NOAA Education
You Have a Mandate to Educate

Presentation to the
NOAA Leadership Seminar
July 30, 2009

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An informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions.
<table>
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<tr>
<th>Ecosystems: A well informed public that acts as a steward of coastal and marine ecosystems</th>
<th>Climate: Use of NOAA’s climate products by climate-sensitive sectors and the climate-literate public to support their plans and decisions</th>
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<td>Weather &amp; Water: Enhance environmental literacy and improve understanding, value, and use of weather and water information and services</td>
<td>Commerce &amp; Transportation: Build public understanding of the scientific, technological and environmental factors of commerce and transportation</td>
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NOAA has a mandate to educate!

America COMPETES Act provides broad education authority for NOAA!

“The Administrator of NOAA shall conduct, develop, support, promote, and coordinate formal and informal education activities at all levels to enhance public awareness and understanding of ocean, coastal, Great Lakes, and atmospheric science and stewardship by the general public and other coastal stakeholders, including underrepresented groups in ocean and atmospheric science and policy careers. In conducting those activities, the Administrator shall build upon the educational programs and activities of the agency.“
“The National Oceanic and Atmospheric Administration shall …

implement a program of public education and outreach to improve public awareness of global climate change and effects on the ocean, coastal, and Great Lakes environment”
Why NOAA Invests In Education

• NOAA has statutory responsibility to educate the public about its role in the environment

• Society reaps the full benefit of its substantial investment in NOAA’s science and services if the public understands our information

• NOAA needs a highly skilled workforce, including meteorologists, oceanographers, cartographers, and engineers, to achieve its mission

• NOAA’s marine protected areas provide excellent venues to explore real world connections between science and the environment

• NOAA leads the nation in many aspects of Earth system science and is a valuable education resource
NOAA Education Assets

- Observations and monitoring
- Data management and display
- Research
- Modeling, predictions and projections
- Resource management
- Partnerships
- More than 600 educators, extension agents, communicators and outreach specialists
NOAA Employees Across the Country

NOAA employees focus on education in Sanctuaries, Reserves, Sea Grant, Weather Service, and more…
Major NOAA Education Programs

• **Education Office** - Leads the Education Council and provides competitive grants, student opportunities and support for minority serving institutions

• **National Sea Grant Program** - Provides educators with insight into marine issues and research through a network of 31 university-based programs

• **National Marine Sanctuaries** - Enhances understanding of sanctuaries and marine environments through a network of 14 National Marine Sanctuaries

• **National Estuarine Research Reserves** - Promotes education linked to research and stewardship through a network of 27 estuarine areas

• **National Weather Service** - Brings weather expertise into the classroom through a network of 122 Weather Forecast Offices

• **Climate** - Advances climate literacy through coordinated climate education programs (e.g., climate literacy principles) and support of graduate education

• **Ocean Exploration** - Connects teachers to ocean exploration expeditions

• **Teacher at Sea** - Send K-16 teachers to sea aboard NOAA research and survey ships to work under the tutelage of scientists and crew
Connecting the Public to the Changing Earth System

Big Picture

Focused Study

Bioluminescence And The Actin Cytoskeleton In The Dinoflagellate Pyrocystis fusiformis

Earth’s Ocean and Atmosphere

Basic, integrated approach to science

Science study specialized, not integrated

Return to basic, integrated approach to solving problems

Global Impact of El Nino
Changing Conditions in Climate, Weather, Ocean and Coasts

In the News

Mountain Pine Bark Beetles

Utah largest fire in history

Record drought in the southeast

Arctic Sea Ice Cover Shatters all Previous Record Lows

Coral reefs in crisis

Janet Tornadoes
New Climate Change Report
June 2009

- Global Climate Change Impacts in the United States
- Released June 16, 2009
- Includes key findings, climate change impacts by regions, and climate change impacts by sector
Climate Change: Key Findings

- Global warming is unequivocal and primarily human-induced.
- Climate changes are underway and are projected to grow.
- Widespread climate-related impacts are occurring now and are expected to increase.
- Climate change will stress water resources.
- Crop and livestock production will be increasingly challenged.
- Coastal areas are at increasing risk from sea-level rise and storm surge.
- Thresholds will be crossed, leading to large changes in climate and ecosystems.
- Future climate change and its impacts depend on choices made today.
• Impacts provided for 9 regions

• Alaska impacts:
  • Longer summers and higher temperatures are causing drier conditions, even in the absence of strong trends in precipitation.
  • Insect outbreaks and wildfires are increasing with warming
  • Thawing permafrost damages roads, runways, and water and sewer systems
  • Coastal storms increase risks to villages and fishing fleets
  • Displacement of marine species will affect key fisheries
Climate Change
Sectoral Impacts

• Impacts provided for 7 sectors

• Health impacts:
  • Increases in the risk of illness and death related to extreme heat and heat waves are very likely
  • Warming is likely to make it more challenging to meet air quality standards necessary to protect human health
  • Extreme weather events cause physical and mental health problems. Some of these events are projected to increase
  • Some diseases transmitted by food, water, and insects are likely to increase
  • Rising temperature and carbon dioxide concentration increase pollen production and prolong the pollen season in a number of plants with highly allergenic pollen
Opportunities to Educate

• Changing the focus of NOAA from a science agency that provides service to a service agency that conducts science

• Finding better ways to communicate NOAA related science

• Leveraging partnerships

• Some examples…
NOAA runs more than 55 scholarship, internship and fellowship programs (www.oesd.noaa.gov) reaching hundreds of students every year:

- 9 High School
- 23 Undergraduate
- 17 Graduate and
- 6 Post Docs

- Recruit, select, place, mentor and evaluate students
Reach the Public through Local Weather Reports

- Most Americans receive environmental information from the media
- #1 reason people watch the news
- Local weather reports use visuals to present complex science topics
- Viewers are in a “learning mode”
Encourage Envirocasting

- Help transform weather casts into envirocasts
- Earth Gauge provides weekly emails with tailored, science-based information tied to the 3-day forecast
- Provides easy viewer action tips [http://www.earthgauge.net/](http://www.earthgauge.net/)
- Reaches more than 177 million television viewers
- Need more “envirocast” insights, tips and subscribing stations
Contribute to the Ocean Today Kiosk

- The kiosk uses multi-media experiences to increase understanding of the ocean [http://www2.nos.noaa.gov/oceannewskiosk/](http://www2.nos.noaa.gov/oceannewskiosk/)
- Available to more than 12 million people through museums, aquariums and visitor centers
- Content updated over night
- Need more installations, content and maybe regional feeds
Promote Spherical Displays

- Science on a Sphere, Magic Planet and more
  - Compelling visuals
  - Creates a strong connection to the planet
  - Available to 11 million people
  - Science on a Sphere is currently displayed in 34 locations reaching more than 11 million people [http://www.oesd.noaa.gov/network/](http://www.oesd.noaa.gov/network/)
- Need more installations and content
Expand Use of Literacy Principles and Concepts

• Climate and Ocean Literacy Principles and Concepts
  http://www.coexploration.org/oceanliteracy/documents/OceanLitConcepts_10.11.05.pdf
  • Community driven efforts to clarify content fundamentals
  • Used as guiding document by teachers, science centers, museums, associations
  • Ocean Literacy scope and sequence being developed
  • Get the Climate and Ocean Literacy Guides to potential users
Partner with K-12 Schools

• Bay-Watershed Education and Training (B-WET)
  • Provides grants of up to $300K to external partners to integrate classroom instruction with meaningful outdoor experiences
  • Programs in Chesapeake Bay, California, Hawaii, New England, Gulf of Mexico, and Pacific Northwest  http://www.oesd.noaa.gov/BWET/
  • Managed in partnership with Sanctuaries, Fisheries, Chesapeake Bay Office and Coastal Services Center
  • Get involved with B-WET projects in your community
Explore More Opportunities

• Send a teacher to sea (Teacher@NOAA)

• Sponsor a girl or boy scout weather or environmental merit badge

• Visit the NOAA island in Second Life
  http://www.youtube.com/watch?v=is8YX32GAyQ
  http://slurl.com/secondlife/Meteora/177/161/27/

• Play computer games or help build one (games.noaa.gov)

• Contact the NOAA Educational Outreach Unit
  (http://www.education.noaa.gov/contacts.html)

• And much more…
Questions?