

NOAA Technology in Education Survey

January 2011

NOAA Education Council CONNECTS Working Group

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About the Survey

This is NOAA’s first attempt to gather an overview of some of its most significant educational projects involving innovative technology. It was not meant to be comprehensive or to catalog every project under this category, but rather to list some of the efforts that sample new educational approaches within the agency. The survey was kept purposely short, at 17 questions, and completed by November 2010. A total of 13 NOAA programs completed the survey, outlining a total of 46 projects. Each member of the NOAA Education Council was asked to list up to five of their most representative projects that would fit under the definition offered below.

Educating with Innovative Technology

“The process of using a variety of hardware or software applications to provide meaningful experiences that use non-traditional means (i.e., not textbooks) to engage the user in learning activities. Innovative technologies should provide a novel experience to the user, thereby captivating them to explore a topic or activity in greater detail.”

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Highlighted Projects

- **Website**

Office of Ed Redesigned Website: Thematic collections, RSS feeds, quality control, user-centric, includes a mobile enabled version for smart phone/tablet use.

- **Virtual World**

NOAA CC Virtual Conference: Professional development will be delivered via virtual platforms (Second Life and others) in the near future to expand asynchronous opportunities. These will include presentations in a virtual conference center, discussions, and tours of virtual places.

- **Distance Learning**

Designing Education Projects: Online course delivered by Office of Education on UCAR's MetED system utilizing MOODLE course management software. Skype and web conferencing are also used to facilitate online portion of course. Course is focused on development of education projects including logic modeling, needs assessments, and smart objectives.

- **Educational Gaming**

NOS Games – with dozens of game, two of the developed in close partnership with a community college, and an estimated usership of 4M/yr.

MIT Sea Grant's Sea Perch: An innovative underwater robotics program that trains teachers - who then train their students - to build an ROV, or remotely operated vehicle. The program, started by MIT Sea Grant (MITSG) in 2003, is aimed at igniting children's enthusiasm for science, technology, and engineering.

- **Web 2.0**

Climate Stewards Education Program Wiki: a Wiki designed for program participants allowing sharing of resources and action plan ideas

- **Interactive/Computer Animation**

Ocean Today Kiosk: a highly dynamic, visitor-friendly experience designed initially for the Sant Ocean Hall in the Smithsonian Institution's National Museum of Natural History. Each kiosk is comprised of an independently operated 32-inch touch-screen display and, directly above it, a 42-inch echo monitor.

- **Data Sharing**

NODE – Data in the Classroom: online scalable modules with lesson plans linked to real and real-time NOAA data, with Flash-based interactive elements.

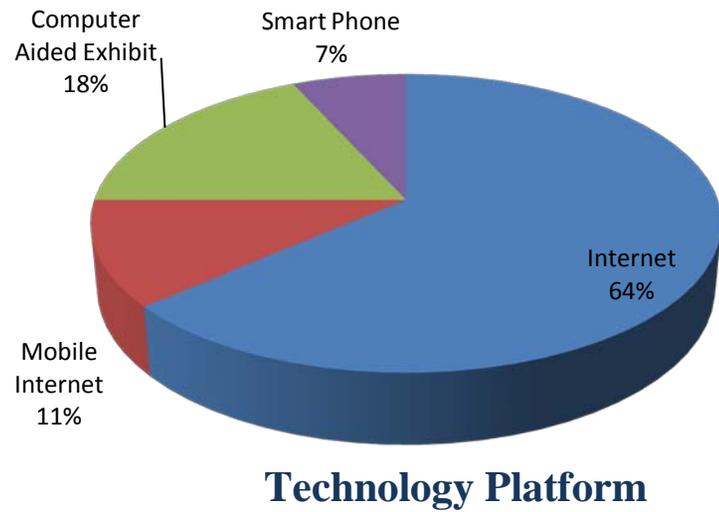
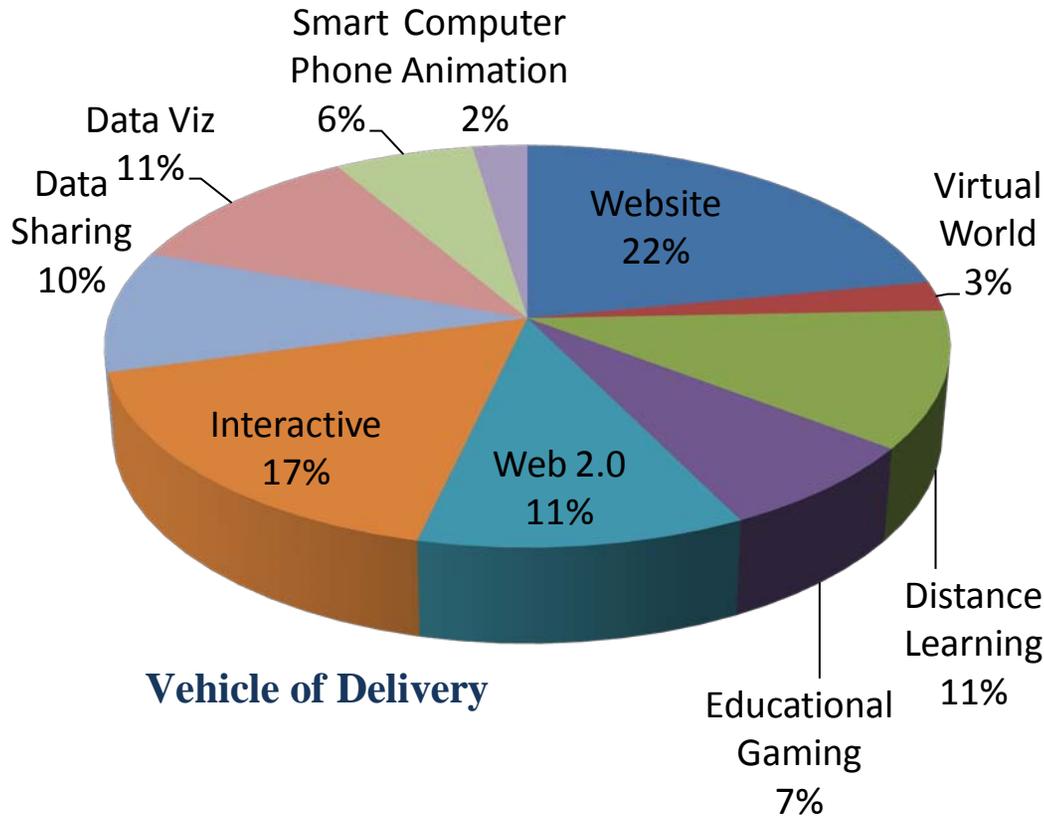
- **Data Viz**

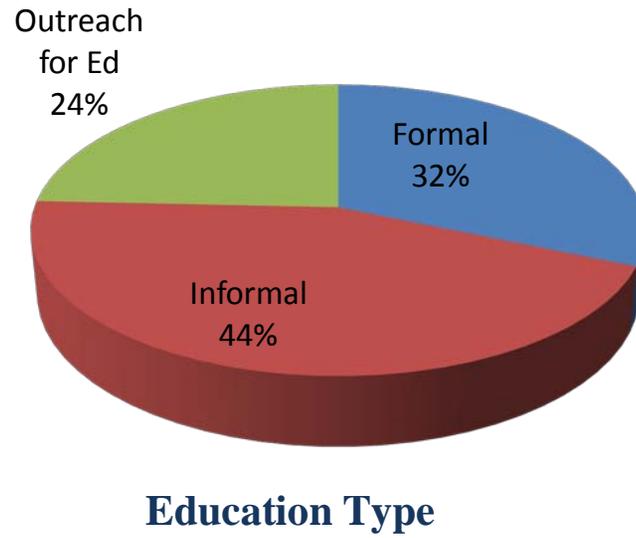
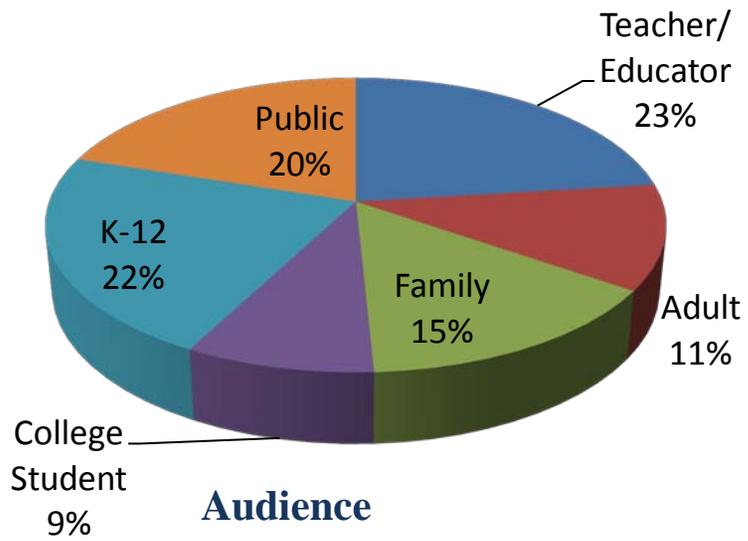
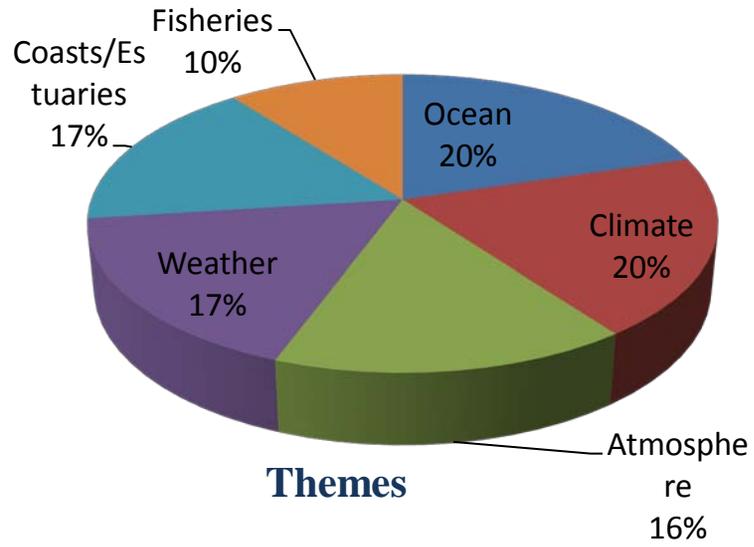
Environmental Visualization Lab's Real-Time Data Feeds: provide data analysis, and the lab's Interpretation of Real-Time Weather and Climate Data, both for SOS.

- **Smart Phone**

Tsunami Preparedness Mobile App: mobile app that use cutting edge technology to prepare users for natural disasters and

Visual Data Summary





1) Sanctuaries

OceanLive

A collection of multimedia and web resources that focuses on ocean expedition and media materials.

<http://isc.gso.uri.edu/oceanslive>

Launch	2005
Upgrade	Re-launch 2011
Vehicle	Website, distance learning, web 2.0, live feed programming
Theme(s)	Ocean, Climate, Coasts/Estuaries
Audience	Teacher/Educator, Adult, Family, K-12, Public
Usership (yr)	150 K- 1.6 million (depending on live feeds)
Type	Formal, Informal, Outreach
External Partners	University of Rhode Island, Institute for Exploration, Immersion Learning
Cost	\$150K
Documentation?	N

2) NOAA Environmental Visualization Lab

Real Time Data Feeds

The VisLab processes NOAA satellite and climate analysis data for use by the Science on a Sphere Network and Ocean Today Kiosks.

Launch	()
Upgrade	8/12/2010
Vehicle	Data Visualization/Animation
Theme(s)	Ocean, Climate, Atmosphere, Weather
Audience	Family, Public
Usership (yr)	()
Type	Informal
External Partners	()
Cost	()
Documentation?	N

Interpretation of Real-Time Weather and Climate Data for Spherical Displays and Online Access

In Partnership with the University of Wisconsin and University of Maryland, the VisLab will be generating real-time data imagery, annotations, talking points, and supplementary videos for docents

associated with the Science on a Sphere Collaborative Network, as a part of an Environmental Literacy Grant funding opportunity through the NOAA Office of Education.

Launch	11/2011
Upgrade	()
Vehicle	Data Visualization/Animation
Theme(s)	Ocean, Climate, Atmosphere, Weather
Audience	Family, General Public
Usership (yr)	()
Type	Informal
External Partners	University of Wisconsin Cooperative Institute for Satellite Studies, University of Maryland Cooperative Institute for Climate and Satellites
Cost	\$1.2 M
Documentation?	Y (TBD)

NOAA Earth and Environment Explorer (E-3)

Entry-level data portal providing satellite and climate data and imagery specifically tailored for use by educators (formal, informal), science-interested public, and media.

Launch	TBD
Upgrade	()
Vehicle	Data Sharing/Citizen Science, Data Visualization/Animation
Theme(s)	Ocean, Climate, Atmosphere, Weather
Audience	Teacher/Educator, Adult, K-12, General Public
Usership (yr)	()
Type	Formal, Informal
External Partners	University of Wisconsin CIMSS
Cost	\$300K
Documentation?	Y

NOAA Environmental Visualization Lab Website

Multi-media website that serves a variety of data visualization products including imagery, animations, real-time data, and spherical displays content. Daily updates. Incorporates RSS.

Launch	05/2009
Upgrade	03/2010
Vehicle	Website, Web 2.0
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries, Fisheries
Audience	Teacher/Educator, Adult, Family, College Student, K-12, General Public
Usership (yr)	()
Type	Informal
External Partners	()

Cost	\$35K
Documentation?	N

NOAA Visualizations YouTube Channel

Complimentary to the Environmental Visualization Lab's main website, the YouTube Channel provides another distribution mechanism for the Lab's animations.

Launch	11/2007
Upgrade	08/2010
Vehicle	Web 2.0, Data Visualization
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries, Fisheries
Audience	General Public
Usership (yr)	100,000 views/year
Type	Informal
External Partners	()
Cost	No cost
Documentation?	N

3) NOAA Coral Reef Conservation Program

Ocean acidification NODE module

The module integrates 5 scalable lesson plans with a dedicated web interface for students and teachers to obtain near real-time and archival OA data. Aiming for 10-11 grade HS chemistry and biology students and teachers.

Launch	3/2011
Upgrade	()
Vehicle	Website, Interactive, Data Sharing, Integration with NOAA DBs (Flash-based)
Theme(s)	Ocean, Climate
Audience	K-12
Usership (yr)	TBD
Type	Formal
External Partners	()
Cost	\$40K
Documentation?	N

CRCP Website (updated)

CRCP site was updated to a dynamic website: it includes RSS feeds (upcoming), video, interactive multimedia (interactive reef flash), frequently updated coral news. The site also offers modern cascading navigation menus.

Launch	11/2009
Upgrade	11/2009
Vehicle	Website
Theme(s)	Ocean, Climate
Audience	General Public
Usership (yr)	300K/yr
Type	Outreach for Education
External Partners	()
Cost	\$50K
Documentation?	N

CRCP Facebook page

Using Fb page as unifier for comm/ed portion of a decentralized program, combining outreach efforts of both program HQ and field labs and cruises. It will bring together a number of separate efforts that yield relatively following. It will be used to also update on coral environmental news (spawning, bleaching) tracked by CRCP. So while FB itself is not necessarily innovative, the planned use for the coral profile (multiple, decentralized admins across a large geographical area) is somewhat innovative.

Launch	11/2011
Upgrade	NA
Vehicle	Web 2.0
Theme(s)	Ocean
Audience	General Public
Usership (yr)	TBD
Type	Outreach for Education
External Partners	()
Cost	TBD (small)
Documentation?	N

Coral App

Early planning stages of coral app - Application will provide dynamic fishing regulations and CRCP location-relevant data (bleaching, etc). App will allow fish measurement and aid in the ID of species, and local fish biomass.

Launch	Est. Summer 2011
Upgrade	N/A

Vehicle	Smart Phone App
Theme(s)	Ocean, Fisheries
Audience	General Public
Usership (yr)	TBD
Type	Outreach for Education
External Partners	Florida state staff
Cost	\$80,000
Documentation?	N

Ocean Acidification DVD

Compilation of ocean acidification resources - will have green-screen taped presentation overlaid with slideshow, several specially designed interactive Flash animations, and be integrated with the NODE OA module.

Launch	March 2011
Upgrade	()
Vehicle	DVD
Theme(s)	Climate
Audience	Teacher/Educator
Usership (yr)	N/A
Type	Formal
External Partners	()
Cost	\$20,000
Documentation?	N

4) OAR/Sea Grant

Wisconsin Sea Grant

Onboard and Online: Education Aquanaut Program in Aquatic Sciences: The program that includes interdisciplinary research that will integrate with pedagogy and hands-on activities. Activities include cruises aboard the R/V Neeskay, lab analysis and applications. Utilizing the knowledge from the different components, teachers will put together laboratory analysis, and context-based interpretations into a final poster. Goals and Objectives: This program seeks to provide exciting, immersion science learning for public educators and teachers of primarily middle school students, produce curriculum modules for use in equally exciting, in-school or in-center hands-on learning activities.

Launch	Fall 2010
Upgrade	()
Vehicle	Website, Distance Learning
Theme(s)	Climate, Coasts/Estuaries, Invasive species

Audience	Teacher/Educator, K-12
Usership (yr)	()
Type	Informal
External Partners	University of Wisconsin-Milwaukee Great Lakes WATER Institute
Cost	\$20,000 (Sea Grant Component - \$10K); \$2000 for Maintenance
Documentation?	()

Hawaii Sea Grant

Exploring our Fluid Earth: NOAA Ocean Science Curriculum, Teacher Professional Development and Public Outreach: This project will develop, evaluate and distribute an online curriculum consisting of six coastal and ocean science curriculum modules and student materials for middle and high school level. Our project will also include an extended television series highlighting scientist case studies in an original statewide television series (also available online).

Launch	July 2011
Upgrade	()
Vehicle	Interactive
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries, Fisheries
Audience	Teacher/Educator, Adult, Family, College Student, K-12, General Public
Usership (yr)	The different components of the project will naturally have differing levels of interaction. We anticipate usership of the complete online curriculum by at least 1,000 students statewide. We anticipate that a minimum of 10,000 additional users will view and utilize parts of the site. Based on data from our local cable provider, OCEANIC Time Warner, and the fact that 90% of households and 90% of visitors watch the local channel OC16 where our show will be aired, viewership of the televised ocean science series will number approximately 2 million viewers annually.
Type	Formal, Informal
External Partners	University of Hawaii at Manoa's Curriculum Research and Development Group (CRDG)
Cost	\$500K/year for first 3 years; \$20K/year after that
Documentation?	Works cited list for this project available in Survey Monkey

MIT Sea Grant Sea Perch Project

Sea Perch is an innovative underwater robotics program that trains teachers - who then train their students - to build an ROV, or remotely operated vehicle. The program, started by MIT Sea Grant

(MITSG) in 2003, is aimed at igniting children's enthusiasm for science, technology, and engineering. The program takes its inspiration from the design presented in "Build Your Own Under Water Robot and Other Wet Projects" by Harry Bohm and Vickie Jensen. Using that simple design, Dr. Tom Consi (a former post-doc and research engineer for MITSG) introduced the Sea Perch ROV to MIT's Ocean Engineering program in a 1997 seminar that evolved into MIT's "Discover Ocean Engineering Program" for pre-freshman. <http://seaperch.mit.edu/>

Launch	2003
Upgrade	2009
Vehicle	Interactive
Theme(s)	Ocean, Coasts/Estuaries, Fisheries
Audience	Formal, Informal, Outreach for Education
Usership (yr)	Depends on what is defined as "usership." Is it website hits, teachers trained, students involved, schools participating, etc?
Type	Formal, Informal, Outreach for Education
External Partners	University of Pierre and Marie Curie/Total (France) Cyprus Institute Around the Americas
Cost	()
Documentation?	Y (on website, seaperch.mit.edu)

5) National Weather Service

Owlie Skywarn/Young Meteorologist Program

The Young Meteorologist Program centerpiece is an interactive computer game that asks children in elementary, middle, and high school to follow a 21st century Owlie on an adventure where they encounter hurricanes, tornadoes, floods winter storms, earthquakes, and tsunamis. Along the way, players are taught about severe weather science and safety. ~~Embedded into the play are t~~Test questions are embedded into the game. ~~that p~~Players must answer successfully in order to proceed.

Launch	Summer 2010
Upgrade	Summer 2010
Vehicle	Website
Theme(s)	Weather, Safety
Audience	Family, K-12, General Public
Usership (yr)	1000 Middle School Students
Type	Informal
External Partners	Plan!TNOW organization American Meteorological Society National Education Association
Cost	Product launched summer of 2010 Cost: Private Sector Organization
Documentation?	N

Xtreme Weather Project

An interactive program for middle school students to teach basics of severe weather in their community and safety preparedness.

Launch	2004
Upgrade	2004
Vehicle	Interactive
Theme(s)	Weather
Audience	K-12
Usership (yr)	1000 middle school students in Illinois
Type	Formal
External Partners	Illinois Education Association
Cost	(Unknown)
Documentation?	N

NWS Hurricane Strike

The publication is an update to our popular module "Hurricane Strike!" Designed primarily for middle school students, this module uses an engaging and interactive scenario to frame learning activities that focus on hurricane science and safety. Versions of the module are also available for hearing, motor, and visually impaired students, as well as Spanish-speaking students.

Launch	2000
Upgrade	2010
Vehicle	Website, Educational Gaming
Theme(s)	Weather
Audience	Teacher/Educator, Adult, Family, K-12, General Public
Usership (yr)	()
Type	Informal
External Partners	COMET
Cost	()
Documentation?	N

NWS/AWS WeatherBug External Partnership

Collaboration between NWS and AWS. NWS receives real-time weather observations from over 8000 AWS schools nationwide. The data is used in local forecast models generated by NWS-NCEP.

Launch	1995
Upgrade	()
Vehicle	Website

Theme(s)	Climate, Atmosphere, Weather
Audience	Teacher/Educator, K-12, General Public
Usership (yr)	()
Type	Informal
External Partners	AWS Convergence Technologies, MD
Cost	None (for NWS)
Documentation?	N

6) NOAA Satellite and Information Service

NOAA's Out of this World Dictionary

DVD. A 250 word Dictionary of scientific terms and 4 interactive games with instructions.

Launch	July 2010
Upgrade	July 2010
Vehicle	Educational Gaming, Interactive
Theme(s)	Climate, Atmosphere, Weather, Satellites
Audience	Teacher/Educator, Adult, Family, College Student, K-12, General Public
Usership (yr)	5000
Type	Informal, Outreach for Education
External Partners	NASA (used some of their graphics)
Cost	\$15K
Documentation?	Y

CLOUDS: A NOAA Science Adventure CD-Rom

Tells an informative and adventurous story with facts about the characteristics of clouds. ~~Then there is~~ a questions and answer session [follows the story](#) to test ~~your~~ knowledge [and recall of the information presented](#). [This story is available in both](#) English and American Sign Language.

Launch	June 2009
Upgrade	June 2009
Vehicle	Educational Gaming, Interactive, Computer Animation
Theme(s)	Atmosphere, Weather, Satellites
Audience	Teacher/Educator, K-12, General Public
Usership (yr)	2,000
Type	Informal, Outreach for Education
External Partners	()
Cost	\$15K
Documentation?	Y (Feedback from a Teacher Conference and

	research by the vendor)
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Looking Up at the Sky with NOAA

Activity Book. Designed for grades 3-6. [Talks-Teaches](#) about satellites and weather topics, with samples, definitions, web sites, activities [w/answers](#) and a list of resources.

Launch	July 2010
Upgrade	July 2010
Vehicle	Website, Distance Learning, Educational Gaming, Interactive, Hardcopy distribution
Theme(s)	Atmosphere, Weather
Audience	Teacher/Educator, K-12, General Public
Usership (yr)	2,000
Type	Informal, Outreach for Education
External Partners	()
Cost	\$10K
Documentation?	N

7) NOAA, NODC, LISD

OceanTeacher for IOC, IODE

Provides capacity building education in marine data and information to developing countries which are members of the Intergovernmental Oceanographic Commission Data Centers. Uses Moodle and Mediawiki as well as video captures of programs.

Launch	()
Upgrade	()
Vehicle	Dist Learning, Web 2.0
Theme(s)	Oceans, marine data and marine information
Audience	Adult
Usership (yr)	()
Type	Informal education/Outreach
External Partners	()
Cost	\$5k
Documentation?	N

8) Bay Watershed Education and Training

The Intersection of Life and Land: Impacts of Land Use Practices on the Chesapeake Bay

www.buoybay.org

<http://chesapeakebay.noaa.gov/community-generated-observations/student-built-buoys>

(Incorporates the NOAA Chesapeake Bay Interpretive Buoy System and “Build-a-buoy” and “Basic Observation Buoy-BOB” programs)

Mary Baldwin College (MBC) is working with teachers and high school students at two regional Governor’s Schools to develop a Community Generated Observation program in the region to help K-12 students monitor stream quality. Students will use the system to compare local data to Chesapeake Bay Interpretive Buoy System (CBIBS) data. Governor’s School students will develop the project (including designing the buoy and determining site locations) and introduce the Buoy program to elementary students through an outreach “build a buoy” effort.

Launch	()
Upgrade	()
Vehicle	Website, Interactive, Data Sharing/Citizen Science
Theme(s)	Coasts
Audience	K-12
Usership (yr)	1000 students/year
Type	Formal
External Partners	Mary Baldwin College
Cost	\$357K for 3 years
Documentation?	N

The Ho`okuleana Project for Educators

The Ho`okuleana Project will include a professional development workshop that offers training in the areas of environmental science, field research methodology and data collection tools and protocol, and Native Hawaiian cultural concepts in order to advance the participants’ understanding of the overall Ahupua`a system and conservation issues, and to prepare them to use innovative technology to implement year-long environmental monitoring projects with their students. The project aims to improve effectiveness with students by supporting the participating educators throughout the school year through an intersession professional development event, online resources, and field activity support. At the close of the year-long project, participants present their final projects in a public forum hosted by a public school on Moloka`i. Includes the Digital Bus program, which offers a mobile science-education platform to grades K-12.

Launch	July 2009
Upgrade	New grant award funding
Vehicle	Website, Web 2.0, Data Sharing/ Citizen Science
Theme(s)	Coasts/Estuaries
Audience	Teacher/Educator, K-12
Usership (yr)	22 teachers/300 students in 2010/2011

Type	Formal
External Partners	The Alaka`i Foundation (B-WET grantee), Moloka`i Complex Area schools, HiDOE, Department of Land and Natural Resources Division of Aquatic Resources Maui Coastal Land Trust, Hawaii Nature Center, Office of Hawaiian Affairs, Project S.E.A.-Link
Cost	\$181,349/year
Documentation?	N

Finding the Nexus of School, Community and Government in the Watershed

Under a NOAA New England B-WET grant, teachers from Cohasset, MA Middle High School and the Center for Student Coastal Research (CSCR) engage 200-plus students in a Summer Institute to address local pollution issues at 3 NOAA Restoration sites and Cohasset Harbor, and to strengthen their STEM proficiencies in a “Science after School” watershed academy in which students are challenged to serve as community partners producing locally relevant professional caliber scientific work.

Launch	October 2010
Upgrade	()
Vehicle	Website, Data Sharing/ Citizen Science
Theme(s)	Coasts/Estuaries
Audience	Teacher/Educator, K-12
Usership (yr)	()
Type	Formal
External Partners	Center for Student Coastal Research (CSCR) in Cohasset, MA (B-WET grantee)
Cost	\$5500/year
Documentation?	Y

Long-term Monitoring Program and Experiential Training for Students (LiMPETS)

The LiMPETS program is an environmental monitoring and education program for middle and high school students. Under the guidance of the LiMPETS staff, students conduct monitoring experiments in both the rocky intertidal and sandy beach ecosystems of the Monterey Bay area. Students are provided with background information, monitoring protocols and final assessment ideas - all linked to California State Science and Ocean Literacy Standards. Participants are provided with a monitoring handbook, equipment, an in-class introduction to the project and a training session at the monitoring site to ensure that consistent protocols are followed. LiMPETS staff provides training and offer support both in the classroom and in the field during all components of the program.

Launch	2002
Upgrade	2006
Vehicle	Website, Data Sharing/ Citizen Science
Theme(s)	Climate, Atmosphere, Weather, Coasts/Estuaries
Audience	Teacher/Educator, K-12, Adult, Family, College Student, General Public

Usership (yr)	1000/yr
Type	Formal
External Partners	Center for Student Coastal Research (CSCR) in Cohasset, MA (B-WET grantee)
Cost	\$5,500/year
Documentation?	Y (strategic plan)

Project Niu Watershed Education and Environmental Responsibility

Through outdoor scientific observations and ocean-going, GPS-tracked remote sensors, project Niu provides K-12 science students and teachers with hands-on, project-based experiences with the technologies used in remotely monitoring the ocean. Through deploying and tracking a high tech "message in a bottle" as it drifts out to sea, students develop an understanding of mankind's impact on the watershed while forming personal connections to the environment.

Launch	May 2007
Upgrade	Received Second B-WET Grant FY2008
Vehicle	Website, Web 2.0, Interactive, Data Sharing/ Citizen Science, Data Visualization, Smart Phone App
Theme(s)	Ocean, Coasts/Estuaries
Audience	Teacher/Educator, K-12
Usership (yr)	4 Teachers/120 students
Type	Formal
External Partners	Archinoetics, LLC (B-WET grantee) Kawanakoa Middle School
Cost	In first year of project total project cost \$170,132 (\$99,989 federal, \$70,243 match); Second year of funding: \$125,000/year (\$100,000 federal, \$25,000 match)
Documentation?	N

9) Office of Education

Science on a Sphere

Science On a Sphere (SOS)® is a room sized, global display system that uses computers and video projectors to display planetary data onto a six foot diameter sphere, analogous to a giant animated globe. Researchers at NOAA developed Science On a Sphere® as an educational tool to help illustrate Earth System science to people of all ages. Animated images of atmospheric storms, climate change, and ocean temperature can be shown on the sphere, which is used to explain what are sometimes complex environmental processes, in a way that is simultaneously intuitive and captivating. NOAA uses Science On a Sphere® as an instrument to enhance informal educational programs in science centers, universities, and museums across the country. The institutions that currently have NOAA's Science On a Sphere, as well as other partners who are creating content and educational programming for these systems, have formed a collaborative network that is currently made up of over 60 U.S. and international members. The Network shares information on the creation of new content, management of playlists, technical improvements, and different ways to use the sphere. A recent focus of the network has been the

establishment of guidelines for creating effective content for spherical display systems. The network has also been heavily focused on evaluation of the effectiveness of content delivery via the SOS system and regularly shares best practices and lessons learned.

Additionally the Office of Education supports the SOS Network to aid in informing investment and development decisions related to the SOS system and to provide a mechanism for member institutions to work together to maximize the effectiveness of SOS as an Earth system science education platform. OEd provides funding to support the use of spherical display systems to promote environmental literacy. OEd also supports workshops and meetings of the Network. The Network shares information on the creation of new content, management of playlists, technical improvements, and different ways to use the sphere. A recent focus of the Network has been the establishment of guidelines for creating effective content for spherical display systems. The Network has also been heavily focused on evaluation of the effectiveness of content delivery via the SOS system. The Network is currently focused on the formation of working groups to focus on specific topics.

There are currently over 50 Network members from variety of museums, science centers, and universities (mainly in the U.S. but also international). See the Network website for a complete list.

Launch	2005
Upgrade	10/2010
Vehicle	Data Visualization/Animation
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries
Audience	General Public
Usership (yr)	Over 50 member institutions, reaching millions of viewers per year
Type	Informal Education
External Partners	There are currently 60+ Network members from variety of museums, science centers, and universities (mainly in the U.S. but also international). See the Network website for a complete list.
Cost	An installation typically costs \$150,000
Documentation?	Y (eval and workshop reports from members, on SOS website)

NOAA Education Resources Portal

Education resources are distributed across many websites and program offices at NOAA and on NOAA partner websites. This portal is designed to assist educators in accessing these materials from one centralized interface. The content here is a sampling of NOAA's education resources and more can be found at each linked location. Materials selected for this site are organized by Themes, topical Collections, and content type that are aligned with common teaching topics and expressed needs of educators. Linked resources are organized into Collections which provide the user with a toolkit of materials and activities suitable for integration into a variety of educational settings. Collections are not grade specific but resources are labeled for grade appropriateness where applicable. Additional NOAA resources which support educator professional development, academic scholarship, career exploration, and education grants are also available. All materials linked from this site are free for use and distribution unless expressly noted.

www.education.noaa.gov

Launch	1995 (?)
Upgrade	09/2010 (soft launch); Spring 2011 (database backend)
Vehicle	Website (collaborative website with MySQL database and will metag all education resources it highlights).
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries
Audience	Teacher/Educator, Family
Usership (yr)	250,000 unique users per year
Type	Informal Education
External Partners	IMSG (contractor for database backend)
Cost	\$145K
Documentation?	Y (Style Guide for collection developer; White Pager about educator website)

Designing Education Projects (DEP)

Online course delivered by Office of Education on UCAR's MetED system utilizing MOODLE course management software. Skype and web conferencing are also used to facilitate online portion of course. Course is focused on development of education projects including logic modeling, needs assessments, and smart objectives.

<http://www.meted.ucar.edu/index.htm>

Launch	March, 2010
Upgrade	n/a (delivered 4 courses to date).
Vehicle	Distance Learning
Platform	Internet (non-mobile)
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries
Audience	Teacher/Educator
Usership (yr)	60 users
Type	Formal & Informal education
External Partners	University Corporation for Atmospheric Research (UCAR)
Cost	Nominal
Documentation?	N

10) Climate Program Office

Multigraph

Open source software that enables users to interact with graphed data on Web pages.

Users interact with graphs of global climate data to understand trends and variability over time.

Specifically, users click and drag to stretch out and/or compress the x and y axes of graphed data, helping them develop an intuitive sense of long term trends and variability of climate parameters.

Best Guidance Document Available

Launch	()
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Upgrade	May 2010(?)
Vehicle	Interactive
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries
Audience	Teacher/Educator, Adult, Family, College Student, K-12, General Public
Usership (yr)	()
Type	()
External Partners	()
Cost	Nominal
Documentation?	Y (Developer documentation available at multigraph.org)

Interactive Earth

An elegant and intuitive geobrowser, similar in some respects to Google Earth. A quicktime movie of the application in action is available here (NOTE: it's a very large file, but worth the wait.)

<http://ftp.terc.edu/pub/Users/ldahlman/iEarthDemo.mov.zip>

Launch	November 30, 2010
Upgrade	September 30, 2010
Vehicle	Virtual World, Interactive, Data Sharing/Citizen Science, Data Visualization
Theme(s)	Ocean, Climate, Atmosphere, Weather, Coasts/Estuaries, Fisheries
Audience	Teacher/Educator, Adult, Family, College Student, K-12, General Public
Usership (yr)	()
Type	Formal, Informal
External Partners	Worldlink
Cost	\$25K BAA to serve test version of application and two climate lessons
Documentation?	Y (One of the two activities is structured as a tutorial for exploring climate data.)

ESRL Global Monitoring Division Interactive Data Viewer

Site enables educators and learners to check what's in our atmosphere and how it is changing over time. Users select an atmospheric monitoring site from a map and generate graphs of the data that are gathered there. Includes carbon cycle gases, ozone, and halocarbons. NOTE: An instruction sheet to walk users through an example of using the graphing tool and interpreting the results will be posted on climate.gov by November 30.

Launch	November 30, 2010
Upgrade	()
Vehicle	Virtual World, Interactive, Data Sharing/Citizen Science, Data Visualization
Theme(s)	Climate, Atmosphere
Audience	Teacher/Educator, Adult, Family, College Student, K-12
Usership (yr)	()

Type	Formal, Informal
External Partners	()
Cost	\$0
Documentation?	N

11) National Ocean Service

Climate Change Virtual Conference

Professional development will be delivered via virtual platforms (Second Life and others) in the near future to expand asynchronous opportunities. These will include presentations in a virtual conference center, discussions, and tours of virtual places. The opportunities are intended for formal and informal educators and citizen scientists who want to increase their knowledge about climate science and impacts.

Launch	Winter 2011
Upgrade	n/a
Vehicle	Virtual World
Theme(s)	CC
Audience	Teacher/adult
Usership (yr)	TBD
Type	Formal ed
External Partners	Internal NOAA
Cost	\$5k
Documentation?	Y

Educational Games

In order to increase the reach of science content to reach the young gaming public, NOAA's National Ocean Service partnered with the Computer and Simulation Program at Montgomery Community College. This collaboration has been working since fall of 2007 to develop the a series of educational games focused on improving environmental literacy and to host the "planetary arcade," a portal for environmental educational games from federal agencies and respected External Partners.

www.Games.noaa.gov

Launch	Spring 2009
Upgrade	Spring 2010
Vehicle	Internet
Theme(s)	All (game dependent)
Audience	k-12
Usership (yr)	4 mil
Type	Outreach
External Partners	Montgomery College, PBS, National Geographic
Cost	\$250k
Documentation?	Y

Climate Change Webinars

A series of 10 web seminars was produced in 2009-2010 and a new series of 12 climate and oil spill webinars will start in fall of 2010. These are hosted by the National Science Teachers Association and feature NOAA scientists and education specialists.

Launch	Continuous
Upgrade	n/a
Vehicle	
Theme(s)	CC
Audience	Educators
Usership (yr)	100 per seminar
Type	Formal education
External Partners	All NOAA, NSTA
Cost	\$2-3k per seminar
Documentation?	Y

Ocean Trivia App for mobile phones

Using ocean, climate, weather, and coral facts found on NOAA's websites, an open source application was developed for multiple smart phones. The trivia format can be used by any educator or office to increase the number of items available for the user.

Launch	Fall 2010
Upgrade	n/a
Vehicle	Mobile
Theme(s)	All
Audience	All
Usership (yr)	TBD
Type	Formal education
External Partners	Montgomery College
Cost	\$5k
Documentation?	N

eLearning Center

Products continue to be developed and hosted on both the NOS Education website as well as the NSTA Learning Center so that the assets are available for educator professional development. New products are underway and there is a comprehensive collection being designed for climate education.

<http://learningcenter.nsta.org/default.aspx>

<http://oceanservice.noaa.gov/education/>

Launch	2005 (NOAA participation)
Upgrade	2010
Vehicle	Dist Learning
Theme(s)	All
Audience	All
Usership (yr)	50k
Type	Formal/informal education

External Partners	All NOAA/ NSTA
Cost	\$250k for short course/\$45k for sci guide
Documentation?	Y

Climate Stewards Education Program Wiki

The Climate Stewards Education Program Wiki is designed so program participants can share resources and action plan ideas with each other as well as comment provide thoughtful feedback on each others work. In the future we may expand to other Web 2.0 products e.g. facebook

Launch	Currently online
Upgrade	Ongoing
Vehicle	Web 2.0
Theme(s)	Climate & Climate Education
Audience	Teacher/Educator
Usership (yr)	25 participants in program; 50 more by FY11
Type	Formal/informal education
External Partners	NA
Cost	No cost; Staff time
Documentation?	Y There are several guidance and best practice documents that have been produces including an overview of the climate stewards program, a logic model for the overall program as well as a logic model for the participants action plans and a guidance rubric for the participants to use in designing their action plans

NOS/AAMB/Communications and Education Division

Ocean Today Kiosk and website

The Ocean Today Kiosk is a highly dynamic, visitor-friendly experience designed initially for the Sant Ocean Hall in the Smithsonian Institution's National Museum of Natural History. Opened in September 2008, the Sant Ocean Hall spans more than 26,000 square feet and is the most prominent hall in the museum. As visitors enter the hall, they discover two Ocean Today Kiosks located to their immediate right. Each kiosk is comprised of an independently operated 32-inch touch-screen display and, directly above it, a 42-inch echo monitor. This arrangement allows multiple groups to simultaneously interact with the content. Each kiosk also includes a specially designed sound system that envelops visitors and allows for a group experience. At the time of its debut at the Sant Ocean Hall, the Ocean Today Kiosk launched simultaneously in five other museums and aquaria as part of the Coastal Ecosystem Learning Center network. Since then, the kiosk has continued to expand and as of November 2010 is in 18 such locations around the United States and Mexico. This project also has a companion website, <http://oceantoday.noaa.gov>, described below in a later entry in this survey.

Launch	September 2008 (Kiosk)
Upgrade	Oct 2010
Vehicle	Interactive

Theme(s)	All
Audience	All
Usership (yr)	Ocean Today Kiosk: 1,500,000 Ocean Today Website: 120,000
Type	Formal/informal education
External Partners	Coastal America's Learning Center Network National Park Service
Cost	approx. \$400K/year for program support. Unit costs vary, estimated at \$5,000.
Documentation?	Y Evaluation was undertaken before the project was developed. Two additional evaluations were undertaken since the product launched, with the most recent one completed in August, 2010.

12) National Marine Fisheries Service

Sea Turtles and the Quest to Nest

Quest to Nest is an online video game developed to meet a recovery planning action for loggerhead sea turtles. The player navigates six sets of obstacles to help a female loggerhead reach her nesting ground and lay her eggs.

Launch	June 27, 2010
Upgrade	June 27, 2010
Vehicle	Educational Gaming
Theme(s)	Ocean, Fisheries
Audience	K-12
Usership (yr)	Unknown
Type	Formal/informal education
External Partners	NA
Cost	\$150K startup, Maintenance: minimal
Documentation?	No

13) Office of Exploration and Research

Gulf of Mexico Deep-sea Ecosystems

Online Professional Development on NOAA-sponsored explorations in the GOM.

Launch	October 2010
Upgrade	November 2010
Vehicle	Distance Learning
Theme(s)	Ocean
Audience	NA
Usership (yr)	700 participant from almost every state and over 20 countries
Type	Formal/informal education, Outreach for Education
External Partners	College of Exploration

Cost	\$40K
Documentation?	Yes, follows the general format of other offerings developed in collaboration with the College of Exploration

13) Pacific Services Center

Tsunami Preparedness Mobile Application

Mobile phone application that will provide tsunami preparedness and evacuation information. The information will be built into the application so that preparedness and evacuation information will be available regardless of availability of service. Information is based on existing web application hosted by CSC.

Launch	NA
Upgrade	NA
Vehicle	Smart Phone App
Theme(s)	Ocean, Coasts/Estuaries
Audience	Adult, Family, College Student, K-12, General Public
Usership (yr)	NA
Type	Informal education, Outreach for Education
External Partners	PDC Hawaii State Civil Defense
Cost	NA
Documentation?	Yes. There was a development document for the web version of the application

Mobile phone based Augmented Reality

A mobile application for the presentation of 3d data visualizations on smart phones via image based augmented reality.

Launch	TBD
Upgrade	NA
Vehicle	Smart Phone App, Data Viz
Theme(s)	Ocean, Coasts/Estuaries, Climate, Atmosphere, Weather, Fisheries
Audience	Adult, Family, College Student, K-12, General Public
Usership (yr)	NA
Type	Formal/Informal education, Outreach for Education
External Partners	NA
Cost	NA
Documentation?	No.

Magic Planet Interactive Kiosk Development

A series of interactive touch screen kiosks for viewing NOAA science visualizations on the Magic Planet and SOS platforms.

Launch	2008
Upgrade	09/27/2010
Vehicle	SInteractive, Data Viz, Computer Animation
Theme(s)	Ocean, Coasts/Estuaries, Climate, Atmosphere, Weather, Fisheries
Audience	Teacher/Educator, Family, K-12, General Public
Usership (yr)	200,000-300,000 informal 11,000 formal
Type	Formal/Informal education, Outreach for Education
External Partners	Bishop Museum Hatfield Marine Science Center 'Imiloa Science Center Waikiki Aquarium
Cost	NA
Documentation?	Yes. Data development, design and set up document.