CAC Meeting
April 13, 2017

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Building 438-Science Education Center
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http://www.bnl.gov/education

Excellence in Community Service

Our approach includes :

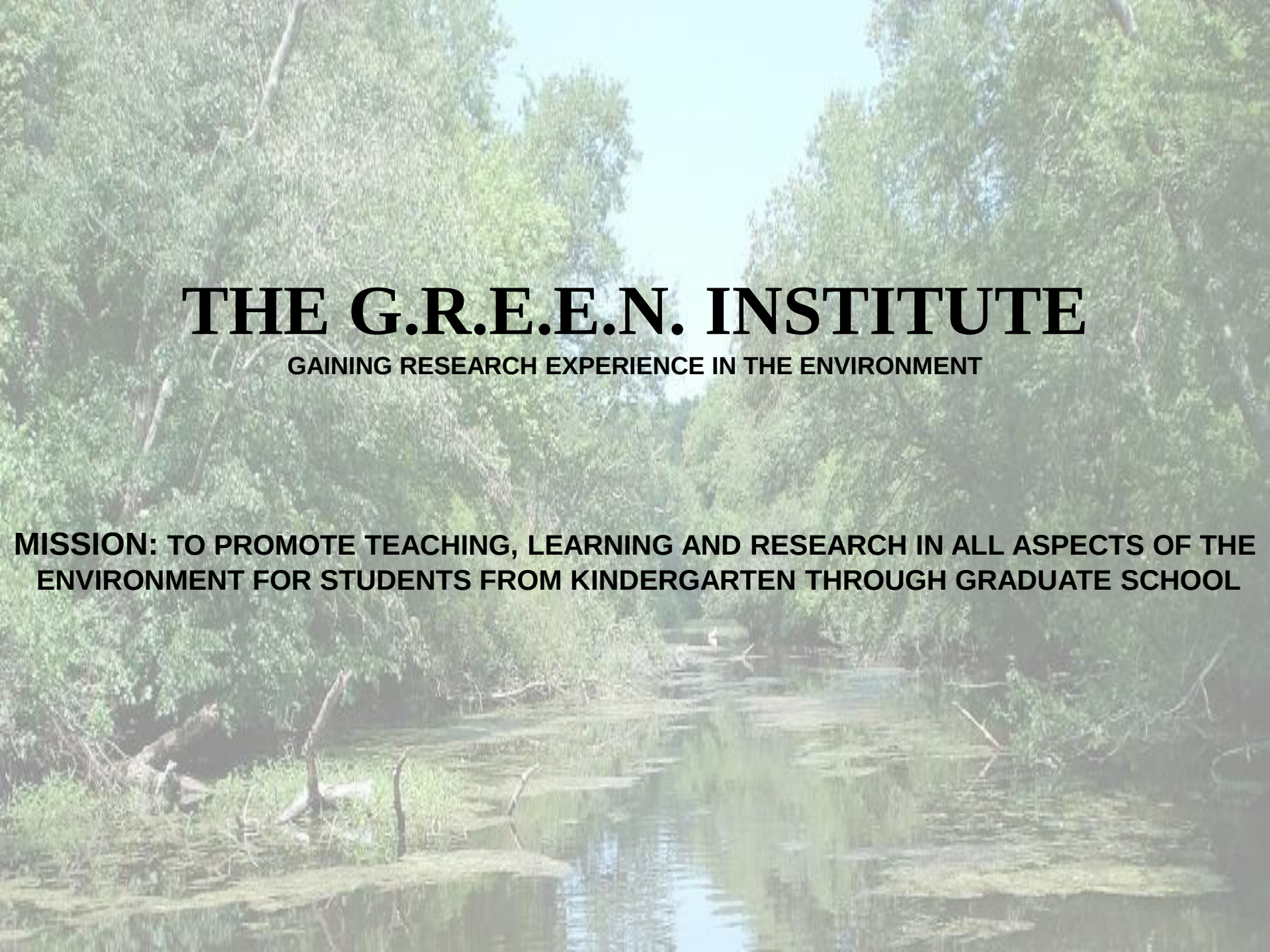
Expanding opportunities for key stakeholders—including the **community**, elected officials, media, staff, and others—to engage with the Laboratory's science mission; designing communications and **engagement strategies** around our critical outcomes;

(STEM)-based educational programs for students and teachers;

Building new regional partnerships and cultivating existing ones to advance the Lab's strategy and plan for growth. We will also **identify issues of interest for community members,** solicit input, and resolve concerns.

Our specific initiatives for excellence in community service include **fostering relationships to advance Discovery Park,** which will have an impact on the region and New York State.

STEM educational programs that introduce middle-and high-school students to our science—and can ultimately increase scientific literacy and inspire the next generation of scientists and engineers.

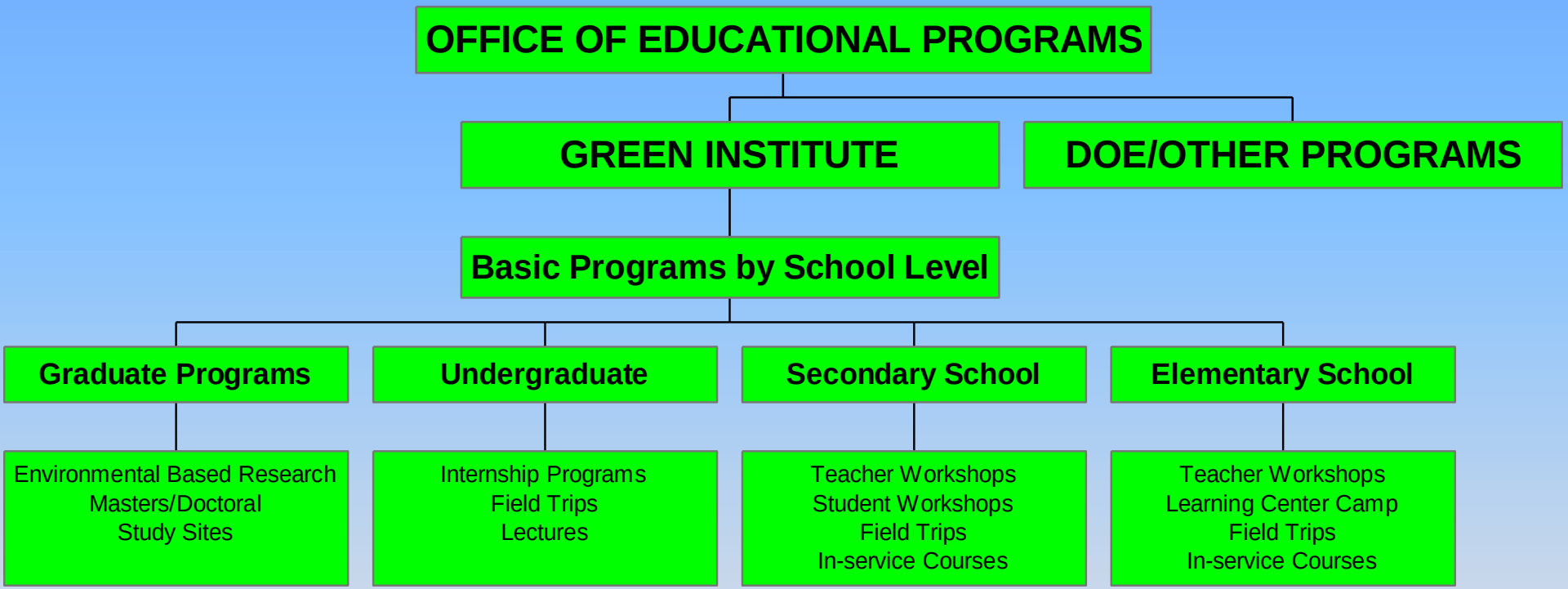


THE G.R.E.E.N. INSTITUTE

GAINING RESEARCH EXPERIENCE IN THE ENVIRONMENT

MISSION: TO PROMOTE TEACHING, LEARNING AND RESEARCH IN ALL ASPECTS OF THE ENVIRONMENT FOR STUDENTS FROM KINDERGARTEN THROUGH GRADUATE SCHOOL

Office of Educational Programs



Open Space Stewardship

A School, Community, and Government Partnership

The Open Space Stewardship Program (OSSP) fosters partnerships between schools and land stewards in local communities. Students directly interact with nature as they collect data on properties within their school district.

Students can:

- Connect with the natural environment
- Conduct authentic research
- Become stewards of property within their community
- Develop an environmental awareness
- Present their work at BNL

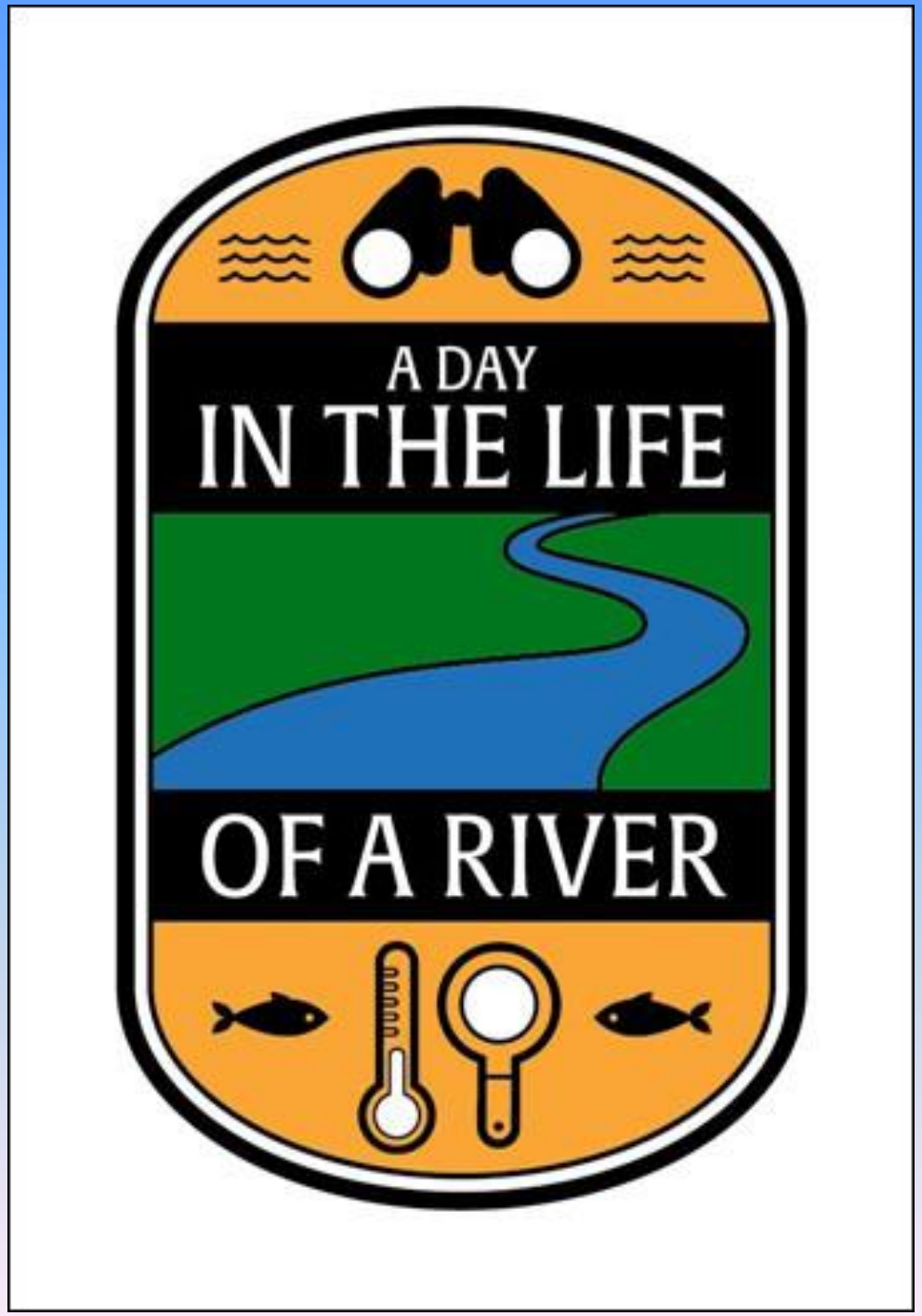
Students in grades K through 12 are involved in authentic environmental research on properties in their own communities, fostering a sense of ownership and responsibility for open space within their neighborhoods. Each June students and teachers who participated in OSSP are invited to BNL for an OSSP evening celebration at which students display and present their work to teachers, parents, scientists and others in the environmental community.

Teacher Benefits

- Enhance the relevance of their curriculum with activities and concepts supportive of many state and national teaching standards
- Provide curriculum relevance through the collection of data and participation in a meaningful scientific endeavor
- Enhance teacher skills through workshops, peer interaction and by working with experts in the field

Student Benefits

- Venue for students to conduct and present independent scientific research
- Learn scientific protocols, analytical techniques and data collection and analysis skills
- Develop a sense of civic responsibility, as they become an integral part of stewardship of lands within their own communities


A DAY
IN THE LIFE
OF A RIVER

Benefits of Environmental Education

Studying EE Creates Enthusiastic Students, Innovative Teacher-Leaders

EE Instructional Strategies Help Foster Leadership Qualities

EE Makes Other School Subjects Rich and Relevant

EE Schools Demonstrate Better Academic Performance across the Curriculum

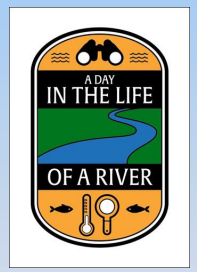
EE Is a Perfect Match for Community Service Learning Requirements

EE Offers All Students Equal Chances for Academic Success

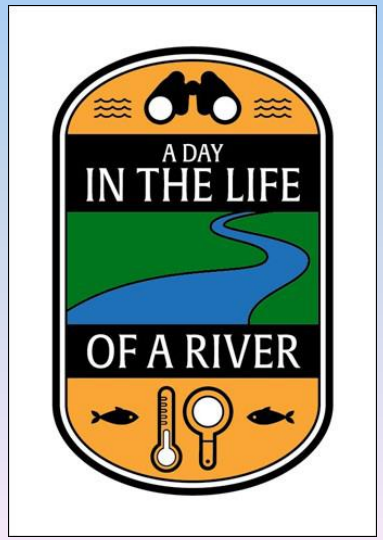
EE Teaches Students to be Real World Problem Solvers

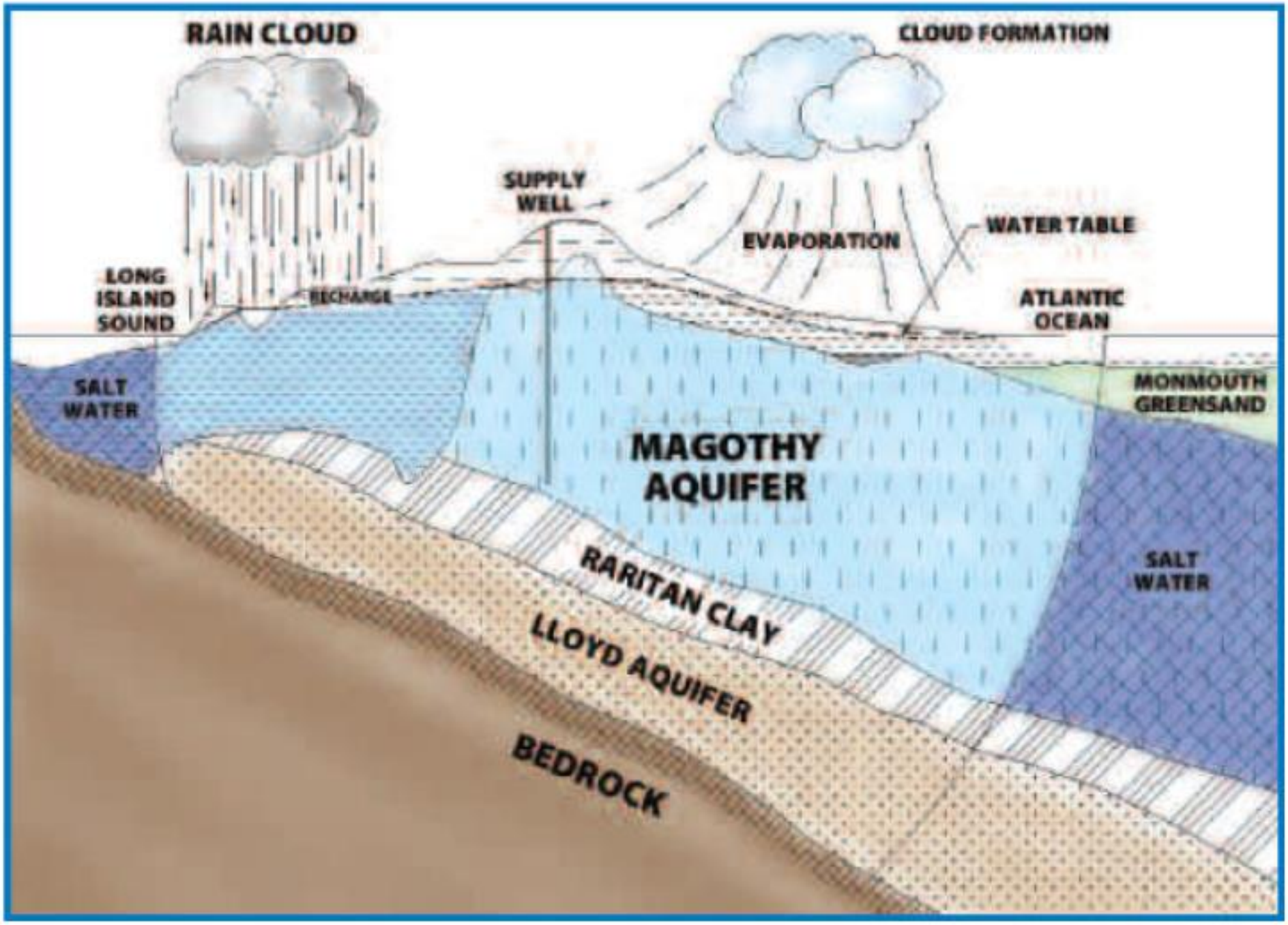
EE Helps Students to Become Self Directed Learners

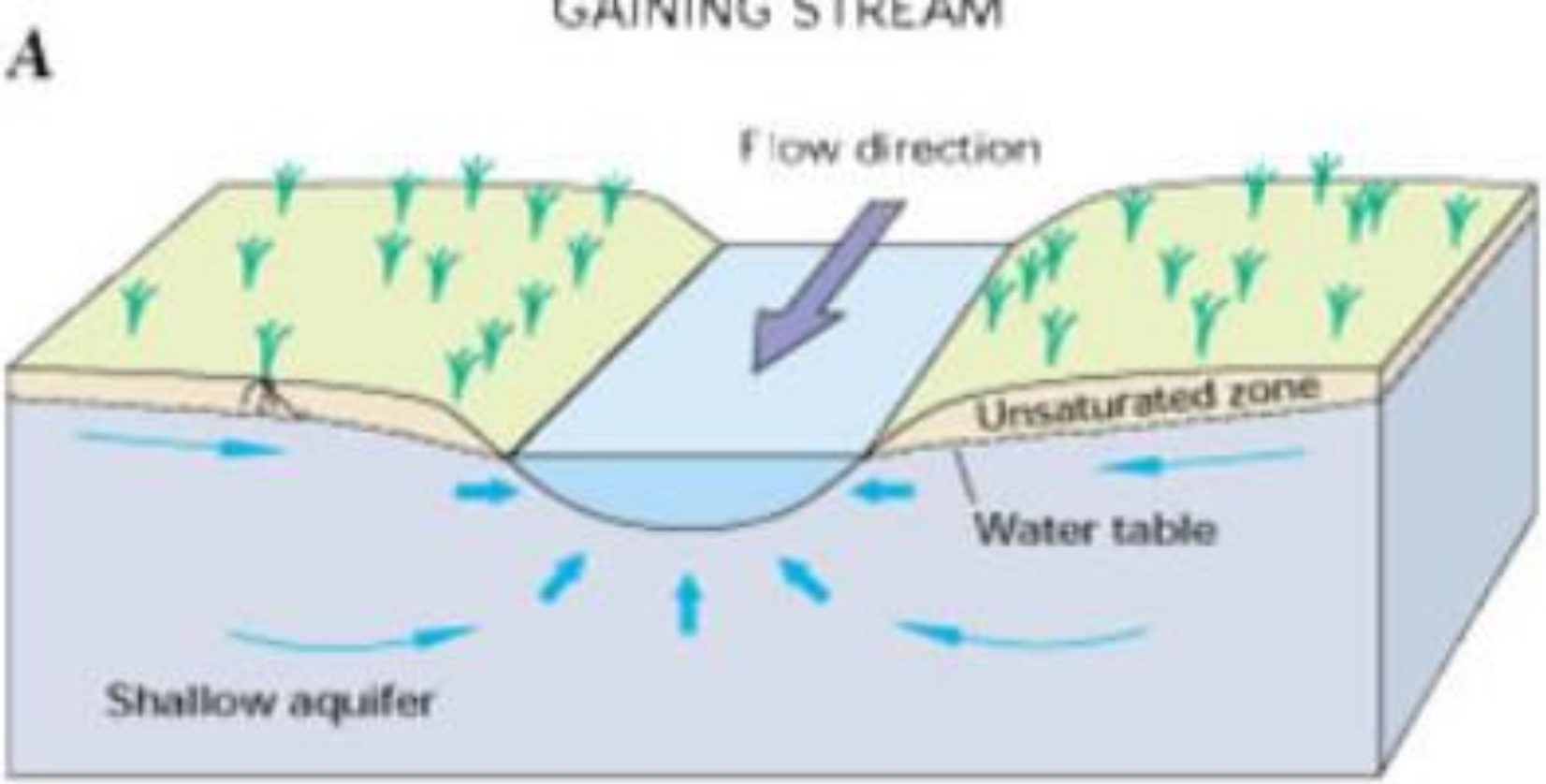
EE Gets Apathetic Students Excited About Learning



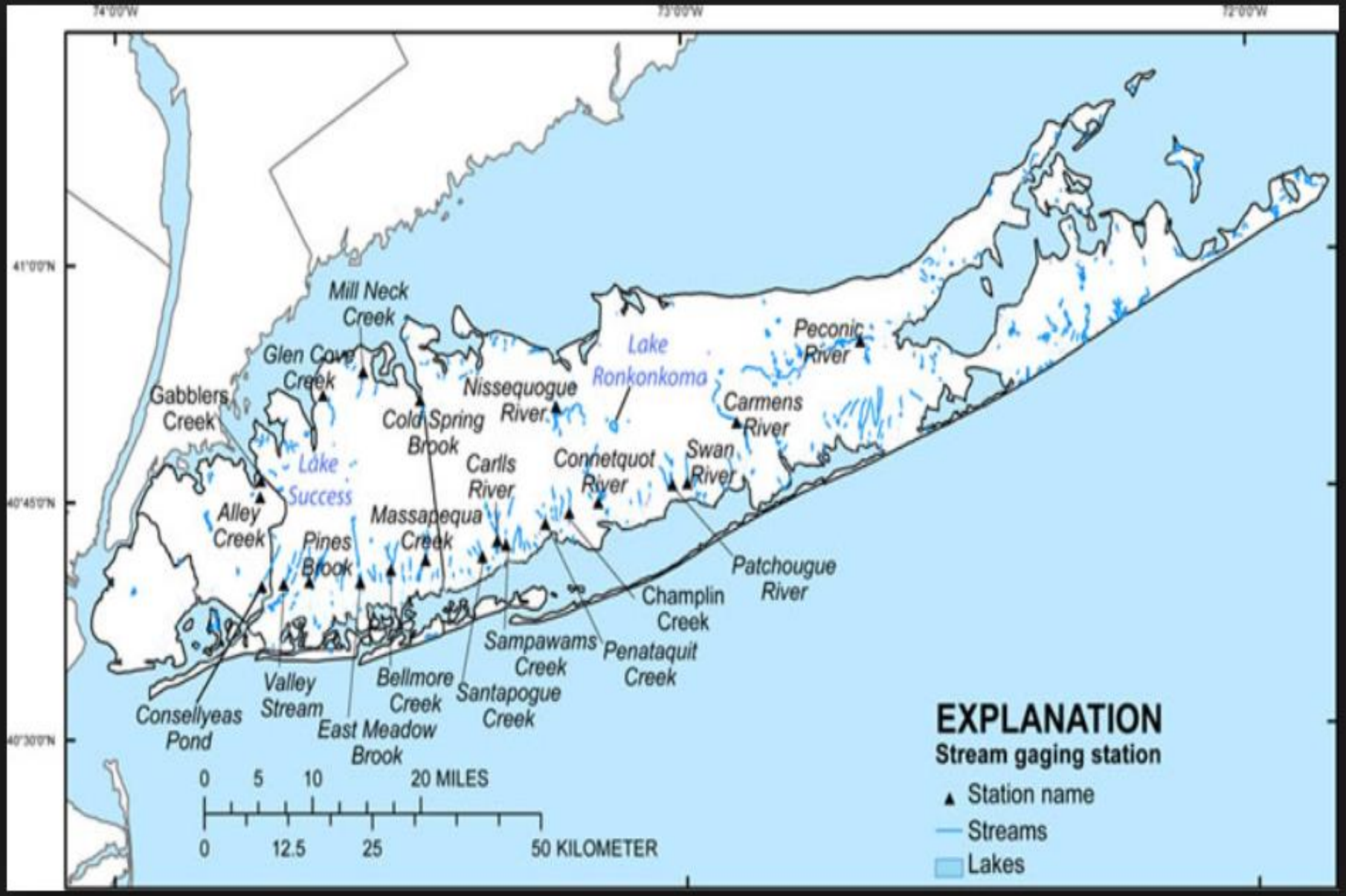
WHY LONG ISLAND RIVERS ?




RAIN CLOUD
CLOUD FORMATION
SUPPLY WELL
EVAPORATION
WATER TABLE
LONG ISLAND SOUND
RECHARGE
ATLANTIC OCEAN
SALT WATER
MONMOUTH GREENSAND
MAGOTHY AQUIFER
RARITAN CLAY
LLOYD AQUIFER
SALT WATER
BEDROCK



On Long Island streams gain water from inflow of groundwater through the streambed.
Long Island streams are surface expressions of the ground water.

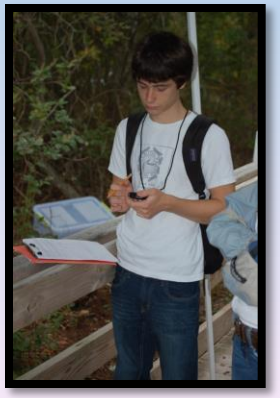

74°00'W
73°00'W
72°00'W
41°00'N
40°45'0"N
40°30'0"N
Mill Neck Creek
Glen Cove Creek
Gabblers Creek
Cold Spring Brook
Nissequogue River
Lake Ronkonkoma
Peconic River
Carmens River
Swan River
Connetquot River
Carlls River
Lake Success
Alley Creek
Pines Brook
Massapequa Creek
Patchogue River
Champlin Creek
Penataquit Creek
Sampawams Creek
Santapogue Creek
Bellmore Creek
Valley Stream
East Meadow Brook
Consellyeas Pond
0 5 10 20 MILES
0 12.5 25 50 KILOMETER
EXPLANATION
Stream gaging station
Station name
Streams
Lakes

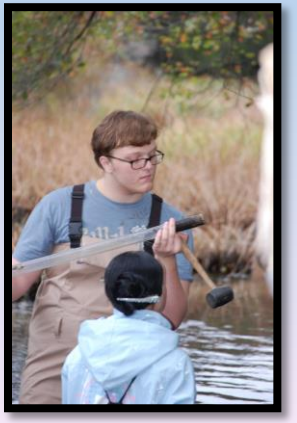
A Day in the Life ….
Three Goals:

1. **Citizen Science-** Results for all locations and groups need to be posted on our A Day in the Life Website

2. **Create Environmental *Stewards*-** *'In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we have been taught.'* *– Baba Dioum, Senegalese poet and environmentalist*

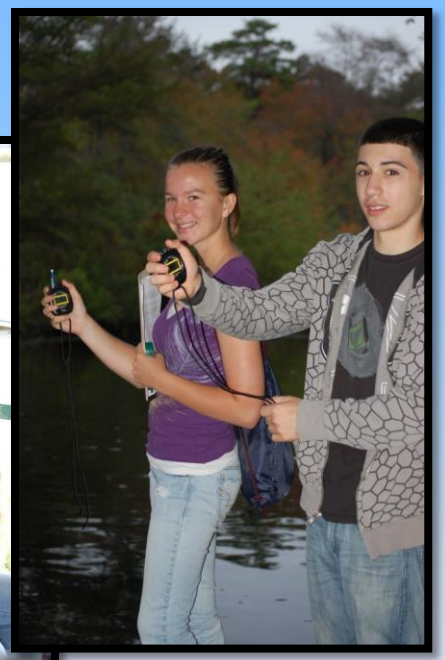
3. **Using the Environment Integrated Context for Learning-** At each location, teams of students and environmental educators used seine nets and lab equipment to investigate aquatic life, biodiversity, water chemistry and quality, tides and weather. Many groups also collect core samples of river bottom mud for analysis



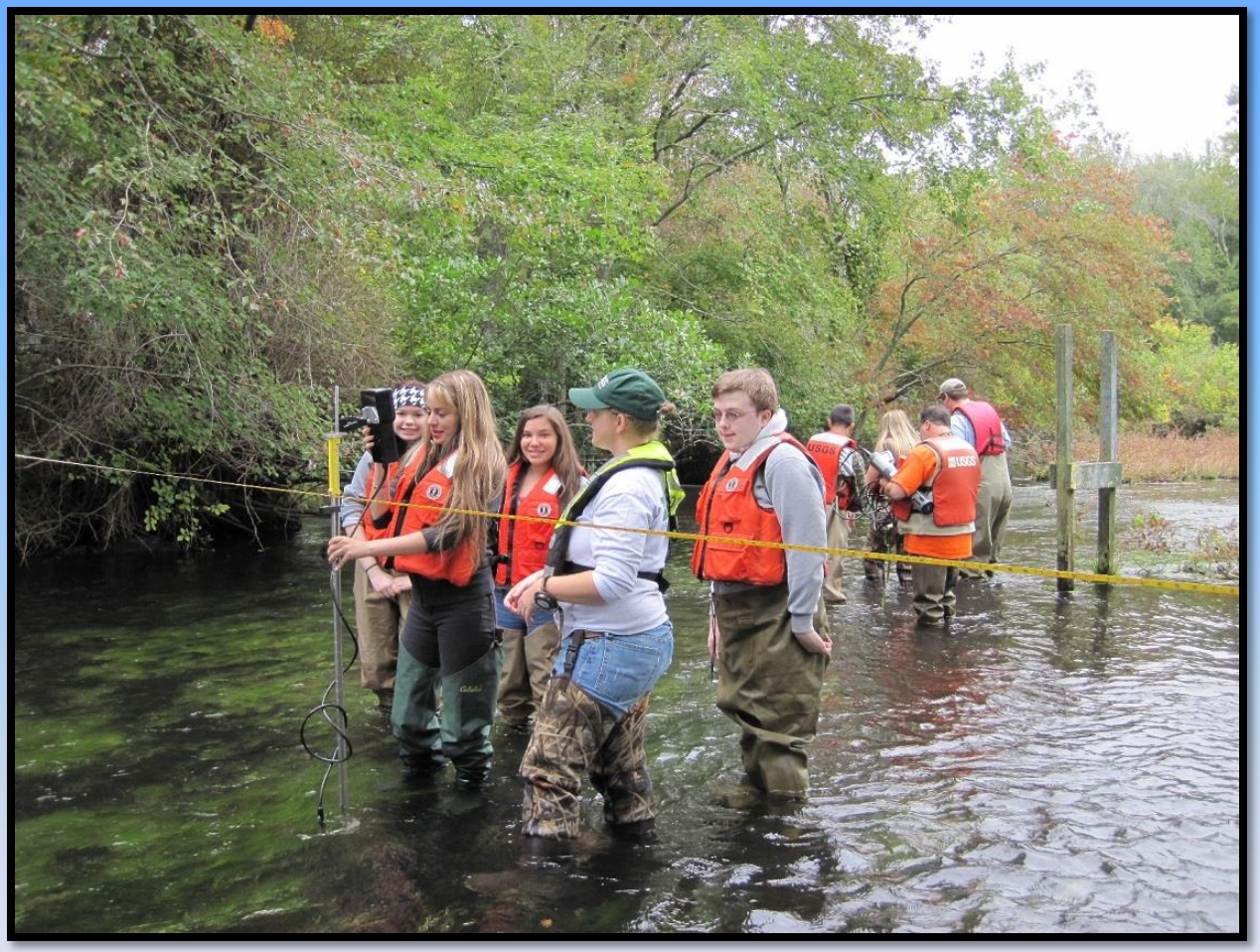


A Day in the Life of the River

- Encourage Multi- Disciplinary study:
- Multi-media- photography & video
- Art
- ELA
- Social Studies
- Science
- Math
- Technology



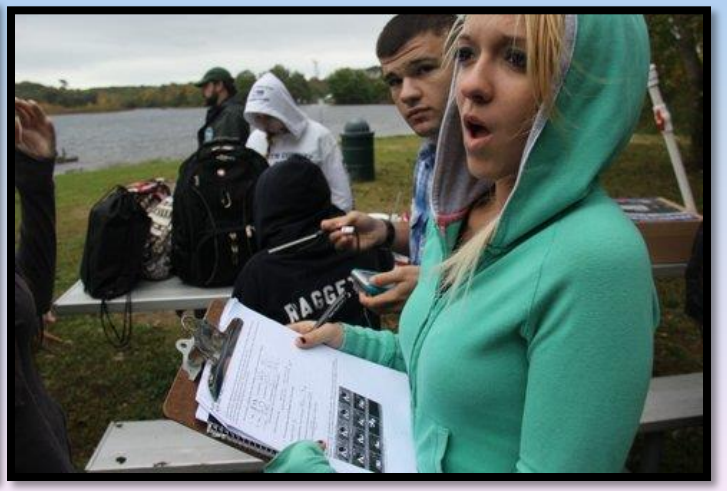
A Day in the Life of a River



http://www.portaltodiscovery.org/aday/

A Day in the Life….

- Students collect scientific information to create snapshots of the river at locations along the river, they will share their data using our website, so they can better understand how their piece of the river fits into the river ecosystem.
- A primary goal is to connect Long Islander's to nature. To help prepare students to become stewards of the river's water quality and natural resources.
- The data can be used in the classroom for place based learning. A program in the beginning of the year allows that to happen.



On a single day, environmental education partners and students all along the river will simultaneously collect scientific information, analyze it and share it to portray the status of the river and estuary ecosystem.

Students will use hands-on field techniques to describe their sites, catch fish in nets, collect water and invertebrate samples, develop a biodiversity inventory of the riparian zone and analyze water chemistry

Students will examine the physical and chemical aspects of the river, such as where freshwater and salty seawater meet, the amount of sediments in the water and turbidity and oxygen levels, as well as conduct biodiversity inventories of the flora and fauna in and around the ecosystems

•All data collected on these Day's will be posted on this website

http://www.portaltodiscovery.org/aday/

What will be provided to teachers:

- Professional support
- Teacher trainings
- Photo Release forms
- Natural History expert at their site
- Assistance with coordination
- Assistance with acquiring permits
- La Motte Water Quality tests
- Data and Biodiversity Inventory sheets
- Web site dedicated to A Day in the Life of the River
- Core samplers, nets, binoculars
- GPS Units, refractometers, anemometer, etc.

School/Teacher Responsibilities:

- Bussing
- Bathroom access
- Safety
- Photo Release forms signed
- Mosquito and Tick precautions
- Overall organization of classes

Revised and Updated Teacher ‘s Manual!

A Day in the Life of A River

- Group 1 - PHYSICAL DATA

- Tasks and Measurements to Accomplish:
- Tide Measurement
- Current Direction and Speed
- Cloud Cover and Air Temperature
- Wind Direction and Speed
-
- Group 2 - SITE DESCRIPTION

- Tasks and Measurements to Accomplish:
- Physical Characteristics of the Site
- Map of Site
- Sediment Sample of Shoreline, Site Bottom
-

A Day in the Life of A River

- Group 3 - BIOLOGICAL SAMPLING
- Tasks and Measurements to Accomplish:
- Aquatic Biological Survey
- Biodiversity Inventory Survey
- Habitat Association Survey
-
- Group 4 - CHEMICAL ANALYSIS
- Tasks and Measurements to Accomplish:
- Water Temperature
- Turbidity
- Water pH
- Salinity
- Dissolved Oxygen

A Day in the Life of A River

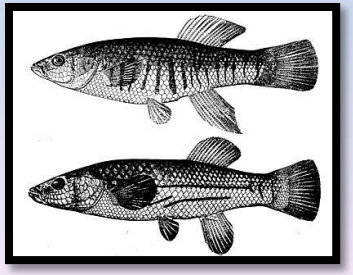
Group 5 - DOCUMENTATION

- Tasks and Measurements to Accomplish:
- Photographs of Site
- Images of all Interesting Animals/Plants to be Identified
- Images of other group members in Action

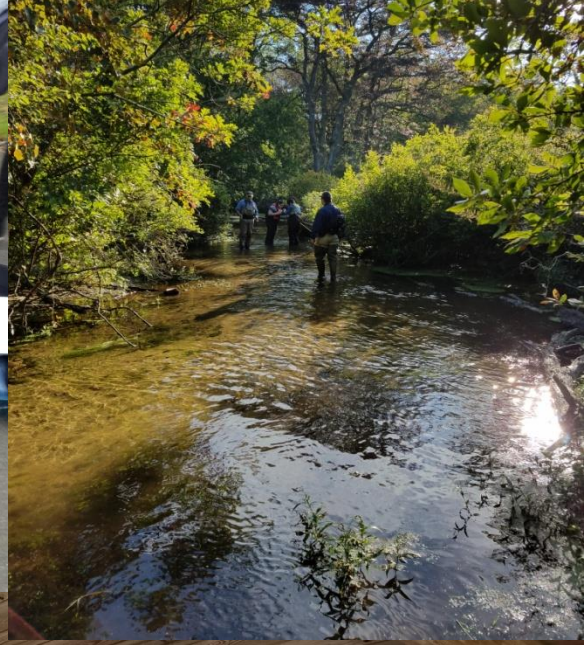
Added:

- **Activities for Grades 3-5**

Fish and Macro-invertebrate Inventory




5
15
12
6
4
7



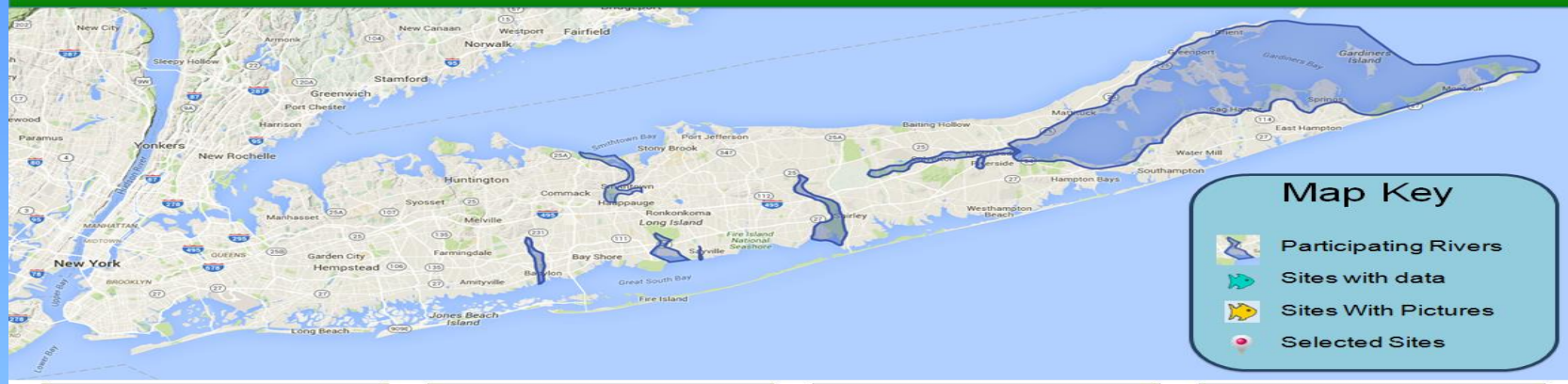
Schools 2016

1. William Floyd High School
2. Nathaniel Woodhull Elementary School
3. Rocky Point Middle School
4. Patchogue-Medford High School
5. Patchogue Middle School
6. Longwood High School
7. Longwood Middle School
8. Bellport High School
9. Mattituck High School
10. Shelter Island Schools
11. Cutchogue East Elementary School
12. Southold Elementary
13. Southold High School
14. Oysterponds Elementary School
15. Westhampton Beach High School
16. Springs Schools
17. Southampton High School
18. Riverhead HS
19. Riverhead MS
20. Riverhead Charter School
21. Eastport/Southmanor High School
22. Easthampton High School
23. Hampton Bays Middle School
24. Brentwood High School
25. Sachem North High School
26. Northport High School
27. Harbor Country Day School
28. The Stony Brook School
29. Smithtown East High School
30. Gelinas Jr. High School
31. Kings Park High School
32. Greenport schools
33. Farmingdale High School
34. Massapequa High School
35. Shoreham Wading River Schools
36. Bayshore High School
37. Avalon Preserve
38. Connetquot High School
39. Babylon High School
40. Islip Middle School
41. Smithtown Christian School

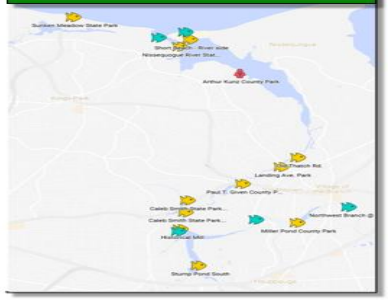
SUCCESS! All About Partnerships & Collaboration

1. Central Pine Barrens Commission
2. Brookhaven National Lab
3. Department of Environmental Conservation
4. Suffolk County Water Authority
5. Cornell Cooperative Extension, Suffolk County
6. Trout Unlimited
7. Wertheim National Wildlife Refuge
8. Sea run Brook trout Coalition
9. Town of Brookhaven
10. USGS
11. Eastern Suffolk BOCES
12. Foundation for Ecological Research in the Northeast (FERN)
13. Girl scouts of Suffolk County- Camp Sobaco
14. The Peconic Estuary Program
15. The Group for the East End
16. The Nature Conservancy
17. The South Fork Natural History Museum
18. East Hampton Town Shellfish Hatchery
19. Long Island Science Center
20. NYS Parks
21. Suffolk County Parks
22. Sweetbriar Nature Center
23. Long Island Sound Study
24. Western Suffolk BOCES

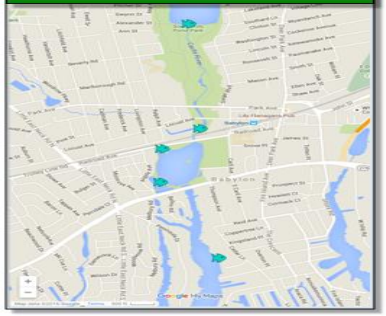
2016 SITE MAPS
A DAY IN THE LIFE PROGRAM



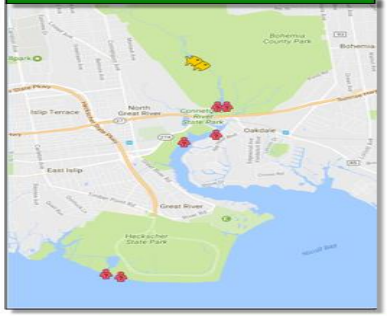
Nissequogue River



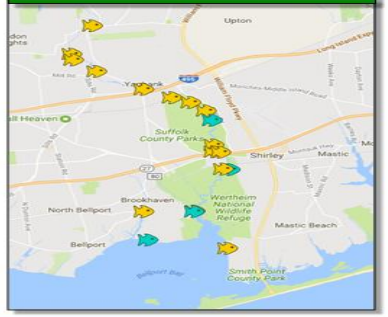
Carll's River



Connetquot River

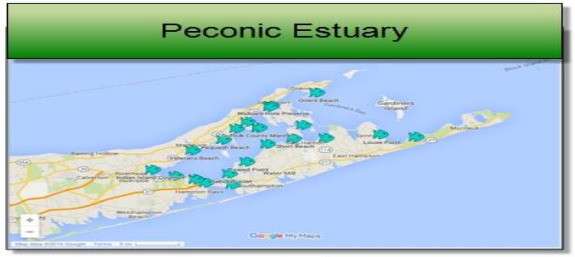


Carmans River



Peconic River

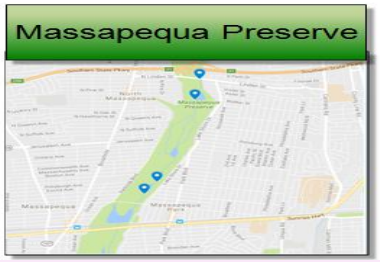
Peconic Estuary



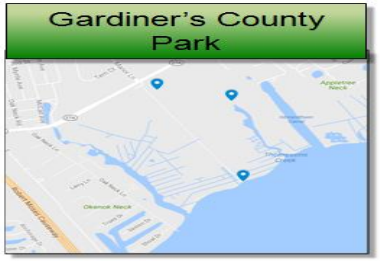
Green's Creek

Mill River

Massapequa Preserve

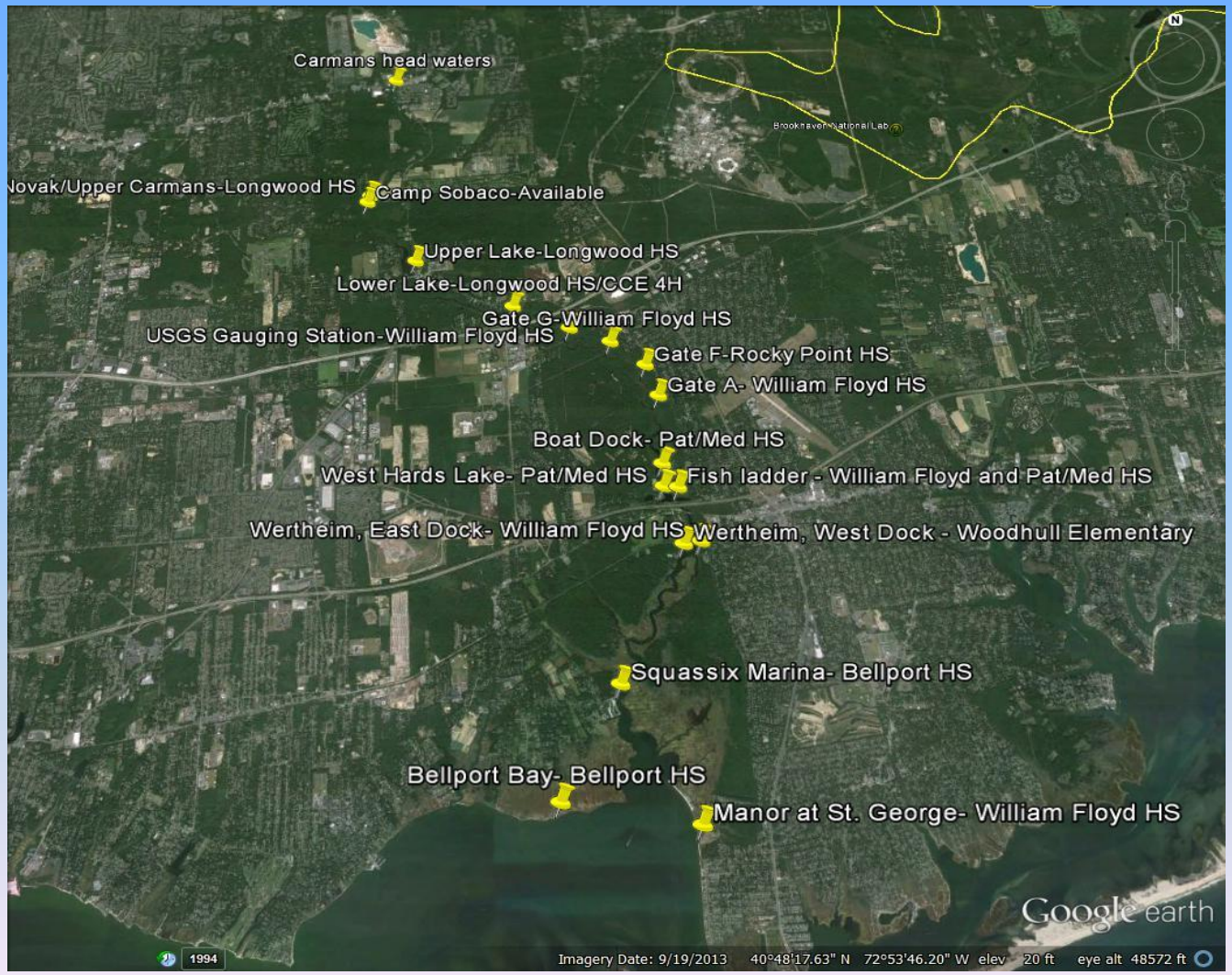


Gardiner's County Park



A Day in the Life of the Carmans River

10 Schools **&** 26 **Experts &** 16 **Locations!**

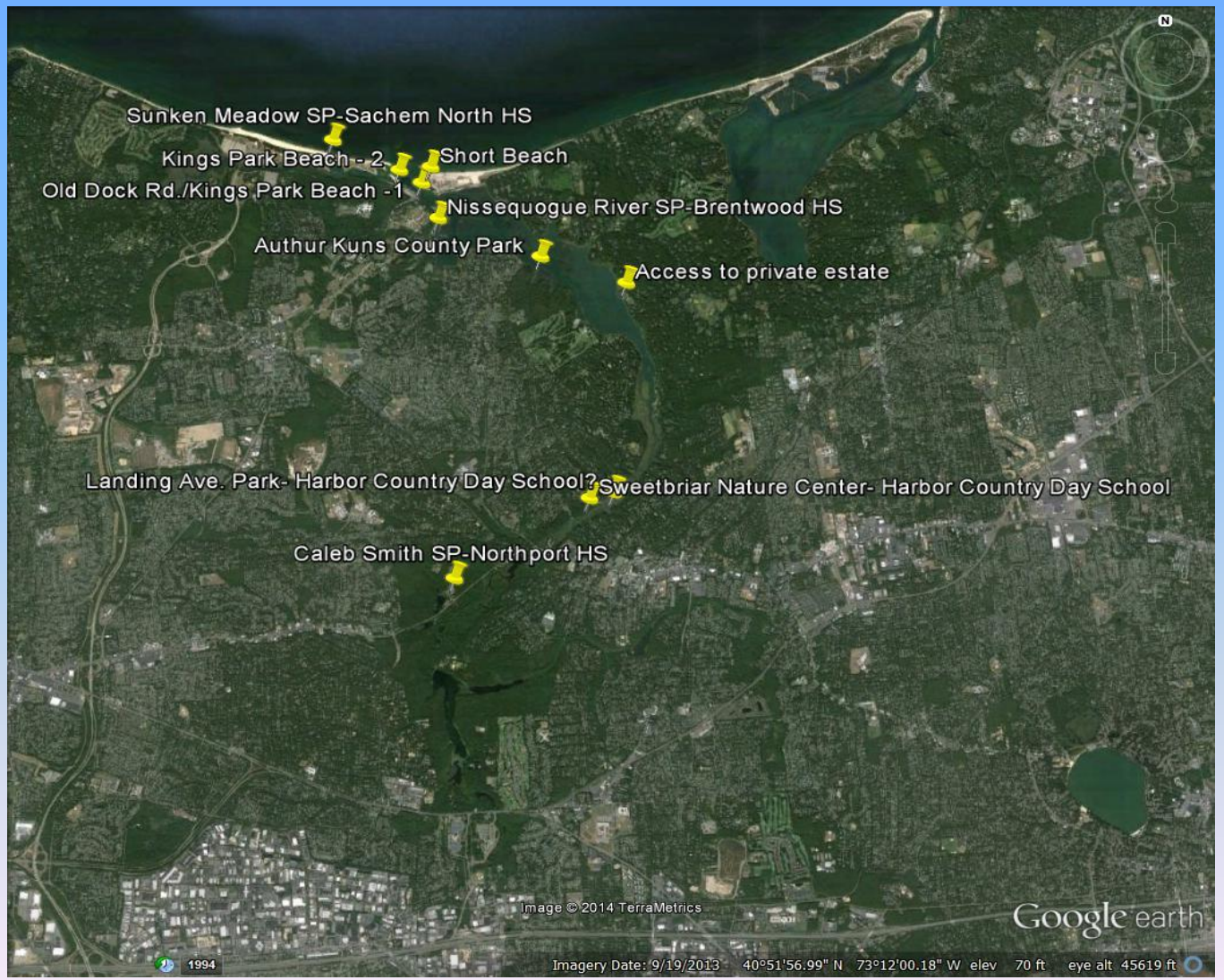


A Day in the Life of the Peconic Estuary

15 Schools **&** 26 **Teachers&** 27 **Experts &** 23 **Locations!**

A Day in the Life of Nissequogue River

10 Schools **&** 18 **Experts &** 13 **Locations & 346 students!**



A Day in the Life of the Peconic Estuary

Peconic Estuary Data:

pH | Salinity | Dissolved Oxygen | Temperature C° | Temperature F° | Participating Schools

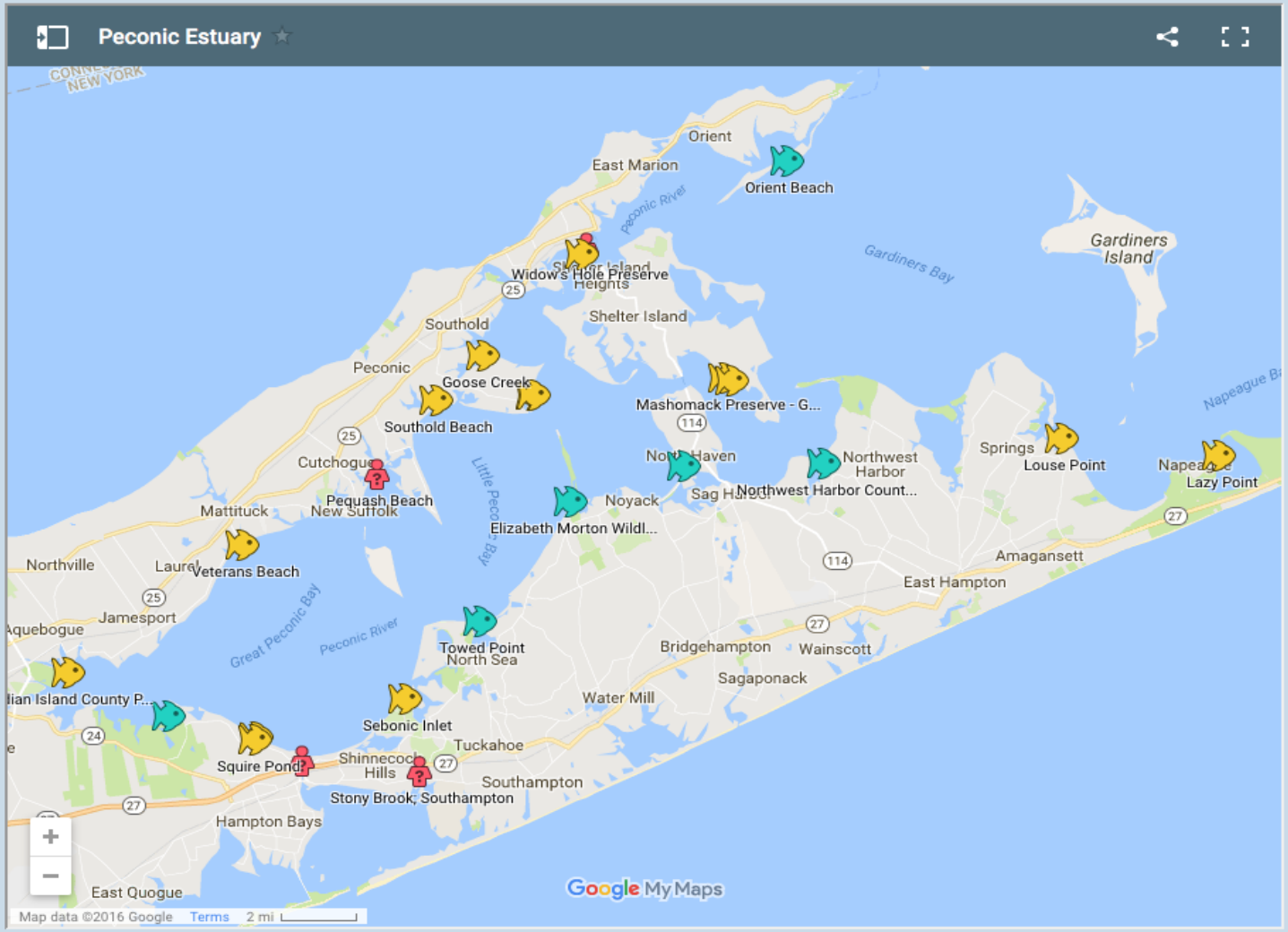
Peconic Estuary Participating Schools

Site Name	School 2014	School 2015
Birch Beach	Riverhead Middle School	
Elizabeth Morton Wildlife Refuge	Southampton High School	
Goose Creek	Southold Elementary School	
Goose Creek	Southold High School	
Hallocks Bay - Orient	Oysterponds School	
Indian Island County Park	Riverhead High School	
Landing Lane - East Hampton	Spring Schools	
Louse Point - East Hampton	Spring Schools	
Mashomack Preserve - Bass Creek	Shelter Island Schools	
Mashomack Preserve - Gibson Beach	Shelter Island Schools	
Napeague Harbor	The Ross School	
Northwest Harbor County Park	Easthampton High School	
Northwest Harbor County Park	Easthampton High School	
Roadhouse Brickoven Pizza Property	Riverhead High School	
Sebonic Inlet - Sag Harbor	Southampton High School	
Short Beach	Hay Ground School	
Squire Pond	Hampton Bays Middle School	
Suffolk County Marine Environmental Learning Center	Cutchogue East Elementary School	
Towed Point	Southampton High School	
USGE/DEC Lowe Peconic River Site	Riverhead High School	
Veterans Beach	Mattituck High School	
West Neck Creek	Shelter Island Schools	

Peconic Estuary

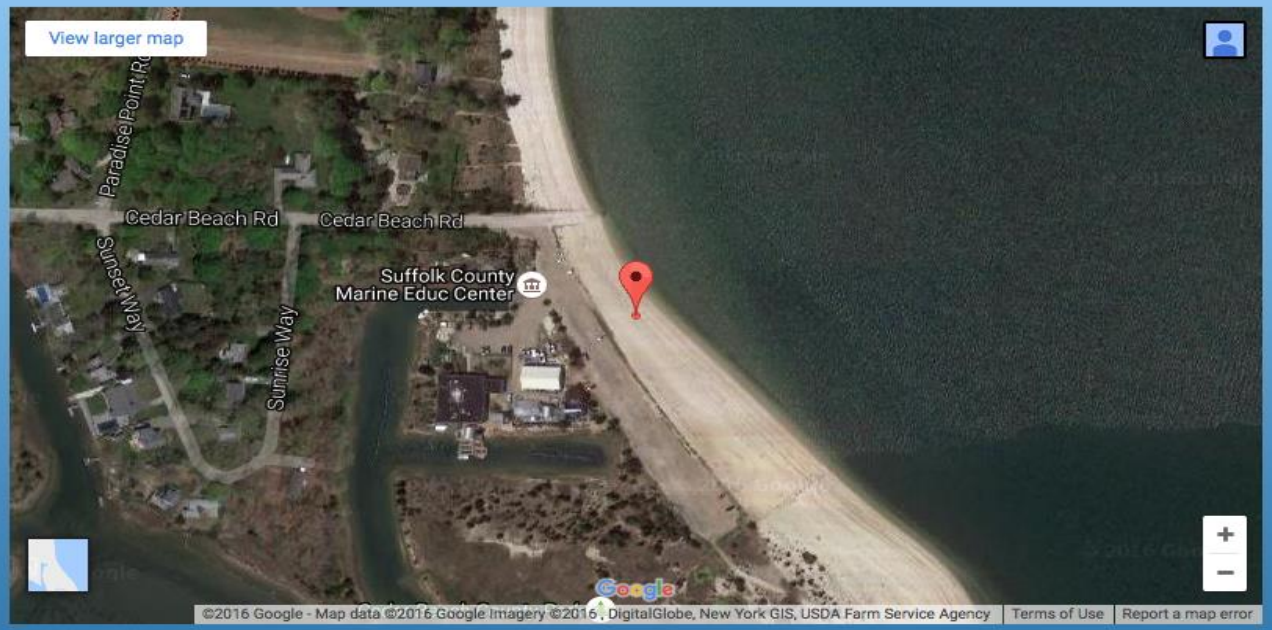
click the icon in the map to view

Site with data | Site with uploaded pictures | Site with no data



A Day in the Life...
Data

Location:	Peconic Estuary
Site Name:	Suffolk County Marine Education Center - Bay
Collaborator Name:	
School:	Cutchogue East Elem.



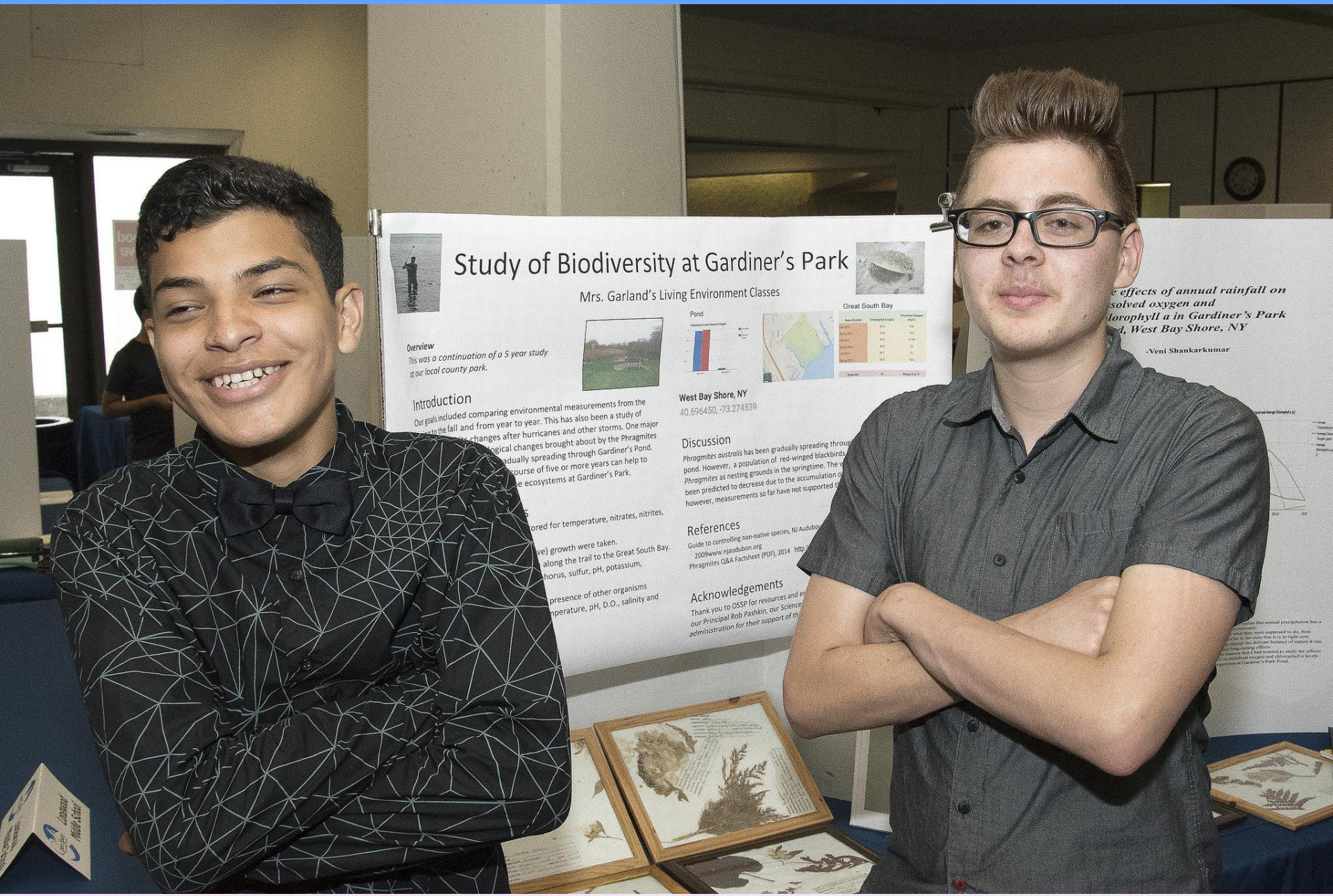
Group 1 - Physical Data

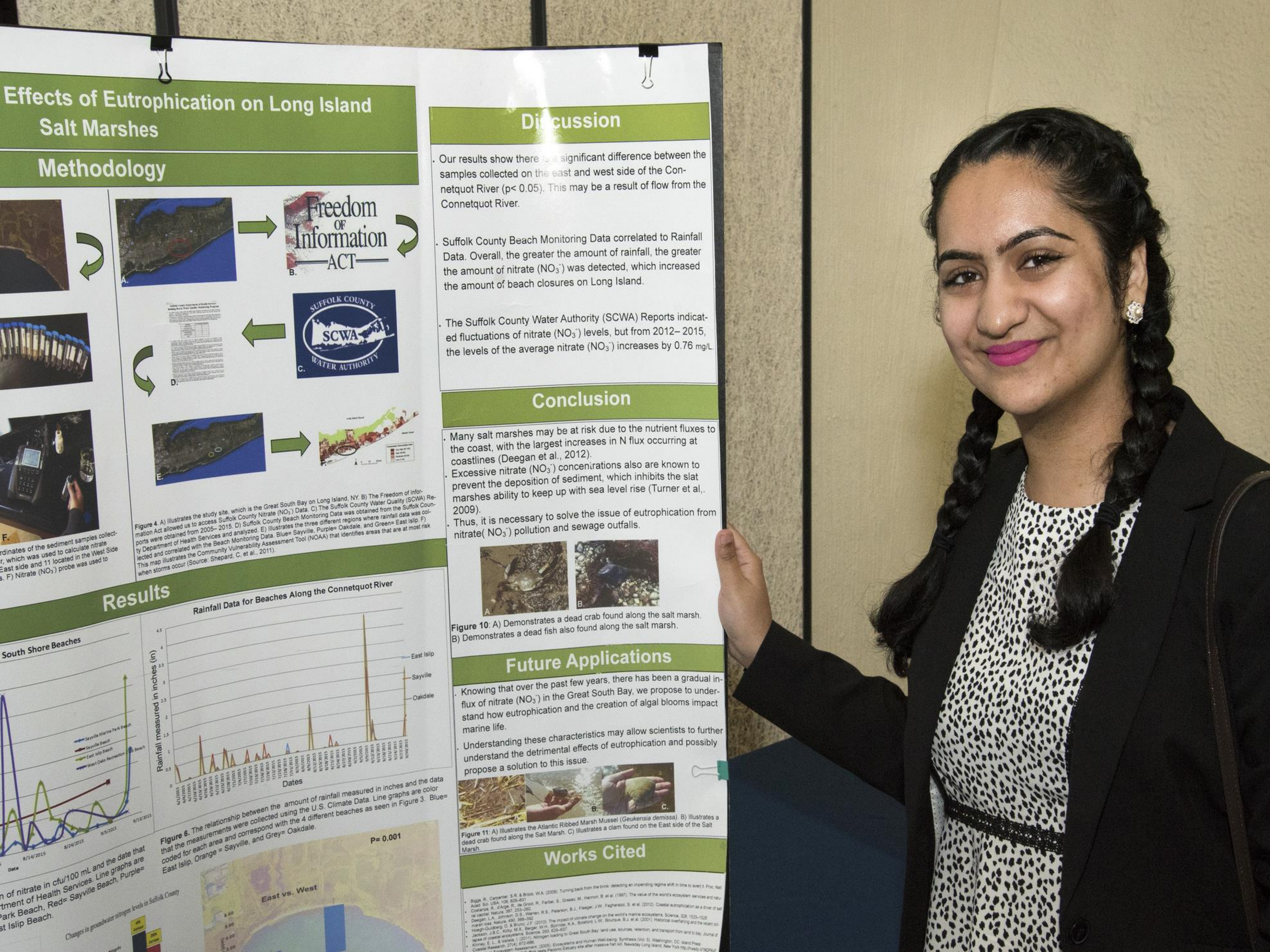
	tidal change		Current			Air & Wind					
Time	Distance	Units	Direction	cm/second:	knots:	F°	C°	Cloud Cover	Direction	Speed mph	Speed knots	Year
10-11:30 Bay	76	cm	West	12.73	8.3	68	20	Cloudy	South	7	7.6	2014
10-11:30 Bay	76	cm	West	12.73	8.3	68	20	Cloudy	South	7	7.6	2014
1:15-2:45 Bay	74	cm	West			63	17	Cloudy	...			2014
9:30-10:30	29.25	inches	West	9.222	0.1793	52	11	Clear	East	10		2015
11:00-12:00	35	cm	West	11.33	0.22	64	17	Clear	East	19.7		2015
11:00-12:00	35	cm	West	11.33	0.22	64	17	Clear	East	19.7		2015


Tenth Annual Celebration
Open Space Stewardship Program
Program
June 2, 2016
Student Posters 6:00-8:30 p.m.
Poster Presentations 6:00-7:20 p.m.
Recognition Ceremony - Berkner Hall Auditorium 7:20-8:10 p.m.
Welcoming Remarks
Mr. Ken White, Office of Educational Programs
Mr. David Manning, Director, Stakeholder & Community Relations Office
Dr. Mel Morris, Open Space Stewardship Program
DOE Site Office Remarks
John Carter, Director of Communication, DOE Site Office
Address
Edward Romaine, Brookhaven Town Supervisor
Recognition of School District Participants
Bay Shore High School
Bellport High School
Brentwood High School
Cutchogue East Elementary School
Eastport South Manor High School
Gelinas Jr. High School
Islip Excel Program
Liberty Program/Longwood/SCCC
Longwood High School
Longwood Middle School
North Country Road Middle School
Quogue Elementary School
Rocky Point Gates Program
Sachem High School North
Sayville High School
Westhampton Beach High School
William Floyd HS
Refreshments, continue with poster presentations, photo opportunities
Adjourn 8:30


Wastewater-derived nitrogen loading promotes harmful algae blooms in our waters
-Hattenrath et al 2010, 2015
Waste water
N
BROOKHAVEN
NATIONAL LABORATORY


Abiotic Factors and their Influence on the Biodiversity of The Carmans River
William Floyd High School


Study of Biodiversity at Gardiner's Park
Mrs. Garland's Living Environment Classes
Overview
This was a continuation of a 5 year study at our local county park.
Introduction
Pond
Great South Bay
West Bay Shore, NY
40.696450, -73.274539
Discussion
References
Acknowledgements
-Veni Shankarkumar


Effects of Eutrophication on Long Island Salt Marshes
Methodology
Freedom of Information ACT
SUFFOLK COUNTY WATER AUTHORITY
SCWA
Figure 4. A) Illustrates the study site, which is the Great South Bay on Long Island, NY. B) The Freedom of Information Act allowed us to access Suffolk County Nitrate (NO3-) Data. C) The Suffolk County Water Quality (SCWA) Reports were obtained from 2005– 2015. D) Suffolk County Beach Monitoring Data was obtained from the Suffolk County Department of Health Services and analyzed. E) Illustrates the three different regions where rainfall data was collected and correlated with the Beach Monitoring Data. Blue= Sayville, Purple= Oakdale, and Green= East Islip. F) This map illustrates the Community Vulnerability Assessment Tool (NOAA) that identifies areas that are at most risk when storms occur (Source: Shepard, C, et al., 2011).
Results
Rainfall Data for Beaches Along the Connetquot River
South Shore Beaches
Rainfall measured in inches (in)
Dates
East Islip
Sayville
Oakdale
Figure 6. The relationship between the amount of rainfall measured in inches and the data that the measurements were collected using the U.S. Climate Data. Line graphs are color coded for each area and correspond with the 4 different beaches as seen in Figure 3. Blue= East Islip, Orange = Sayville, and Grey= Oakdale.
P= 0.001
East vs. West
Discussion
Our results show there is a significant difference between the samples collected on the east and west side of the Connetquot River (p< 0.05). This may be a result of flow from the Connetquot River.
Suffolk County Beach Monitoring Data correlated to Rainfall Data. Overall, the greater the amount of rainfall, the greater the amount of nitrate (NO3-) was detected, which increased the amount of beach closures on Long Island.
The Suffolk County Water Authority (SCWA) Reports indicated fluctuations of nitrate (NO3-) levels, but from 2012– 2015, the levels of the average nitrate (NO3-) increases by 0.76 mg/L.
Conclusion
Many salt marshes may be at risk due to the nutrient fluxes to the coast, with the largest increases in N flux occurring at coastlines (Deegan et al., 2012).
Excessive nitrate (NO3-) concentrations also are known to prevent the deposition of sediment, which inhibits the slat marshes ability to keep up with sea level rise (Turner et al,. 2009).
Thus, it is necessary to solve the issue of eutrophication from nitrate(NO3-) pollution and sewage outfalls.
Figure 10: A) Demonstrates a dead crab found along the salt marsh. B) Demonstrates a dead fish also found along the salt marsh.
Future Applications
Knowing that over the past few years, there has been a gradual influx of nitrate (NO3-) in the Great South Bay, we propose to understand how eutrophication and the creation of algal blooms impact marine life.
Understanding these characteristics may allow scientists to further understand the detrimental effects of eutrophication and possibly propose a solution to this issue.
Figure 11: A) Illustrates the Atlantic Ribbed Marsh Mussel (Geukensia demissa). B) Illustrates a dead crab found along the Salt Marsh. C) Illustrates a clam found on the East side of the Salt Marsh.
Works Cited


Coastal
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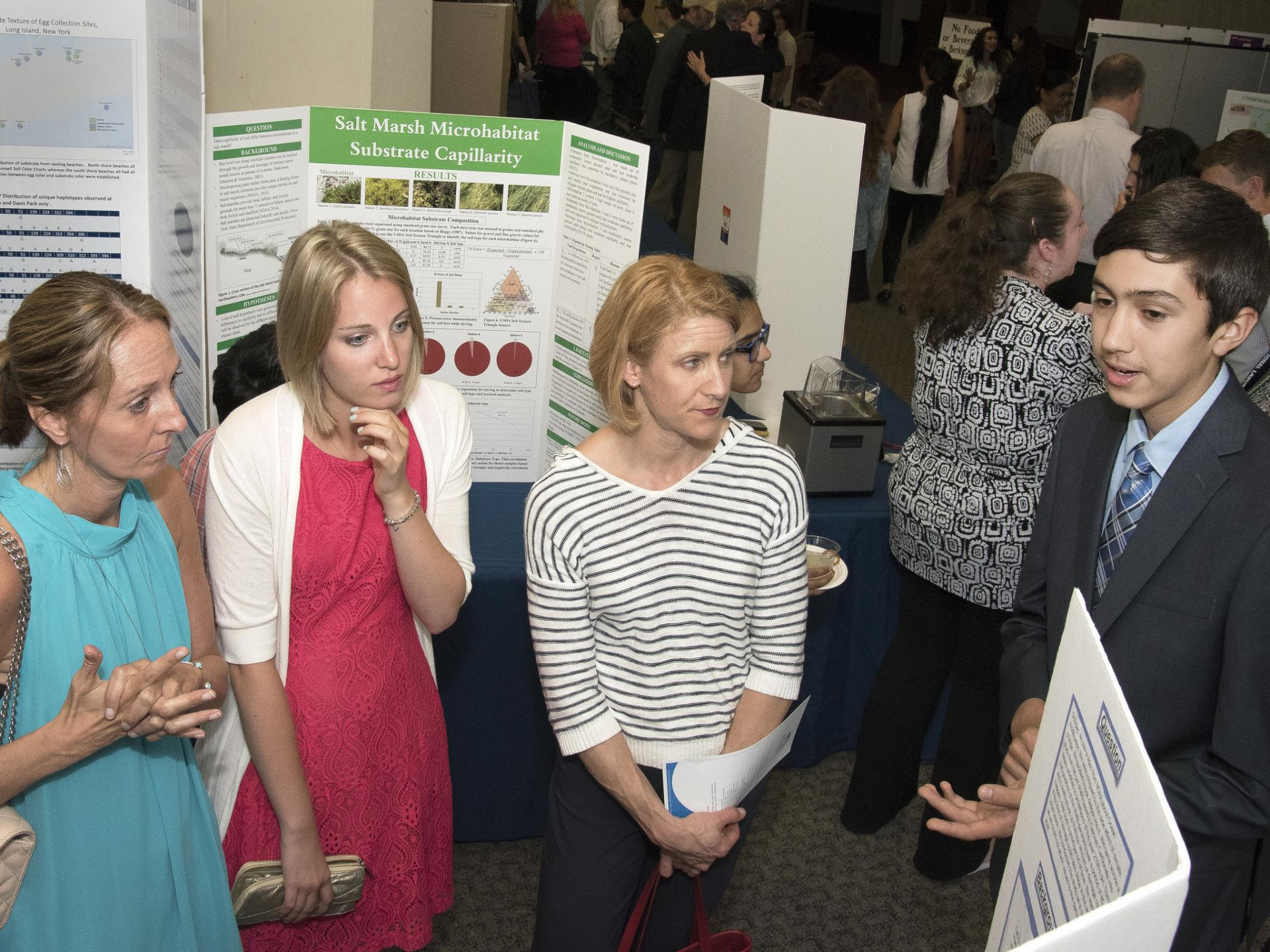
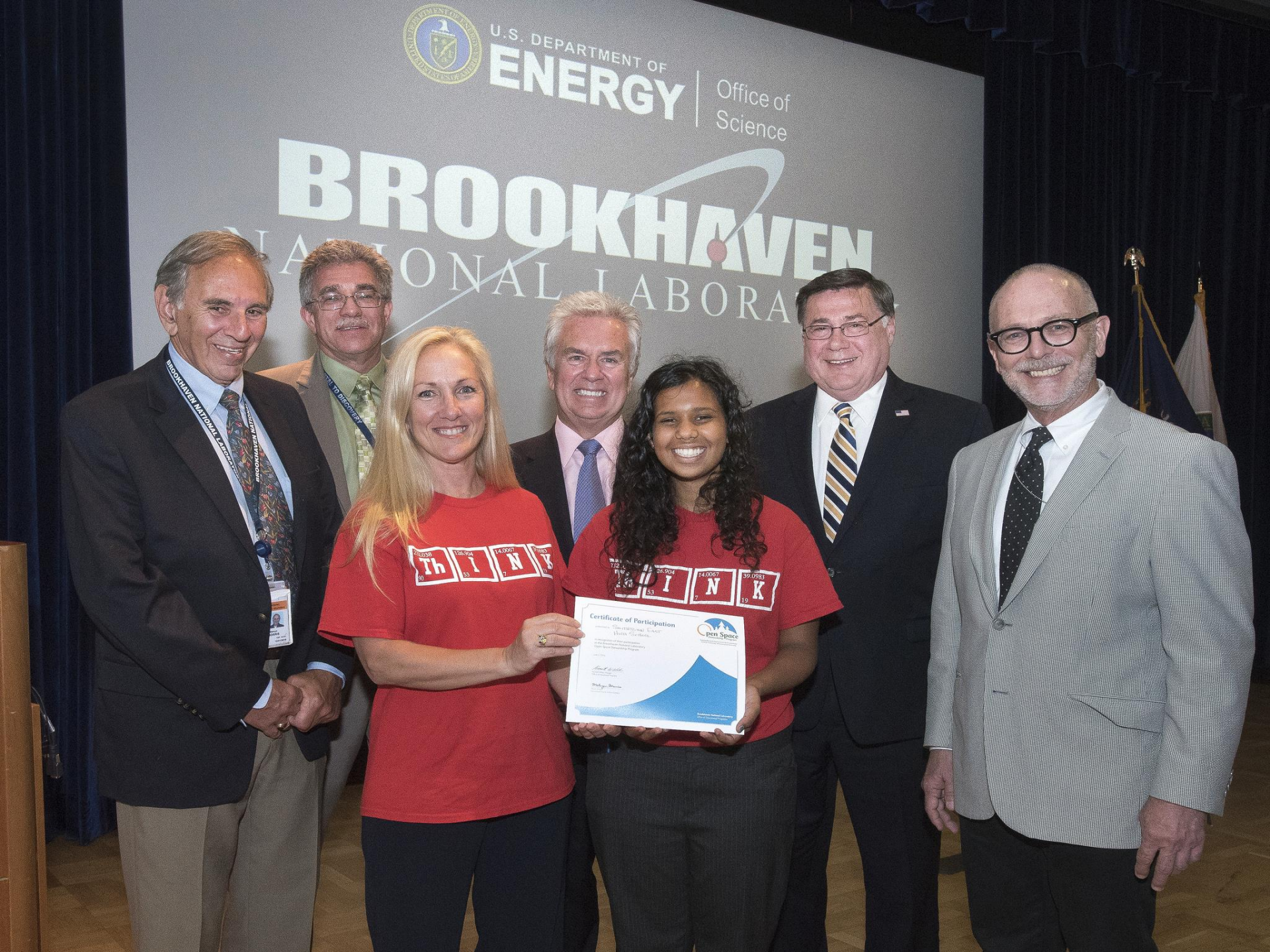

Salt Marsh Microhabitat Substrate Capillarity
QUESTION
BACKGROUND
HYPOTHESES
RESULTS
Microhabitat
Microhabitat Substrate Composition
ANALYSIS AND DISCUSSION
Question


BROOKHAVEN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In the News

A DAY IN THE LIFE OF A RIVER

East End Beacon

Today in the Life of the Peconic Estuary

Charles Guthrie of the New York State Department of Environmental Conservation shows students the contents of his catch, which included an eel.

"Bringing young people out to breath the fresh air, see the wildlife, and determine how this ecosystem changes is one of the best ways to help develop future scientists and informed, responsible citizens who care for the environment," said Mel Morris of Brookhaven Lab's Office of Educational Programs. He helped organize the event that that was based on a similar program for the Hudson River region upstate. Morris also founded and oversees the Lab's Open Space Stewardship

The Peconic Bathtub

Jump Right In!

Student Scientists Spend a Day in the Life of the Peconics

Photo Above: Southampton HS at Sebonic Inlet, with teacher Jennifer Keller, looking through their seining finds. In the net are shrimp, killies, silversides, mussels and slipper snails.

Nine hundred and twenty students from the third through twelfth grade spent last Friday, Oct. 21 engaged in hands-on citizen science exploration at 23 sites with the help of 30 natural history experts on the Peconic Estuary.

Young Island citizen scientists explore Coecles Harbor

'What Better Way to Experience Environmental Sciences?'

Brookhaven Town Supervisor Ed Romaine stopped by in the morning to meet the students along the river. "It's only by gathering data that we can monitor the health of the river," he said. "You're taking the river's blood pressure right now. Thank you."

Brookhaven Town Supervisor Ed Romaine thanked the students for "checking the river's blood pressure."

Bob Borowiek teaches an advanced placement, environmental science class at Patchogue-Medford High School and has now brought students to participate in the program two years in a row. "I'm a big supporter of learning from experience and today the kids are outside, they're taking

NOTEBOOK

Research project on LI's waters

Longwood High School students collect water samples from the Carmans River for testing of nitrate, phosphate, dissolved oxygen and salinity levels.

SOUTHAMPTON

Interim superintendent

Allan Goldenbaum is interim superintendent of the Tuckahoe Common

Chrysostom are inviting middle- and high-school students to participate in a "Hispanic Heritage Month" essay contest by writing about the topic: "Name a Latino, past or present, with whom

THE EAST HAMPTON STAR

NEWS ARTS FOOD BUSINESS SPORTS OUTDOORS OPINION CLASSIFIEDS DIRECTORY KIDS EAST

Students Dip Into Peconic Estuary for Mass Water Quality Study

More than 200 students from East Hampton High School, the Springs School, and Southampton High School joined hundreds of others from around the East End taking part in a recent water-quality initiative dubbed A Day in the Life of the Peconic Estuary.

Working in locations such as Louse Point, Lazy Point, Landing Lane, Northwest Harbor County Park, and the Elizabeth Morton National Wildlife Refuge, the students measured the water's salinity, sediment content, nitrates, phosphates, and oxygen

Daily Grind

Guild Hall Presented Academy of the Arts Awards Monday

Cancellations and Closures for Tuesday

East End May Dodge Blizzard . . . or Get It to 12 Inches

A Chance to Win Tickets to 'Rent Baby' Premiere

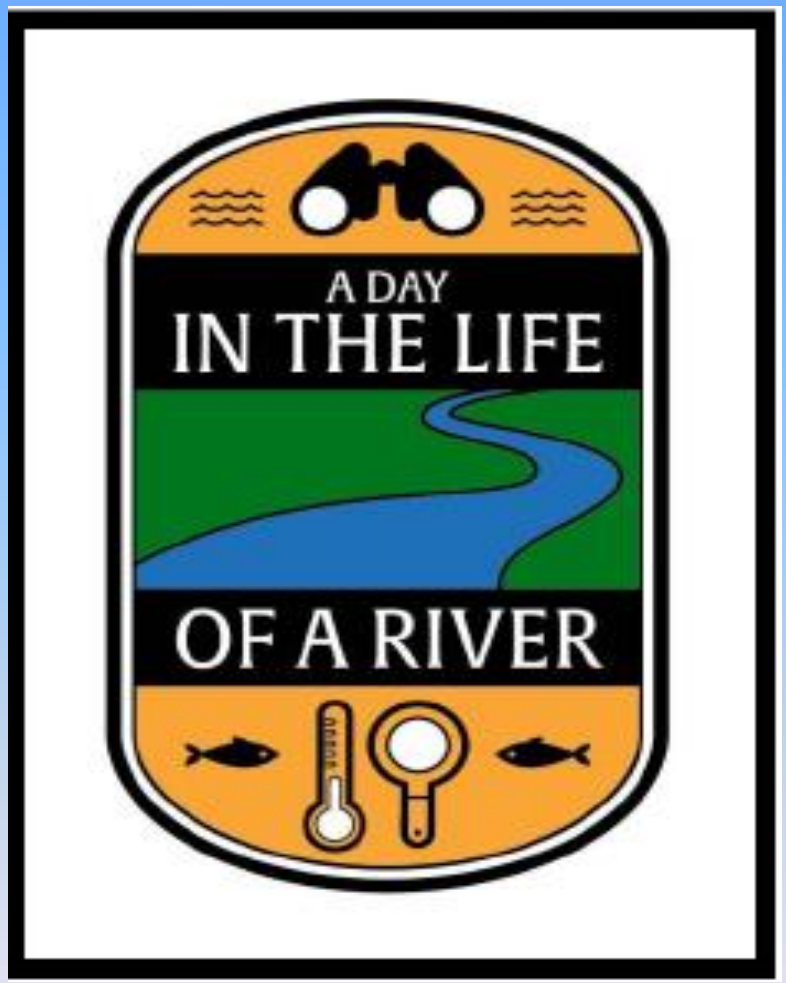
SMITHTOWN EAST STUDENTS EXPLORE NISSEQUOGUE RIVER

Rising Tides Among Sayville Student Scientists

SCIENCE RESEARCH (STEM & R.I.S.E.) TEACHER MARIA BROWN SHARES REPORTS BY RESEARCH STUDENTS

Sayville Sixth-Grader Presents at Industry GIS Conference

2016



9 RIVERS
123 EXPERTS
47 SCHOOLS
100 TEACHERS
2, 208 STUDENTS

A Day in the Life

Grades 2-12— A Fun, Experiential science research program!

Using the Environment Integrated Context for Learning- At each location, teams of students use seine nets and lab equipment to investigate aquatic life, biodiversity, water chemistry and quality, tides and weather and other parameters to fit into your STEM curriculum.

Citizen Science- Results for all locations and schools are posted on our "A Day in the Life" Web-site to be used by the students, land use decision makers, civic groups, and the general public.

Creating Environmental Stewards- Students are our future decision makers; our goal is to give them the inspiration and knowledge to make informed decisions for environmental health.

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Brookhaven National Lab

2017 DATES

- Carmans River~ September 22
- Greens Creek~ September 22
- Gardiner County Park~ September 22
- Massapequa Preserve~ September 29
- Fire Island~ September 29
- Nissequogue River~ October 6
- Carlls River~ October 13
- Lake Ronkonkoma~ October 13
- Peconic Estuary~ October 20
- Connetquot River~ October 27
- Mill River~ November 3