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### Macroinvertebrate and Water Quality Survey of Smelt Brook

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**Macroinvertebrate and Water Quality Survey of  
Smelt Brook. Braintree Massachusetts March 27,  
2009**



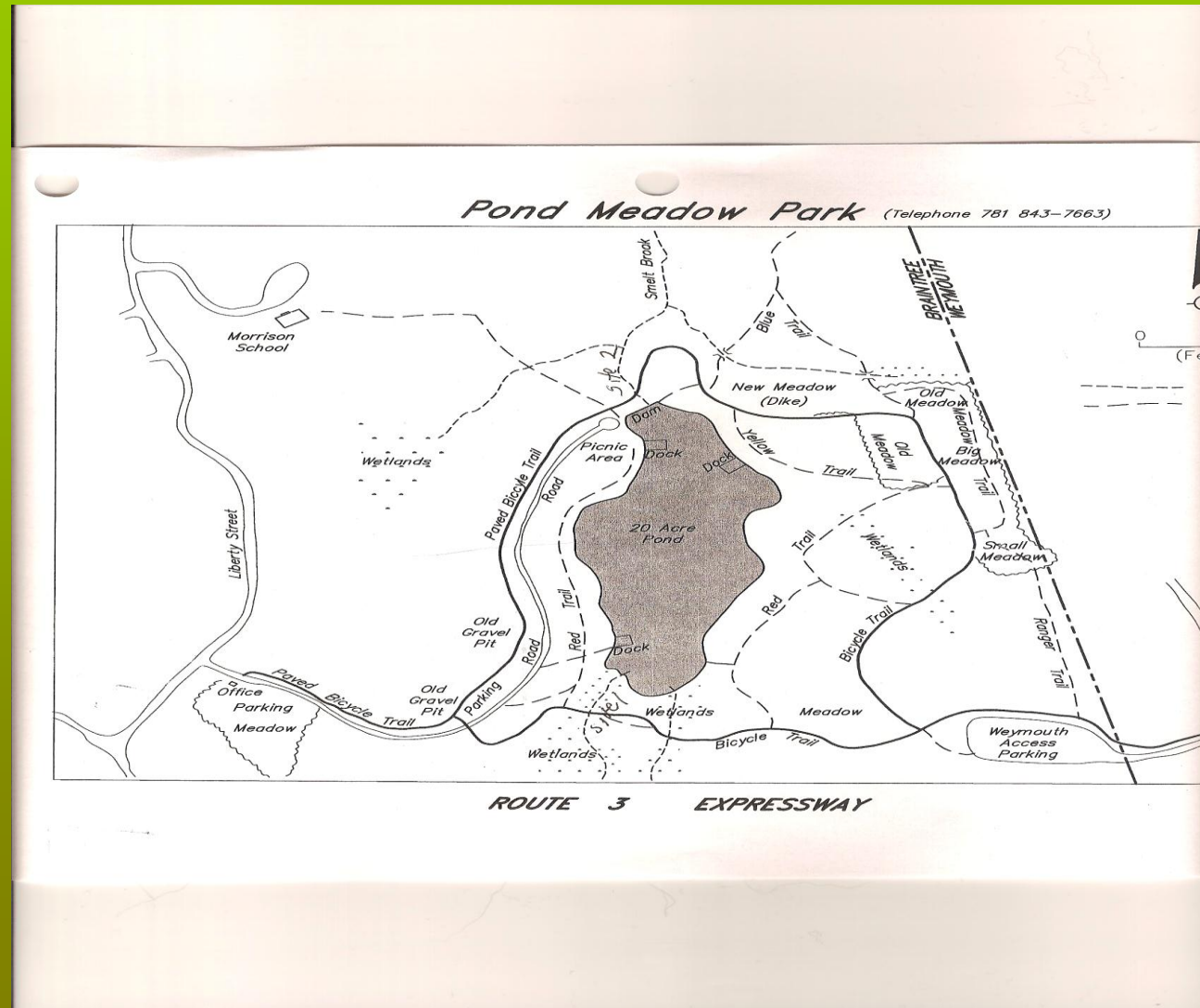
By: Rohan Aggarwal, Eleanor Mees, Jackie Flynn, Joseph Folan,  
Dylan Mitchell, Kasey Nolan, Bridget Burke

# Image of the Site from Virtual Earth

Site is 42.222 N latitude and -71 W longitude

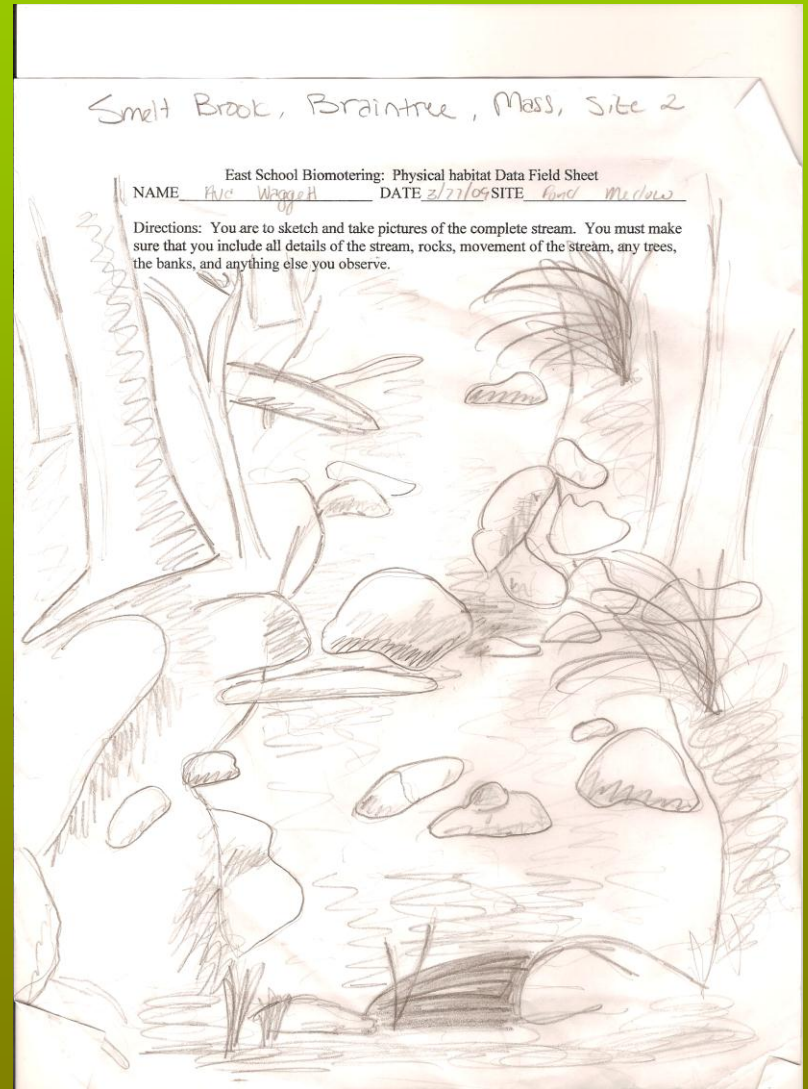
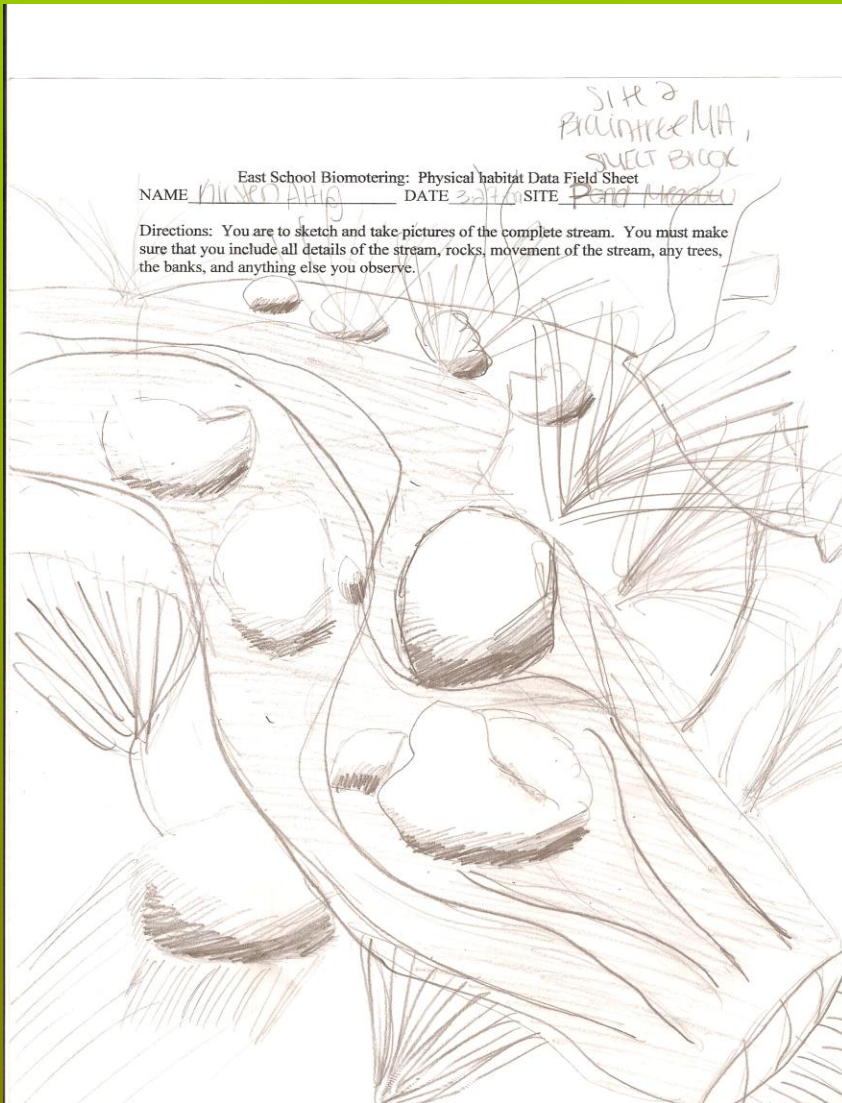


# Pond Meadow Map





# Drawings of the Site



# Physical Features

- 1. Lots of boulders in the stream
- 2. Major ripple areas
- 3. Both banks covered with trees and brush
- 4. Water was clear
- 5. Many broken branches in the water



# Additional Site Pictures





# The Smelt Brook





# Smelt Brook





# The Front of Smelt Brook





# Side View of Smelt Brook





# Smelt Brook





# Brush Surrounding Brook





# Smelt Brook Mini Waterfall





# Smelt Brook





# Students Collecting Data





# Data Collection in the Morning





# Measuring River Flow





# Measuring Width





# Collecting Macroinvertebrates





# Separating Bugs





# Classifying Bugs





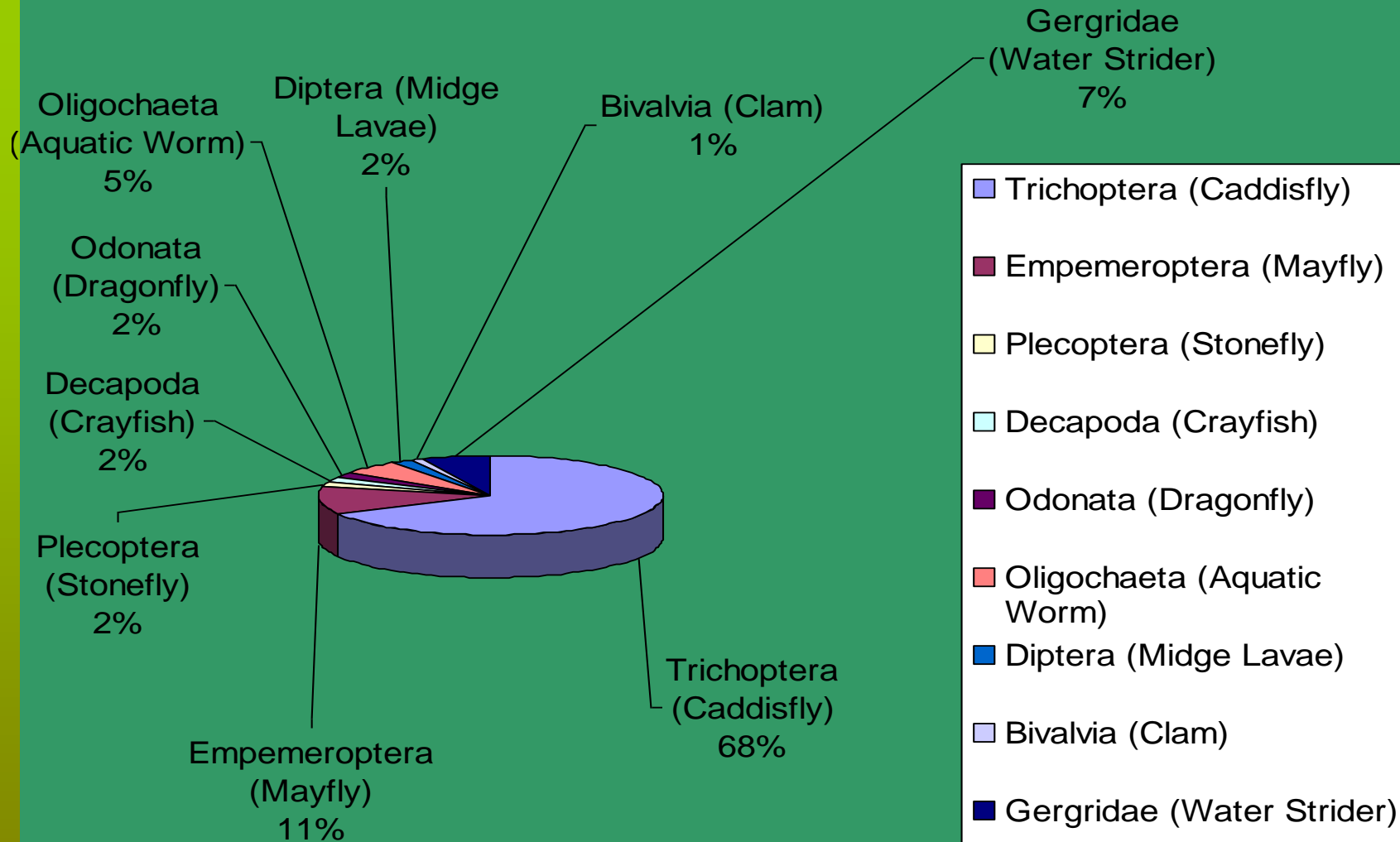
# Percentage of Bugs collected

- All squares were used to collect bugs
- This gave us 100 percent samples
- We were short on the number of actual bugs collected





## Percentage of Insects Found



# BUGS Sensitivity

- There is three levels of sensitivity with bugs.
- Level 3 are tolerant bugs such as the leeches, that wouldn't die of pollution.
- Level 2 are somewhat sensitive bugs such as crayfish, or dragonflies. Somewhat sensitive bugs can live in pollution, but not for a long period of time.
- Level 1 is sensitive types of bugs, such as stoneflies, and caddis flies. These bug can't survive in polluted water.



# Odonata “Darner Dragonfly”

This bug is somewhat sensitive to pollution, so finding these bugs are encouraging to the health of the river. They have 1 pair of wings, 6 legs, and 2 short antennae.



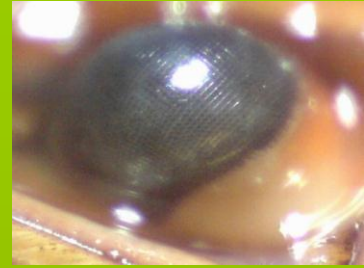
# Plecoptera Stonefly Nymph

Stoneflies are Group 1 (sensitive) bugs. They are prey to fish, water insects, and crayfish. They live on/under rocks and are usually found in streams or rivers rarely in a pond or lake.





# Crustacea Crayfish



- Crayfish are somewhat sensitive to pollution. They have an orange pigment. They have eight legs and one tail. They have two whiskers.



# Trichoptera Caddisfly Larvae

Trichoptera are the group 1 sensitive bugs. They have big eyes and a spiky tail. They have hair on their back. There are many types of caddisflies and they are of all different shapes.





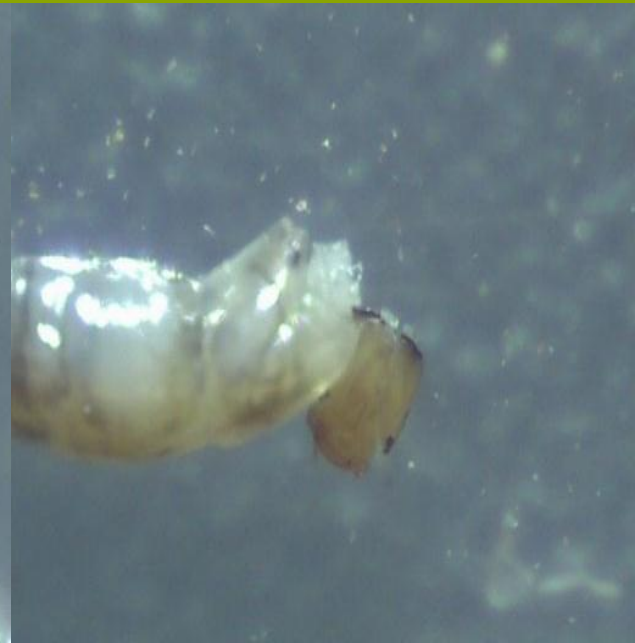
# Aquatic Worms

Aquatic worms are group 3 bugs. That means that they are tolerant and can live in polluted water. This news is neither good or bad for the health of the river. They are common water insects and look a lot like worms.



# Biting Midge

Midges are group 3 bugs. Their body is segmented in many parts. It also has smooth skin. Even though they are small they still have the capability to bite you.





# Diptera Black Fly Midge

This bug is usually 6 mm long. Found on rocks and in fast flowing rivers/streams. It has a smooth body and a sharp front claw. When it grows up it grows wings.



# Trichoptera Finger-Net Caddisfly

These bugs are sensitive bugs. These bugs have a white pigment and have brown heads. These bugs have a labrum which is made out of membrane.





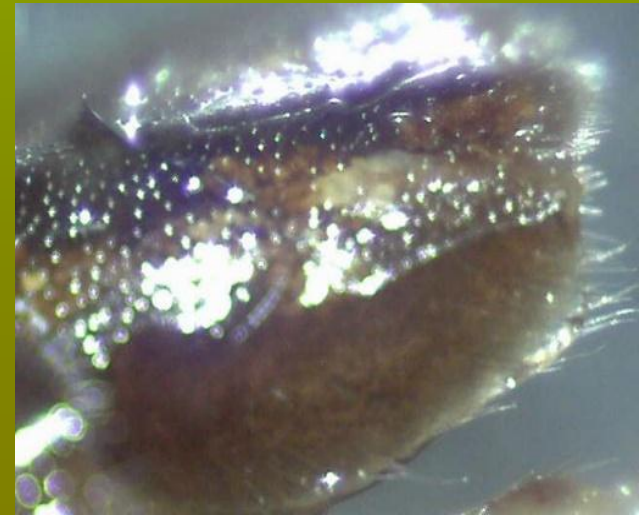
# Hemiptera Water Strider

Water Striders are of the tolerant group.  
These bugs can live in polluted water.  
They skip on top of the water and are black.  
They look a lot like spiders.



# Plecoptera Mayfly Nymphs

Mayflies are group 1 (sensitive) bugs. They have 3 tails, 1 claw abdominal gills, short antenna, and 1 set of wings.





# Brook Measurements

We took measurements from the water at Smelt Brook. For our first sight, the length bank to bank was 9 feet, 9 inches. The high water level was 34 centimeters. For our second sight, we measured that the length was 6 feet, 4 inches and the high water level was 30 centimeters. For our third and final sight, the length was 6 feet, 4 inches, and the high water level was 37 centimeters. The average length was 8 feet. The average high water level was 33 centimeters. The average temperature for the brook was 42°F or 7°C.

In conclusion we took three measurements at Smelt Brook.

We noticed many things at Smelt Brook. The brook seemed shallow at some points. This was probably because of the many rocks and boulders. Some of the boulders were so big that it was difficult to move around and measure the brook. There was also lots of overhang from the trees above. Some tree branches were so low that it was tough to move under and around them. In conclusion, we got a lot of information from Smelt Brook.

# Depth Data Collected

Segment #	Segment Distance	Depth A	Depth B	Average Depth	Area of Segment (ft <sup>2</sup> )	Average Flow At 0.6 from Surface	Flow ft <sup>3</sup> /sec (CFS)
1	2 ft.	20 Cm	8 cm	14 cm	28 ft <sup>2</sup>	.69	19.32
2	2 ft.	30 cm	8 cm	19 cm	38 ft <sup>2</sup>	.81	30.78
3	2ft.	13 cm	12 cm	12.5 cm	25 ft <sup>2</sup>	.78	19.5
4	2 ft.	24 cm	20 cm	22 cm	44 ft <sup>2</sup>	.47	20.68



# Smelt Brook Average Discharge

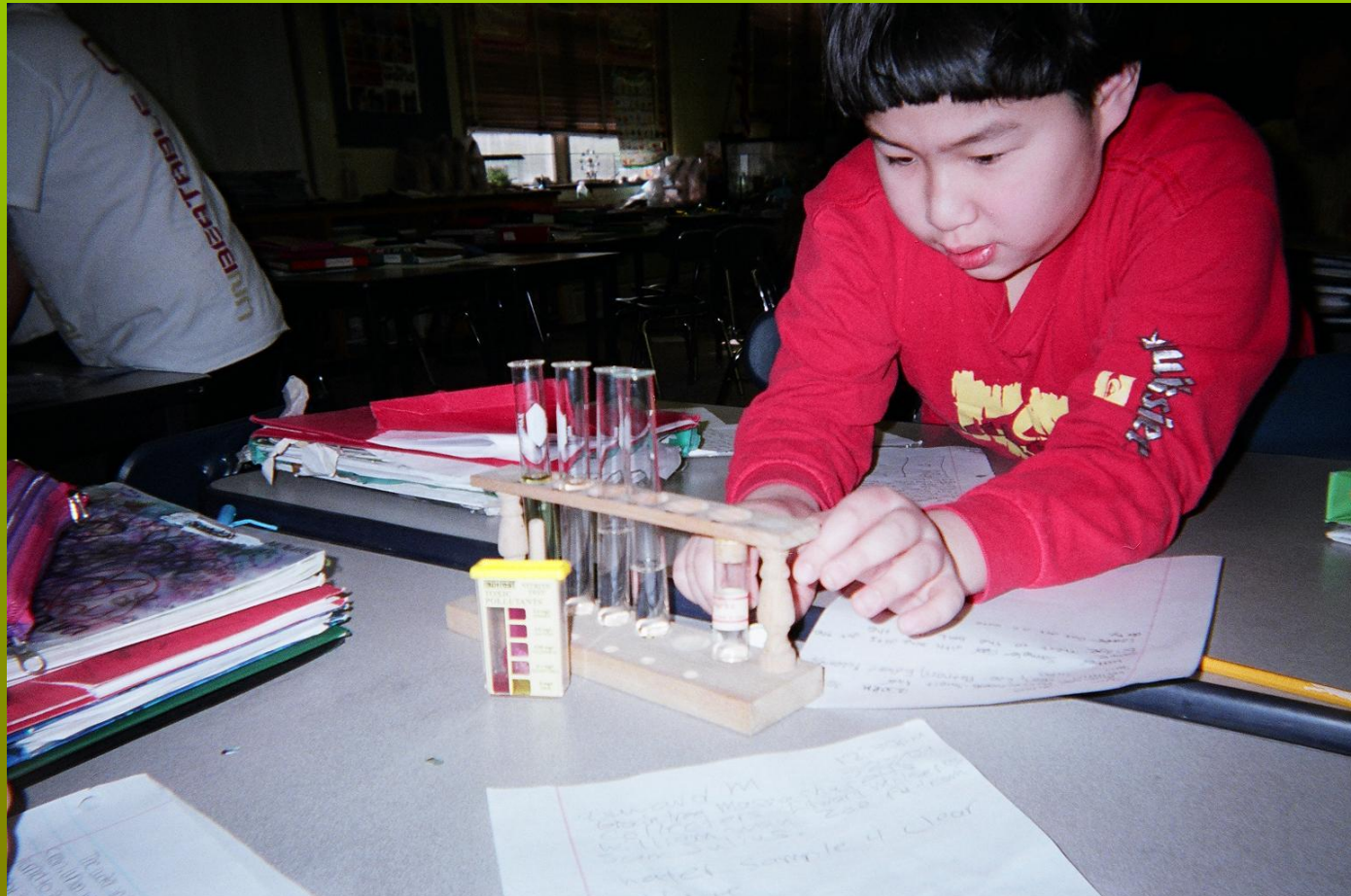
Q= Total Discharge	90.28	Q in CFS	90.28
		Q in L/sec	2556.72

# Water Temperature at Smelt Brook

Temperature at Smelt Brook March 27, 2009













# Data Table for Tests

pH	Nitrogen	Phosphate
Medium Green	Pinkish-brown	Yellow
6.5	low	10%mg1 ideal



On the morning of March 27 2009 at Pound Meadow Park at Smelt Brook we took some water samples. When we got back to East Middle School we took a nitrate test. What we did was we put some river water into the test tube and put some nitrate indicator into it. After we did that we shook it up. The water turned light pink so that means the nitrate in the river was low. Which means when it is low the river is very healthy which is great.

# Water Quality

The water in Smelt Brook appears to be clean. The PH test came out to be a medium green. That means that the water was a 6.5 which is pretty decent. We also took a pollution test. The results turned the water yellow which meant there was no toxic pollutants in this water. We also took a nitrogen test. The water turned to a pink-brown which means the nitrogen level was very low. This shows that Smelt Brook is a healthy and clean river and is helpful to its surroundings.



# Healthy Brook?

- The information that we collected shows that the brook is a pretty healthy brook. We only took limited information and it would be better if we could study this brook more often. This way we could really get some good information.

# East Middle School Brook Study

- Thank you for allowing us time to present our information to you

