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Teaching with HRECOS

Using Remotely Sensed Data to Frame Estuary Inquiry

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Fitting Hudson Estuary education into the school ecosystem

Emphasis on ELA & math, especially in elementary/middle school

Learning standards underlie instruction; require metrics showing mastery (tests)

Activities not directly linked to achieving progress on standards get short shrift

Budgets are tight

These factors limit field trips, & often science education in general

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HRECOS & classroom learning: A good fit?

Good match with learning standards…

Existing NYS standards:
Mathematics, Science, & Technology Standard 2: Information Systems
Students will access, generate, process, and transfer information using appropriate technologies.

Common Core:
Speaking & Listening Standards: Presentation of Knowledge & Ideas
Grades 9-10: 5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

NGSS standards:
Five of the Eight Science & Engineering Practices:
1) Asking questions & defining problems; 3) Planning & carrying out investigations; 4) Analyzing and interpreting data; 5) Using mathematics and computational thinking; 6) Constructing explanations

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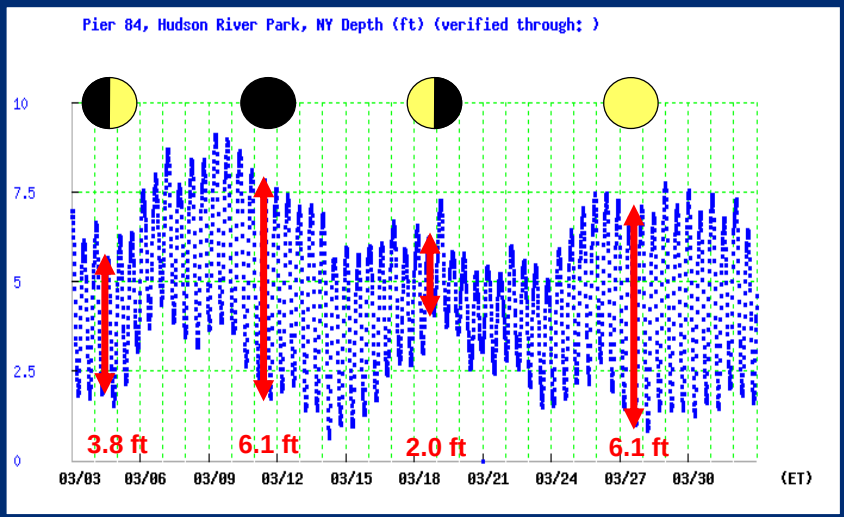
HRECOS & classroom learning: A good fit?

Promotes STEM skills & knowledge



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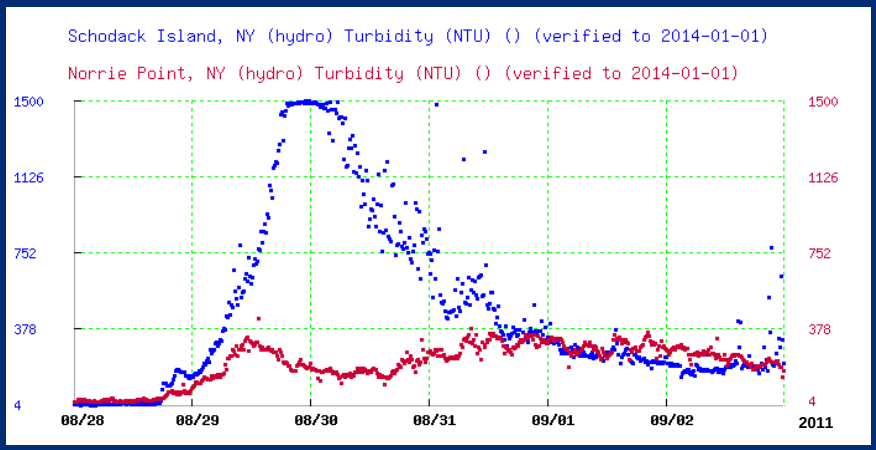
HRECOS & classroom learning: A good fit?

Place-based teaching – local sites & data; extend to system



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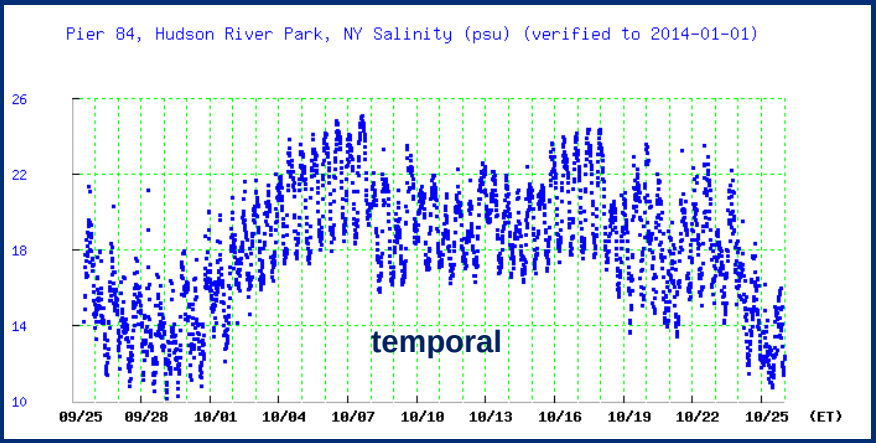
HRECOS in classrooms: other benefits

Reinforce field experience; put field measurements in context



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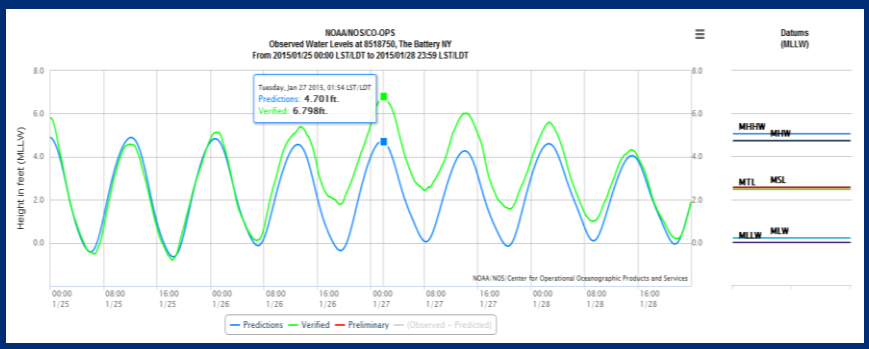
HRECOS in classrooms: other benefits

Use dramatic current events to engage with the resource



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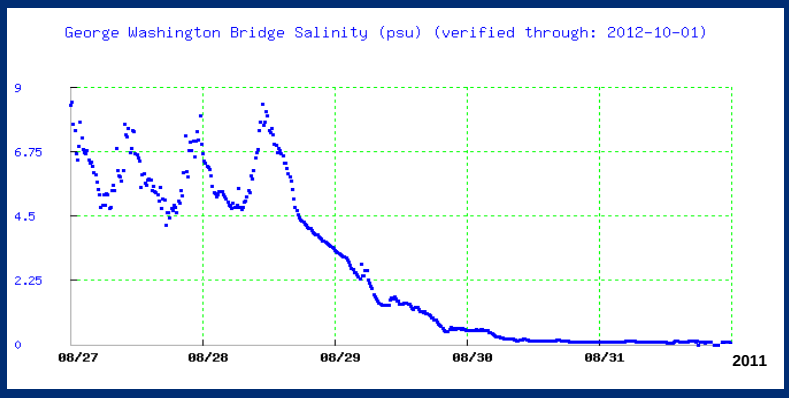
HRECOS in classrooms: other benefits

Empower students to interpret graphs; pose and answer questions with data presented



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Interpreting graphs: What is the story that each of these graphs tells?

Working in small groups, answer these questions:

1. What time period is shown in this graph?
2. What is being measured in this graph?
3. Where is it being measured?
3. What happens to it over the time period shown?
4. What is your hypothesis about what caused this to happen?
5. Measurements of what other parameters would help you test and verify your hypothesis?

We will then go on the web and give each group a chance to test its hypothesis.

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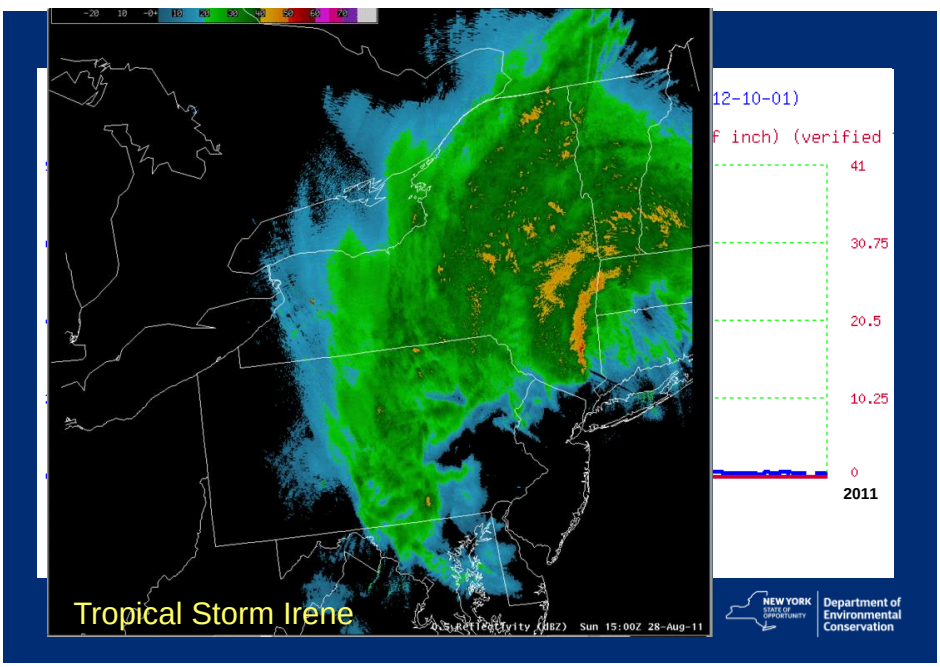

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Hudson River Environmental Conditions Observing System

Home | River Conditions | Interpreting the Data | About HRECOS | Partners: | NEW YORK STATE OF OPPORTUNITY Department of Environmental Conservation

Home › Interpreting the Data › Lesson Plans

HRECOS Classroom

The HRECOS data set provides a unique opportunity for educators in the Hudson River valley. Students can have a hands on experience with the Hudson River from a computer terminal. They can explore through inquiry-based lessons a data set which is rich in untold stories. Even a simple math lesson on graphing is enhanced by using data from the local environment.

Telling Hudson River Stories with Graphs

Monday, 03 February 2014 10:02 Lesson Plans

The Hudson River Estuary Program's educators have begun production of short PowerPoint presentations featuring remotely sensed Hudson River data readily available on the internet. The shows promote development of skills in interpreting graphs and formulating and testing hypotheses to explain phenomena, as well as exploring physical and biological attributes of the Hudson estuary ecosystem.

The shows are only ten slides long, facilitating their use in often crowded syllabi. Notes accompanying each slide provide explanations and additional information about phenomena illustrated.

Two PowerPoints are available for download below, one covering the basics of the Hudson's tides, the second examining the various ways in which storms impact water levels in the estuary.

Part 1: Tides and Water Levels
Part 2: Storms and Water Levels
Note: Each slide contains accompanying presenter notes

Oxygen, Plants and the Hudson River

Lesson Plans

Author: Lia Harris - Education Program specialist, Cary Institute.

Time: 1-2 class periods; Grade Level: high school; Objective: Students will develop and test a hypothesis about the relative oxygen contributions of three Hudson River Ecosystems.

Curriculum resources available on HRECOS website

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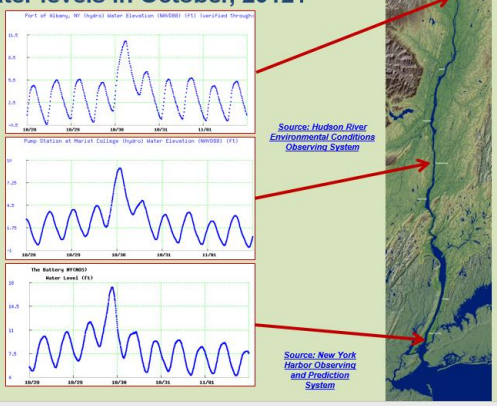
What caused this pattern of water levels in October, 2012?



Note that all three graphs cover the same time span and show the same perturbation, a spike in water level occurring late on 10/29/12 at the Battery, a few hours later at Marist College in Poughkeepsie, and just before dawn 10/30/12 upriver at Albany. After students have suggested hypotheses to account for these levels, ***Click*** to go to next slide for answers and relevant notes.

The graphs from the Port of Albany and Marist College were generated on the Current Conditions page of the *Hudson River Environmental Conditions Observing System* website at http://www.hrecos.org/joomla/. The graph from the Battery was generated on the *New York Harbor Observing and Prediction System (NYHOPS)* website of the Stevens Institute of Technology's Center for Maritime Systems at http://hudson.dl.stevens-tech.edu/maritimeforecast/PRESENT/data.shtml. Both sites are hyperlinked on the slide.

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Cary Institute of Ecosystem Studies — **Changing Hudson Project**

Name _____ Date _____

Oxygen, Plants, and the Hudson River

Read "Dissolved Oxygen" to help you answer the questions below.

Part 1: Developing Your Hypotheses

1. How does oxygen **naturally** enter the water?

2. How is oxygen **naturally** removed from the water?

3. During this activity, you will have to remember what process occurs in plants during the day. What is this process called? _____

4. What is the equation that describes this process?

5. Look at the two plants below. Draw an arrow to demonstrate where oxygen goes when it is released from the plant.

Water celery, submerged

Water chestnut, floating

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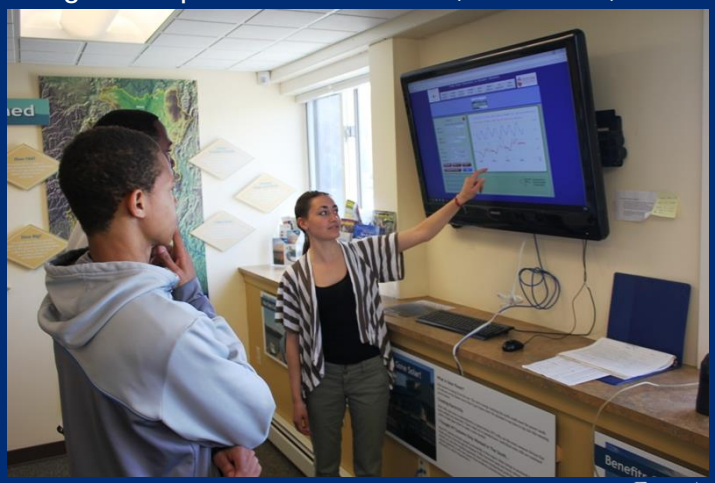
HRECOS & non-formal education

Use during field trips at nature centers, museums, etc.



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HRECOS & non-formal education

Displays in public places – marinas, ferry terminals, etc.

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Enhancing use of HRECOS in education

Professional development for teachers to promote & increase use

Add to the collection of curriculum resources available

Link with school technology grants to bring HRECOS displays into middle & high schools

Expanded use in undergraduate instruction & research

Expand/convene an education working group

Build partnerships to achieve non-formal education objectives

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Thank You

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