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Mussel Mania

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Mussel Mania

Michael Smith
Lucas Corey
and
Jarred Paré



- 300 kinds of freshwater mussels in North America



- In the past 100 years nearly 35 species of freshwater mussels have become extinct

Mussel Background

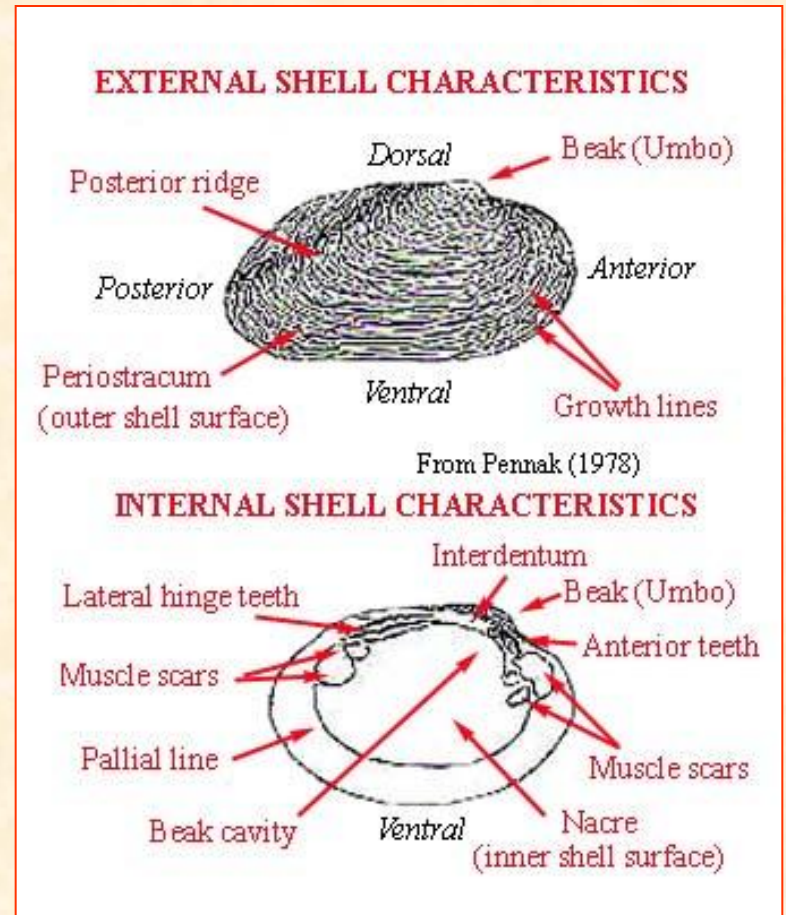


•Right now 75% of freshwater mussels are endangered, threatened or at least decreasing in numbers

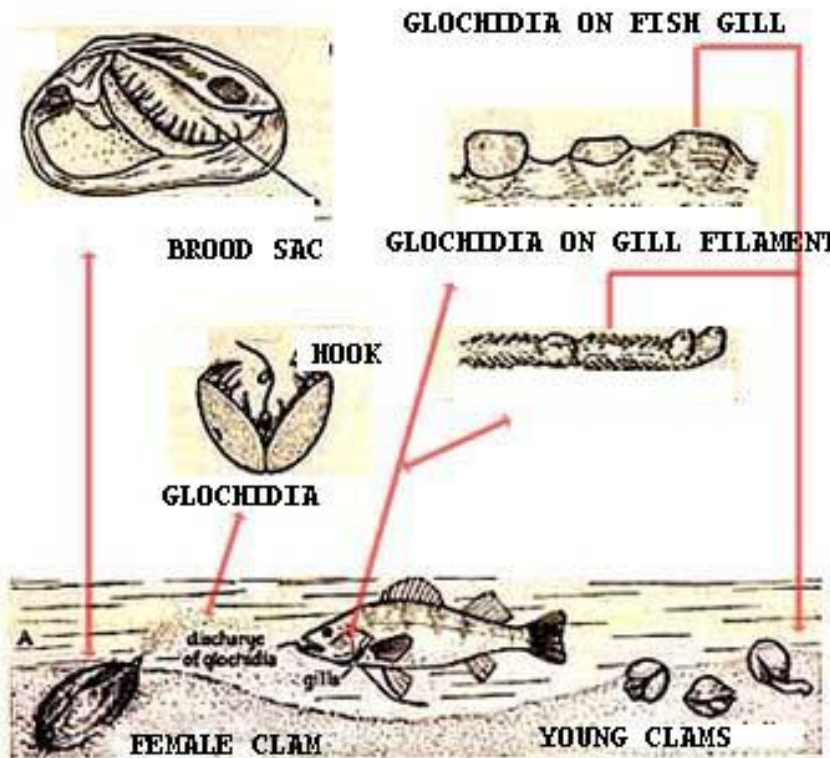
•Massachusetts state law protects 7 of the 12 species of freshwater mussels

Mussel Lifecycle

- Most mussels live 3-5 years
- Their approximate age can be found by counting the ridge shells
- The lifecycle is similar to that of a common moth or butterfly
- The eggs develop inside the mother and are called larva or glochidia
- Before the metamorphosis to become a mussel, the glochidia must attach itself to a fish



Mussel Lifecycle cont...



- The parent mussel tries to make itself look like something the fish would normally eat
- Before these fish can realize that it's not food, the larva have already attached themselves inside the mouth.
- Inside the mouth these glochidia form a cyst
- After a number of weeks, they come out as a freshwater mussel

Finding the Mussels

- Go out into water that is around 3 feet deep
- Set up a pattern going back into the shore, much like mowing a lawn.
- Look through either SCUBA goggles or a bucket with a hole in the bottom that has a clear surface attached to look through.
- As you pace back in forth through the water, look for small brownish-black pieces sticking out of the water.
- You must go slow and look very closely for it is only half of the mussel which is shown.



Mike Smith analyzing a freshwater mussel

Assawompset Culvert Site



□ MA Towns

The Assawompset Culvert test site is located off of the southern tip of Assawompset Pond. This was the most important site in the sense that we collected water samples as well as mussels. Assawampsett Pond does not allow any motorized boating on the pond and swimming is kept to a minimum as well. There are only a few houses and a graveyard near this testing location. There is no swimming allowed near the culvert either. One must live on the pond in order to obtain the privilege of swimming in the water.



0.1 0 0.1 0.2 Miles

Assawampset Culvert

- Assawampset is the drinking supply for New Bedford. To minimize the rapid spread of evasive weeds across Long Pond and to prevent the growth through Snake River into the Assawampsett Pond, certain herbicides were applied. The Assawampset Culvert plays a big role in this experiment due to the fact that it is located between the other two.



Lucas Corey reaching
for an open mussel shell

Assawampset cont...

- **There are two separate views relating to the water flow from Long Pond to Assawampset.**
- **The state of Massachusetts believes that the culvert drains the wetlands adjacent to Snake River during floods of high water.**
- **There isn't much concern because the water is thought to filter through the marshland.**



- **The other outlook on this issue is that the culvert directly connects Parkhurst to Assawampset.**
- **If this were so, the herbicides would enter Assawampset directly.**

PARKHURST

- The Parkhurst test site is located off of the north end of Long Pond. This particular body of water is part of a channelized water loop. This is thought to be connected to Snake River, which runs into the Assawampset Culvert on Asswampsett Pond. This is a residential area built for living and recreational uses. There are many houses close together with much human activity on and off of the water.

Parkhurst Site Area Map

Assawampsett Pond

Wetlands

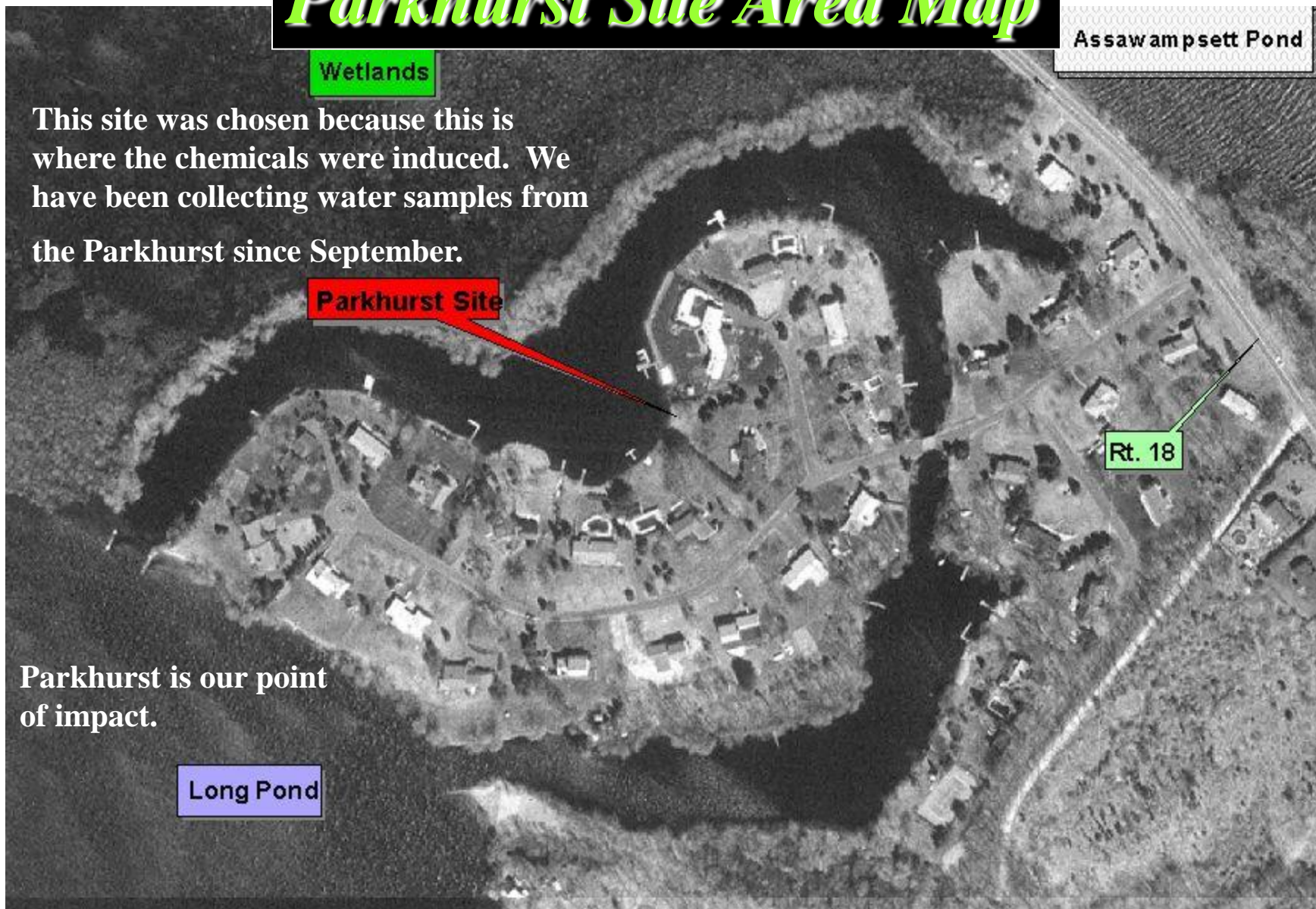
This site was chosen because this is where the chemicals were induced. We have been collecting water samples from the Parkhurst since September.

Parkhurst Site

Rt. 18

Parkhurst is our point of impact.

Long Pond



BETTY'S NECK

- The Betty's Neck test site is located off of the eastern end of Assawampset Pond.
- We used the Betty's Neck test site for mussel collecting and analyzing.
- This particular site was chosen because it is well preserved.
- This specific site is composed of mostly open farmland, but near the waters edge, there is nothing present except forest with nature trails.
- For the most part, the land area is flat and untouched.



skypic.com

Betty's Neck cont...



- In order to reach the testing location, one must travel about ten minutes from Long Point Rd, between the lakes in Lakeville, around the farmland the through the forests.
- Betty's Neck is our control for the experiment; it is detached and far enough away from the Assawampset Culvert site as well as from Parkhurst.

- It is very clear that these waters have been nurtured much more than Long Pond.
- Here is a photograph of where most of our mussel samples were obtained.
- We did not do water quality here because access was time consuming and difficult.
- Also, it required the opening of the gate into Betty's Neck to be unlocked.

SONAR

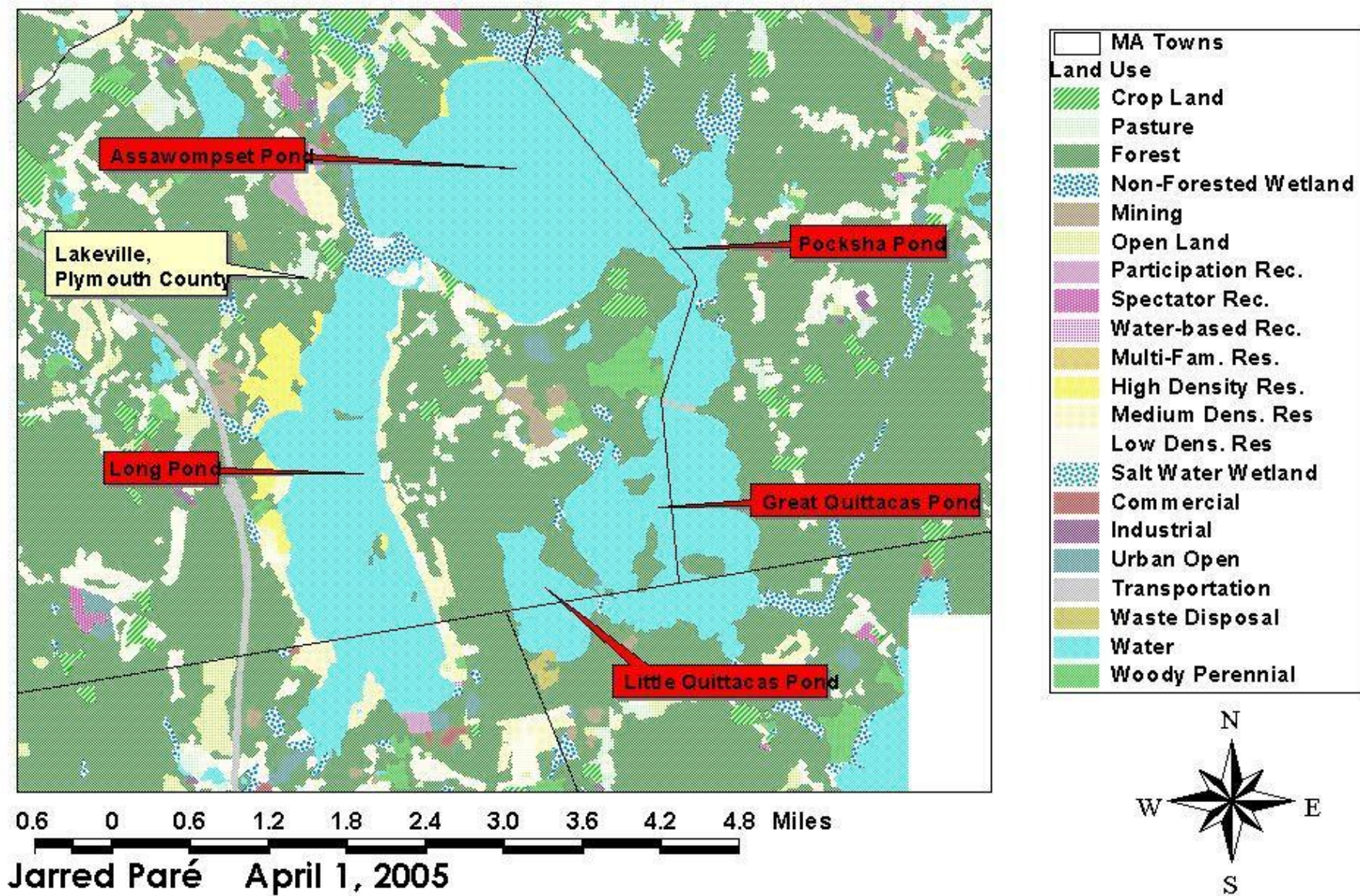
- Sonar or fluridion is a slow acting systematic compound that rehabilitates water bodies that have become overpopulated with milf oil.
- Twenty pounds of SONAR SRP(slow release pellets) were added to Long Pong at Parkhurst on July 2, 1998 and one more gallon was added the following year on July 12, 1999

Diquat

- Diquat is a quick acting herbicide used mainly used to control unwanted freshwater plants and weeds.
- Nine gallons were added to Parkhurst in Lakeville on July 2, 1998 and ten more gallons were applied on July 12, 1999.



Lakeville Five Pond Complex Land Use Map

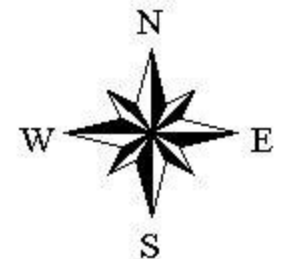


Pond Sites

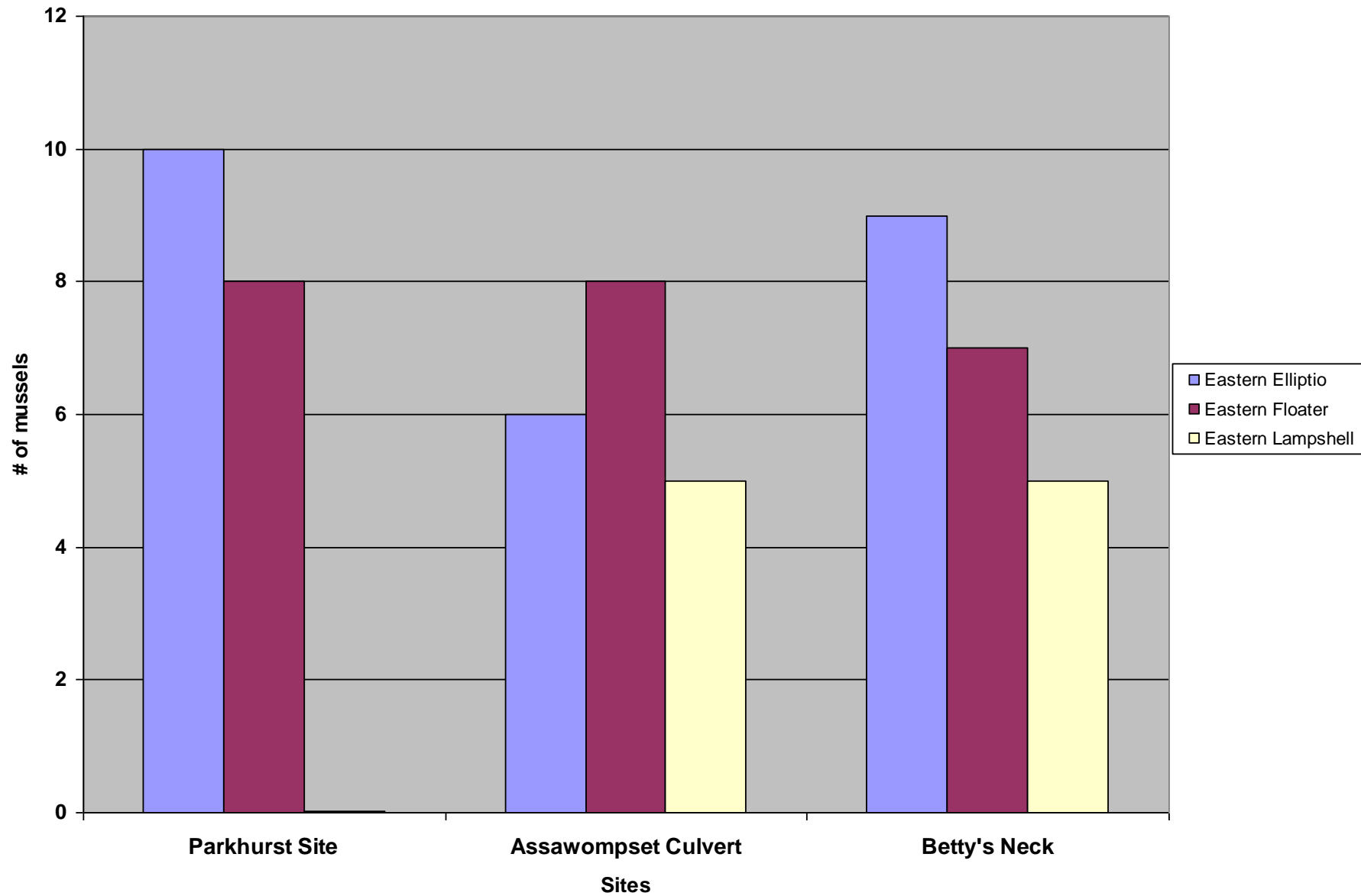


0.6 0 0.6 1.2 1.8 Miles

- MA Towns
- Text Maj Pond Labels
- Lakes & Ponds
- Wetland / Salt Marsh
- Cranberry Bog
- Surface Water
- Tidal Flat
- Impoundment
- Dam
- Railroads
- Maj MHD Rds by Admin lg scale
- Interstate
- U. S. Federal
- State
- Major Road - Connector
- Maj. Roads Labels and Shields



Mussels Found in Lakeville Ponds



Eastern Eliptio

- **Size:** Up to five inches.
Shape: Highly variable, but most often subtrapezoidal or subovate. Valves heavy, strong, and laterally compressed.
Periostracum: Color tan (juveniles) to dark brown or black (adults). Shell rays may or may not be present.
Lateral Teeth: Present. Two on the left valve and one on the right valve.
Pseudocardinal Teeth: Present. Two on the left valve and one on the right valve.
Nacre: Color usually white, rose-colored, or purple, and is often discolored.



Eastern Floater

- **Size:** Up to seven inches, though infrequently specimens may grow nearly ten inches long!

Shape: Somewhat elongate, with a rounded ventral margin. The hinge ligament is either straight or curves slightly upward. Valves laterally inflated, thin, and fragile.

Periostracum: Color yellowish-green, green, or greenish-brown. Shell rays either absent or very faint.

Lateral Teeth: Absent.

Pseudocardinal Teeth: Absent.

Nacre: Color silvery-white or metallic blue, sometimes with a yellowish tinge toward the beak cavity.

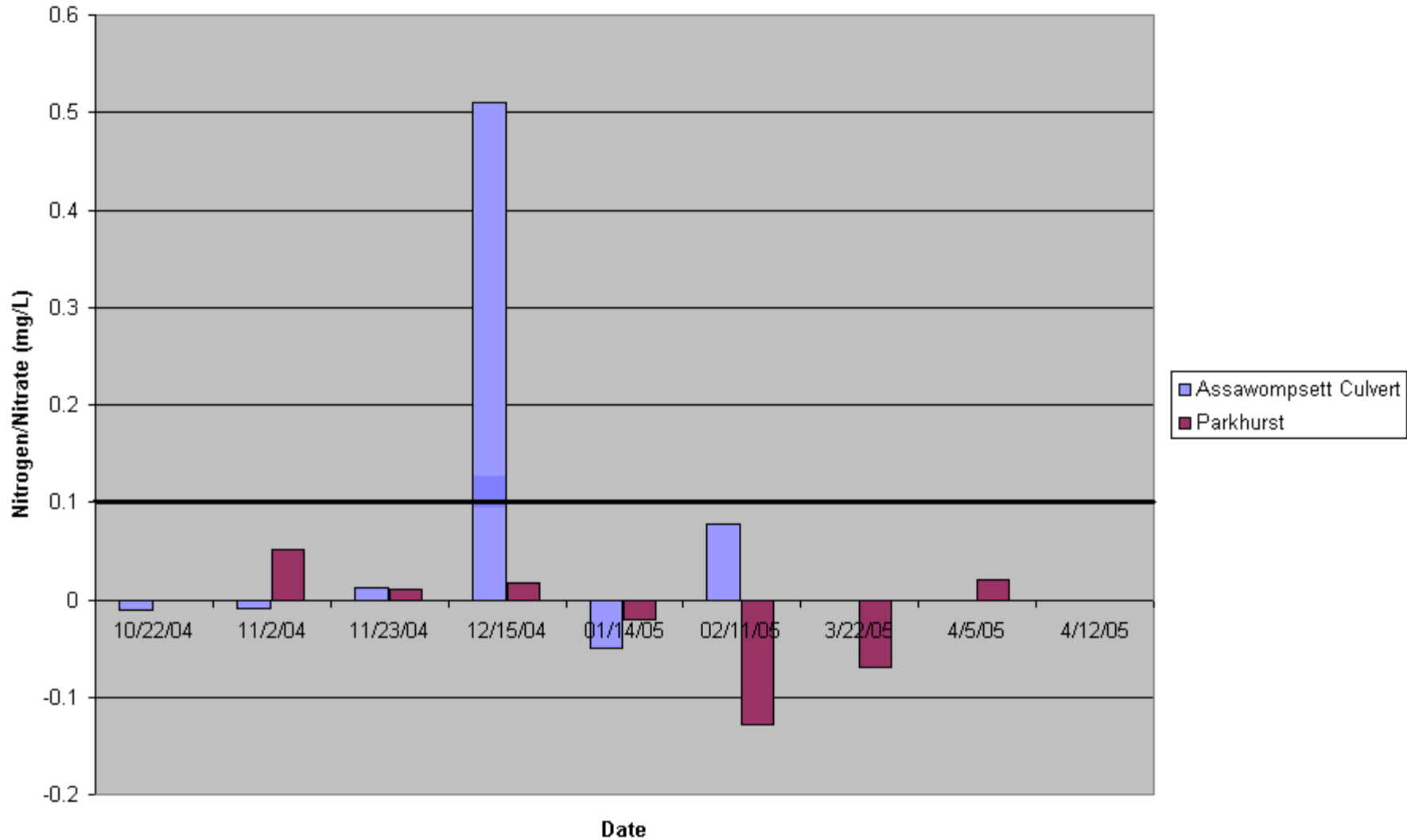


Eastern Lampmussel

- **Size:** Up to six inches.
Shape: Ovate or subovate. Mature females usually more rounded toward the posterior ventral margin. Valves slightly inflated, strong, and thick.
Periostracum: Color yellowish-green (juveniles) to yellowish-brown, greenish-brown, or brownish-black (adults). Shell rays numerous and prominent.
Lateral Teeth: Present. Two on the left valve and one on the right valve.
Pseudocardinal Teeth: Present. Two on the left valve and two or three on the right valve.
Nacre: Color white, bluish-white, or pink. Usually lighter in color and much thicker toward the anterior end.

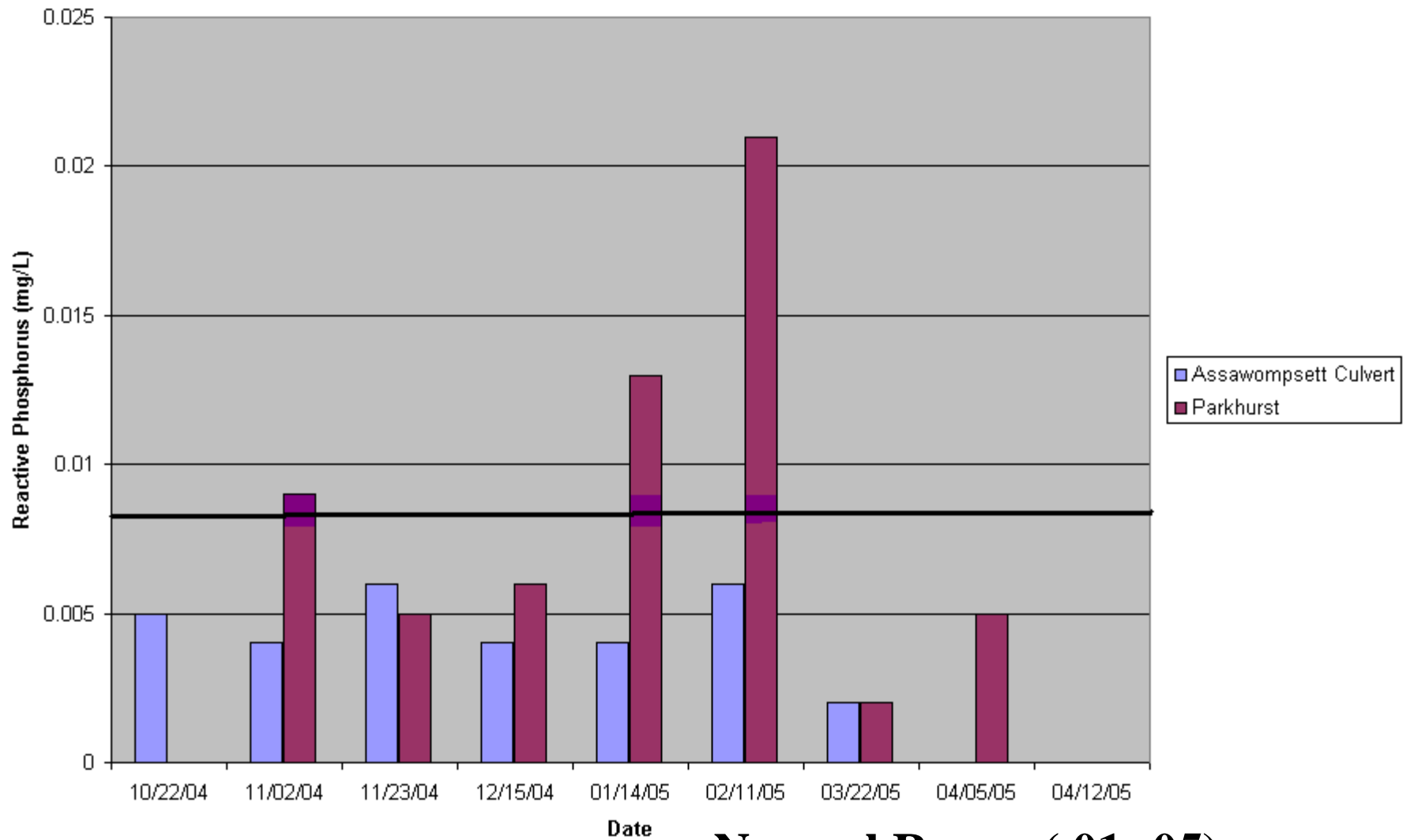


Nitrogen/Nitrate (mg/L) Graph

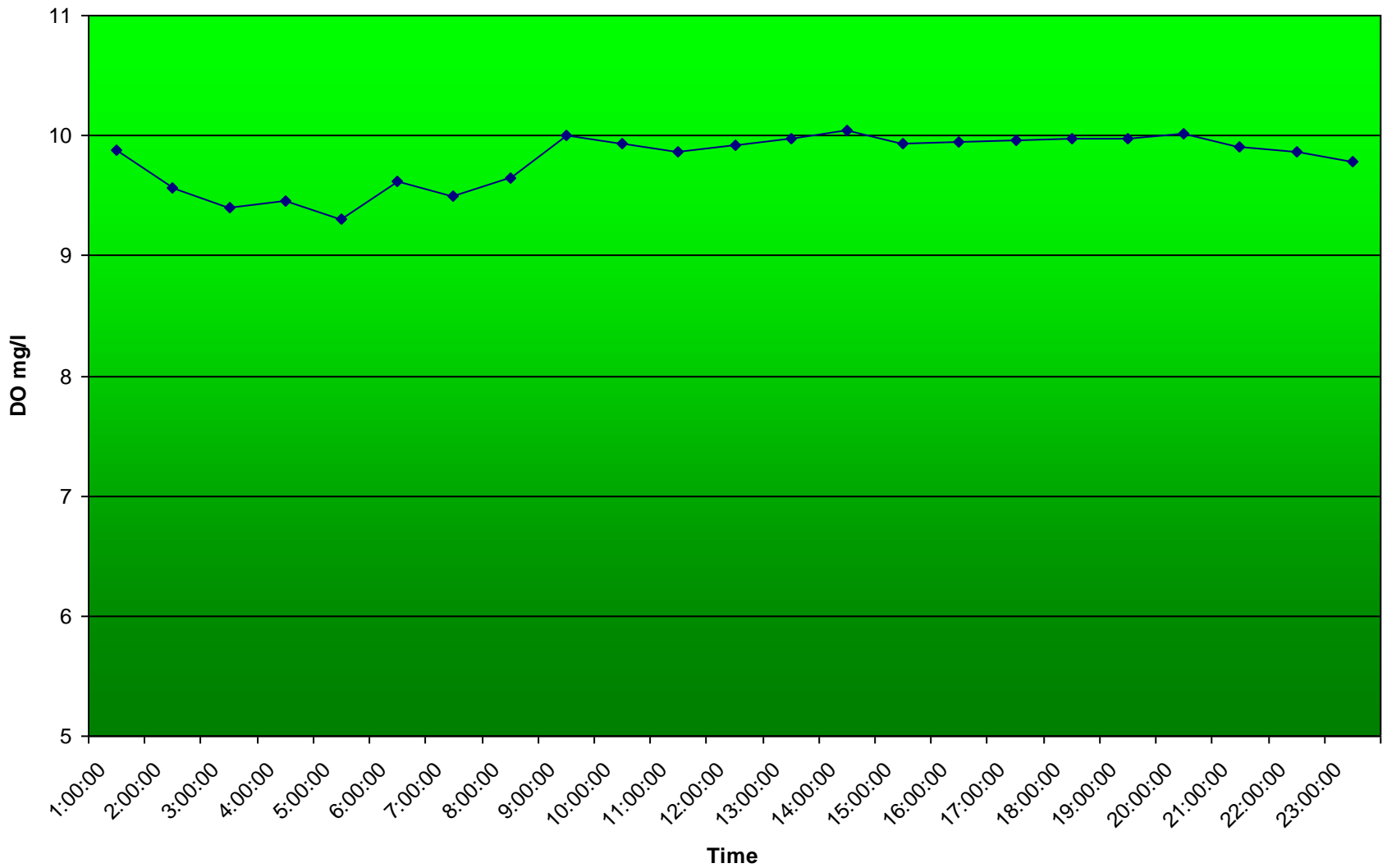


Normal Range (.01-.05)

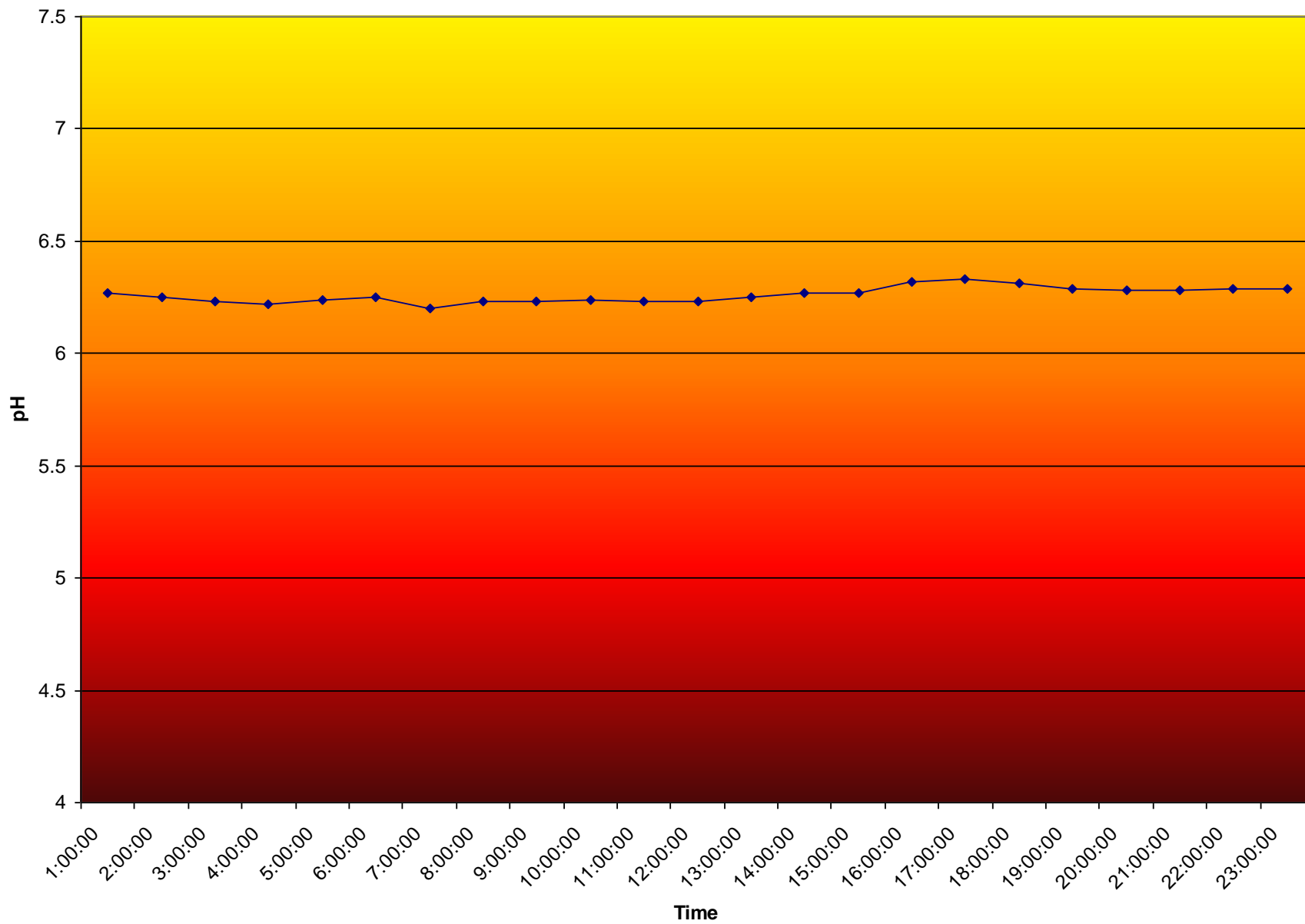
Reactive Phosphorus (mg/L) Graph



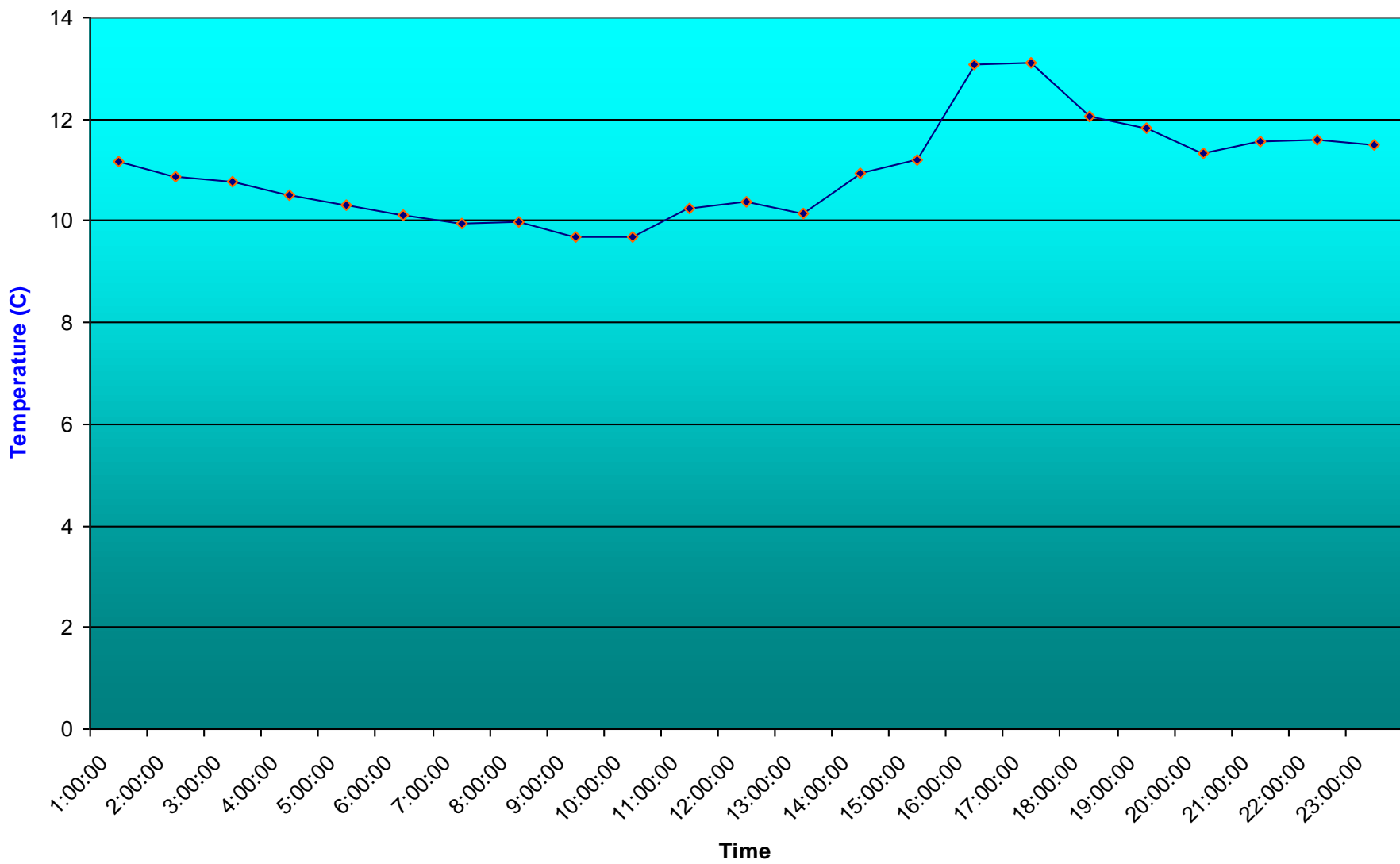
Long Pond, Parkhurst Site, Dissolved Oxygen, April 6, 2005



Long Pond, Parkhurst Site, pH, April 6, 2005



Long Pond, Parkhurst, Temperature, April 6, 2005



In Conclusion...

- The likelihood of these two chemicals affecting the mussels in Long Pond or Assawompset is improbable
- Our group is only a baseline study
- Further research must be done in the future to really find out the answer

AND A SPECIAL THANKS TO

JAY

CORDEIRO