5-2-2007

Agawam River Project – Year 6 – River Water and Eel Grass

Welcome To Our Sixth Year Of The

Agawam River Project

River Water and Eelgrass

- Our Middle School is proud to present our 6th Agawam River Project. We have six years of data about the River!
- We also do an Environment Project called "Submerged Aquatic Vegetation". We have transplanted 225 eelgrass plants into Onset Bay.
- Our River Project this year will take a look at how the Agawam River flow affects the eelgrass in Onset Bay. The Agawam River and Onset Bay are ecosystems of 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 to its end in merging with the Wankinco River to become brackish Wareham River. This area is brackish water influenced by the salt water tidal flow coming in and out through the Wareham River, which is formed at the confluence of the Agawam River and the Wankinco River. The Wareham River meets the inlets of Buzzards Bay. One of these inlets is Onset Bay, at the west end of the Cape Cod Canal.

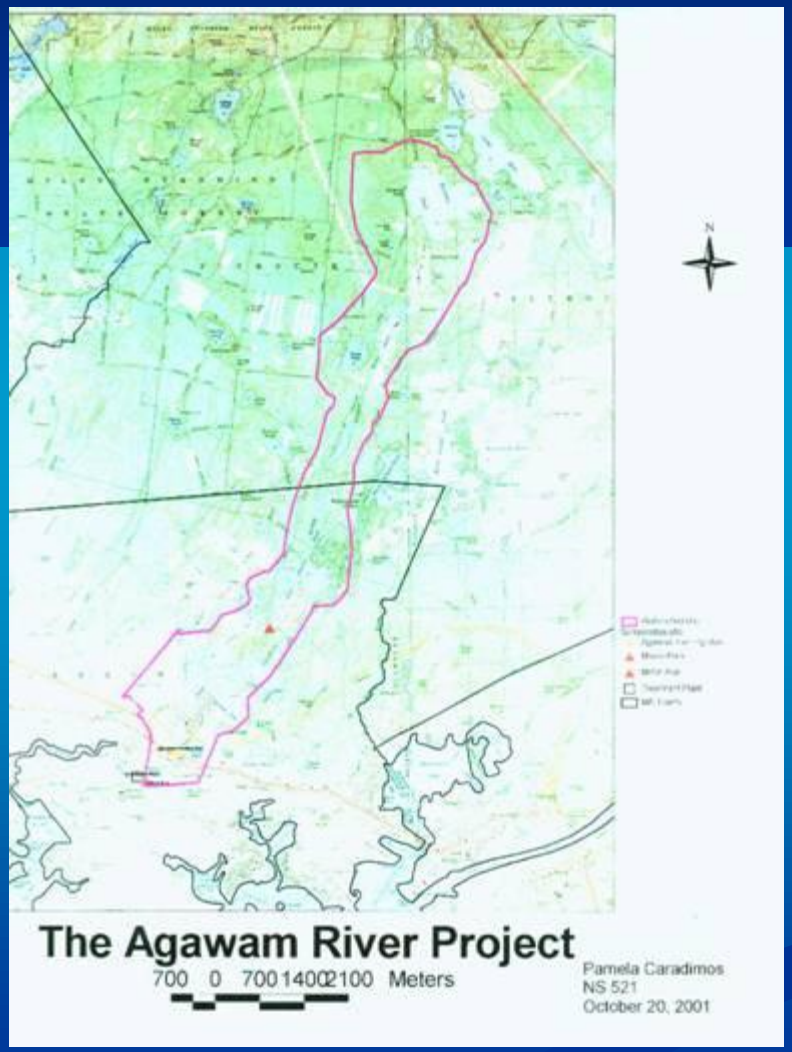
St. Margaret Regional School, Buzzards Bay, 2007 River Project:

- Barbara
- Anastasia
- Alessandra
- Brad
- Tyler
- Mary
- Sean
- Brian
- Jonathan
- Samuel
- Olivia

Our Questions…

- What influence, if any, does the quality of the Agawam River water have relative to submerged aquatic vegetation in Onset Bay?
- Why is the recent Water Pollution Control Facility upgrade of Phosphorus and Nitrogen removal systems positive for the ecosystem of the Agawam River watershed?

Map of Agawam River and Onset Bay



The Agawam Herring Run

- This is our first river site
- Wampanoag tribes harvested herring at this site for food and fertilizer.
- In 1632, the first dam was built here
- In 1720, Colonists built a fishway here
- The colonists caught herring at this site by hand or spear. Herring were survival to them.
- The Agawam Ironworks was near this area which melted iron into cannon balls.
- There was a bleachery here in 1902

Off Glen Charlie Road

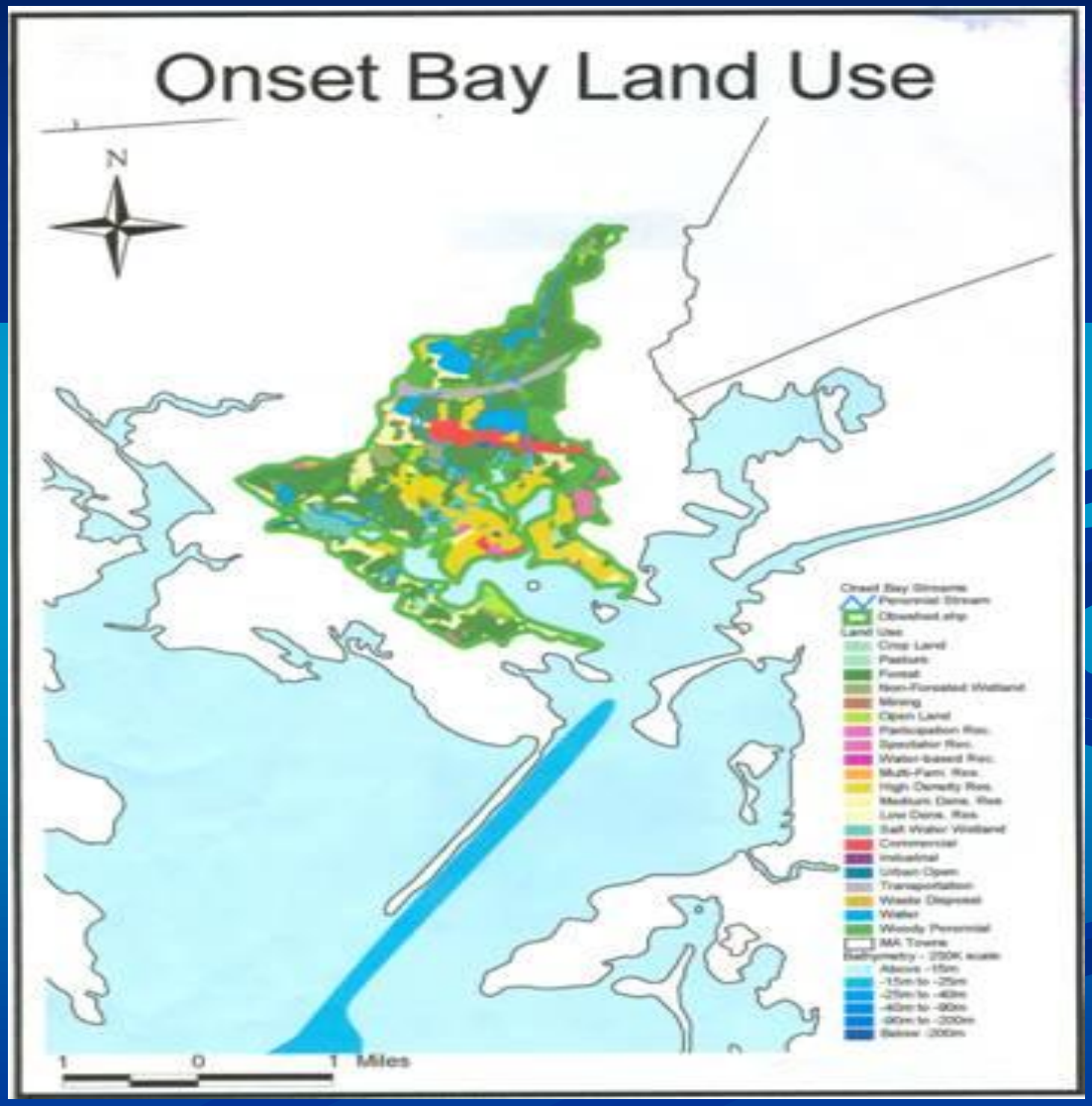
- In 1700s, a rolling mill was built here
- A second dam was built upstream from the AHR in the 1800s by the owner of the Nail Works
- The site was called the Glen Charlie Mill- we saw some stone of the mill
- This was called Maple Springs area

A stone foundation of the Mill

Onset Bay

- 1800s – a Victorian Seaside Resort
- Swimming, fishing, boating
- 1800s Steamboat
- Cape Cod Canal was not built – think about the tides

Onset Bay Land Use - current



Land Use:

Agawam Herring Run

- **Past:**
- 1632-First dam
- 1720- fish way
- Agawam iron works
- Bleachery-1902
- **Current:**
- Highway
- Parking lot
- Fish ladder

Off Glen Charlie

- **Past:**
- 1700s-Rolling Mill,dam
- Spawning grounds for herring
- farms, family picnics
- **Current:**
- Cranberry bogs
- power lines
- herring fish ladder
- camp,housing,road

What We Measured

- River Flow/Velocity
- Turbidity
- Dissolved Oxygen
- Temperature
- Latitude/ Longitude
- Macroinvertebrates
- pH (potential hydrogen)

Materials

- Flow meter
- Turbidity tube
- Measuring tape
- Depth measure
- Buckets
- Macroinvertebrate Collection nets
- Ethyl alcohol
- Hydrolab
- Data book
- Microscopes
- Waders
- Small forceps
- Gloves/Brush
- Filters
- Camera/Computer

Methods

- Measure river width
- Measure river velocity in segments
- Measure river depth in segments
- Collect macroinvertebrates
- Collect water samples
- Measure turbidity, dissolved oxygen, temperature, and pH
- Classify and count macroinvertebrates

Physical Assessment March 2007

AHRun	OGCharlie	Onset Bay
Air cold		Cold Breeze
No leaves on trees		
Windy, fast river flow		Ice melted
Outgoing new moon tide		
	Construction – loose sand	

Agawam Herring Run Site

- Upstream one mile from the Water Pollution Control Facility

Off Glen Charlie Site

- Upstream three miles from Water Pollution Control Facility

The Water Pollution Control Facility has completed its upgrade of a Nitrogen and Phosphorus Removal System.

Why is the Upgrade Important to Our Projects?

- A five year goal of our River and Eelgrass projects, is to monitor and record phosphorus and nitrogen data and compare this new data with data we have collected over the past six years of doing our projects.
- Lower amounts of Nitrogen and Phosphorus should be present, which is an important positive benefit to our project
- The upgrade should improve the health of the Agawam River and Onset Bay ecosystem.

Nitrogen and Phosphorus Removal

- We visited the Water Pollution Control Facility
- We saw water, after it had been processed through the plant, trickling into the Agawam River.
- The new Nitrogen and Phosphorus removal system will remove excess nitrogen and phosphorus from going into the river.
- This will also be healthy for the bays neighboring the Agawam River.
- Too much Nitrogen and Phosphorus will create algae blooms, and suffocate the ecosystem.

Why The Water Cycle Is Important

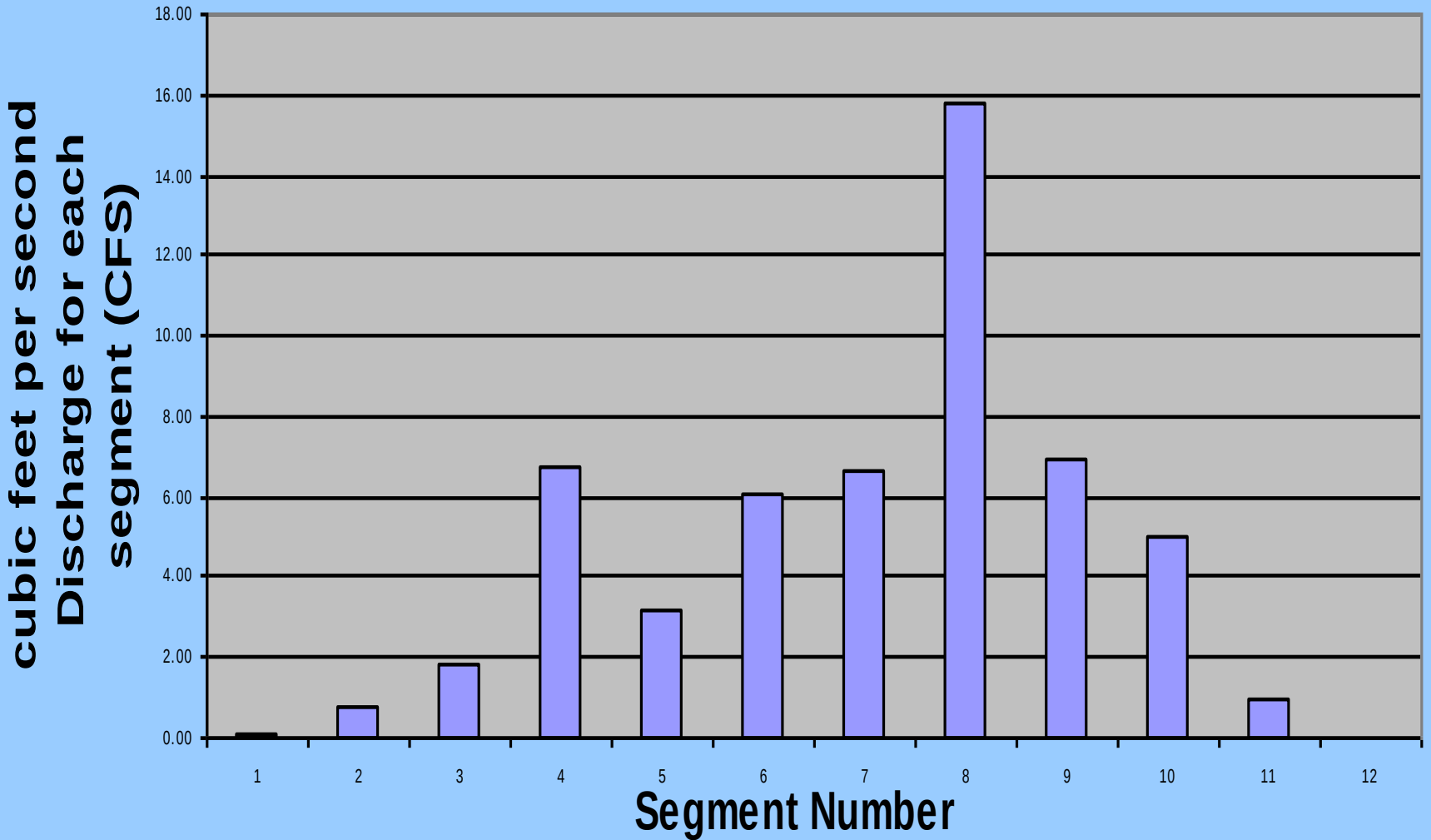
Rain water fills up Long Pond and the overflow goes into the Agawam River. This water flows bringing Salt from the rocks into Buzzards Bay. Evaporation creates condensation which eventually will turn into precipitation adding water back into Long Pond. The surface run off affects the water quality and affects the health of Eel grass.

Measuring River Flow

Salt Water VS Fresh Water Erosion

- We have discovered in transplanting eelgrass that eelgrass prevents salt water erosion in the sea floor. Without the tight roots of zostera marina, then salt water erosion will happen.
- As demonstrated in the next slide our river flow on March 29th, 2007 was relatively rapid. This will cause fresh water erosion which can result in a land slide which can result in a chemical breakdown of the soil. These chemicals can now more freely flow into the salt water bay.
- The river banks had a slower flow that day.

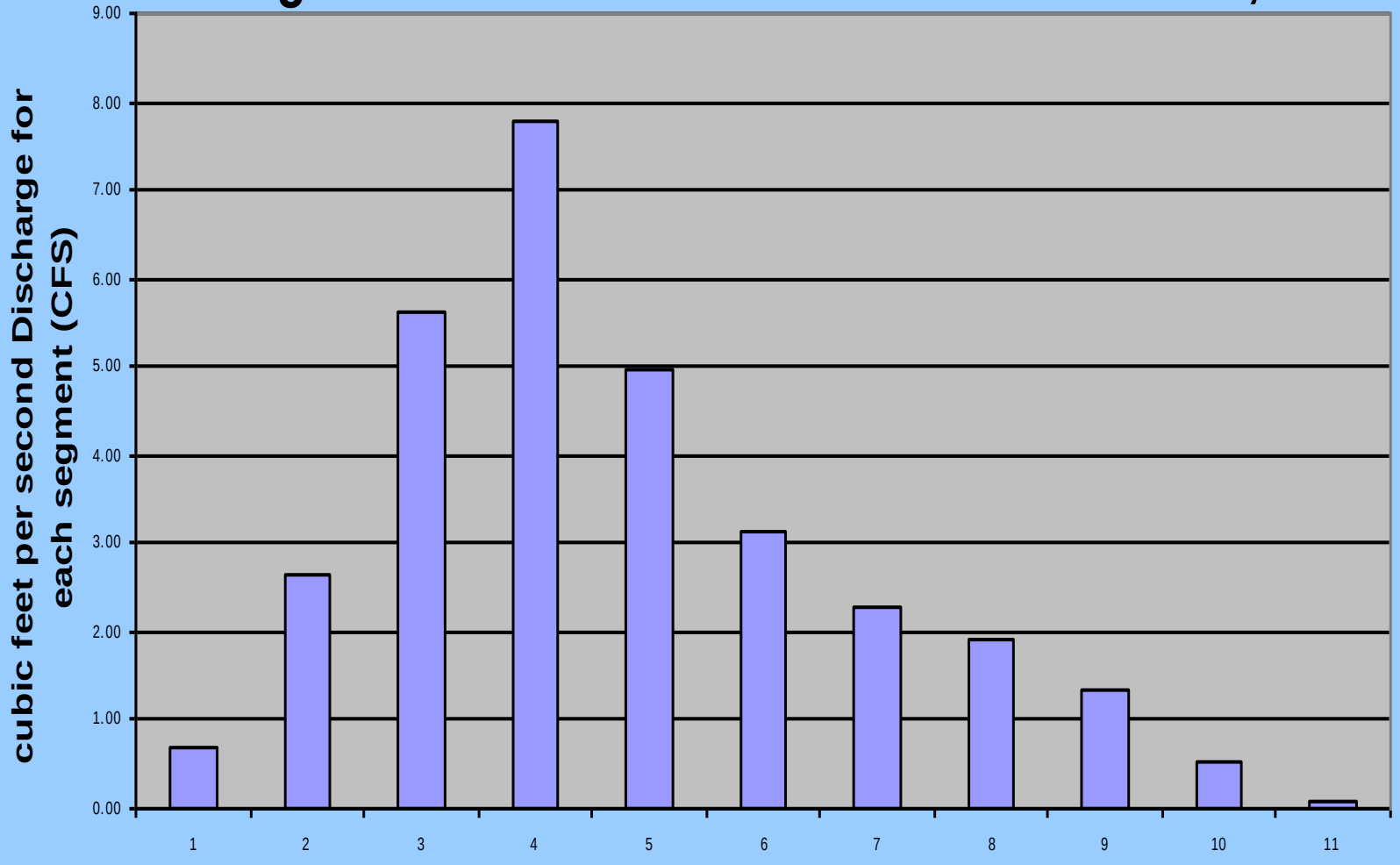
Average Flow Data Agawam Herring Run March 29, 2007



The River was divided into twelve

1 ft. Segments.

Average Flow Data Off Glen Charlie March 29,2007



The River was divided into eleven 1 ft. segments

Water Quality Data

	AHR	OGC
DO	11.90 mg/L	11.74 mg/L
Water Temp.	9.18°c	9.5°c
pH	6.18	6.57
Turbidity	<120	<120

Collecting Macroinvertebrates

Macroinvertebrates

Agawam Herring Run

Spring 2007

Unable to get bugs; current was too fast.

Off Glen Charlie

Spring 2007

12 caddisflies
7 caddisfly casings
6 riffle beetles
32 scuds
10 clams
2 crustaceans
11 worms
2 leeches

Results

- The pH of the river at both sites on March 29, 2007 was within normal acidity parameters. The pH in Onset Bay is within normal seawater parameters.
- The DO in Onset Bay when we transplant eelgrass is higher than normal sometimes, because the seawater is often turbulent with human activity near our site, and seawater is cooler than fresh water. Saltwater has a lower freezing point than fresh water.
- The DO at the river sites this year was higher than some other years, perhaps due to the rainfall we had that week, and due to the fast flow, and the water was cold.
- River macroinvertebrates exhibited a concern that we did find some worms and leeches at OGC site.
- We have seen new young zostera marina plants.

Discussion

- We think the river flow definitely does affect the waters of Buzzards Bay into smaller bays, such as Onset Bay, where we transplant our eelgrass. As we can see on maps, the Earth's places are all connected by water. The Storm Remediation Plan in Onset has storm drains collecting the first inch of rainfall runoff in combination with the Water Pollution Control Facility's upgrade should help to stabilize nutrient levels in the bay. Therefore, because of tidal influence, the Agawam River will benefit from the Bay, and the Bay will benefit from the river's flow. Remember, it's the river that contributes the salt to our seas. Eelgrass, zostera marina, will hopefully return! Some scientists believe eelgrass flourishes in years of cycles, others believe eelgrass growth is based on water and sediment conditions only.

Thank You

- Dr. Curry
- Kim McCoy
- Our Principal, Mrs. Lafleur for supporting this project
- Mrs. Gilmore
- Mike - Wareham Harbormaster
- Mr. Dave Simmons of WWPCF
- Wareham Public Library
- Our Parents

Agawam River and Onset Bay
"One Water – In the Circle of Life we are all connected by water "

Quote by St. Margaret Regional 2007 River Project Participants