



# Climate Stewards

"It is better to teach people in advance about the environment, than to reverse the damage they do..."

6<sup>th</sup> grade student



# Why This, Why Now?

- The public has many misconceptions about climate science, climate change, and global warming.
- Increasing environmental literacy and active stewardship is a major education goal for NOAA.
- NOAA has many education networks positioned to take advantage of climate education.
- There are an increasing number of opportunities and resources for educators in climate science.
- Weather and climate have always been a topic of high interest for many educators and citizen scientists.

# The NOAA Climate Stewards Leadership Team

- Peg Steffen/Bruce Moravchik/Billy Sweet  
**National Ocean Service**
- Frank Niepold, **Climate Office**
- Ron Gird/Judy Koepsell,  
**National Weather Service**
- Kate Thompson/Tracy Hajduk  
**National Marine Sanctuaries**
- Atziri Ibanez/Amy Clark/Kristin Van Wagner  
**National Estuarine Research Reserves**
- Paulo Maurin, **Coral Program**
- Molly Harrison/Jennifer Hammond  
**National Marine Fisheries Service**
- Nina Jackson, **NESDIS**

# Program Overview

- Nation-wide program led by NOAA Ed. Community
- For formal and informal educators, citizen scientists
- Distribution of climate science data, professional development, place-based field opportunities and teaching tools
- Support system with mini-grants to implement action plans for local environmental stewardship projects
- Expand support and the numbers of educators served on a yearly basis as funding allows

# Phased Approach

## Phase I : Pilot Now in Progress

### Educator Emphasis

- Increase the **content knowledge** in climate and related sciences
- Increase the ability to **identify and use scientifically credible** resources and processes
- Increase **participation in active environmental stewardship**

## Phase II : Future Potential with Funding

### Student Emphasis

- Increase the **content knowledge** in climate and related sciences
- Increase the ability to **identify and use scientifically credible** resources and processes
- Increase **participation in active environmental stewardship**
- Increase **knowledge about careers** in climate and related sciences

# NOAA will provide:

- Collaborative program leadership
- Access/training in the use of data resources, digital tools, innovative technology applications
- Wide array of short and long duration professional development opportunities
- Access to NOAA scientists and education specialists
- Communications network and information distribution system in cooperation with National Science Teachers Association
- Formal program evaluation

# Access to Opportunities

- High Tech learning
- Professional development online, at conference, summer
- Field opportunities
- Access to resources
- Support to attend and present at conferences
- Support for local projects





# Finding and Using Climate Data

NOAA Climate Services - Portal / Education / Teaching Resources - Mozilla Firefox

NOAA HOME WEATHER OCEANS ESTUARIES CHANGING SATELLITES CLIMATE RESEARCH COASTS CAREERS

**NOAA CLIMATE SERVICES** Development Prototype

Explore: ClimateWatch Magazine Data & Services Understanding Climate Education

Teaching Resources Professional Development Multimedia

**Featured Teaching Resources**  
Browse Features: 1 2 3 4

**Educational Resources**

- Climate Change: Is It Getting Hot in Here? (Grades: 8-12) More info
- Global patterns in Greenhouse and Ozone-deven (Grades: All) More info
- Normal Climate Patterns (Grades: 4-7) More info

**Related Portal Resources**

- An Amazing Climate: Ocean Acidification More info
- Energy Overview More info
- Global Climate Change in the United States report More info

Climate Timeline Information Tool - Mozilla Firefox

NOAA Home Page NOAA Helpline Getting Started Latest Headlines

Climate Timeline

Data Access Tutorial Glossary About CTL

**Exploring Weather & Climate Change Through the Powers of 10**

Climate Timeline Summary

Drag your mouse over the Timeline below for a snapshot of the scientific processes (Climate Science) and events (Climate History) of each period or click on timeline for more.

**Interannual to Decadal Scale**  
The oceans, with their great heat capacity and slowly changing properties, give rise to cycles in climate like El Niño and La Niña. Along with climate change, can occur within a ten year period.

**Climate Science: Investigating Climate and Environmental Processes**

**Climate History: Exploring Climate Events and Human Development**

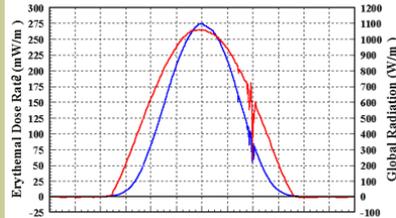
**Past Ten Years**  
ERO's been pulses of El Niño warming and La Niña cooling have impacted socio-ecological conditions in many parts of the world.

See Variability Variance

Weather and climate are always in flux, always changing. At times the changes can be sudden and dramatic, while on other occasions the changes are subtle and occur over long periods of time. What are the primary causes and effects of these changes? How do they relate to our everyday lives and to human history? These and other questions we explore in the Climate Timeline.

The Climate Timeline uses a "powers of ten" exponential approach (see CTL Overview) to frame 1) meteorological and climatic processes (Climate Science) and 2) specific climate events of the past

Diurnal Variation of Global and Ultraviolet Radiation



Diurnal Variation of Surface Temperature



**Data in the Classroom**

About NODE Project Downloads

Investigate Earth processes using real data:

- El Niño
- Sea Level
- Water Quality In development

**Sign up**  
Step 1 Teachers, if you are interested in helping us test the new curriculum modules for this project, please take a moment to register and sign up.

**Use the curriculum**  
Step 2 Once you've registered, feel free to try any of the curriculum modules shown above. The El Niño and Sea Level modules are available now.

**Tell us what you think**  
Step 3 After using the curriculum, be sure to fill out an evaluation survey. You can earn continuing education credits through the University of Wisconsin.

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Science & Data: Facts, Research, Estuarine Data, NERRS Living Classrooms and Living Laboratories, Animations, Maps - Mozilla Firefox

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Curriculum Overview Earth Science Life Science Physical Science Chesapeake Bay Classroom Activities Teacher Training

**Science & Data**

Taking the Pulse of Our Estuaries

Water Temperature Dissolved Oxygen Salinity Land use

Access real-time data - Coming Soon!

National Estuarine Research Reserve System

How is data collected?  
All 27 reserves use same monitoring equipment, similar monitoring schedules and protocols. Data is collected, transmitted & interpreted real-time.

Monitoring the Health of Our Estuaries

The National Estuarine Research Reserve System-wide Monitoring Program (SIVAMP) tracks short-term variability and long-term changes in estuarine waters to understand how human activities and natural events can change ecosystems.

Dissolved Oxygen Salinity Precipitation

# Expectations for Participants

- Attend monthly telecons
- Complete 15 hours of professional development training in climate science and education applications
- Develop and implement an action plan
- Track the professional development and action plan progress on NSTA online system
- Participate in online learning communities
- Provide feedback on the program development
- Continue to participate in professional development opportunities each year of the project

# Keeping us organized

The screenshot shows the NSTA Learning Center website. At the top, there are navigation links: "Back to NSTA.org", "Contact Us", "Help", and "Feedback". The main header features the NSTA Learning Center logo and a photograph of three people. Below the header is a navigation menu with tabs for "Home", "My Account", "Subjects", "Learning Resources & Opportunities", "Professional Development Tools", and "Education Administrator".

The main content area is titled "Welcome to Your Professional Development". It includes a paragraph of text and a small image of a woman. To the right of this section are links for "Login" and "[ Click Here to Log In Now ]", along with "RSS" and "SHARE" buttons.

Below the welcome message is a section titled "Explore Learning Opportunities" with a search bar and a "Go" button. There are also links for "See all FREE Resources" and "Advanced Search".

The "Explore Learning Opportunities" section is divided into three columns: "By Subject", "By Grade Level", and "By State Standards".

By Subject	By Grade Level	By State Standards
<ul style="list-style-type: none"><li>Earth &amp; Space Science</li><li>Life Science</li><li>Physical Science</li></ul>	<ul style="list-style-type: none"><li>Elementary</li><li>Middle School</li><li>High School</li><li>College</li></ul>	Select your state to begin: <input type="text" value="Choose a state"/>

At the bottom of this section, there are two icons: "Do-It-Yourself Learning" and "Live Online Seminars & Classes".

On the right side of the page, there is a "Most Popular Science Objects" section with a list of four items: "Energy: Different Kinds of Energy", "Plate Tectonics: Layered Earth", "Energy: Thermal Energy, Heat, and Temperature", and "Universe: The Sun as a Star". Below this is a "Multimedia Overview" section with a "View Overview of the NSTA Learning Center" button and a "Flash Player Required" warning. At the very bottom right, there is a "Free Learning Resources" section with a "Solar System: A Look at the" link.

# Pilot Educators

- 35 people were nominated by the NOAA team and represent K-12 teachers, informal educators and NOAA education networks including:
  - NERRS
  - National Marine Sanctuaries
  - AMS Atmospheric Educational Resource Agents
  - NWS Weather and Climate Observations managers
  - U. of Wisconsin, Madison, Cooperative Institute
  - Nauticus, Norfolk

# Schedule

- **Winter 2010** Needs assessment and telecons begin  
Ongoing PD Opportunities via web seminars, conference activities, summer opportunities
- **Spring 2010** Pilot educators achieve “certification” and submit action plans.
- **Summer, 2010** Extended PD opportunities
- **April 2010 – March 2011** Pilot educators complete action plans.
- **Summer/Fall 2011** Reporting and presenting at local, state, national conferences.

## Webinar Series

[http://learningcenter.nsta.org/products/symposia\\_seminars/fall09/NOAA/webseminar.aspx](http://learningcenter.nsta.org/products/symposia_seminars/fall09/NOAA/webseminar.aspx)

Date	Title	Featured Scientist(s)
November 5, 2009	“Climate Change, Here and Now: Western Regional Climate Impacts”	Katharine Hayhoe Texas Tech University
November 17, 2009	“Climate Change, Here and Now: Eastern Regional Climate Impacts”	Tim Owen NOAA NCDC
December 15, 2009	“Monitoring the Impacts of Climate Change on Corals”	Mark Eakin NOAA Coral Reef Watch
January 14, 2010	“Higher Than a Sea-Bird’s Eye View: Coral Reef Remote Sensing Using Satellites	Margaret Mooney Steve Ackerman CIMSS, U.W, Madison
April 20, 2010	“Impact of Climate Change on West Coast Marine Mammals”	Siri Hakala, NMFS
April xx, 2010	“Impact of Climate Change on East Coast Fisheries”	NMFS TBD
Fall 2010	“Climate Change and Ocean Acidification”	CRCP TBD
Fall 2010	“Climate Change and Sea Level Rise”	William Sweet NOS CO-OPS
November 10, 2010	“Climate Change and Coastal Communities”	Chris Bowser and NERRS Climate Education Working Group

# Special Events at NSTA

<http://www.nsta.org/conferences/2010phi/?lid=tnavhp>

**A half-day symposium, "Climate Change Here and Now: Coastal, Ocean and Atmospheric Impacts" on March 18**

**Dr. Jane Lubchenco**

**Presentation: Building an Environmentally Literate Workforce through STEM Education**

**March 19**

# A Day for Climate – NSTA

<http://www.nsta.org/conferences/2010phi/?lid=tnavhp>

“Whither Arctic Sea Ice? – An Earth Exploration Toolbook  
Chapter on the Climate’s Canary in a Coal Mine”

“Explore Earth’s Systems Using the 2007 GLOBE Earth  
System Poster”

“The Coastal Impacts of Climate Change: Sea Level Rise”

“Climate Change Wildlands and Wildlife Toolkit”

“Corals and Climate Change”

“Climate Information in Your Neighborhood”

“Using Data to Teach About Climate Change in Estuaries  
Nationwide”

Climate change is the defining  
environmental issue of our  
time.....



Join us on the Journey