

**SEACOOS Extension and Education
Documentation
January 2003-August 2007**

I. Purpose

In addition to the observation, collection and analysis of data, SEACOOS funding supported the development of a complementary Extension and Education (E&E) component. The E&E Work Group (WG) was tasked with providing information and education to ocean and coastal users, and to design user needs assessments for educators and researchers in the development of useful products and services. The purpose of this document is to discuss how these education and outreach functions have been structured and developed from the funding to E&E Principal Investigators (PIs). The report also presents how the E&E WG collaborated within its own specialties and how effort within E&E supported and extended the research of SEACOOS.

II. People

The Education and Extension WG consists of Sea Grant extension leaders in North Carolina, South Carolina, Georgia and Florida. In year 3, the University of Georgia Marine Extension leader joined the team. Sea Grant has a long history of transferring information to coastal stakeholders through outreach methods. Additionally, the newly formed Centers for Ocean Sciences Education Excellence (COSEE) became the core of the education efforts. COSEE SE serves NC, SC and GA. COSEE FL and COSEE Gulf of Mexico serve FL, the latter also providing opportunities to network closely with Texas, Louisiana, Mississippi and Alabama under GCOOS. The E&E WG consists of PIs either directly or indirectly funded to conduct extension and education efforts.

A. *Extension & Education Primary Investigators*

Robert Bacon, Extension Leader, South Carolina Sea Grant Consortium (SCSGC)
Mac Rawson, Ph.D., Director, Georgia Sea Grant (2003-2004)
Mike Spranger, Ph.D., Extension Leader, Florida Sea Grant (FSG)
Jack Thigpen, Ph.D., Extension Leader, North Carolina Sea Grant
Randy Walker, Ph.D., Director, University of Georgia Marine Extension (2005-2007)

Paula Coble, Ph.D., Director COSEE Florida (2003-2004)
Barbara Spector, Ph.D., Director COSEE Florida (2004-2006)
Lundie Spence, Ph.D., Director, COSEE Southeast

B. *SEACOOS-funded projects with Outreach Components*

Ed Kearns and Rod Zika, Ph.D. funded Liz Williams, University of Miami and *Explorer of the Seas*
Charlie Barans, Ph.D., SC DNR MRRI (2003-2005)
George Sedberry, Ph.D., SC DNR MRRI (2005-2006)

C. *Extension and Education Staff Personnel*

Draft August 28, 2007

Sandy Bernard (Eslinger), SCSGC, Coordinator SERA-COOS 2003-2005
Chris Simoniello, Ph.D., FSG, Coordinator E&E Work Group 2004-2007
Katie Greganti Hall, E&E Specialist, University of Georgia (2005-2006)

D. E&E Organization and Communication Structure

The E&E Chair was the Working Group representative on the SEACOOS Executive Committee (EXCOMM) and reported information to the E&E PIs and staff personnel. Bernard and Simoniello joined the EXCOMM communication calls and meetings.

2003-2004 Jack Thigpen, Chair
2004-2005 Robert Bacon, Chair
2005-2007 Lundie Spence, Chair

III. Fiscal Allocation and Leveraging

Primary Investigators representing E&E were allotted a portion (about 8%) of the SEACOOS award. Funding was apportioned within the four states with FL, GA, SC and NC Sea Grant programs leading the extension efforts. COSEEs Florida, Gulf of Mexico and Southeast, along with the University of Georgia Marine Extension Service (UGA MAREX) led K-12 education efforts within the four states. E&E funds awarded to Florida Sea Grant and UGA MAREX supported the only two full time SEACOOS positions--the Regional Extension and Education Coordinator, and the UGA E&E Specialist, respectively.

The E&E WG made extensive use of partnering with Sea Grant specialists and agents and other people to increase program impacts. During the five-year program, more than 55 months of unfunded time was contributed by 22 individuals--41 months by Sea Grant/Marine Extension staff and 13 months by COSEE personnel. The diverse areas of expertise represented include fisheries, tourism, conservation, Geographic Information Systems (GIS), communications, enterprise development, science education, and administrative support.

Additionally, SEACOOS PIs, technicians and support staff from other work groups contributed time and expertise to a variety of community outreach projects. Collaborations with NOAA, FL COOS, GCOOS, FWC, SC DNR, and other state and federal programs allowed E&E to achieve much more than would have been possible with SEACOOS E&E funds alone. Combined, internal and external leveraging account for all major program impacts.

IV. SEACOOS Extension & Education WG Planning Process

A. Planning Process

In the first year, the SEACOOS E&E WG held a planning meeting to identify program focus areas. Three were identified: 1) Increasing an awareness of SEACOOS; 2) Identifying stakeholders and their needs; and 3) Developing potential for products. Assessments that resulted from these activities include the User Characterization Study, the Internal User Needs Assessment, and the Economic

Parameters report (see References Cited section). During this time, education efforts were focused on developing awareness products for distribution to teachers and students.

The initial planning meeting also provided the opportunity to discuss the organizational structure of the work group. It was decided that Dr. Jack Thigpen would be the first E&E WG Chair and represent the group on the SEACOOS Executive Committee (EXCOMM). Primarily for practical reasons and time constraints, it was decided that members would rotate and share the responsibility associated with being WG Chair/EXCOMM member. This strategy proved beneficial because it fostered strong communication and allowed people with different areas of expertise in education and extension to provide leadership roles. Lack of continuity on the EXCOMM was not an issue because there was excellent communication among the core work group members and because the Regional E&E Coordinator was a constant in all EXCOMM activities.

B. Strategic Program Framework

Within the four-state SEACOOS footprint, there are differences in both the types of information available regionally, and the types of information users. Early in the project, it became apparent that in order to maximize WG resources, product development needed to show regional synergy, while retaining local relevance. The strategic program framework was created to organize regional, sub-regional and local E&E WG efforts, and to facilitate building program capacity. Introduced at the SEACOOS Fall Workshop (Charleston, SC, November, 2004) the framework is outlined below. See Appendix A for a full list of E&E activities and products catalogued in this format.

Strategic Framework Objectives

1) Facilitate PI/User Interaction

- a. Region-wide** Working with SEACOOS PIs and targeted users on region-wide SEACOOS science applications.
- b. Sub-Regional Systems** Creating communications and collaborative linkages among regional sub-system extension and education program activities, and working with SEACOOS (and other sub-regional system) PIs and targeted users on sub-regional COOS science applications.
- c. Business & Industry** Working with SEACOOS PIs and targeted users in the non-governmental sector on regional and sub-regional SEACOOS science applications.
- d. K-16 Education** Formal and informal education programs targeted to school systems, “free choice” institutions, teachers and students.

2) Increase Public Awareness. Communications activities targeted at the general public and targeted public audiences with the intention of raising awareness about COOS science and its societal benefits and impacts.

- 3) **Provide SEACOOS Internal Program Development (In-reach).** Internal PI/E&E interactions to improve communications among WGs included participation in Product Interface Committees, website development processes, SEACOOS committees and workshops.
- 4) **Transition to SECOORA.** Planning and implementing the transition from SEACOOS to SECOORA E&E.

V. Annual Progress Reports

Each year of the SEACOOS program, the E&E WG submitted an annual report for inclusion in the program report or review document. Highlights are reported below.

A. *Year One January, 2003-August 31, 2003*

The initial activity at the 2002 SEACOOS Chapel Hill meeting established a working committee comprised of the Sea Grant extension leaders from each of the four states-NC, SC, GA and FL and educators from COSEE. The committee also included participating researchers and NOAA partners to ensure that the outreach products identified were feasible from a research standpoint. The team worked to coordinate the plan for the E&E Work Group for the first year of the SEACOOS project. Jack Thigpen, NC Sea Grant, was designated Chair and served as the E&E WG representative to the Executive Committee (EXCOMM).

Activities during this time include the following:

Stakeholder Information: Conducted an email survey of SEACOOS initial partners. The baseline information was used to identify 11 major categories of users and the most commonly requested information (wave, current and wind information). Information gained from the survey was important because it set the stage for future work. The major categories of users identified and the type of information requested led to the concept of Thematic Areas-cross-work group projects targeting specific "Super Users." The U.S. Coast Guard and Fisheries were among the groups selected to be engaged in SEACOOS science application development. The modeling and observation work groups had more interaction with the U.S. Coast Guard because the detailed information needed was beyond the scope of E&E expertise.

Identify products and partners: Hosted an Outreach Work Group Workshop-32 participants met in Charleston, SC in December, 2002, to begin to identify projects and link the various state, federal, academic and private sector extension representatives.

Outreach Partner Identification: Ground work was conducted to select several examples of how users in coastal communities have established working relationships and utilize information provided by SEACOOS researchers
Website Development-The WG evaluated various models around the country to determine the strengths and weaknesses of web-based outreach programs

B. *Year Two September 1, 2003 -August 31, 2004*

Year Two efforts focused on increasing awareness of national ocean observing operations and research, in general, and SEACOOS in particular. This was accomplished through a combination of the development of E&E products, presenting information at regional and national meetings, working one-on-one and with user groups, site-specific demonstration projects, and coordinating efforts between states and projects. A regional outreach coordinator was hired to serve as the principal regional connection between users and the project workgroups. Jack Thigpen continued as Chair and EXCOMM representative.

Early products designed to increase an awareness of the potential for ocean observing information included a PowerPoint slide presentation (SEACOOS 101), a draft Outreach web page interface for the www.seacoos.org website, contributions to the tri-fold brochure showcasing SEACOOS, and a community user profile to develop an assessment of stakeholder interests and needs

Formal and informal education-focused activities include posting the first SEACOOS-related electronic newsletter, *Passport to the Sea*, on the COSEE SE website and developing the first of four education posters/virtual classrooms (Making Waves). The Southeast Portals to Oceanographic Research for Teachers (SEPORTs) workshops were launched in three states, lectures were given at the University of Florida and at the COSEE Gulf of Mexico Non-formal Educators Workshop, and COSEE FL hosted a one-week, summer Physical Science Workshop at USF focused on SEACOOS science. Also noteworthy is the planning that went into the national IOOS Education Workshop that took place in Charleston, SC in Year 3 with the resulting printed proceedings from OCEAN.US.

The E&E WG partnered with The Coastal States Organization on a web-based survey to assess research information and technology needs of coastal managers. A second assessment addressing the regional economic and social impacts of coastal observing for the southeast was contracted with economists at UNC-Wilmington (see References). SC Sea Grant completed their user community profile interviews that had representatives from 12 sectors (e.g. Weather, Public Health, Recreation, Education). NC Sea Grant worked to determine offshore fishermen's needs and preferences for CODAR information. An exploratory meeting with the Rutgers University CODAR project team was held (NJ, 2004) to determine how best to deal with public/private issues for COOS product development.

National, regional and sub-regional workshops, conferences and meetings were organized, facilitated and/or attended, and oral and/or poster presentations given. Noteworthy are the Coastal Storms Initiative work group meeting in Astoria, OR, the Florida Association of Extension Professionals annual meeting and the Coastal Society Biennial Conference, Rhode Island. Presentations were also given at several expositions, international boat shows, and marine professional trade shows.

C. Year Three September 1, 2004 –August 31, 2005

Robert Bacon assumed the role of Chair of the E&E WG for Year Three of the SEACOOS Project (September, 2004 – August, 2005). E&E activities continued, with the

added responsibility of providing information for the SEACOOS External Evaluation and review. An important development in Year 3 was the creation of the E&E Strategic Program Framework (See IV B above). This framework facilitated tracking regional program activities and allowed WG members to readily determine how resources were being allocated and leveraged. Noteworthy activities include:

Hosted the SEACOOS Extension Workshop in Raleigh, NC where 30 participants representing 8 OOS programs, academia, and state and federal agencies contributed to the “Best Extension Practices” meeting summary report (see References)

Co-hosted the National IOOS/COOS Education Workshop with COSEE-SE, NOAA CSC and Ocean.US. Sixty researchers, extension specialists and science educators pooled resources to create the meeting report “*Promoting lifelong ocean education using the IOOS to shape tomorrow’s earth stewards and the Science and Technology workforce*” edited by Blanche Meeson, Ocean.US Report#4, Charleston, SC, 2004

Hosted the SEACOOS User Needs Workshop for Georgia with the purpose of introducing GA user communities to SEACOOS. COOS needs of commercial and recreational fishing industries, marine operators and emergency managers were prioritized. The workshop report, *SEACOOS Users Need Workshop for Georgia*, by the Georgia Coastal Center, Savannah, GA is available on the www.seacoos.org website (see References)

SEACOOS in partnership with COSEE FL held a “Boats, Buoys and Science Teachers” workshop to familiarize educators with COOS research. Related activities include lesson plan development, web-ready video clips, a “How to Manual” and a presentation at the 2004 NMEA conference, St. Petersburg, FL. 10,000 copies of the SEACOOS/COSEE education poster, Making Waves, were distributed nationally and companion web pages developed for the SEACOOS Community and Classroom portion of the website. The site was launched with a presentation at NMEA, St. Petersburg, FL, 2004.

Two important surveys were completed: 1) *State Coastal Observations and Monitoring Needs: Results of a Survey to Assess Coastal Management Needs* (May, 2004); and 2) *The Economic Benefits of the Southeast Coastal Ocean Observing System* (September, 2004) (see References)

“Super-User Meetings” targeting the following communities were held: Marine Weather and Emergency Management (with Miami NWS-WFO, NOAA AOML and NOAA HazMat personnel), Fisheries and Habitats (with NOAA SE Fisheries and AOML staff); and HF Radar (with SC coastal residents, NC offshore fishermen). Focus groups/interviews were conducted with marine recreational users to determine user information needs for the Cape Lookout Buoy.

More than 30 conference presentations were made by SEACOOS E&E work group members (e.g. AGU, AMS, NMEA, FAEP, GA Association of Marine Educators, SC Science Council Conference), as well as 3 presentations to NOAA CSC for work contracted to SEACOOS E&E to demonstrate regional COOS applications. The Jennette’s Pier Observing Partnership Education Kiosk came online in NC, July, 2005

D. Year Four September 1, 2005-August 31, 2006

Dr. Lundie Spence replaced Robert Bacon as the E&E WG chair and representative to the SEACOOS EXCOMM in Year 4. A major role was coordinating the proposal process for Year Five with the drastically reduced funding. The objective of the group remained the same--to increase connections between users and emerging information from the science community. Activities in Year Four included the following:

Increased region-wide public awareness through displays and presentations at boat shows, fishing symposia and marine trade shows. Created four touch screen kiosks on display at public piers and informal education centers in GA and NC, and created four model buoys that are being used in educational displays in science centers/aquaria in FL, GA, SC and NC.

Hosted/Co-hosted and/or facilitated meetings for the expansion of the *Carolinas Coast* Project at the Tampa NOAA WFO office in Ruskin, FL, January, 2006, USF/FWRI COOS workshop St. Petersburg, FL, November, 2005, and the Tackle Shop and Charter Boat Owners/Operators meeting, Manteo, NC, June, 2006.

Presentations were made at: Sustainable Beaches Conference, St. Petersburg, FL, October, 2005, IOOS Public Health Workshop, St. Petersburg, FL, January, 2006, EPAF, Sarasota, FL, September, 2005, GCOOS Board of Directors Meeting, St. Petersburg, FL, August, 2006, FL Bay and Adjacent Marine Systems Science Conference, Duck Key, FL, 2005

Invited participation in the NOAA Climate Office for International COOS Workshop, Bali, Indonesia, 2006 to develop outreach capabilities for the international Sea Partnership Program. Participation is on-going.

Conference Planning Committee, Session Co-chair and presented at The Coastal Society's 20th Biennial Conference, May, 2006, St. Pete, FL, special IOOS session Key education activities include hosting a media cruise, including CNN, on the cruise ship *Explorer of the Seas*. Educational efforts on the ship were assessed and formative information provided to the PIs (*Evaluation of Explorer of the Seas*, K. Byler, 2005, see References Cited). Educational posters, *Forming Hurricanes* and *Flowing Ocean: Understanding the Gulf Stream*, were developed and 25,000 were distributed regionally and nationally. New Virtual Classroom activities were added to the www.seacoos.org website. Twelve SEPORT workshops were conducted in 3 states, two COOS-related DVDs were developed for educators through the COSEE FL and COSEE SE programs, and the web-based game, FishMatch, created in partnership with SCDNR-MRRI, was completed and located on the SC Aquarium and SEACOOS websites.

In support of transitional efforts to SECOORA, SEACOOS E&E supported the CORMP outreach project, the *Carolinas Coast*, initiated a web revision for extension and education, providing new site maps for each, and engaged with the SECOORA Product Development and Market Committee.

"Taking the Pulse of our Coastal Ocean" a one week residential workshop was held at UGA MAREX, UGA MECA and Skidaway Institute of Oceanography, June 2006. This workshop tested the COSEE MidAtlantic efforts in a new location. Evaluations indicated that the 14 teachers learned about SEACOOS information and how to apply what they learned in the classroom.

E. Year Five September 1, 2006-August 31, 2007

Dr. Lundie Spence continues in her role as E&E WG chair and representative to the SEACOOS EXCOMM. With the exception of support for the final documentation effort, no new funds were allotted for E&E in Year 5. Despite cuts, Year Four projects have been continued using residual and leveraged funds, and partnerships are being pursued to launch new programs. Activities include the following:

Workshops and conferences include the SC Sea Grant Extension-hosted workshop on Pritchard's Island, SC, teaching coastal managers about information from HF Radar technology; BIOSENSE Workshop at Mote Marine Laboratory bringing together researchers and private sector companies working on next-generation sensors that measure biological/chemical parameters, June, 2007; NC Watermen United Charter/Head boat Association board meeting presentation, Hatteras, NC, 2006

Progress in the education arena includes completion of the 4th poster in the SEACOOS/COSEE Series: *Catching the Current: Who Goes With the Flow*-15,000 posters are being distributed nationally and related activities are being added to the Virtual Classroom site. Educational DVDs continue to be distributed and the production with Blue Bear Productions has been completed. Ten SEPORT workshops and one hurricane-related workshop have been, or will be held for educators in the four-state SECOORA footprint

SEACOOS E&E personnel have partnered with the FL Division of Emergency Management, FEMA and Sea Grant and Simoniello is serving as Co-chair of the Technical Advisory Team for the joint DVD production "Boater Preparedness" to be released August, 2007

A private sector partnership is being developed with Son Tek/YSI instruments, Florida Sea Grant, the National Sea Grant Office, and the Alliance for Coastal Technologies. The goal is to have instruments that collect water quality data in near-real time in classrooms in the US and abroad, and to link the classrooms via a communication system so that collaborative projects can be undertaken.

SEACOOS outreach targeting commercial & recreational fishermen continue with funds leveraged from the FL State Marine Recreational Fishing program

The extension of SEACOOS funds is allowing development of a kiosk at the Roper Mountain Science Center, SC (location of one of the model buoys), development of a kiosk at the SC Aquarium, and reformatting two of the education DVDs into a single product with improved access entry. Regarding kiosks, following storm damage to the public pier, the kiosk in NC is temporarily offline until the pier is restored. The display at Gwinnett County, GA is operating and a UGA MAREX MECA display is being constructed. Exploratory meetings have been held to develop a COOS exhibit for the Florida Aquarium in Tampa, FL.

In support of the Documentation effort, E&E has compiled a CD reference list of all E&E documents, products, articles, presentations and workshops

In partnership with CORMP, SEACOOS/SECOORAE&E was awarded competitive funds from NOAA CSC to continue work on the *Carolinas Coast* expansion project (the Southwest Marine Weather Portal). The *Carolinas Coast* template is nearly complete and work to transport to the Tampa WFO is underway. After March, 2007, support was no longer available for the E&E specialist based at UGA

VI. Process for Extension and Education Product Development

Extension and education products were developed as the PIs perceived the needs of their audiences or from stakeholder comments. The main items include user characterization studies to identify stakeholders, educational posters and website support, workshops, kiosks and other public displays designed to build program awareness and involvement in SECOORA-wide projects such as the Coastal States Organization needs assessment and NWS partnership with the Coastal Ocean Research and Monitoring Project-led *Carolinas Coast*. For a complete list of products in the strategic program framework (section IV B above), see Appendix A.

SEACOOS was required by the funding entity, the U.S. Office of Naval Research, to have an outreach component. The E&E WG was established at the onset of the SEACOOS project along with the other working groups to meet this criterion. With a limited budget and personnel, the challenge was to develop a program that increased awareness of Coastal Ocean Observing Systems to a diverse set of stakeholders. The dilemma was that the stakeholders were not aware of the extent of the observing system capabilities or the potential benefits of coastal ocean monitoring information.

As a first step, targeted stakeholder focus groups were organized to determine and prioritize the information demands. These meetings generated “wish-lists” of information needs. They also refined the stakeholder profiles. However, development of products suggested by stakeholders was delayed due to the lack of a dedicated technical product development team and sufficient resources. The importance of these requirements is emphasized by the progress on the *Carolinas Coast* project where a strong feed-back loop from stakeholders to product developers representing IT, research, stakeholders, the NWS and outreach has been established.

The needs assessments conducted for stakeholder groups revealed that there are significant differences in the complexity of information desired. The efficient SEACOOS data integration system promoted high-end products for “Super-users,” such as researchers, the U.S. Coast Guard and the National Weather Service. However, some of the less sophisticated data users could have benefited from less complicated data products. The Rutgers, New Jersey “Cool Room” approach is a good example of how information can be tailored to fishermen, surfers and other general public audiences.

The audiences E&E activities targeted included the following: the general public (recreational boaters, swimmers, fishermen, surfers, SCUBA divers), formal and informal education audiences, coastal resource managers, legislators, county, city, and state officials, and leaders in the tourism industry. A variety of approaches were developed and tested in each region. Initially, awareness products were broad in scope and developed for regional/national distribution. These included banners, bookmarks and stickers with the program logo and url designed to promote the branding identity of SEACOOS and product recognition. As the program matured, stakeholder-specific products such as workshops, public exhibits, web-based activities and DVDs were developed. For all of these, an ongoing challenge exists for creating metrics to assess the impacts of outreach activities and products.

VII. Transitioning to SECOORA

At the onset of the project, the E&E WG was aware that SEACOOS is a regional coastal ocean observing system. The emergence of the regional association, combining all of the observing systems with a focus on meeting societal needs identified by Ocean.US, encouraged the SEACOOS E&E WG to initiate transition activities to the SECOORA. The E&E WG was expected to be the first WG to transition, a logical expectation since program activities are inherently inclusive-linking stakeholders to research in multiple disciplines, institutions and sub-systems in the region. To the extent that early program activity fostered a general awareness of IOOS, E&E supported SECOORA's mission from the start. Activities that facilitated the transition include:

Initiated participation and collaborations with Caro-COOPS, CORMP, NC, SC and FL NERRS, and other non-SEACOOS observing and monitoring programs. Collaborations include the CSO/SECOORA needs assessment for southeastern coastal resources managers, implementation and promotion of the *Carolinas Coast* and expansion project the Southwest Marine Weather Portal; co-chairing IOOS sessions with NOAA CSC at TCS conference; coordinating SECOORA's Preliminary Asset Inventory, and supporting the IOOS/COOS Education Workshop. SEACOOS E&E took the lead in creating a new site map for the SECOORA E&E website, incorporating suggestions based on feedback from formal and informal educators as well as the general public.

Contributions from the SEACOOS E&E WG to SECOORA are included in the Marketing Management section of the SECOORA Business Plan.

VIII. Lessons Learned from Extension and Education Experiences

Any complex project yields educational experiences for those involved. SEACOOS was no exception. This section briefly identifies some of the important lessons that were learned about conducting extension and education projects in a regional ocean observing project. It is hoped that this information will be useful in guiding future projects.

Relationship Building: Professional and business relationships are first and foremost personal relationships. One of the most important tasks that SEACOOS E&E undertook was developing lines of communications between stakeholders and researchers. This engagement of stakeholders (those groups and individuals who will be using SEACOOS-generated data and information) must be a two-way communication. As Figure 1 illustrates, this communication allows clientele to make their needs and preference for information known to researchers and conversely lets researchers share with clientele a realistic view of what technologies and information can be made available. The iterative and continuing process requires time, hosting formal meetings, informal workplace interactions, focus groups, individual social interactions and continual feedback to both groups.

System Integration: In retrospect, it is apparent that the integration of activities from research, operations, data management, and information product development is one

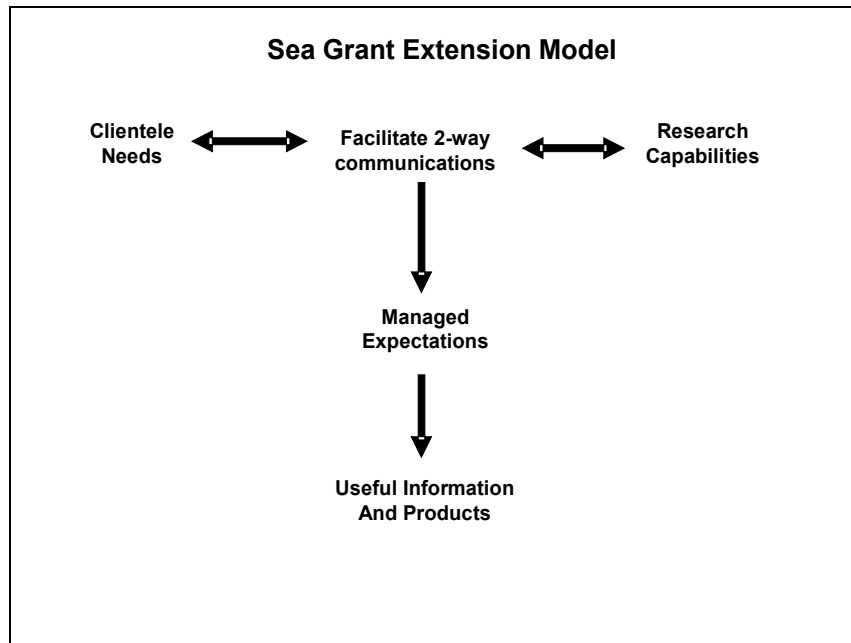
key to success. Outreach efforts work best when they are integrated in all stages of planning.

Managing User Expectations: It is important to make sure that targeted user groups understand that the development of information products can be a long process. Promising too much too soon can lead to dissatisfaction for information users and frustration for researchers and extension specialists. Involvement of the users in the entire process can help ensure that they are aware of the realities of developing new information products and delivery methods.

Coordinating Products Development and User Engagement: There is an inherent conflict in the coordination of information product development and establishing a working relationship with information users. In order to successfully engage information users, practical and useful products are needed. Conversely, in order to develop useful products, input from users is essential. The optimum situation for reducing this conflict is to have users involved with product development from the formative stages to the initial product delivery and throughout the process of improvement of product and delivery methods.

Figure 1 illustrates that early user engagement that stresses the two-way flow of information between clients and researchers is important. This enhances mutual understanding and lessens the possibility of unrealistic expectations from users. Additionally, honest and continual communications tend to reduce frustrations with unexpected delays in information delivery schedules that are inherent to new complex projects.

Figure 1. Sea Grant Extension Model



Information Development and Private Business: There are many current and emerging niches for specialized data information products that are appropriate for private enterprise development. Extension specialists should work from the start with representatives of the private business sector to provide assistance and, most importantly, not hinder the efforts of value-added private business.

Education and extension: There is much mission compatibility and design overlap between extending information to users and the development of programs for formal educators. This development of education programs for professional educators is similar but not identical to working with stakeholders in business and recreation. This distinction needs to be made clear to researchers so that areas of overlap can be taken advantage of and inappropriate efforts reduced.

Practices that apply to both education and extension activities include having clearly defined audiences, explicitly expressed information needs, evaluation designed with a strong feedback loop, and a focus on long-term relationships with clientele and educators. These practices result in establishing a more user-driven system that is responsive to real information needs. This in turn generates real support and enhances project longevity.

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IX. **Appendix A**
Products and Outreach Presentations in the Strategic Program Framework