4-28-2010

Agawam River Project: Year 7

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Welcome To Our Seventh Year Of The Agawam River Project
This year the entire 8th grade class went to the Agawam River in Wareham to investigate the impact of the large amounts of rain our area had in April 2010.

Some of us will also participate in another environment project called “Submerged Aquatic Vegetation”. We will transplant eelgrass plants into Onset Bay. Our school has already transplanted over 225 plants.

The Agawam River and Onset Bay are ecosystems of the Buzzards Bay Watershed. We will investigate rain water and its impact to the Buzzards Bay watershed.
The Agawam River’s Brackish Relationship with
Onset Bay
Within The Buzzards Bay Watershed

The Agawam River begins at Long Pond in Plymouth and meanders 13 miles south.
The river merges with the Wankinco River into brackish Wareham River.
The tides bring salt water from Buzzards Bay into the Wareham River where it meets the inlets of Buzzards Bay. One of these inlets is Onset Bay, at the west end of the Cape Cod Canal.
Our Question...

How do large amounts of rain water affect the Agawam River System as it flows into Buzzards Bay, a salt water system?
Map of Agawam River and Onset Bay
Off Glen Charlie Road Site

- In 1700, a rolling mill was built here
- A dam was built in the 1800s by the owner of the Nail Works
- Iron was melted into cannonballs
- Ruins of the Glen Charlie Mill exist
- This was called Maple Springs area
A stone foundation of the Mill
Onset Bay Land Use - current
What We Measured

- Turbidity
- Dissolved Oxygen
- Temperature
- Macroinvertebrates
- pH (potential hydrogen)
Materials

- Turbidity tube
- Microscopes
- Buckets
- Macroinvertebrate Collection nets
- Hach DO kit
- pH paper
Methods

- Collect macroinvertebrates
- Collect water samples
- Measure turbidity, dissolved oxygen, temperature, and pH
- Classify and count macroinvertebrates
- Physical assessment
<table>
<thead>
<tr>
<th><strong>OG Charlie</strong></th>
<th><strong>Onset Bay</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Air 54 F</td>
<td>Air 59 F</td>
</tr>
<tr>
<td>Trees budding</td>
<td>Low tide</td>
</tr>
<tr>
<td>High water levels</td>
<td>Green algae</td>
</tr>
<tr>
<td>Rapid flow</td>
<td></td>
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<tr>
<td>Construction - loose sand</td>
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</tbody>
</table>
Why The Water Cycle Is Important

Rain water fills up Long Pond and the overflow goes into the Agawam River. The water flows bringing salt from the rocks into Buzzards Bay. Evaporation creates condensation which eventually will turn into precipitation adding water back into Long Pond.

The surface run off affects the water quality and affects the health of Eel grass.
River Flow – DEP Project
Salt Water VS Fresh Water Erosion

- Onset Bay - Eelgrass prevents salt water erosion in the sea floor. Without the tight roots of zostera marina, then salt water erosion will happen.

- Agawam River – At our site this year, there was DEP project work done. All of the trees upstream surrounding the pond were taken out. This was sad to see. We will closely monitor erosion in our future studies. We believe that chemical breakdown of the soil will take place, because the soil will erode from the weather, rain and flow pressure. This chemical breakdown will affect Onset Bay over time.
### Water Quality Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>OGC</td>
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<tr>
<td><strong>DO</strong></td>
<td>12 mg/L</td>
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<tr>
<td>Water Temp.</td>
<td>9.2°C</td>
</tr>
<tr>
<td>pH</td>
<td>3</td>
</tr>
<tr>
<td>Turbidity</td>
<td>&lt;120</td>
</tr>
</tbody>
</table>
Collecting Macroinvertebrates

We collected mostly scuds. We also collected caddisfly casings, caddisflies, a few mayflies, midge larvae, mussels, leeches, eels, and one crustacean.
Midge Larvae

- We found midge larva in the river.
- Midges are pollution tolerant, but cannot survive in heavily polluted areas. An indicator of poor water quality.
- Midge larva squirm through the water and attach to debris.
- Midge eat algae, organic debris, and other insect larva.

Kevin, Delton, Brian
Caddisflies

- Caddisfly is in the Kingdom of Animilia, Arthropoda, Insecta.
- Caddisflies eat small aquatic vascular plants, nymphs, and larvae.
- The caddisfly needs a lot of oxygen to survive, which means they can't live in heavily polluted water.
- Cy and Zack.
Mayflies

- We found Mayflies in the river.
- Mayflies are a good sign for a healthy river system.
- Mayflies cannot live in polluted water.
- Mayflies eat plant material and algae.
- Mayflies are insects in the Ephemeroptera family. They have a life span of about 30 minutes to a day.

- Shaelyn and Rachel
Scuds

- The scud’s main food is plant and animal debris.
- Scuds are pollution tolerant. They may survive in moderately polluted water.
- Scuds are an important food source for fish.
Results

- The pH of the river was very acidic, most likely due to acid rain.
- The D.O. was within normal range. Vegetation, cool air temperatures, and a fast flow benefit D.O.
- Our macroinvertebrate collection has some reason for concern about excess nitrogen, phosphorus, and acid.
- Upstream the landform has completely changed, with no trees, straw, rock, black tarp fencing, and loose soil.
Discussion

- We think the water is not as healthy as it could be, because we had a low pH, and we had only a few good indicators of species. We also found some leeches, which could indicate poor soil quality. Crayfish and clam populations decrease in acidic conditions and plants and blackfly larvae increase. Since the construction, the metal plates on the dam are exposed. We will investigate the goals of this DEP project.

- There is recreational boating in the ponds. Acid rain can interfere in the process of photosynthesis because it causes the leaves to turn brown. Acid rain is a factor of an unbalanced river system and we feel that the recent excess rain has affected the Agawam River, which will affect Buzzards Bay.
2010 Agawam River Crew
I learned that the Agawam River has macroinvertebrates and many forms of vegetation. The river water was clear, but it looks reddish brown from the iron. Rachel

We learned about the different species in the river and that they need oxygen in the water.

We learned that the river’s current is important for oxygen. Katie, Olivia, Brittany, Leila
I learned that the Agawam River is over 10 miles long. Edward

I learned that many macroinvertebrates live beneath the soil in the river. Brian

I learned about the species and habitats of the river ecosystem. Gwen

I learned that soil may be different colors, such as the iron filled soil we saw. Cy and Zack
Thank You

- Dr. Curry
- Kim McCoy
- Our Principal, Mr. Hudson, for supporting this project
I learned about what a class can accomplish when everyone works together!

Gwen