

NRC Review



NOAA Sea Grant Education: Evaluation Overview

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College Program***



Outline



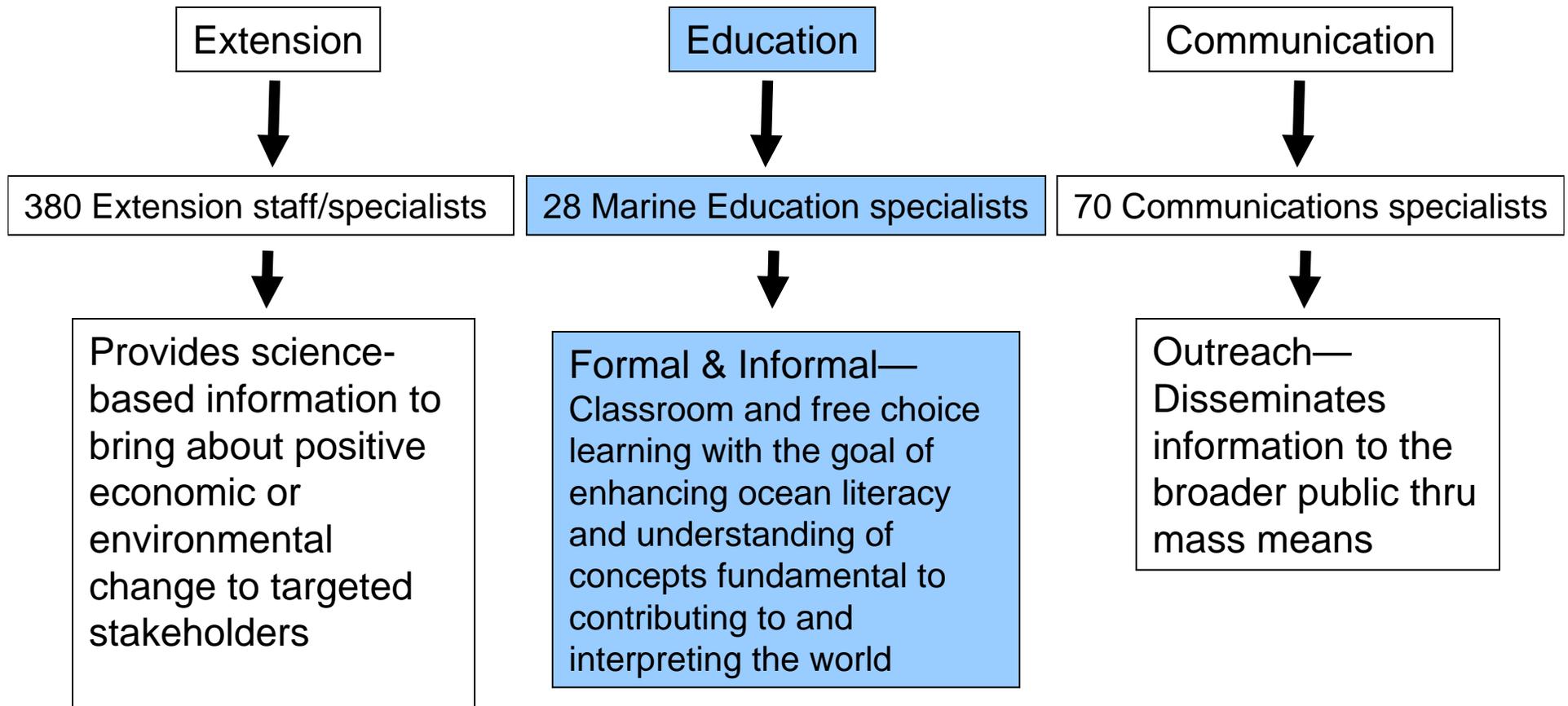
- Sea Grant Educators
- National Evaluation
- Criteria & Benchmarks
- National Fellowships
- Highlights: Program Education Projects & Evaluation Protocols
- Discussion



Sea Grant Education



Extension, Education & Communications... Sea Grant *Organizational structure in NOAA Sea Grant*





Sea Grant Educators



Sea Grant Educators



National Evaluation Categories and Weights



Program Assessment Rating Categories and Weights

I. ORGANIZING AND MANAGING THE PROGRAM (20%)

Leadership of the program	6%
Institutional setting	4%
Project selection	2%
Recruiting talent	3%
Integrated program components	5%

II. CONNECTING SEA GRANT WITH USERS (20%)

Engagement with appropriate user communities	15%
Partnerships	5%

III. EFFECTIVE AND AGGRESSIVE LONG-RANGE PLANNING (10%)

Strategic planning process	4%
Strategic plan quality	4%
Implementation Plan	2%

IV. PRODUCING SIGNIFICANT RESULTS (50%)

Contributions to science and technology	10%
Contributions to education and outreach	10%
Impacts on society, the economy, and the environment	25%
Success in achieving planned program outcomes	5%



I. Organizing and Managing the Program (20%)



Effective and Integrated Program Components



Expected Performance Benchmark –

Each component of the program (research, extension, communications, **education**, and management) **demonstrates effectiveness.**

Each component of the program **uses the most appropriate and effective methods and technology.**

All components strive to develop **new and innovative approaches** to achieve the program's goals.

Each program component has areas of **national leadership** in its own right.

Research results are consistently reported in **peer-reviewed publications.**

Outreach projects consistently **accomplish stated outcomes.**

Program components, when added together, often result in **outcomes and impacts** greater than the sum of the individual contributions.

Indicators of Performance –

- **Integration** of outreach and research **program elements**
- **Core Federal and matching funds (last 8 years)** and distribution among program elements
- **Additional Program Funding** through grants, contracts and development activities

Suggested Considerations for Evaluators –

Given the resources available to each component (research, extension, communications, **education**, and management) to accomplish its mission, **what has been its productivity and effectiveness?**

Have all the outreach and **education** programs used **state of the art tools of the trade?**

What, if any, areas of **national leadership** do each component exhibit?

Do the components form an **integrated team** in addressing a priority issue?

Are there barriers to the team working together effectively? Institutional? Managerial?



I. Organizing and Managing the Program: Benchmarks



Effective and Integrated Program Components



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IV. Producing Significant Results (50%)



Contributions to education and outreach

Expected Performance Benchmark –

Educational programs **maximize the development of highly-trained students** and enhance their potential for career development.

Indicators of Performance – Education

- **Numbers of graduate and undergraduate students supported**, including fellowships and internships
- **Staff and product awards**
- **Numbers of theses** completed
- **Tracking of graduate students** after Sea Grant support
- **Use of products for K-12** education (classroom enhancement, curriculum development), and informal learning (free-choice learning)
- **Numbers of teachers and/or students** using Sea Grant materials in curriculum

Suggested Considerations for Evaluators –

For the stated objectives, did the education program produce **significant results**?

What role has the Sea Grant program had in increasing the **diversity** of students in marine programs?

Where have Sea Grant-supported graduate students gone following completion of their studies? What have they accomplished?

How **successful** has the program been in **competitions** for: Knauss fellows? Industrial fellows? Sea Grant/NOAA Fisheries Fellows? Other fellows?



IV. Producing Significant Results: Benchmarks



Contributions to education and outreach



Expected Performance Benchmark –

Educational programs maximize the development of highly-trained students and enhance their potential for career development.



IV. Producing Significant Results: Benchmarks



Impacts on society, the economy, and the environment



Impact on Society, the Economy, and the Environment

Expected Performance Benchmark –

Management procedures ensure the consistent production of significant results that will have widespread economic, environmental and/or social benefit, and address the priority needs of the program's constituency. Impacts of the program occur not only in the state and regions, but also nationally and even internationally.

Indicators of Performance –

- **Descriptions of the most important impacts**
- **Positive environmental impacts and economic and social benefits resulting from changes in behavior of individuals, businesses, and institutions**

Suggested Considerations for Evaluators –

What resources has the program had to work with to achieve these benefits? Dollars? Human resources?

What are the economic benefits claimed? How are they presented: Sales? Profits? Jobs?

New or expanded industries, companies, businesses? Cost savings/ productivity improvements?

What are the social benefits claimed? How are they presented: Improved management of resources? Better-informed public/constituent group on a major issue? Changes in constituent group/public opinions/behavior? Better public health/safety? Other?

Would constituents/partners support these claims?

What is the area of impact: Local/State? Regional/National? International?

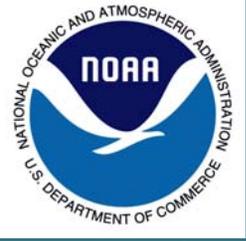
Is there a quantitative analysis to support the claims?

What has been Sea Grant's role in producing this benefit?

Who are the partners, if any? What has been their role?



IV. Producing Significant Results: Benchmarks



Impacts on society, the economy, and the environment



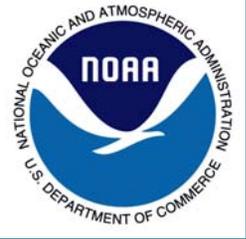
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Program Assessments for Education: Challenges



Observations after two cycles of program assessments –

Program assessments necessarily broad

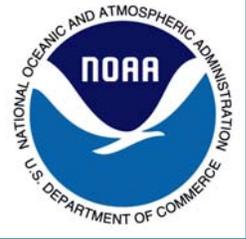
- Limited time available to consider education
- Small review teams composed to reflect program emphases, unlikely to include education specialist

Program assessments focus on one Sea Grant Program at a time

- Not taking advantage of the potential insights to be gained from comparative evaluation across programs
- Tend to focus more on individual projects than overall program



Program Assessments for Education: Changes



Integrated Planning, Implementation, and Evaluation –

Planning and Implementation

- Strategic focus areas and teams for national priorities
- Nested performance measures, metrics at state and national level
- Coordinated implementation

Evaluation

- Continual tracking and guidance
- Evaluation based on planned outcomes
- Onsite review for management, institutional setting, connections with stakeholders and users
- Panel review for science, education, outreach, and societal impact
 - All programs at one time – allows comparative evaluation, facilitates integration of state impacts to national level
 - Larger panel allows for more specialized expertise



Education: National Fellowships



John A. Knauss Marine Policy Fellowship

- 48 fellows in FY 2008

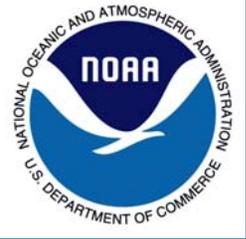


Sea Grant/National Marine Fisheries Service Fellowship

- 6 fellows in FY 2008



Sea Grant/NOAA Fisheries Service Fellowship Program



- **Began in 1999**
- **NOAA Fisheries/Sea Grant share costs**
- **A minimum of 4 fellowships awarded annually**
 - **Population dynamics**
 - 3 years
 - **Marine Resource Economics**
 - 2 years
- **35 fellowships awarded to date**
- **14 current fellows**



Sea Grant/NOAA Fisheries Service Fellowship: Evaluation



- **A goal is to provide pathway/incentive to federal employment in these highly specialized areas**
- **Finished fellows currently working for NOAA Fisheries**
 - **Population Dynamics > 50%**
 - **Economics ~ 35%**
- **Others tend to take post-docs or other academic positions**
 - **Increases visibility and 'next generation' applicants**



Knauss Sea Grant Fellowship



- **Began 1979 – One year graduate fellowship**
- **\$45,000 Fellowship**
- **Placement Legislative/Executive Branch**
- **Based in Washington, D.C.**
- **More than 650 alumni**
- **Authorizing Legislation - 33 U.S.C. 1127 Fellowships (from the National Sea Grant College Program Act)**



Evaluation Criteria



Evaluation of application package by 10-member review panel:

- **Personal & academic curriculum vitae**
- **Personal educational & career goal statement**
- **Two letters of recommendation with one from student's major professor**
- **Letter from sponsoring Sea Grant Director**
- **Official copy undergraduate/graduate transcripts**

National database to track alumni

Six-month review with host office/fellow

Final report from each fellow



National Evaluation



- Topical Advisory Teams
 - One of several components of ongoing program evaluation process
 - Provide opportunity for program to receive outside advice by team of experts in specific area
 - Provides focused, intensive review of specific program element
 - Provides a written report with opinions, options and conclusions in effort to improve element reviewed



National Evaluation

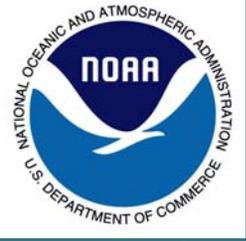


- Topical Advisory Team (TAT): Oregon Sea Grant (2002)
 - Objectives:
 1. Understand local, regional and national trends & opportunities in marine education
 2. Gain knowledgeable outside perspectives re. how to align or match existing strengths with trends & opportunities
 3. Weigh merits of program of narrowing and deepening its focus on broadening and diversifying efforts in marine education
 4. Assess optimal organizational structures, programming concepts, staffing needs and direction, evaluate programming and consider support to educational programming beyond present venues and structure
 - 10 Observations and Recommendations
Summary: TAT advised program to focus on *learning*, not *content*; encouraged closer interaction with the Oregon Coast Aquarium and the OSU Department of Science and Math Education.
 - Program Comments
“We implemented most of the suggestions and hired Shawn Rowe who had a strong background in free choice learning. OSU has subsequently developed a masters and doctorate program in free-choice learning....Several students have graduated and assumed positions in other venues (public aquariums, interpretative centers, etc). The TAT infused Oregon Sea Grant with a stronger sense of a program taking risks but enormously benefiting, in so many ways, from that action.”

--Dr. Jay Rasmussen, Assistant Director, Oregon Sea Grant



Program Education Projects & Evaluation Protocols



Highlights:
Sea Grant Education Projects
by Region



Education: Sea Grant Network Pacific Northwest



Type of Program: Free-Choice Learning at Hatfield Marine Science Visitor Center Oregon State University

Focus on informal education for families, peer groups, and school audiences

Description: Education, Research and Evaluation Programs at Hatfield Visitor Center:

- Science Center/Aquarium focusing on interpretation of marine research conducted by university, state, and federal agencies in Oregon.
- Social Laboratory designed to assist graduate students and other researchers investigating how people learn in a free-choice environment.
- Audience of approximately 150,000 people per year.

Partners:



Five colleges from Oregon State University

Four programs from NOAA/NMFS EPA

Department of Agriculture

USFWS

Oregon Department of Fish and Wildlife





Education: Sea Grant Network Pacific Northwest



Assessment Process:

Build formative and summative evaluation into all Visitor Center and Sea Grant programming and disseminate results where appropriate.

Key Findings:

- Small changes to texts and photos based on how people use signage can have big payoffs in terms of comprehension.
- Age does not seem to be a barrier to use of technology (i.e., touch screens and iPods) in science centers.
- Extension agents can be powerful partners in carrying out evaluations.

Challenges:

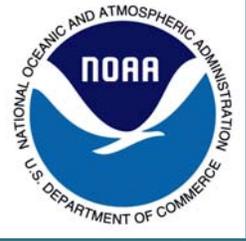
- Ongoing financial support for evaluation for help in doing evaluations.
- Finding out what others have learned (i.e., no central databases and evaluations are not usually published).

Lessons Learned:

- Evaluation projects make great internship experiences for graduate students in resource management and education.



Education: Sea Grant Network Pacific



Type of Program: Informal, middle and high school

Name: University of Southern California Summer Science Programs for Middle and High School Girls

Description:

Educational immersion program engages middle school girls and high school girls (in separate sessions) in marine science through lab and field experiences.

Covers topics in science, community, careers with active hands-on exploration. Labs and water-based activities, exposure to scientists, experiments at USC field station Catalina Island.

Potential to bring young people into marine science careers; serves as a

Partners:

- USC's Sea Grant Program, Wrigley Institute for Environmental Studies and Office of the Provost;
- Michigan and California Sea Grant have sponsored participants.
- Wide awareness for educators through COSEE-West "umbrella."





Education: Sea Grant Network Pacific



Assessment Process:

- Pre- and post-testing, evaluative surveys and interviews conducted over past 7 years.
- Analysis via coding of closed- and open-ended survey questions and and pre- and post-tests.
- Effort to re-contact participants for longitudinal analysis.
- Areas examined: demographics, interests, content mastery, self confidence in science, interest in science and stewardship, girls' goals

Key Findings:

- Involvement fosters interest in the environment and science. Interest in who are the scientists, what do they do, how do they do it, what tools they use?
- Students are enthusiastic about what they learn, remember hands-on activities & field experiences. Some expectation improvement in next year classroom performance

Challenges/lessons learned:

- Looking in-depth year-by-year advantageous before effort to merge multi-year data. Careful coding preserves year-to-year differences in program.
- Difficult to follow up with former students for longitudinal study but important to continuing assessment of program.

What would you do differently?

- Questions on content need to be specific; need detail on activities to ascertain learning but cannot ask too many questions.
- Social component important modifier of results, so over time, more investigation of the overall "experience."



Education: Sea Grant Network Great Lakes



Type of Program: promotes effective partnerships between research scientists and educators

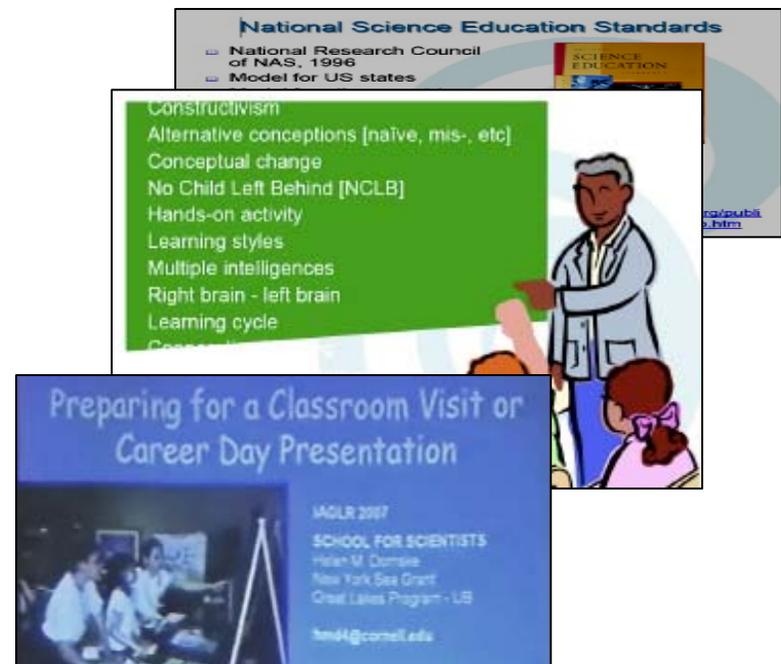
Name: One of 11 Centers for Ocean Science Excellence (COSEE) Great Lakes

Description:
<http://www.glerl.noaa.gov/seagrants/COSEE/SchoolforScientists.html>

- Addresses scientists' need for guidance on interaction with teachers
- Focuses on preparation, language, pedagogy, standards, options for interaction with education
- Offered within IAGLR conference: ½ day symposium in 2007 and 2009
- Organization reaches most regional researchers in multiple disciplines of Great Lakes science

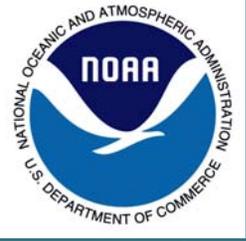
Partners

- NSF
- 5 Great Lakes Sea Grant Programs
- NOAA-GLERL
- IAGLR (International Assoc. for Great Lakes Research)





Education: Sea Grant Network Great Lakes



Assessment Process:

- Survey of scientists at 2006 IAGLR conference
- Analysis published in Kim & Fortner, 2008, J. Great Lakes Res. 34:98–108

Key Findings:

- Positive attitude toward collaboration, but little knowledge of education systems
- Differences in cultures, education perspectives, and communication gap deter interaction with educators
- Need to facilitate interaction, provide training in education theory/practice and assist with integration into culture of educators [vocabulary, Standards, demands, etc]
- Participants reported learning techniques they could use
- 80% said sessions will affect how they design and deliver education messages
- Suggested longer sessions with discussion next time



Education: Sea Grant Network Mid-Atlantic



Type of Program:

A multi-faceted national project connecting educators with **online ocean science** content research data, and resources
With **10 years of service**, Bridge is established and respected within ocean education community

Name of education program:

The Bridge www.marine-ed.org/bridge

Describe program briefly:

- Growing collection of 1,000+ educator-reviewed ocean education websites, featuring *current and accurate scientific content*
- Includes a portal website devoted specifically to NOAA's *Educational Resources*
- Powerful *search engine* designed with metadata *relevant to educators*
- Series of 60 *data-focused classroom activities* ocean observing data
- Professional development *workshops* incorporating Bridge lesson plans and activities
- Resources uploaded to *DLESE and NSDL*
- *Scuttlebutt*, an ocean education listserv connecting ocean educators and scientists, with over *1,000 subscribers* worldwide

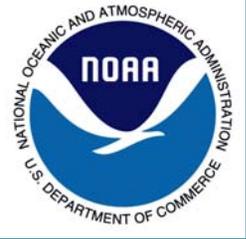
Partners:

- National Marine Educators Assoc.
- NOAA
- Sea Grant Education Network
- College of William & Mary, School of Marine Science, VA Institute of Marine Science





Education: Sea Grant Network Mid-Atlantic



Assessment Process:

- Formative and iterative; over 10 years of project activity
- Analysis of site visitation statistics (number of visits, temporal usage trends, etc.)
- User feedback via website form (voluntary input) and online surveys
- Useability tests (observation of site users under controlled conditions)
- Written questionnaires and verbal feedback from workshop participants

Key Findings:

- Bridge attracts and maintains its target audience (educators, esp. classroom teachers)
- Usage patterns positively correlate with school calendar
- Membership and use frequency of listserv (“Scuttlebutt”) continues to grow

Challenges:

- No way to contact most site users (registration not required)
- Statistical analysis of usage provides only numerical data
- Most effective strategies limited by time and funding (useability tests, workshops)

Lessons learned:

- Site usage statistics do not provide information on *how* resources are used
- Feedback form rarely used as intended, provides little useful data

What we would do differently re. evaluation

- More frequent useability tests (\$\$)
- Use more powerful site statistics package (\$\$)
- Conduct more frequent workshops in broader geographic area (\$\$)



Education: Sea Grant Network Gulf/Southeast



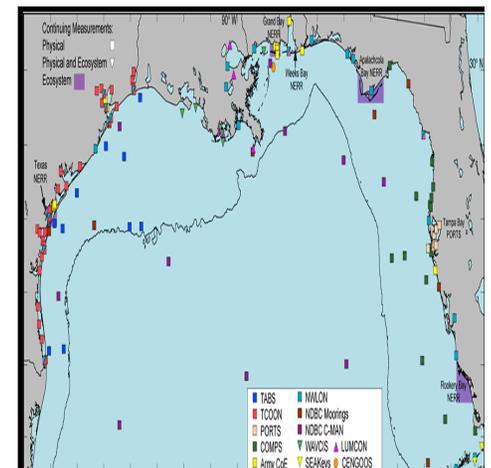
Type of Program: Professional/Curricular Development for Formal (K-12) & Informal Educators

Name: Mississippi-Alabama Sea Grant—A Collaboration Involving Teachers and Scientists

Program Description:

- Features scientists & teachers working as teams
- Focus on enhanced content & integration of ocean observing system data into curricula
- Reached and will reach approximately 100 educators and nearly 15,000 of their students during 2007 & 2008

Partners: Three Sea Grant programs (MS, AL, FL)
National Coastal Data Development Center
Northern Gulf Institute
Gulf of Mexico Coastal OOS
MS-Dept. of Marine Resources
COSEE-Central Gulf of Mexico
Univ. of Southern Mississippi-Center for Higher Learning-
Visualization Center
Sessions within two of the Gulf of Mexico states annually





Education: Sea Grant Network Gulf/Southeast



Assessment Process: Implement annual Logic Model evaluations; outcomes based on:

- enhanced understanding of OOS data through PD programs (short-term);
- classroom curricular development during Workshops/Summer Institutes (medium-term);
- inclusion of OOS data & activities within curricula, standards, and assessments (long-term)

Key Findings: Due to an increasingly prescribed curricula, educators need:

- an increased understanding of OOS data and subsequent interpretations;
- alignment of OOS curricula with state and national standards;
- grade-level appropriateness of OOS data within curricular development; &
- expanded partnerships work.

Evaluation Challenges:

- expensive in terms of expertise and time;
- consistency of use throughout the SGEN; and
- professional development program needed for the SGEN.

Lessons Learned:

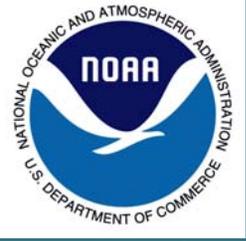
- appropriateness of NOAA Ed. Council working toward eval. consistency &
- not having an evaluation component is a “fatal flaw” in grant submissions.

Next steps include:

- ensuring 7 to 10% of the budget is dedicated to evaluation/assessment;
- employing internal and external evaluators; and
- having evaluation as a PD priority at annual meetings.



Education: Sea Grant Network Northeast



Type of Program: Professional Development for Formal (K-12) and Informal Educators

Name: Connecticut Sea Grant's Long Island Sound (LIS) Mentor Teacher Program

Description:

- Features “teachers teaching teachers” how to integrate water topics into curricula
- Ocean, water and watershed topics have been virtually eliminated from state (CT) and national science standards
- Has reached more that 150 educators and through them, nearly 12,000 students since program inception in 2002

Partners:

Connecticut Sea Grant EPA Long Island Sound Study (LISS)



Location of sessions is throughout Connecticut within the Long Island Sound watershed





Education: Sea Grant Network Northeast



Assessment Process: Logic Model evaluation annually; Outcomes are related to

- changes in awareness of educational resources (short term),
- classroom practices to include water-related topics (medium term), and
- the inclusion of water-related topics in curricula, standards, assessments and career counseling (long term)

Key Findings: To implement water-related topics into increasingly prescribed curricula, educators must be:

- aware of resources aligned with state and national standards,
- provided with content appropriate to the grade level they teach, and
- actively engaged in the learning process and application of water-related content, process and product to gain true understanding

Evaluation Challenges: Sessions were purposely not all the same – were designed by CTSG staff and teacher leaders for specific grade level bands (i.e., K-2, 3-5, 6-8, 9-12)

Lessons learned: Evaluation instrument and processes must be standard across all sessions (implemented after Year 1)

Next steps include:

- content and gap analysis of LIS curricular resources (begins 10/08)
- classroom observations of participants to determine degree of implementation,
- one-on-one individual training for participants



Advice for Committee



NOAA's portfolio is broad and extensive – capacity across many NOAA programs

Focus should be on how to increase:

- **Coordination**
- **Relevance**
- **Productivity given limited resources**



Thank You

Questions?