

Toward an Ocean Literate Society

Implementation Plan of the Interagency Working Group on Ocean Education FY 2007 – 2008

Introduction

The Interagency Working Group on Ocean Education (IWG-OE) was established by the Interagency Committee on Ocean Science and Resource Management Integration (ICOSRMI). The IWG-OE is tasked to implement recommendations of the *U.S. Ocean Action Plan* to collaborate across Federal agencies in order to increase ocean literacy and build a future workforce. Formally established in 2006, the working group has been meeting regularly to compare Agency-funded programs and identify common priorities. The group is particularly focused on coordinating formal and informal education programs, developing a coordinated ocean message, promoting the use of ocean observation data in education, and attracting a future workforce to marine science, technology and management.

Why is Ocean Education Important?

In its landmark report, *An Ocean Blue Print for the 21st Century* (2004), the U.S. Commission on Ocean Policy identified lifelong learning as critical to addressing the complex ocean and coastal issues facing the nation. The report provided a strategy to build a collaborative ocean education network and increase coordination across agencies. Since the report of the U.S. Commission on Ocean Policy, the number of reports and plans emphasizing the critical importance of creating an ocean-literate society continues to increase:

- The Council on Environmental Quality, 2004, *U.S. Ocean Action Plan*
- The Subcommittee on Integrated Management of Ocean Resources (SIMOR), 2005, *Priorities of the Subcommittee on Integrated Management of Ocean Resources*
- The Joint Ocean Commission Initiative, 2006, *From Sea to Shining Sea; Priorities for Ocean Policy Reform*
- The Joint Subcommittee on Ocean Science and Technology (JSOST), 2006, *Charting the Course for Ocean Science in the United States for the Next Decade*
- The National Research Council, 2006, *A Review of the Draft Ocean Research Priorities Plan: Charting the Course for Ocean Science in the United States*, ISBN: 0-309-66783-6
- National Marine Sanctuaries Foundation, *Conference on Ocean Literacy Report*, 2006

These recent efforts build on a body of work, including: the *Centers for Ocean Sciences Excellence Business Plan* (2005); the *National Ocean Partnership Program (NOPP) Education Plan* (2002); the *NOPP Strategic Plan* (2004); *National Oceanic and Atmospheric Administration's (NOAA) Strategic Plan* (2004); the *IOOS-COOS and*

Education Workshop March 22-24, 2004 Report; and *Ocean.US's Promoting Lifelong Ocean Education* (2004). The documents point to the need to develop the next generation of environmental stewards, attract a future workforce, and generate an ocean literate public that understands the value of the ocean to their everyday lives, and a public who can make responsible decisions. Collectively, these efforts call for a national ocean education plan that will most effectively leverage resources across the ocean education community.

What has been done to date?

The ocean education community has been working to move an ocean literacy agenda forward in a strategic fashion. Several national-level efforts provide a foundation for a national strategy.

Defining Ocean Literacy Essential Principles

In 2005, the National Marine Educators Association, the National Geographic Society and other partners developed the *Ocean Literacy Essential Principles and Fundamental Concepts* and aligned these with the *National Science Education Standards*. The effort defines ocean literacy as an understanding of the ocean's influence on you – and your influence on the ocean. Seven basic principles are identified as what an ocean literate person should understand about the ocean.

Convening the Conference on Ocean Literacy

In June, 2006, Federal interagency partners and external stakeholders sponsored the Conference on Ocean Literacy (CoOL). The conference brought together formal and informal educators, governmental officials and leaders in the ocean community to discuss the importance of building an ocean literate society. Five concurrent regional conferences, hosted by aquariums around the country, connected to Washington via satellite teleconferencing and provided input to the final report. A set of recommendations for future actions derived from CoOL were used in developing this *IWG-OE Implementation Plan*.

Conducting a Status Report on Ocean Literacy in the States

In a recent study, TERC compared *Ocean Literacy Essential Principles and Fundamental Concepts* to state science education standards nationwide.

Funding Ocean Workforce Studies

NOPP and NOAA provided funding for the Marine Advanced Technology and Education (MATE) Center to define future workforce needs and assess a professional certification for oceanography careers.

Conducting an Inventory of Federal Activities in Ocean Education

The IWG-OE conducted an inventory of ocean education activities across the member agencies. Results provide a preliminary look at the breadth of programs across the government and will be used to identify opportunities for collaborative efforts.

What is the way forward?

From these efforts emerge a set of principles to guide future planning efforts. These efforts will:

- Address lifelong learning through formal and informal education;
- Leverage resources by broadening and strengthening networks and investing in common messages;
- Recognize ocean education as a specific expression of Earth system science and environmental education and link to these important concepts; and
- Promote the *Ocean Literacy Essential Principles and Fundamental Concepts* as a model framework for organizing our efforts to increase understanding of the relevance of the ocean to our everyday lives.

Given these overarching principles and the tasks outlined in the *Administration's Ocean Action Plan*, the IWG-OE identifies the following priority activities for FY 2007 – 2008 to increase collaboration, develop coordinated messages, deliver ocean observing system data to classrooms, and ensure a well-prepared workforce. Participating agencies are indicated in parentheses following the activity.

Task 1: Increase Coordination and Promote Collaboration.

Priority 1: Strengthen regional networks.

Objective: Build on and expand existing education networks to more effectively deliver ocean, coastal and watershed education resources, particularly at the regional, state and local level.

- Develop coordinated regional education efforts across place-based federal programs, including the National Park Service, U. S. Fish and Wildlife Service, National Marine Sanctuary Program and National Estuarine Research Reserves. (DOI/NOAA)
- Expand the network of Centers for Ocean Science Education Excellence (COSEE) from 10 to 11 Centers in 2007 via a competition for new and/or renewed centers and strive for continued long-term growth. (NSF)
- Expand *Hands on the Land*, a national network of field classrooms, to include sites that explore the ocean and its watersheds. (NOAA, DOI, USDA)
- Improve communication and coordination with non-Federal efforts, including regional, state and private entities. (multi-agency)
- Use the results of IWG-OE inventory of Federal ocean education programs to foster regional collaborations. (IWG-OE)

Priority 2: Collaborate with Earth system science, environmental education and other disciplines, as appropriate.

Objective: Promote ocean education as a specific expression of the larger fields of Earth system science and environmental education and link to these efforts to achieve common goals.

- Work with the Earth system science education community by supporting efforts to expand the Advanced Placement (AP) Environmental Science course to become an Environmental and Earth Science AP course and to begin a National Academy of Sciences effort to define a roadmap for reforming Earth science education in the classroom by defining Earth system science essential principles. (NSF, DOI, NOAA, NASA)
- Support California’s Environmental Education Initiative (EEI) by providing curriculum content and reviewers and work to transport the California EEI and other successful models to interested states. (NOAA)
- Collaborate on efforts to refine the education benchmarks for climate and weather and to develop essential principles of climate literacy that highlight the role of the ocean. (multi-agency)

Priority 3: Support strategic efforts and leverage partnerships.

Objective: Leverage limited resources across federal agencies by supporting strategic efforts that are interconnected and sustainable.

- Identify and support efforts to provide professional development to teachers, particularly using delivery mechanisms that reach large audiences. (multi-agency)
- Support the National Ocean Sciences Bowl. (multi-agency)
- Facilitate a discussion between formal and informal educators on ways to enhance collaboration, as part of the National Student Ocean Summit. (CEQ, NOAA)
- Develop education benchmarks for the *Ocean Literacy Essential Principles* for different grade level intervals. (NOAA, NSF)
- Develop model laboratory classes for Earth system science education. (NOAA, NSF)
- Explore cyber infrastructure and other technologies to connect the ocean to students, educators and the public. (multi-agency)
- Develop partnerships to promote ocean literacy with foundations, industry and user groups, such as the ocean industries and dive community. (multi-agency)

Task 2: Develop a Coordinated Ocean Education and Outreach Message

Priority 1: Develop and deliver common messages.

Objective: Identify and evaluate mechanisms to most effectively deliver common messages to the public under the framework of the *Ocean Literacy Essential Principles*.

- Coordinate a cross-agency effort to communicate common messages for the International Polar Year in 2007 - 2008 and the International Year of the Reef in 2008. (multi-agency)
- Partner with states and other key stakeholders to deliver coordinated ocean, coastal and watershed messages at the regional level, such as current efforts of the Chesapeake Bay Program, the Gulf of Mexico Alliance (e.g., hazard resilient communities), and the California Ocean Communicators Alliance (e.g., *Thank You Ocean Campaign*). (multi-agency)
- Develop an Ocean-in-the-News Kiosk for the Smithsonian Ocean Hall (opening September 2008) and other interested aquariums and science centers. (Smithsonian, NOAA, CEQ)
- Work with the aquarium community through the Coastal Ecosystem Learning Center network to develop common materials that can be used across the network. (IMLS, CEQ, NOAA)
- Work with external partners to deliver messages to large audiences through newscasts, weathercasts and online. (multi-agency)

Task 3: Ensure data from Ocean and Earth Observing Systems are translated to useable forms for teachers, students and the public.

Priority 1: Support the Ocean Observatories Initiative (OOI) Education Plan

Objective: Ensure the OOI Education Plan is an integral part of the overall OOI effort.

- Leverage existing educational networks in implementing the OOI plan. (NSF, NOAA)
- Ensure coordination and communication with similar education efforts, including those of the Integrated Ocean Observing System (IOOS) and the IOOS Regional Associations. (NSF, NOAA)

Priority 2: Develop IOOS education.

Objective: Guide development of standards and protocols in support of ocean education within the context of ocean observing education efforts.

- Form an *Education Data and Technology Protocols* working group to work with IOOS Data Management and Communications (DMAC) to address the management, open access to and usability of ocean observing data, tools, information products and learning materials for education. (Ocean.US)
- Foster early connection of IOOS education to IOOS DMAC, OOI cyber infrastructure, national education digital library efforts, and other appropriate initiatives by providing expert guidance through requirements specification,

articulation of education environment systemic constraints, and case studies/scenarios. (Ocean.US)

Priority 3: Encourage education research on and use of observing system data in education.

Objective: Apply results of research on learning using observation system data to develop education programs incorporating such technology.

- Incorporate education research on and use of observing system data in education into agency internal and external solicitations (*e.g.*, COSEE, ORION, NOPP, Geosciences education, and GLOBE). (NSF, NASA, Ocean.US)
- Foster development of innovative visualization products for educational purposes. (NSF, NASA, NOAA, Ocean.US)

Priority 4: Improve information sharing across networks.

Objective: Improve information exchange and infrastructure to promote observing system education efforts across existing education networks.

- Organize a full-day, information-sharing track on ocean observing education at the conferences of the National Marine Educators Association, American Geophysical Union and other venues to build awareness and foster collaborations. (NSF, Ocean.US)
- Encourage hiring of an education specialist for Ocean.US. (Ocean.US)
- Encourage development of a caucus for regional OOS education coordinators. (NOAA, Ocean.US)

Task 4: Ensure a Well-Prepared Ocean Workforce.

Priority 1: Assess future workforce needs.

Objective: Acquire data necessary to assess future marine-related workforce.

- Assess future workforce needs through studies by the Marine Advanced Technologies Education (MATE) Center, scheduled for completion in 2008. (ONR/NOPP, NOAA).
- Arrange an interim progress report in 2007 from the MATE Center on workforce needs to the IWG-OE and ORRAP Education and Industry sub-panels. (ORRAP)

Priority 2: Leverage existing career programs.

Objectives: Use existing programs to highlight career opportunities in marine science and technology.

- Support expansion of the DOT Adopt-a-Ship program to include NOAA and UNOLS vessels. (DOT, NSF, Navy, NOAA, ORRAP)
- Assess U.S. Department of Labor (DOL) programs that may be used to highlight marine science and technology careers. (DOL, NSF)

Priority 3: Focus on underrepresented groups.

Objective: Extend model programs encouraging underrepresented groups to enter marine science and technology degree programs and careers.

- Expand partnership opportunities between the National Association of Marine Laboratories (NAML) and Minority Serving Institutions (MSI's) to provide marine science opportunities to underrepresented groups. (ORRAP, NOAA, NSF)
- Work with community colleges by providing small grants to develop ocean courses in collaboration with the ocean scientists. (NOAA)
- Expand the NOAA Educational Partnership Program Centers of Excellence from four centers to five centers. (NOAA)
- Develop a marine science award, named after the renowned African American marine biologist, Ernest Everett Just. (ORRAP, NOAA)

IWG-OE Membership

National Science Foundation (NSF), co-chair
National Oceanic and Atmospheric Administration (NOAA), co-chair
Department of the Interior (DOI)
National Park Service (NPS)
Minerals Management Service (MMS)
Oceanographer of the Navy
Office of Naval Research (ONR)
Council on Environmental Quality (CEQ)
National Aeronautics and Space Administration (NASA)
Department of Transportation (DOT)
Environmental Protection Agency (EPA)
Institute for Museum and Library Services (IMLS)
Department of Labor (DOL)

Ex-officio:

Ocean.US
Ocean Research and Resources Advisory Panel (ORRAP)