



# **Meadowlands Stewardship High Tech High School**

**Coordinating Advisor:  
Ms. Shelly Witham**

**Lead Team Members:  
Natalie Rivera (U.Penn)  
Willow Latham (Harvard University)  
Valentina Paiva  
Sophia Ramos  
Anna Hsieh**

# Project Description

- Much of the lower Hackensack River watershed is a tidal marsh known as the Hackensack Meadowlands, home to over 700 plant and animal species, several of which are rare and endangered.
- Water quality in this ecosystem is primarily affected by non-point sources including extensive urban development, construction activity, roads, and landfill leachate.
- The introduction of pollutants resulting from these activities into this fragile ecosystem is interfering with the valuable functions of wetlands.
- The Meadowlands are a key ecological system for both the natural and human communities in the area.



# Project Description

- Our goals are to safeguard the quality of the Hackensack Meadowlands Wetlands through monitoring of the water quality within the wetlands accessed at various sites along the Hackensack River.
- Information gathered by this monitoring can be compared to previous and future measurements to gauge the relative health of the wetlands, and alert the public if the meadowlands are being further degraded.
- Through the education of the public about environmental stewardship, we will add to the information already provided by the Riverkeepers to create awareness which can ultimately lead to water quality improvements.



# Project Description

- In order to obtain our goals we trained 55 high school students in the Environmental Club and Earth Science classes to monitor water quality.
- The 2008 tests included: Dissolved oxygen, Ammonia, Nitrate, Phosphate, Salinity, Turbidity, Air temperature, Water temperature, and pH provided by LaMotte.
- The 2009 tests included: Arsenic, Chromate, Carbon dioxide, Copper, Chlorine, Hardness, Cyanide, and Iron
- We monitored the water quality in the Hackensack Meadowlands.

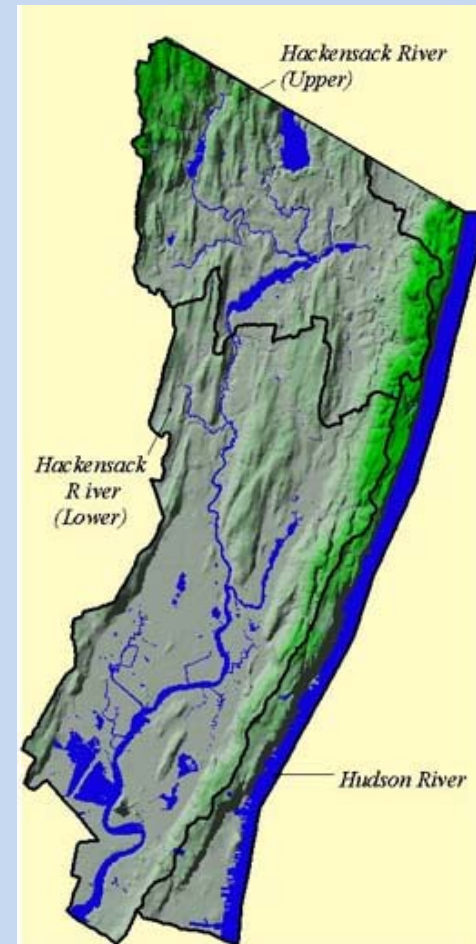
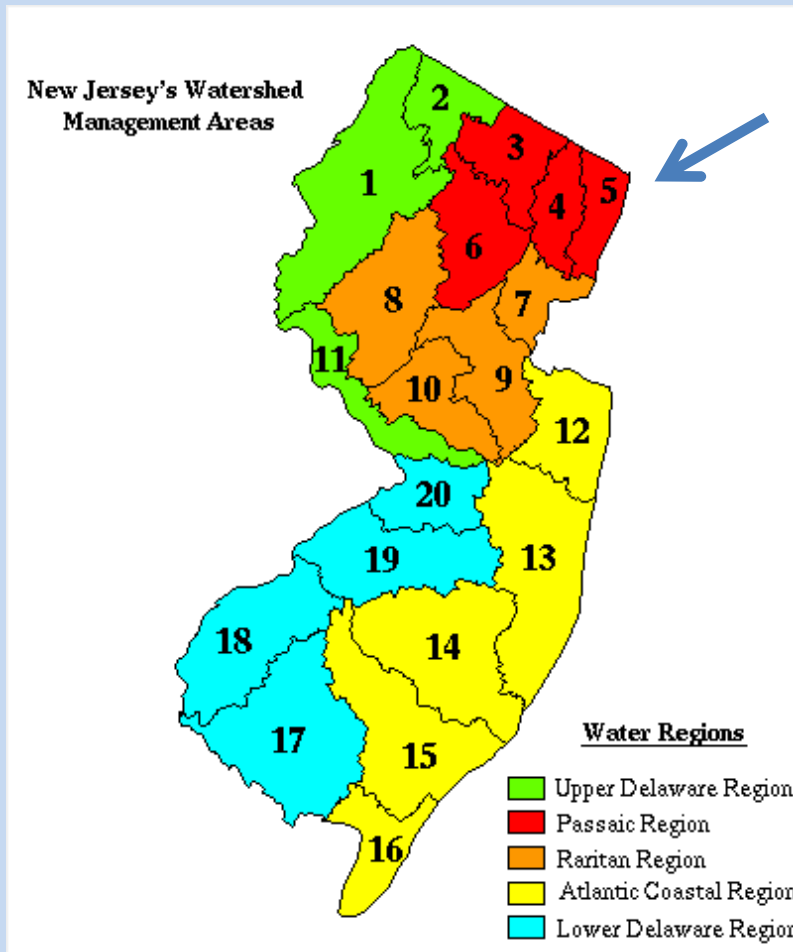


# Project Description

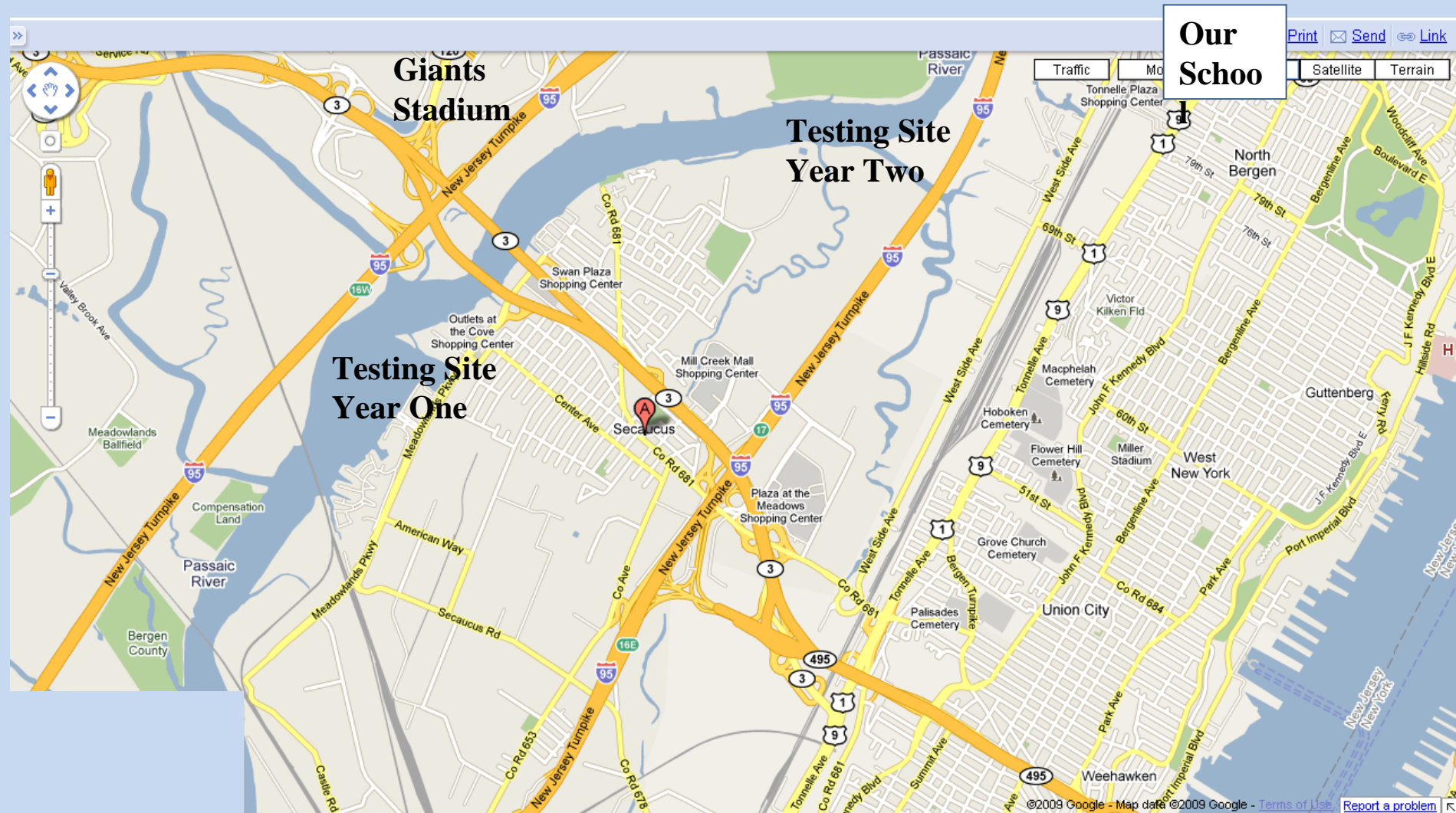
- The total time spent on the project was approximately 20 hours.
- The water monitoring took place for two 40 minute school periods over 6 days in Year One and over 7 days in Year Two
- In addition, completion of the grant and compiling the manual took a 6 hour school day.



# Watershed Management Area 5



The goal of this project was to improve the quality of the Hackensack Meadowlands Wetlands through monitoring of the water quality within the wetland accessed at various sites along the Hackensack River. Potential, safe access points were found at: [http://www.hackensackriverkeeper.org/public\\_access.html](http://www.hackensackriverkeeper.org/public_access.html).



The goal of this project was to improve the quality of the Hackensack Meadowlands Wetlands through monitoring of the water quality within the wetland accessed at various sites along the Hackensack River.

Potential, safe access points were found at:

[http://www.hackensackriverkeeper.org/public\\_access.html](http://www.hackensackriverkeeper.org/public_access.html).



**Testing Site : the intersection of the Mill Creek and the Hackensack River in Secaucus.**



The goal of this project was to improve the quality of the Hackensack Meadowlands Wetlands through monitoring of the water quality within the wetland accessed at various sites along the Hackensack River.

Potential, safe access points were found at:

[http://www.hackensackriverkeeper.org/public\\_access.html](http://www.hackensackriverkeeper.org/public_access.html).



**Testing Site : the intersection of the Mill Creek and the Hackensack River in Secaucus.**

The goal of this project was to improve the quality of the Hackensack Meadowlands Wetlands through monitoring of the water quality within the wetland accessed at various sites along the Hackensack River. Potential, safe access points were found at: [http://www.hackensackriverkeeper.org/public\\_access.html](http://www.hackensackriverkeeper.org/public_access.html).

## Nesting Area



**Testing Site : the intersection of the Mill Creek and the Hackensack River in Secaucus.**

- Additionally, we developed and printed water monitoring training manuals designed to train future students; as we anticipate the continued monitoring of the Hackensack River.

- As we trained, we analyzed the instructions the kits came with and tried to improve the instructions by clarifying certain parts.

- Testing in Year Two was done both in the field and in the classroom.

# Training Manual



- Additionally, we developed and printed water monitoring training manuals designed to train future students; as we anticipate the continued monitoring of the Hackensack River.

- As we trained, we analyzed the instructions the kits came with and tried to improve the instructions by clarifying certain parts.

- Testing in Year Two was done both in the field and in the classroom.

# Training Manual



# Results

- Our manual will make it even easier for students to grab a bucket and test some water with simple and easy to follow instructions and also giving them what are the normal ranges for a healthy river, so they can see for themselves what conditions are like.



# Results

- We feel accomplished in what we set out to do since 55 students are now well versed in water monitoring techniques and have a new interest in helping to keep the river clean and safe



# Results

- From the students' perspectives most of them did not know what they had in their backyards. They stood amazed as they pointed at their house on the Palisades as the Empire State building loomed in the distance.



# Results

- They experienced an awakening to what our backyard faces today and possibly the knowledge and awareness to change it tomorrow.





# Year One Data

Date	5/19/2008	5/20/2008	6/2/2008	6/3/2008	6/9/2008	6/10/2008
<b>Weather</b>	partly cloudy, very windy	cool, very light rain	sunny, warm, clear sky	partly cloudy	sunny and hot	sunny, hot, humid
<b>Yesterday's Weather</b>	rainy	cooler	sunny	partly cloudy	sunny, hot with thunderstorms	hot, humid
<b>Tide</b>	High	High	High	High	Low	Low
<b>Location</b>	Meadowlands Hospital	Mill Creek	Meadowlands Hospital	Mill Creek	Mill Creek	Mill Creek
<b>Air Temp (Celsius)</b>	12	16.5	20	28	31	36
<b>Water Temp (Celsius)</b>	14	15	19.5	21	26	28
<b>pH</b>	7.85	7.5	7.5	7.5	7.5	7.6
<b>Dissolved oxygen (ppm)</b>	12.5	8.6	5.5	3.4	6.8	7.2
<b>Salinity (ppm)</b>	10	12	13.5	10	10.8	10.6
<b>Nitrate (ppm)</b>	< 1.32	0.4	0.1	0.2	1.4	1.35
<b>Phosphates (ppm)</b>	< 0.2	< 0.2	< 0.2	0.25	0.8	0.3
<b>Turbidity (cm)</b>	n/a	n/a	0.39	0.33	n/a	0.13
<b>Ammonia (ppm)</b>	n/a	1.5	1.25	1.5	1.5	0.4

# Year Two Data

Date	4/20/2009	4/21/2009	5/4/2009	5/5/2009	5/11/2009	5/12/2009	5/26/2009
Weather	cloudy, slight rain, cool	overcast	rainy	raining	sunny, clear	partly cloudy, dry	partly cloudy, very windy
Yesterday's Weather	cloudy, warm	overcast, storms	rainy	raining	sunny, clear	partly cloudy, dry	partly cloudy, very windy
Tide	High	High	High	High	High	High	High
Location	Mill Creek	Mill Creek	Mill Creek	Mill Creek	Mill Creek	Mill Creek	Mill Creek
Air Temp (Celsius)	8.5	12	n/a	13	17	15	22
Water Temp (Celsius)	10	11	n/a	16	15	16	20
pH	7.3	7.5	7.1	7.25	6.7	7.35	7.25
Dissolved oxygen (ppm)	8.8-9.2	7	2.5	4	4.8	n/a	4.6
Salinity (ppm)	24.8	25	15.5	9.25	8	27.5	6
Nitrate (ppm)	2.64	1.32	0.6	0.4	0.3	1.76	0.88
Phosphates (ppm)	0.6	n/a	0.4	0.2	0.2	0.4	0.4
Turbidity (cm)	26.65	28.2	34.6	31.3	n/a	18.9	14.55
Ammonia (ppm)	2	2	> 2	2	> 2	2	1.45



# Meadowlands Stewardship High Tech High School

This Water Monitoring Project  
and  
our Training Sessions & Water Testing  
Manual was made possible by the  
generosity of a grant provided by the  
NJDEP Division of Watershed Management  
and New Jersey Project WET Watershed  
Stewards Program.

Special thanks to Nick Vos-Wein, Kevin  
Kopp and Ray Nichols for their support.