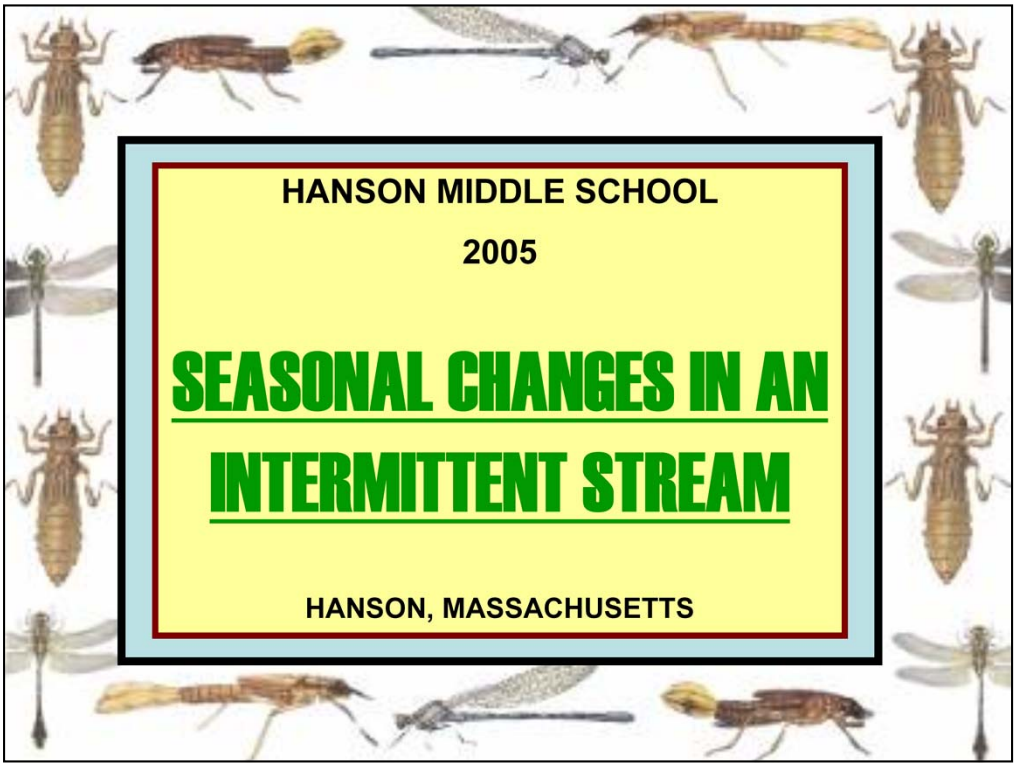
5-6-2005

Seasonal Changes in an Intermittent Stream



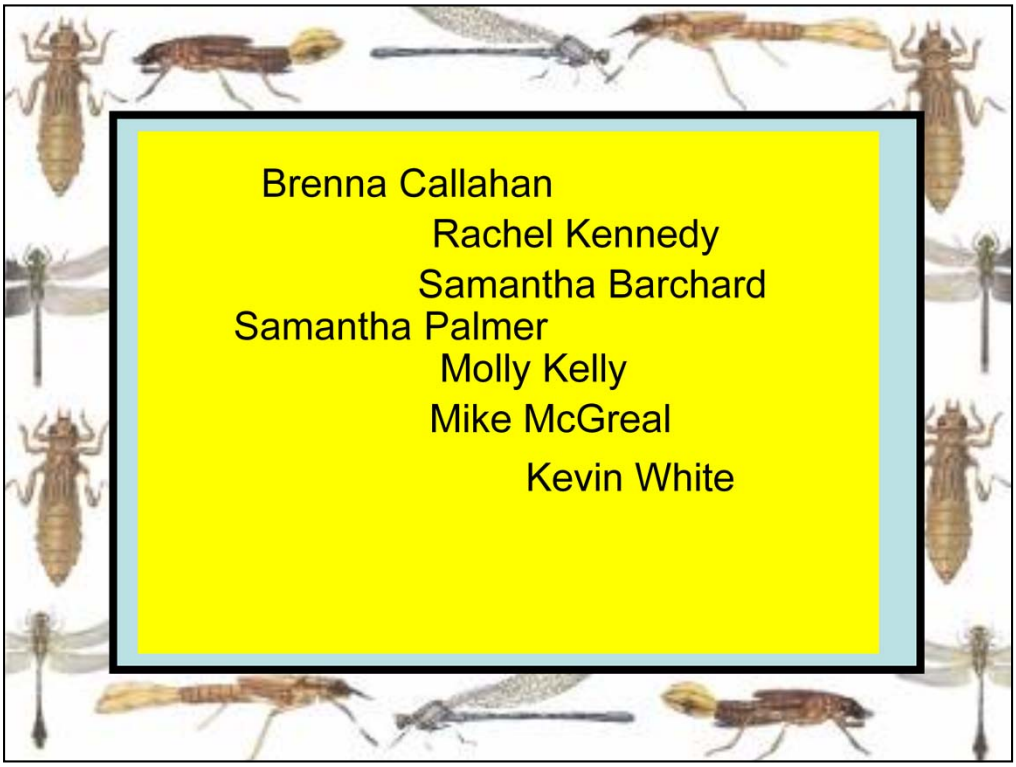
Kevin:

We are grade eight students at the Hanson Middle School in Hanson, Mass. The title of our investigation this year is “Seasonal Changes In An Intermittent Stream”

1…….

2…….

3……



Introduce yourselves in order

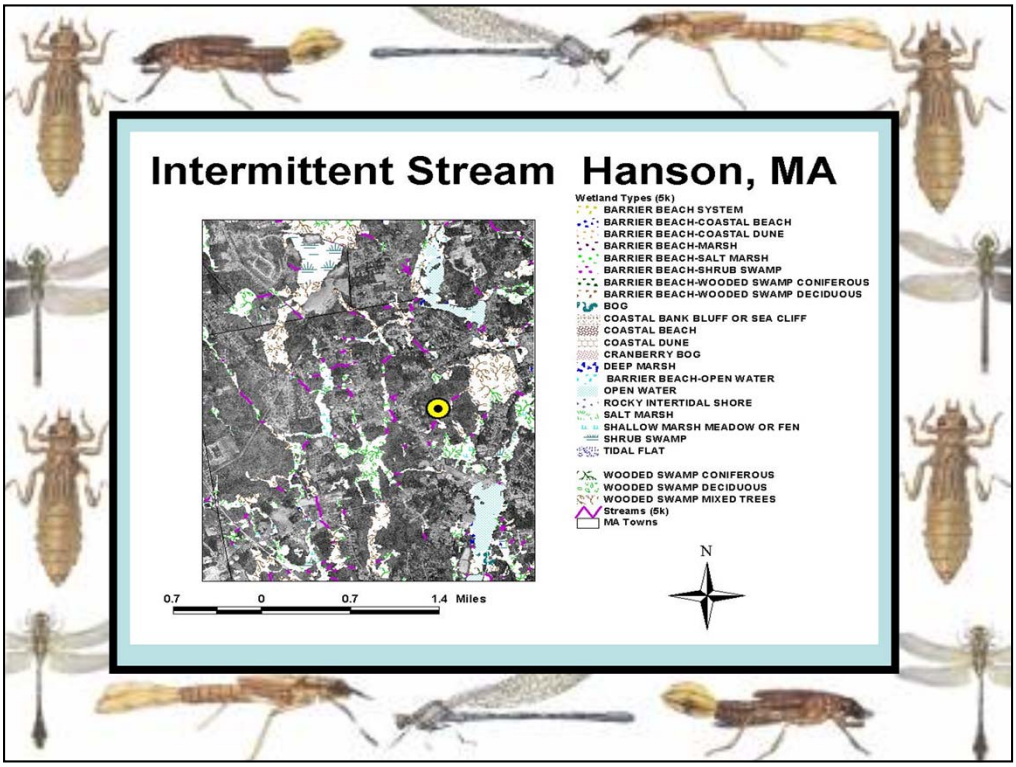
Brenna
Rachel
Sam Palmer
Sam Barchard
Molly
Mike
Kevin

……

Kevin:

This picture shows the stream as we first saw it in September. As you can see, it is almost dry. The stream is indicated on some maps as a Wetland Copnnector. It connects a series of small wooded swamps to a larger wetland called the Little Cedar Swamp.

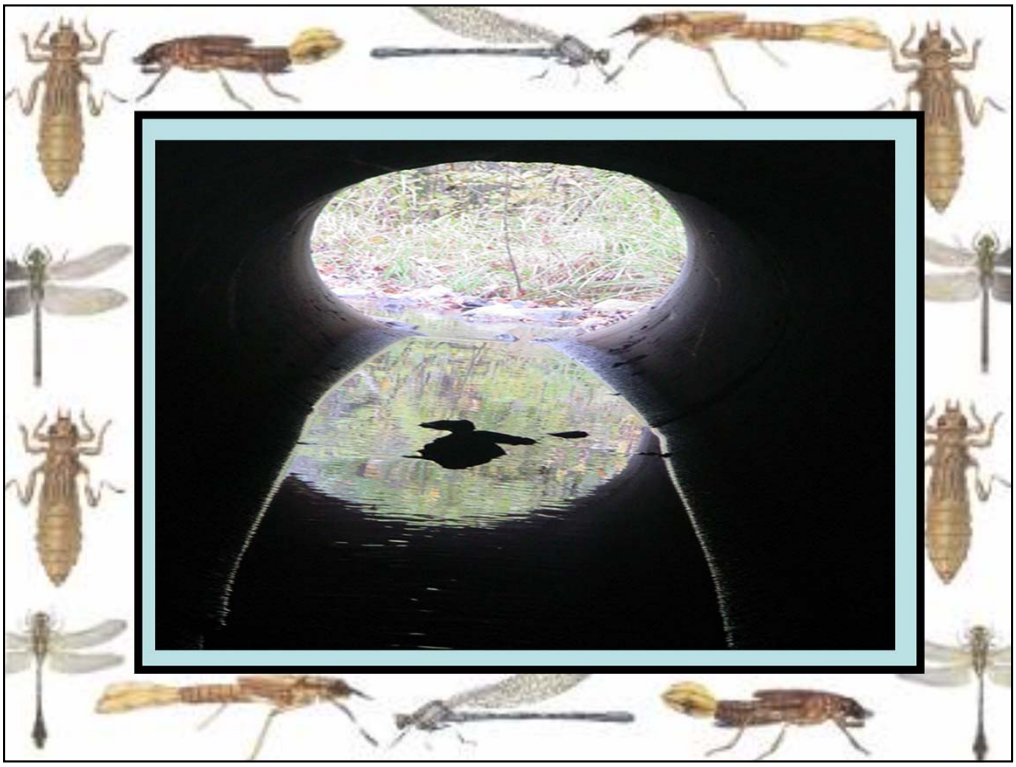
……..



Sam B.

The map here shows the area surrounding our site before building the Hanson Middle School. At the time, the property was surveyed as a possible school site, many of the wet areas were classified as “wet ponds” and were filled in to prepare for the new school.

……



Sam B.

This pipe now represents the conduit through which the water flows from wooded swamp areas into the Little Cedar Swamp. It was installed so that an access road could be built from the school to the leeching field.

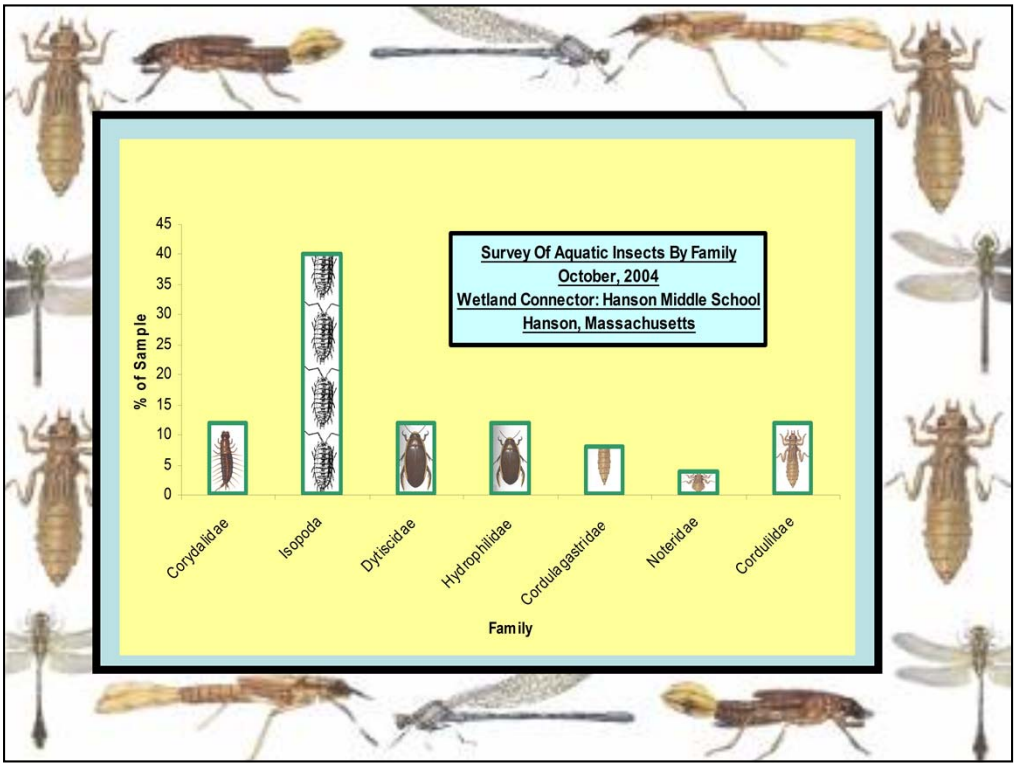
We originally intended to monitor water quality on either side of the connector. However, time, accessibility and deep – sno fall limited our studies to the up – stream side of the connector only.

……..

Brenna:

Our first job was to collect and identify the macroinvertebrates found in our study area. Because we did not start collection until after the leaves fell in the fall, what we ended up with was a lot of bags of wet leaves. Despite this, we were able to collect a few representative species but not enough to construct an accurate biotic index.

……



Brenna:

This graph shows our results in percent of sample. In all, we collected and identified only 25 individuals.

Almost 45% of the sample was made up of Isopods or aquatic sowbugs. These organisms enjoy shallow water and leaf littet and can be found in large numbers in these areas,

We also found three different families of aquatic beetles:

Water Scavenging Beetles	Hydrophylidae
Burrowing Water Beetles	Noteridae
And Predaceous Diving Beetles	Dytiscidae

The third group of invertebrates represented in the sample were members of the family Odonata and were all Dragon Fly larvae. Two different families were represented, the Cordulegastridae commonly known as “biddies” and the Cordulidae commonly know as “Green-eyed Skimmers”

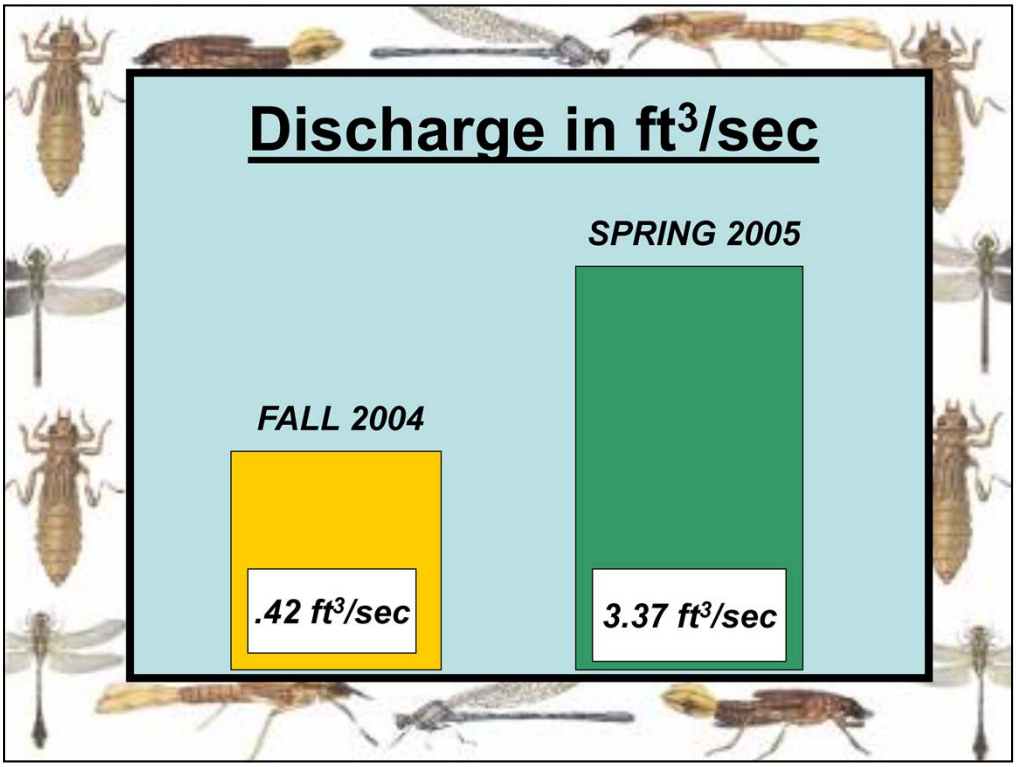
The fourth group represented were members of the Order Megaloptera, specifically from the Family Corydalidae or common Hellgrammites……..

Rachel:

This picture shows the low flow conditions we found last fall at our study site.

It’s not difficult to imagine that, in dryer conditions, no water at all would pass through the connector.

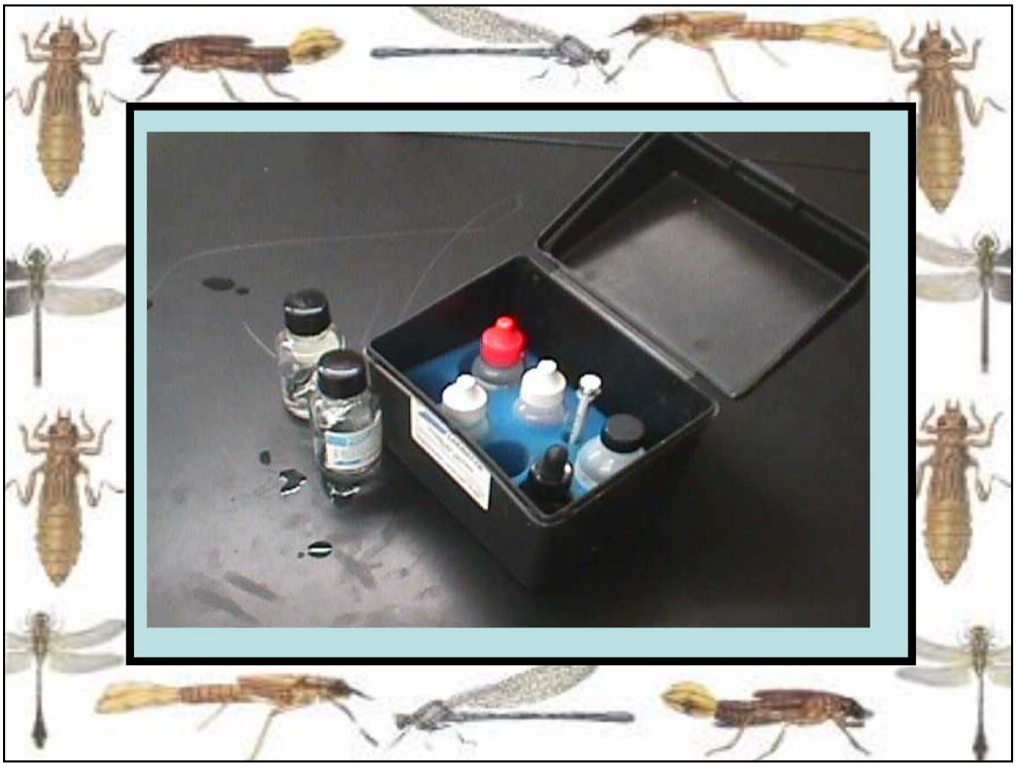
……



Rachel:

Heavy snowfall this winter and spring rains helped to increase the flow in our April measurements to about 8 times what it was in the fall.

……..

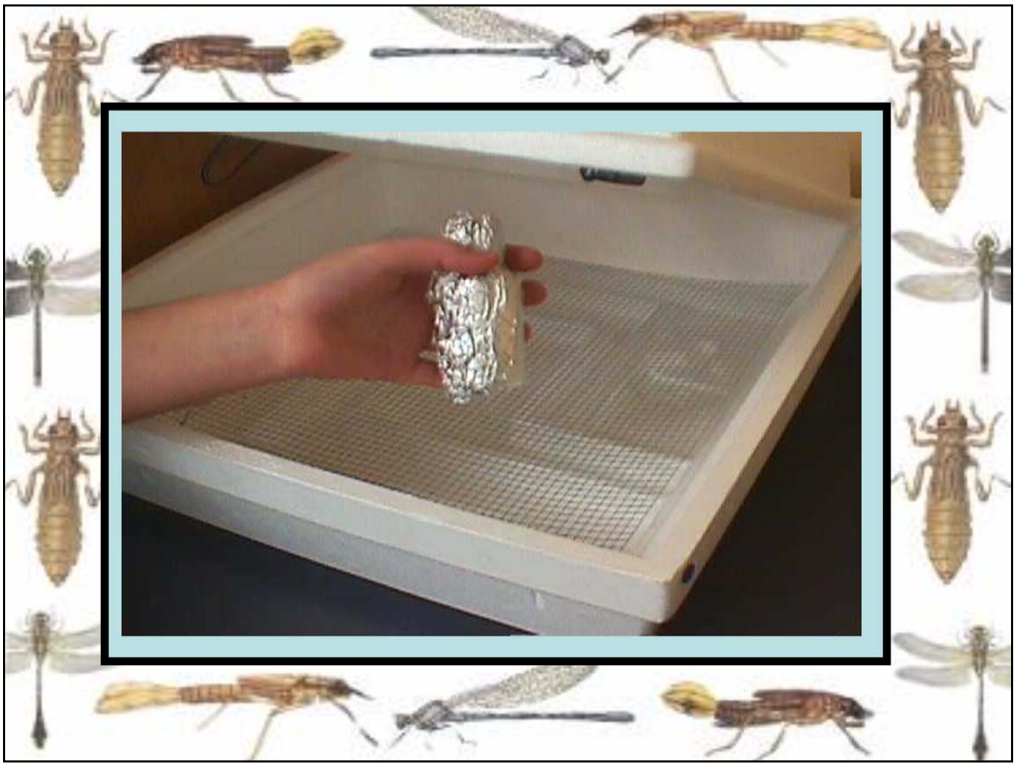


Mike:

Biological oxygen demand or BOD is a measure of the oxygen needed by microorganisms to decompose organic waste. High levels of this waste in a water resource will increase this demand while low levels decrease the demand.

We did this test both in the fall and spring using the Winkler Titration Method and a dissolved oxygen kit from the LaMotte Company

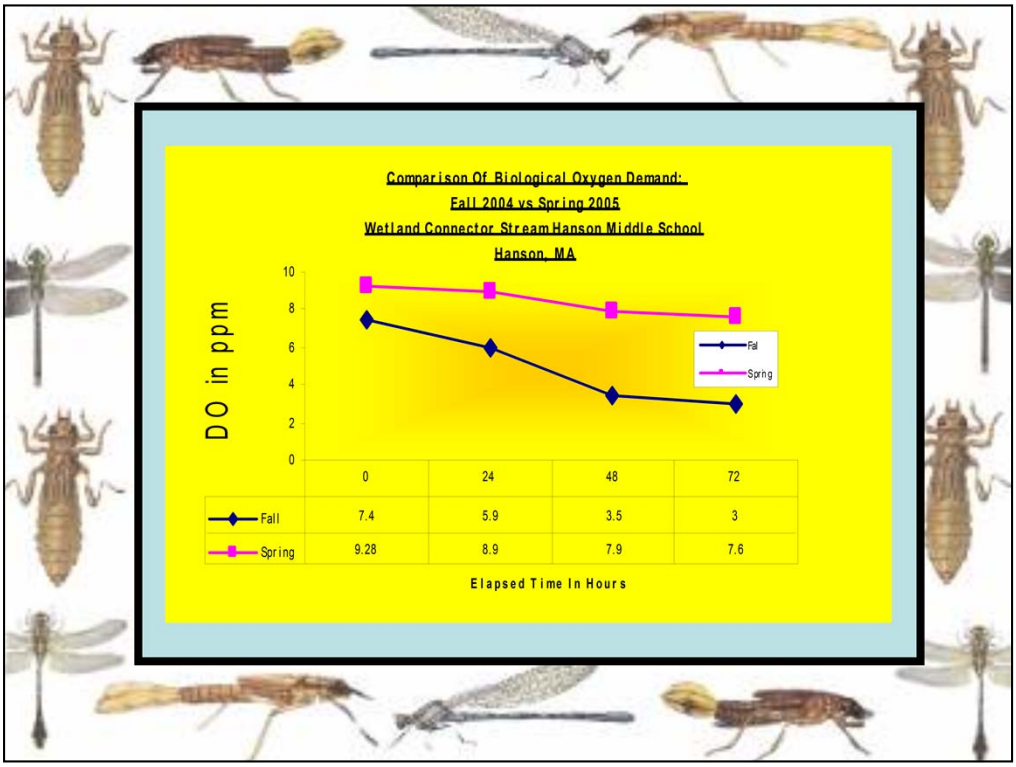
……



Mike

Five water samples were collected and one used for the initial measurement of dissolved oxygen. The other 4 samples were wrapped in aluminum foil and incubated at 25o C. Every 24 hours a sample was removed and titrated for D.O. Levels.

……



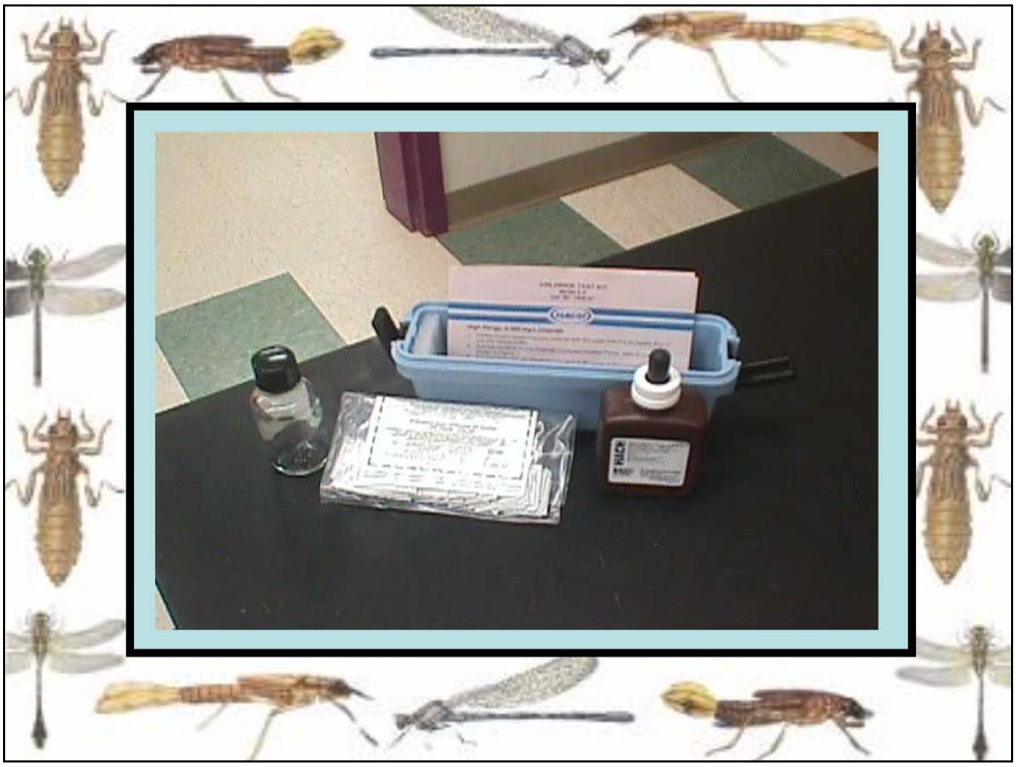
Mike:

These are our results for the spring and fall BOD measurements. Although this test should span 5 samples total, we were only able to get 4 due to a weekend interfering during each testing period.

In the fall, the 4 day BOD was 4.4 ppm. In the spring it was 1.7 ppm

BOD's between 1 and 2 ppm indicate a healthy water systems w/ little to no accumulated organic waste while BOD's beween 3 and four represent moderate pollution due to the accumulation of organic waste

……



Molly:

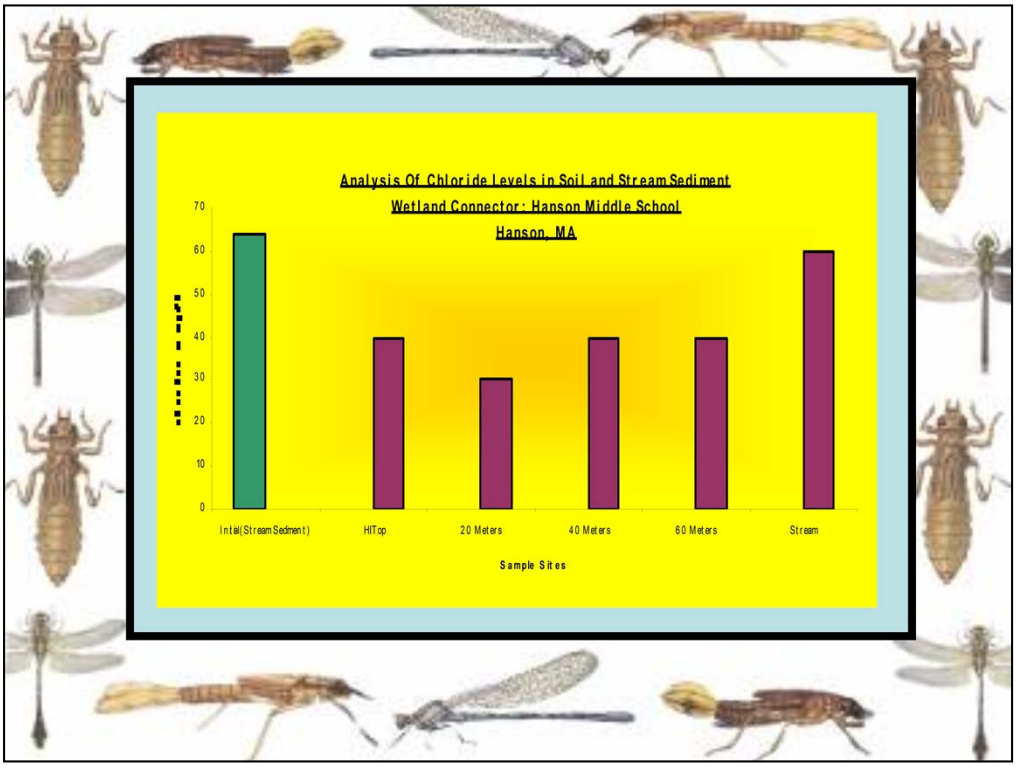
We wanted to measure the levels of salt entering out study site specifically that from salting the road and the parking lots around the school. One of these parking lots directly drains down a hill and into the stream.

We used a Hach Kit to measure total chlorides in parts per million.

In the fall, we collected a sediment sample from the stream bed. This spring we took soil samples from the top of the hill, and then every 20 meters down to the study site and took a final sediment sample from the stream bed.

All of the soil and sediment samples were filtered with distilled water and the filtrate was tested for total chlorides.

…….



Sam B.

This graph shows the results of our experiment. In the fall, the sediment sample had 64 ppm of chlorides. In the spring, the sediment sample had 60 ppm of total chlorides. We really expected this to be much higher but were p[leased to see that these levels are well below any that are considered threatening to aquatic ecosustems.

Kevin:

We also did an experiment to look at the effect of leaf litter on levels of phosphates and nitrogens in our water samples.

DO YOUR DEMONSTRATION HERE WHILE SAM P. READS:

Sam:

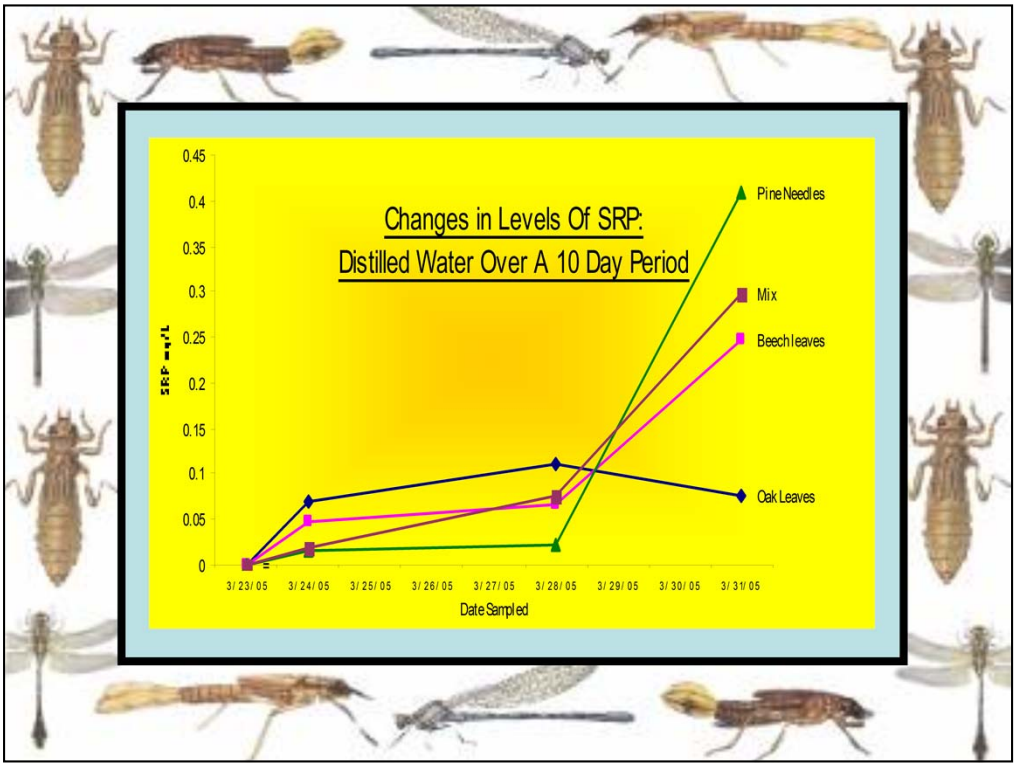
We used 10 beakers.
The first five beakers contained 500 ml of distilled water

The next five beakers contained 500 ml water from our sample site.

Beakers 1 and 6 contained just water
Beakers 2 and 7 contained water + 5 grams of Oak Leaves
Beakers 3 and 8 contained water + 5 grams of Beech Leaves
Beakers 4 and 9 contained water + 5 grams of Pine needles
Beakers 5 and 10 contained water + 5 grams of a mixture of all three .

Each sample was filtered periodically over an 8 day period.

……..

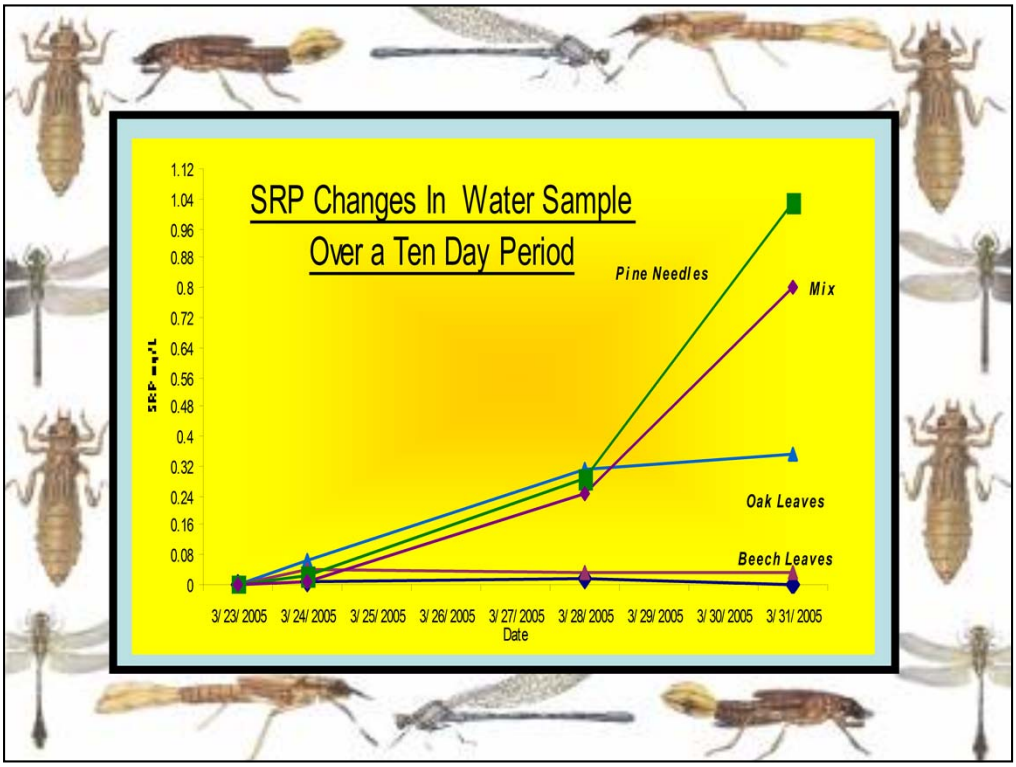


Kevin:

This graph shows the results in the distilled water samples. After 8 days the SRP or soluble reactive phosphorus increased in concentration from below detectable limits to .410 mg/L . The greatest increase occurred during the last four days, an increase of about .39 mg/L.

there were significant increases in the Beech sample and the mixed sample as well. However, the SRP concentration in the Oak leaf sample actually went down.

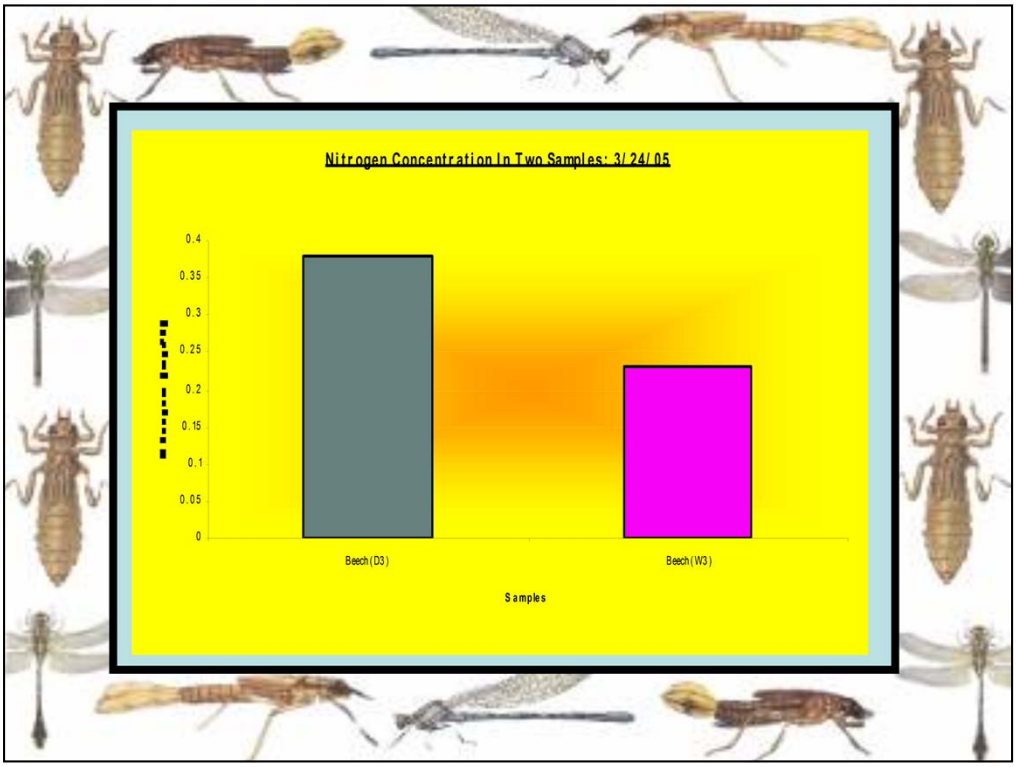
……



Sam P.

These are the results of changes in SRP in the sample water. All levels on day one were below detectable limits. The pine needle sample increased much as it did in our distilled water sample. This time the increase was by one mg/L

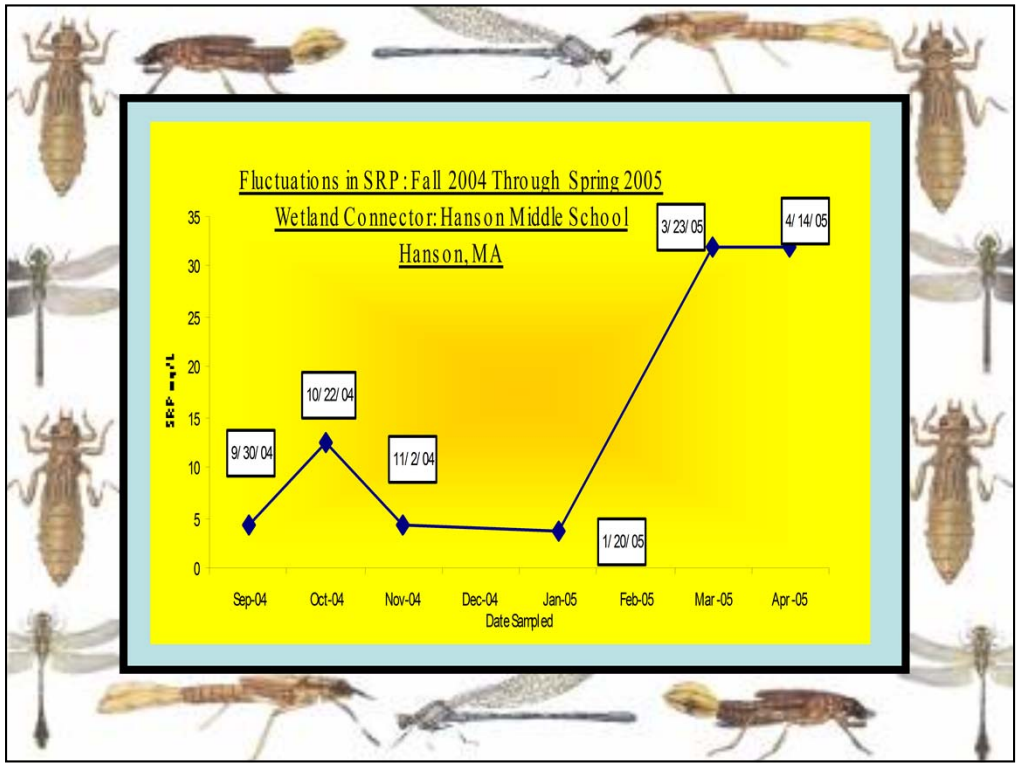
……..



Kevin:

For the most part, nitrogen levels remained below detectable limits. But, on day one in the beech leaf samples for both distilled and stream water, there was a spike of detectable nitrogen. This spike disappeared in each subsequent sample

……

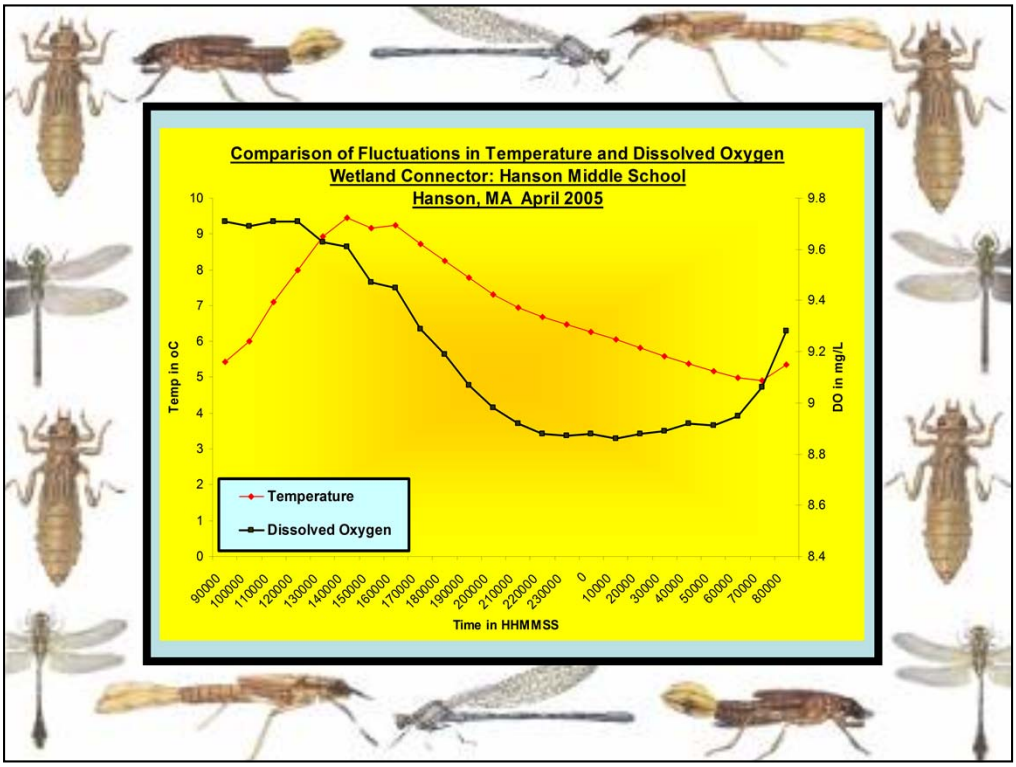


Rachel:

This graph shows the results for grab samples taken periodically over an eight month period. All Nitrogen levels are BDL.

Changes in levels of SRP in grams per day averaged from 6 during the low flow fall testing to 32 in the periods of peak flow in March and April.

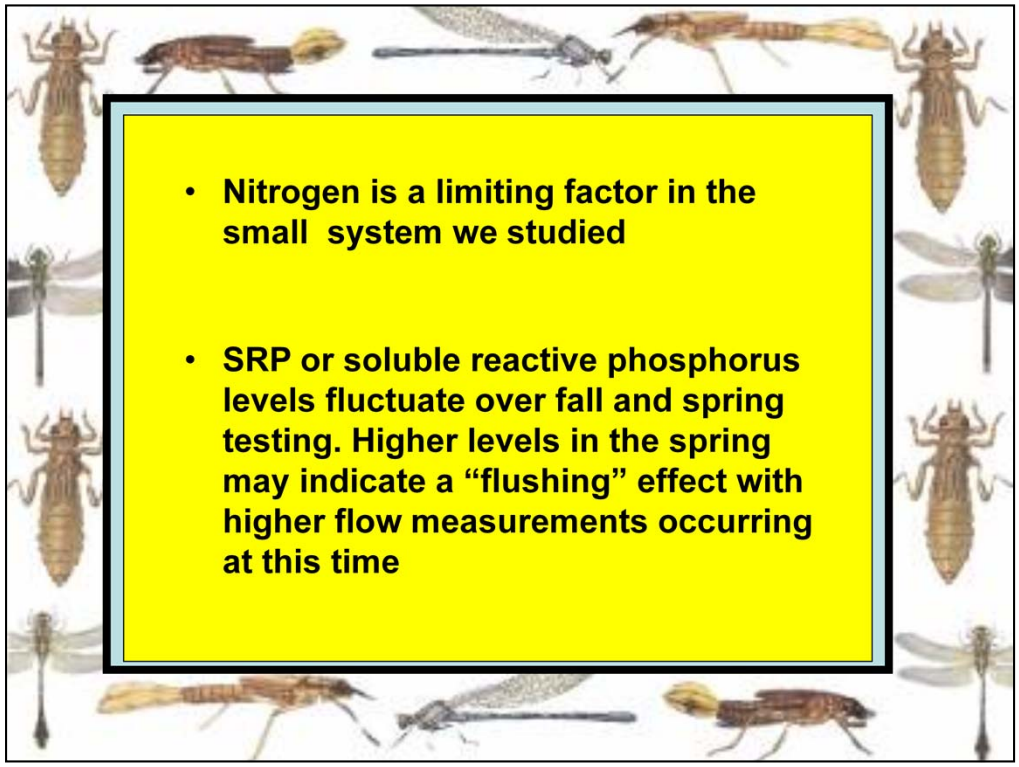
……



Brenna:

In April, we did a 24 hour analysis of temperature, pH and dissolved oxygen. This graph compares dissolved oxygen levels w/ temperature changes over the testing period 9:00 AM to 9:00 AM of the following day.

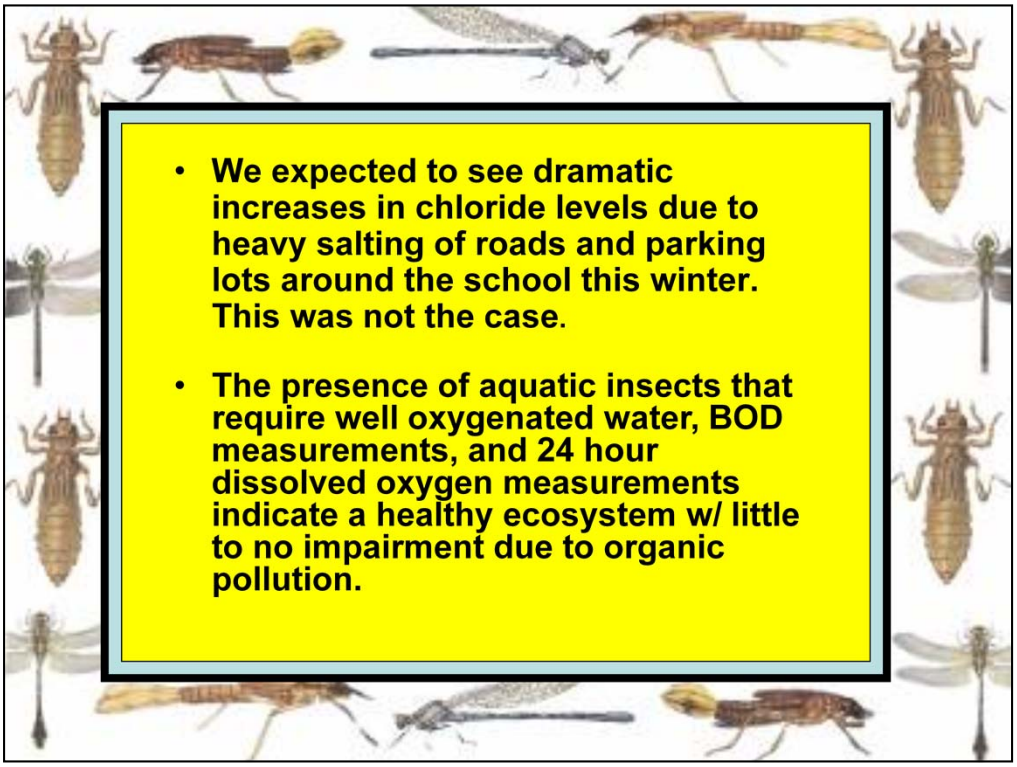
As expected, as temperature increases during the daylight hours, levels of dissolved oxygen decrease. As temperature decreases, dissolved oxygen increases

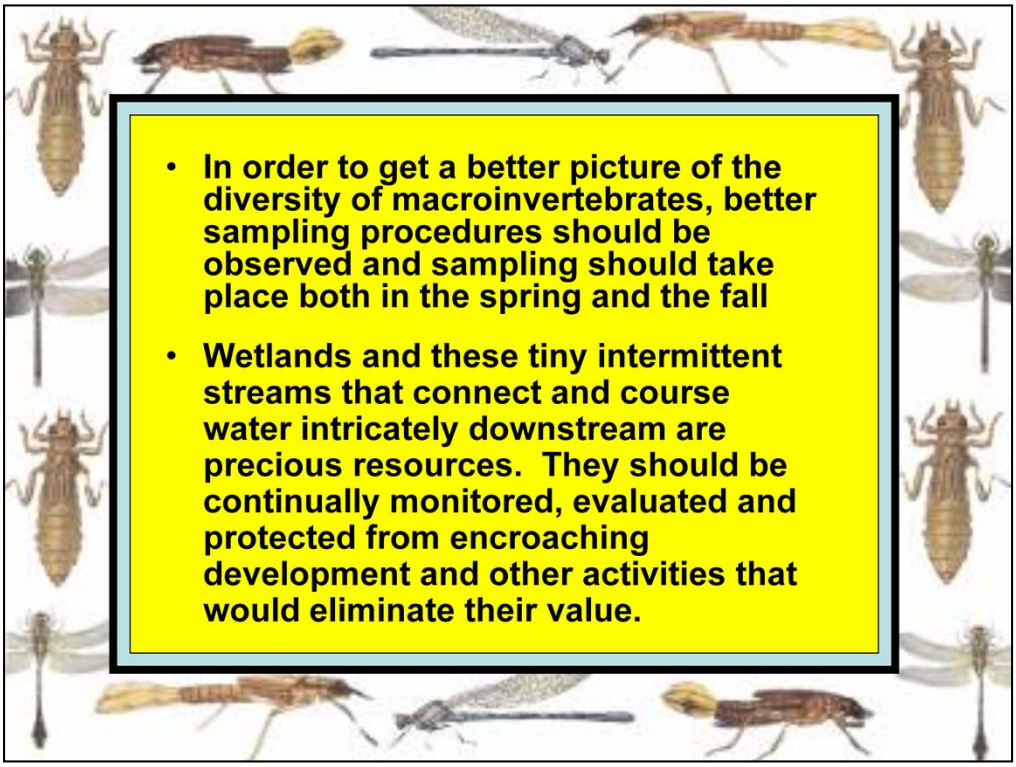


Molly

Our conclusions are as follows.

YOU NEED TO CLICK EACH BULLET ONTO THE SCREEN AT THIS POINT


• We expected to see dramatic increases in chloride levels due to heavy salting of roads and parking lots around the school this winter. This was not the case.
• The presence of aquatic insects that require well oxygenated water, BOD measurements, and 24 hour dissolved oxygen measurements indicate a healthy ecosystem w/ little to no impairment due to organic pollution.


• In order to get a better picture of the diversity of macroinvertebrates, better sampling procedures should be observed and sampling should take place both in the spring and the fall
• Wetlands and these tiny intermittent streams that connect and course water intricately downstream are precious resources. They should be continually monitored, evaluated and protected from encroaching development and other activities that would eliminate their value.

MIKE

we would like to thank:

Dr. Curry and Kim McCoy for making this learning experience possible.

Our principal, Mr. Carroll for supporting our efforts throughout the school year

Ms. Kofton, our teacher