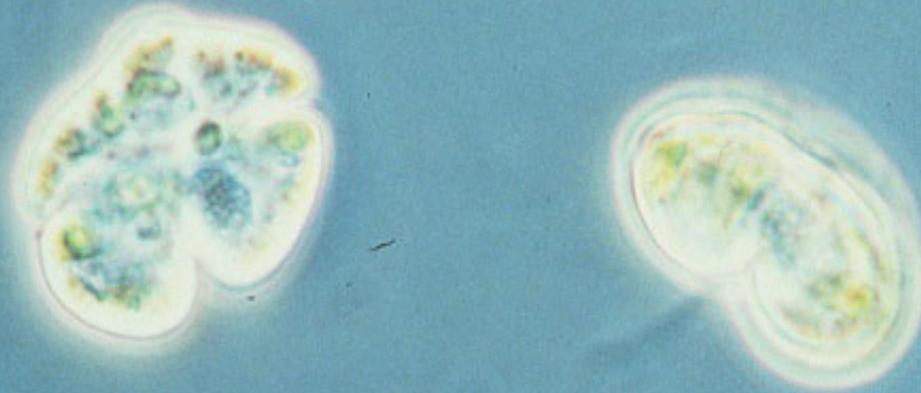


Harmful Algal Blooms

Red Tide Overview



Texas Department of Health

Seafood Safety Division

Kirk Wiles, R.S.

What organisms cause HABs ?

- Dinoflagellates
- Diatoms
- Pfiesteria and Pfiesteria-like organisms
- Blue-green algae
- Golden algae (*Prymnesium parvum*)

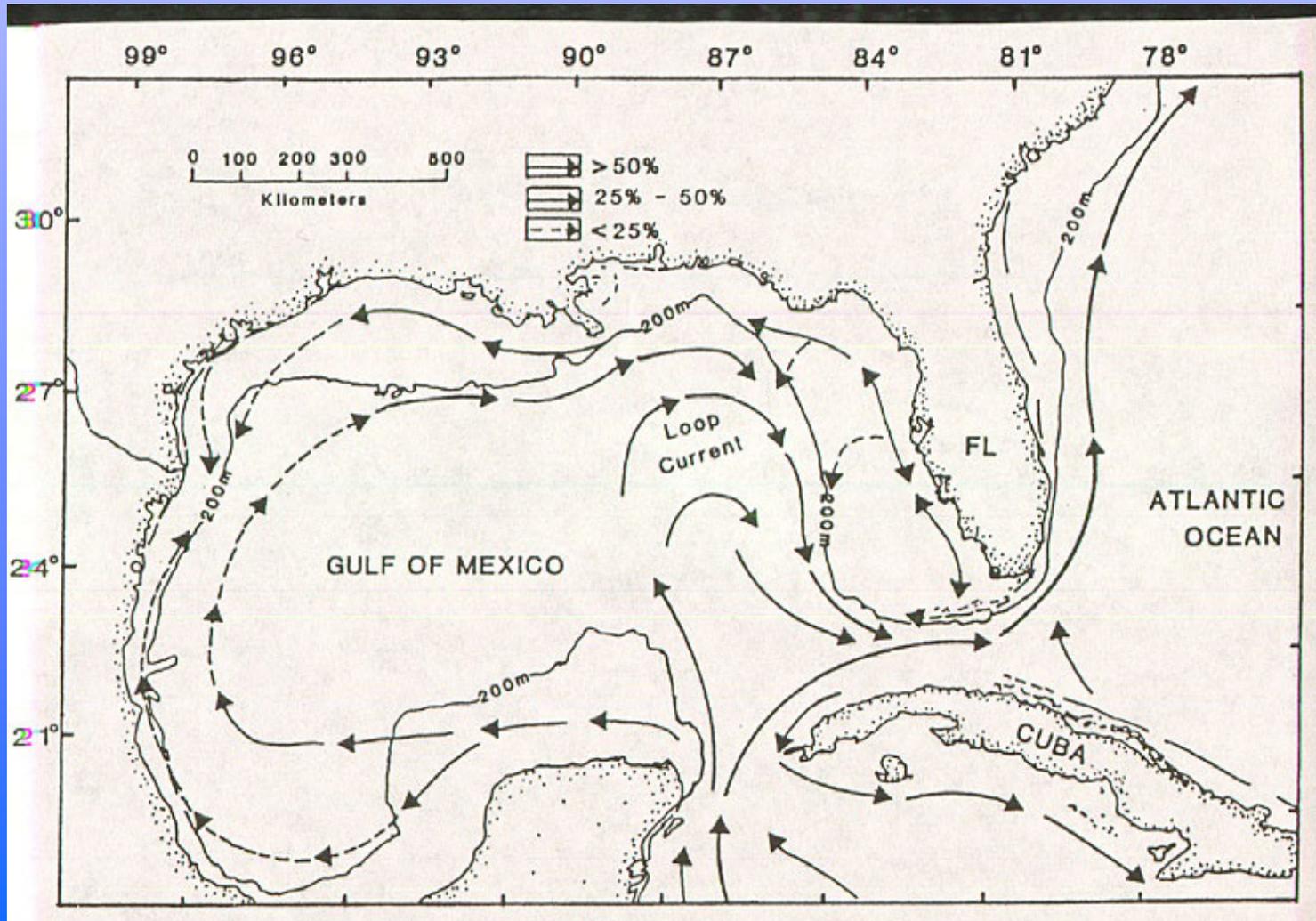
Human Illness Associated with HABs

- Ciguatera Fish Poisoning (CFP)
- Amnesic Shellfish Poisoning (ASP)
- Diarrhetic Shellfish Poisoning (DSP)
- Paralytic Shellfish Poisoning (PSP)
- Neurotoxic Shellfish Poisoning (NSP)

Neurotoxic Shellfish Poisoning

- *Karenia breve*
- Brevetoxin is toxin produced
- Tingling and numbness of tongue, lips and throat, muscular aches, gastrointestinal distress and dizziness, reversal of hot and cold
- Not fatal
- Gulf Coast and New Zealand

Gulf of Mexico Loop Current



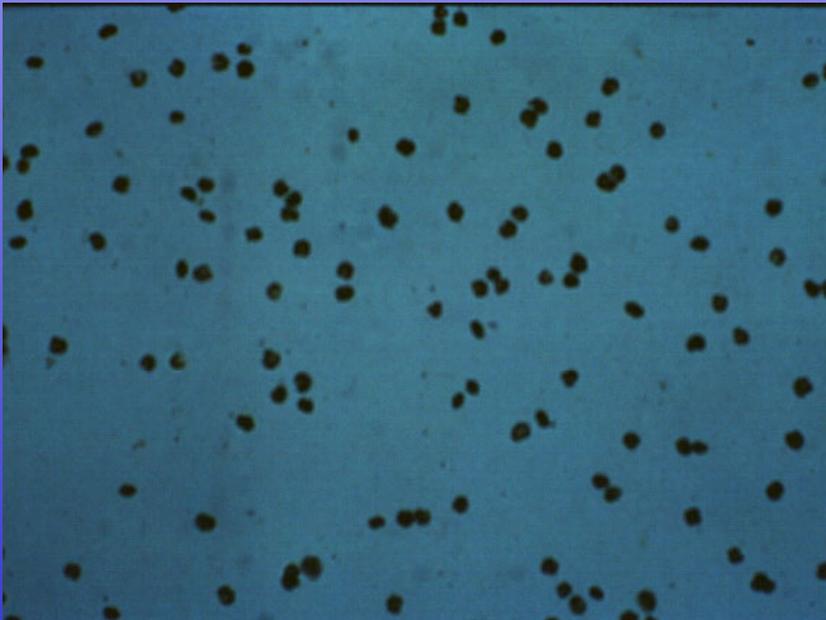
Karenia breve Blooms

- Discolored Water
- Kills fish
- Causes Respiratory Problems
- Toxin accumulates in mollusks



Shellfish Closure Criteria

- Cell counts > 5000 cells per liter, or
- Any detectable levels of toxin in shellfish



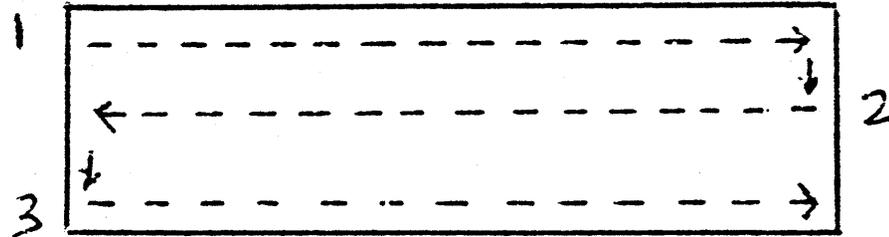
Collection of water samples

- Label with date and location on container.
- Document all data on field data sheets.
- Note discolored water, dead fish or symptoms (burning eyes, throat, etc.)
- If possible collect both live cells and preserved cells.
- Usually collect surface samples (1 – 2 feet).
- May need to collect sub-surface samples.

Identification and Cell Counts

- Identification can be much easier with live cells. *G. breve* are very motile.
- Resuspend preserved samples by gently turning container upside down / right side up ten times.
- Use disposable pipette, add 1 ml to Sedwick counting chamber and cover with cover slip.

Cell counts continued



Use the following formula to determine the number of organisms per ml.

$$\frac{(N) 1000}{(L) (D) (W) (S)} = \frac{\text{Number of organisms}}{\text{ml}}$$

N = Number counted;

L = Length of strip = length of counting chamber = 50 mm

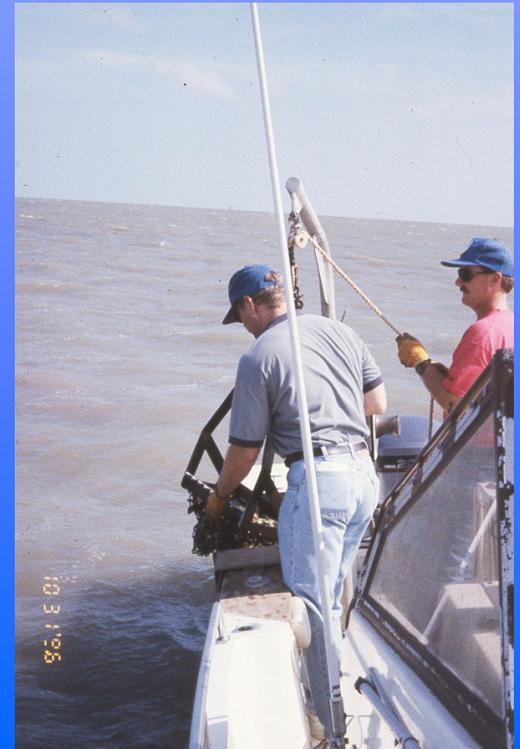
D = Depth of counting chamber = 1 mm

W = Width of field of view (this depends on magnification)

S = Number of strips counted = Number of linear times across chamber

Reopening Criteria

- Cell counts < 5000 cells per liter, and
- Shellfish tissue with no detectable level of toxin (< 20 mouse units)



Oyster Meat Samples

- Collect shellfish by dredge or hand. Wash off excess mud and place in plastic sack.
- Label with date and location (Land Tract and GPS).
- Sample needs to be able to yield 200 grams of meat and shell liquor.
- If sample cannot be shipped immediately to lab, shuck into container. Samples can be frozen after shucking.

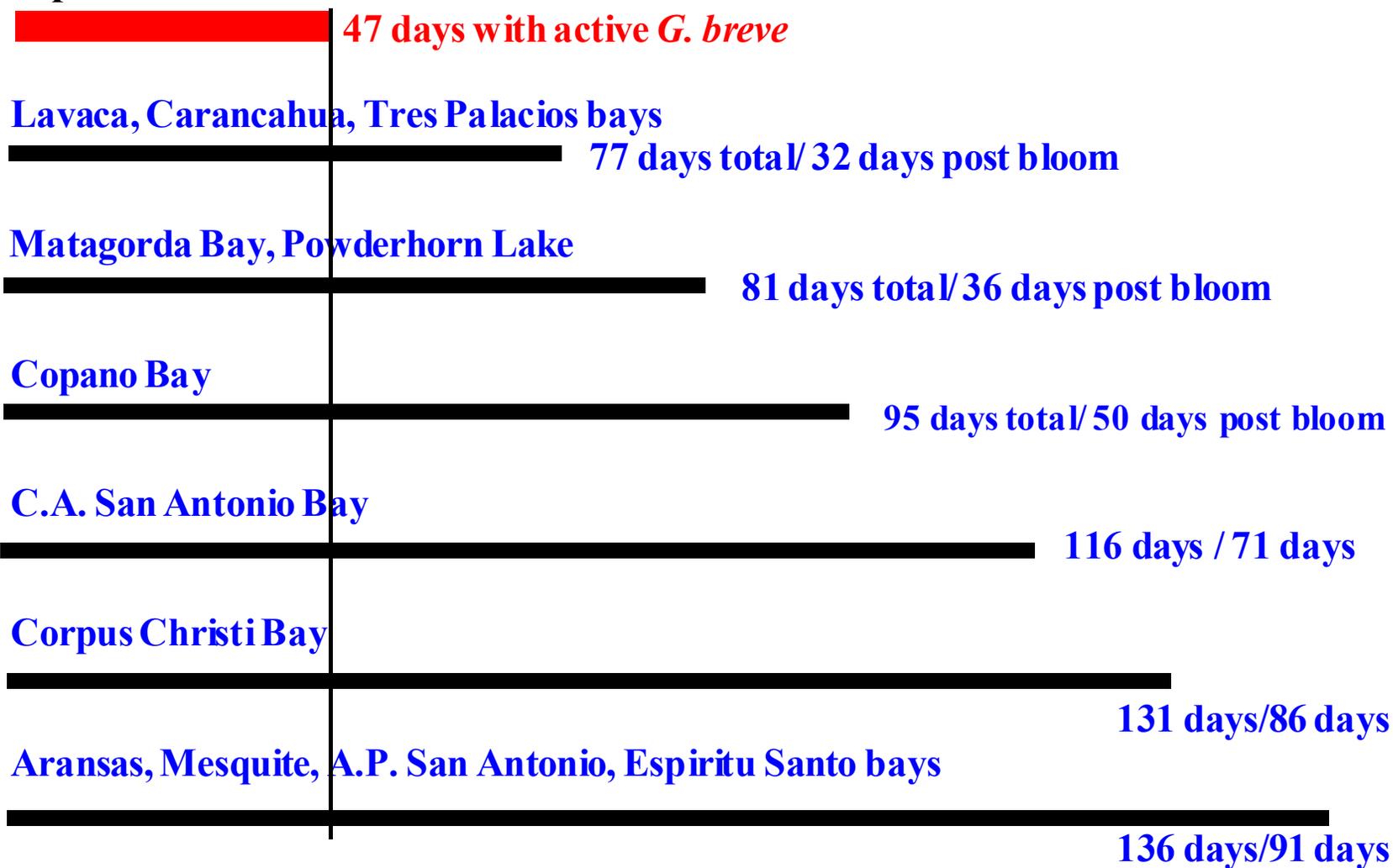
Shellfish mouse bioassay procedure

- Collect oysters, clams, mussels
- Perform an ether extraction of toxin
- Injections of 5 mice
- Observe mice for 6 hours
- Record time of death
- ~ 20 mouse units is lower sensitivity of test



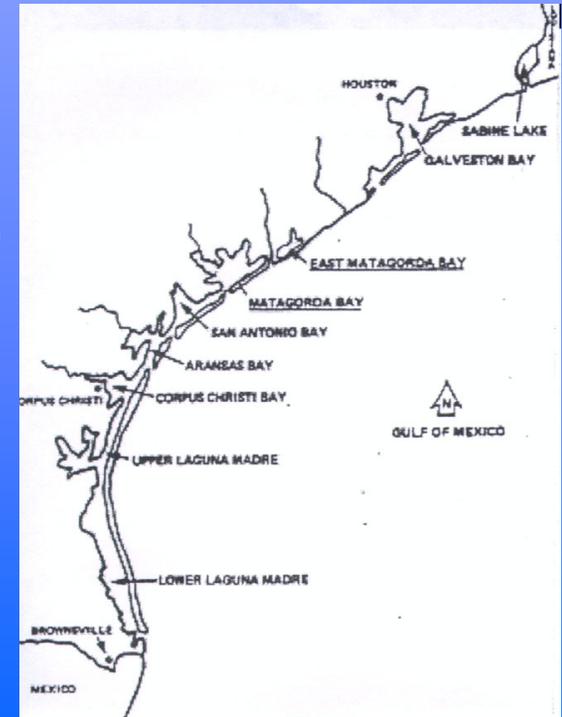
Impacts on the shellfish resources from *Gymnodinium breve* during 1996.

Sept. 16 Oct. 31 Nov. Dec. 2 Dec. 6 Dec. 20 Jan. 10 Jan. 25 Jan. 30



Large Scale Red Tide Blooms in Texas

- 1986 -- Surfside to Mexico
- 1996 -- Colorado River to Mexico
- 1997 -- Sargent's Beach to Mexico
- 2000 -- Sabine Pass to Mexico



Remnant Populations of *K. breve*

- Inside estuarine areas
- Man made harbors
- Subdivision canals
- Ship channels



Atypical, Localized Blooms

- Aransas Bay, Corpus Christi Bay -- 1987
- Aransas Bay -- 1990
- Brownsville Ship Channel -- 1990
- Brownsville Ship Channel -- 1995
- Corpus Christi Bay -- 1998
- Lower Laguna Madre -- 1998
- Lower Laguna Madre -- 1999

Economic Impacts of *Karenia breve*

- Long term shellfish closures
- Decrease in tourism
- Dead fish clean-up costs



