Connecting STEM and Environmental Education

Mid-Atlantic Environmental Literacy Summit
December 2, 2013

Louisa Koch
NOAA Director of Education
www.education.noaa.gov
Louisa.Koch@NOAA.GOV

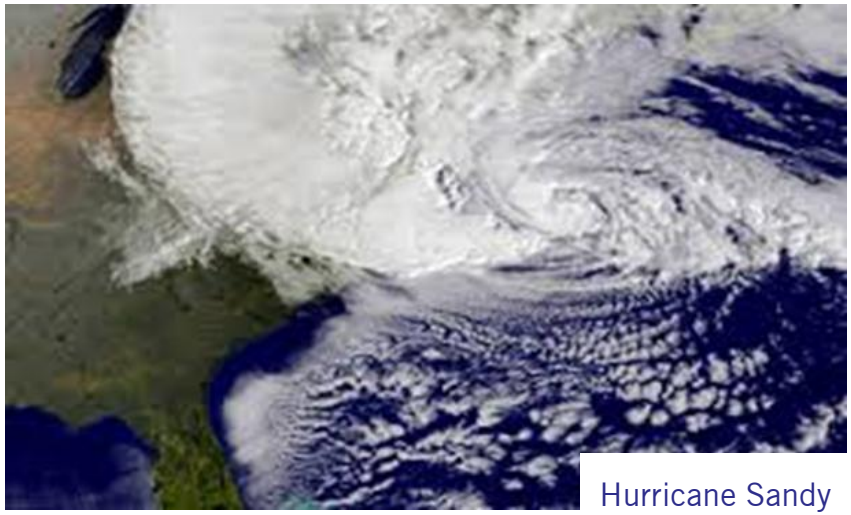
Outline

- NOAA, STEM and the Environment
- A Good Match: Science and Environmental Education
- Moving Forward

Taking the Pulse of the Planet

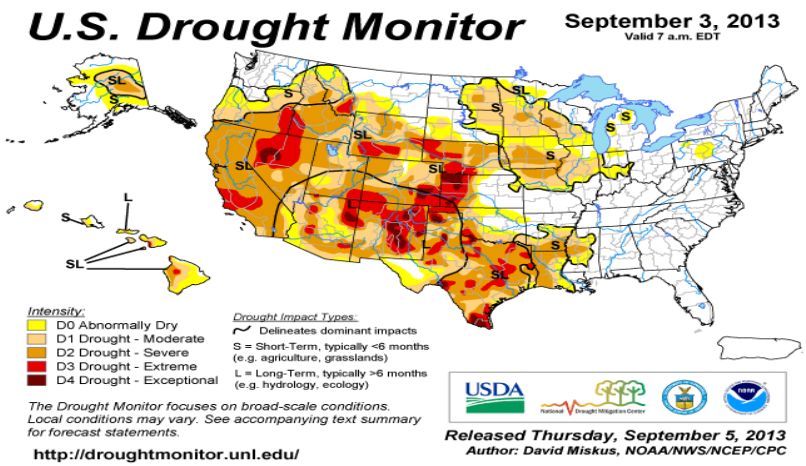
- NOAA works around the clock and around the world to
  - Monitor the earth's ocean and atmosphere
  - Understand and predict the earth's environment
  - Communicate that information in meaningful ways

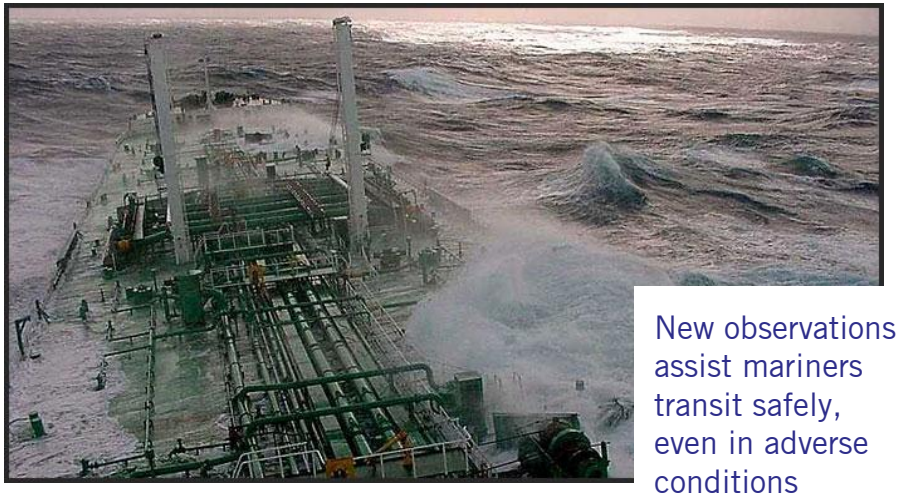
NOAA STEM is Rigorous, Real-Time and Relevant



Hurricane Sandy

Herring caught during acoustic trawl survey

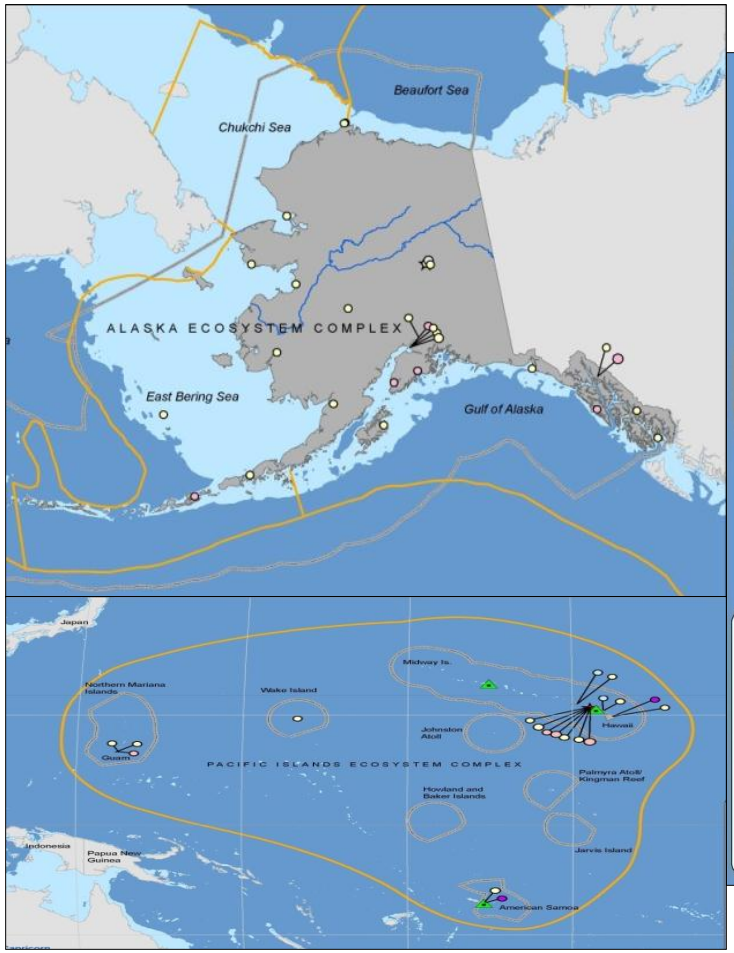


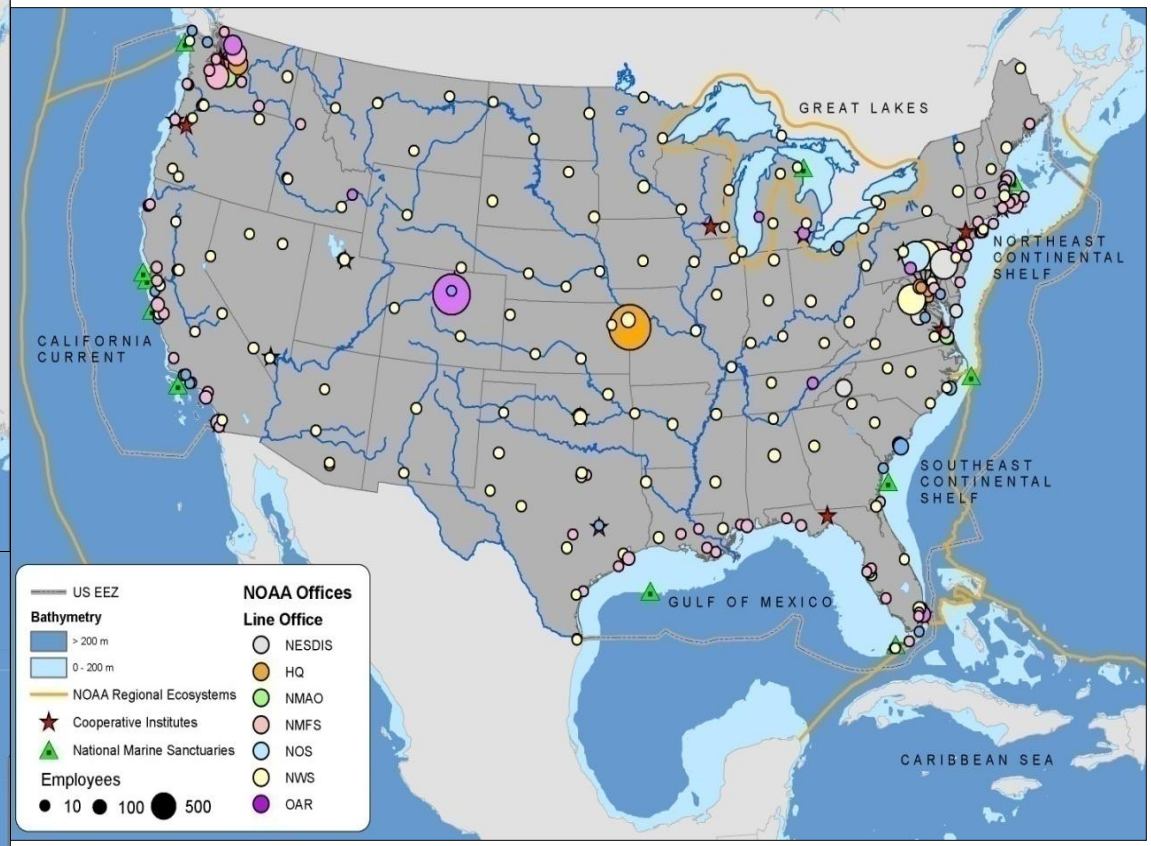


New observations assist mariners transit safely, even in adverse conditions

NOAA STEM Assets Across the Country

- Weather Service, Sanctuaries, Reserves, Sea Grant and more…





New Science Framework

Key Principles

- Children are born investigators
- Focusing on core ideas and practices
- Understanding develops over time
- Science and engineering require both knowledge and practice

New Science Framework

Three Integrated Dimensions

- 8 Scientific and engineering **practices**
- 7 Crosscutting **concepts**
- 13 Disciplinary core **ideas**

Practices

Science/Engineering Practices

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics, information and computer technology, and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence

Crosscutting Concepts

- Patterns
- Cause and effect
- Scale, proportion, and quantity
- Systems and system models
- Energy and matter: Flows, cycles, and conservation
- Structure and function
- Stability and change

Disciplinary Core Ideas

Life Science	Physical Science
LS1: From Molecules to Organisms: Structures and Processes LS2: Ecosystems: Interactions, Energy, and Dynamics LS3: Heredity: Inheritance and Variation of Traits LS4: Biological Evolution: Unity and Diversity	PS1: Matter and Its Interactions PS2: Motion and Stability: Forces and Interactions PS3: Energy PS4: Waves and Their Applications in Technologies for Information Transfer
Earth & Space Science	**Engineering & Technology**
ESS1: Earth's Place in the Universe ESS2: Earth's Systems ESS3: Earth and Human Activity	ETS1: Engineering Design ETS2: Links Among Engineering, Technology, Science, and Society

Moving Forward in Maryland

- State/Federal focus on Chesapeake Bay restoration
- Maryland requirement that every high school graduate be environmentally literate
- Math Science Partnership funds required to address Maryland Environmental Literacy Standards (2011)
- Systemic implementation of evidence based meaningful watershed education experience
- NOAA brings education grants, tools, data, science, scientists, teaching tools, destinations

Moving Forward with the Math Science Partnership Program

Pennsylvania's Saint Francis University improves teacher content knowledge and instruction in science using NOAA supported Headwaters to Estuaries project

Maryland Public Schools use NOAA's Chesapeake Bay Buoy data as part of teacher professional development

Virginia's Math Science Innovation Center uses underwater acoustics to help teachers lead investigative inquiries

Moving Forward with Other Resources

- Sustainable Jersey For Schools
- 21st Century Community Learning Centers - academic enrichment during non-school hours
- Shannon – can I list anything here from Delaware, Pennsylvania West Virginia?
- Other ideas?