Science, Service, Stewardship

Integrating NOAA Data and Tools into Environmental Education Programs

2011 Gulf of Mexico B-WET Regional Meeting Agenda

April 21, 2011

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Objectives

- Learn of NOAA assets, with a focus on online data, available for use in inquiry-based education
- Share ideas to integrate assets into environmental education programs

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Presentation Overview

- Definition of NOAA Assets
- Overview of Select NOAA Assets
- Connecting with a NOAA Scientist or Lab
- Your Ideas …sprinkled throughout

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NOAA Assets

Science Categories:

- Ocean
- Coastal
- Great Lakes
- Weather
- Climate

Includes:

- Protected natural areas
- Ocean-going ships
- Monitoring devices
- Scientists
- Web sites

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NOAA Assets

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Have you used NOAA assets in your environmental education initiatives?

How?

What are the challenges to using them?

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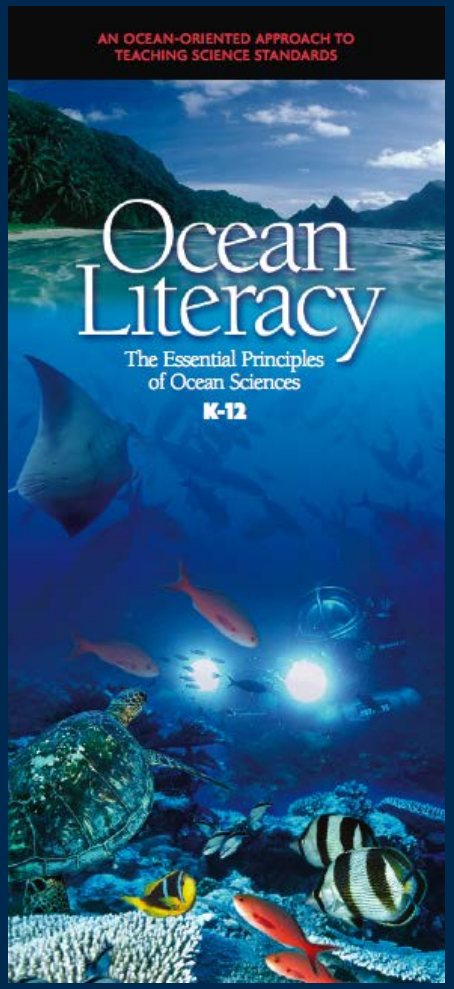
Select NOAA Assets

http://climate.noaa.gov/education/pdfs/ClimateLiteracyPoster-8.5x11-March09FinalLR.pdf



http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf

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NOAA Education Resources

www.education.noaa.gov

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Real World Data

NOAA EDUCATION RESOURCES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Gulf Oil Spill

On April 20, 2010, an explosion on the Deepwater Horizon/BP MC252 drilling platform in the Gulf of Mexico caused the rig to sink and killed 11 workers. As a result, oil began leaking into the Gulf creating the largest spill in American history to date.

Over the course of 87 days an estimated 4.9 million barrels of oil were released into the Gulf. Although research continues to determine the full extent of the damage, we know that this spill impacted wildlife, habitats, fishing communities, and commerce along the large coastal areas of Louisiana, Mississippi, Texas, Alabama, and Florida.

Oiled turtle is recovered from Gulf of Mexico by NOAA Scientist

Impacts to Wildlife

Sea turtles and marine birds were some of the first wildlife affected by the oil as they live and feed in the surface areas where floating oil collects. Marine mammals such as dolphins and whales are other affected species, as they must come to the surface to breath. Oil accumulated on the skin of animals can make it difficult to breath and move in the water. Oiled birds can lose the ability to fly, dive for food, or float on the water which could lead to drowning. Oil also interferes with the water repellency of feathers and can cause hypothermia under the right conditions. Ingested oil can kill animals immediately; more often it results in lung, liver, and kidney damage which can lead to death. Extensive efforts to prevent more extensive wildlife impacts, rescue and rehabilitate oiled animals, and investigate possible long-term effects of oil exposure are ongoing. (Source: USFWS)

Fisheries

Fish, shrimp, and shellfish are integral to the food web of the Gulf as well as the economic health of the region. To minimize human exposure to potentially unsafe seafood from the spill region, more than 80,000 square miles of commercial and recreational fishing grounds were closed while scientists investigated the impact of the spill and clean-up efforts on these organisms. After careful research on the presence of chemical and microbial contaminants in species from all levels of the food chain, portions of the region deemed safe by FDA and NOAA scientists were re-opened to fishing. Once again, Gulf fisherman have access to valuable fishing grounds and consumers and fish sellers are protected knowing that only safe seafood is entering the marketplace from this area. Ongoing monitoring continues to insure safety of seafood and changes in the Gulf habitats. (Source: NOAA Keeping Seafood Safe)

Habitat Impacts

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Water Cycle

Resources

Multimedia
- » Water Cycle Multimedia Module (MS, HS)
- » Global Precipitation and Energy Tutorial
- » Blue Planet Video

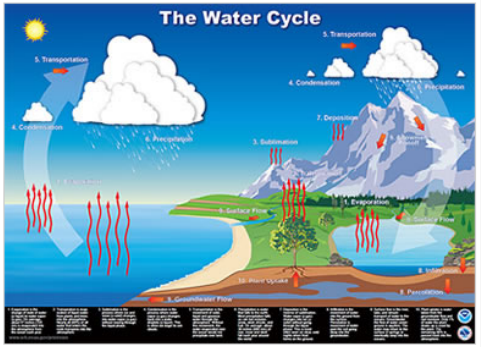
Lessons and Activities
- » Water Cycle Game (ES, MS, HS)
- » Water, Water Everywhere (ES, MS, HS)
- » Rivers to the Sea and Back Again (ES)
- » Water Cycle Wheel (ES, MS)
- » Five simple water cycle activities (ES, MS)
- » Drought Online Unit (MS, HS)

Real World Data
- » Observed Precipitation Data
- » Interactive Snow Map
- » Interactive River Observation Map
- » Interactive Evaporation Maps
- » Satellite Animations and Imagery
- » Groundwater Data from USGS

Background Information
- » The Hydrologic Cycle
- » Water Vapor Satellite Interpretation
- » Water and Climate
- » Flood Hazards
- » All About the Cryosphere
- » MetEd Watershed Module (MS, HS)

Water is constantly in motion. Sometimes quickly, as in a fast-flowing river, but sometimes it moves quite slowly, like in underground aquifers, glaciers and deep ocean currents.

The water cycle, is often shown as a simple circular cycle (as in the accompanying diagram) in which water evaporates from the ocean, is carried over land, falls as rain, and then travels back to the ocean through rivers.



Water moves through Earth's systems in a cyclic fashion taking many forms as it travels. This process is known as the Hydrologic or Water Cycle. Source: National Weather Service Jetstream project.

Although a drawing of the water cycle oversimplifies the actual movement of water, the diagram is a useful tool. The actual path any given water molecule follows in a complete water cycle can be varied and complex and may not follow the exact path shown by a diagram.

It is also important for students to understand that water cycle diagrams do not show the amount of time that a water molecule may take as it travels through the water cycle. For instance, water starting in the Antarctic may take over 250 years to travel along the bottom of the Pacific Ocean before it re-surfaces near Alaska. Water can also remain frozen in a glacier or ice sheet for thousands of years before re-melting.

Water may also change state, back and forth, from a liquid, gas and solid (condensing, evaporating, etc.) as it travels through the cycle. Water even travels underground, where it seeps through the spaces between grains of soil, sometimes coming to the surface as artesian springs.

Living organisms also move water around. Water, is either directly consumed as liquid or extracted from food and then carried within bodies. It leaves the organism as a gas during respiration, is excreted or may evaporate from the skin as perspiration. Plants are the major biotic movers of water. Their roots collect water for distribution throughout the plant. Some of the water will be used in photosynthesis, but most travels to the leaves where it is easily evaporated.

Although water vapor is invisible, fog and clouds do give some indication of water vapor in the atmosphere. Water condensation, seen as early morning dew or even on a cold glass, is one visible example of the water vapor present in our air. In clouds, water molecules condense and collect on microscopic dust particles into droplets until they become heavy enough that gravity pulls the water down as precipitation- in the form of rain, snow, sleet or hail.

Education Connection

The water cycle is more than a diagram it has significant impacts on our daily lives, local and global ecosystems and even economic systems. The resources in this collection can help teachers take students beyond just a minimal knowledge of a simple diagram of the cycle. This collection provides real-time and historic data sources that track and measure the water in different portions of the water cycle; satellite images shows water vapor in the atmosphere, interactive maps can be searched to show precipitation, snow depths, river flows and evaporation rates. Included are also lessons, games and

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NOAA Ocean Data Education (NODE) Project

http://dataintheclassroom.org

Data in the Classroom

Monitoring Estuarine Water Quality

- Level 1
- Level 2
- Level 3
- Level 4
- Level 5
- Get Data
- Teachers
- Survey

Water Quality

Changes in water quality conditions have a big impact on organisms living in estuaries. But how is water quality monitored?

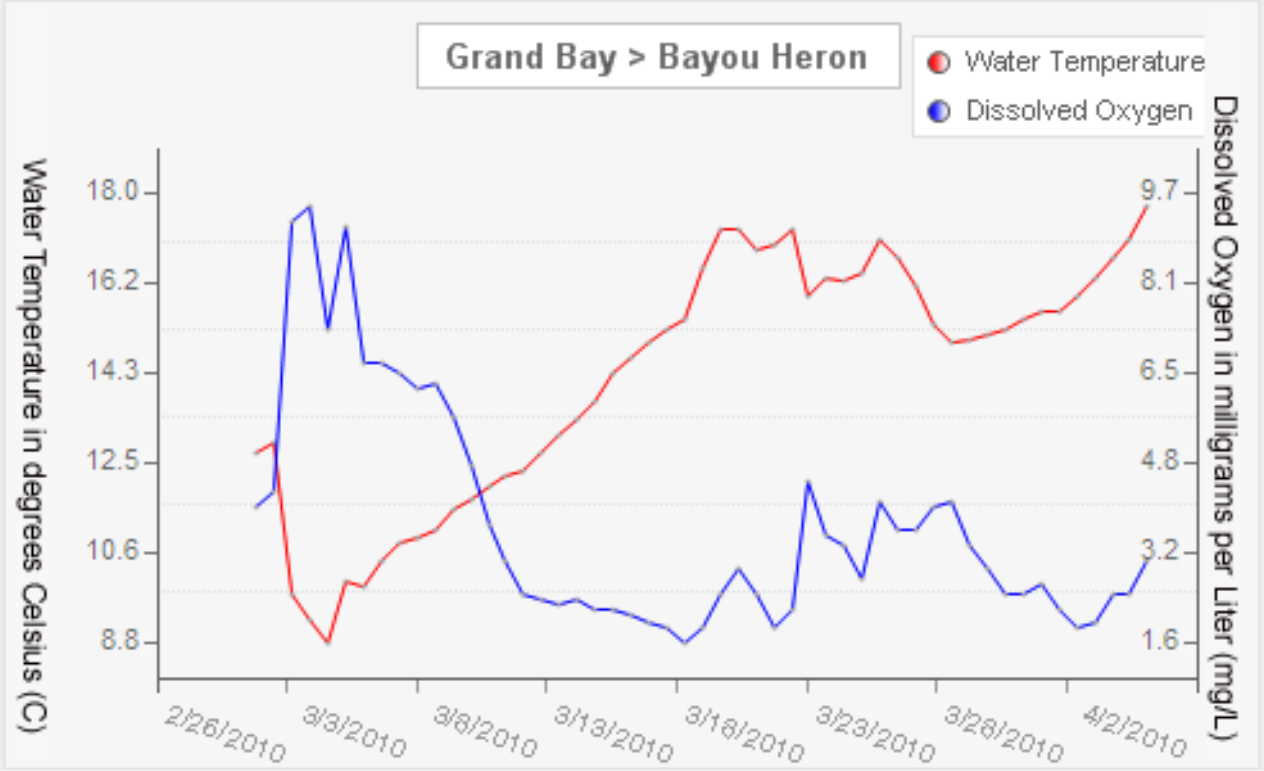
This Web site features five activities at different levels to help you learn about data.

Teachers: start here

Links

- Estuaries.gov
- National Estuarine Research Reserves System (NERRS)
- System-wide Monitoring Program Water Quality Indicators

Graph



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http://estuaries.gov

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The Bridge Data Series Archive

www.vims.edu/bridge

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BRIDGE

An ocean of free teacher-approved marine education resources

Bridge DATA Series

Watersheds

What's in Your Watershed?

Written by: Lisa Ayers Lawrence, Virginia Sea Grant, Virginia Institute of Marine Science
Credits: Dave Fuss, Lewis Lawrence, Middle Peninsula Planning District Commission

Summary
Examine land use in the Chesapeake Bay watershed and determine if these areas are protecting the water with vegetated buffers.

Objectives

- Define the term watershed and explain the importance of riparian buffers.
- Examine types of land use and acreage used in subwatersheds in the Chesapeake.
- Evaluate the impacts of land use in the Chesapeake on water quality.

Vocabulary
Watershed, Riparian buffer

Introduction
When we are age 4 or 5, our parents and teachers begin teaching us our telephone number and address. The importance of knowing these is obvious—to help ensure our safe return when we are lost. But do you know your watershed address? Everybody has one, and it's an important address to know, because we each impact our watershed. Not only do you consume the water in your watershed, but your activities, such as clearing vegetation or fertilizing your lawn, can

Grade Level:
9-12

Lesson Time:
1.5 -2 hrs.

Materials Required:
Dragon Run Swamp data (Excel), Dragon Run pie chart worksheet (pdf)

Natl. Science Standards
Click here for a list of the aligned National Science Education Standards.

Related Resources
Pollution, Estuary

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NOAA.education.gov

NODE

Estuarues.gov

The Bridge Data Series Archive

Have you used items found in the online NOAA resources described thus far?

In what way?

What other similar NOAA or non-NOAA resources have you used?

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Other NOAA Assets B-WET Recipients Use

- NOAA Mussel Watch
  - Program Overview: http://ccma.nos.noaa.gov/about/coast/nsandt/musselwatch.html
  - Data Portal: http://ccma.nos.noaa.gov/about/coast/nsandt/download.html
- Digital Library for Science and Education: www.dlese.org
- GLOBE: http://globe.gov/
- Science on a Sphere: http://sos.noaa.gov/
- NOAA Ocean Exploration: http://oceanexplorer.noaa.gov/edu/materials.html
- NOAA Photo gallery: http://www.photolib.noaa.gov/
- Monitoring Oil Spill Response and Restoration: www.GeoPlatform.Gov

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Request lessons, posters, and other educational and supporting materials

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Connecting with a Scientist or Lab

- Ask NOAA via Answers@NOAA
  http://findanswers.noaa.gov/noaa.answers/consumer/search.asp
- Feedback button at NOAA.Education.Gov
  http://www.education.noaa.gov/Suggest.php
- NOAA in Your State
  http://www.legislative.noaa.gov/NIYS/
- NGI Researcher Information Database
  http://www.northerngulfinstitute.org/researchers/index.php
- NOAA Regional Collaboration Team

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Tip!