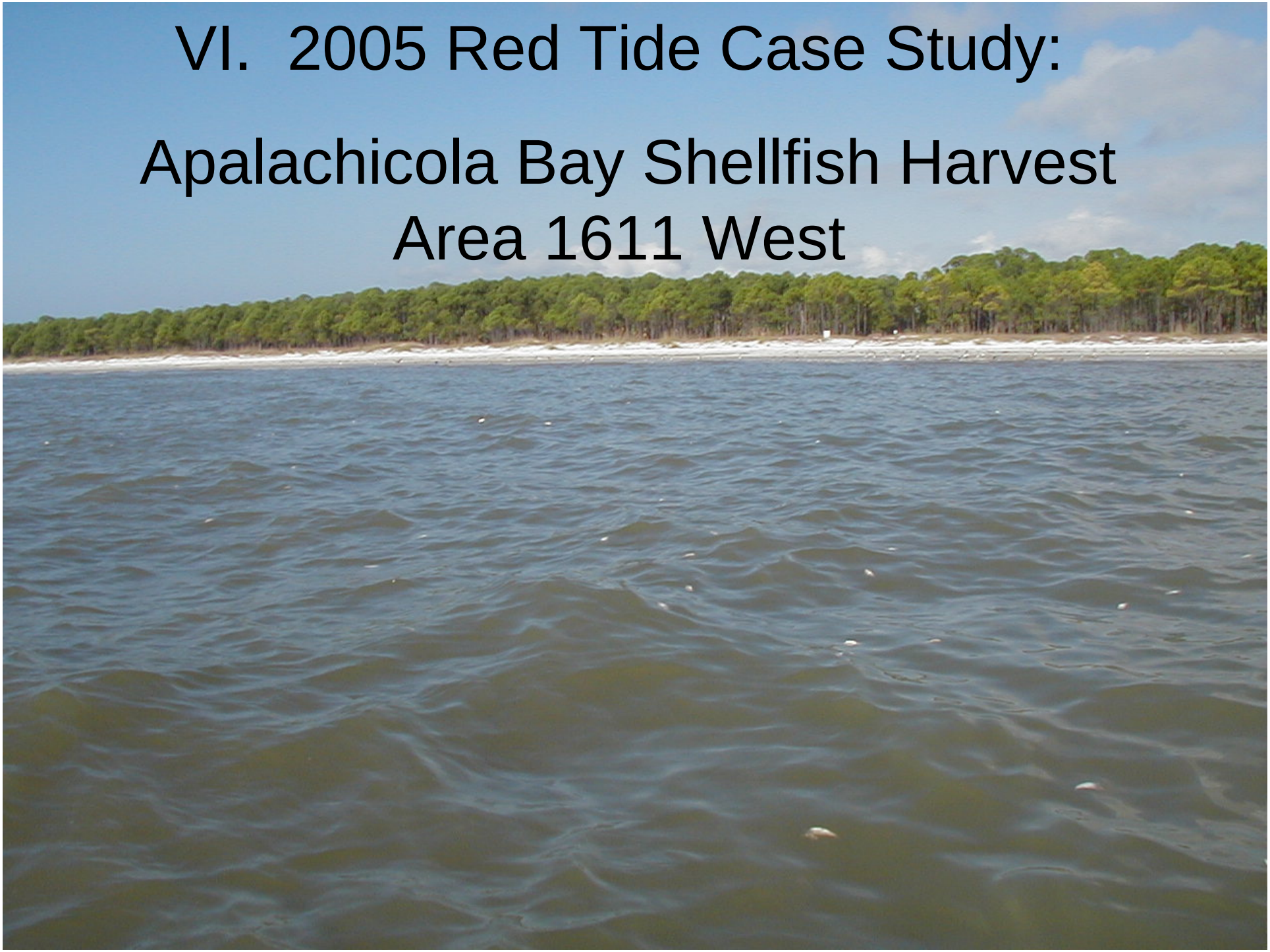
Winter months, January-June, October-December

Red Tide Sampling Stations

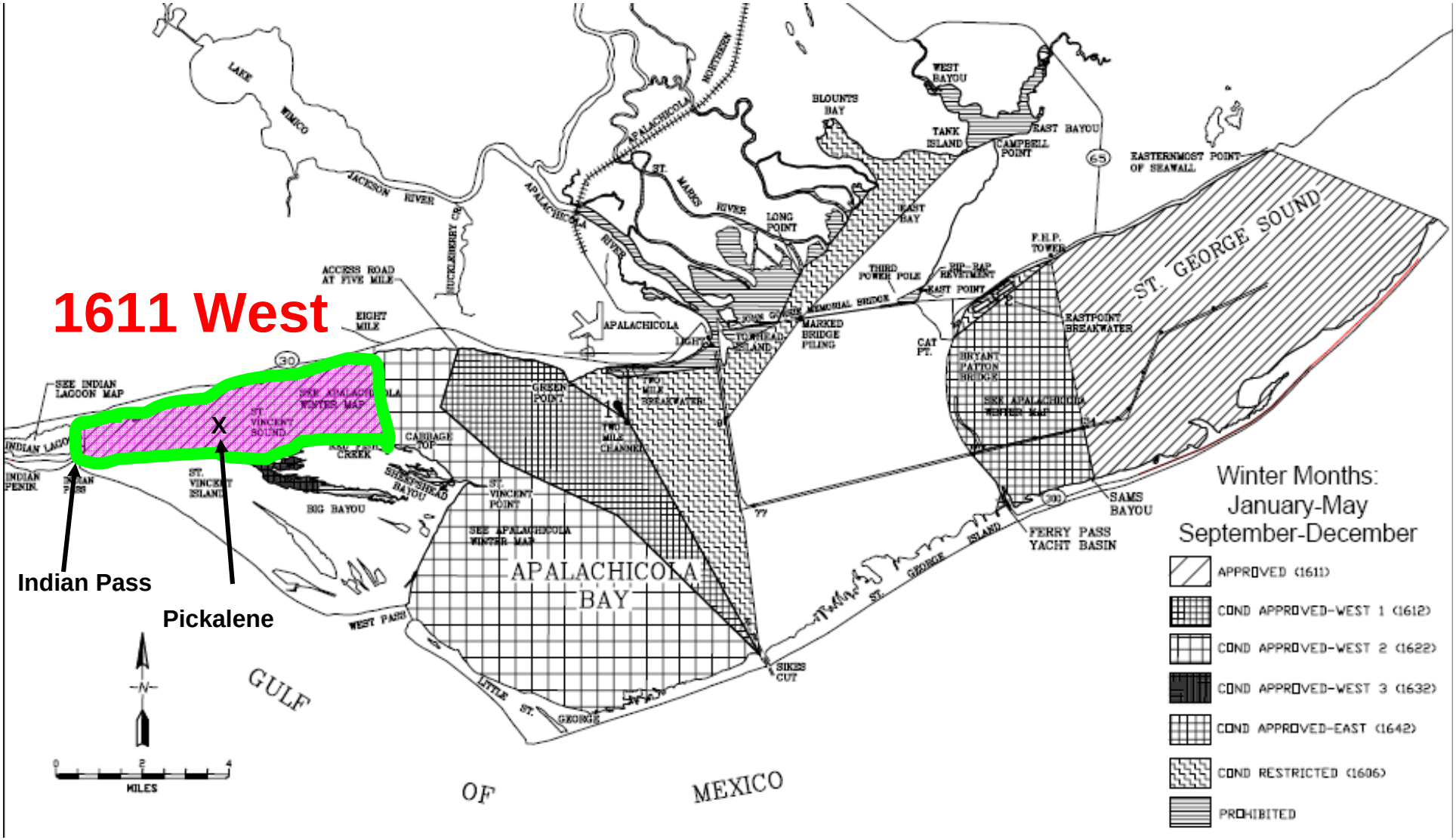


VI. 2005 Red Tide Case Study:

Apalachicola Bay Shellfish Harvest Area 1611 West



Apalachicola Bay System:

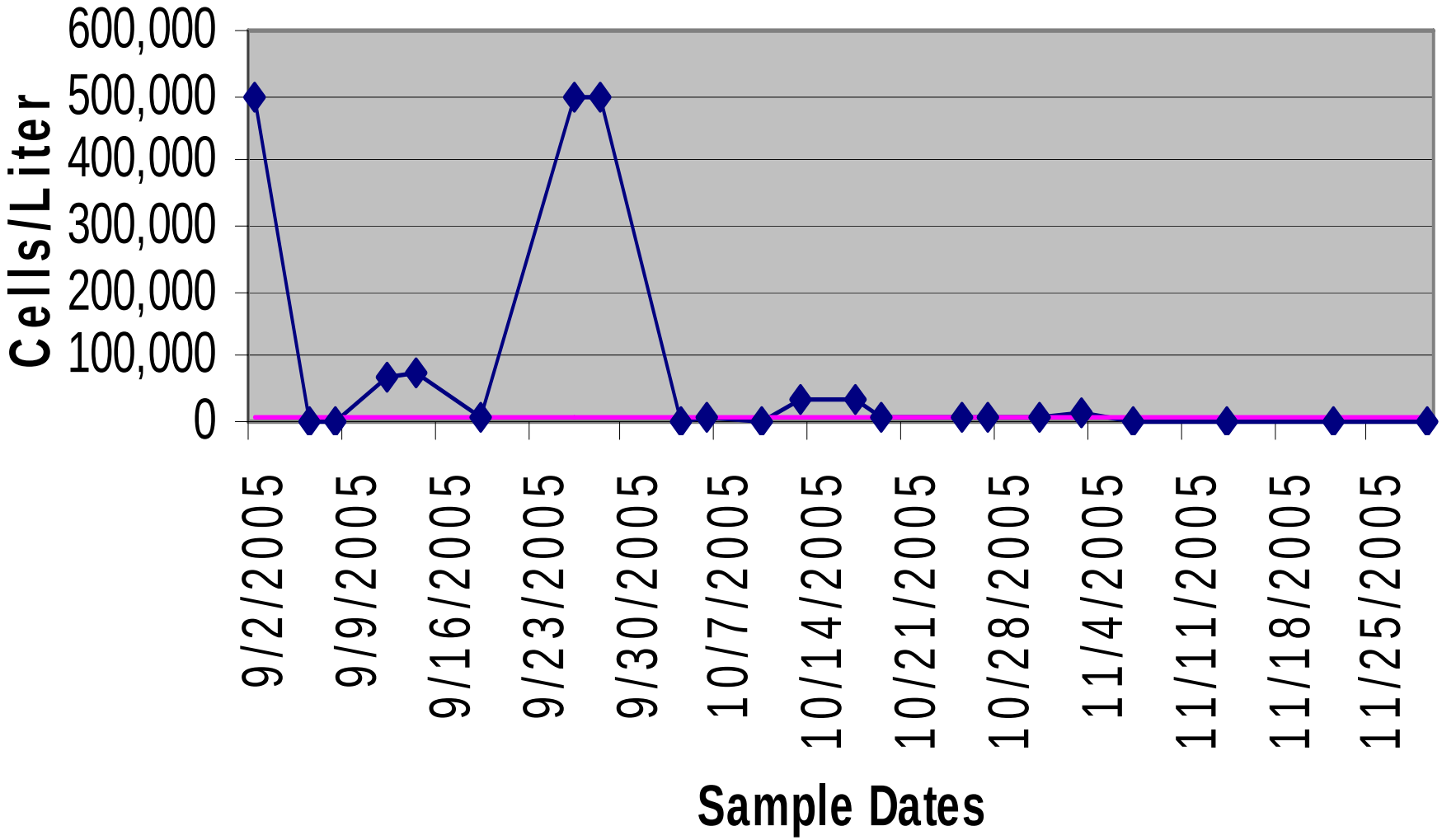


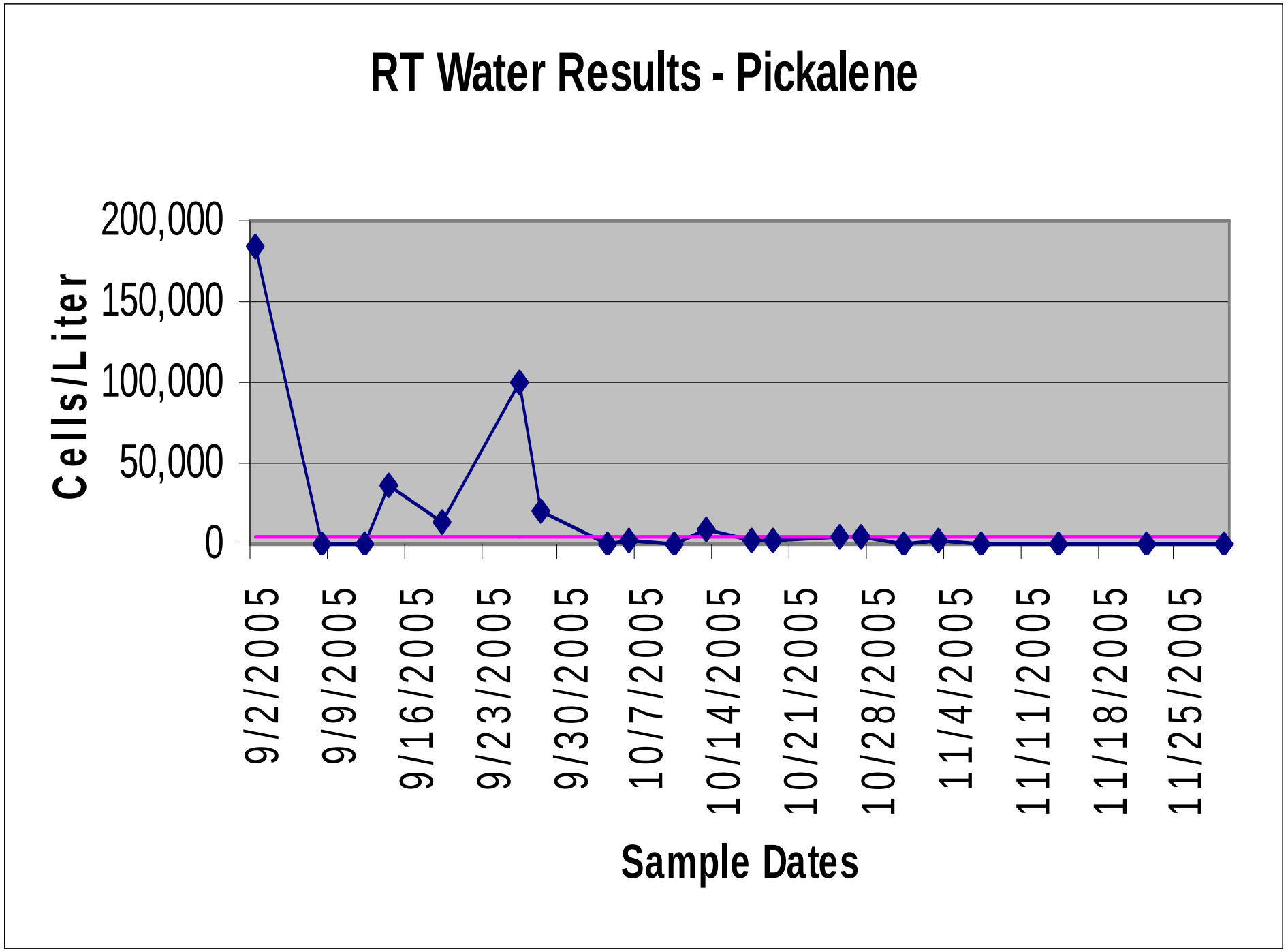
Management of the Approved Area (1611 West) during the 2005 Red Tide Event

- Closed: September 2, 2005 (cell counts >5,000 cells/Liter)
- Opened: November 24, 2005 (cell counts <5,000 cells/liter AND bioassay <20 Mouse Units/100 grams)
- Total Number of Days Closed Due to Red Tide: 82

Water sample results (cells/Liter) for the Approved Area (1611 West) of Apalachicola Bay during the 2005 Red Tide Event

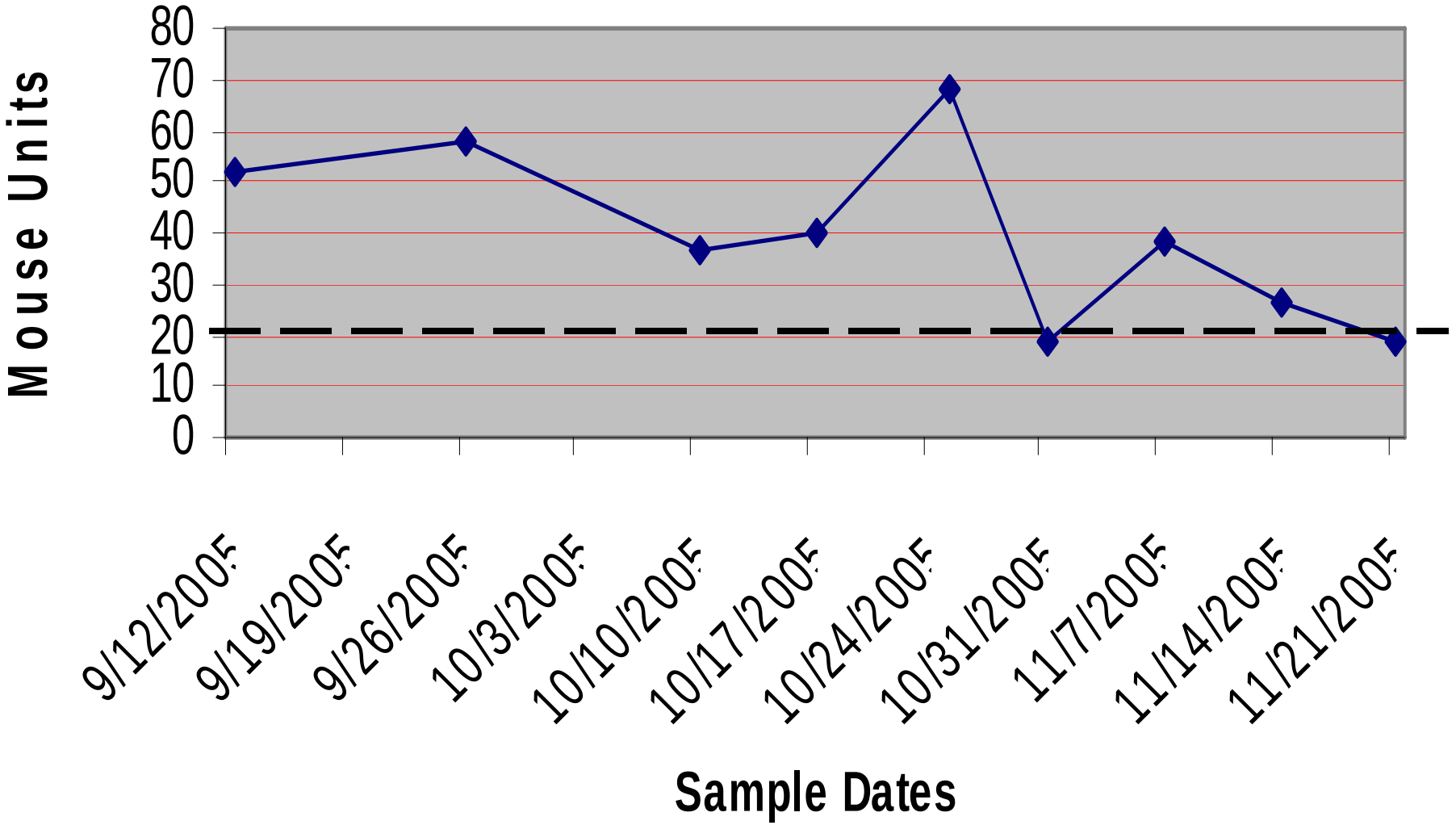
RT Water Results - Indian Pass




RT Water Results - Pickalene
Cells/Liter
200,000
150,000
100,000
50,000
0
9/2/2005
9/9/2005
9/16/2005
9/23/2005
9/30/2005
10/7/2005
10/14/2005
10/21/2005
10/28/2005
11/4/2005
11/11/2005
11/18/2005
11/25/2005
Sample Dates

Mouse Bioassay Results (Mouse Units) for the Approved Area (1611 West) of Apalachicola Bay during the 2005 Red Tide Event

Mouse Bioassay Results - Pickalene 1611 West



Management Observations during the Apalachicola Bay System 2005 Red Tide Event

- Red tide is transported inshore from offshore blooms.
- From the beginning of the event (August 31, 2005) through the end of the event (January 24, 2006), 243 red tide water samples were taken along with 45 meat samples.
- Red tide water sample results at stations tested throughout Apalachicola Bay ranged from 0 cells/Liter to >500,000 cells/Liter. Red tide water samples taken in the eastern half of Apalachicola Bay were significantly higher than red tide water samples taken in the western half of Apalachicola Bay over the duration of the event.
- Meat Sample results at stations tested throughout Apalachicola Bay ranged from <20 Mouse Units at the end of testing, to as high as 82.4 Mouse Units (Platform; 10/31/06). Once the bloom left the Bay, toxins took from 2 to 6 weeks to purge from the oysters.
- Initially, as mouse bioassay results began to decline, Hurricane Katrina's heavy winds and surf transported another offshore bloom into the region and the mouse bioassay results spiked before beginning their final decline to acceptable limits.
- The presence of red tide in our region coincides with the warming of water in Spring and Summer months. Red tide presence also coincides with higher salinity in the Bay during low flow river years.

Questions from Apalachicola Bay Shellfish Industry during 2005 Red Tide Event

- “Is Red Tide really out there?”
- “I don’t see any dead fish so why is the Bay still closed?”
- “Why do you use a mouse to test the oysters?”
- “Why do you sample at the Cut?”
- “Why are the meat results so much higher in the East?”

VII. Illness Outcomes

- No reports of NSP illnesses from commercial shellfish harvest. (NOTE: potential NSP illnesses currently being investigated by DOH)

- No reports of NSP from recreational shellfish harvest from open waters.

- July 2005, the Florida Department of Health reported one outbreak with a total of four cases of NSP from consumption of raw clams from illegal recreational harvest in a temporarily closed shellfish harvesting area in southwest Florida. All four individuals required hospitalization.

Questions?