NOAA Education and B-WET National Updates

2015 B-WET Gulf of Mexico Regional Meeting

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Education Supports NOAA's Mission

- Education is critical to achieving NOAA's mission
- The NOAA Education Council promotes coordination among NOAA's education investments and work towards a coherent education portfolio
- Membership includes all programs with major education investments and capability
- Activities: education strategic planning, implementation work groups, data collection and reporting, creating community

NOAA Education Strategic Plan

- Mandated in America COMPETES Act
  - 20 year plan, updated every 5 years
- Frames education activities at NOAA
  - Agency level planning document
  - Established by the NOAA Education Council
  - Coordinated by the NOAA Office of Education
  - Enabled and implemented by the NOAA Education community
- Revision emphasis
  - Better reflect alignment with NOAA core mission
  - Improve ability to evaluate the plan

NOAA Education Strategic Plan 2015-2035

NOAA's Education Vision

An informed society that uses ocean, coastal, Great Lakes, weather, and climate science to make the best social, economic, and environmental decisions.

NOAA's Education Mission

To educate and inspire the Nation to use science toward improving ocean and coastal stewardship, increasing safety and resilience to environmental hazards, and preparing a future workforce to support NOAA's mission.

Revised Strategic Plan Goals Reflect NOAA's Mission

- **Goal 1: Science-Informed Society**

An informed society has access to, interest in, and understanding of NOAA-related sciences and their implications for current and future events.

- **Goal 2: Conservation and Stewardship**

Individuals and communities are actively involved in stewardship behaviors and decisions that conserve, restore, and protect natural and cultural resources related to NOAA's mission.

- **Goal 3: Safety and Preparedness**

Individuals and communities are informed and actively involved in decisions and actions that improve preparedness, response, and resilience to challenges and impacts of hazardous weather, changes in climate, and other environmental threats monitored by NOAA.

- **Goal 4: Future Workforce**

A diverse and highly-skilled future workforce pursues careers in disciplines that support NOAA's mission.

- **Goal 5: Organizational Excellence**

NOAA functions in a unified manner to support, plan, and deliver effective educational programs and partnerships that advance NOAA's mission.

Data We Currently Collect: NOAA-wide Common Measures

- **Over 61 million people** visit informal education institutions hosting NOAA supported exhibits or programs that enhance stewardship and promote decision making.
- **Over 470 institutions** increase educational capacity through NOAA-funded interpretive/educational centers, exhibits or programs.
- **Over 2.2 million lifelong learners** participate in NOAA supported informal education programs that enhance stewardship and promote informed decision making.
- **Over 340,000 preK-12 students** participate in NOAA supported formal education programs that enhance understanding and use of NOAA science and other resources.
- **Over 32,800 educators** participate in NOAA supported professional development programs that enhance understanding and use of NOAA science and other resources.
- **Over 19 million people** visit NOAA Education websites that support a broad spectrum of educational activities and provide critical information to the Nation.
- **Over 3,850 postsecondary students** trained in NOAA-mission related sciences through NOAA-funded higher education programs that prepare students for career paths at NOAA and related organizations.
- **Over 560 postsecondary degrees** in NOAA-related disciplines awarded to students who were supported by NOAA in higher education programs.

NOAA Narrative Accomplishments

- B-WET stories from progress reports, grantee communication, other examples from the field
- FY14 Accomplishments now [available online]

Goal 1: Environmental Literacy

Education in Support of Healthy Oceans

Partners Include:

Anahuac National Wildlife Refuge

Houston area teachers and students gain deep insight in the importance of coastal ecosystems through real-world scientific research

In 2014, the University of Houston Downtown's Bay Watershed Education and Training (B-WET) project, Watershed Wonder, held a two day preparation session and a one week camp to provide teachers and high school students with meaningful learning experiences in biology, chemistry, physics, and environmental science. The program provided a research-based summer experience mentored by Ph.D. scientists and undergraduate students. Participants collect and analyze data for use in studies targeting the Trinity River and San Jacinto River Watersheds.

Focal areas of the experience included supporting and fostering environmental problem-solving and stewardship among students from underrepresented groups with interest in science related to the San Jacinto River and Harris County watersheds. The project included a two-day preparation session to introduce teachers to the relevant scientific process and concepts, data collection methods, and online professional sharing wiki (the University of Houston Downtown HUNSTEM portal). In addition, teachers participated in a curriculum development project, which helped them to prepare lessons to integrate what they learned through the summer reach projects into their classrooms. The experience culminated with a week-long summer research camp which paired teachers with high school students, undergraduates, and university research scientists to collect and analyze data in the field and lab. Through this project, teachers and students worked to test hypotheses and draw conclusions about the function and importance of watersheds and the inextricable link between humans and the environment. To date, 14 teachers and 16 high school students have been trained by undergraduate mentors and university researchers and additional students and teachers will be reached in FY15. The real-world research experience obtained through this project provided an engaging and exciting learning opportunity and built awareness of potential research careers.

Above: Students view their microbial cultures, collected from a local Houston bayou and learn about the relationship between microbes and wetland and coastal watershed health. Data collected from such laboratory experiments is used in University of Houston, Downtown research scientists' studies.

32 2014 NOAA Education Accomplishments

21st Century Community Learning Centers (21CCLC)

- This program supports the creation of community learning centers that provide academic enrichment opportunities during non-school hours for children, particularly students who attend high-poverty and low-performing schools. The program helps students meet state and local student standards in core academic subjects, such as reading and math; offers students a broad array of enrichment activities that can complement their regular academic programs; and offers literacy and other educational services to the families of participating children.
- Funded by the Department of Education

Potential NOAA/21CCLC Partnership

- Department of Education is interested in providing some funding to support NOAA activities at 21st Century Community Learning Centers. Activities must include:
  - Authentic STEM experiences for students, in NOAA-related topics, offered for 1-2 hours per week over a 6 - 10 week period (8 weeks is typical)
  - Capacity building for 21CCLC staff who will be offering, or assisting with, the authentic STEM experiences for the students
  - Direct interaction with NOAA (or related) scientists

B-WET Opportunity

- If this goes forward, NOAA will work with Department of Education (likely through a third party) to select organizations to provide meaningful environmental education activities at 10 - 25 21st Century Community Learning Centers in 5 or more states.
- The opportunity would be advertised sometime this fall.

Other Education Topics

- **Climate education:** The President has provided a call to action to build resilience for climate change, and education is a component of this effort.
- **Science on a Sphere network:** We provide support to the network of institutions who have installed spheres by providing a forum to share ideas and lessons learned, and through grants for new content and interpretation training.
- **Evaluation:** We've invested in a professional evaluator and have been increasing our community's capacity to evaluate every year, including reporting into eight NOAA-wide measures. The new strategic plan also has an evaluation section built in to help us keep track of progress.
- **Citizen Science community of practice:** We are putting effort into being the glue for this community and to represent NOAA in the national dialog on this topic.
- **NOAA Outreach Center:** We maintain this center and provide outreach support on behalf of NOAA. We coordinate staffing and material support at events and when people call "NOAA", often times the call comes to the Outreach Center.
- **Scholarships and fellowships:** Provides hands on experience at our agency, including the Hollings Scholarship Program and the Educational Partnership Program.
- www.education.noaa.gov**:** This portal is designed to assist educators in accessing education resources that are distributed across many websites and program offices at NOAA (and partner) websites from one centralized interface.

Watersheds, Flooding and Pollution

Resources

Multimedia
- Gulf of Mexico Dead Zone
- Open Rivers, Abundant Fish
- Tracking the Raindrop from the Sky to the Sea
- FEMA Flood Risk Scenarios
- Watersheds: Connecting Weather to the Environment

Lessons and Activities
- Human Impacts Survey (MS, HS)
- Water, Water Everywhere (ES, MS)
- Observing Estuaries (HS)
- Where Does My Water Come From (ES)
- Adopt Your Watershed (MS, HS)
- Where's the Point? (MS, HS)

Real World Data
- River Observations and Forecasts
- River Forecast Centers
- Water Quality Map
- Gulf of Mexico Dead Zone
- Interactive Restoration Map

Background Information
- Nutrient Pollution
- Non-point Source Pollution
- U.S. Fish Habitat Report
- Floods: The Awesome Power
- Flood Safety
- Flood Research Projects

Career Profiles
- What is hydrology?"

Look around you, right now - you are in a watershed. The water in your watershed quenches thirst, grows food, washes clothes, and powers industry. However, too much water can cause raging floods and flush pollutants and soil into rivers and streams. How do we interact with the water in our watershed?

Water Forecasts and Management

Cities, utilities, reservoir operators, agriculture, and other industries depend on accurate forecasts of water availability. Hydrologists, water-system scientists, use snow data, river gauges, evaporation rates, precipitation forecasts, radar and other data to produce forecasts that allow water managers and others to plan efficient and safe use of this natural resource.

Mountain streams quickly over flow in flash floods due to rainfall or snowmelt. Source: NOAA National Weather Service - Hazardous Weather Awareness Week

Water managers use this information to make decisions about water allocation. For instance, how much water should they release from a reservoir during spring run-off and how much should they hold for later consumer, agricultural and industrial needs. These decisions can reduce flooding threats, limit the impact of droughts, and influence fish migrations. Cargo ship and barge captains on large rivers use information on the current and forecasted depth, river level, and the volume of water, flow rate, information for navigation planning. Hydroelectric dam operators use similar information to most efficiently produce electricity. And, recreationist such as fishermen, whitewater paddlers, and other boaters use these river predictions to plan safe outings.

Watersheds and Flooding

When water enters the watershed too quickly for the land to absorb it flooding can occur. Floods result from rapid melting of winter snows, severe thunderstorms, tropical storms, and other high precipitation events. Annually in the U.S., flooding causes billions of dollars in damages and takes dozens of lives. Accurate prediction of the amount of water flowing down rivers and the time of its arrival has saved countless lives and dollars. Hydrologists, the forecasters who predict these events, consider the condition of the watershed and its relationship to the rest of the water cycle. Watersheds in urban areas with lots of concrete, pavement, and roofs, shed water quickly while forested and grassy rural areas absorb more water. Knowledge of land use, geology, and hydrology of an area, combined with weather predictions are essential to accurate flooding forecasts.

www.noaa.education.gov

Thank You!

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