

Engaging NOAA's Constituents: A Report to the NOAA Science Advisory Board



*Putting the
pieces together
to create
impacts*

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I. EXECUTIVE SUMMARY

In November 2006, the National Oceanic Atmospheric Administration (NOAA) Science Advisory Board established an Extension Outreach and Education Working Group to address the NOAA Administrator's concern with NOAA's need to more effectively engage its constituents and respond to their needs. The Working Group consists of ten individuals with diverse backgrounds and expertise in the areas of extension, outreach, and education.

The Working Group's main conclusion is that NOAA must dramatically change its way of doing business if it expects to engage and serve its consumers and clients. The Working Group believes that NOAA's return on investment to society is reduced because NOAA does not present an understandable vision to its clientele and does not systematically listen to and communicate with its partners and the public. In short, the public does not know NOAA.

NOAA is the nation's leading ocean and atmospheric science and service agency, and through the America COMPETES (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science) Act of 2007, has the responsibility to lead this country's extension, outreach, and education programs in this arena. While acknowledging that legislation exists that has given an education mandate to specific programs in NOAA, there was no agency-wide mandate to conduct education activities prior to the passage of the America COMPETES Act.

The Working Group embraced the concept "engagement" (with consumers and clients of NOAA products and services) to represent the desired outcome. Extension, outreach, and education are the "tools" that NOAA would use to become a fully engaged agency that is more connected to its consumers and clients, fostering enhanced partnerships and leveraging programs. This will allow NOAA's contribution to overall competitiveness to be more efficient and effective, increasing the overall value of NOAA to society.

Although the Working Group did not attempt an audit of NOAA's extension, outreach and education activities, it did seek the advice of NOAA staff on examples of activities that illustrate various aspects of extension, outreach and education. Thus, many programs were not examined and, therefore are not mentioned in this report. The Working Group's charge was to look at NOAA's opportunities and challenges. To accomplish this, the working group looked for examples of activities that illustrated particular characteristics or recommendations.

The Working Group responded to its charge by making recommendations on actions NOAA should take to increase, improve, and refine its extension, outreach and education activities. The Working Group did not attempt to make recommendations on HOW NOAA should accomplish these, believing that those decisions are best made within the agency.

In this report, the Working Group provides eight findings and associated recommendations that provide the mechanisms for amplifying NOAA's effectiveness to accomplish its mission and maximize its impact on society. The Working Group also believes that cost-sharing through partnerships, leveraging of programs, and subsequent return on investment will allow the whole of "one NOAA" to achieve a greater impact than the sum of its current parts.

While some of the recommendations are long-term, the Working Group believes that several could be implemented immediately at relatively low cost. Such changes would affect the way NOAA employees, consumers, and clients perceive NOAA. The Working Group recommends that NOAA:

1. Perform the engagement test both by NOAA and its consumers and clients as described in Section III.
2. Restructure the Education Council to become an Engagement Council and expand its authority to include budgetary issues.
3. Interpret the new statutory authority in education to include outreach and extension.
4. Charge the proposed Engagement Council with revising the Mission and Vision Statements of NOAA to include engagement with consumers and clients.
5. Implement regional demonstration projects.
6. Amend NOAA management and scientist annual performance evaluation measures to include engagement.

Immediate implementation of these short-term steps will encourage NOAA employees, consumers, and clients to recognize NOAA as the Nation's Ocean and Atmosphere Agency, which offers a comprehensive and coherent portfolio of services, products, and science, that are critically important to the nation and the daily lives of all U.S. residents. Establishing NOAA as a fully engaged agency is a "win-win" proposition for NOAA, society, and the federal government. Development of new extension, outreach, and education efforts (including K-12 and higher education) should not be viewed as costs or taxes on NOAA programs, but as investments that will return increased benefits to society and to all of NOAA.

II. INTRODUCTION

In 1970 NOAA was created within the Department of Commerce by combining Bureau of Commercial Fisheries, Weather Bureau, Coast and Geodetic Survey, Environmental Data Service, National Oceanographic Data Center, National Satellite Center, Research Libraries, and other components. In 1971 NOAA was funded at nearly \$300 million. Although NOAA has grown substantially since that time into a \$4.1 billion agency, it has yet to achieve a "one NOAA" identity and culture. Due to a lack of public identity, many U.S. citizens whom NOAA is intended to serve are not cognizant of the unique and vast array of information, products, and services available to them through NOAA. Given the nation's substantial and ongoing investment in NOAA, it is crucial that the agency better communicate its mission and services to all potential customers. Extension, outreach, and

education are the vehicle for clarifying NOAA's public image and identity as the nation's ocean and atmosphere agency. NOAA provides a comprehensive and coherent portfolio of services, products, and science, which are critically important to the nation and to the daily lives of all U.S. residents.

During the March 2006 Science Advisory Board (SAB) meeting, Vice-Admiral (VADM) Conrad C. Lautenbacher Jr., U.S. Navy (Ret.), NOAA Administrator, expressed concern with NOAA's ability to effectively engage its constituents. At the previous SAB meeting in November 2005, the Director of NOAA's National Sea Grant College Program gave a presentation on the report, *A Mandate to Engage Coastal Users: A Review of the National Sea Grant Extension Program and a Call for Greater National Commitment to Engagement* (November 2000) produced by a committee led by John Byrne, President Emeritus of Oregon State University, and former NOAA Administrator. At the March 2006 meeting the NOAA Director of Education described efforts under way to develop an effective, coherent, and authorized education program for NOAA. As a result of the discussion following both presentations, the SAB recommended that "NOAA establish a short-term Extension, Outreach, and Education Working Group of the SAB. The purpose of the Working Group will be to support the SAB in providing advice to NOAA to strengthen, coordinate, organize and improve its extension, outreach, and education activities to fully engage its constituents."

The SAB identified issues for this Working Group to address, and charged the group (Appendix I) to explore ways to enhance the impact of NOAA's extension, outreach, and education activities with its constituents. Specific work areas identified by the SAB include the following:

- Define NOAA's purpose and unique role in extension, outreach, and education.
- Identify opportunities at different levels of geographic granularity (e.g., local, state, regional, national, international).
- Identify opportunities for NOAA's research enterprise to better connect with constituencies through extension, outreach, and education.
- Review the legislative authorities of NOAA in extension, outreach, and education and the opportunities to expand these authorities.
- Explore the communication paths between NOAA and its constituents with the goal to improve channels and enhance processes.
- Cite best management practices and examples that could be broadly utilized within NOAA.
- Review training opportunities and funding support for NOAA programs and staff involved in extension, outreach, and education.

The Working Group fully addressed the charges within the recommendations (Appendix II). From January to October 2007, the Working Group held a series of meetings with NOAA personnel, other federal agencies, and Congressional staff (Appendix III). During this time, the group requested summary information on NOAA's extension, outreach, and education programs, as well as information on specific issues of interest to the Working Group.

The group’s first meeting in January 2007 with the NOAA Administrator focused on how the group’s advice could be most useful. In this meeting, he encouraged the group to provide fresh perspectives and “out of the box” thinking; advice on regional collaboration and how NOAA could get broad-based input to programs; a model or way to show NOAA program leadership that it is better off working as part of a whole; and information on the percentage of funding to be used for engagement, based on other agencies’ experiences or other criteria. In addition, VADM Lautenbacher asked for advice on how to organize extension, outreach, and education given the limitations in changing the NOAA management structure and how to use the Sea Grant extension model throughout NOAA.

Since the discussions with the NOAA Administrator, in August 2007 Congress passed, and the President signed, the America COMPETES (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science) Act, containing broad education authority for NOAA (see Appendix VIII for additional information). This law states that “The Administrator of NOAA shall conduct, develop, support, promote, and coordinate formal and informal education activities at all levels to enhance public awareness and understanding of ocean, coastal, Great Lakes, and atmospheric science and stewardship by the general public and other coastal consumers and clients, including underrepresented groups in ocean and atmospheric science and policy careers.” Additionally, this legislation requires NOAA to develop a 20-year education plan and update it every five years. Although the passage of this legislation represents a very important turning point for NOAA and should be used to launch NOAA’s transition to being an engaged organization, no additional resources were authorized.

III. ENGAGEMENT AS AN ORGANIZING CONCEPT

In studying extension, outreach, and education activities¹ (see the text box for short definitions of these terms and Appendix IV for more complete definitions.) it became clear to the Working Group that the term “engagement” best described the group’s view of what NOAA should strive for in interacting with consumers and clients, and is the term used throughout this report. If NOAA is to serve the people of the United States as effectively as possible, it must interact with those people, establish

Definitions of Extension, Outreach, and Education

Environmental Literacy: Lifelong learning about the environment’s influence on you, and your influence on the environment.

Formal Education: Learning within a structured educational system in which children or adults are required to demonstrate proficiency.

Informal Education: Learning outside the established formal system that meets clearly defined objectives through organized educational activities.

Outreach: Opportunities designed to build awareness, develop relationships, and inspire audiences to pursue further learning opportunities.

Extension: The goal of extension education is to change the behavior of individuals, groups or institutions. Extension agents and specialists use science-based information and help people apply it in decision making and resolution of issues.

¹ The Working Group considers training an important part of the NOAA engagement effort and it should be assumed in the extension, outreach, and education umbrella label.

a dialogue, a “give and take” that clearly identifies the needs of society and then determines how best to attend to those needs.

Fundamental to the concept of engagement is an open and ongoing dialogue with the public, a dialogue that leads to a partnership between NOAA and the public to address jointly the problems and opportunities facing society. NOAA must “engage” with society to be most effective as a service agency.

Engagement implies a commitment of service to society through a partnership based on reciprocity and sharing of goals, objectives, and resources between NOAA and society. Implicit to engagement is a respect for each partner that involves listening, dialogue, understanding, and mutual support.

In 1999, the Kellogg Commission, which consisted of the Presidents and Chancellors of 25 leading public universities in America, reported on the Future of State and Land Grant Universities. In particular, the commission recognized the need to be more responsive to the societies they serve by being more closely engaged with those societies. To meet the demands of a rapidly changing world and to fulfill their purpose as public universities they identified the need to accomplish at least three things: 1) be organized to respond to the needs of today’s students and tomorrow’s, not yesterday’s, 2) provide practical learning opportunities for students to prepare for the world they will enter, and 3) be more closely engaged with society by putting their critical resources of knowledge and expertise to work on problems faced by the communities they serve. A result of this recognition was the publication of the report, “Returning to Our Roots: The Engaged Institution” (National Association of State Universities and Land Grant Colleges. 1999).

This report called for universities to serve society by being engaged with society according to the definition given above. The report offered a seven-part test that included the characteristics by which universities could measure their engagement. While the concept of engagement presented here was originally intended for use by higher education, it is equally valid for any agency, such as NOAA, whose mission includes service to society. As such, this test applies to NOAA as follows:

- **Responsiveness.** Does NOAA listen to the users it serves, locally, regionally, and nationally? Is it asking the right questions? Does it offer the proper services in the right way, at the right time, and in the right place? In short, does it respond to user needs?
- **Respect for partners.** Does NOAA understand that it can improve its services and learn from the users it accepts as partners? Does it respect the skills and capacities of its partners in collaborative projects and do they feel that they have good partnerships with NOAA?
- **Intellectual/scientific neutrality.** Is NOAA’s scientific research presenting data, research, and analysis that informs important, and sometimes controversial, issues in a factual and timely manner?
- **Accessibility.** Has NOAA created ways to help potential partners negotiate the complex structure of NOAA in order to find the appropriate partners or solutions

to problems within NOAA? Has NOAA properly communicated its activities and strengths to society? Is its expertise accessible to those who can best use it?

- **Integration.** In addressing opportunities with its partners, has NOAA developed ways of integrating its diverse expertise in order to address the real multidisciplinary problems of society?
- **Coordination.** As a corollary to integration, is NOAA organized so the staff within its many excellent elements are cognizant of the expertise and services provided by its other parts? Is internal communication appropriate to the complexities of an agency that provides so many different services? Do all the employees of NOAA understand and appreciate the expertise and diversity of the many products and services provided by NOAA?
- **Resource partnerships.** Does NOAA make a serious effort to partner with other organizations, governmental and nongovernmental, national, regional, and local to address the problems of society and to fulfill its mission and achieve its vision?

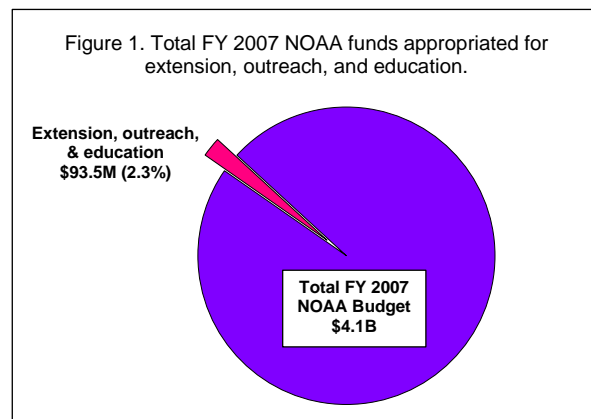
NOAA has an opportunity to be *the* federal ocean and atmosphere agency that leads in its relationship with the American public through genuine engagement.

IV. FINDINGS AND RECOMMENDATIONS

Overall Observations

During discussions with NOAA staff and reviews of materials provided, the Working Group found excellent activities in all the domains of engagement throughout NOAA. However, the presence of excellent engagement activities among the program offices was uneven in the various parts of NOAA.

In FY 2007, funding of NOAA’s extension, outreach, and education efforts totaled \$93.5M, representing only 2.3% of the total NOAA budget (Figure 1). Furthermore, this funding was invested primarily in six programs and/or offices: Office of Education, Sea Grant, National Marine Sanctuaries Program, National Estuarine Research Reserves Program, Ocean Exploration, and Office of Communications spent a combined amount of \$65.6M or 70% of the NOAA appropriation of \$93.5M for extension, outreach, and education. This fact points out that most NOAA programs have little funding (and thus little activity) dedicated to extension, outreach, and education.



New efforts by NOAA are promising. The Office of Education is making significant efforts to improve the visibility and coherence of NOAA’s education programs and

activities. The Education Council's efforts to coordinate activities in education for NOAA-wide benefit, including the development of an Education Plan and a strategy for evaluation, are commendable. Additionally, the effort of NOAA's recently created Office of Communications, to identify corporate NOAA messages and transmit these messages to targeted groups and the general public, is praiseworthy.

Many examples of excellent activities that are under way at the NOAA program level were presented to the Working Group (see Appendix V for details). For example, the National Marine Sanctuaries Program stood out among NOAA programs by routinely using marketing and the results of research studies in operating their program. The Sanctuaries program has established user advisory groups to provide regular feedback, as well as an advanced system for evaluating its outreach and education programs. Sea Grant's extension agents provide outreach and technology transfer in coastal communities across the country by taking complex information and showing people how to use it to solve real problems. This assures that Sea Grant's research, education, and outreach components remain focused on real world problems and opportunities. The Warning Coordination Meteorologists at the National Weather Service (NWS) forecast offices provide weather, emergency preparedness, and other information to audiences at the local level. The National Estuarine Research Reserves System (NERRS) provides an excellent example of site-based coastal training, education, and outreach to address local issues. The Chesapeake Bay Watershed Education and Training (B-WET) program demonstrates the value of partnering within a federal, state, and locally coordinated context. NOAA's work with "Science on a Sphere" is another example of a powerful partnership with a number of informal learning organizations nationwide, especially museums, and is a prime example of how NOAA's resources can be highly leveraged to reach larger audiences.

While NOAA currently has significant efforts in K-12 education and teacher professional development, there is a need, as well as many opportunities, for NOAA to further expand its leadership in formal education. Programs in these areas have a huge multiplier effect and thus are a wise investment for NOAA. This effort is stronger when pursued through partnerships. Strengthening Science, Technology, Engineering, and Mathematics (STEM) education has a powerful impact on the nation's workforce development and global competitiveness.

Unfortunately, NOAA's engagement activities are so diffuse that they are almost invisible to the general public, and thus adversely affect NOAA's ability to serve its consumers and clients. During its deliberations, the Working Group had an opportunity to contribute questions to summer surveys at three separate aquariums (Aquarium of the Pacific, Shedd Aquarium, and Point Defiance Zoo and Aquarium). While the results of these surveys are discussed in more detail under Finding #4, and in Appendix VI, results showed that only 49% of the respondents recognized NOAA's areas of responsibility as belonging to NOAA. The majority of respondents attributed those responsibilities to the National Aeronautics and Space Administration (NASA), the Department of Interior, Environmental Protection Agency (EPA), or the Department of Agriculture. The respondents to these questions were all aquarium visitors and therefore could be expected

to have more knowledge about NOAA than the general public. Based on these results, the Working Group finds that the public is not as aware of NOAA and its engagement services as it should be desired. As a representative from the Friends of NOAA organization and former appropriations staffer indicated during discussions with Working Group members, this lack of public awareness not only impacts NOAA appropriations, but also its ability to more fully serve consumers and clients.

NOAA programs involve more than 600 extension, outreach, and education professionals, including 420 Sea Grant educators, communicators, and extension agents; 122 NWS Warning Coordination Meteorologists; 45 educators, outreach, media, and public relations people in the Sanctuaries program; and 50 educators, trainers, and communicators in the National Estuarine Research Reserves. NOAA leverages funding for at least 140 of these staff from non-federal sources. Training of these 600 professionals to familiarize them with NOAA-related information is critical for developing and disseminating NOAA materials and messages, and enhancing the return on investment.

There is little evidence of collaboration among NOAA programs that could amplify NOAA’s impact. The Working Group saw this lack of coordination through the results of a request made to NOAA program staff to identify their customers. The response from the NOAA line and staff offices showed that many of the customer groups were the same (see Appendix VII). Appendix VII shows that staff of all NOAA elements believes that they are communicating with almost all audiences. The Working Group learned that the communication efforts are not coordinated, and are not effective in transmitting a “one NOAA” message. There are few examples of NOAA-wide materials and messaging being provided by line offices or programs to reach these audiences.

Regional efforts provide a coordination mechanism to localize the power of “one NOAA.” NOAA has begun a promising effort in regional collaborations. However, within NOAA there are multiple regional structures (e.g., NWS, National Marine Fisheries Service [NMFS], Sea Grant, etc.) which are not the same and cause confusion both inside and outside NOAA. This obstacle must be addressed. Despite the multiple regions, there are many benefits of a regional collaboration as outlined in Finding #6.

Finding #1: A strategy for public engagement is missing.

NOAA has some of the best known and highly regarded extension, outreach, and education programs of any federal agency. While many excellent examples from NOAA programs can be identified, there appears to be no agency-wide coordinated strategy of engagement (extension,

If NOAA were an “engaged organization” its vision and mission could be as follows:

VISION: A society that understands the oceans, coasts, and atmosphere as elements of a global ecosystem and uses that understanding to make wise social and economic decisions.

MISSION: To help the United States meet its environmental, social, and economic needs by engaging with users and sharing with them an understanding and predictions of atmospheric and oceanic changes important to the conservation and management of the nation's atmospheric, oceanic, terrestrial, and intervening coastal resources.

outreach, and education) with the public. Additionally, the public does not appear to recognize that many of these efforts are under the NOAA umbrella. The NOAA Education Plan (An Education Plan for NOAA, 2004) makes a valuable contribution by providing a clear vision and set of goals, strategies, definitions, and standards, but fails to articulate clear priorities for moving forward, and does not incorporate extension and outreach to create an overall engagement strategy.

There is a recognized national need for improving science education. In an era of increased concern about global warming, and as the nation's premier ocean, climate, and atmosphere agency, NOAA should take the lead in designing, developing, and delivering a comprehensive set of engagement strategies to encompass the domain of NOAA services that are consistent with the new education authorization for the agency.

Recommendation for Finding #1:

- 1.1 NOAA should review and revise its strategic plan, mission, and vision statements to include the importance of an informed and engaged public consistent with the new authorization language. There needs to be a shift in focus to a more engaged organization providing products and services, as well as science, to the American people. NOAA must work to change the organizational culture as well as its process and procedures to encourage, promote, and reward engagement.
- 1.2 NOAA should develop a strategy for public engagement that provides a roadmap for coordination of all extension, outreach, and education programs in the agency.
- 1.3 NOAA should develop a coherent set of informational products and tools, including appropriate evaluation strategies, for use by all NOAA employees when engaging their stakeholder communities. NOAA also should acknowledge the importance of the involvement of NOAA employees in engagement, and this should be communicated and rewarded at all levels of NOAA management starting in the highest administrative offices.
- 1.4 NOAA should include a climate science component for non-coastal programs to deal with atmospheric and climate change issues.

Finding #2: There is no coordinating body to implement public engagement strategy.

Internally, NOAA has a number of strong extension, outreach, and education programs, and while there are examples of collaboration among them, there is no agency-wide coordination and collaboration to maximize effectiveness, provide opportunities for synergy, or evaluate the impact of NOAA activities. NOAA's strength in some of its existing programs should be built on and expanded across the agency.

The Office of Communications works to effectively identify corporate NOAA messages and transmit these messages to targeted groups and the general public. The Education Office and Council works to effectively coordinate a NOAA-wide education program,

but there is no authority to coordinate programs and funding for all of NOAA's efforts in extension, outreach, and education. While both the Communications and Education Office perform valuable and complementary roles, NOAA needs to develop a new model to maximize its effectiveness and realize the NOAA vision of "Engaging an informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions." A strong centralized effort is needed to direct and provide guidance for NOAA education, outreach, extension, and training programs.

Recommendations for Finding #2

- 2.1 NOAA should expand the mission and membership of the current Education Council to become an Engagement Council, chaired by the NOAA Education Director, to administer a NOAA-wide program of extension, and outreach. The expanded Council must be given appropriate administrative and budgetary authority, and leaders of NOAA programs in extension, outreach, and education, as well as the Office of Communications, should be represented on the Council. The Council should have as its mission to seek ways to combine strengths, leverage as appropriate partnerships established by any NOAA activity for the benefit of all, and refine and modify NOAA engagement programs as needed to address national and/or regional needs.
- 2.2 The Engagement Council should be charged with development of the NOAA engagement strategy.
- 2.3 The Engagement Council should maintain an inventory of all extension, outreach, and education activities across NOAA. The Council should review NOAA's engagement with consumers and clients with the aid of the engagement test prepared with support from the Kellogg Commission. The Council should also establish guidelines for best management practices in all NOAA extension, outreach, and education programs. The Council should also define metrics for success and ensure that the required data are collected.
- 2.4 The Engagement Council should report annually to the NOAA Administrator and, when appropriate, to the SAB to provide an update on progress of programs of engagement, an assessment of their effectiveness, challenges, and plans for the future.

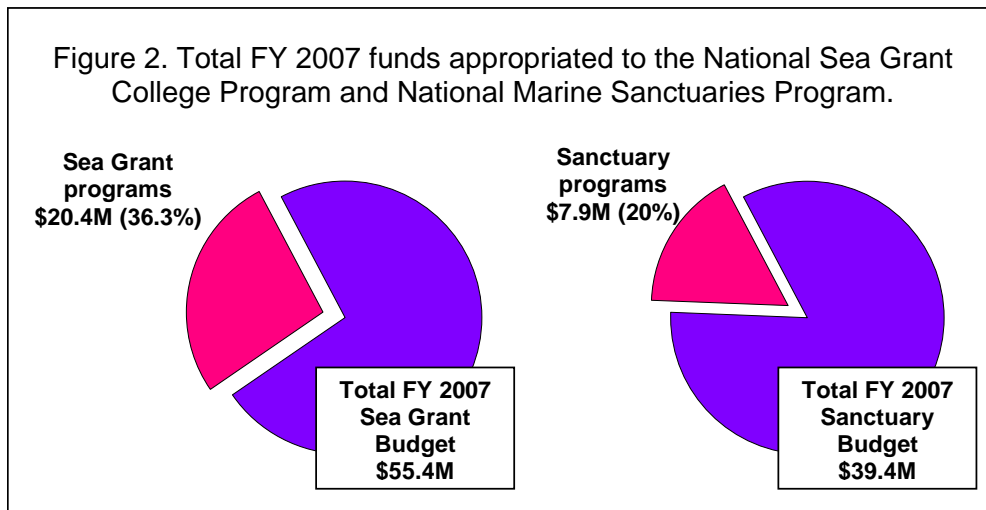
Finding #3: There are insufficient resources for engagement.

NOAA allocates inadequate resources to extension, outreach, and education, and could make better use of resources to engage the public in using its services, products, and programs. In FY 2007, this funding of \$93.5M represented only 2.3% of total NOAA budget (see Figure 1). Furthermore, this funding was invested primarily in six programs/offices: Office of Education, Sea Grant, National Marine Sanctuaries Program, National Estuarine Research Reserves Program, Ocean Exploration, and Office of

Communications, which spent a combined amount of \$65.6M or 70% of the NOAA appropriation of \$93.5M for extension, outreach, and education, pointing out that most NOAA programs have little funding (and thus little activity) dedicated to extension, outreach, and education. Without Sea Grant and the Sanctuaries program funding included, this number would be less than 1% of the total NOAA budget and the cadre of staff would decrease by over 50%.

Recommendations for Finding #3

3.1 The Working Group recommends that at least 10% of the NOAA budget be committed to engagement. This funding recommendation was based on percentage of funding spent on extension, outreach, and education in NOAA programs that the Working Group determined to have strong engagement programs (including Sea Grant and National Marine Sanctuaries Program, which spend 36.3% and 20% respectively), (Figure 2). The proposed Engagement Council should periodically evaluate the adequacy of the 10% funding recommendation. Efforts to enhance NOAA's extension, outreach, and education programs are too critical to wait for new money.



3.2 NOAA's program managers, researchers, and other employees, where appropriate, should have, as a starting point, a commitment of 5% of their time to engagement in their position descriptions, performance plans, and programs. The NOAA Engagement Council should assist NOAA employees in engaging the public. NOAA employees and associates should be given basic information about NOAA science and services and points of contact within the organization to allow them to get additional information on topics of interest. This will allow NOAA employees to acquire and present a broader and more integrated view of NOAA. The Engagement Council should highlight activities that allow NOAA employees to discuss their research or programs with the general public, policy makers, community groups, school groups. The Council also should highlight events where NOAA programs are focused on such as beach clean-ups, lectures, and

storm watcher training. Identifying the best practices in this area will help improve and expand these efforts. The Engagement Council should reach out to individuals across NOAA to sponsor the development of communications materials that provide insightful visual material (videos, search engines, or data displays) or compelling written descriptions of NOAA issues.

Finding #4: Organizational culture in NOAA is not conducive to engagement.

There is a need for NOAA to redefine its management and operational goals in a manner that more broadly incorporates engagement into its vision, and into the performance of its mission. A major change in NOAA's organizational and operational model that incorporates engagement in a consistent manner across all NOAA programs is essential if NOAA is to meet its promise, have greater impact, and receive recognition for its significant investments and contributions.

It does not appear that NOAA has consistently incorporated engagement performance benchmarks, indicators of performance, or other similar means of establishing the expectation across all NOAA programs and personnel. Doing so would signal that the implementation and incorporation of extension, outreach, and education is important to NOAA management, and to executing and achieving NOAA's mission and vision.

NOAA may better advance science, serve the nation, and enhance the awareness and recognition of its investments and contributions, that is, the "whole" NOAA, and the NOAA "brand," by more broadly and consistently integrating extension, outreach, and education as a vital and fundamental element of NOAA's operational and management conventions and behaviors across all NOAA programs.

Recommendations for Finding #4

Under the direction of the Engagement Council, all NOAA programs:

- 4.1 Should review their operational plans to ensure that they include the "one NOAA" vision and expectation that extension, outreach, and education are essential components of, and expectation for, success and performance.
- 4.2 Should identify resources to allow them to consistently implement NOAA strategies identified in the engagement plan to integrate extension, outreach, and education in the delivery of their products and services, and in their interaction with consumers and clients.
- 4.3 Should establish an agency-wide engagement training program for all current and future employees. More extensive training programs in translational science should be developed for the 600 extension, outreach, and education professionals to equip them to be the interface between NOAA's scientists and its consumers and clients.

- 4.4 Should consistently incorporate performance benchmarks, indicators of performance, or other similar means of establishing the expectation across all programs and personnel that the successful implementation and incorporation of engagement is important to NOAA management, and to achieving NOAA’s mission and vision.

Finding #5: The public is not fully aware of NOAA and its services.

NOAA provides the people, organizations, and businesses of the United States with a host of unique, essential, and creative services, products, and programs that impact every aspect of life, from food to weather to education. However, it is clear that a large percentage of the public is not aware of NOAA. Few people recognize its name or logo or know where it is placed in the federal government. Because NOAA is not clearly identified by logo or acknowledged during presentations, the scope, diversity, and essential usefulness of its programs are often not apparent either locally or nationally.

While a number of NOAA’s extension, outreach, and education programs (e.g., Sea Grant, NERRS, NWS) have great capabilities, their efforts are not currently coordinated to promote the role that NOAA has in serving the public. Their engagement activities are almost invisible as a service of NOAA. Several NOAA-funded programs fail to connect themselves directly with NOAA. As a result the public is not always aware of the actual work of NOAA. The lack of NOAA-wide engagement exercises limits the delivery of a “one NOAA” image. Such a visible image could provide NOAA with the critical support needed to secure increased funding for its work.

NOAA Perception Survey

Evidence for a lack of public awareness for the efforts of NOAA was identified through a perception survey conducted during June, July, and August at three aquariums: Aquarium of the Pacific in Long Beach, California; Point Defiance Zoo and Aquarium in Tacoma, Washington; and Shedd Aquarium in Chicago, Illinois. (See Appendix V for survey questions and details.) Despite the presumption that the audience at aquariums would be more familiar with NOAA than the general public, only half of the individuals viewing a list of NOAA’s major responsibilities chose NOAA from a short list as the federal agency with those responsibilities.

NOAA's benefit to society would be greatly enhanced if the agency were to become more fully engaged with consumers and clients. This engagement can be accomplished by enhancing NOAA's extension, outreach, and education efforts. Engagement with consumers and clients will also benefit NOAA through the development of advocates for its products and programs.

While the new NOAA website, www.noaa.gov, tries to provide better integrated access to NOAA products and services, these efforts are not enough. For example, in the website called “NOAA in Your State” (for examples of current “NOAA in Your State documents, see <http://www.legislative.noaa.gov/NIYS0107/noaainyourstate.html>), there is a description of various NOAA facilities for each state on a map of the United States.

While this is an excellent idea, it is poorly executed and does not show the total value of NOAA services to individual states.

Recommendations for Finding #5:

- 5.1 Extension, outreach, and education efforts need to be coordinated across organizations to assure that the results will be greater than the sum of their parts. The public should easily be able to identify services, products, and programs funded by or associated with NOAA; all services, products, and programs should display the NOAA logo.
- 5.2 NOAA should establish a mechanism to regularly monitor public awareness, knowledge, and use of its services, products, and programs.

Finding #6: NOAA is developing a new regional structure, although its place within existing NOAA regional structure is not clear.

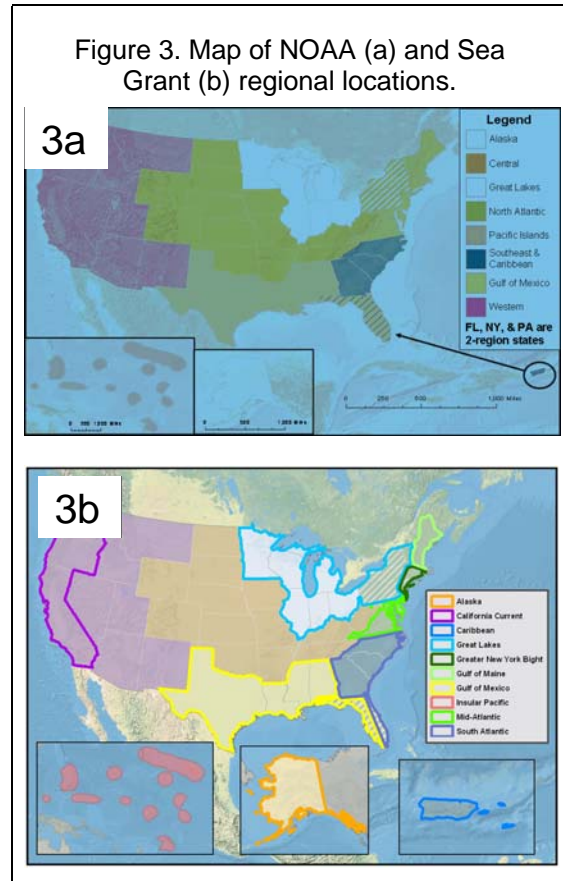
NOAA’s new regional structure presents a great opportunity for the agency to be nationally focused, regionally directed, and locally engaged.

NOAA’s regional structures are multiple and seemingly inconsistent. For example, NWS has six regions, NMFS has six regions, and Sea Grant has ten regions. While NOAA has recently established eight regions (Figure 3a) and strategies to collaborate and cooperate within each of these regions, there is no attempt to realign current regional structures. In fact, NOAA Sea Grant has recently funded eight regional research and information networks and hopes to fully fund all ten regions in 2008 (Figure 3b). One common identified regional structure by NOAA has the potential to localize the “one NOAA” strategy.

NOAA devotes insufficient resources to extension, outreach, and education related to atmospheric and climate change issues and does little to leverage partnerships (e.g., universities, K-12 education, and professional associations) to enhance its capabilities in these areas.

Recommendations for Finding #6:

- 6.1 NOAA should recognize that while it currently has many very valuable national audiences, consumers, and clients that it must continue to



- foster, its greatest growth potential is in further development of, and engagement with, local audiences, consumers, and clients.
- 6.2 NOAA should utilize its newly formed regional collaboration structures to create opportunities to become fully engaged with local consumers and clients on national issues. While the majority of extension, outreach, and education specialists in NOAA reside in Sea Grant, in many regions it is not clear how fully these capabilities are being leveraged by NOAA teams. For example, the Gulf of Mexico Region may be a leader in including Sea Grant and other partners in regional activities and thereby leveraging the power of those organizations. The proposed pilot project with Sea Grant in the Gulf of Mexico (see Appendix IX) could be a good test case for expanding this synergy.
 - 6.3 NOAA should coordinate its existing extension, outreach, and education networks at the national, regional, and local levels to better engage consumers and clients at all levels. At the national level this coordination should be through the proposed NOAA Engagement Council (See Finding #2).
 - 6.4 NOAA should assure that its newly created regional structures, and those of NOAA Sea Grant, are well integrated and coordinated. Local engagement should be accomplished by nationally and regionally coordinated programs inside and outside of NOAA, including Sea Grant, NERRS, NWS, Coastal Zone Management, Coastal Services Center, National Centers for Coastal Ocean Science, museums, aquariums, etc. This would also address recent requests for better coordination of coastal programs from the Office of Management and Budget (OMB).
 - 6.5 NOAA should use its regional structures to address pressing issues, such as climate and energy, through its extension, outreach, and education programs in both coastal and non-coastal states with a variety of partners (e.g. universities, K-12 education, and professional associations).

Finding #7: NOAA should better utilize partnerships in engagement.

Some NOAA programs have strong partner relations with universities (e.g., through Sea Grant, Cooperative Institutes, and NERRS Graduate Research Fellowship Program), informal learning institutions (e.g., through Science on a Sphere and private entities), local agencies (e.g., through Chesapeake B-WET), and networks (e.g., through Coastal Ecosystem Learning Centers [CELCs], Center for Ocean Sciences Education Excellence [COSEE]), and professional societies (e.g., National Science Teachers Association, National Marine Educators Association, American Meteorological Society). In the areas of weather and climate, NOAA is a major component of a public, commercial, and academic enterprise that provides a full suite of weather products and services to the nation. In turn, these partners have strong and ongoing relationships with constituent populations that NOAA wishes to engage further, such as K-16 students and faculty,

families, local governments, businesses and industries, and the general public. Partners may have strong local credibility and familiarity, which can complement NOAA's national credibility and familiarity.

Many of these partnerships are working exceptionally well but are not formalized in a way that would, for example, ensure that partners and their audiences recognize that there is an ongoing partnership with NOAA. There are a few NOAA-wide programs that select, adapt, and/or create products that extend the effectiveness of materials by tailoring them to the special wants, needs, and opportunities of partners. For example, with informal science partners the Science on a Sphere program and the Dome both have been successful, although the number of institutions that have been able to benefit is limited. The new partnership of NOAA with the Smithsonian Institution's Ocean Hall and the Coastal America Coastal Ecosystem Learning Center network will start by developing and funding kiosks for four aquariums in different parts of the country and eventually will lead to kiosks in all of the Coastal Ecosystem Learning Centers, which attract more than 25 million visitors each year.

In many cases, using these channels is a "win-win" proposition for all the partners, and there is huge unrealized potential. Informal learning institutions like museums, television, and aquariums, for example, serve a majority of the general public, but they need a continuous flow of new science and technology topics and images, and assistance in adapting these for their own program offerings. By helping these institutions gain access to exciting NOAA findings, databases, services, and scientists, and by showing them how they can be used in different settings with different audiences, NOAA is meeting its own needs more fully by communicating with many consumers and clients that NOAA would like to reach but lacks the internal infrastructure, resources, know-how, or commitment to do so. Even if NOAA subsidizes these programs, the cost should be far less than the cost of producing, distributing, and publicizing NOAA's own exhibitions, films, or school visit programs.

NOAA has the opportunity to leverage its existing partnerships and seek new, mutually beneficial partnerships to expand its reach and effectiveness in conducting extension, outreach, and education activities. These partnerships should complement and extend NOAA's direct efforts, rather than replace them.

NOAA also has an opportunity to work through partners to address the issue of insufficient focus on emerging environmental issues in the current national science education standards. NOAA staff have made a start in this area through participation in the recent revision of science curriculum standards in California. However more needs to be done to include atmospheric, ocean and climate change topics in science curricula.

Recommendations for Finding #7:

NOAA should commit to utilize its existing partnerships, including the university community, other federal agencies, the informal science education community, industry

partners, vendors, professional societies, and mass media to extend the engagement NOAA has with the public. NOAA should support these partnerships by:

- 7.1 Funding regional pilot projects (see Finding #6) with selected partners to learn how broad engagement activities, representing all of NOAA and clearly identified as NOAA, could take place.
- 7.2 Funding similar regional pilot projects with universities, informal science education institutions, the weather and climate enterprise partners, and others that are not currently NOAA partners, to learn how new partners can be enlisted in the most cost-effective manner.
- 7.3 Continuing and expanding diagnostic assessment activities to learn which of these partnerships produces the largest return on investment. Those findings in turn can be used by NOAA to decide where future pilot and implementation projects should be undertaken. The evaluation of “Science on a Sphere” is a good example of such assessment practices.
- 7.4 Documenting the value of partnerships (for NOAA, OMB, and the Department of Commerce) by recognizing cost-share coming from partners, both cash and in-kind, including volunteered hours by paid NOAA staff.
- 7.5 Deepening existing partnerships by listening to partners, soliciting regular feedback from them on the partnership, and demonstrating that their ideas and concerns are heard, appreciated, and acted upon whenever possible.
- 7.6 Taking leadership to include environmental issues in the next generation of science education standards through working with formal education partnerships.

Finding #8: NOAA needs to institutionalize a public accountability system.

NOAA’s mission puts it on the forefront of research in many areas of science, technology, math, and engineering (STEM). NOAA is the nation’s leading resource on oceanic and atmospheric science. Helping consumers and clients understand NOAA’s services and make use of them requires a degree of public education in NOAA’s work and in the STEM disciplines underlying that work. As a result, NOAA makes many modest but important investments in extension, outreach, and education. These programs include some evaluation measures and much promising anecdotal evidence. But the Working Group found no evidence that there were NOAA-wide uniform performance indicators or a program of rigorous evaluations of sample program impacts. Ongoing systematic impact evaluation would be invaluable for program review and public engagement, which would provide increased accountability for NOAA’s investments in extension, outreach, and education.

The NOAA Education Council has already made an excellent start on developing impact evaluation, as described in the August 28, 2007 presentation by Kimberly Benson, A

Consistent Logic Model for NOAA Education/Promoting a Thoughtful Approach to Program Design & Evaluation. Also, it should be noted the National Science Foundation has recently developed a guide to evaluating practices that may prove useful to NOAA. This guide, “Framework for Evaluating Impacts of Informal Science Education Projects”, is available at www.insci.org .

Recommendations for Finding #8:

- 8.1 NOAA should establish a program to determine (1) baseline public understanding and recognition of NOAA, its mission, products, and services; (2) baseline public understanding of core STEM principles upon which NOAA's work is based; (3) NOAA-wide outputs, that is, numbers of people being reached in various segments of the population, and descriptions of the duration, topics, and depth of that outreach; and finally, (4) impact evaluations on the baseline measures of samples of NOAA-operated or NOAA-supported activities in extension, outreach, and education. This program of data collection, which should use both qualitative and quantitative methods as appropriate, should also be used to provide direction to NOAA staff and partners in designing public engagement activities that are responsive to the perceived needs of key audiences and stakeholders.
- 8.2 These measures should reflect national focus, regional direction, and local relevance. NOAA should also consider a performance evaluation system that rewards senior NOAA managers and field workers for effective impacts, yet reward systems must be very carefully developed to avoid skewing the portfolio toward impacts that are most easily quantified and measured.
- 8.3 Impact evaluation should be developed with the full participation of NOAA staff or NOAA-supported staff.
- 8.4 Baseline data and output information should be collected across NOAA's programmatic efforts.
- 8.5 NOAA should use established best practice techniques for overall planning and evaluation of its extension, outreach and education programs. These techniques include the use of “logic models” and “backward-design strategies,” specific to each program, because individual programs will have their own target audiences and desired impacts.
- 8.6 NOAA should use the most rigorous practical methodology to provide the best data on project and overall program effectiveness.

V. CONCLUDING REMARKS

In summary, this report provides eight findings and associated recommendations the Working Group believes will provide the mechanisms for amplifying NOAA's effectiveness to accomplish its mission and maximize NOAA's impact on society in light

of new statutory authority. The Working Group believes that cost-sharing through partnerships, leveraging of programs, and subsequent return on investment will allow the whole of “one NOAA” to achieve greater impact than the sum of its parts.

ACKNOWLEDGEMENTS

The Extension Outreach and Education Working Group thanks the many individuals, specifically the NOAA staff who provided input for the report and who answered many of the group’s questions. The Working Group is particularly grateful to staff members from NOAA’s Science Advisory Board (Dr. Cynthia Decker, Ms. Mary Anne Whitcomb) and Office of Education (Ms. Louisa Koch, Dr. David Ginsburg) for their support to the Working Group. Thanks also go to Ms. Lisa Leof of the Aquarium of the Pacific for work on the development and analysis of the perception survey questions used in the report. The Working Group is also grateful to the Texas Sea Grant program and the Mississippi-Alabama Sea Grant consortium for their graphic for the report cover and to Sue Keller of the Alaska Sea Grant program for her help in editing the draft report. The Working Group also thanks Dr. LaDon Swan of the Mississippi-Alabama Sea Grant consortium for his leadership in developing the “Sea Grant Regional Pilot Proposal.” Finally, the Working Group would like to thank the 29 individuals/organizations who took the time to submit comments during the public comment period.

Summary of Findings and Recommendations

Finding #1: A strategy for public engagement is missing.

Recommendations:

- 1.1 NOAA should review and revise its strategic plan, mission, and vision statements to include the importance of an informed and engaged public consistent with the new authorization language. There needs to be a shift in focus to a more engaged organization providing products and services, as well as science, to the American people. NOAA must work to change the organizational culture as well as its process and procedures to encourage, promote, and reward engagement.
- 1.2 NOAA should develop a strategy for public engagement that provides a roadmap for coordination of all extension, outreach, and education programs in the agency.
- 1.3 NOAA should develop a coherent set of informational products and tools, including appropriate evaluation strategies, for use by all NOAA employees when engaging their stakeholder communities. NOAA also should acknowledge the importance of the involvement of NOAA employees in engagement, and this should be communicated and rewarded at all levels of NOAA management starting in the highest administrative offices.

- 1.4 NOAA should include a climate science component for non-coastal programs to deal with atmospheric and climate change issues.

Finding #2: There is no coordinating body to implement public engagement strategy.

Recommendations:

- 2.1 NOAA should expand the mission and membership of the current Education Council to become an Engagement Council, chaired by the NOAA Education Director, to administer a NOAA-wide program of extension, and outreach. The expanded Council must be given appropriate administrative and budgetary authority, and leaders of NOAA programs in extension, outreach, and education, as well as the Office of Communications, should be represented on the Council. For example, the National Sea Grant Extension Leader should be a member. The Council should have as its mission to seek ways to combine strengths, leverage as appropriate partnerships established by any NOAA activity for the benefit of all, and refine and modify NOAA engagement programs as needed to address national and/or regional needs.
- 2.2 The Engagement Council should be charged with development of the NOAA engagement strategy.
- 2.3 The Engagement Council should maintain an inventory of all extension, outreach, and education activities across NOAA. The Council should review NOAA's engagement with consumers and clients with the aid of the engagement test prepared with support from the Kellogg Commission. The Council should also establish guidelines for best management practices in all NOAA extension, outreach, and education programs. The Council should also define metrics for success and ensure that the required data are collected.
- 2.4 The Engagement Council should report annually to the NOAA Administrator and, when appropriate, to the SAB to provide an update on progress of programs of engagement, an assessment of their effectiveness, challenges, and plans for the future.

Finding #3: There are insufficient resources for engagement.

Recommendations:

- 3.1 The Working Group recommends that at least 10% of the NOAA budget be committed to engagement. This funding recommendation was based on percentage of funding spent on extension, outreach, and education in NOAA programs that the Working Group determined to have strong engagement programs (including Sea Grant and National Marine Sanctuaries Program, which spend 36.3% and 20% respectively), (Figure 2). The proposed Engagement Council should periodically evaluate the adequacy of the 10% funding recommendation. Efforts to enhance NOAA's extension, outreach, and education programs are too critical to wait for new money.

- 3.2 NOAA’s program managers, researchers, and other employees, where appropriate, should have, as a starting point, a commitment of 5% of their time to engagement in their position descriptions, performance plans, and programs. The NOAA Engagement Council should assist NOAA employees in engaging the public. NOAA employees and associates should be given basic information about NOAA science and services and points of contact within the organization to allow them to get additional information on topics of interest. This will allow NOAA employees to acquire and present a broader and more integrated view of NOAA. The Engagement Council should highlight activities that allow NOAA employees to discuss their research or programs with the general public, policy makers, community groups, school groups. The Council also should highlight events where NOAA programs are focused on such as beach clean-ups, lectures, and storm watcher training. Identifying the best practices in this area will help improve and expand these efforts. The Engagement Council should reach out to individuals across NOAA to sponsor the development of communications materials that provide insightful visual material (videos, search engines, or data displays) or compelling written descriptions of NOAA issues.

Finding #4: Organizational culture in NOAA is not conducive to engagement.

Recommendations:

Under the direction of the Engagement Council, all NOAA programs:

- 4.1 Should review their operational plans to ensure that they include the “one NOAA” vision and expectation that extension, outreach, and education are essential components of, and expectation for, success and performance.
- 4.2 Should identify resources to allow them to consistently implement NOAA strategies identified in the engagement plan to integrate extension, outreach, and education in the delivery of their products and services, and in their interaction with consumers and clients.
- 4.3 Should establish an agency-wide engagement training program for all current and future employees. More extensive training programs in translational science should be developed for the 600 extension, outreach, and education professionals to equip them to be the interface between NOAA’s scientists and its consumers and clients.
- 4.4 Should consistently incorporate performance benchmarks, indicators of performance or other similar means of establishing the expectation across all programs and personnel that the successful implementation and incorporation of engagement is important to NOAA management, and to achieving NOAA’s mission and vision.

Finding #5: The public is not fully aware of NOAA and its services.

Recommendations:

- 5.1 Extension, outreach and education efforts need to be coordinated across organizations to assure that the results will be greater than the sum of their parts. The public should easily be able to identify services, products, and programs funded by or associated with NOAA; all services, products, and programs should display the NOAA logo.
- 5.2 NOAA should establish a mechanism to regularly monitor public awareness, knowledge, and use of its services, products, and programs.

Finding #6: NOAA is developing a new regional structure, although its place within existing NOAA regional structure is not clear.

Recommendations:

- 6.1 NOAA should recognize that while it currently has many very valuable national audiences, consumers and clients that it must continue to foster, its greatest growth potential is in further development of, and engagement with, local audiences, consumers and clients.
- 6.2 NOAA should utilize its newly formed regional collaboration structures to create opportunities to become fully engaged with local consumers and clients on national issues. While the majority of extension, outreach and education specialists in NOAA reside in Sea Grant, in many regions it is not clear how fully these capabilities are being leveraged by NOAA teams. For example, the Gulf of Mexico Region may be a leader in including Sea Grant and other partners in regional activities and thereby leveraging the power of those organizations. The proposed pilot project with Sea Grant in the Gulf of Mexico (see Appendix IX) could be a good test case for expanding this synergy.
- 6.3 NOAA should coordinate its existing extension, outreach, and education networks at the national, regional, and local levels to better engage consumers and clients at all levels. At the national level this coordination should be through the proposed NOAA Engagement Council (See Finding #2).
- 6.4 NOAA should assure that its newly created regional structures, and those of NOAA Sea Grant, are well integrated and coordinated. Local engagement should be accomplished by nationally and regionally coordinated programs inside and outside of NOAA, including Sea Grant, NERRS, NWS, Coastal Zone Management, Coastal Services Center, National Centers for Coastal Ocean Science, museums, aquariums, etc. This would also address recent requests for better coordination of coastal programs from the Office of Management and Budget (OMB).
- 6.5 NOAA should use its regional structures to address pressing issues, such as climate and energy, through its extension, outreach, and education programs in

both coastal and non-coastal states with a variety of partners (e.g. universities, K-12 education, and professional associations).

Finding #7: NOAA should better utilize partnerships in engagement.

Recommendations:

NOAA should commit to utilize its existing partnerships, including the university community, other federal agencies, the informal science education community, industry partners, vendors, professional societies and mass media to extend the engagement NOAA has with the public. NOAA should support these partnerships by:

- 7.1 Funding regional pilot projects (see Finding #6) with selected partners to learn how broad engagement activities, representing all of NOAA and clearly identified as NOAA, could take place.
- 7.2 Funding similar regional pilot projects with universities, informal science education institutions, the weather and climate enterprise partners, and others that are not currently NOAA partners, to learn how new partners can be enlisted in the most cost-effective manner.
- 7.3 Continuing and expanding diagnostic assessment activities to learn which of these partnerships produces the largest return on investment. Those findings in turn can be used by NOAA to decide where future pilot and implementation projects should be undertaken. The evaluation of “Science on a Sphere” is a good example of such assessment practices.
- 7.4 Documenting the value of partnerships (for NOAA, OMB, and the Department of Commerce) by recognizing cost-share coming from partners, both cash and in-kind, including volunteered hours by paid NOAA staff.
- 7.5 Deepening existing partnerships by listening to partners, soliciting regular feedback from them on the partnership, and demonstrating that their ideas and concerns are heard, appreciated, and acted upon whenever possible.
- 7.6 Taking leadership to include environmental issues in the next generation of science education standards through working with formal education partnerships.

Finding #8: NOAA needs to institutionalize a public accountability system.

Recommendations:

- 8.1 NOAA should establish a program to determine (1) baseline public understanding and recognition of NOAA, its mission, products, and services; (2) baseline public understanding of core STEM principles upon which NOAA's work is based; (3) NOAA-wide outputs, that is, numbers of people being reached in various segments of the population, and descriptions of the duration, topics, and depth of that outreach; and finally, (4) impact evaluations on the baseline measures of

samples of NOAA-operated or NOAA-supported activities in extension, outreach, and education. This program of data collection, which should use both qualitative and quantitative methods as appropriate, should also be used to provide direction to NOAA staff and partners in designing public engagement activities that are responsive to the perceived needs of key audiences and stakeholders.

- 8.2 These measures should reflect national focus, regional direction and local relevance. NOAA should also consider a performance evaluation system that rewards senior NOAA managers and field workers for effective impacts, yet reward systems must be very carefully developed to avoid skewing the portfolio toward impacts that are most easily quantified and measured.
- 8.3 Impact evaluation should be developed with the full participation of NOAA staff or NOAA-supported staff.
- 8.4 Baseline data and output information should be collected across NOAA's programmatic efforts.
- 8.5 NOAA should use established best practice techniques for overall planning and evaluation of its extension, outreach and education programs. These techniques include the use of "logic models" and "backward-design strategies," specific to each program, because individual programs will have their own target audiences and desired impacts.
- 8.6 NOAA should use the most rigorous practical methodology to provide the best data on project and overall program effectiveness.

Appendix I
Terms of Reference
NOAA Science Advisory Board
Working Group to Evaluate NOAA's Extension, Outreach, and Education

Background

During the March 2006 Science Advisory Board (SAB) meeting, NOAA Administrator Conrad Lautenbacher expressed concern with NOAA's ability to effectively engage its constituents. At the previous SAB meeting in November 2005, the Director of NOAA's National Sea Grant College Program gave a presentation on the Byrne Report on engagement and extension within NOAA. At the March 2006 meeting, the NOAA Director of Education described efforts under way within NOAA to develop an effective, coherent, and authorized education program for NOAA. As a result of the discussion following both presentations, the SAB recommended that "NOAA establish a short-term Extension, Outreach, and Education Working Group of the SAB." The purpose of the Working Group will be to support the SAB in providing advice to NOAA to strengthen, coordinate, organize and improve its extension, outreach, and education activities to fully engage its constituents."

Charge to the Working Group

The Working Group will explore opportunities to enhance the impact of NOAA's extension, outreach, and education activities with its constituents, including, but not limited to, the following:

- Define NOAA's purpose and unique role in extension, outreach, and education.
- Identify opportunities at different levels of geographic granularity (e.g., local, state, regional, national, and international).
- Identify opportunities for NOAA's research enterprise to better connect with constituencies through extension, outreach, and education.
- Review the legislative authorities of NOAA in extension, outreach, and education and the opportunities to expand these authorities.
- Explore the communication paths between NOAA and its constituents with the goal to improve channels and enhance processes.
- Cite best management practices and examples that could be broadly utilized within NOAA.
- Review training opportunities and funding support for NOAA programs and staff involved in extension, outreach, and education.

Term and Composition

The Working Group will consist of up to eleven members selected by the SAB from a pool of candidates generated by both the SAB and NOAA. The Working Group will be established by November 2006 and will submit a draft report to the SAB by November 2007. The revised draft, including SAB comments, will be submitted for public comment and a final report will be presented to the SAB at the March 2008 meeting. The panel will be disestablished following the transmittal of its final report by the SAB to the Under Secretary.

Support

NOAA's Science Advisory Board office will cover travel and other costs related to four meetings of the Working Group in that time period. Mary Anne Whitcomb will provide staff support to the panel.

Listing of Working Group Members

Frank Kudrna (Chair), President, Kudrna and Associates, and member of the SAB.
Gerry Wheeler (Vice-Chair), Executive Director, National Science Teachers Association and member of the SAB.
John V. Byrne, President Emeritus, Oregon State University, and former Administrator, NOAA.
James A. Christenson, Director, University of Arizona Cooperative Extension.
Alan J. Friedman, Consultant in Museum Development and Science Communication.
Ramon E. Lopez, Professor of Physics, University of Texas at Arlington.
Jean May-Brett, Math Science Partnership Program Coordinator, Louisiana Department of Education.
Jeffrey M. Reutter, Director, Ohio Sea Grant College Program and Stone Laboratory, Ohio State University.
Jerry R. Schubel, President and CEO, Aquarium of the Pacific.
Jeffrey R. Stephan, United Fishermen's Marketing Association, Inc.

Appendix II

Responding to the Charge: Crosswalk to Specific Recommendations

Finding	<u>Charge and Recommendations</u>						
	1 NOAA's purpose & role	2 Geographic opportunities	3 Research connections	4 NOAA's legislative authorities	5 Paths of communication	6 Best management practices	7 Training opportunities
1.1	X			X	X		
1.2					X		
1.3			X		X		X
1.4	X	X	X				
2.1	X	X	X			X	
2.2	X				X		X
2.3					X	X	
2.4						X	
3.1	X					X	
3.2			X		X		X
4.1	X					X	
4.2					X	X	
4.3						X	X
4.4						X	
5.1	X				X	X	
5.2					X	X	
6.1	X	X					
6.2		X			X		X
6.3		X			X	X	
6.4	X	X				X	
6.5	X	X	X				
7.1	X	X	X				
7.2	X	X					
7.3	X					X	
7.4						X	
7.5					X	X	
7.6	X		X				
8.1	X					X	
8.2	X	X				X	X
8.3						X	
8.4			X			X	
8.5			X		X	X	
8.6			X			X	

Appendix III
List of Contacts and Meetings: January 8, 2007 to October 15, 2007

January 8-9, 2007 – Silver Spring, Maryland

Presentations by and discussions with:

- Mary Glackin – Deputy Assistant Administrator for Program Planning and Integration, NOAA.
- Peter Hill – Senior Policy Analyst, Consortium for Oceanographic Research and Education (CORE) and Joint Ocean Commission Initiative.
- Louisa Koch – Director, NOAA Office of Education.
- Conrad C. Lautenbacher Jr., Vice Admiral, U.S. Navy (Ret.); Under Secretary for Oceans and Atmosphere, NOAA.
- Michiko Martin – Education Coordinator, NOAA National Marine Sanctuaries Program.
- Luke Nachbar – Congressional Affairs Specialist, NOAA Legislative Affairs.
- Jim Murray – Deputy Director, NOAA National Sea Grant College Program.
- Ralph Otto – USDA Cooperative State Research Education and Extension Service.
- Katherine Gronberg, Principal, Morhard and Associates; former Clerk, Senate Commerce Justice and State Appropriations Subcommittee.
- Peter Hill, Senior Policy Analyst, CORE; staff, Joint Ocean Commission Initiative.
- Jim Stofan – Acting Deputy Assistant Administrator for Education Programs, NASA.
- Kevin Wheeler – Director of External Affairs, Consortium for Oceanographic Research and Education (CORE); Friends of NOAA.

April 24, 2007 – Phone Meeting

Discussion on communicating climate as an emerging issue with:

- Chet Koblinsky – Director, NOAA Climate Office

May 2-3, 2007 – Annapolis, Maryland

Presentations by:

- Kate Barba – Program Manager, NOAA Estuarine Reserves Division.
- David Bryant – Communications Coordinator, Georgia Sea Grant.
- Margaret Davidson – Director, NOAA Coastal Services Center.
- Anson Franklin – Director, NOAA Office of Communications.
- Chris Maier – National Coordinator, Warning Coordination Meteorologists, NOAA National Weather Service.
- Peyton Robertson – Acting Director, NOAA Chesapeake Bay Office.
- Shannon Sprague – Education Program Manager, NOAA Chesapeake Bay Office.
- Stephen Stewart – Education Co-Leader, Michigan Sea Grant.
- Jack Thigpen – Extension Director, North Carolina Sea Grant.
- Doug Wilson – Observations Program Manager, NOAA Chesapeake Bay Office.
- Greg Withee – Special Assistant to VADM Conrad C. Lautenbacher.

July 24-25, 2007 – Seattle, Washington

Presentations by:

- Thomas Ackerman – Director, Joint Institute for the Study of the Atmosphere and Ocean.
- Eddie Bernard – Director, NOAA Pacific Marine Environmental Lab.
- Suzanne van Drunick – Assistant Director, Cooperative Institute for Research in Environmental Sciences.
- Usha Varanasi – Director, NOAA Northwest Fisheries Science Center.

August 8, 2007 – Phone Meeting

- Discussion on program evaluation approach adopted by the Education Council with Kimberly Benson, Program Manager, NOAA Office of Education.

August 23, 2007 – Mystic, Connecticut

- Briefing of preliminary results with VADM Conrad C. Lautenbacher, NOAA Administrator; Jack Kelly, Deputy Under Secretary; Mary Glackin, Acting Assistant Administrator for the NWS; and Paul Doremus, Acting Assistant Administrator for Programs, Plans and Integration.

September 26, 2007 – Washington, D.C.

- Briefings on preliminary results and requests for input with Shimere Williams and Tara Rothschild, House Science and Technology Subcommittee on Energy and Environment; and Amy Fraenkel, Todd Bertosen, and Kris Lynch, Senate Commerce Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard.

October 15, 2007 – Arlington, Virginia

- Discussion with Terry Garcia, Executive Vice President for mission programs for the National Geographic Society and Liaison with the NOAA SAB Ocean Exploration Advisory Working Group.

Appendix IV

Definitions of Extension, Formal and Informal Education, and Outreach

Environmental Literacy: A process of lifelong learning about the environment's influence on you, and your influence on the environment. (Adopted by the NOAA Education Council in 2006; used in the FY09 Planning, Programming, Budgeting, and Execution System (PPBES) process.)

Formal Education: Learning that takes place within a structured educational system in which children or adults are required to demonstrate proficiency, i.e., tested and graded, in the process of reaching a certain level of achievement, degree, certification, continuing education credits, etc. (Adopted by the NOAA Education Council in 2006; used in the FY09 PPBES process.)

Informal Education: Learning outside the established formal system that meets clearly defined objectives through organized educational activities. This mode of education may be voluntary, self-directed (e.g., a museum or aquarium exhibit), or systematic and guided (e.g., a field trip). (Adopted by the NOAA Education Council in 2006; used in the FY09 PPBES process.)

Outreach: Opportunities generally designed to build awareness, develop relationships, and inspire audiences to pursue further learning opportunities. Often designed to reach a wider audience, but can be personal and interactive, designed to identify and appeal to an individual's personal interest or motivation for information. (Adopted by the NOAA Education Council in 2006; used in the FY09 PPBES process.)

Extension: The goal of extension education is to change the behavior of individuals, groups, or institutions. Extension agents and specialists use science-based information and help people apply that information in their decision-making. Specific extension programs are developed based on the needs of stakeholders, and the programs always focus on outcome-based objectives. Extension specialists use a variety of educational processes and techniques, often over a sustained period of time, to achieve their objectives. Extension specialists are neutral, non-advocacy based educators who build long-term relationships with the user communities they serve. (Developed by NOAA Sea Grant for the Education Council.)

External Training: Training is the process of employing a standardized program for professional audiences designed to be repeatable using instructional methods and techniques through lesson plans, trainers, mentors, and/or instructional devices, for the purpose of developing the competencies that enrich and enhance the performance level of coastal, ocean, and atmospheric professionals. (Developed by NOAA Coastal Services Center.)

Appendix V

Descriptions of NOAA Programs with Significant Extension, Outreach, and Education Components

National Sea Grant College Program

Program Overview

The Sea Grant network addresses the nation's most pressing environmental, economic, and education issues and needs that provide a solid foundation for further investment in university-based research, education, and outreach efforts. Sea Grant's priority, or theme areas, promote sustainable fisheries; develop responsible aquaculture; preserve, enhance, and restore coastal habitat; create quality coastal community development; mitigate the effect of coastal hazards; create value through marine biotechnology; and expand public literacy.

Extension, Outreach, and Education Overview

The National Sea Grant College Program sponsors a variety of marine research, outreach, and education projects, primarily through the 30 state Sea Grant programs. A network of extension professionals takes Sea Grant scientific information out of the laboratory and into the field, working to enhance a coastal business, a fishery, or residents' safety and quality of life. A dedicated corps of communications specialists builds public understanding of these issues for informed decision-making. Sea Grant educators bring the discoveries into the nation's schools, using them to pioneer better ways of teaching and helping to foster a new generation of scientifically literate Americans. See <http://www.seagrant.noaa.gov/> for details.

Budget and Staff

In FY 2007, the National Sea Grant Program allocated \$20.4 M for extension, outreach and education and supported 420 communicators, educators and extension agents across its network.

National Estuarine Research Reserve System

Program Overview

The National Estuarine Research Reserve System (NERRS) consists of 27 areas representing different biogeographic regions of the United States that are protected for long-term research, water-quality monitoring, education, and coastal stewardship. The system protects more than one million acres of estuarine land and water in 17 states and Puerto Rico. Established by the Coastal Zone Management Act of 1972, NERRS receives funding, national guidance, and technical assistance from NOAA. Each reserve is managed by either a lead state agency, university, or with input from local partners.

Extension, Outreach, and Education Overview

NERRS staff works with local communities and regional groups to address natural resource management issues, such as nonpoint source pollution, habitat restoration, and invasive species. Through integrated research and education, the reserves help

communities develop strategies to deal successfully with these coastal resource issues. Reserve educators offer field classes for K-12 students and support teachers through professional development programs in coastal and marine education. Additionally, reserve educators work to develop friendly web interfaces, activities, and lesson plans for classroom use of ocean observing data (real-time and archived) , specifically the NERRS System-wide Monitoring Program (SWMP) data. SWMP is a fully operational network of integrated observing systems, developed by NERRS scientists, that is focused on monitoring short-term variability and long-term changes in estuaries and coastal systems. Targeting coastal decision-maker audiences, the Coastal Training Program provides needs-based training on estuarine issues of concern in their local communities and regions. The program (not included in the funding total below) reaches decision-makers through workshops or other training venues. Reserves also provide long-term water quality monitoring as well as opportunities for scientists and graduate students to conduct research in a “living laboratory.” See <http://www.nerrs.noaa.gov/> for details.

Budget and Staff

In FY 2007, the National Estuarine Research Reserve allocated \$1.3M for extension, outreach and education and supported 50 educators, trainers, and communicators across its network.

National Marine Sanctuaries Program

Program Overview

The National Marine Sanctuaries Program maintains 14 marine protected areas that encompass more than 150,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys, and from Lake Huron to American Samoa. The system includes 13 national marine sanctuaries and the Northwestern Hawaiian Islands Marine National Monument. Since 1972, the Office of National Marine Sanctuaries has worked cooperatively with the public and federal, state, and local officials to promote conservation while allowing compatible commercial and recreational activities.

Extension, Outreach, and Education Overview

The National Marine Sanctuaries Program hosts a variety of educational and research programs. For example, a series of marine education lesson plans were recently launched that highlight cutting-edge research, maritime heritage, cultural resources, and environmental issues in our national marine sanctuaries. Designed for K-12 teachers and marine educators, the "Oceans for Life" series of lessons and videos gives students an opportunity to explore the history, biology, and ecology of the National Marine Sanctuaries system. Additionally, research projects within the Sanctuaries system allow scientists to address other information needs that are not recognized through site characterization and monitoring. Process studies, modeling, and prediction are research activities conducted at sanctuary locations. Such studies allow scientists and managers to better understand the resources within a sanctuary and how their condition is affected and changed. See <http://sanctuaries.noaa.gov/> for details.

Appropriations and Staff

In FY 2007, the National Marine Sanctuaries Program allocated \$7.9M for extension, outreach and education and supported 45 education, outreach, media, and public relation specialists across its network.

Office of Ocean Exploration

Program Overview

The Office of Ocean Exploration strives to engage broad audiences to enhance America's environmental literacy through the excitement of ocean discovery. Increasing this literacy requires high-quality, effective collaborations between ocean explorers and America's teachers. This office supports expeditions, exploration projects, and a number of related field campaigns for the purpose of discovery and documentation of ocean voyages. Education and outreach rank high as office priorities, and are geared primarily toward developing the next generation of ocean explorers, scientists, and educators.

Extension, Outreach, and Education Overview

The Office of Ocean Exploration has developed over 200 hands-on, inquiry-based lessons correlated to the National Science Education Standards. Scientists and educators explain the science behind each NOAA expedition for classrooms. Such lessons are designed to introduce educators to ocean scientists, and provide tools and resources that will interest students in NOAA-related science and exploration efforts. For example, through the NOAA Ocean Explorer website, students can interact virtually with the likes of Bob Ballard and Shirley Pomponi through video-based interviews as they learn why these premier ocean explorers chose careers in ocean science. See <http://oceanexplorer.noaa.gov/> for details.

Budget and Staff

In FY 2007, the Office of Exploration allocated \$1.5M for extension, outreach and education and supported 2 educators.

B-WET Program

Program Overview

The Bay-Watershed, Education, Training (B-WET) Program provides hands-on watershed education to students and teachers to foster stewardship. NOAA recognizes that environmentally literate citizens who have the skills and knowledge to make well-informed environmental choices are important to sustaining the nation's ocean and coastal environments. To meet this challenge, the Chesapeake Bay B-WET Program was established in 2002. Soon thereafter, two additional B-WET Programs were created in Monterey Bay (2003) and the Hawaiian Islands (2004).

Extension, Outreach, and Education Overview

Using the environment to help advance student learning and problem solving abilities has been shown to increase academic performance, enthusiasm for learning, and environmental stewardship. NOAA B-WET supports the commitment of partnerships for watershed restoration, by providing students in the watershed with meaningful bay or

stream outdoor experience. For more information on these programs, see <http://chesapeakebay.noaa.gov/formaleducation.aspx>, Chesapeake Bay Program; <http://sanctuaries.noaa.gov/news/bwet/welcome.html>, Monterey Bay; and <http://www.csc.noaa.gov/psc/bwet.html>, for the Hawaiian Islands.

Budget and Staff

In FY 2007, NOAA's B-WET programs were staffed by an individual program manager, and appropriated the following budgets: \$2.1M, Chesapeake Bay; \$1.2M, California; \$0.8M, Hawaii.

Warning Coordination Meteorologists

Program Overview

A Warning Coordination Meteorologist works within a National Weather Service Weather Forecast Office. The Warning Coordination Meteorologist is responsible for planning, coordinating, and carrying out area-specific public awareness programs related to hydrometeorological events. The Warning Coordination Meteorologist also provides direction, guidance, instructions, and assistance to forecast office staff in the conduct of weather service operations.

Extension, Outreach, and Education Overview

For a given forecast office, the major duties of a Warning Coordination Meteorologist include addressing conventions, conferences, and meetings of emergency management agencies and community groups. Additional duties include appearing on local radio or television as the spokesperson for the National Weather Service on severe weather-related actions and local natural disaster hazards. See <http://www.met.ed.ucar.edu/resource/wcm/> for details.

Budget and Staff

In FY 2007, Warning Coordination Meteorologists were appropriated \$8.5M. Across the country, each Weather Forecast Office was provided with one Warning Coordination Meteorologist (total 122).

NOAA Education Office

Program Overview

The Office of Education (OEd) is a staff office within the NOAA Administrator's office. OEd provides advice and counsel to the Under Secretary on matters pertaining to education. OEd, in conjunction with the NOAA Education Council, coordinates education activities across NOAA and oversees the implementation of the NOAA's Education Plan and Policy. These efforts help to ensure that NOAA's education programs and activities are based on NOAA science and support the agency's cross-cutting priority of promoting environmental literacy. OEd also works with external partners to promote environmental literacy efforts that directly benefit the NOAA mission.

Extension, Outreach and Education Overview

OEd's Environmental Literacy Grants (ELG) Program provides funding for exemplary projects that advance key educational goals. Project topics range from free-choice learning to creation and utilization of data visualizations in exhibits to formal K-12 education projects. To date, the program has awarded \$1,661,675 to install and develop content for 12 Science on a Sphere projects in partnership with science museums and centers and \$6,805,570 to 15 free-choice and K-12 formal education programs across the United States.

OEd's Educational Partnership Program (EPP) with Minority Serving Institutions (MSI) also seeks to increase collaborative research efforts between NOAA scientists and researchers at minority serving academic institutions. Financial assistance is provided through four competitive program components:

1. Cooperative Science Centers have been established at MSIs to advance scientific research and to provide training to students in coursework directly related to NOAA's mission.
2. The Environmental Entrepreneurship Program offers grants to attract historically underrepresented groups to environmental sciences for program development and environmental demonstration projects.
3. The Graduate Sciences Program is designed to recruit and provide graduate level training in NOAA-related sciences to outstanding minority and women candidates.
4. The Undergraduate Scholars Program offers 15 internships and scholarships annually to students attending MSI.

Budget and Staff

In FY07, the Office of Education allocated approximately \$30 M for extension, outreach and education.

Appendix VI

Summary of NOAA Perception Survey Results

Objective

Gauge public awareness and perception of NOAA along with their mission among visitors from selected aquariums across the country.

Background

In order to gather a national sample of data, the NOAA questions were integrated into summer surveys in 2007 at the Aquarium of the Pacific (AOP) in Long Beach, California, the Shedd Aquarium in Chicago, Illinois, and the Point Defiance Zoo & Aquarium in Tacoma, Washington..

AOP – 298 exit interviews were conducted on randomly selected visitors at the Aquarium of the Pacific between June 2 and August 18, 2007.

AOP visitors are typically families with children ages 7-11 from Los Angeles County (9% from Long Beach). The majority of respondents are Caucasian with a median household income of \$60,725, and have either completed some college/technical school or have graduated from college.

Shedd Aquarium – 395 exit interviews were conducted on randomly selected visitors at Shedd from June 30 to August 26, 2007.

Shedd visitors are predominantly in their 40s from the Midwest (11% from Chicago). The majority of respondents are Caucasian with a household income range between \$50 and \$75K and have graduated from college.

Point Defiance Zoo & Aquarium – 474 surveys were collected through self-administration on a computerized Touch Poll stand. The dates were June 9 through July 26, 2007.

PDZA visitors are typically ages 25-34 and mostly from the Puget Sound area (70%). About 25% of survey respondents have a college degree (26%), roughly half are married (56%), and 22% have a combined household income of \$50,000-\$74,999.

Findings

Based on the percentages, it appears that aquarium visitors (as a national sample with all three aquariums combined) feel that it is most important for the federal government to **“create nautical charts and clean up oil spills along the nation’s coast.”** This cause received the highest percentage with **79%** of respondents giving it a rating of 8 or above, followed by **“regulate fishing for marine species”** and **“conduct research on climate change”** both with a **74%** rating it at 8+, and **66%** of respondents rated **“forecasting the weather”** as important with an 8+.

One important observation to note is that visitors may have been confused while taking the surveys at Point Defiance Zoo & Aquarium since the “1” ratings were fairly high

proportionally. Respondents may have thought by rating with a “1” (instead of a “10”), they were marking an answer as “extremely important.” Thus, we speculate that a fair amount of “1” ratings given for these questions by Point Defiance respondents were intended to be “10” ratings.

About **half of the national sample surveyed (49%) identified NOAA** as the federal agency responsible for the areas mentioned in questions 1-4. **NOAA received the highest percentage of responses** across all three aquariums. The second highest percentage of responses went toward the **EPA (Environmental Protection Agency) with 25%**.

Aquarium of the Pacific (**with 66%**) and Shedd Aquarium (**with 57%**) appear to have a **higher awareness of NOAA regionally** since well over half of the respondents from both facilities identified NOAA correctly. Furthermore, **AOP actually has NOAA exhibits and signage inside the institution**, which would definitely contribute to a heightened awareness of NOAA.

When respondents were asked which organizations they believed were a part of NOAA, the **Oceanic & Atmospheric Research Office (OAR)** was most often identified (**75%** of the “national” sample chose OAR). This was followed by the **National Ocean Service (70%)** and the **National Marine Fisheries Service (62%)**. The NOAA organization that was **least recognized as part of NOAA** across the national sample was the **National Environmental Data, Satellite and Information Service** with an average response of **46%**. And the **National Science Foundation** received the **lowest average response (with 39%)**, which suggests that survey participants may have identified it correctly as an organization that is *not* a part of NOAA.

Roughly $\frac{3}{4}$ of respondents (**74%**) feel **it is extremely important (giving a rating of 8+) that NOAA increase its outreach activities so the public has a greater understanding of its research and services**. The rating point that received the **highest percentage of responses (at 50%)** across all three aquariums rated the **importance of this cause with a “10.”**

SUMMARY TABLE OF NOAA DATA

AOP = Aquarium of the Pacific in Long Bch.; **SH** = Shedd Aquarium in Chicago; **PD** = Point Defiance Zoo & Aquarium in Tacoma

 = 1st highest % of responses; = 2nd highest % of responses; = 3rd highest % of responses

Q1: How crucial would you say it is for the federal government to **forecast the weather**? (Use a 10 point scale where "10" is extremely important and "1" is not important at all.)

	1	2	3	4	5	6	7	8	9	10	Responses
AOP	.3%	-	.3%	.7%	3%	3%	7%	18%	11%	55%	298
SH	6%	2%	2%	2%	8%	8%	7%	15%	12%	38%	387
PD	13%	3%	5%	4%	8%	7%	7%	13%	11%	30%	474

Q2: How crucial would you say it is for the federal government to **regulate fishing for marine species in federal waters**? (Use a 10 point scale where "10" is extremely important and "1" is not important at all.)

	1	2	3	4	5	6	7	8	9	10	Responses
AOP	-	-	.3%	.3%	2%	2%	3%	16%	14%	63%	298
SH	1%	.2%	.2%	1%	3%	2%	6%	16%	16%	54%	384
PD	14%	2%	6%	3%	8%	7%	7%	11%	8%	35%	474

Q3: How crucial would you say it is for the federal government to **create nautical charts and clean up oil spills along the nation's coasts**? (Use a 10 point scale where "10" is extremely important and "1" is not important at all.)

	1	2	3	4	5	6	7	8	9	10	Responses
AOP	.3%	-	-	-	-	1%	1%	4%	7%	88%	298
SH	3/1%	2/1%	-	.2%	3%	2%	3%	11%	11%	69%	383
PD	16%	1%	5%	3%	7%	5%	5%	6%	7%	45%	474

Q4: How crucial would you say it is for the federal government to **conduct research on climate change**? (Use a 10 point scale where "10" is extremely important and "1" is not important at all.)

	1	2	3	4	5	6	7	8	9	10	Responses
AOP	1%	-	-	-	1%	1%	2%	9%	9%	77%	298
SH	2%	1%	1%	.3%	3%	1%	4%	14%	13%	61%	383
PD	16%	2%	3%	7%	7%	7%	8%	8%	9%	33%	474

****Please note:** There appears to be a discrepancy with some of the results from the Point Defiance Zoo & Aquarium due to the dichotomy between ratings of “1” and “10”. We believe this may have occurred due to respondent confusion since the visitors took the surveys themselves using a Touch Poll computer kiosk.

AOP = Aquarium of the Pacific in Long Bch.; **SH** = Shedd Aquarium in Chicago; **PD** = Point Defiance Zoo & Aquarium in Tacoma

= 1st highest % of responses; = 2nd highest % of responses; = 3rd highest % of responses

Q5: Which single federal agency is responsible for the areas mentioned in the previous questions (forecasting weather, regulating fishing, creating nautical charts and researching climate change)?

	AOP	SH	PD
U.S. Dept. Of Interior	1%	8%	19%
NASA	1%	2%	14%
NOAA	66%	57%	31%
EPA	29%	30%	19%
U.S. Dept. of Agriculture	3%	3%	18%
Total Chosen Responses	328	342	474

Q6: The agency responsible for these activities is the National Oceanic and Atmospheric Administration (or NOAA). Which of the following organizations do you believe are part of NOAA?

	AOP	SH	PD
National Ocean Service	89%	78%	42%
National Weather Service	69%	72%	30%
National. Science Foundation	48%	44%	24%
National Marine Fisheries Service	80%	72%	35%
NESDIS (National Environmental Satellite, Data &	51%	58%	29%

Information Service)			
OAR (Oceanic and Atmospheric Research Office)	95%	85%	41%

Q7: How essential is it to you that NOAA increase its outreach activities so the public has a greater understanding of its research and services? Use a 10 point scale, where "10" is extremely important and "1" is not important at all.

	1	2	3	4	5	6	7	8	9	10	Responses
AOP	1%	-	.3%	-	2%	-	4%	8%	10%	75%	297
SH	1%	.3%	1%	.3%	2%	2%	7%	15%	20%	52%	379
PD	14%	3%	6%	4%	9%	6%	9%	9%	7%	34%	474

Appendix VII Table on NOAA Customers

The NOAA Education Council provided a self-report on their perception list by program of who NOAA perceives are their current customers for extension, outreach, and education.

NOAA Customers	NOAA-wide	National Environ. Satellite & Infor. Service	Office of Marine & Aviation Operations	National Weather Service	National Marine Fisheries Service	National Ocean Service-wide	National Estuarine Research Reserves	Office of Atmospheric Sanctuaries	Office of Ocean Exploration	National Sea Grant College	Office of Education	Office of Communications
General public	X	X	X	X	X	X	X	X	X	X	X	X
Recreational water users (e.g., boaters, fishers, divers)	X	X		X	X	X		X	X			
Media (e.g., TV, print, radio)	X	X	X	X	X	X	X	X	X			X
Resource & emergency managers (e.g., habitat, fisheries, weather)	X	X		X	X	X	X	X		X		
Academia (e.g., Research community)	X	X	X	X	X	X	X	X	X	X	X	
Formal education (e.g., K-12, college)	X	X	X	X	X	X	X	X	X	X	X	
Informal education (e.g., museums, aquaria, science centers)	X	X	X	X	X	X	X	X	X	X	X	X
Governmental organizations (e.g., federal, state, local, congress)	X	X	X	X	X	X	X	X	X	X	X	X
Non-governmental organizations (e.g., environmental and research consortiums)	X			X	X	X	X	X	X	X	X	X
Professional organizations (e.g., AMS, AGU, NSTA)	X	X	X	X	X	X	X	X	X	X	X	X
Private industry (e.g., fisheries, aerospace, shipping)	X	X		X	X	X	X	X	X	X	X	X

Appendix VIII
NOAA Education Section of the America COMPETES (Creating Opportunities to
Meaningfully Promote Excellence in Technology, Education, and Science) Act

Section 4002 Ocean and Atmospheric Science Education Programs.

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

(b) NOAA Science Education Plan. – The Administrator, appropriate National Oceanic and Atmospheric Administration programs, ocean and atmospheric science and education experts, and interested members of the public shall develop a science plan setting forth the education goals and strategies for the Administration, as well as programmatic actions to carry out such goals and priorities over the next 20 years, and evaluate and update such a plan every 5 years.

Appendix IX Sea Grant Regional Pilot Proposal

A Three-year Pilot for NOAA Sea Grant to Coordinate NOAA-wide Extension, Outreach, and Education Programs

This document summarizes the detailed proposal submitted to the NOAA Science Advisory Board's Extension, Outreach, and Education Working Group. The three-year pilot will provide sufficient time for NOAA Sea Grant to develop, implement, and evaluate a national extension, outreach, and education framework for a bottom-up and top-down approach to respond to the needs of NOAA and its Gulf of Mexico (GoMEX) constituents. An annual budget of \$1.5 million is required to build the regional extension, outreach, and education infrastructure necessary to successfully complete the pilot. The annual cost to replicate this model nationwide is estimated at \$15-20 million.

Two recommendations from the U.S. Commission on Ocean Policy and the President's U.S. Ocean Action Plan were to support a regional partnership in the Gulf of Mexico and expand NOAA's authority to include education and outreach. Building on these recommendations, the NOAA 2006-2011 Strategic Plan identified the need to engage, advise, and inform individuals, partners, communities, and industries to facilitate information flow, assure coordination and cooperation, and provide assistance in the use, evaluation, and application of information.

NOAA's National Sea Grant College Program is a logical choice to coordinate a NOAA-wide extension, outreach, and education program. The Sea Grant network already delivers the majority of NOAA's extension, outreach, and education programs through an estimated 420 non-federal full time equivalents (FTE) funded by the 30 Sea Grant College programs.

The goal of this pilot is to improve NOAA's ability to respond to constituent needs by coordinating NOAA extension, outreach, and education efforts among existing NOAA programs within the GoMEX.

The project objectives are to:

- Improve NOAA's ability coordinate extension, outreach, and education programs within NOAA and with other regional programs (Gulf of Mexico Alliance [GOMA], Gulf of Mexico Coastal Ocean Observing System [GCOOS], GoMEX Ocean Research Priorities Plan [ORPP], COSEE, CELC, etc.).
- Develop and implement needs-based extension, outreach, and education programs by using all assets among NOAA's Line Offices.
- Evaluate the effectiveness of the GoMEX pilot and provide recommendations for NOAA-wide implementation.

To fulfill project objectives, eight FTE's are requested:

- One Sea Grant extension specialist (five total) will be detailed to an appropriate regional line office (NWS, National Environmental Satellite Data Information Service [NESDIS], Oceanic and Atmospheric Research [OAR], NMFS, National Ocean Service [NOS]). The specialist will be responsible for coordinating

extension, outreach, and education programs within and across line offices. At least one specialist will be located in each GoMEX state.

- One regional Sea Grant Communicator to coordinate the dissemination of NOAA-generated impacts and to monitor the project's success in achieving outcomes and meeting performance objectives.
- One regional education coordinator to coordinate NOAA's education programs and to assist other GoMEX education efforts (GOMA, COSEE, CELC, etc.)
- One regional extension, outreach, and education coordinator will serve as an interface between regional and national (Program Planning Integration [PPI], Program Coordination Office [PCO], Office of Education [OEd]) programs.

Annual work plans will be designed and implemented to achieve the expected outcomes, performance objectives, and strategies previously outlined. An Extension, Outreach, and Education Advisory Council will be established and have a prominent role in guiding the development of work plans and to provide guidance and direction throughout the pilot period. Formative and summative evaluations will be conducted throughout the three-year pilot. At the end of the three-year pilot an external confirmative evaluation is requested.

Contact: LaDon Swann, Mississippi-Alabama Sea Grant Consortium