

**National Sea Grant Advisory Board (NSGAB)**  
**Fall Meeting**  
**September 28 -29, 2011**  
**University of Rhode Island**  
**Graduate School of Oceanography**  
**Narragansett Bay Campus**  
**215 South Ferry Road, Ocean Technology Center**  
**Narragansett, RI 02882**

**AGENDA**

**Wednesday, September 28**

**(8:00 a.m. - 4:30 p.m.)**

- 8:00** Welcome, review agenda, approval of minutes - John Woeste, NSGAB
- 8:20** Allocation Subcommittee Presentation, Recommendation – Dick West, NSGAB  
Allocation Committee-II Chair
- 10:15** Break – 15 minutes
- 10:30** Allocation Presentation Discussion and Vote
- 12:20** Working Lunch
- 12:30** Chair Report – Woeste
- 12:45** Nominating Committee Slate - Woeste
- 1:00** National Sea Grant Office (NSGO) Director Report - Leon Cammen, NSGO
- 2:00** Sea Grant Association (SGA) President Report - Jon Pennock, SGA
- 2:30** Break - 15 minutes
- 2:45** Board Activity updates  
Senior Research Council - West  
Cooperative Institutes/Sea Grant meeting - West  
Knauss Fellows – Vortmann  
Scientific Integrity Conference Call - Schmitt  
Upcoming Policy Issues (Sea-Level Rise, Data Sharing) - Woeste
- 3:30** PIER (PIE Reporting System - replaces current NIMS)/NSGO Website update – Nikola Garber, NSGO
- 4:00** Allocation and Futures Committees revisit

**Thursday, September 29**

**(8:00 a.m. -4:00 p.m.)**

- 8:00** Call to Order, review agenda and previous day's discussions - Woeste
- 8:15** Planning, Implementation and Evaluation (PIE) and Performance Review Panel (PRP) updates - Sami Grimes, NSGO (via telephone)
- 9:15** Biennial Report to Congress– assignments and goals - Woeste
- 9:45** Break – 15 minutes
- 10:00** Senator Sheldon Whitehouse
- 10:30** Rhode Island Sea Grant highlights and facilities tour – Barry Costa-Pierce, Director of Rhode Island Sea Grant
- 12:15** Working lunch (if needed)
- 1:00** New Committee Assignments – Woeste  
Reauthorization Committee

Sea Grant Strategic Plan  
Minority Serving Institutions/Diversity Committee  
Sub Committee on OAR Strategic Plan

- 1:30** Nominations/Vote for Advisory Board Chair and Vice Chair - Woeste  
**2:00** Break – 15 minutes  
**2:15** Craig McLean, Assistant Administrator, NOAA Research  
**2:45** Public Comment Period  
**3:00** Dr. Ames Colt, Chair, RI Bays, Rivers, and Watersheds Coordination Team  
**4:00 p.m.** **Adjourn**

## Spring 2011 National Sea Advisory Board Meeting Minutes

### In attendance:

**Board Members:** Byrne, Orbach, Rabalais, Schmitten, Simmons, Stubblefield, Vortmann, West, Woeste

**Ex-Officio Members:** Ban, Cammen, Pennock

**Not in attendance:** Harris

**Tuesday, February 8**

**8:00 Introductions, review agenda, approval of minutes, etc. (J. Woeste, Chair, NSGAB)**

### Discussion:

Jeremy Harris will not be attending

Approval of agenda: John Byrne - approve, Harry Simmons – second. Carried unanimously

Review minutes from October 2010 meeting. Changes as noted:

Byrne – Jim Murray was official member of committee (pg 19)

Page 22 – what is a mortar? NOAA research is the “mortar between bricks”

Agenda says “Orbach asked if a woman could be on the nominating committee”

Page 26 – discussion about travel. It says “Harry needed refundable because he is a mayor” which isn’t true – because he’s a mayor he may have to leave due to a storm

Page 9 – Rabalias quote about “no conclusion other than to stay on course” – delete entire comment – no one remembers her saying that.

Vortmann – why do we need this detailed of minutes?

Ban – FACA requires “detailed minutes” but that can be anywhere between a summary and very detailed notes.

Group discussed whether they would like to have a summary or detailed notes – agreement on summary

**Motion to approve minutes as revised – Byrne, 2nd Schmitten**

**Passed unanimously**

**8:15 Chair’s update (J. Woeste)**

### Discussion:

Jim Murray has been sent out to Denver for the OAR Next/Senior Research Council meeting

**8:30 NSGO report (L. Cammen, NSGO)**

### Presentation and Discussion:

- Budget – nothing much to discuss. We’re still waiting to see a budget. We’re planning multiple scenarios just in case.
  - President’s Budget comes out on Feb 14
- Changes in NSGO Personnel
  - Miguel Lugo left Sea Grant – his position is not being replaced
    - Chelsea Lowes has taken on Sea Grant Knauss Manager duties
    - Program Management has been parsed out among other Program Officers
  - Jim Murray will be retiring on June 30
    - NSGO will replace Jim’s position – though how will depend on what the budget looks like
    - Would like to do some IPAs as well

- Lauren Land and Amy Scaroni are on board and will be taking on the coordination of the focus areas
- Lisa Adams is staying on for a few months
- Evaluation
  - Site Reviews (SRT)
  - SRTs have received informal feedback – this process is much less stressful than the previous process, but NSGO has asked for “Lessons Learned.” SGA is concerned about the Performance Review Panel (PRP).
    - Assume that if there are big issues that we would be getting that feedback without a formal mechanism
  - Performance Review Panel (PRP)
    - Was scheduled for fall of 2011 – rescheduled for spring of 2012
      - Will target the first 2 years of the new reporting program
      - And looking at how programs did in relation to the other programs in the network – in the last 4 years (so it will be a 4 year review)
      - Weighting – 50% on the first 2 years of the reporting, 50% in relation to other programs
  - Annual review – not for evaluation
- Enhancing Sea Grant’s Partnerships with NOAA
  - “noaa.gov” email addresses have been secured for SG Directors
  - Interested in Intergovernmental Personnel Act (IPAs) for Directors and Regional Leads
    - IPAs authorize temporary assignment of employees between Federal agencies and State, local, or Indian tribal governments, institutions of higher education and other eligible information.
  - Working more closely with NOAA regional Sea Grant liaisons
  - Sea Grant Advisory Board study of how to improve NOAA’s engagement with universities
  - Enhanced communications
    - Social media (daily news items)
      - Twitter
      - Facebook
      - Possibly Ning
    - National Sea Grant web site – undergoing revisions currently
    - External Newsletter for NOAA Leadership and Decision-makers
      - Monthly distribution
  - Board inquired if there was a NOAA-wide effort or just NSGO.
    - NSGO is trying to create a venue for disseminating State program information to the public, within NOAA/DoC and within the network
    - In the interest of time maybe at the next meeting we can have a tutorial on how to use these different social media
      - Fact Sheets

- Not officially approved by NOAA yet, so NSGO cannot hand them to Congress yet.
    - Tried to feature impacts from SG Programs
  - National Stories
  - The State of Sea Grant 2010 Biennial Report to Congress
- OAR Next
  - Once Climate leaves OAR, coasts and oceans should become a much bigger part of OAR
  - Extension and engagement needs to be better recognized within OAR
- National Ocean Policy
  - Came out last summer with 9 priority areas identified and now strategic action plans are being developed; drafts out soon and public comments being requested via Federal Register Notice
  - These plans are supposed to be what we are capable of doing with no increase in funding. Most things do cost money and that money is going to have to come from somewhere.
  - Board discussed the NOAA Climate Service (It's in the President's Budget) and whether it can go forward without Congressional support. (Cammen – believe it has to be “blessed” by the appropriations committee)
  - Also discussed if it is better for Sea Grant to be tied to the Climate Service or to OAR. (No resolution.)

**9:15 SGA report (J. Pennock, President, Sea Grant Association)**

**Presentation:**

- NOAA Inreach and Governmental Relations
  - NOAA
  - Governmental Relations
- Funding – particularly for small programs
  - NSGAB Allocation Committee
  - BMPs from Successful Programs
  - Focus on Role of SG to NOAA and Other Federal Agencies
  - Joint ERC/PMC Effort to Define Sea Grant Capacity
- New Approaches and Focus Areas
  - PMC Leading Effort to Design Approach to Develop New Ideas
  - Insure Focus on Internal Discussions of BMPs
- PIE and NIMS
  - Working with NSGO
  - Still concern over PRP
- Focus Teams
  - Need to integrate breadth of SG Network and Communicate
- Internal Organization and Communication
- Organization and Roles of ERC and PMC

**9:45** Break – 15 minutes

**10:00 SAB Brief and Biennial Report Follow-up Visits (D. West, NSGAB)**

**Presentation:**

- Admiral West recommends doing the SAB every 2-3 years to keep Sea Grant visible
  - Biennial Report was well received
  - Next report in 18 months or less – will be very important since FY13 will be the reauthorization

**Discussion:**

- Board inquired as to the response from Congress or NOAA on the Biennial Report. Positive feedback has been received and it has been a tool to promote Sea Grant's work within both groups. DOC commented on impact statements in the Biennial Report saying that they need further development in other parts of NOAA, but that it looks good as long as we keep pushing forward with it.
- A few weeks after the briefing, Mary Glackin (Deputy Under Secretary) called Craig McLean about how to involve Sea Grant more in NOAA. The report is a powerful message that was well done and is a great selling point for Sea Grant
- These kinds of reports are so helpful for new legislators who are coming in on an agenda to make government "work better". It is going to be extremely useful to new legislators as they familiarize themselves with programs.

**10:30 NOAA Climate Program Office and Sea Grant (Dr. Chet Koblinsky, NOAA Climate Program Office)**

**Presentation in Appendix A**

**Discussion:**

- Board inquired as to the relationship between the Coastal Zone Management Program and the Climate Program Office.
  - Dr. Koblinsky said that information from the CPO generally flows through the NOAA Coastal Services Center and that they will soon increase focus to societal impacts of climate change.
- Board inquired how the CPO and future Climate Service will integrate with the United States Geological Survey.
  - Dr. Koblinsky said that they are working hard to make sure that the right agencies and people are connected prior to the Climate Service beginning.
- Board asked about synergy and partnership with Sea Grant.
  - Dr. Koblinsky said that the Climate Service will need to draw on Sea Grant expertise to integrate the programs and to avoid duplication of effort.
- Board suggested that the regional climate coordinators be requested to get in touch with the Sea Grant programs in their regions.

**11:30 Discussion of morning topics**

**Discussion:**

- Board expressed concern that Sea Grant is thought of as an extension program, but not research.
  - Dr. Cammen replied that there have been some grant opportunities that he talked about that some of the PIs from Sea Grant have been awarded. That is probably

the way that this funding is going to go. He added that Sea Grant are not big players in climate research, but that outreach and extension are unique to Sea Grant within NOAA.

- Board discussed upcoming meeting with Dr. Lubchenco, NOAA Administrator. Topics suggestions included Biennial Report to Congress, Academic Affairs Committee, Advisory Board membership, Sea Grant Allocations Committee, regional coordination with NOAA programs

**12:00** Adjourn for Lunch

### **Spring 2011 National Sea Advisory Board Meeting**

**Tuesday, February 8**

**1:00 USDA Cooperative Extension Program and Climate Change (Louie Tupas, USDA)  
Presentation in Appendix A**

**Discussion:**

- Board asked if Land Grant was having the same budgetary issues as Sea Grant, particularly with research and personnel.
  - Mr. Tupas said that Cooperative Extension has separate budgets for research and personnel. Because Sea Grant is smaller, it is much more flexible and can act much more quickly. USDA does not actually motivate the research much, it can only very indirectly influence what people do. NOAA can plan and guide the research much more efficiently. Natural resources research is competing with Family/Consumer, Nutrition, and Food production.
- Board and NSGO said that there will be a joint Land Grant/Sea Grant climate summit later in the year.
  - Mr. Tupas said that extension professionals need to catch up on basic knowledge and planning for climate and managing risks. He hopes to develop an advisory group that will accommodate both Land Grant and Sea Grant priorities and objectives

**1:30 NOAA and Academic Relations Committee (Andy Winer and Caren Madsen,  
NOAA Office of External Affairs)**

**(Presentation in Appendix A)**

**Discussion:**

- Board said that there are already associations of universities that look at engagement – why come to Sea Grant?
  - Mr. Winer said that NOAA needs help making those connections, as opposed to cold calling them.
- Board said that they will need the support of NOAA leadership to take on this committee, particular to get input from all NOAA research enterprises. They also sought clarification on the objectives of the committee.

- Mr. Winer said that this is an opportunity to engage on issues that are mutually important. Then if there is another emergency (like the Deep Water Horizon spill), the relationships are already there. There is a problem with distinct groups working together; not cooperating, so a lot of opportunities were missed just due to trouble linking people in.
- Dr. Cammen observed that if if this oil spill had happened anywhere else, it may not have happened so well. GOM works very well together– particularly Buck Sutter. Those relationships were already established. You have to get these relationships set up before you need them. DWH was a rapidly moving crisis. CMSP (Coastal and Marine Spatial Planning) and catch shares are slow moving, serious issues that could use a similar solution. It is a good effort on your part to get this established now.
- The Board asked if the charge was to look at academic relationships only, or if they should to look at coastal managers or stakeholders.
  - Mr. Winer said that the NOAA Science Advisory Board reported on coastal managers and stakeholder engagement in 2008. They found that engagement was happening, but not in a coordinated manner. NOAA is now using NOP (National Ocean Policy) and CMSP to improve that engagement. Coastal manager engagement is much better than academic engagement. Academic area is sorely in need of some help.
- Board said that the NSF has a good relationship with universities (including university leadership) because much of their funding is from NSF. NOAA doesn't provide as much funding to universities
  - Mr. Winer replied that he hoped recommendations include the needs for NOAA leadership and academic leadership, for example. If we have the resources, how do we best use them to advance the goals of the AGM (Annual Guidance Memorandum.)

**ACTION – Mr. Winer will provide Science Advisory Board report on engagement to the Sea Grant Advisory Board**

**2:30** Break – 15 minutes

**2:45** **Committee updates**  
**-Allocation II (D. West, NSGAB) (45 min)**

**Discussion:**

- Admiral West said that there was a weak response to the Allocation survey, even after additional plea at Sea Grant Week. The Board needs to make a recommendation on Allocation plan at the Fall meeting. The budget will not grow. The SGA has agreed that \$1.5M is the base for a viable SG Program.
  - The Board asked if the Allocation committee has thought through all options. Is this something that the Board should deal with our perhaps OAR? The Board has received input from the SGA and will need the Allocation Committee II to sit down and determine the ground rules to address these issues before the next board meeting, such as how do you define a Sea Grant program – there is a standard, but is it still the right one?

- Board suggested that the committee bring an action to the Board in the fall. Dr. Cammen should review committee task, and revise the charge, and the Board will address it in fall.
- Dr. Cammen added that the Board exists to give high level and strategic advice and that the allocation issue should be approached at two levels. What do we do with a program if funding stays just like it is? At some point, when the Sea Grant re-authorization is up, the Board's decision can help give them a choice about what Sea Grant currently looks like, and what Sea Grant could look like. The Allocation committee needs to provide a couple of alternatives and then get a recommendation from the board.

**Motion: Ask the allocation subcommittee to review Dr. Ross Heath's paper and to refine a matrix of problem, objectives and options and narrow those options and give a preferred option to this body for comments. Once approved, it would be submitted to the Director of the National Sea Grant College Program for final action at the next advisory meeting. – Schmitten, 2<sup>nd</sup> Orbach**  
**Passed unanimously**

- The Board agreed to add members to the Allocation Committee, and ask Dr. Pennock for representation from the SGA. The original Allocation Committee will be disbanded and a new one, with a revised charge from Dr. Cammen, will meet to make recommendations to the Board.

**3:45 Gulf Oil Spill Restoration Efforts (Dr. Shelby Walker, NOAA)**  
**Presentation in Appendix A**

**Discussion:**

- The Board asked how the British Petroleum (BP) funding for the restoration effort was going to be dispersed.
  - Dr. Walker said that the BP Request for Proposals (RFP) is not yet out, but understands that BP will not require any review of the data. A council (10 representatives from the states, 10 from BP) will select the project for funding. BP is looking to address the Natural Resource Damage Assessment (NRDA) process with their funding. NOAA restoration report is looking at broader restoration.
  - Dr. Walker said that the NOAA Gulf Oil Spill Restoration team would appreciate suggestions for outreach and recommendations for the plan, including academic entities that would be helpful.

**4:30 Discussion of afternoon topics**

**Discussion:**

Academic Affairs Committee:

- The Board discussed the benefits and concerns of the new committee. It will bring some visibility to the Sea Grant program, but could also be seen as stepping on toes. Even though it is a Sea Grant advisory board, they are to provide advice to the Secretary of Commerce on "such other matters as the Secretary refers to the Board for review and advice."

- The Board will respond to Mr. Winer’s charge and appoint a committee once they get clarification on several items:
  - Staff support
  - Line Office support
  - Announcement from leadership
  - Universities involvement
  - Budget
  - Timeframe
  - NOAA Science Advisory Board or National Research Council as an alternative

**MOTION: Empower the Chair to go to Mr. Winer and accept the task subject to appropriate expressions of support both monetary and staff and an announcement from NOAA leadership. – Orbach, 2<sup>nd</sup> Simmons**

**Vote: 8 Yes, 1 No; Motion passes**

**-Futures II (M. Orbach, NSGAB) (15 min)**

**Discussion:**

The Board agreed that the Futures Committee needs a more specific charge once OAR and Climate Service issues are resolved. Once the decision is made as to whether or not the Climate Service will break from OAR, the committee should act very expeditiously.

SUGGESTION: Bring back tomorrow for further discussion and dilberation.

**4:45 Public Comment Period (15 minutes)**

**Discussion:**

Ms. Ban, the Designated Federal Officer stated that she did not receive written comments and no members of the public came to provide comments.

**5:00 Adjourn**

**Wednesday, February 9**

**(J. Brown)**

**8:30 Call to Order, review agenda and previous day’s discussions (J. Woeste)**

**Discussion:**

Any additions to agenda? None

Carryover item from yesterday: Futures II committee – specificity of charge to committee needed.

- The Board discussed the nature of Futures I and Futures II committees. Futures I was about big ideas – sustainable communities, being built in via 2 focus teams. The Futures II committee is looking for more specific goals for the group, possibly recommendations on reorganization and the placement of Sea Grant. The Futures II committee should have a fair amount of flexibility – when events happen, need to be able to respond.
  - Board agreed that for the short term, the Futures committee is continuing in a monitoring role

#### Notes from Business Meeting from the Chair:

- Dates for Fall meeting:
  - Sept 28-29 – ask University of Rhode Island/Barry Costa-Pierce, Director of Rhode Island Sea Grant about hosting
  - Dates for 2012:
    - Will send out email regarding Spring Meeting dates once SGA has decided on their meeting dates.
    - Waiting to learn about Sea Grant Week decision for Fall
- Committee assignments:
  - Knauss Fellowship committee assignment – Dick Vortmann
  - SAB Liaison – Bill Stubblefield and Dick West will be asked to serve as representatives from the board, will decide based on agenda if participation is warranted. If in DC, one will attend, elsewhere in the nation, they will coordinate with Board for someone to attend

#### **8:45** Sea Grant's Social Science Portfolio (Dr. Heather Triezenberg, NSGO)

##### **Presentation in Appendix A**

##### **Discussion:**

- Board stated that it is commendable that Sea Grant is taking lead in social science but wanted to know what efforts are going on in NOAA beyond Sea Grant
  - Dr. Triezenberg said that the main interactions are from NOAA Fisheries – economic and anthropological impacts, monitoring and observing vs. research. NOAA's National Centers for Coastal Ocean Science (NCCOS) also does some, but challenge is obtaining funding. Coral program has a human dimensions strategy. NOAA social scientists meet regularly, and are interested in applying for Sea Grant funds. This is an opportunity for Sea Grant to integrate social sciences throughout NOAA. It is simple to look at economic impacts, harder to look at social/cultural impacts. Sea Grant has that local connection, plus university ties, to allow strong studies in support of management efforts on local scales. Social science is so important, because every decision always impacts people. Every decision also has tradeoffs beyond economics. Must have scientific understanding of people, not just fish and water. One of OAR's priorities is social science – but OAR has limited capacity, and it is mostly in Sea Grant.

#### **9:15** NOAA's Educational Partnership Program (Dr. Audrey Trotman, NOAA)

##### **Presentation in Appendix A**

##### **Discussion:**

- The Board asked how many of 88 PhDs are working for NOAA and how many go elsewhere.
  - Dr. Trotman said she would find out. Her data is not yet broken down to just PhD, but could do so – each center tracks students for 5 years
- The Board wanted to understand what NOAA is doing to make itself more attractive to the EPP graduates.

- Dr. Trotman said that the EPP is an education program, but they don't do the hiring. Different NOAA line offices have different hiring philosophies, but that the EPP is looking at how to respond to these different hiring patterns, engaging with leadership. Center Directors meet annual – Drs. Cammen and Woeste are invited to meet with them this year, information will be given to Ms. Ban

**9:45** Break – 15 minutes

**10:00** Focus Team liaison reports

**- Hazard Resilience in Coastal Communities (H. Simmons)**

**Discussion:**

Lisa Adams has been working with the focus team; Lauren Land will be replacing her Update in New Orleans about changes in the group Projects

- National survey of coastal decision makers on climate change, 18 programs involved
- Coastal processes roundtable – 18 people attended, how to build capacity, developing listserv, professional network, want to bring external partners to form Center.
- Expert panel on intersections of Smart Growth, hazard resilience, and climate change, how to implement all 3 – June 2011
- 2011 Climate Summit – Sea Grant/Land Grant leadership to discuss how to expand internal capacity

Some topics that cross-over with Sustainable Coastal Development (SCD)

**- Sustainable Coastal Development (M. Orbach)**

**Discussion:**

Concern – sea level rise (SLR) is going to be the biggest challenge facing the nation, because law is set up based on static sea level. SCD summary does not mention SLR once, SCD must incorporate SLR – it is not just a hazard, it is a permanent state change – it is not going to go away.

- Dr. Triezenberg will give a brief update of activities
  - Initiated bimonthly calls with team and SCCD network
  - Working with NOAA CSC to develop improved land cover/use GIS database – fine scale
  - Developing SCD toolbox from programs
  - Expert panel on smart growth
  - Coastal tourism roundtable
  - Telling story better – working with network communicators on working waterfronts and on renewable energy
  - Team wants to invite experts to next meeting, to think big picture
  - Look at aggregate impacts, not just series of smaller impacts

The Board and Dr. Triezenberg discussed timeframes for various stakeholders and what forms frame of reference for sustainable.

For politicians, next election

Developers, length of development

- Constituent specific, but often not consistent or explicit
- Team “sustainable” does not have a agreed upon time frame
- Have a chance to address this explicitly in next strategic plan (1 year out)
  - Focus beyond your vision (look at 2050 or longer, look so far out you have to really brainstorm because the increments are too small.) Sea Grant needs to do more, bring the good science and historical data.
  - NOAA is dealing with global SLR, but not scaling down – that is needed to address community development issues
  - Sea Grant Strategic Planning starts January of 2012, national plan needs to be completed 6 months later, states 6 months thereafter
  - Discuss this at Fall Meeting

**- Healthy Coastal Ecosystems (N. Rabalais)**

**Discussion:**

- One area is restoration – needs to include SLR and other Future conditions, not clear that is being incorporated
- Gaps – regional scale, post-project evaluation, more research on baseline habitat status (big, done by parts of NOAA), education on EBM approaches
- New areas – AIS, oil spill research (not sure how much \$ SG should put into oil spill), overharvesting Asian carp, lionfish, and mitten crabs (this causes Rabalais)
- Concern – flurry of activity before meeting, things that sorted out did not show up, not getting traction, this team is not active between meetings – how effective is it operating with little activity?
- Obvious that much is going on, but how is it being organized

**- Safe and Sustainable Seafood Supply (R. Schmitten)**

**Discussion:**

- Staff changes – new chair (Kim), new backup (Ban), new coordinator (Scaroni)
- National projects – Energy use in Fisheries just completed (added a day to accommodate the UN FAO), sponsored by National Marine Fisheries Service and NSGO
  - Purpose was to address direct and indirect energy costs for fisheries, and talk solutions
  - 90 presentations, 14 countries
  - Solar powered fishing gear, direct marketing
  - Community improvements in fuel efficiencies
  - Recycled cooking oil as a fuel (2 examples, one involving Jimmy Buffet)
  - Brown gas in fuel (distilled water) 1 gallon = 15 gallons of diesel

**10:30 Focus Teams Discussion (Dr. Cammen)**

**Discussion:**

- Focus areas from NSGO plan, weave together state efforts
- Provide big ideas, innovation, leadership on topics
- Get expertise from network
- Members function on behalf of whole network, not their programs
- Teams set their own agenda, with common expectations

- Membership is about 12 people, selected by NSGO Director and SGA President, term is life of plan
- Teams developed implementation plan
- Influenced NSIs
- Focus area research priority gaps
- Provide input on big ideas
- Focus network expertise, not exclusive clubs
- The Board asked Dr. Cammen about further integrating Sea Grant into NOAA – when you hold a workshop, do you invite relevant parts of NOAA?
  - Dr. Cammen replied that the Focus Team Chairs invite NOAA participants regularly and that all Focus Teams have representation from other NOAA offices.

**11:00** Discussion of morning topics

**Discussion:**

Chair:

Thanks to Ann Andrus (NSGO) for logistical support

Sixteen undefined acronyms this morning – could we have a common acronyms list for new members. Ms. Ban will include Knauss (or other) acronym list in briefing book in the future

Clarification of strategic planning process

Began with National Research Council report

Members of Board, SGA, and NSGO came up with process

Byrne chaired the actual planning committee

Involved all of the Sea Grant directors in formulating the plan at Sea Grant Week

Next strategic plan is for FY14-FY18

Upcoming tasks that will involve the board

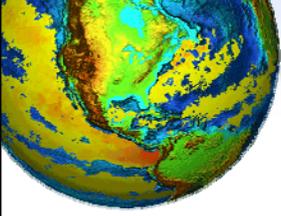
Strategic Planning 14-18

Biennial Report to Congress

Reauthorization of Sea Grant Act

Site visits will be done in June, Board would like report if available.

**11:30** Adjourn



## Expanding Partnerships with Sea Grant



Chester J. Koblinsky  
*Transition Deputy Director, NOAA's Climate Services  
Climate Mission Goal Lead  
Director, Climate Program Office  
February 8, 2011*

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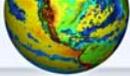
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## Overview

1. Climate Service Overview
2. Partnerships to Meet the NOAA Climate Service Societal Challenges
3. For Discussion

February 8, 2010 2

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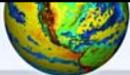
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## Climate Service Overview: Vision and Mission

**Vision**  
By providing science and services, the Climate Service envisions an informed society capable of anticipating and responding to climate and its impacts.

**Mission**  
Improve understanding and prediction of changes in climate and promote a climate-resilient society by:

- Monitoring climate trends, conducting research, and developing models to strengthen our knowledge of the changing climate and its impacts on our physical, economic, and societal systems
- Providing authoritative and timely information products and services about climate change, climate variability, and impacts
- Informing decision making and management at the local, state, regional, national, and international levels

The Climate Service delivers products and services in collaboration with public, private, and academic partners to maximize social, economic, and environmental benefits.

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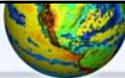
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### Partnerships to Meet the Climate Service Societal Challenges

**Coastal Climate Extension Specialist Program**

NOAA's RISA and Sea Grant programs co-sponsor a pilot: Coastal Climate Extension Specialist located in the Carolinas that:

- explores the benefits of connecting RISA's climate adaptation knowledge with Sea Grant's coastal knowledge and extension network;
- extends science-based information to coastal communities, resource managers and interest groups in North and South Carolina;
- contributes to coastal climate research motivated by community needs; and
- provides hands-on operational and technical support for coastal climate issues.



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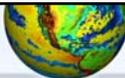
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### For Discussion

**Other Potential Areas for Collaboration**

- Development of partnerships with the National Estuarine Research Reserves (NERR), National Marine Sanctuaries (NMS) and National Marine Fisheries Service (NMFS)
- Expand partnerships with Sea Grant extension for climate services in the coastal zone
- Impacts of Weather/Climate Extremes and built infrastructure on coasts
- Connections to work in water resources and drought
- Private sector partnership and development

February 8, 2010

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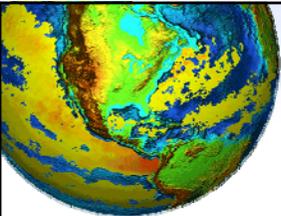
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**Thank You ....**

**..... Any Questions?**

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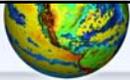
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### Interagency Initiatives

- Interagency Climate Change Adaptation Task Force
- The National Climate Assessment
- The National Ocean Council
- National Fish, Wildlife, & Plants Climate Adaptation Strategy

February 8, 2010 10

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## National Institute of Food and Agriculture



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## MISSION

To advance knowledge for agriculture, the environment, human health and well being, and communities by supporting research, education and extension programs



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## Function 1

Program leadership to identify and meet research, extension, and education priorities in areas of public concern that affect agricultural producers, small business owners, youth and families, and others.



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## Function 2

Fair, effective, and efficient administration of Federal assistance implementing research, education, and extension awards and agreements



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Employ research based information and education programs to meet the needs of local clientele.



Extend research-based knowledge to the public and engage people in life-long learning.

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The **Smith-Lever Act of 1914** established a system of cooperative extension services, connected to the land-grant universities.

Each U.S. state and territory has a state office at its land-grant university and a network of local or regional offices.

NIFA is the federal partner in the Cooperative Extension System. It provides federal funding to the system and, through program leadership, helps the system identify and address current issues and problems.



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### Human Resources

2005 U.S. CES staffing totaled 14,650 (FTE)  
of which:

- 8,925 county agents/educators  
(B. Sc. or M. Sc.; in 3,038 counties)
- 4,050 specialists  
(Ph.D. faculty; many joint appointments)
- 715 directors/supervisors
- 960 administrative support



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### Contemporary Cooperative Extension System Focus

U.S. Cooperative Extension works in 6 areas:

- Agriculture
- Natural Resources
- Community and Economic Development
- Youth Development
- Leadership Development
- Family and Consumer Sciences



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To be able to address adaptation to and mitigation of climate change, extension services will need to be strengthened substantially, while providing an efficient interface between policy-makers and local communities.



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*Research provides the backbone for adaptation and mitigation methodologies*

Research results need to be public and there needs to be an enabling environment in which agriculture, forestry and agroforestry methods, germplasm, crops varieties, animal breeds, crops and trees are accessible for use and introduction in adaptation programs.

Simple, transparent methods, tools and indicators are required for decision-makers at all levels to assess the technical effectiveness and the social and environmental impacts of adaptation and mitigation measures, while at the same time explicitly keeping track of ecosystem services and food security

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*Research provides the backbone for adaptation and mitigation methodologies*

It needs to be linked with social science research on how to introduce new methodologies, crop varieties, to communities, whether they will be taken up, and how different members of vulnerable communities can benefit.

Research for a rapidly changing situation is different from research for static ecological conditions. Traditional knowledge and local biodiversity are likely to be surpassed in a rapidly changing situation in which methodologies, crops and crop varieties need to be developed for future conditions.

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To ensure that options are made available to the public and that coping strategies are preserved and enhanced at the local level, communication among extension experts and local communities needs to be improved.



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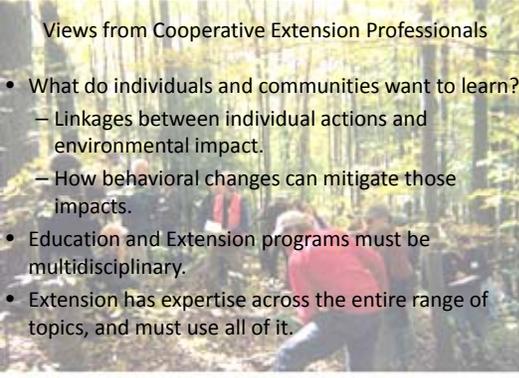
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Views from Cooperative Extension Professionals

- What do individuals and communities want to learn?
  - Linkages between individual actions and environmental impact.
  - How behavioral changes can mitigate those impacts.
- Education and Extension programs must be multidisciplinary.
- Extension has expertise across the entire range of topics, and must use all of it.



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Views from Cooperative Extension Professionals

- How can we organize and prepare our existing workforce?
- Form multi-county teams of Extension educators and advisory committee members.
- Focus on planning and delivering multi-disciplinary programs that reach into all subject and issue areas.



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Scientific Questions

- What is a reasonable way to lessen one's ecological footprint, while maintaining a lifestyle that meets personal goals for a high quality of life?
- What are the vulnerabilities and options that enhance agricultural, forest, freshwater and marine sustainability?

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## Implementation Objectives

- Develop expert decision-making tools based on scientific data
- Help the public evaluate how best to invest discretionary purchasing power to maximize targeted results. Holistic approach to making lifestyle choices
- Merge our traditionally separate, single-discipline audiences into one – youth through adult .

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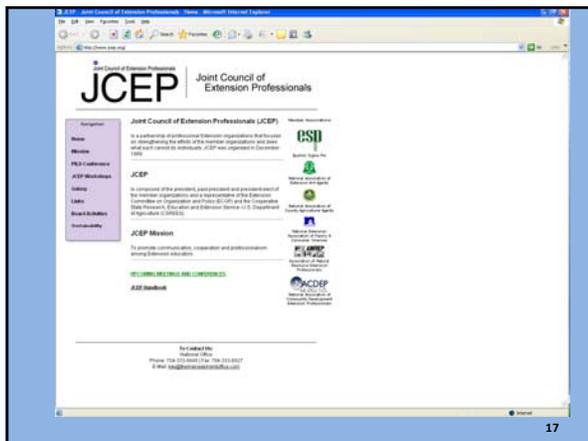
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### National Network for Sustainable Living Education

Linking sustainable living educators through a Sustainable Living Education National Network of natural resource and extension professionals, who will investigate, educate, and model sustainable living practices to individuals, families, institutions, businesses, camps, and schools.

**Sustainable Living Education: A Call to All Extension**  
Journal of Extension, April 2008

#### Abstract

Community priorities are shifting in response to the scientific reality and socioeconomic threats of climate change. Improving sustainable resilience in the ways we supply food, water, and energy are creating new ways of thinking about these critical resources. Cooperative Extension is in a prime position to teach individuals and communities how to live and work sustainably. The National Network for Sustainable Living Education has identified six essential steps for creating a national approach to Extension programming on this topic.

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**SUSTAINABLE LIVING Project**



**Walking our Talk:** Sustainable living training for Extension faculty and staff

**On-line Sustainability Course:** Web-based curriculum to be either a distance education class, or a self-paced course.

**Lessons from Grandma:** A multi-week workshop designed to support small, cohesive neighborhood or workplace groups wanting to explore life choices.

**Climate Change Guide:** Explore the causes of climate change, and the necessary actions to take to slow down the rate of change.

**Green Camps:** 4-H faculty working on a national Sustainability and Global Climate Change curriculum for youth.

**Searchable Database:** Basic searchable database of sustainability education materials.

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The screenshot shows the AgroClimate website interface. The top navigation bar includes 'Home', 'About Us', 'Contact Us', and 'Help'. The main content area is divided into 'News' and 'Outreach' sections. The 'News' section features several articles with dates and headlines, such as '2011 Spring Crop Progress and Outlook (June 8, 2011)' and 'Special Storm Recovery Plan Finalized (May 26, 2011)'. The 'Outreach' section includes information about '2011 Spring Crop Progress and Outlook (June 8, 2011)' and 'Special Storm Recovery Plan Finalized (May 26, 2011)'. There are also logos for RMA, CAEMN, and FAWN.

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The screenshot shows the 'AgroClimate Tools' page. It is organized into four main categories: 'Climate Tools', 'Drought', 'Crop Yield', and 'Crop Development'. Each category lists various tools and resources available to users, such as 'Climate Tools' which includes 'Climate Data' and 'Forecast Risk Maps'. The 'Drought' section includes 'DROD Maps' and 'Lands and Land Use History'. The 'Crop Yield' section includes 'County Yield Database' and 'Regional Yield Maps'. The 'Crop Development' section includes 'Growth Degree Days' and 'CMI Accumulation'.

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- EDEN's goal is to provide county-based educators with tools they need to help communities and individuals prepare for, respond to, and recover from natural and man-made disasters.
- EDEN member institutions in every state and territory are represented by more than 200 EDEN delegates who have expertise in more than 75 different disciplines.
- One strength of the network is the ability of delegates to share ideas and resources with one another and with colleagues at the state and local level.
- eXtension provides a platform for EDEN delegates and others with disaster-related expertise to work together to deliver educational information directly to the public.
- According to December 2008 eXtension data, the Agrosecurity and Flooding work teams have published 209 pages and 152 FAQs.

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eXtension is an interactive learning environment delivering the best, most researched knowledge from the smartest land-grant university minds across America.

eXtension offers:

- Credible expertise
- Reliable answers based upon sound research
- Connections to the best minds in American universities
- Creative solutions to today's complex challenges
- Customized answers to users' specific needs
- Trustworthy, field-tested data
- Dynamic, relevant and timely answers



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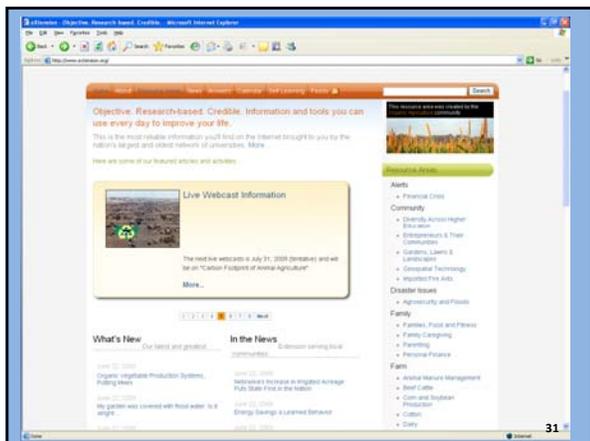
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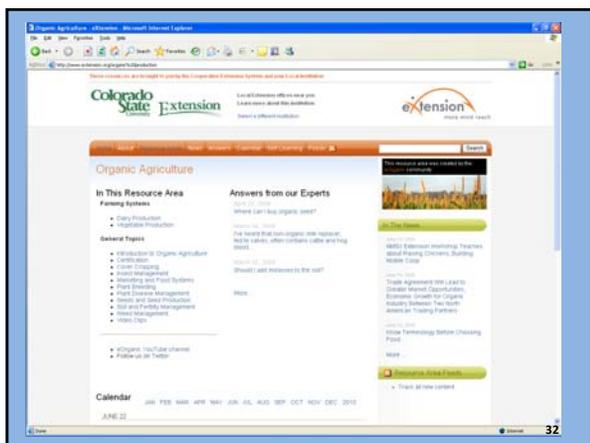
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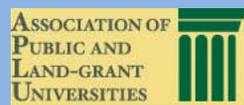
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**Steps Towards a Land-Grant and Sea-Grant  
Climate Extension Service**

- 1) Joint development of Extension Professional of all types.
- 2) Collaboration of APLU's Extension Committee on Organization and Policy (ECOP) and Sea Grant's Assembly of Sea-Grant Extension Leaders(ASGEPL).
- 3) Joint Advisory Board for Interagency Stakeholder Input.
- 4) Inventory of climate extension services across the country.

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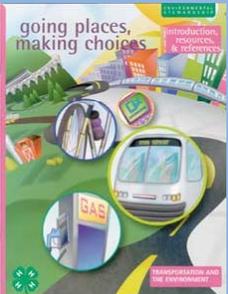
California Climate Change Extension  
University of California Cooperative Extension



**Nonpoint Education for Municipal Officials**

Created in 1991 at the University of Connecticut as a partnership between the Cooperative Extension System, the Connecticut Sea Grant College Program and the Natural Resources Management and Engineering Department.

Confederation of 32 educational programs in 31 states dedicated to protecting natural resources through better land use and land use planning



going places, making choices  
introduction, resources, & references  
REGISTRATION AND THE ENVIRONMENT

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NOAA External Affairs

## Engaging with Academic Stakeholders

Presented to the National Sea Grant Advisory Board  
By Andy Winer, NOAA Director of External Affairs  
NOAA Office of Communications & External Affairs  
February 8, 2011

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### Our overall vision for External Affairs

- To provide communications policy input
- Organize stakeholder meetings and events
- Identify potential problems and develop proactive strategies
- Deploy leadership to events and engagement opportunities
- Interact with others in DoC and federal family
- Develop engagement elements in AGM priorities
- Link and communicate constituent positions to NOAA priorities

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### Our philosophy and mission

- Evolve into a creative force within NOAA that markets the people behind our science, service and stewardship missions.
  - Be the incubator for creative ideas that will inform the public and our stakeholders.
  - Develop strategic partnerships and outreach efforts that will help our constituents feel that they are co-owners of the enterprise as well as the missions and goals of the organization.
  - Be responsive to stakeholder needs and convey their input to NOAA leadership.

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## Progress over the past year...

- 2010 External Affairs Plan Implementation
  - Staff added via 2 details and 1 contractor
  - Mid-year and fall planning retreats held
  - Relationship formalized between External Affairs and the NOAA Regional Network
  - Constant Contact set up as interim measure heading toward a centralized Customer Relations Management System (CRMS)
  - Coordination between HQ, lines, regions improved

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## External Affairs Website revised



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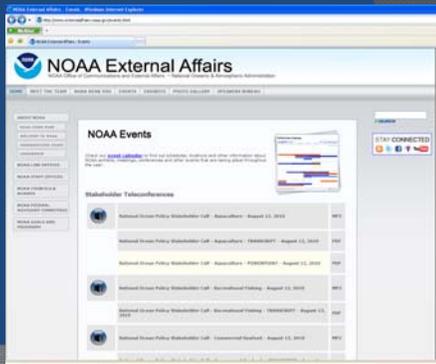
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## ..to a more constituent-friendly format



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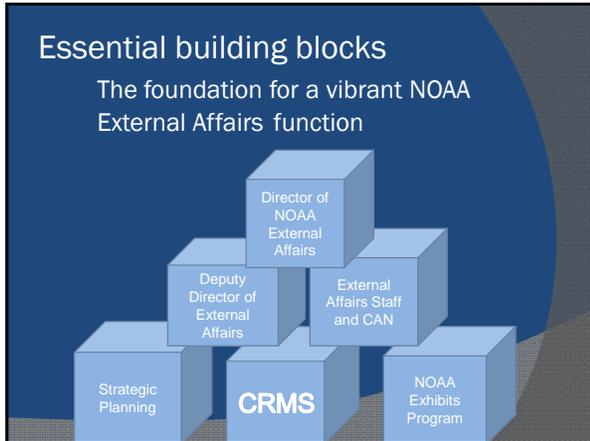
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Out of the crisis and foundation laid in EA, an engagement model was formed to interact with

- Federal partners responding to the crisis
- White House offices
- Environmental NGOs
- Business and industry, including commercial and recreational fishing
- Emergency management and response stakeholders
- State and local governments
- Academic and research communities

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### Engagement model



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### Lessons learned from the crisis...

- 1) Need for a CRMS -- Customer Relations Management System
- 2) Need for a permanent Deputy Director of External Affairs
- 3) The need for more sustained engagement between NOAA and the academic community



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### Constituent portfolios ripe for expansion

- Research and academic community of stakeholders
- Business and industry



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### A few next steps in solidifying the structure of External Affairs in 2011

- External Affairs Deputy Director position created
- Additional FTE opened up
- Our relationships with Regional Teams, policy office, lines and Sea Grant to be further explored

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### Our request for Sea Grant Advisory Board Assistance

- Convene a subcommittee to address:
  - Current status of NOAA engagement activities with research and academic institutions
  - Are the agency's activities sufficient to meet our goals in the AGM and Strategic Plan?
  - If not, what are some recommendations for improving engagement with academic and research institutions?

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Thank you!  
Questions?



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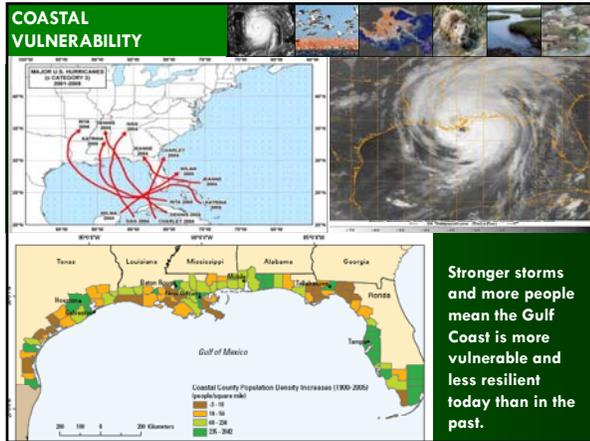
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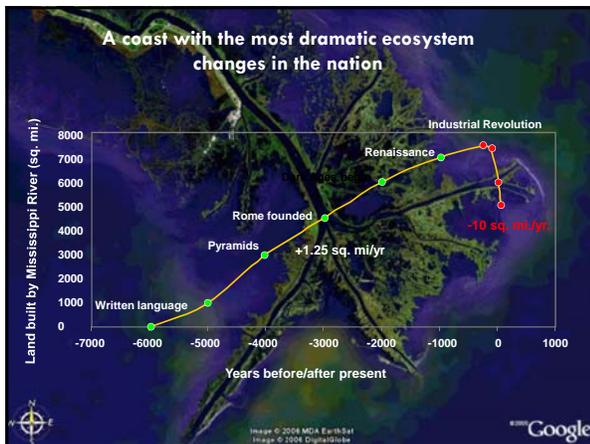
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 **Louisiana Mississippi Roadmap**

October 2009: President Obama formed the *Louisiana Mississippi Gulf Coast Ecosystem Restoration Working Group*, led by CEQ and OMB and comprised of senior officials from NOAA, DOI, EPA, USACE, DHS and DOT

March 2010: "Roadmap for Restoring Ecosystem Resiliency and Sustainability of the Louisiana Mississippi Gulf Coast."

6 key objectives:

- Develop an integrated State-Federal long-term vision, recommend a governance structure.
- Identify near-term interim projects and actions needed
- Improve science, analytical, and data management efforts
- Improve sediment management.
- Improve the effectiveness of mitigation policies.
- Recommend modifications to existing Federal funding programs/streams to improve Federal investment strategy for the coast.




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 **Deepwater Horizon BP Oil Spill Impacts**

- ▣ **April 20 explosion**
- ▣ Total oil released: Apr. 22 – July 15 (when flow suspended)  
4.9 million barrels, +/- 10% (FRTG)
- ▣ Over 1.8 M gallons of dispersant (as of 8/23)
- ▣ Over 80,000 square miles of Gulf closed to fishing (8/10)
- ▣ 642 mi. of coastline impacted, 343 mi. coastline oiled (8/25)




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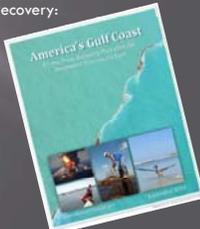
 **Mabus Report**

June 15, 2010: President Obama, during his Oval Office address about the Deepwater Horizon oil spill, announced that he had appointed Secretary of the Navy, Ray Mabus, to lead an effort to create a plan for the long-term restoration and recovery of the region beyond addressing the impacts of the oil spill.

Charge - address three components of long-term recovery:

- environmental restoration
- economic development
- public health recovery

Collaborate with states, local communities, tribes, fishermen, businesses, conservationists and other stakeholders.




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## Overview of Gulf Coast Ecosystem Restoration Task Force

- Established through Executive Order on October 5, 2010.
- Chaired by Lisa Jackson, EPA Administrator and New Orleans native.
- State representative as Vice-Chair: Garret Graves (LA) appointed
- Federal membership on Task Force: USDA, DOC, DOI, DOJ, DOT, EPA, USACE, OMB, CEQ, OSTP, and the Domestic Policy Council.
- State membership: 5 state representatives, appointed by the President upon recommendation of the Governors of each Gulf State & may include tribal representation.

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## Task Force Responsibilities

- ❑ Develop a Gulf of Mexico Regional Ecosystem Restoration Strategy
- ❑ Coordinate intergovernmental efforts to improve the efficiency and effectiveness of ecosystem restoration
- ❑ Support the Natural Resource Damage Assessment (NRDA) process by referring potential ecosystem restoration actions to the NRDA Trustee Council
- ❑ Engage stakeholders to inform the work of the Task Force, including the development of the Strategy
- ❑ Coordinate science (e.g., research, monitoring, adaptive management) in support of ecosystem restoration
- ❑ Coordinate to encourage health and economic benefits of ecosystem restoration
- ❑ Prepare a biennial update on progress




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## Gulf of Mexico Regional Ecosystem Restoration Strategy

The Executive Order requires a Gulf of Mexico Regional Ecosystem Restoration Strategy within 1 year of the signed Executive Order.



- In developing the Strategy, the Task Force should:
- define ecosystem restoration goals & describe milestones for making progress;
  - consider existing research and ecosystem restoration planning efforts in the region;
  - identify major policy areas where coordinated intergovernmental action is necessary;
  - propose new programs or actions to implement elements of the Strategy where existing authorities are not sufficient; &
  - identify monitoring, research and scientific assessments needed to support decision making for ecosystem restoration efforts; evaluate existing monitoring programs & gaps in current data collection.

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 **Principles for Ecosystem Restoration**

The following principles serve as the drivers for achieving the vision of resilient and healthy Gulf of Mexico ecosystems. These principles represent broad objectives that draw from, and build upon, existing plans for the Gulf.

 **Coastal Wetland and Barrier Shoreline Habitats are Healthy and Resilient.**

**Fisheries are Healthy, Diverse and Sustainable.**

**Coastal Communities are Adaptive and Resilient.**

 **A More Sustainable Storm Buffer Exists.**

**Inland Habitats, Watersheds and Off-Shore Waters are Healthy and Well-Managed.**

(from the Mabus report)

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 **Ecosystem Restoration**

Per Executive Order- "Ecosystem restoration" means:

- All activities, projects, methods, and procedures appropriate to enhance the health and resilience of the Gulf Coast ecosystem, as measured in terms of the physical, biological, or chemical properties of the ecosystem, or the services it provides, and to strengthen its ability to support the diverse economies, communities, and cultures of the region.
- Includes activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity, and sustainability.
- Includes protecting and conserving ecosystems so they can continue to reduce impacts from tropical storms and other disasters, support robust economies, and assist in mitigating and adapting to the impacts of climate change.

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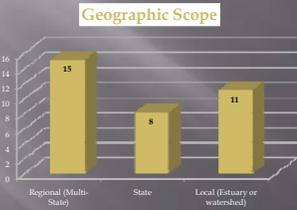
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 **Existing Planning Efforts**

**Geographic Scope**



Geographic Scope	Number of Efforts
Regional (Multi-State)	15
State	5
Local (Estuary or watershed)	11

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## Task Force Support Structure

**Regional Planning and Integration Technical Team**  
Responsible for advising the Task Force on a GOM Regional Ecosystem Restoration Strategy and identifying gaps and planning priorities.

**Policy Coordination Team**  
Responsible for examining existing policies supporting or impeding restoration activities and proposing modifications or enhancements to support integrated and coordinated Gulf of Mexico restoration.

**Budget and Funding Coordination Team**  
Responsible for working across agencies to identify, coordinate and implement shared budget priorities, and develop annual budget guidance in consultation with OMB.

**Communication and Engagement Team**  
Responsible for effectively engaging stakeholders in the development of the Gulf Restoration Strategy and building communications and engagement into the Strategy.

**Science Coordination Team**

- Ensure that decisions are based on practical and applied science
- Coordinate/develop scientific and technical framework for ecosystem restoration and monitoring
- Assist developing review and selection criteria, performance measures and indicators to track progress in achieving restoration goals, or research priorities, including research into new methods to provide innovative and sustainable solutions

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## Science Working Group

- ☐ First in-person meeting-January 12
  - 2<sup>nd</sup> meeting-March 1, following February 28 Public Task Force Meeting (New Orleans)
- ☐ Membership
  - States and agencies identified in the executive order, including:
    - LA, MS, TX, FL, AL
    - NOAA, USACE, USGS, NPS, USFWS, EPA, USDA, BOEMRE, OSTP
- ☐ Initial tasking
  - Sub-groups oriented around each of the 5 goals
    - Definition of goals
    - Current condition, using existing reports and data
    - Major actions to support goals
    - Significant gaps in understanding to address goals

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## Outreach

- ☐ Task Force at large:
  - ☐ Regional-week-long meetings with Executive Directors covering diverse stakeholder groups (academics, NGOs, local governments, industry)
    - LA
    - TX
    - Others to follow
  - ☐ One-on-one meetings – NGOs, industry, agency partners
- ☐ Science:
  - ☐ Place-based groups- State Sea Grant, NEPs, NERRS
  - ☐ Research consortia
  - ☐ NGOs

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<http://www.restorethegulf.gov/task-force>

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Futures Committees Statements  
of Task

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I) Futures Committee I Statement of  
Task

[Committee of the whole]

- 1) The National Sea Grant College Program was established by Congress in 1966. Since that time the program has produced an admirable record of accomplishment in marine research, education and extension services. Despite this fact, the program has failed to grow to realize its full potential.
- 2) The task of the Futures Committee is to examine why this has occurred, to assess the successes and failures of the program and to help chart a new course of growth for the program at this time of transition for our country.

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I) Futures Committee I Statement of  
Task

- 3) The Committee will examine Sea Grant's relationship with NOAA and the Department of Commerce and make recommendations to the Board about Sea Grant's future position and role in the Federal government.
- 4) The Futures Committee will also explore Sea Grant's image and brand and make recommendations to the Board on how these important assets can be enhanced.
- 5) Finally, the Committee will examine opportunities for Sea Grant to be immediately responsive to the severe environmental and economic challenges that confront our nation by developing initiatives that fully utilize its superb nationwide research and extension talents.

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Abstracted Findings and Recommendations  
of the Futures I Committee

**I) Sea Grant Funding**

*Findings*

- 1) The National Sea Grant believes that Sea Grant has faced funding stagnation because it lacks the support it deserves in Congress and within Commerce.

*Recommendations*

- 1) The National Sea Grant Office should pursue a renewed, vigorous, outreach effort to strengthen its relationships with the NOAA Administration and with other NOAA agencies.
- 2) The National Sea Grant Office, in coordination with the Sea Grant Association (SGA), should expand its efforts to identify its clientele and other public audiences who benefit from Sea Grant research, education, and extension services, and should develop expanded educational initiatives to inform these constituency groups about Sea Grant programs, funding, and resource needs.

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**II) Sea Grant's Image**

*Findings*

- 1) In general, it appears that the Department of Commerce has little knowledge of the Sea Grant Program. The Committee believes that NOAA's view of Sea Grant is generally positive but that Sea Grant is viewed as largely irrelevant to the rest of NOAA. Many in NOAA view Sea Grant as a competitor for funding.
- 2) In Congress, Sea Grant is on the radar screen, especially of coastal community Congressional delegations. Despite this, Sea Grant has no real champions in Congress.

*Recommendations*

- 1) The committee recommends that Congressional champions be sought in both the Senate and House. Meetings should be initiated with selected Representatives and Senators who have been involved with the Sea Grant Program to seek their advice on strengthening the Congressional/Sea Grant relationship.
- 2) The Committee recommends that the SGA and the Board be approached for suggestions and contacts in the new Obama White House who should also be approached as potential Sea Grant supporters.

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**III) Sea Grant's Structure and Location**

*Findings*

- 1) The organizational position of the Sea Grant Program within the Federal government has been reviewed in the past, but the committee believes it should be reviewed again.

*Recommendations*

- 1) The Committee's recommendation is for the National Sea Grant Office to determine its optimum position within the federal governmental framework and be ready to advocate for that proposal should a major restructuring of Federal research and scientific functions be undertaken by the Obama administration. The committee does not recommend that Sea Grant unilaterally attempt to reposition itself within the bureaucracy absent a major agency shake-up.

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**IV) The Brand - The Sea Grant Name**

*Findings*

- 1) While the Sea Grant Program has earned a respectable brand over the last 40 years, the word "grant" continues to cause confusion and a misunderstanding of the Program's mandate.

*Recommendations*

- 1) The Committee recommends that the name Sea Grant be "enhanced" by adding two or three descriptor words that help define the program's mission in relationship to the urgent challenges the nation faces. An example would be – "NOAA Sea Grant – Helping Build Sustainable Coastal Communities".
- 2) The committee recommends that a brochure be developed that highlights the existing capabilities and successes of Sea Grant to illustrate its track record in tackling the issues highlighted by the new brand. This publication would be distributed primarily to elected policy makers at all levels.

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**V) Building Relevancy**

*Findings*

- 1) The Committee believes that Sea Grant should seize the current period of opportunity to establish itself as an important asset to the nation in meeting some of the country's most urgent challenges [in the area of coastal community adaptation to climate change in particular].

*Recommendations*

- 1) The committee recommends that Sea Grant establish a new pilot program focusing on coastal city sustainability and climate change mitigation and adaptation, and that it develop this program into a full-scale national initiative [building to \$50 million] over the next three years.

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**II) Futures Committee II Statement of Task**

[Orbach, Harris, Stubblefield]

The committee will examine and make recommendations to the Board on:

- 1) Opportunities for greater NOAA and Sea Grant program impact and visibility through increased program integration within the "sustainable coastal communities" and the "climate service" initiatives
- 2) Potential and strategies for Sea Grant's nationwide research and extension expertise to further the scope, responsiveness and scientific base for support of NOAA's mission

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II) Futures Committee II Statement of Task

- 3) Articulate the role and capacity of the Sea Grant college program to assist NOAA's regional efforts and facilitate service connectedness with decision makers and the public
- The sense from the executive committee was to use the vision of the Board from the Futures Committee I report to examine alternatives for NOAA and Sea Grant moving forward addressing, within their mission and capability, priority national concerns.

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Our Questions.....

- Can we be more specific in the charge to the committee?
- What are the other “shoes to fall”?
- Should we wait?

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### Where We Are

- 2010: ~3.3% (\$3 M) of total awards, 60% of programs
- Hired subject-matter expert
- Mechanism to grant funds
- Much more in Sea Grant Extension applied social science work
  - North Carolina coastal homeowner attitudes and perceptions about climate change and sea level rise
  - Examining the impact of social marketing programs on the public accessing local seafood



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### Where We Are: Examples of SG Funded Projects

- Sustainable Coastal Development:
  - An economic spatial-dynamic model of Great Lakes coastal development (Wisconsin)
  - Mapping public perceptions and preferences toward wind power development through time (Delaware)
  - Developing new institutions for managing ocean zoning (WHOI)



NOAA NGSP:  
Resilient coastal  
communities &  
economies



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### Where We Are: Examples of SG Funded Projects

- Healthy Coastal Ecosystems:
  - Stakeholder involvement: Multi-methodological approach to determining the factors that affect quality, satisfaction, and impact of public participation in coastal policy-making (Georgia)
  - A community-based framework for identifying, estimating, and evaluating ecosystem services associated with Oregon's proposed marine reserves (Oregon)



NOAA NGSP: Healthy Oceans



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### Where We Are: Examples of SG Funded Projects

- Safe and Sustainable Seafood Supply:
  - Constraints and motivations related to bass fishing along the Lake Ontario coast (New York)
  - Assessing Vulnerability and Resilience in Maine Fishing Communities (Maine)



NOAA NGSP:  
Resilient coastal communities & economies;  
Healthy oceans



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### Where We Are: Examples of SG Funded Projects

- Hazard Resilient Coastal Communities:
  - Implications of takings law on innovative planning for sea level rise in Gulf of Mexico (Florida, Louisiana, Texas, and Mississippi-Alabama)
  - Climate change collaborative: Linking natural, behavioral, and communications sciences to enhance coastal community well-being in the face of climate change (Rhode Island)
  - Understanding attitudes, beliefs, and preparedness for climate change impacts and other coastal hazards in Hawaii (Hawaii)



NOAA NESF:  
Climate adaptation & mitigation;  
Weather ready nation



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### Program Impacts: SCD

- First Pacific Coast wave energy test buoy
- Funded research captured world headlines and created modern Gold Rush for potential wave energy which led to funding a New Center
- Community engagement to identify possible pilot test sites and discuss concerns
- Unified acceptance and identification of test site for two buoys
- Produced DVD: *Wave Power: The potential of Oregon's Ocean Energy*



NOAA NESF



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### Program Impacts: SCD & SSSS

- North Coast fishing communities project
- Mendocino, Humboldt, and Del Norte Counties are most productive area for fisheries and most affected by federal groundfish and salmon mgmt
- Historical socio-economic analysis to develop community histories.
- Results supported port infrastructure development planning, state & federal MPA planning, and increase awareness of opportunities and challenges of sustainability



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### Program Impacts: HCE

- Media campaign reduces spread of invasive species
  - Formative research for media campaign development
    - *Statewide survey: 72% did not believe their individual actions would help stop invasions and were looking for practical guidance*
  - Collaborated on *The Silent Invasion (Oregon Public Broadcasting)* – being adapted as national documentary
  - ORSG publications, including AIS field guide
  - Summit for stakeholders, including decision-makers
  - 11 new AIS laws enacted: 24 million watershed acres now under AIS management



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### Program Impacts: HRCC

- Planning for climate change
  - Adaptation-focused course for shoreline and coastal professionals
  - Partnership among WSG, Padilla Bay NERR CTP, UW Climate Impacts Group, and King County Exec. Office
  - 93% (79/85) of respondents reported increased understanding of adaptation principles and practices
  - Course being adapted for CSC and Sea Grant trainings nation-wide



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### Where We're Going

- Research priorities emphasized social science
- FY12-14 >\$6 million national strategic investment (\$4 M Fed, \$2 M local)
- Regional social science RFPs
  - West coast
  - Northeast
  - Gulf of Mexico
  - Mid-Atlantic



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### Where We're Going

- Human Dimensions 101
- NOAA leadership & line office briefings
- NOAA NSGCP Social Science Symposium
- Envisioning social science portfolio



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### Thank you



Heather.Triezenberg@noaa.gov  
301-734-1274



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### Where We Are: Examples of SG Funded Projects

- Hazard Resilient Coastal Communities:
  - Changing flood mitigation: The consequences of new flood insurance rate maps on Louisiana coastal communities



NOAA NGSP:  
Resilient coastal  
communities &  
economies;  
Weather ready  
nation



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### Program Impacts: Resilient Coastal Communities & Economies

- Coastal communities prepare for predicted earthquake and tsunami event reducing potential loss of life
- Funded research evaluates impacts on existing structures and evacuation
- Coastal hazards specialist engaging community decision-makers, specifically Manzanita
- Renewed collaboration with local public safety officials and Oregon State Parks to update plans
- Emergency volunteer corps formed
  - Mapped neighborhoods, trained in first aid and CPR, and certified HAM radio operators



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**Educational Partnership Program with Minority Serving Institutions**

**A Presentation to the  
Sea Grant Advisory Board**

**Audrey A. Trotman, Ph.D.**

Acting Director, Educational Partnership Program & Student Opportunities  
 Program Manager, Cooperative Science Centers  
 NOAA Office of Education, Educational Partnership Program (EPP)  
 February 9, 2011

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**Outline**

- Overview of the Educational Partnership Program
- Role in Preparing Future Workforce
- Administration and Outcomes
- Explore Areas of Synergy




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**Purpose**

**NOAA Educational Partnership Program (EPP)**

- Outcomes in education and engagement, research, and capacity building – created through the EPP
- Discussing opportunities for synergy with Sea Grant to develop a well trained next generation workforce that also reflects the diversity of the Nation

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## NGSP: Engaged and Educated Public Enterprise Objective



- A NOAA EDUCATION PROGRAM – EPP is contributing to building a future workforce, reflecting the diversity of the Nation, skilled in science, technology, engineering, mathematics, and other disciplines critical to NOAA's mission.
- EPP has component programs that create a robust pipeline through post-graduate training with the primary focus on higher education
- EPP Components: **Cooperative Science Centers (CSC); Graduate Science Program (GSP); Undergraduate Scholarship Program; Environmental Entrepreneurship Program**

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## Introducing the CSCs



**Five Cooperative Science Centers, designated through a competitive process, must be led by a Minority Serving Institution that has an accredited doctoral degree program in a NOAA mission-relevant STEM discipline, in partnership with other academic institutions prepare a well-trained and diverse next generation workforce and advance collaborative research – in support of the NOAA mission. Each CSC meets a 30% in direct student support base.**

- NOAA Center for Atmospheric Science (NCAS) at Howard University (NWS)
- NOAA Cooperative Center for Remote Sensing Science and Technology (CREST) at City College of The City University of New York (NESDIS)
- NOAA Environmental Cooperative Science Center (ECSC) at Florida A&M University (NOS)
- NOAA Interdisciplinary Scientific Environmental Technology Cooperative Science Center (ISETCSC) at North Carolina A&T State University (OAR)
- NOAA Living Marine Resources Cooperative Science Center at the University of Maryland Eastern Shore (LMRCSC) (NMFS)

**Each CSC is aligned with a primary NOAA Line Office.**

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## CSCs Partners with NOAA



### Advancing NOAA Sciences

- **ECSC:** Developed Ecological Risk & Hydrologic Model - Creating Evaluation and Management tools to support management in the NERRs
- **CREST:** Scientists' applied research resulted in 2 patents in cooperation with NOAA (one in separation of fluorescence and elastic scattering for coastal water quality measurement, and another in development of data compression techniques for use with satellite data)
- **NCAS-led team (NESDIS/OAR):** Generated the most comprehensive datasets for characterizing Saharan dust layer and biomass burning episodes (2004-2010) over the tropical Atlantic Ocean
- **ISET:** Design to improve detection, modeling and prediction - (i) a prototype hyperspectral Stokes Vector polarimeter for ocean sensing, (ii) a bench top fiber optic eye safe infrared heterodyne wind speed LIDAR; (iii) Develop chemical sensors for VOC detection
- **LMRCSC-generated data:** Used in resource management to: (1) develop models of recruitment and distribution of fish species in relation to environmental factors, (2) quantify the essential habitat of fishes, and (3) validate the qPCR technique for the detection of parasite infection in Blue Crab

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## Performance Measures & Metrics

- Number of students from underrepresented communities trained and graduated in NOAA mission sciences
- Number of collaborative research projects between Centers, NOAA scientists and the private sector, focused on engagement of scientists and educators from underrepresented communities
- Number of peer reviewed publications
- Total dollar amount of leveraged funds
- Number of EPP participants hired by NOAA, NOAA Contractors and other natural resource and science agencies at the Federal, state, local and tribal levels





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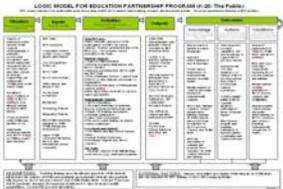
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## Evaluation Mechanism

- Center program evaluations conducted by external teams
- Student tracker database
- Semi-annual reviews of performance and financial reports, with feedback
- Logic model framework

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## Contributions to STEM Talent Pool

Program implemented to address NOAA-wide issues of national significance

- Focuses on MSI community
- CSCs are partners with NOAA in advancing NOAA Sciences and contributing in all scientific core areas in NOAA-NGSP
- EPP: Student Tracking – critical component
  - CSCs have deliberate impacts on the K-12 sector
  - 82 CSC funded students hired by NOAA
  - Research in NOAA mission critical areas underpin student training
  - Graduate Sciences Program: 57 hires

**Challenge:** How do we at NOAA attract a larger fraction of CSC graduates into the NOAA workforce?

EPP CSC Metric	Output
Total # of students, by gender, supported by CSC.	<b>2108</b> F: 1064 M: 1044
Total # of graduates, by gender, supported by CSC.	<b>860</b> F: 493 M: 367
Total # of students from underrepresented groups supported by CSC.	<b>1758</b>
Total # of graduates, who are from underrepresented groups, supported by CSC.	<b>748</b>
Total degrees, by level, granted at CSC for students supported by CSC.	Baccalaureate: <b>542</b> Master's: <b>230</b> Doctoral: <b>88</b>

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## Unique CSC Impacts



**506 collaborative research projects between Centers and NOAA scientists**

**All CSCs have increased workforce diversity at NOAA and other federal agencies through the number of graduates currently working at NOAA and mission-aligned agencies**

- **CREST:** Graduates work at NOAA (4), industry, academia. CREST education model institutionalized allowing expanded engagement in NOAA mission sciences across the CUNY system
- **ECSC:** Eight Ph.D. graduates hired by NOAA. Alumni enter other natural resource professions and teaching. Creating pipeline for future training in NOAA relevant disciplines through with summer camps, poster competitions, teacher training in underserved communities
- **ISET:** Support and train over 300 students in NOAA sciences. Graduates employed in industry, teaching, or postdoctoral positions; Teacher Development through Earth System Science for Educators workshop to increase NOAA science content in curriculum
- **LMRCSC:** Graduates employed at NOAA, and other state and federal agencies; Support student experiential learning on NOAA research vessels, and developed K-12 programs including Summer Camp to train students and enhance ocean literacy
- **NCAS:** Five (5 graduates) and four (4) current students work as NOAA employees. Seven (7) of these students are products of the Howard University Program in Atmospheric Sciences (HUPAS) - national leader in graduating minority students, at the doctoral level in Atmospheric Sciences. Four alumni are NOAA contractors (NWS/NESDIS)

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## Addressing STEM Talent Pool



**EPP Goals**

- To increase programs and opportunities for students to pursue education and research, and graduate in NOAA sciences.
- To develop collaborative programs with MSIs that provide education to serve the interests of NOAA and the nation at large.
- To increase linkages between NOAA and MSIs, other academic institutions, the public and private sectors, the Non-Governmental Organization community.

**Potential Areas of Synergy**

- Education Strategy
- Engagement Strategy
- Research Strategy
- NOAA Succession Planning
- Environmental and Natural Resources Talent Expansion
- Advance National Security and America's Competitiveness
- Engaging Public
- Expanding awareness and environmental literacy

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Allocation Committee II Charge  
From Leon Cammen, Director, NSGO  
March, 2011

**Subject:** Revised charge to the National Sea Grant Advisory Board to Review Sea Grant's Funding Model and its Policies and Criteria for Allocating Sea Grant Funding Resources

**Purpose:** To develop policies and criteria for managing and allocating Sea Grant funding resources that will be consistent with Sea Grant's legislative authority and will maximize the effectiveness, efficiency, and impact of the National Sea Grant College Program.

**Background:** Following the 2002 reauthorization of the National Sea Grant College Program, a policy document, "*Policy for the Allocation of Funds, FY 2003 and Beyond*," was developed by a joint committee of the National Sea Grant Review Panel, the Sea Grant Association (SGA), and the National Sea Grant Office (NSGO) to guide the allocation of appropriated funds in a manner consistent with the new legislation. Almost a decade later, state austerity budgets, coupled with years of relatively flat Federal funding and continued inflation, have increased the financial pressure on all state Sea Grant Programs. This has been especially difficult for the smaller programs, which have less ability to absorb budget cuts.

The National Sea Grant Advisory Board's 2009 report, "*Sea Grant Research*," considered several alternative models for funding allocation, outlining the positive and negative aspects of each, but did not make any recommendations regarding their potential adoption.

It is time again to reconsider Sea Grant's current allocation policy in light of its current and prospective budget levels and determine whether it is still appropriate or whether we need to make changes in the way Sea Grant defines and supports its local, state, regional, and national programming.

**Charge to the National Sea Grant Advisory Board:** The National Sea Grant Advisory Board should provide advice on national policy and criteria for allocating funding resources for Sea Grant programs and initiatives that will maximize the effectiveness, efficiency, and impact of the National Sea

Grant College Program, be consistent with Sea Grant's legislative authority, and recognize the long-term decline in the purchasing power of the national Sea Grant appropriation. The allocation policy will need to meet the following objectives:

- Take into account strategies that State programs have developed to accommodate declining real federal and, in many cases, state funding
- Ensure that Sea Grant programs will have sufficient resources, to the extent overall funding allows, to function effectively in their respective environments
- Provide guidance for the allocation of funding between base programs and discretionary activities

In developing recommendations for the allocation policy, the Advisory Board should consider alternative models for allocating resources than the current policy, including those presented in the recent "*Sea Grant Research*" report. The Advisory Board should also consider whether guidelines are appropriate for the allocation of resources within Sea Grant programs for research, education, etc. and if so, what form those guidelines might take.

**Participants:** The Advisory Board, through the appointment of an appropriate subcommittee, will carry out this policy review. The subcommittee should include Board members and may include any other individuals who could provide useful perspective both from within and external to the Sea Grant network. The National Office is prepared to provide staff support and travel funds as necessary to facilitate the subcommittee's discussions.

**Potential Schedule:** Draft recommendations, with or without options, should be available for discussion at the fall, 2011 Board meeting.

# NOAA's Cooperative Institutes:

Collaborative research to advance NOAA's mission.

Cooperative Institutes are non-federal organizations supported by the National Oceanic and Atmospheric Administration (NOAA). Cooperative Institutes have outstanding research programs in one or more areas relevant to the NOAA mission.

NOAA's Cooperative Institutes collaborate in a large portion of NOAA's research and play a vital role in increasing NOAA's research capacity and expertise. Cooperative Institutes are located at degree-granting institutions with outstanding research programs in one of more areas relevant to the NOAA mission.

Cooperative institutes can serve diverse research communities and research programs and laboratories throughout NOAA. Especially when a cooperative institute is co-located with a NOAA research laboratory; there is a strong, long-term collaboration between scientists in the laboratory and at the cooperative institute.

Each cooperative institute has designated areas of excellence (themes) recognized by NOAA

and these themes serve as the basis for NOAA's partnership with each cooperative institute. Research portfolios range from satellite climatology and fisheries biology to atmospheric chemistry and coastal ecology.

Beyond furthering research, Cooperative Institutes also help educate and train the next generation of NOAA's and the nation's scientific workforce.

All cooperative institutes have the capacity to award graduate degrees in discipline related to NOAA's mission and NOAA supports education and training at many of the cooperative institutes through the

sponsorship of cooperative institute graduate and post-doctoral fellowships. Cooperative Institutes are assigned to a NOAA Line Office. NOAA line offices oversee the initial competition process, performance and funding throughout the award period. Contact information for line office program offices is on the back of this page.



Currently NOAA supports 18 Cooperative Institutes (CI) consisting of 42 universities and research institutions in 23 states and the District of Columbia.





## Cooperative Institute Program Offices

### National Ocean Service (NOS)

Dr. Elizabeth Turner, Ph.D.  
35 Colovos Road, Room 146  
Durham, NH 03824-3534  
Phone: 603-862-4680  
Fax: 603-8662-2094  
Email: [Elizabeth.turner@noaa.gov](mailto:Elizabeth.turner@noaa.gov)

### National Marine Fisheries Service (NMFS)

Kathleen Jewett  
2725 Montlake Blvd East  
Seattle, WA 98112-2097  
Office: 206-860-3208  
Fax: 206-860-3442  
Email: [kathleen.jewett@noaa.gov](mailto:kathleen.jewett@noaa.gov)

### Office of Oceanic and Atmospheric Research (OAR)

Philip Hoffman, Director OAR Cooperative  
Institute Program Office  
NOAA Research, R/LCX2  
1315 East-West Highway, Room 11342  
Silver Spring, MD 20910  
Office: 301-734-1090  
Fax: 301-713-1459  
Email: [philip.hoffman@noaa.gov](mailto:philip.hoffman@noaa.gov)

### National Weather Service (NWS)

Dr. Curtis Marshall, Ph.D.  
1325 East West Hwy, Room: 15360  
Silver Spring, MD 20910-3283  
Phone: 301-713-3557 x 179  
Email: [curtis.marshall@noaa.gov](mailto:curtis.marshall@noaa.gov)

### National Environmental Satellite, Data, and Information Service (NESDIS)

Ingrid Guch  
Chief, Cooperative Research Programs  
World Weather Building, Suite 701  
5200 Auth Road  
Camp Springs, MD 20746  
Office: 301-763-8282 x152  
Fax: 301-763-8108  
Email: [ingrid.guch@noaa.gov](mailto:ingrid.guch@noaa.gov)

<http://www.nrc.noaa.gov/ci>



**FINALIST INFORMATION**

**PLACEMENT INFORMATION**

Degree	Last Name	First Name	SG Program	University	Discipline	Dept. or Agency	Line Office	Host Office
<b>EXECUTIVE FINALISTS</b>								
PhD	Azzara	Alyson	TX	Texas A&M University	Marine Biology			
PhD	Bagwill	April	TX	Oklahoma State University	Zoology			
PhD	Beharry	Stacy	VA	Old Dominion University	Oceanography			
PhD	Carr	Liam	TX	Texas A&M University	Geography			
MS	Clemence	Michaela	USC	Bren School of Environmental Science and Management, UCSB	Environmental Science and Management			
PhD	Cohen	Jillian	NY	Cornell University	Natural Resources			
MS	Compton	Sanya	GA	Savannah State University	Marine Sciences			
MS	Crowther	Dan	WA	Washington State University	Environmental Science and Regional Planning			
PhD	Fauquier	Deborah	CA	University of California, Santa Cruz	Ocean Sciences			
PhD	Gaither	Michelle	HI	University of Hawai'i at Mānoa	Zoology			
PhD	Galkiewicz	Julia	FL	University of South Florida	Biological Oceanography			
PhD	Gibbon	Fern	MIT	Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography/Applied Ocean Science	Geology and Geophysics			
MS	Jabanoski	Kristen	NC	University of North Carolina - Wilmington	Marine Biology			
MS	Jones	Robert	FL	Rosenstiel School of Marine and Atmospheric Science, University of Miami	Marine Affairs and Policy			
JD, MA	Laputz	Sarah	FL	Rosenstiel School of Marine and Atmospheric Science, University of Miami	Marine Affairs and Policy			
PhD	Lee	Wan-Jean	NH	University of New Hampshire	Zoology			
MS	MacMillan	Eric	MI	Michigan State University	Fisheries and Wildlife			
MS	Manyak	Anna	SC	College of Charleston	Marine Biology			
MS	Massaua	Meghan	WA	University of Washington	Marine Affairs			
MS	Michael	Pamela	HI	Hawai'i Pacific University	Marine Science			
PhD	Prosser	Christopher	VA	College of William and Mary, Virginia Institute of Marine Science	Marine Science			
MS	Rife	Alexis	CA	Scripps Institution of Oceanography	Marine Biodiversity and Conservation			
PhD	Riley	Kenneth	NC	East Carolina University	Interdisciplinary Biology			
MS	Sams	Erin	OH	Miami University Institute for the Environment and Sustainability	Environmental Science			
PhD	Segarra	Katherine	GA	The University of Georgia	Marine Sciences			
PhD	Sharpe	Leah	MN	University of Minnesota	Conservation Biology			
JD	Sousa	Brandon	LA	Tulane University Law School	Law			
MS	Susko	Emily	VA	Virginia Polytechnic Institute and State University	Fisheries			
MS	Trespalacios	Dania	CT	Yale School of Forestry & Environmental Studies	Environmental Management			
PhD	Vardi	Tali	CA	Scripps Institution of Oceanography	Marine Biology			
MS	Vuxton	Emily	NC	Nicholas School of the Environment, Duke University	Environmental Management			
PhD	Walsh	Michelle	NH	University of New Hampshire	Zoology			
MS	Welder	Kathleen	TX	Texas A&M University	Environmental Science			
PhD	White	Brooke	MN	University of Minnesota	Geology			
PhD	Yau	Annie	USC	University of California, Santa Barbara	Environmental Science and Management			

**LEGISLATIVE FINALISTS**

MS	Bennett	Jennifer	SC	College of Charleston	Marine Biology			
MS	Dresler	Jennifer	OR	Oregon State University	Environmental Science			
MS	Effron	Micah	USC	Bren School of Environmental Science and Management, UCSB	Environmental Science and Management			
MS	Jablonski-Diehl	Rebecca	WA	University of Washington	Marine Affairs			
PhD	Kraatz	Lindsey	VA	College of William & Mary, Virginia Institute of Marine Science	Marine Science			
MS, JD	McDermott	Sean	FL	Levin College of Law, School of Natural Resources and Environment University of Florida	Law, Interdisciplinary Ecology			
MS	Molton	Kyle	MI	Michigan State University	Fisheries and Wildlife			
MS	Tyler	Ellen	WHOI	Friedman School of Nutrition Science and Policy, Tufts University	Agriculture, Food and Environment Program			
MS	Weaver	Charlotte	VA	Virginia Polytechnic Institute and State University	Public Administration			

# DRAFT SCIENTIFIC INTEGRITY POLICY



Dr. Larry Robinson, Assistant Secretary for Conservation & Management  
NOAA Scientific Integrity Teleconference, July 28, 2011

# Overview



1. Why a new policy?
2. What's new?
3. What does this mean for me?
4. Looking forward
5. Q&A



# Timeline for Scientific Integrity



March 9, 2009 – President Obama issues memorandum on scientific integrity

March 20, 2009 – Dr. Lubchenco sworn in as NOAA Administrator

March–August 2009 – NOAA participates in OSTP Scientific Integrity Task Force

September 2010-March 2011 – Research Council tasks Ad Hoc committee with drafting scientific integrity policy, as part of response to April 2010 Strengthening Science Workshop recommendations and direction from HQ Leadership.

December 17, 2010 – OSTP issues Scientific Integrity policy guidance

February 8-18, 2011 – Employee and union comments solicited on early draft policy

April 18, 2011 – DOC provides progress report to OSTP, including NOAA and NIST intention to develop bureau specific Scientific Integrity Policies

June 16–August 20, 2011 – Public comment on draft NOAA scientific integrity policy and stakeholder outreach

# Draft Scientific Integrity Policy



Establishes NOAA principles for scientific integrity, a scientific Code of Conduct, and Code of Ethics for Science Supervision and Management.

Extends whistleblower protections to those who report scientific and research misconduct.

Scope: employees and contractors, who conduct, supervise, assess, and/or interpret scientific information. Grantees are accountable to their home institution.

# Contractors and Grantees



- Contractors will be expected to comply with NOAA's Scientific Integrity policy.
- Grantees will be expected to comply with the scientific integrity policy of their home institution.
- In both cases the external organization will be responsible for preventing, responding to, investigating, and resolving allegations of misconduct, and for reporting to NOAA promptly at all stages.

# NOAA Principles of Scientific Integrity

1. Transparency, traceability, and integrity are core values.
2. NOAA scientists are encouraged to publish data and findings.
3. NOAA scientists may speak freely to the media and public about scientific matters.
4. NOAA scientists are free to present personal viewpoints and opinions, but must be clear when doing so.
5. NOAA scientists are encouraged to engage with their peers.
6. NOAA supports the election of its scientists to governance of professional organizations.
7. NOAA supports the ability of its scientists to accept awards.
8. NOAA commits to providing regular scientific integrity training to its employees and contractors.

# Scientific Integrity Commons

<http://www.nrc.noaa.gov/scientificintegrity.html>



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration

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Welcome to NOAA's Scientific Integrity Commons - a place for NOAA's scientific community to find training opportunities, engage with peers, and to have open discussions with managers and leadership on the many topics and issues related to scientific integrity.

*"(a) Public service is a public trust. Each employee has a responsibility to the United States Government and its citizens to place loyalty to the Constitution, laws and ethical principles above private gain. To ensure that every citizen can have complete confidence in the integrity of the Federal Government, each employee shall respect and adhere to the principles of ethical conduct set forth in this section, as well as the implementing standards contained in this part and in supplemental agency regulations."*

Standards of Ethical Conduct for Employees of the

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Department of Commerce, but updates and extends them substantially based on the guidance from President Obama and Dr. Holdren.

[Draft NOAA Administrative Order on Scientific Integrity](#)

# Draft Procedural Handbook



Sets procedures for responding to allegations of Scientific and Research Misconduct by NOAA employees, contractors, and external organizations.

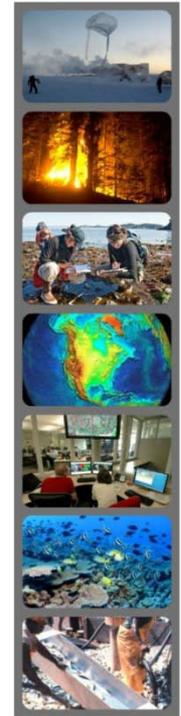
Deputy Under Secretary for Operations oversees proceedings and appoints officials to manage review.

Process consists of up to three stages: inquiry, investigation, and adjudication.

External organizations and contractors have primary responsibility for preventing, detecting, and investigating allegations of misconduct.

# Next Steps

- July-August: Engage NOAA staff and research community
- August 20: end public comment period
- Summer/Fall: Revise policy and handbook based on comments received; internal review and clearance to finalize policy
- Fall: Release final scientific integrity policy



Strengthening Science



Science  
Service  
Stewardship

Check out the policy at:  
[www.noaa.gov/scientificintegrity](http://www.noaa.gov/scientificintegrity)

Submit comments to:  
[integrity.noaa@noaa.gov](mailto:integrity.noaa@noaa.gov)

QUESTIONS?



## **Coastal Sea-Level Change Societal Challenge Needs Assessment Report**

### **Executive Summary**

NOAA has focused its efforts on four climate-related challenges to society, which represent a spectrum of needs for which NOAA can develop and deliver services with information provided to make informed decisions for effective adaptation actions and other climate-sensitive decisions. The four societal challenges, as defined in "A Climate Service in NOAA: Connecting Climate Science to Decision Making, Vision and Strategic Framework," are:

1. Climate Impacts on Water Resources
  - Providing coordinated and authoritative information system to guide water resource managers.
2. Coasts and Climate Resilience
  - Understanding physical processes driving sea-level rise and coastal inundation, and providing best available information to decision-makers on sea-level change impacts and adaptive management strategies.
3. Sustainability of Marine Ecosystems
  - Improving understanding of, and information about, the impacts of climate on ocean physical, chemical and biological properties critical to managing large marine ecosystems.
4. Changes in Extremes of Weather and Climate
  - Developing and delivering information to prepare for and adapt to climate and weather extremes, e.g., droughts, floods, heat waves & cold snaps

This needs assessment will focus on challenge #2 – resilience of coasts to the impacts of sea-level change.

The results of the coastal sea-level change societal challenge needs assessment literature review presented in this document represent a snapshot of data, information and services gaps as captured in fifty-two documents, presentations and publications. This synthesis of findings highlights the needs of coastal decision-makers to assist in making informed decisions about the risks and impacts of sea-level change. This report focuses on a discreet subset of decision-makers who have significant influence in the coastal communities that they manage and where they work. These groups include: 1) tribal, state, and local planners; 2) coastal managers; 3) regional and local professional organizations; 4) port authorities and operators; 5) federal and state natural resource and habitat conservation, restoration, and protection managers; and 6) practitioners and land-acquisition partners. Decisions related to coastal and environmental challenges are made every day and it is a priority of NOAA to ensure that these coastal decision-makers have the data, information, tools and services they require to make the most informed choices about the realities they face.

The results of this report are intended to provide NOAA with current information on the defined needs of coastal decision-makers in order to directly inform the

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development of decision-support tools and applications. This report looks at the specified needs through the lens of NOAA's strategic planning efforts. The gaps identified in the needs assessments reviewed for this report are binned by: category and theme, their relationship to the needs of other societal challenges, and sector. Some of the needs that appear in each of the three sections include:

- **Data, models and information:** Users are interested in a combination of more, better, higher-resolution, local, scalable, integrated and interdisciplinary data, models and information that are validated, comparable and compatible, easily accessible and easy to use. Social science gaps are communal.
- **Tools and Education:** Users need tools that incorporate data, models and information into visualizations, forecasting systems or other products, and training and education to get the most out of the tools.
- **Communication:** Users need to understand their risks and vulnerabilities and the accompanying terminology and concepts in order to make the most informed decisions. A lack of clarity can translate into a reluctance to take action. In addition, users need sufficient understanding to communicate the essential information to their constituents.

The following chapters in this report more fully describe the needs expressed in the fifty-two documents, presentations and publications examined in this process. By reviewing the lengthy list of needs, it is clear that there are extensive gaps in knowledge, understanding, products, and services related to coastal issues, particularly that of sea-level. NOAA's goal is to assess the needs collated here, prioritize them according to those that should and can be addressed first, and develop climate services to assist coastal decision-makers in suitably addressing their everyday needs. As a key societal challenge, adapting to sea-level change requires dedicated communities who will take time to ensure the safety of our growing population living in coastal regions across the globe.

## **Section 1**

### **Introduction**

As documented in the National Oceanic and Atmospheric Administration (NOAA) *Next Generation Strategic Plan*, NOAA envisions an informed society capable of anticipating and responding to climate change and its impacts. This report identifies specific needs associated with an important climate-related challenge to society: sea-level change.

### **Mission and Goal**

To meet NOAA's mission *to understand and predict changes in climate, weather, oceans, and coasts, to share that knowledge and information with others, and to conserve and manage coastal and marine ecosystems and resources*, NOAA will continue to enhance the quality, usefulness and accessibility of climate information and services, building on our history of climate science. NOAA's long-term climate goal is to improve understanding and prediction of changes in climate and promote a climate-resilient society by:

- Monitoring climate trends, conducting research, and developing models to strengthen our knowledge of the changing climate and its impacts on our physical, economic, and societal systems,
- Providing authoritative and timely information products and services about climate change, climate variability, and impacts, and
- Informing decision-making and management at the local, state, regional, national, and international levels.

NOAA will deliver climate products and services in collaboration with public, private, and academic partners to maximize social, economic, and environmental benefits.

### **Societal Challenges**

NOAA has focused its existing efforts on four climate-related challenges to society, which represent a spectrum of needs for which NOAA can develop and deliver services with information provided to make informed decisions for effective adaptation actions and other climate-sensitive decisions. The four societal challenges, as defined in "A Climate Service in NOAA: Connecting Climate Science to Decision Making, Vision and Strategic Framework," are:

5. Climate Impacts on Water Resources
  - Providing coordinated and authoritative information system to guide water resource managers.
6. Coasts and Climate Resilience
  - Understanding physical processes driving sea-level rise and coastal inundation, and providing best available information to decision-makers on sea-level change impacts and adaptive management strategies.
7. Sustainability of Marine Ecosystems

- Improving understanding of, and information about, the impacts of climate on ocean physical, chemical and biological properties critical to managing large marine ecosystems.
- 8. Changes in Extremes of Weather and Climate
  - Developing and delivering information to prepare for and adapt to climate and weather extremes, e.g., droughts, floods, heat waves & cold snaps

This needs assessment will focus on challenge #2 – resilience of coasts to the impacts of sea-level change.

#### **Needs Assessment for Coastal Challenge: Sea Level**

The goal of the needs assessment process described in this report is to conduct a systematic investigation of decision-maker needs in order to identify information gaps and develop priorities for new climate-related products and services. This process will be ongoing to ensure continued evaluation of existing and emerging stakeholder needs for information, products, and services.

This coastal needs assessment report focuses on sea-level change and will help identify gaps in the science, understanding, and services required by coastal decision-makers in order to make the most informed management decisions. The document is a synthesis of climate-related needs of coastal decision-makers gathered from an array of relevant sources (see Appendix I for bibliography). It is a snapshot of sea level-related information gaps identified in these sources. Coastal decision-maker needs and broader needs are categorized in the following sections after a review of the methodology used to obtain the needs assessment information. Next steps are offered in the concluding section.

The results of this needs assessment will additionally serve as one input to help frame National and International Climate Science Assessments. This effort will help NOAA understand the nation's vulnerability to climate variability and change, and to inform climate adaptation and mitigation strategies at all levels.

## **Section 2**

### **Needs Assessment Methodology**

A systematic, well-planned needs assessment is critical for informed product and service development, and a powerful force for guiding agency decision-making. The proceeding narrative identifies the systematic sequence used to conduct the needs assessment for the Coasts and Climate Resilience Societal Challenge. In addition to a rigorous, systematic approach, this methodology takes great care to fit within the realities of current time and budget constraints.

As a precursory activity to the needs assessment process, it was necessary to clearly articulate the issue and target audience of interest. To reiterate, the question addressed in this needs assessment is “what are the management needs surrounding the issue of local sea-level rise and inundation that affect coastal regions and communities?” This question served as a reference point to frame subsequent steps of the needs assessment. The initial audience, broadly stated for the assessment was coastal managers. This would be further expanded and then prioritized during the assessment process.

As a second, preliminary step, a planning team was formed in January, 2011 and included representatives from diverse NOAA line offices and programs positioned to assist with solutions to the needs identified in this report. The committee includes representatives from the National Ocean Service, the National Environmental Satellite, Data and Information Service, the National Marine Fisheries Service, and the Climate Program Office. See Appendix II for a complete list of planning team members.

Following the initial activities described above, the planning team collectively engaged in a formal needs assessment process outlined in Figure 1. The first step was to conduct an audience analysis to further identify audiences of interest, as well as the discreet interests and concerns of each group. This step revealed three primary audience types or groupings. These were generally referred to as 1) state-level managers, 2) county- and local-level managers, and 3) other influencers. The first two categories focused predominantly on a geographic scale as opposed to jurisdictional. For example, federal agencies were dispersed across these categories based on the focus of their work in relation to the needs assessment question. The third category did not possess a clearly defined geography, but had considerable influence on decision-making and associated outcomes. Such audience subgroups in the “other influencers” category included the media, educators, and the insurance industry. Upon reviewing the extensive list of sub-audiences within each category, a collective decision was made by the group to focus exclusively on the state-level category in this effort to effectively account for the working group’s time and budget realities. This prioritized audience includes state, local and tribal planners and managers with foci on the coast, floodplains, infrastructure, utilities, emergency management, natural resources and conservation, etc., land acquisition partners, state/regional/local professional organizations, and port authorities. The general sentiment was that all NOAA line offices had current initiatives and high interest in

this audience segment which allowed for all offices to effectively engage from the start. It is the understanding of the planning team that later needs assessment processes will examine the needs of other audiences.

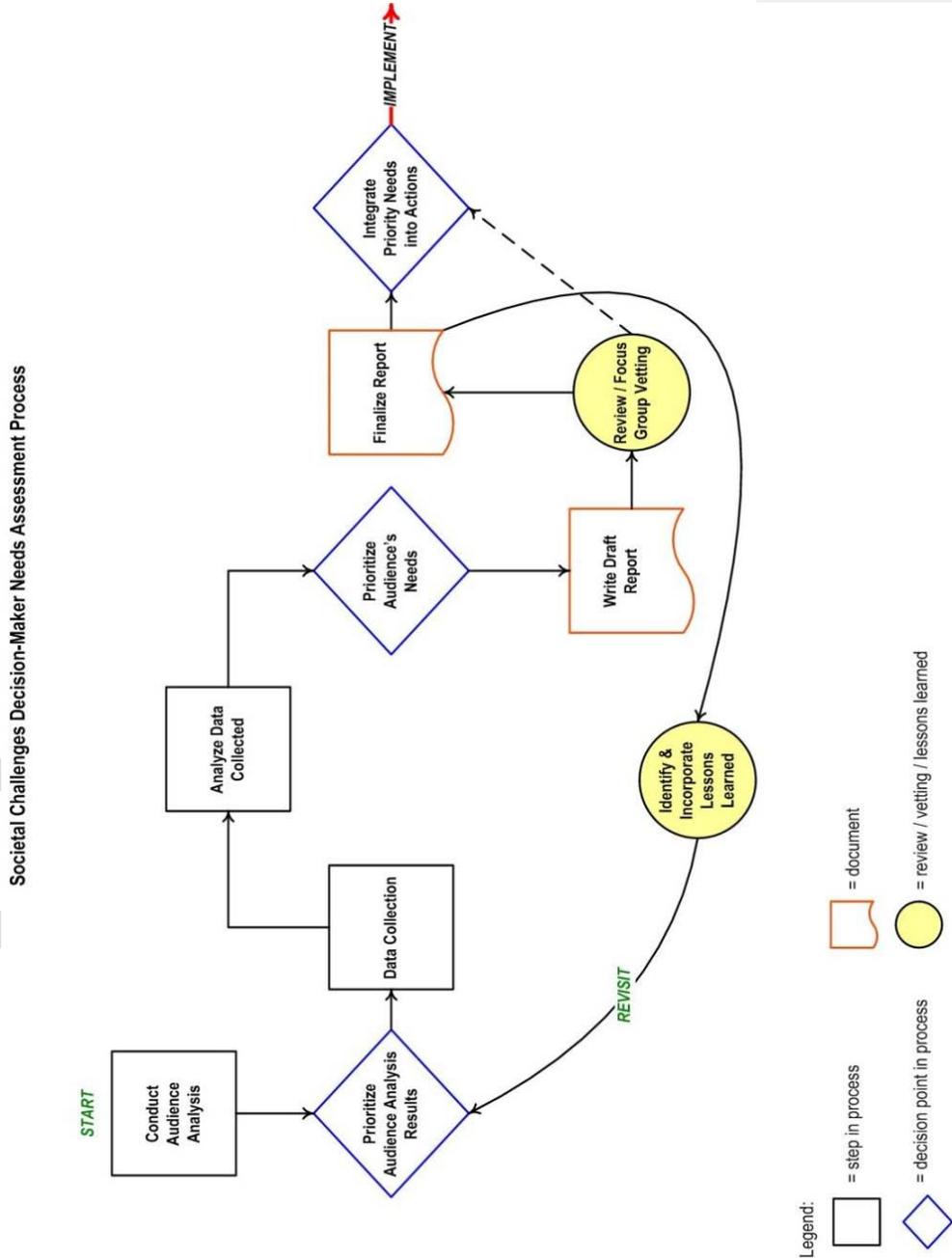
Following the results and decisions made regarding the audience analysis and prioritization, the data collection phase was initiated. There are a number of considerations that go into selecting the most appropriate data collection method(s) for a needs assessment, including the method that would be most receptive to the target population, cost implications, and legal requirements. The decision was made to employ a literature review as a primary approach. Analysis of an array of reports, management documents, and similar resources revealed an array of expressed needs and challenges within the community of interest. These needs were compiled, documented, and subsequently prioritized (based on expressed need reported by the audience) by the planning team. These findings were summarized into a draft report.

Once the draft report was completed, as a secondary data collection approach, findings were ground-truthed by vetting the report through an assemblage of key informants in the audience of interest. These comments were noted, addressed or incorporated to provide verification or correction to the findings of the literature review. Information received through the interviewing process was integrated into this final report.

It should be noted in the figure below that needs assessment is a continual process. Once findings have been determined, reported, and integrated over time, lessons will be learned and new challenges will surface. This necessitates that the investigator revisit both the audience of interest, as well as the needs assessment question and determine if these elements are in need of refinement.

**Comment [ncc1]:** Note to Veters: the “vetting the report through an assemblage of key informants” reflects the current stage in the process. It is the intent of the team to review every comment received. Thank you for your efforts, they are useful and appreciated.

Figure 1



### **Section 3 Coastal Decision-Makers' Needs for Sea-Level Changes**

#### **Needs Across the Spectrum**

The need for information for decision-making in coastal areas has been increasingly focused on sea-level changes and has been well documented based on feedback from state and regional partners, as well as partner organizations. For example, when asked about their highest climate impacts of concern in a 2008 survey, three-quarters of Washington state shoreline planners and coastal managers who responded prioritized sea-level rise. At a regional perspective, the Gulf of Mexico Alliance held a 2010 Special Session on management strategies for sea-level change in the Gulf region, identifying not just data and modeling gaps, but the need to engage local coastal managers so they understand, accept and use the data and information for managing resources and risks. In addition, coastal decision-makers identified several sectors where there were specific needs for information on the impact of SLR on coastal communities, including trade, infrastructure, finance, economic development and transportation.

Sea-level change impacts will affect the entire spectrum of decision-makers in coastal areas, from state and local to sectoral, and efforts have been underway to determine their needs. This section of the literature review will categorize the commonalities and define the broad themes that have emerged from the data.

#### **Categorized Needs**

From the literature examined, the needs expressed by coastal decision-makers were grouped into five general categories:

1. Improved ability to predict sea-level change
2. Assessment and predictions of sea-level impacts to coastal communities (trade, tourism, infrastructure, etc.)
3. Science-based assessment and predictions of sea-level change impacts to coastal ecosystems
4. Adaptation and mitigation strategies for coastal decision-makers
5. Education and outreach to stakeholders on sea-level change science and adaptation strategies

#### *Improved Ability to Predict Sea-Level Change*

Many coastal decision-makers have expressed a need for an improved ability to predict sea-level change. Improving predictions and projections of local sea-level change requires several information types, including bathymetric, elevation and tide gauge data, and down-scaled sea-level change models. Coastal decision-makers are aware that a means to analyze, interpret and apply scientific research to land use decisions is needed that incorporate multiple fields of data, such as shorelines, geomorphology, socioeconomic data and model projections to develop realistic scenarios for planning purposes. These specific needs are covered in the three following subsections, where appropriate.

Coastal decision-makers have a very clear idea of what they need in terms of data. Over a third of the needs assessments reviewed provided specific detailed needs such as:

- High-resolution topography and bathymetry at consistent temporal and spatial coverage
- Inundation and tidal elevation maps
- Land cover maps(physical coverage of the earth's surface – examples include trees, grass, asphalt, water, etc)
- Additional surface elevation tables and water-level stations to track relative sea-level rise and subsidence
- Paleoclimatological data
- Wave heights, precipitation and wind data

They are also knowledgeable about their needs for modeling. In addition to an overarching request for high-resolution, downscaled models that are easy to use, they need:

- Shoreline change modeling
- Socio-economic models such as economic valuation models, ecosystem change models, comparative evaluation of models, public health models, social and environmental justice models, hazard response models, and population forecasting
- Combined models of inundation and shoreline erosion that also incorporate changes in coastal geomorphology, hydrological conditions, and human alterations and response (seawalls, sand replenishment, etc.) to assess social, environmental, and economic vulnerabilities
- Local and regional scale modeling and projections of specific ecosystems

Coastal decision-makers also need to understand the costs of obtaining this data and information.

#### *Assessment and Predictions of Sea-Level Rise Impacts to Coastal Communities*

The societal challenge of coastal resilience to climate change was the leading issue identified in the needs assessments reviewed. Of the sectors identified as having specific needs for information on the impact of SLR on coastal communities, coastal decision-makers most frequently cited infrastructure, followed by economic development and transportation. Specific needs include:

- The ability to devise adaptation practices, standards and strategies, and adjust them in the future as forecasts and predictions improve or are refined
- Standardized information on key indicators of social and economic vitality
- Understand more about how people perceive and respond to risk
- Gaps in regional and local planning response systems
- Tools for decision-makers to easily see potential risk to people and development due to sea-level rise, flooding, and related hazards such as sea-level rise visualizations

- Ability to demonstrate importance of weather, climate, and ocean information in business models
- Predictive models showing the socioeconomic impacts of sea-level change

#### *Science-based Assessment and Predictions of Sea-Level Change Impacts to Coastal Ecosystems*

Valuable coastal habitats, including salt marshes, oyster reefs, mangroves and coral reefs may be adversely affected by sea-level change over the coming year and decades. Two-thirds of the needs assessments examined identified 'natural resources' as one of the areas of concern. Coastal decision-makers identified the need for science and information to inform decisions on the conservation and restoration of coastal wetlands, and to guide permitting and other land-use policies, including:

- Understanding of marine resources and ocean dynamics and targeted studies of biological and physiological tolerances to changes anticipated from sea-level change
- Issues and information related to nearshore water circulation, shoreline stability and erosion, coastal hazards, and ocean acidification
- Understanding the human connection and our dependence on healthy ecosystems
- How to design and prioritize restoration projects given sea-level and climate change predictions
- Better understanding of natural erosion and deposition cycles in tidal marshes and sediment trapping/accretion
- Landscape response to sea-level and salinity changes
- Natural resource mapping and identification of high-priority areas and the impacts of sea-level rise
- Models that predict migration and/or vertical accretion of coastal wetlands and beaches
- Data and tools to predict impacts on habitats

#### *Adaptation and Mitigation Strategies for Coastal Decision-Makers*

In order to prepare coastal communities for projected sea-level change, the literature review clearly indicates a need for adaptation and mitigation strategies by coastal decision-makers. Collectively, these strategies represent the actions coastal decision-makers can take to respond to threats to local communities and habitats from sea-level change. Coastal decision-makers need:

- Specific determination of likely changes to human communities or local ecosystems
- To develop local capacity to assess community status and barriers to achieving sustainable and vibrant communities, and develop strategies to move towards sustainability and vibrancy
- Risk assessment and planning and vulnerability assessments
- Adaptive management planning

- Strategies for incorporation of the outputs of sea-level rise research and modeling into planning, policies and regulations
- Catalog of best management practices for climate adaptation strategies
- Dialogue to determine practical strategies

Adaptation strategies were linked to short-term risks, and mitigation strategies to longer-term risk. In addition to the adaptation strategies themselves, a need for an economic assessment of adaptation strategies was expressed.

#### *Education and Outreach to Stakeholders on Sea-Level Change Science and Adaptation Strategies*

In order for coastal decision-makers to implement strategies to build resilience to climate impacts such as sea-level change, it is important to be able to explain, advocate and get support for the implementation of adaptation strategies. Across the nation, coastal decision-makers have identified the need for help in educating stakeholders on the science supporting sea-level change predictions, the impacts of sea-level change on coastal communities and habitats, and why and how adaptation strategies will work. According to the literature reviewed, tools that support coastal decision-makers' education of and outreach to the public regarding sea-level change will enable stakeholders to:

- 1) better understand SLR impacts, as well as risk and uncertainty;
- 2) make informed personal and collective decisions (behavior change); and
- 3) inspire engagement in decision-making and planning processes.

Many coastal decision-makers specified that education and outreach tools should be focused at the local level, in order to most effectively inform the public on their climate risks and initiate action. It was noted that current climate science needs to be articulated in a way that is "not only understood, but accepted by, the audience targeted." The literature review identified a suite of potential tools that could help translate climate change science into localized impacts, and facilitate education and outreach regarding SLR impacts. These included:

- Products and tools with user-friendly interfaces, e.g. interactive maps such as data layers that are available via Google Earth, preferably at a local scale
- Models that are more intuitive to laymen
- Public relations information that might include brochures, DVDs, and traveling exhibits
- K-12 education materials

Two documents also noted the need for coastal decision-makers to better understand the factors that support or prevent resilient behavior and decision-making, so that outreach and education at the local level can be tailored to "foster resilient behaviors and support local champions of resilience who can make a significant impact in their communities." These different tools and information would allow coastal decision-makers to engage a variety of stakeholders in the process of understanding, anticipating, and responding to sea-level change.

### **Thematic Needs**

Throughout all of these categories run five overarching themes that point to the bigger picture of climate needs:

1. Defining and understanding uncertainty
2. The need for standards, protocols and access for everything from data collection to infrastructure design
3. The need for a centralized database and resource list
4. The need for interdisciplinary, integrated information, data, models, tools and strategies, to incorporate biological, physical, ecological, economic and social information to better inform all decision-making
5. The need to take general information to the local actionable level, whether the information is sea-level change rates, adaptation strategies, or threats to infrastructure.

#### *Defining and Understanding Uncertainty*

Coastal decision-makers find that communicating uncertainty is difficult and must be done in a meaningful way and in some cases, require assistance in doing so. Data gaps also lead to uncertainty. Some of the specific uncertainties are in:

- Impacts of sea temperature, acidification, and sea-level rise on the marine environment.
- Ranges for climate change impact projections to indicate scientific confidence.
- Well-founded distinctions between more and less likely impacts (e.g., at-least vs. maybe as much as)
- Clearly presented assumptions of sea-level rise models: Disagreement leads to indifference.

#### *Standards, Protocols and Access*

Establishing standards, methodologies and protocols for data collection, storage and analysis as well as processes such as infrastructure design and projects such as mapping allows for data and information to be accessible to a wider audience and user group. A common ground provides a platform for others to build upon what is already known and "better integrate science into decision making." A publically accessible format allows for broader use.

#### *Centralized Database and Resource List*

Coastal decision-makers need data and information to help them make decisions. They are also asking for the climate data and information to be housed in a single location for easier access and better understanding of what else may be available. Some sector-based or regional users of climate data and information are looking for more specifically categorized information. Coastal decision-makers are also looking for a venue to share information.

#### *Interdisciplinary and Integrated Decision-Making*

Decision-makers understand they are facing increasingly complex issues that require multifaceted solutions. Their requests for data, tools and services are punctuated with their clear need for the information to integrate biological, physical, ecological, economic and social information. Several representative examples include:

- Information that can be used in socio-economic, physical, biological and physiological models
- Cross-disciplinary coordination and collaboration across government agencies and with the private sector
- Interdisciplinary training and research, bridging the gap between climate research and other disciplines such as ecology, fisheries, socioeconomics, etc.
- Integrated natural and social science approaches to identify the attributes of populations, ecosystems, and natural and human communities that promote resilience
- Stronger tools that include economic, social and institutional factors

#### *Local, Actionable Information*

Coastal decision-makers also need information or services at a level and scope where they can use that information to make policy, planning or emergency decisions and take action at their individual level of authority or influence. Some of these include:

- Downscaled global sea-level rise models to a finer resolution to adequately represent regional or local effects
- Localized climate science
- Sea-level change data at the local level to better incorporate socio-economic data for local impacts
- Local planning capacity
- Development of local-level tools and technical assistance
- Tools for sea-level rise that are local and specific, show a range of scenarios, highlight loss of tax money from lost infrastructure, clearly present assumptions, indicate landmarks as examples to make relevant, and give concrete ideas of how this information can be incorporated into decision-making processes, including examples

## **Section 4 Relationships and Needs of Decision-Makers Associated With Other Societal Challenges**

### **The Societal Challenges**

NOAA's draft Vision and Strategic Framework for Connecting Climate Science to Decision Making identifies four specific societal challenge areas where a dedicated focus of NOAA's climate capabilities will provide the information and services necessary to make informed decisions for effective adaptation actions and other climate-sensitive decisions: Climate Impacts on Water Resources; Coasts and Climate Resilience (the main focus of this needs assessment report); Sustainability of Marine Ecosystems; and Changes in the Extremes of Weather and Climate. These societal challenges areas are driven by NOAA's mission responsibilities and will provide initial focus and integration in NOAA's efforts to deliver climate services, linking NOAA's world-class climate science and research to the urgent and growing needs of NOAA's customers. This section will identify the trends in the relationship between sea-level change and the needs of coastal decision-makers as they apply to Climate Impacts for Water Resource, Sustainability of Marine Ecosystems and Changes in the Extremes of Water and Climate societal challenge areas.

### **The Importance of Sea-Level Change**

In the 2010 Coastal Management Customer Survey Report, 68.5% of respondents considered sea-level rise to be a high priority management topic, particularly in the Mid-Atlantic, Southeast and Alaskan regions. Subsidence is compounding the issue of sea-level change in the Gulf of Mexico and in other select locales around the nation. Climate change impacts overall were the highest priority for almost all of the U.S. regions, and these impacts stretch across the societal challenge areas, resulting in similar needs for basic data and information. Spatial data, for example, has been identified as key information used by coastal decision-makers and corresponding needs have been identified. For example, the needs identified in this assessment clearly show spatial data needs related to sea-level change including storm surge, sea-level rise, economics, and climate change impacts.

While there are some distinct requirements within the societal challenge areas, there is some overlap of specific data needs. For example, coastal decision-makers in various fields are using LiDAR and land elevation data for a variety of purposes, risk and vulnerability assessments unique to their missions, and social and economic indicators, data and information to better inform how to weight and make decisions affecting coastal communities and ecosystems. They also want multidisciplinary information presented in a comprehensible manner in order to make better decisions across their increasingly complex scope of responsibilities.

### **Needs Across the Societal Challenge Areas**

Across the societal challenge areas, the most prevalent trend is the need for data. While the specific needs for data are sometimes unique, common needs that are shared with sea-level change were identified with respect to data accessibility,

utility, interoperability, and reliability. Each societal challenge area is facing the need for more data that are:

- Covering broader specific geographic regions, and/or more parameters
- Higher resolution (especially topography and bathymetry);
- Scalable or already scaled to be appropriate for a particular use;
- Validated, provided by a reputable source, and clearly articulating assumptions and uncertainties, where applicable;
- Comparable to and compatible with other data being collected (i.e., using common formats); and
- Easily accessible and provided in an easy-to-use format.

Correspondingly, there is a need for the data to be translated for use in decision-making into user-friendly tools, including visualizations and prediction and forecasting systems. For example, the literature documents a pressing need for sea-level rise planning tools that allow decision-makers to visualize impacts to people and development under a range of potential sea-level rise scenarios. However, to ensure utility for decision-making, the models and predictions applied should be accompanied by a clear articulation of the underlying assumptions and level of uncertainty, as disagreement among the data and model outputs can lead to skepticism and/or indifference within coastal communities.

#### *Climate Impacts on Water Resources Needs*

Addressing the Climate Impacts on Water Resources societal challenge area will help NOAA improve the nation's capacity to manage its water resource, and contribute to NOAA's abilities to anticipate, prepare for, and adapt to drought and flooding events on climate time scales. Intersecting with sea-level change, the needs for this societal challenge area are:

- Aquifer problems, including groundwater sustainability and recovery rates
- Salt water intrusion
- Changes in water quality
- Inundation mapping with GIS overlay
- Risk & vulnerability analysis for water management infrastructure, including floodmaps
- Seasonal climate forecasts

#### *Sustainability of Marine Ecosystems Needs*

Addressing the Sustainability of Marine Ecosystems societal challenge area will enhance resource managers' access to and application of the best available information to manage marine ecosystems in a changing climate. Within this societal challenge area, there is a range of needs for information, research, and guidance on environmental/habitat changes associated with sea-level change, including:

- Ecosystem/species migration and the spread of invasive species
- Geospatial information on climate and ocean processes
- Tools that forecast ecosystem and habitat changes

- Coastal wetlands/habitat loss and other natural resource mapping to facilitate risk assessments
- Data inventories and monitoring systems for an adequate baseline understanding of local species and ecologic indicators
- Data and models that address water & air temperature, salinity, precipitation, ocean acidification
- Survey standardization
- Coordinated monitoring

A number of needs were identified for tools and models that incorporate the above research and information toward a particular management question. For example, users require tools that can inform prioritization of restoration and conservation efforts based on a given sea-level rise and/or climate change prediction. This information can guide project design and provide critical information relative to the anticipated impact on the longevity of the project. Improved models are also needed to characterize the ecological migration of habitats and species and potential impediments to that migration.

Social science needs were identified relative to the economic cost of accelerated sea-level rise impacts, such as migration and/or vertical accretion of coastal wetlands and beaches and/or the consequences of taking no action. More robust socioeconomic analysis of ecological values is needed in order to fully understand and characterize local impacts.

#### *Changes in Extremes of Weather and Climate Needs*

Addressing the Changes in Extremes of Weather and Climate societal challenge area will enhance the ability of resource managers, policy-makers and the public to apply the best information to anticipate, prepare for, and adapt to ongoing changes in climate extremes and their impacts. The sea-level change-related needs for this societal challenge area are:

- Data, information and better understanding of environmental drivers such as tides, water levels, waves, precipitation and temperature
- Spatial data and visualization tools to inform risk assessments, such as population density and other demographic information, coastal infrastructure, flood zones, and high hazard zones
- Detailed models and mapping and visualizations of future sea-level change including extreme states, variability, frequency, magnitude of inundation events
- Combined models of inundation and shoreline erosion that incorporate changes in coastal geomorphology, hydrological conditions, and shoreline protective structures
- Risk assessment model that considers the additive impact sea-level rise on other hazards, such as erosion, wetlands loss, storm surge increase, and increased intensity and/or frequency of storms.

- Better understanding of the linkage between climate change, sea-level rise and wave climatology
- Climate monitoring stations
- Dynamic models
- Inundation models, including Digital Elevation Models

A variety of social science data and analyses are needed to articulate the long-term costs of sea-level change. For example, there is a need to assess the social, legal, and economic issues related to sea-level change and the various adaptation strategies a community might employ, including “retreat,” armoring, renourishment, and “no action” alternatives across developed and urbanized coastlines.

**Sharing Needs Across Societal Challenge Areas**

The literature also illuminated where the societal challenge areas shared the same needs with each other, as well as coastal decision-makers addressing sea-level change.

<b>Cross-Cutting Needs Shared By Societal Challenges</b>	<b>Sea-level Change</b>	<b>Water Resources</b>	<b>Marine Ecosystems</b>	<b>Extremes</b>
Understand how sea-level change & storm surge will change nutrient dynamics	X	X	X	X
Predictions of impacts from storms on estuaries	X		X	X
Downscaled climate models to help deal with increased impacts from storms	X	X		X
Information on marine over wash	X	X		X
Data and information to monitor and mitigate impacts linked to ecological changes, i.e., wetlands migration	X		X	X
Information related to pollution loads, potential runoff and temperature and salinity data for water flowing into the coastal and estuarine areas	X		X	X
Information on ecosystem services at risk due to inundation and saltwater intrusion	X	X	X	

## **Section 5 Broad Needs That Cross Sectors**

### **The Sectors**

NOAA's draft Vision and Strategic Framework for Connecting Climate Science to Decision Making identifies core capabilities which will support basic services in a variety of sectors. In looking across a wide variety of climate literature produced over the past decade, we note common areas of requirements that are repeatedly mentioned, regardless of whether the needs are addressing the structural sectors of Transportation, Energy, and Infrastructure; the economic sectors such as Finance, Trade and Economic Development or the well-being sectors of Health and vital Natural Resources. Across each of these sectors there is a recognized need to understand and improve social and ecological resilience in the context of a shifting climate, and changes in sea level by:

- Integrating locally relevant data in a more holistic and geospatial approach to planning that includes vulnerabilities from climate and hazards impacts that cross natural habitats; to transportation, health and safety infrastructure; and socioeconomic factors
- Improving understanding by users of the terminology and concepts of sea-level rise, its uncertainty, and probabilistic risk
- Investing in research and improving science answers

### **Integrating Locally Relevant Data to Ensure Structural and Systems Integrity**

Increasingly, decision-makers are seeing the need to take a systems approach to planning for resilience in the face of sea-level change, and they are asking for the data and tools to enable this methodology. Even if a planner is from the highway transportation sector, for example, there is an inherent understanding that both multi-modal transportation vulnerabilities (airports, highways, ports, rails) and the socio-economic factors that determine how and who will use these systems need to be considered. The vulnerability of support systems such as waste treatment and power plants are also key examples. Communities are looking to assess which locations and facilities will remain usable under different sea-level change scenarios, and which portions may need to "yield to the sea." The specific local data, information and knowledge should incorporate region-specific climate change forecasts and scenarios, and should include:

- Geospatial techniques to better analyze the spatial relationships among topography, development, infrastructure, habitats and climate.
- Geospatial tools and approaches to help coastal and habitat managers assess habitat resiliency and adaptation under different climate change and management scenarios
- Tools and protocols that incorporate high-resolution data on habitat distribution and condition with projected decadal climate conditions and other factors (e.g., socio-economic conditions) to target priority areas for habitat restoration and protection.
- Comprehensively documented infrastructure elevations

- Preferred setbacks from high water line
- Migration of frequently flooding areas
- Priorities for the state's coast and shoreline and factoring these into any new proposals for coastal development
- Requirements for enhanced communication technologies to access data and to deal with episodic response emergencies
- Describing and mapping the environmental characteristics in districts, including current conditions (soil type, etc), and natural buffers and habitats
- Mapping wetland and habitat types
- Development of risk analysis methods and tools is needed to enable planners and managers to assess the range of potential climate impacts, the vulnerability of infrastructure segments, and the relative risk of components of the transportation network.
- Increased modeling capability and ease of use
- High resolution, high quality topographic data consistently available for a region
- Observations and monitoring to more clearly understand the key threats in the region, measure and monitor local sea level (includes both water level and subsidence rates)
- Monitoring capabilities that more directly provide advanced warning of impending infrastructure failures due to repeated weather hazards or climate
- Improved data management and accessibility (e.g., establish a data clearinghouse across agencies)
- Socioeconomic data, including census data, tax data, demographic data, infrastructural data, land use data, economic data, and legal frameworks

#### **Communication of Sea-Level Change Concepts**

Across all sectors, decision-makers noted that addressing sea-level change requires both improved information but also improved understanding of the key concepts by those who need to act on this information. The concepts and terminology of uncertainty, vulnerability, impacts and risk, as well as subsidence, local and global sea-level change, are frequently intermingled and not always clear and distinctly articulated. This lack of clarity can translate into a reluctance to take action. Even when decision-makers have been trained and feel comfortable with the predictions and tools used by sea level change practitioners, they are not always equipped to convey this information on to their constituents. Coastal decision-makers need:

- Improved methods to convey sea-level change concepts to the public, and particularly to local and state governments
- Training efforts clarifying how adaptation strategies, model and tool applications can be applied to the decision making process
- Ways to stay informed and current on the best scientific information available, as the science of sea-level change advances and is refined

Communities are also looking for feedback on plans that are developed at the local level, and for policy changes which will support identifying and enforcing measures to mitigate the identified vulnerabilities.

### **Improving Science Answers**

Coastal decision-makers are also cognizant of the science on which tools and services are built. In addition to communicating risk and uncertainty, coastal decision-makers also need to have the uncertainty lowered, in order to better understand their risks. Research priorities include:

- General support for more research led by the federal sector
- Interdisciplinary climate impact research to include mapping, modeling, and risk analysis
- Research to improve the accuracy and specificity of forecasts
- Information on past, current and future habitat responses to climate change including ecological tipping points.
- Including ecological changes and impacts in inundation models

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- **Section 6: Next Steps for Translating Needs Into Actions**

This sea-level change needs assessment literature review has provided NOAA with a wealth of information regarding the science, tools, and services requested by coastal decision-makers to address the management challenges associated with sea-level change. Coastal decision-makers make risk-base, uncertain decisions everyday with the best available science they can find. They generally know what their needs are, ranging from data and models to predict sea-level change and better understand impacts to coastal communities and ecosystems, to tools that inform the development of adaptation strategies and public outreach and education materials. This assessment illustrated that climate information is needed to guide decisions made across a variety of sectors that are considered in coastal management, including: transportation, energy, economic development, and natural resources. In addition, general themes regarding the relevancy of and access to science and services emerged, such as: local-scale information, publically accessible data and models, inter-disciplinary and integrated tools and strategies, and translation of information that includes direct and personal contact.

In accordance with its mission “to improve understanding and prediction of changes in climate and promote a climate-resilient society”, NOAA is already working to develop and provide these types of climate products for coastal decision-makers. Making the best available science easier to find is a vital service, as is effectively communicating this data and information to those who have already asked for it. NOAA will be better consolidating and making available the science that is available already. However, successful development and delivery of the breadth of climate information and products articulated in this report depends on NOAA’s collaboration with its public, private, and academic partners. Providing relevant and accessible climate science, service, and tools to support decisions for a variety of sectors needs to happen through partnerships across:

- government in the development of standard protocols and integration of social, economic and behavioral information;
- the private sector through publically accessible data via widely available sources such as Google Earth,;
- academia regarding model standards and scaling; and,
- non-governmental and professional organizations to help translate information.

Prioritizing how we address these needs will also occur in a variety of collaborative ways, including at the intra- and inter- agency levels, through partnerships with the private sector and academia, and through relationships with non-governmental and professional organizations. For example, at the interagency level, both the US Global Change Research Program and the National Ocean Council are working on strategic plans that articulate current climate science and service gaps, and identify how the Federal government can work to address them in the short to mid-term. Bi- and tri-lateral interagency agreements are also in place to enhance cooperation in meeting

the needs of a wide variety of users. Within NOAA, addressing the priority needs identified through this and other needs assessments will be approached through the Annual Operating Plans, beginning in Fiscal Year 2012. NOAA is also collaborating with the private sector and academia through the Climate Working Group, a sanctioned body of NOAA's Science Advisory Board. Linkages with coastal management professionals and organizations are also made through conferences and workshops, where informal needs assessments occur and collaborations are developed to leverage resources in response.

Needs assessments such as this are critical to guiding the development and delivery of NOAA's climate services. Through continued communication and collaboration with both its customers and partners, NOAA will be able to better understand the nation's vulnerability to climate variability and change, to address science and service needs and help inform climate adaptation decision-making, and to help build a more resilient society.

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## **Coastal Sea-Level Change Societal Challenge Needs Assessment Report**

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**Coastal Sea-Level Change Societal Challenge Needs Assessment Report**

**Appendix II –  
Sea-Level Change Needs Assessment Core Working Group Team Members**

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Kimberly M. Penn, Office of Ocean and Coastal Resource Management  
Diane M. Stanitski, Ph.D., Climate Program Office

DRAFT

MEMORANDUM TO: NOAA Cooperative Institutes  
NOAA Sea Grant Programs

FROM: Christopher D. Miller, OAR Representative to the  
NOAA Environmental Data Management Committee

DATE: August 1, 2011

SUBJECT: Request for NOAA Data Sharing Policy Comments

NOAA has recently drafted a Data Sharing Policy for data collected under NOAA-funded grants, and the agency is interested in receiving your comments. NOAA intends to implement the policy during Fiscal Year 2012 and update the policy based upon lessons learned in Fiscal Year 2013. A summary of comments received will be shared with OAR leadership as well as NOAA's Observing System Council and NOAA's CIO Council prior to Fiscal Year 2012 and will be used as we plan Fiscal Year 2012 implementation activities. Please provide comments to *Christopher.D.Miller@noaa.gov* no later than August 29, 2011 in order to allow time for us to summarize and present them to the various Councils prior to the new fiscal year. The policy is attached and background information is below.

The sharing of research data is widely recognized as a good practice. The greater the availability of the data, the more quickly and effectively user communities can develop innovative practical applications for public benefit. In many cases these applications will be in areas not originally anticipated by the principal investigator. In addition, not making data available that supports scientific findings may provide reason to doubt the validity of the findings and limit their usefulness. More information about data sharing concerns are in a 2007 GAO Report, <http://www.gao.gov/new.items/d071172.pdf>, "Climate Change Research: Agencies Have Data-Sharing Policies but Could Do More to Enhance the Availability of Data from Federally Funded Research." The GAO report specifically recommends NOAA consider evaluating data sharing plans as part of the grant review process.

There is currently an interagency effort including NOAA, NSF, and NASA to have a consistent data sharing policy for grantees, but there is not yet an estimated completion date. NOAA leadership recommended we implement our own data sharing policy until the interagency one is available. Lessons learned will be communicated to the interagency group.

Sharing research data is not necessarily the same as archiving research data, but both are important aspects of the scientific enterprise. NOAA has a policy to determine what research data are most appropriate to archive available at [https://www.ngdc.noaa.gov/wiki/images/0/0b/NOAA\\_Procedure\\_document\\_final.pdf](https://www.ngdc.noaa.gov/wiki/images/0/0b/NOAA_Procedure_document_final.pdf).

ATTACHMENT

NOAA Environmental Data Management Committee (EDMC) Procedural Directive  
NOAA Data Sharing Policy for Grants and Cooperative Agreements  
Date of Implementation: XX/XX/XXXX

*Summary*

All NOAA Grantees must share data in a timely fashion produced under NOAA grants and cooperative agreements, except where limited by law, regulation, policy or security requirements. Grantees must formally address this requirement by preparing a Data Sharing Plan as part of their grant project narrative.

*Definitions*

Environmental data are recorded and derived observations and measurements of the physical, chemical, biological, geological, and geophysical properties and conditions of the oceans, atmosphere, space environment, sun, and solid earth, as well as correlative data, such as socio-economic data, related documentation, and metadata. Media, including voice recordings and photographs, may be included. Environmental Data in the context of the Grants Data Sharing Policy at NOAA also have one or more of the following attributes: potential broad utility, significant NOAA funds were spent creating/collecting the data, are a reference data set, or are associated with community buy-in.

Sharing data refers to making data visible, accessible, and independently understandable to users in a timely manner at minimal cost, except where limited by law, regulation, policy or by security requirements. NOAA facilities that archive data and make the data openly available should be considered for the disposition of the data.

*Implementation Process*

- ❖ In the first year of implementation of this directive, program managers will have the option to require a Data Sharing Plan for new competitions, grants and cooperative agreements. All competitions, grants and cooperative agreements will be required to follow this procedural directive in the second year of implementation. Program managers should familiarize themselves with the definition of Environmental Data in the context of the Grants Data Sharing Policy at NOAA (above) to determine if their grantees are likely to produce Environmental Data. Lessons learned will be reported by program managers to the Environmental Data Management Committee and incorporated into this procedural directive as needed.
- ❖ The default language in competition announcements will indicate Environmental Data must be shared starting no later than 90 days after the end date of the project and that a 2-page Data Sharing Plan is required to be part of the project narrative.
  - The timeliness for sharing data (90 days after the end date of the project) allows program managers to determine if data were shared at the time they are approving the final report and take enforcement actions if necessary. Meeting this 90-day target will place NOAA in a leadership role with regard to expanding access to data collected using federal funds. However, program managers should consider that in many cases the data available at this time will be pre-publication data and not of archival quality. The cost to make data

available prior to final analyses by the Principal Investigator (and the risk to the Principal Investigator not being the first to publish scientific results based on their own data) should be weighed against the potential benefit of the provisional data to the wider community. Should the program manager choose not to support the default requirement “90 days after the end date of the project”, the program manager can indicate the actual timeliness desired in the competition announcement.

- Similarly, if a 2-page Data Sharing Plan would not be adequate, the program manager can indicate actual information required (e.g., a complete Data Management Plan) in the competition announcement.

### *Implementation Language*

The following language will be incorporated for competition announcements:

Environmental data and information collected and/or created under NOAA grants/cooperative agreements must be made visible, accessible, and independently understandable to general users in a timely manner free of charge or at minimal cost that is no more than the cost of distribution, except where limited by law, regulation, policy or by security requirements.

1. Unless otherwise noted in the federal funding announcement, data should be made available no later than 90 days after the end date of the project.
2. Unless otherwise noted in the federal funding announcement, a Data Sharing Plan of no more than two pages shall be required as part of the Project Narrative. A typical plan may include descriptions of the types of environmental data created during the course of the project; the standards to be used for data format and content; policies addressing data stewardship and preservation; previous data sharing experience; and procedures for providing access, sharing, and security. The Data Sharing Plan will be reviewed as part of the NOAA Standard Evaluation Criterion “Importance and/or relevance and applicability of proposed project to the mission goals.”

There will be a flier/PDF with Frequently Asked Questions about the grants data sharing policy distributed widely to the grants community via NOAA Grants Management Advisory Council members. The Environmental Data Management Committee will circulate the flier/PDF to NOAA program managers and maintain a website with guidance and answers to questions raised by NOAA and non-NOAA persons. At a minimum, the flier/PDF/website with Frequently Asked Questions will address what is considered “independently understandable”, “a reference dataset”, “data associated with community buy-in” and more information about the meaning of the required disclaimer “These environmental data have not been formally disseminated by NOAA, and do not represent and should not be construed to represent any agency determination, view, or policy.”

The following language will be incorporated in new competitive awards:

Environmental data and information collected and/or created under this grant/cooperative agreement will be made visible, accessible and independently understandable to general

users in a timely manner free of charge or at minimal cost that is no more than the cost of distribution, except where limited by law, regulation, policy or by security requirements.

1. Unless otherwise noted in the federal funding announcement, data should be made available no later than 90 days after the end date of the project.
2. Environmental data produced under this award and made available to the public must include the following statement: These environmental data have not been formally disseminated by NOAA, and do not represent and should not be construed to represent any agency determination, view, or policy.

The following language (or modified to reflect timeline/plan needed by the program) will be incorporated in new non-competitive awards:

Environmental data and information collected and/or created under this grant/cooperative agreement will be made visible, accessible and independently understandable to general users in a timely manner free of charge or at minimal cost that is no more than the cost of distribution, except where limited by law, regulation, policy or by security requirements.

1. Data should be made available no later than 90 days after the end date of the project.
2. A Data Sharing Plan of no more than two pages must be submitted for review and acceptance by the NOAA Federal Program Officer and/or NOAA Grants Officer prior to or as part of the first progress report for this grant.
3. Environmental data produced under this award and made available to the public must include the following statement: These environmental data have not been formally disseminated by NOAA, and do not represent and should not be construed to represent any agency determination, view, or policy.

#### *Directive Review and Metrics*

This procedural directive shall be reviewed by the NOAA/EDMC annually and lessons learned will be incorporated as needed. Success occurs if a high percentage of data produced under NOAA Grants/Cooperative Agreements is made visible, accessible and independently understandable to users in a timely manner at minimal cost. Indicators of success will be:

- A low number of enforcement actions taken by NOAA due to lack of data sharing by the grantees
- Spot checks by NOAA personnel requesting data indicate grantees are following their Data Sharing Plans and the data are visible, accessible and independently understandable in a timely manner at minimal cost

- NOAA Federal Program Officers report benefits of data sharing
- NOAA Archive Centers report benefits of data sharing
- NOAA grantees report benefits of data sharing
- Users of data report benefits of data sharing
- Other agencies use NOAA policy as a model for data sharing

## [Attention NOAA Grantees: New policy for sharing environmental data collected/created using NOAA funds](#)

### **Frequently Asked Questions**

**What is meant by "environmental data"?** Environmental data are recorded and derived observations and measurements of the physical, chemical, biological, geological, and geophysical properties and conditions of the oceans, atmosphere, space environment, sun, and solid earth, as well as correlative data, such as socio-economic data, related documentation, and metadata. Media, including voice recordings and photographs, may be included. Environmental Data in the context of the Grants Data Sharing Policy at NOAA also has one or more of the following attributes: potential broad utility, significant NOAA funds were spent creating/collecting the data, are a reference data set, or are associated with community buy-in. Refer to the solicitation and/or contact the funding program if you are unsure if the data you are collecting/creating meets the criteria. Examples of data that meet the criteria are:

- data for location/measurement/time that has large multidisciplinary community interest (potential broad utility),
- data collected at a cost to NOAA exceeding \$500K (significant NOAA funds spent to collect the data),
- data intended for use evaluating other data sets (reference data set), or
- data that others in the scientific discipline must concur are accurate prior to the data serving its primary purpose (data associated with community buy-in).

**What is meant by "sharing"?** Sharing data refers to making data visible, accessible, and independently understandable to users in a timely manner at minimal cost, except where limited by law, regulation, policy or by security requirements. NOAA facilities that archive data and make the data openly available should be considered for the disposition of the data.

- **What is considered "timely"?** This will depend on the program awarding the grant or cooperative agreement, and the nature of the research project conducted. Time requirements for data sharing will generally be spelled out in the Federal Funding Opportunity (FFO) announcement

In general, data that have potential usefulness to others are expected to be made available as soon as possible consistent with logistical considerations. Data from small studies can be analyzed and ready for publication and sharing relatively quickly. If data from large studies are collected over several discrete time periods or waves, data should be released in waves as they become available or main findings from waves of the data are published.

NOAA recognizes that the investigators who collected the data have a legitimate interest in benefiting from their investment of time and effort. NOAA continues to expect that the initial investigators may benefit from being the first user of the data, but not from prolonged or indefinite exclusive use.

In any case, unless otherwise indicated in the FFO, data must be shared no later than 90 days after the project end date. Documentation and metadata should clearly indicate the status of the dataset (initial raw data, draft data with only rudimentary quality controls, partial dataset, final data, etc).

- ***What is meant by “independently understandable”?*** The data must be accompanied with documentation, metadata and, if needed, tools to read the data that allow a user to interpret the data properly. If there are concerns with understandability, they can be reported to NOAA, who will do an independent check.
- ***Who will determine if my data are visible, accessible and independently understandable?*** The person generating the data will have first responsibility for determining this. Common data quality standards in your scientific discipline may help you decide if the data are understandable. Ultimately, others who use your data will know whether they are visible, accessible and understandable to them. If there are concerns with data access or understandability, they can be reported to NOAA, who will do an independent check.
- ***What are examples of law, regulation, policies or security requirements that may limit my ability to share data?*** Policies applicable to protection of personally identifiable information, critical infrastructure information or proprietary trade information as well as regulations related to export control may impact your ability to share data, among other items.

***Why share data?*** The greater the availability of the data, the more quickly and effectively user communities can develop innovative practical applications for public benefit. In many cases these applications will be in areas not originally anticipated by the principal investigator. In addition, NOT making data available that supports scientific findings may provide reason to doubt the validity of the findings and limit their usefulness. More information about data sharing concerns are in a 2007 GAO Report, <http://www.gao.gov/new.items/d071172.pdf>, “Climate Change Research: Agencies Have Data-Sharing Policies but Could Do More to Enhance the Availability of Data from Federally Funded Research.” The GAO report specifically recommends NOAA consider evaluating data sharing plans as part of the grant review process.

Data sharing is widely accepted as a good practice. National scientific organizations have made a commitment to the sharing and archiving of data through their ethical codes (e.g., the American Sociological Association) or publication policies (e.g., the American Psychological Association). More than 15 years ago, the National Academy of Sciences described the benefits of sharing data. (See <http://books.nap.edu/catalog/2033.html>) For many years, the National Science Foundation (NSF) Economics Program has required data underlying an article arising from an NSF grant to be placed in a public archive. Similar expectations exist at the National Institute of Health, and the National Institute of Justice. Moreover, many scientific journals require that authors make available the data included in their publications.

***How must data be shared?*** This depends on the nature of the project and the data, and will be proposed by the investigator himself. Grant and cooperative agreement proposals will need to include a Data Sharing Plan as part of the Project Narrative. A typical plan may include descriptions of the types of environmental data created during the course of the project; the standards to be used for data format and content; policies addressing data stewardship and preservation; and timelines and procedures for providing access, sharing, and security. Data sharing can be accomplished through:

**Data Archive**—place where data are acquired, manipulated, documented, and distributed. NOAA facilities that archive data and make the data openly available should be considered.

**Data Enclave**—controlled, secure environment in which eligible researchers can perform analyses using data resources.

**Publishing**—articles in scientific publications.

**Researcher's Efforts**—investigator responds directly to data requests (e.g., posting data on a Web site).

Environmental data and information made available to the public by the grantee must include the following statement: *These environmental data have not been formally disseminated by NOAA, and does not represent and should not be construed to represent any agency determination, view, or policy.* In order to remove this disclaimer NOAA must verify that the data meets NOAA Information Quality Act guidelines and approve the dissemination of the data to the public.

**Who benefits from data sharing?** Everyone benefits, including investigators, funding agencies, the scientific community, and, most importantly, the public. Data sharing provides more effective use of NOAA resources by avoiding unnecessary duplication of data collection. It also conserves research funds to support more investigators. The initial investigator benefits, because as the data are used and published more broadly, the initial investigator's reputation grows.

**Does data sharing pertain only to published data?** No. Data-sharing plans should encompass all data from funded research that can be shared without compromising individual subjects' rights and privacy, regardless of whether the data have been used in a publication. Furthermore, data sharing prior to the publication of major results is encouraged in many instances, for example, when data are collected to provide a resource for the scientific community (as in the case of many large surveys).

**Is data sharing the same as data archiving?** No, an archive is one way to share data but not the only way. For instance, data sharing could be a conference presentation followed by providing a personal or institutional website link upon request that has both data and metadata/contextual details describing the data included.

**Data from my studies are generated from a very small number of experimental samples, and I publish the final data. Am I expected to provide these data to other investigators as well?** Publishing these final data can constitute an acceptable mechanism for sharing data. If only some of the final data are published, however, you would need another mechanism to share the remaining data.

**What is the significance of "90 days after the project end date"?** Unless otherwise noted in the Federal Funding Opportunity, data must be shared no later than 90 days after the project end date. This strikes a balance between providing grantees with initial periods of exclusive use time to prepare and submit publications and providing NOAA Federal Program Officers the ability to verify compliance.

**Can I get an exemption?** If you determine it is impractical or not possible to share data according to NOAA policy you may include a request for an exemption of this requirement in your original proposal to collect/create data. If your proposal is funded verify the special award conditions indicate you are exempt from the data sharing requirement prior to accepting the award. If you determine post-award you require an exemption you may submit a request with an explanation as a post-award action request to the NOAA Federal Program Officer for consideration. You do not need to request an exemption when data sharing is limited by law, regulation, policy or security requirements. You do need to request an exemption if you are holding onto data until publication well after the project end date.

**What if I don't want to share my data?** Data sharing plans will become a part of every new research grant and cooperative agreement proposal to NOAA. By accepting a grant award, you are agreeing to perform the work proposed, including the data sharing. If you fail to share your data as you proposed, you could be subject to a number of sanctions, including denial of future grant awards, freezing of funds in your current award, or in extreme cases even being forced to repay the grant award to the government.

***Can I share data with colleagues under my own auspices?*** Yes. Your data-sharing plans should indicate the criteria for deciding who can receive your data and whether or not you will place any conditions on their use. Data should be made as widely and freely available as possible while safeguarding the confidentiality of the data and privacy of participants. You should not place limits on the questions or methods others might pursue nor should you require co-authorship as a condition for receiving the data.

***I'm a busy investigator. I don't have time to process requests for my data. What should I do?*** In addition to publishing small datasets, there are several alternatives to responding to each separate request to share data (e.g., putting data in an archive or restricted access facility, and setting up a web site for data access). Archives and data enclaves provide technical assistance for users with questions or problems and may spare busy investigators time.

***Can I get additional funding to share my data?*** Unless otherwise noted in the federal funding announcement, funding to address data sharing must be requested as part of the proposal to collect/create data. The data sharing plans and related funds requested should consider the anticipated benefit of the data, the likely number of interested users of the data and the priorities of the program as outlined in the solicitation.

***I am the PI of a large [Cooperative Institute/Sea Grant/similar] program funded by an omnibus grant which in turn manages a number of individual research projects. Must every individual project have its own data sharing plan, or can I develop a program-wide data sharing plan?*** As the omnibus grant recipient, you have a responsibility to see that data sharing plans are followed for all research projects under your program. This may be done with a single Program-wide data sharing plan, individual plans for individual projects, or something in between, as long as all the relevant data generated is covered under some data sharing plan.

***What web resources are available to help me do this and obtain more information?*** There is information available at the NOAA Environmental Data Management Committee website reachable from [www.nosc.noaa.gov](http://www.nosc.noaa.gov). In general considering data sharing requirements **prior** to finalizing the methods for collecting/creating/storing the data will save time and effort later on. Unless otherwise noted in the federal funding announcement there is no specific data sharing plan template required.

***The NOAA Program I apply to already requires an extensive Data Management Plan. Do I still need to do a Data Sharing Plan?*** Not necessarily, refer to the specific NOAA Program federal funding announcement to determine if a Data Sharing Plan is needed.

***My question wasn't on this list, is there a person I can call or email?*** Questions about specific sharing plans, grants, or RFPs should go to your Federal Program Officer or the contact listed in the specific Federal Funding Opportunity announcement of interest. More general questions can go to members of the NOAA Environmental Data Management Committee, who are listed at <https://www.nosc.noaa.gov/EDMC/membership.php>. Specifically the chair or deputy chair will take your general questions and work to answer them and add them to this list.



# NATIONAL SEA GRANT COLLEGE PROGRAM

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- [Leveraged Funding](#)
- [Impacts & Accomplishments](#)

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- [Metrics](#)
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  - [Economic Benefits](#)
  - [Tools, Technology, and Information Services](#)
  - [Hazard Resiliency Training](#)
- [Strategic Plan Objectives Reporting](#)
- [Estimated Level of Effort per Focus Area](#)

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Date	Headline	Additional Information
Oct 14	<a href="#">All Annual Report Elements (other than National Performance Measures and Metrics, see below) Due</a>	Submission of Other Annual Report Data is extended through Friday, October 14, 2011.
Aug 20	You can now edit Primary and Secondary Focus Areas on the "Focus Areas" tab.	Focus Areas can now be edited on submitted projects.
Feb 01	<a href="#">Annual Report Definitions</a>	

## Program Data Updates Feature Live Items Status

Table	Updated By	Update Time	Program
ProgramFocusAreas	NIMS.DBA	6/27/2011 1:39 PM	NSGCP
StrategicPlans	NIMS.DBA	6/27/2011 1:37 PM	NSGCP

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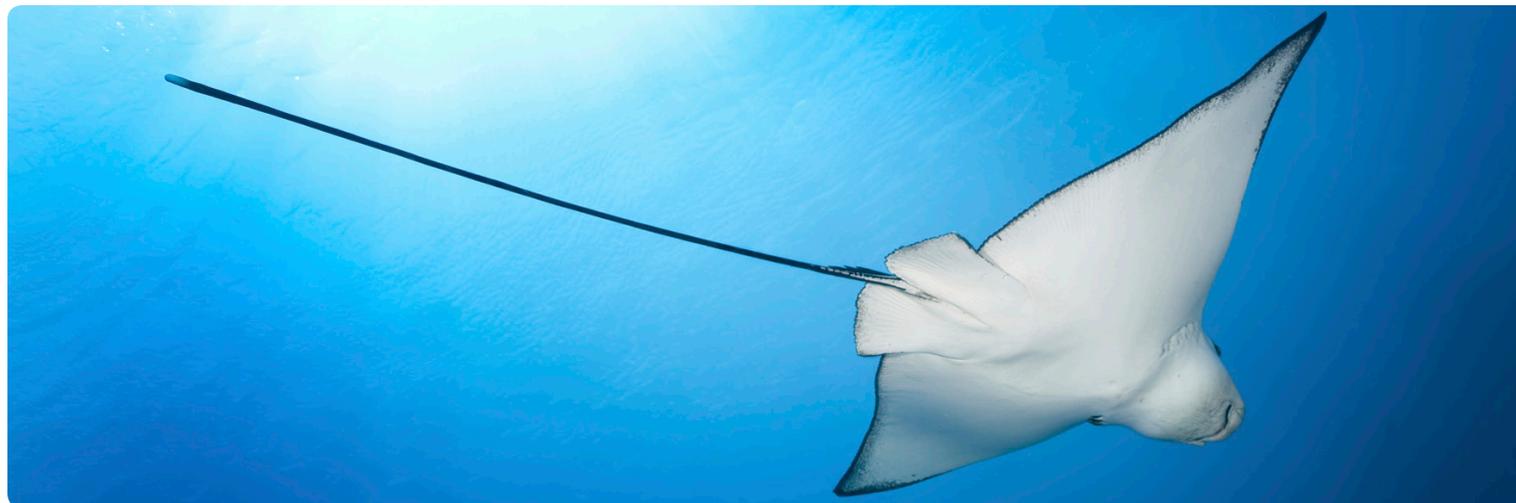
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### Manta Ray Ecology and Biology

First described by J. Walbaum in 1792, manta rays are the largest living rays in the ocean. Measured by their wingspan, individuals may reach over 7m in disc width. Currently there are two recognized species of manta rays. [MORE](#) ▾



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#### FOCUS AREAS

Healthy Coastal Ecosystems

Sustainable Coastal  
Development

Safe Sustainable  
Seafood Supply

Hazard Resilient  
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- ▶ Newsletters
- ▶ Publications
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## Manta Ray Ecology and Biology

First described by J. Walbaum in 1792, manta rays are the largest living rays in the ocean. Measured by their wingspan, individuals may reach over 7m in disc width. [MORE](#) ▼

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- ▶ Healthy Coastal Ecosystems
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## New Online Tools for Coastal Climate Learning and Training Now Available

As coastal communities confront intensified storm surges, flooding and a host of other impacts as a result of the Earth's changing climate, a multimedia self-guided educational module on coastal climate change was released today. This new resource can assist localities in developing strategies to cope with a variety of hazards – whether ongoing or intensified by climate change.

The material can be found at <http://www.meted.ucar.edu/climate/coastalclimate/index.htm> thanks to a collaboration among the Wisconsin Sea Grant College Program, University Corporation for Atmospheric Research's (UCAR) COMET® program, and the National Oceanic and Atmospheric Administration's Climate Program Office's Sectoral Applications Research Program (NOAA-SARP). Users will need to register prior to taking the course, but registration is free and easy.

TOOLKIT

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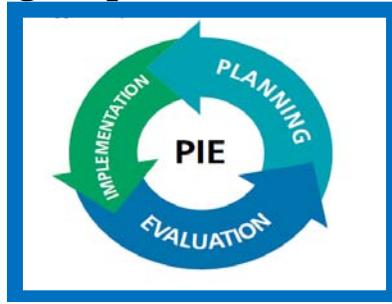
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# Sea Grant's Planning, Implementation and Evaluation System



## About Sea Grant

A partnership between universities and the federal government's National Oceanic and Atmospheric Administration (NOAA), the National Sea Grant College Program directs federal resources to pressing problems in local communities. For more than 40 years, the National Sea Grant College program has worked to create and maintain a healthy coastal environment and economy. The Sea Grant network includes more than 30 programs based at top universities in every coastal and Great Lakes state, Puerto Rico, and Guam. The programs of the Sea Grant network work together to help citizens understand, conserve, and better utilize America's coastal, ocean, and Great Lakes resources. By drawing on the experience of more than 3,000 scientists, engineers, public outreach experts, educators, and students from more than 300 institutions, Sea Grant is able to make an impact at local and state levels, and serve as a powerful national force for change.

Sea Grant invests in high-priority research, addressing issues such as population growth and development in coastal communities; preparation and response to hurricanes, coastal storms, and tsunamis; understanding our interactions with the marine environment; fish and shellfish farming; seafood safety; and, fisheries management. The results of this research are shared with the public through Sea Grant's integrated outreach program, which brings together the collective expertise of on-the-ground extension agents, educators, and communications specialists. The goal is to ensure that vital research results are shared with those who need it most and in ways that are timely, relevant, and meaningful.

The National Sea Grant College Program has developed a five-year strategic plan (2009-2013), in conjunction with an enhanced Planning, Implementation, and Evaluation system. Both the plan and the new evaluation model respond to recommendations made by the National Research Council (NRC) and align to NOAA's Next Generation Strategic Plan (NGSP) and to the new Strategy, Execution and Evaluation (SEE) process.

## Background on Sea Grant's Review Process

In 1994, the NRC reviewed the NOAA National Sea Grant College Program (NSGCP). In its *Review of the NOAA National Sea Grant College Program* report, the NRC recommended several actions, including systematic, periodic reviews of each Sea Grant program. In response to the NRC, NSGCP developed a program review and evaluation process to which the Sea Grant programs were reviewed by an external Program Assessment Team every four years since in 1998.

The National Sea Grant College Program Act Amendments of 2002 (P.L. 107-299) directed NOAA to contract with the NRC a second time to review the evaluation process and make recommendations to improve its effectiveness.

The resulting NRC report, *Evaluation of the Sea Grant Review Process* (2006), included a total of 24 recommendations in the following categories: strategic planning; evaluation; periodic assessment and performance criteria; program assessment teams and site visits; and, improving program cohesion, coordination, and oversight. A new, integrated model for strategic planning, implementation and evaluation was developed based on the recommendations of the NRC. The integrated planning and evaluation system outlined here is also consistent with needs articulated by Congress, the Office of Management and Budget

(OMB), and NOAA. It extends NOAA’s Strategy Execution and Evaluation (SEE) process to the program level and ensures that Sea Grant’s activities will support NOAA’s mission as well as meets local, state, and regional needs.

**An Integrated Planning, Implementation, and Evaluation (PIE) System**

The NSGCP places a premium on careful planning and rigorous evaluation at both the state program level and the national level to ensure that the program has both localized and broader impacts. Better integration of planning, implementation, and evaluation activities will maximize Sea Grant’s efficiency and effectiveness at both levels and make the best use of limited resources.

The PIE system begins with rigorous strategic planning at both the national and state levels that lasts two years. The plans are then implemented with coordinated and collaborative research, outreach and education activities at the state level for four years. Once the activities are completed, there is an evaluation of the success of those efforts in meeting the objectives set forth in the strategic/implementation plans. The complete cycle, including planning, implementation, and evaluation will take eight years to complete (Fig. 1).



Sections I, II, and III, below, describe each component of the integrated PIE system—Planning, Implementation and Evaluation. Section IV describes how Sea Grant’s PIE system aligns to NOAA’s SEE process, including the NOAA’s NGSP.

**I. Planning**

**National Strategic/Implementation Plans (every four years):** Every four years, the NSGCP develops a new national strategic plan. Sea Grant’s national plan is done in concert with the development of strategic plans for the state programs in order to ensure that the state strategic plans reflect national priorities. Likewise, stakeholder input collected for state Sea Grant planning efforts is included with other relevant local and regional plans to inform the national planning process. NOAA’s strategic plan provides the national framework for Sea Grant’s planning effort together with other national plans. Sea Grant’s national plan identifies a limited set of priorities that helps NOAA to achieve its strategic outcomes and serves as the foci for Sea Grant’s next four-year implementation cycle.

**Individual Sea Grant Program Plans (every four years):** The national plan serves as the basis for the states to complete the development of their four-year strategic plans. The state plans include metrics and performance measures that align with and support national measures and metrics for the national priority areas. Since each state has its own unique set of local and regional stakeholders, partners and priorities, the individual program plans will not necessarily address all of the national priority areas; and, the plans may include additional emphases as appropriate. State plans are developed with the federal program officer and reviewed and approved by the NSGO, in consultation with the Advisory Board. Sea Grant programs use their

plans to guide and inform requests for proposals. In addition, these plans are used as the basis for subsequent program evaluation. With the understanding that these plans are living documents, programs may make changes to their plans, subject to approval by the federal program officer, so the changes are documented for eventual evaluation purposes.

## II. Implementation

Sea Grant programs consider the local, regional, and national priorities identified during the planning process as they implement their research, outreach and education activities. Each program retains the authority to implement its program as it sees fit in order to achieve optimal results.

The PIE system and subsequent changes to program implementation make it easier for programs to plan and act on a regional and national scale. For instance, project competitions, omnibus grant applications and awards will be synchronized to facilitate collaborative efforts among programs. There is a common format for annual reports so that accomplishments of individual projects and state programs can more easily be synthesized into national impacts.

## III. Evaluation

Sea Grant's program evaluation process shows how its research, outreach and education capabilities have local, regional and national impacts. Program evaluation also provides the opportunity to discover means by which the state programs, and in turn the National Program, can improve. The performance of state programs is evaluated according to the priorities set forth in the national plan and the individual state plans, and programs are held accountable for meeting the metrics and performance measures established in those plans. Evaluation is a continual process, both internal and external, and involves all facets of the Sea Grant network. Programs are evaluated in four general areas: 1) on their approach to management; 2) on the scope and success of their engagement with stakeholders; 3) on their ability to collaborate with NOAA and other Sea Grant programs; and, 4) on the impact their program has on society from both an environmental and a socio-economic perspective. Evaluation is based on the metrics and performance measures established in the national plan and reflected in their state plans. The process is also intended to recognize that unplanned or rapid-response activities may also have significant impact.

The Office of Management and Budget, the Advisory Board and other entities have recommended that the Sea Grant programs be recertified on a reasonable and regular schedule. The PIE system serves as the recertification process for the programs.

**Annual Reports/Self-Evaluation:** Annual reports are used by programs to evaluate progress against their strategic plans, national performance measures, and metrics over a one-year period. These reports are also used by the National Sea Grant Office (NSGO) and programs to track and report progress. The individual programs' progress in meeting goals set forth in their plans and in producing accomplishments relative to those goals contributes to the Sea Grant network's progress toward meeting national goals set forth in the national strategic and implementation plan.

**Site Visits (every four years, beginning in FY2010):** Once every four years, a review team visits each Sea Grant program. The review teams are chaired by the NSGO program officer and co-chaired by a member of the Advisory Board with a Sea Grant Director as a review team member. Additional members of the teams may be drawn from the Advisory Board and/or outside experts as needed. The review team meets with the program management team, advisory committees, and university administration to review and discuss broad issues related to three of the four evaluation components: 1) program management and organization, 2) stakeholder engagement, and 3) collaborative network activities. The team is provided with a limited and focused set of briefing materials. The team prepares a site visit report with findings, suggestions and recommendations to improve the Sea Grant program's performance but is not be responsible for rating the program.

**Performance Review Panel (every four years, beginning in FY2012):** Every four years, following the completion of all Sea Grant program site visits, a Performance Review Panel (PRP) conducts a retrospective evaluation of the impact of the programs relative to their four-year strategic plans. The PRP evaluates the programs' overall impact on society from both an environmental and a socio-economic perspective. Annual reports, combined with a brief four-year summary document prepared by the programs, provides the basis for the review. The PRP is composed of approximately 25 members with some of the members drawn from the Advisory Board and the remainder drawn from senior-level academia, government, and industry.

**Annual National Sea Grant Office (NSGO) Review (beginning in FY2010):** The NSGO meets each year to discuss the progress of each state program relative to its plan, and to identify potential areas for improvement. Once every four years the NSGO review is expanded to include a performance evaluation and rating of all programs based upon the PRP and site visit reports. State programs have the opportunity to submit a memorandum to the NSGO responding to findings in both the site visit and PRP reports, which is also used as part of the NSGO review.

**Recertification:** The four-year reviews constitute a recertification process. A successful review results in recertification of a state program. If a program receives an unsuccessful rating, the program is placed on a probationary period for at least two years. During the fall review of the second probationary year, the NSGO assesses the program's progress in addressing the issues that led to the unsuccessful rating based on the appeal issued by the state Sea Grant program in question. If the program has made satisfactory progress, the program is allowed to continue on probation for the remaining two years. If the program then receives a successful rating during the next four-year review, the program is recertified. However, if progress is deemed to be unsatisfactory after two years, or if a program receives a second consecutive unsuccessful rating during the four-year review, the program is referred to the Advisory Board for possible decertification.

**National "State of Sea Grant Program" Review (once every two years, beginning in 2010):** Once every four years, the Advisory Board provides a review of the "State of the Sea Grant Program." This review assesses the progress of the Sea Grant College Program in addressing the priority areas highlighted in the national plan, analogous to the manner in which state programs are evaluated in addressing their respective plans. This review relies extensively on information collected from state program reports and reviews, and gives an analysis that helps inform the subsequent national strategic planning process. This national program review is central to the PIE system and provides an assessment of the overall performance of the entire Sea Grant College Program, including the National Sea Grant Office, in achieving its local, regional, and national objectives while supporting NOAA's mission.

## **IV. Aligning PIE to NOAA's Strategy, Execution, and Evaluation (SEE) Process**

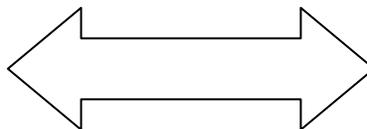
On an annual basis, Sea Grant programs report on their contribution and their anticipated contribution towards national Sea Grant performance measures, metrics and goals. This information aligns to NOAA's NGSP, Annual Guidance Memorandum (AGM), and to NOAA Government Performance Results Act (GPRA) measures. By aggregating information up to the national level, Sea Grant is able to use this information for NOAA, Department of Commerce (DOC) and OMB reporting/evaluation purposes. Within NOAA's current system, Sea Grant uses this information to:

- Develop Sea Grant's portion of the Annual Operating Plan (AOP);
- Contribute to NOAA's GPRA measures and NOAA's Balanced Scorecard; and
- Develop Sea Grant budget narratives

Sea Grant's alignment to NOAA's NGSP and to the AGM can be found in Appendix A.

## Appendix A: Sea Grant’s Strategic Plan alignment with NOAA’s NGSP and AGM (2011-17)

NOAA NGSP Goal/Enterprise	NOAA NGSP Objective	NOAA AGM Priorities	Sea Grant Focus Areas/Cross-cutting Goals
S&T Enterprise; Engagement Enterprise; Resilient Coastal Communities & Economies	Holistic Understanding; Resilient Coastal Communities	Strengthening Science; Promote resiliency and adaptation to climate change and ocean acidification	Hazard Resiliency in Coastal Communities
S&T Enterprise; Engagement Enterprise; Healthy Oceans	Holistic Understanding; Sustainable Fisheries and Safe Seafood	Strengthen science; Eliminate overfishing, rebuild fish stocks, conserve habitat and foster sustainable aquaculture; Implementing the National Ocean Policy	Safe and Sustainable Seafood Supply
S&T Enterprise; Engagement Enterprise; Healthy Oceans	Holistic Understanding; Resilient Coastal Communities	Strengthening Science; Promote ecosystem-based management	Healthy Coastal Ecosystems
S&T Enterprise; Engagement Enterprise Resilient Coastal Communities & Economies	Holistic Understanding; Resilient Coastal Communities	Strengthening Science Promote resiliency	Sustainable Coastal Development
S&T Enterprise	Holistic Understanding	Strengthening Science	Sound Scientific Research
Engagement Enterprise	An engaged & educated public; Integrated services meeting the evolving demands of regional stakeholders	All AGM Priorities	Informed, Scientifically Literate Public; Inclusive Decision Making
Organization & Administration	Diverse & evolving capabilities in NOAA's Workforce	Continuously improve internal business operations and services	Well-trained Workforce



This table shows how NOAA Sea Grant's Focus Areas/Cross-cutting Goals link to NOAA's NGSP and AGM priorities.  
 (Example: How Sea Grant's Hazard Resiliency Focus Area (measures/milestones) align within NOAA.)

NOAA NGSP Goal/Enterprise	NOAA NGSP Objective	NOAA AGM Priorities	Sea Grant Focus Areas/Cross-cutting Goals	GPRA/BSC/DOC Priority	Sea Grant Performance Measures/Milestones		NOAA Report
S&T Enterprise Engagement Enterprise Resilient Coastal Communities and Economies	Holistic Understanding  Resilient Coastal Communities	Strengthening Science  Promote resiliency and adaptation to climate change and ocean acidification	Hazard Resiliency in Coastal Communities	GPRA	Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	100	AOP; Budget Narrative
				GPRA	Number of coastal communities that have received resiliency training/technical assistance to prepare for and respond to/minimize coastal hazardous events	500	FOR GPRA reporting purposes
				GPRA	Number of regions provided with information/training in best practices to prepare for and respond to climate change	8	AOP
				DOC priority (6, 14, & 18)	Economic (market and non-market) benefits derived from Sea Grant activities	\$110M; 630 businesses created/retained; 3500 jobs created/retained	AOP; Budget Narrative
				BSC	Number of peer-reviewed publications	172	AOP; BSC
S&T Enterprise; Engagement Enterprise; Healthy Oceans	Holistic Understanding; Sustainable Fisheries and Safe Seafood	Strengthen science; Eliminate overfishing, rebuild fish stocks, conserve habitat and foster sustainable aquaculture; Implementing the National Ocean Policy	Safe and Sustainable Seafood Supply				
S&T Enterprise; Engagement Enterprise; Healthy Oceans	Holistic Understanding; Resilient Coastal	Strengthening Science; Promote ecosystem-based management	Healthy Coastal Ecosystems				
S&T Enterprise; Engagement Enterprise Resilient Coastal Communities and Economies	Holistic Understanding; Resilient Coastal Communities	Strengthening Science Promote resiliency	Sustainable Coastal Development				
S&T Enterprise	Holistic Understanding	Strengthening Science	Sound Scientific Research				
Engagement Enterprise	An engaged and educated public; Integrated services meeting the evolving demands of regional stakeholders	All AGM Priorities	Informed, Scientifically Literate Public; Inclusive Decision Making				
Organization & Administration	Diverse & evolving capabilities in NOAA's Workforce	Continuously improve internal business operations and services	Well-trained Workforce				



# THE STATE OF SEA GRANT 2010

Impacts, challenges and opportunities

Biennial Report to Congress by the National Sea Grant Advisory Board, November 2010



# CONTENTS

Executive Summary .....	2
Introduction .....	5
The Sea Grant Model .....	7
National Priorities and Impacts .....	11
Constraints on Realizing Sea Grant's Potential .....	23
Outlook and Recommendations .....	27
Appendix 1	
List of all Sea Grant Programs .....	30
Appendix 2	
Web links to reports in document .....	31
Appendix 3	
Web link to Sea Grant program impacts .....	33

## *The State of Sea Grant 2010: Impacts, Challenges and Opportunities*

Biennial Report to Congress by the National Sea Grant Advisory Board, November 2010

### National Sea Grant College Program Biennial Report Committee Members

Dr. John V. Byrne, Chairman, President Emeritus, Oregon State University  
 Dr. Michael K. Orbach, Professor, Nicholas School of the Environment, Duke University  
 Rear Admiral Richard D. West, U.S. Navy (Ret.)  
 Dr. John T. Woeste, Professor Emeritus, University of Florida  
 Dr. Jonathan R. Pennock, incoming President, Sea Grant Association (SGA), Director, New Hampshire Sea Grant

### Ex Officio Committee Member

Dr. James D. Murray, National Sea Grant Office

### National Sea Grant Advisory Board Members

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 Richard Vortman, Vice Chairman, Past President, National Steel and Shipbuilding Co. (Ret.)  
 Dr. John V. Byrne, President Emeritus, Oregon State University  
 The Honorable Jeremy Harris, Former Mayor, Honolulu, Hawaii  
 Dr. G. Ross Heath, Dean Emeritus and Professor of Oceanography, University of Washington  
 Dr. Michael K. Orbach, Professor, Nicholas School of the Environment, Duke University  
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 Rolland A. Schmitt, Former Director, National Marine Fisheries Service (Ret.)  
 The Honorable Harry Q. Simmons, Jr., Mayor, Caswell Beach, North Carolina  
 The Honorable Dr. William L. Stubblefield, Rear Admiral, NOAA (Ret.)  
 Rear Admiral Richard D. West, U.S. Navy (Ret.)

### Ex Officio Advisory Board Members

Dr. Leon M. Cammen, Director, National Sea Grant Office  
 Dr. E. Gordon E. Grau, President SGA, Director, Hawaii Sea Grant

### Biennial Report Staff

Amy Painter, National Sea Grant Office  
 Elizabeth Waters, planning consultant, Charlottesville, Virginia  
 Greg Aylsworth, graphic designer

### On the covers (from l-r)

Sleeping Bear Dunes National Lakeshore, Lake Michigan (Michigan Sea Grant);  
 A Taku Fisheries processing plant worker shows off a nice coho salmon just offloaded from a troller at the company's dock in downtown Juneau, Alaska. Alaska Sea Grant works with Alaska seafood processing plants to educate managers on how to write Hazard Analysis and Critical Control Point Plans and develop sanitation control procedures, both required by federal law (Kurt Byers, Alaska Sea Grant);  
 Puerto Rico Sea Grant actively participates in the promotion and implementation of a Caribbean tsunami warning system, similar to the one in the Pacific Region (Puerto Rico Sea Grant);  
 Earth Force Summit (Pennsylvania Sea Grant);  
 Pleasure boats abound on Peconic Bay during the Annual Maritime Festival in Greenport, New York, a working waterfront since the 18th century. This historic harbor, used by whalers, commercial fishers and even rum runners, is now a haven for artists, writers and musicians. The Peconic Estuary is vital to the ecological and economic health of Long Island's East End. (Barbara A. Branca, New York Sea Grant).





## National Sea Grant Review Panel

*A Federal Advisory Committee*



Dear Member of the Congress of the United States of America,

It is my pleasure to transmit to you on behalf of the National Sea Grant Advisory Board this report of the state of Sea Grant college programs throughout the United States. The 2008 Sea Grant Act (PL110-394) requires the Advisory Board, a federal advisory committee established by Congress, to prepare biennial reports to congress on the state of Sea Grant. This is the first report provided in response to this requirement.

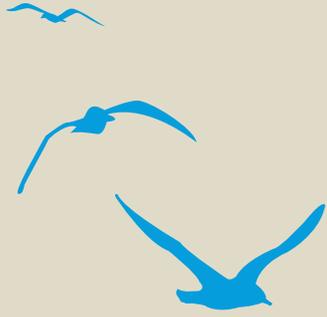
In preparing this report the Advisory Board reviewed all elements of the Sea Grant enterprise including the activities of the national office, the state programs and the Sea Grant Association. We assessed the effectiveness of the Sea Grant program, noted the constraints to realization of the Sea Grant potential to benefit the people of the United States and we recommend ways to maximize the future contributions of the Sea Grant program.

The Advisory Board finds the Sea Grant program to be an effective program that responds to local needs of the coastal and marine-related community while at the same time addressing critical national needs. Sea Grant's recently developed national strategic and implementation plans with which each state program is aligned, ensure that throughout the 32 state programs national goals as well as local needs will direct research, aggressively engage society and educate the public to enhance informed decision making concerning our marine and coastal resources.

In spite of its many accomplishments, constraints do exist that have impeded Sea Grant's achievement of its full potential. The recommendations that conclude this report provide guidance to Sea Grant, to the National Oceanic and Atmospheric Administration and the Congress of the United States which, if followed, will materially benefit the people of the United States.

The National Sea Grant Advisory Board looks forward to working with Congress, NOAA and the entire Sea Grant team to capture the academic capacity of the Sea Grant colleges and to maximize the benefits Sea Grant can provide to our country and its coastal communities.

John T. Woeste,  
Chair, National Sea Grant Advisory Board



## The National Sea Grant Advisory Board,

a federal advisory committee established by Congress under the Federal Advisory Committee Act, is pleased to report to the U.S. Congress on the status of the National Sea Grant College Program. This is the first response to the requirement under PL 110-394 for a biennial report on the status of Sea Grant. Included in the report are the Advisory Board's assessment of Sea Grant impacts, the program's effectiveness in responding to changes in national priorities, the constraints that prevent Sea Grant from living up to its originally envisioned promise and the outlook for the future. The report concludes with recommendations for action that will enhance Sea Grant's ability to contribute to the fulfillment of national goals in the future, building on past national investments.

## The Sea Grant Model

Congress established Sea Grant in 1966 to bring practical scientific information from the nation's universities to coastal businesses, citizens and all levels of government in order to capture the economic and social benefits of the nation's oceans, coasts and Great Lakes in a sustainable way. In its first four decades, Sea Grant has worked with thousands of public and private partners across the country to create and preserve coastal jobs, balance economic development and resource protection, and create an informed coastal citizenry.

Today, Sea Grant is a network of 32 university-based state programs administered by the National Oceanographic and Atmospheric Administration (NOAA) through the National Sea Grant Office.

The Sea Grant model—integrated research, stakeholder engagement and education—offers many advantages in addressing contemporary

coastal challenges. The network supports and draws on the work of more than 3,000 scientists at over 300 colleges and universities to build a sound scientific foundation for the use and preservation of the nation's coastal and Great Lakes resources. Sea Grant has been a leader in public engagement activities in coastal communities for decades. Over 375 Sea Grant extension agents are working directly with stakeholders to prepare for climate change impacts, preserve and build the nation's fishing and aquaculture industries, and deal with such coastal crises as Hurricane Katrina and the Deepwater Horizon oil spill.

Sea Grant's impacts are impressive for the federal investment directed to the program. Federal dollars invested in Sea Grant require a 50% state match, and most state programs exceed that requirement. In 2010, federal Sea Grant investments of \$59.3 million federal, \$9.6 million pass thru, \$33.1 million match dollars and more in private support, magnifying the impact of taxpayers' investment.

## National Priorities and Impacts

Sea Grant's 2009-2013 strategic plan includes four national priority areas chosen to align with NOAA agency-wide priorities:

- healthy coastal ecosystems
- sustainable coastal development
- safe and sustainable seafood supply
- hazard resilience in coastal communities

Within these focus areas, Sea Grant programs are helping communities make decisions concerning coastal land use and offshore energy development. They are preventing seafood-related illnesses and saving consumers millions of dollars by training seafood handlers. Sea Grant is conducting research and outreach activities that are building the nation's aquaculture industries and are resulting in more effective fishing practices, saving jobs and building local economies. Sea Grant is helping communities prepare for climate change and working with other parts of NOAA to design regional approaches to coastal resource protection and use.

The 2009-2013 strategic plan is part of Sea Grant's new Planning, Implementation and Evaluation (PIE) system adopted in 2009. The new system puts renewed emphasis on national priorities and includes national and state performance measures that will track Sea Grant contributions toward advancing national priorities and achieving national goals.

## Constraints on Realizing Sea Grant's Potential

During its earliest years, NOAA was regarded as a science agency. Local capacity and service to the public were not highlighted, leaving Sea Grant's outreach and education functions somewhat disconnected to NOAA's central focus. As the outreach/engagement functions of NOAA increase, the Sea Grant program can play a significant role in helping to marry national programs with local and regional presence. Realizing Sea Grant's potential in this arena will require NOAA leadership at all levels to embrace the importance of engaging the public in carrying out its mission. Finding ways to integrate Sea Grant with other NOAA coastal programs so they function together as one is also a challenge. Clearer delineation of individual program roles and responsibilities within NOAA is needed to help Sea Grant—and other coastal programs—maximize their contributions.

Despite Sea Grant's many accomplishments and contributions to national goals, there have been perceptions among some leaders and decision-makers that Sea Grant is not a national program, but rather a collection of independent state programs. In the past two years, Sea Grant has taken a number of steps to strengthen its national focus: adoption of national priorities for the entire network, alignment of state plans with the national plan, and adoption of performance measures to demonstrate national impact. However, past perceptions, combined with Sea Grant's difficulty in aggregating and communicating its significant national contributions, may have contributed to level appropriations for Sea Grant over the past two decades. Level appropriations combined with inflation have resulted in a loss of buying power for Sea Grant. This erosion in buying power has impeded Sea Grant's capacity at both the national and state levels to respond fully to national coastal challenges and opportunities.

## Last year alone, SEA GRANT

- Was instrumental in creating or retaining over 3,500 jobs and 650 businesses
- Assisted 160 coastal communities to adopt or implement hazard resiliency practices
- Supported nearly 1,700 undergraduate and graduate students to develop a diverse, highly qualified workforce

## Outlook and Recommendations

The outlook for Sea Grant and other NOAA ocean and coastal programs is one of increased complexity and uncertainty. Population growth, climate change, increased pressure on coastal and marine environments and more conflicts related to the use of limited natural resources all point to unprecedented challenges. To respond effectively, Sea Grant must be a strong, well-integrated national program that concentrates its energies where it has the most to offer. The program needs to support research in high priority areas and serve as a leader in engagement activities. Sea Grant must bring its broad base of academic expertise to coastal crises whenever and wherever they occur.

If Sea Grant is to achieve its potential to help address pressing national needs, important actions need to be taken as soon as possible.

1. **The entire Sea Grant network must focus its efforts on advancing national priorities, while remaining sensitive to local needs.**
2. **The ability to track and report the cumulative measurable impacts of Sea Grant activities on achieving national goals should be a high priority for Sea Grant.**
3. **NOAA coastal programs, including Sea Grant, should be more fully integrated in order to maximize NOAA's contributions to national goals.**
4. **Sea Grant should capitalize on its nationally recognized leadership in stakeholder engagement within coastal and Great Lakes communities as federal-state-local communication and collaboration become more critical to addressing needs and responding to crises.**
5. **Sea Grant should continue to re-examine its priorities and methods of operation in order to respond to the nation's most urgent needs.**
6. **Significant additional resources should be provided to the National Sea Grant College Program in order to reverse the erosion of buying power and maintain a dynamic program with rapid response capability.**

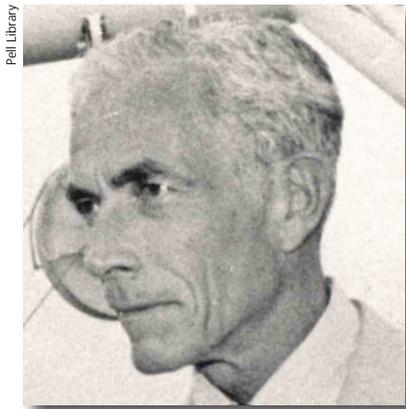


# INTRODUCTION

The National Sea Grant College Program was created in 1966 at a time of major national concern about the future of our coasts and oceans. Then, as now, population growth along the coasts, decline in wild fisheries, and tension between protection and use of ocean and coastal resources threatened the future health and vitality of ocean and coastal resources and communities.

Congress established Sea Grant to unite the academic power of the nation's universities with public and private sector partners in order to capture in a sustainable way the economic and social benefits of the oceans, coasts and

Great Lakes. Inspired by the contributions of the Land Grant college system, Senator Claiborne Pell of Rhode Island and others saw the need to create a similar program to harness the best science available to inform public and private decision-making "for the wise use and protection" of America's complex and dynamic coastal and ocean environments.



Pell Library

↑ Senator Claiborne Pell

Today, Sea Grant is a national network of 32 university-based state programs (Appendix 1), administered by the National Oceanic and Atmospheric Administration (NOAA) through the National Sea Grant Office (National Office). Sea Grant is advised by the National Sea Grant Advisory Board (Advisory Board), and supported by the Sea Grant Association (SGA),

an association of the academic institutions that serve as host institutions for Sea Grant within their respective states. The broad reach of the Sea Grant network provides NOAA and the nation with direct links to an extensive array of scientific expertise and to the people living and working on America's coastlines and beyond.

From the outset, the Sea Grant Program has taken a leadership role in identifying and addressing emerging coastal and ocean issues. Sea Grant has been instrumental in bringing national attention to issues such as coastal land use, aquaculture, wild fisheries technology, invasive species and coastal literacy. Often, the programs started by Sea Grant have been embraced and expanded by other agencies and organizations, frequently in partnership with Sea Grant.

The Sea Grant reauthorization process provides Congress with regular opportunities to guide, adjust and enhance the program. Over the years, Sea Grant has made numerous operational and programmatic changes in response to this guidance. The 2008 Sea Grant Act (PL110-394) requires the Advisory Board, a federal advisory committee established by Congress, to prepare biennial reports to Congress on the state of Sea Grant. This is the first report provided in response to this requirement. In preparing the report, the Advisory Board has reviewed the Sea Grant enterprise in order to assess the current status of the program and to suggest ways to maximize the contributions of the program in the future. The Board's findings and recommendations are included in this report.

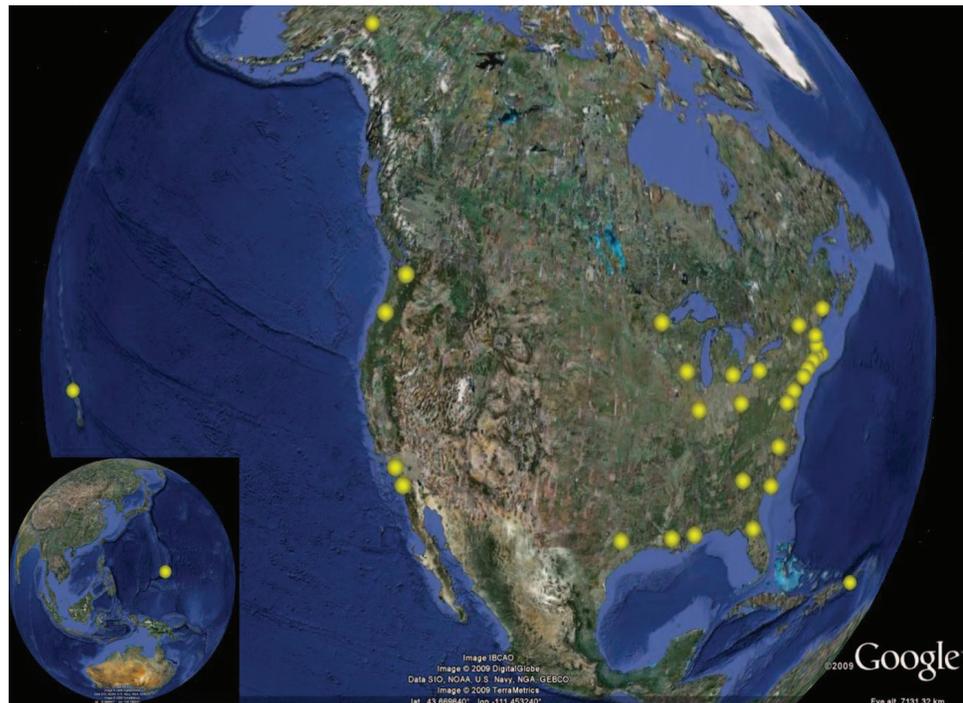
The report is organized into the following major sections:

- **The Sea Grant Model**
- **National Priorities and Impacts**
- **Constraints on Realizing Sea Grant's Potential**
- **Outlook and Recommendations**

It includes an assessment of recent Sea Grant impacts, the Program's effectiveness in responding to changes in national priorities, the challenges it faces in trying to fulfill its originally envisioned promise and an outlook for the future. The report concludes with recommendations for action designed to enhance Sea Grant's ability to contribute to the fulfillment of national goals in the future, building on past investments.

Web links to all reports cited in the document may be found in Appendix 2.

## SEA GRANT'S 32-PROGRAM NATIONAL NETWORK



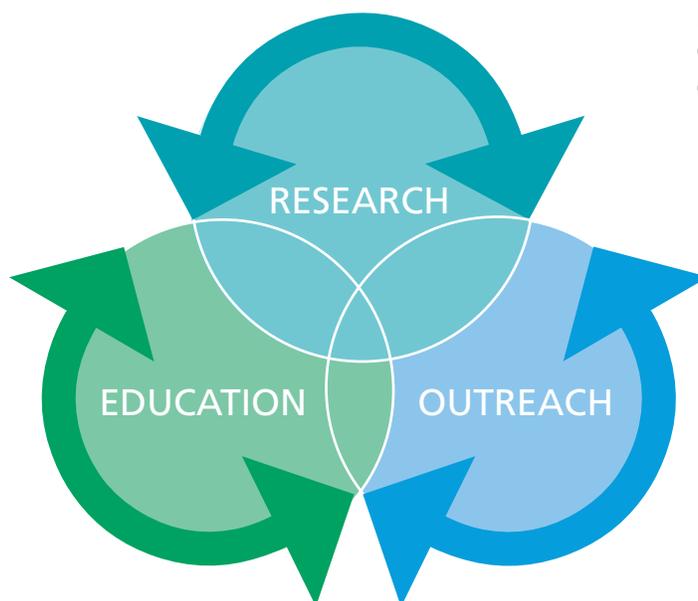
# THE SEA GRANT MODEL

*Sea Grant researchers, extension agents and educators provide a multi-dimensional way to address national priorities and respond rapidly to crises and opportunities that arise in coastal, ocean and Great Lakes environments.*

The Sea Grant model is designed to combine research, outreach and education in ways that allow for an integrated approach to solving problems and capturing opportunities. On-the-ground experts, located in every coastal and Great Lakes state, translate sound scientific information into tools, products and services that benefit coastal residents and their communities every day. Sea Grant experts address national priorities at the local level, while identifying citizens' needs in ways that help guide state and national research agendas. This two-way flow of services and information enables Sea Grant and NOAA to meet demonstrated needs, support businesses and help policy-makers make balanced, well-informed science-based decisions.

From its inception, the hallmarks of Sea Grant's work have been:

- **quality research** to answer critical questions and generate solutions that often include new technologies
- **local technical assistance** teams in communities around the country that share and explain new discoveries and empower stakeholders to address national, state and local issues as they emerge
- **education programs** that create informed citizens in coastal and Great Lakes communities and help prepare the next generation of citizens, workers and professionals involved with our nation's coastal resources, communities and economies



## Mobilizing a nationwide team of scientists

The location of state Sea Grant leadership in major universities gives the Program access to researchers working to identify the best ways to use and manage our coastal, ocean and Great

Lakes resources in a sustainable fashion. Today, Sea Grant draws on and supports the work of over 3,000 scientists and researchers from over 300 institutions. Sea Grant supports natural, biological and social science research in a wide array of disciplines. It helps illuminate scientific, technical and socio-economic issues related to the use and management of coastal, ocean and Great Lakes resources. Peer-reviewed Sea Grant research provides practical scientific information to support the work of Sea Grant and other agencies, organizations and businesses. When urgent new questions arise, Sea Grant can call on this network of scientists for information and science-based solutions.



↑ Oregon State University professor Chris Langdon holds juvenile Kumos oysters raised from eggs. With grants from Oregon Sea Grant and cooperation from Oregon shellfish growers, Langdon has developed a system that uses ultraviolet light to rid hatcheries of a highly pathogenic organism, *Vibrio tubiashii*.

## Providing local presence and expertise for every coastal locality

Sea Grant provides an on-the-ground workforce in coastal communities to help them address problems of local, regional and national significance. Collectively, the 32 state Sea Grant programs have over 375 extension agents engaging directly with citizens, businesses and local governments to address national and regional priorities and respond to state and local needs. These extension agents have experience in a broad range of scientific and technical areas. They have access to highly specialized scientists and they understand the particular cultures and constituencies they serve. Extension agents are skilled at sharing new knowledge and convening stakeholders at the local, state and regional levels to forge informed consensus on new policies and management strategies. This experienced team of experts mobilizes to respond to needs wherever they arise and transfers research needs back to their university communities.



## Educating workers, citizens and tomorrow's professionals

Sea Grant is a leader in K-12, undergraduate, graduate, professional, technical and public education in coastal and Great Lakes states. It works closely with its host universities, the NOAA Office of Education, the National Marine Educators Association, the Centers for Ocean Sciences Education Excellence (COSEE) and others to develop school programs, workforce training and professional education for the next generation of coastal leaders.

Sea Grant education and outreach specialists around the country are providing training in seafood safety regulations, use of new fishing gear and other topics that advance the safety and productivity of coastal-related commerce. Sea Grant pioneered the first U.S. program training volunteers to conduct sampling and analysis of water quality indicators, an approach used widely today by Sea Grant and countless other governmental and non-governmental organizations. Sea Grant funding supports graduate students in coastal-related biological, natural and social sciences. Sea Grant's Knauss Marine Policy Fellowship Program has brought over 800 graduate students interested in natural resource policy to Washington, D.C. to work with federal agencies and congressional offices as part of their professional training.

Sea Grant research, extension and education programs are supported by a cadre of nearly 90 communications specialists who provide information to many constituencies through a variety of media, including print, web, video, radio and television outlets.



↑ Students learn about aquatic plants on the R/V Clinton during a Great Lakes Education Program (GLEP) cruise on the Detroit River. The GLEP program is designed to stimulate interest in the Great Lakes and help students understand their role in protecting these vital freshwater resources.

## Focusing on critical national issues

In recent years, Sea Grant has stepped forward to assist with some of the nation's most critical coastal crises and challenges. In the earliest stages of the Hurricane Katrina crisis, Sea Grant programs issued public service announcements in multiple languages with basic public health information related to the adverse effects of contaminated water. Louisiana Sea Grant built a website to serve as a clearinghouse for hurricane recovery resources for the public, businesses and policymakers. In the ensuing months and years, the Sea Grant network has provided technical assistance throughout the region to support the recovery of coastal communities and economies.



↑ Hurricane Katrina

In response to the Deepwater Horizon oil spill, Florida, Louisiana, Texas and Mississippi-Alabama extension and legal specialists have been working with fishing communities to provide information on the spill and facilitate interaction with BP to help with the damage claim process. Mississippi-Alabama and Florida Sea Grant are providing hazmat clean-up training for both professionals and citizens in the Gulf region. Four South Atlantic state programs held summits to identify potential risks and precautions that should be taken in response to the oil spill. Sea Grant has worked with NOAA's Coastal Data Development Center to create a web-based clearinghouse for information on oil spill research and monitoring activities that can be used by interested stakeholders throughout the Gulf region and beyond.

Sea Grant is also applying the strength and diversity of its network to address the impacts of climate change in coastal communities. At the request of the governor, Maine Sea Grant collaborated with the University of Maine Climate Change Institute and others to produce a document that serves as the foundation for statewide climate preparation. North Carolina, Oregon, Washington, Wisconsin, Woods Hole and other Sea Grant programs are participating with government and other partners in statewide climate-change planning. As a result, our nation is becoming better prepared to deal with anticipated climate change impacts such as sea level rise, changes in fisheries ranges, and loss of habitat.



Delaware Sea Grant, University of Delaware

↑ Sea Grant programs are investigating renewable energy options to aid the transition to a clean energy economy. The University of Delaware and Gamesa Technology Corporation installed this utility-scale 2-megawatt wind turbine in Lewes.



Georgia Sea Grant (from expedition led by Dr. Samantha Eby)

↑ Throughout the oil spill disaster, Georgia Sea Grant worked with the state's Department of Natural Resources to develop a comprehensive monitoring and sampling protocol for Georgia's waters and coastal ecosystem.



Louisiana Sea Grant

← St. Tammany, LA Oil Spill Forum, June 1, 2010. Sea Grant has facilitated communication between local stakeholders and incident response personnel to identify and address immediate concerns and provided timely, science-based information to the public, including Vietnamese and Hispanic communities, and the tourism, fishing and recreational sectors.

Since the oil spill, Sea Grant has organized 47 meetings involving over **4,500** participants in Florida, Alabama, Mississippi, Louisiana and Texas to provide science-based information to communities and to facilitate communication between local stakeholders and incident response personnel.

# A PRESCRIPTION FOR CLEAN WATER:

SEA GRANT PROGRAMS TEAM UP TO KEEP DRUGS OUT OF DRINKING WATER

Whether flushed down toilets or disposed of in garbage cans, unwanted drugs are contaminating our drinking water and causing deformities in fish. A 2008 investigation launched by the Associated Press found pharmaceuticals in the drinking water of at least 41 million Americans and in the water supplies of 24 major metropolitan areas. Illinois-Indiana, Michigan, New York, Ohio, Minnesota and Pennsylvania Sea Grant are working to help citizens address dangerous drug disposal habits by establishing safe, legal collection programs in communities. Sea Grant educators and outreach experts have created programs and activities for 4-H youth, scouts and after-school youth clubs. The idea is that these youth will serve as important agents for change to help protect and improve the quality of our waters. Sea Grant and the U.S. EPA Great Lakes Office developed a resource kit for those interested in starting a “take-back” program or creating other disposal programs. The kit includes background information on unwanted medicines, what’s known about their impact on the environment, and numerous resources for addressing the problem, including extensive collection program case studies, and is available online at [www.iisgcp.org/unwantedmeds](http://www.iisgcp.org/unwantedmeds).



## Fostering partnerships

Working with a wide range of coastal interests and users—fishermen, ports, tourism industries, seafood processors, energy producers and others—makes public-private partnerships central to Sea Grant’s activities. In an era of growing complexity in the interactions between human activities and the natural environment along the coasts, Sea Grant, with a long history as a trusted partner and source of objective information, offers NOAA the crucial capacity to solve problems and resolve conflicts at local, state and regional levels.



▲ Congressman Frank Pallone (6th District) (center) who worked for the New Jersey Sea Grant Extension Program, presented this year’s Stew Tweed Fisheries and Aquaculture Scholarships at Ocean Fun Days, one of Sea Grant’s showcase public outreach events sponsored by private sector partner New Jersey Natural Gas.

Within NOAA, Sea Grant partners regularly with the National Marine Fisheries Service, the National Weather Service, the National Ocean Service, including



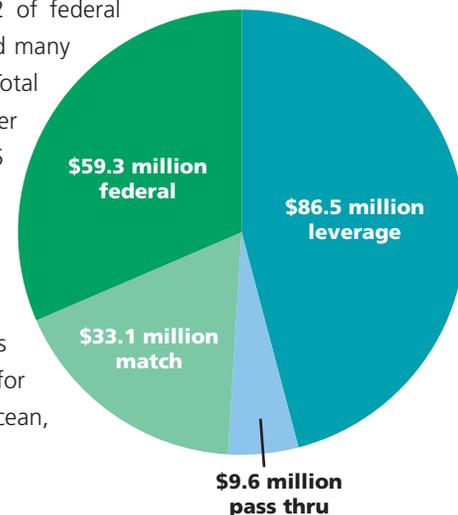
▲ Dave Goethal, left, a fisherman in Hampton, N.H., and deck hand Paul Kuncho hauling back one of a new topless shrimp trawl designed to reduce finfish bycatch in the pink shrimp fishery in the Gulf of Maine. New Hampshire Sea Grant collaborated with Goethal on the design, and secured funds from NOAA’s National Marine Fisheries Service to make several topless trawls for demonstration purposes. The trawl has reduced Gulf of Maine herring by-catch by 90% without loss of shrimp.

the Coastal Services Center and the National Estuarine Research Reserve System, and the Office of Oceanic and Atmospheric Research, including the Climate Program Office, to advance NOAA’s mission. State Sea Grant programs cooperate regionally and throughout the network on sustainable fishing gear development, preserving waterfront access for citizens and water-dependent businesses, and protecting water quality and habitat.

## Leveraging federal dollars for greater impact

Sea Grant is required to match every \$2 of federal funding with \$1 of non-federal funds, and many state programs far exceed this match. Total investments in the Sea Grant program over the past two years have been \$196.5 million. Of these \$133.1 million are federal dollars and \$63.4 million are state match. In 2010, Sea Grant leveraged \$86.5 million from other partners and sources. By leveraging federal funds, Sea Grant expands its reach and effectiveness in planning for and managing the future of America’s ocean, coastal and Great Lakes resources.

▼ Sea Grant federal, pass thru, match and leverage dollars for 2010





# NATIONAL PRIORITIES AND IMPACTS

*Sea Grant is increasingly focused on advancing national priorities while also attending to state and regional planning and management issues.*

Since its creation in 1966, Sea Grant has continued to evolve in response to new guidance from Congress and changing priorities within NOAA and in coastal communities and industries.



In its 2002 Sea Grant reauthorization (PL107-299), the United States

Congress directed NOAA to contract with the National Academy of Sciences/National Research Council (NRC) to review Sea Grant's process of program evaluation and make recommendations to improve its effectiveness. The resulting NRC report, *Evaluation of the Sea Grant Review Process* (2006), included recommendations for revising and strengthening the process of evaluating state Sea Grant programs.

The NRC's recommendations were followed with new Congressional authorizing legislation in 2008 which supported the NRC's recommendations. The reauthorization encouraged collaboration at the regional and national levels and highlighted Sea Grant's role in supporting coastal and ocean resource management. The legislation also changed the name of the National Sea Grant Review Panel to the National Sea Grant Advisory Board. It called for an elevated role for the Advisory Board, including providing the National Sea Grant Office with strategic advice and submitting biennial reports to Congress on the state of Sea Grant.

**Sea Grant has responded to this most recent Congressional input with a substantial realignment of the Sea Grant program that includes:**

- **2009-2013 national priorities**
- **a new planning, implementation and evaluation system**
- **an ongoing commitment to regional leadership**
- **new roles for the National Sea Grant Advisory Board**

All elements of the Sea Grant network—the National Office, the state programs, the Sea Grant Association and the Advisory Board—are working closely to produce the desired outcomes from this realignment.

## 2009-2013 Sea Grant National Priorities

*The NOAA National Sea Grant Strategic Plan 2009-2013: Meeting the Challenge* was adopted in 2009. It includes four national focus areas chosen to align with current NOAA agency-wide priorities: healthy coastal ecosystems, sustainable coastal development, safe and sustainable seafood supply and hazard resilience in coastal communities. The plan also embraces three cross-cutting goals—sound scientific information, an informed public, and open decision-making processes—that form an integral part of the work in which Sea Grant engages.

Specific goals, objectives and performance measures have been set for each of the four focus areas in the *Sea Grant Implementation Plan 2009-2013*. National teams have been established to guide implementation of the national, regional and state plans in an effective, coordinated manner. Significant contributions in all of the national focus areas are documented on an ongoing basis.

**IN 2009, 186 COASTAL  
COMMUNITIES RESTORED  
DEGRADED ECOSYSTEMS  
AS A RESULT OF  
SEA GRANT ACTIVITIES.**



Alaska Sea Grant - Kurt Byers

# HEALTHY COASTAL ECOSYSTEMS

## NATIONAL GOALS →

- Sound science to support ecosystem-based management
- Widespread use of ecosystem-based approaches to managing land, water and living resources in coastal areas
- Restored function and productivity of degraded ecosystems

Healthy coastal ecosystems are the foundation for life along the coast, but increasingly rapid coastal development, global overfishing, and other human activities are leading to water quality degradation, decline of fisheries, wetlands loss, proliferation of invasive species and a host of other challenges that need to be understood in order to restore and maintain these ecosystems.

Millions of Americans suffer from waterborne illnesses each year. Sea Grant has helped redefine approaches to contaminant monitoring, develop molecular fingerprinting methods that can distinguish between human and nonhuman sources of fecal matter, and reduce chemical pollutants in waterways by organizing pharmaceutical collection events. In 2009, California Sea Grant scientists identified methyl mercury, a highly toxic form of mercury, in the

groundwater at two sites. Findings indicated that the amount of mercury being introduced into coastal waters from these two sites may be as great as the total amount of mercury entering these coastal waters as a result of atmospheric deposition. Illinois/Indiana Sea Grant, MIT Sea Grant and other state programs have contributed significantly to advancing understanding about toxic pollutants in water and wetlands.

Sea Grant programs nationwide have mobilized to control and mitigate the negative impacts of invasive species through their research, outreach and education activities. In a two-year period, more than 3,000 fish producers learned about control of invasive species from Sea Grant workshops. Maryland Sea Grant developed a comprehensive invasive species rapid response plan template for use by states in the Mid-Atlantic region and beyond

for responding to newly introduced invasive species. Every coastal and Great Lakes state that has an aquatic nuisance species plan did so with input from their Sea Grant Program. Appendix 3 provides a link to additional impacts.

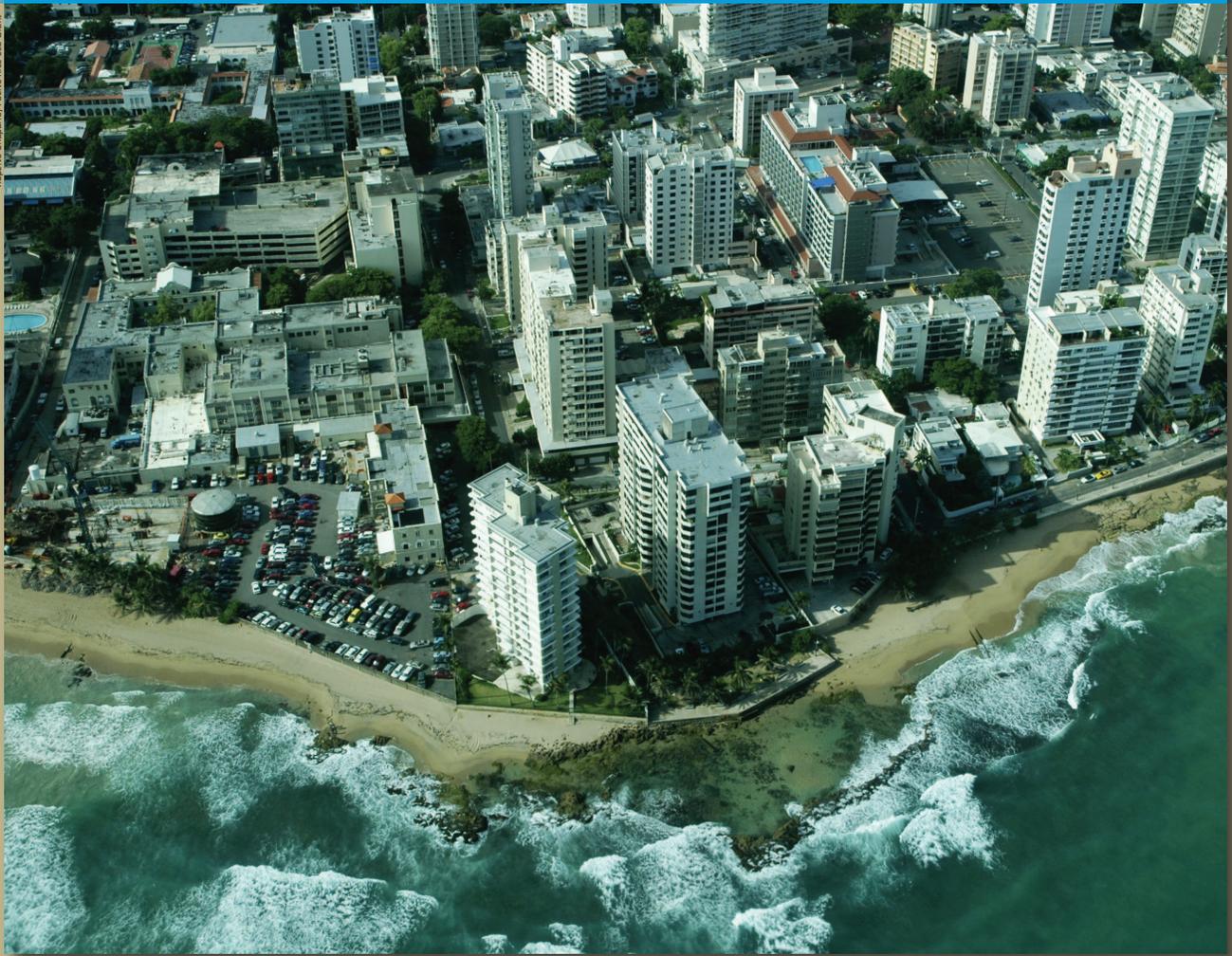
← A brightly colored blood star (*Henricia leviuscula*) on the rocky Alaska coastline.

→ Sea Grant supports the development of new policies, technologies and processes that promote restoration of ocean, coastal and Great Lakes ecosystems in ways that balance the needs of the natural systems with the needs of the humans who inhabit them.



Washington Sea Grant

IN 2009, 435 COASTAL COMMUNITIES ADOPTED OR IMPLEMENTED SUSTAINABLE (ECONOMIC AND ENVIRONMENTAL) DEVELOPMENT PRACTICES AND POLICIES (E.G., LAND-USE PLANNING, WORKING WATERFRONTS, ENERGY EFFICIENCY, CLIMATE CHANGE PLANNING, SMART GROWTH MEASURES, GREEN INFRASTRUCTURE) AS A RESULT OF SEA GRANT ACTIVITIES.



Ruperto Chaparro, Puerto Rico Sea Grant

# SUSTAINABLE COASTAL DEVELOPMENT

## NATIONAL GOALS →

- **Healthy coastal economies**
- **Coastal communities that make efficient use of land, energy and water resources**
- **Informed coastal citizenry to balance multiple uses and achieve environmental sustainability**

According to NOAA's *State of the Coast Report*, the U.S. coastal zone contributed \$7.9 trillion to the nation's GDP in 2007. Coastal and marine waters provide 69 million jobs. Economists estimate non-market economic value from the nation's ocean and coastal resources to be over \$100 billion a year. Coastal communities provide vital economic, social and recreational opportunities for millions of Americans. However, decades of population migration have transformed our coastal landscapes and intensified demand on finite coastal resources. In 2010, approximately 160 million people (52%) of the nation's population lived in the 673 U.S. coastal counties, an increase of 49.6 million people since 1970. That growth trend continues. The increase in population has resulted in new housing developments and recreation facilities, a new generation of energy development activities, port expansions and other new business activities. These changes are placing tremendous pressure on coastal lands, water supplies and traditional ways of life.



↑ Fishtown Harbor, Leelanau Peninsula, Michigan. Changing development patterns along the coast are threatening to displace traditional water-dependent industries and cut off water and beach access for coastal residents. Sea Grant provides information, tools and techniques to support working waterfronts.

← The San Juan coastline. Citizens and decision-makers have an urgent need for tools that will help them evaluate the implications of land-use changes, coastal development pressures, and increased resource use in approaching the policy and management decisions they face. Sea Grant's well-established role as a trusted broker makes it a key player in facilitating the development and implementation of new coastal policies, plans, management approaches and consensus-building strategies.

Sea Grant is engaging a diverse array of stakeholders to work on building vibrant coastal economies and communities that function within the carrying capacity of their ecosystems. USC Sea Grant is bringing science and policy research to the ports of Los Angeles and Long Beach, CA to advance sustainable management practices at this complex that handles close to 45% of all marine freight entering the U.S. Texas Sea Grant facilitated the testing of new fuel-efficient trawl gear. In Brownsville, Texas, more than 85% of the vessels have adopted the experimental gear, saving almost \$9 million in fuel costs in 2009 alone and an estimated 200 jobs. Virginia Sea Grant, Maine Sea Grant and others are leading an emerging national coalition on maintaining working waterfronts and coastal access in partnership with state coastal zone management programs, Boat US, the Urban Harbours Institute, the Coastal States Organization, and others, and work done by Delaware Sea Grant helped advance the development of a \$1.6 billion wind farm project that will generate renewable energy for the state. Appendix 3 provides a link to additional impacts.

**IN 2009, 27,748 STAKEHOLDERS MODIFIED THEIR PRACTICES USING KNOWLEDGE GAINED IN FISHERIES SUSTAINABILITY, SEAFOOD SAFETY AND THE HEALTH BENEFITS OF SEAFOOD, WHILE 366,687 FISHERS USED NEW TECHNIQUES AS A RESULT OF SEA GRANT ACTIVITIES.**



Ben Young Landis, North Carolina Sea Grant

# SAFE AND SUSTAINABLE SEAFOOD SUPPLY

## NATIONAL GOALS →

- Sustainable supply of safe seafood
- Healthy domestic seafood industry
- Informed consumers who understand sustainable harvesting, health benefits of seafood consumption and seafood safety

Fisheries provide over \$60 billion to the U. S. GDP annually (NOAA FY 2010 Budget Summary). At the same time, the U.S. has witnessed the decline of many of its major fisheries while seafood consumption is on the rise, resulting in a multi-billion dollar seafood trade deficit. Seafood safety is also a growing concern as international trade increases and fish diseases and contamination become larger problems.

Sea Grant is working closely with a wide range of federal, state and local partners to find ways to balance the protection of species with the protection of economies. Sea Grant programs in Rhode Island and New Hampshire supported research on new shrimp trawls and haddock nets that resulted in larger shrimp being caught, with 90% reduction in bycatch of herring—a fish that is important to both the economy and the marine food web. In Alaska, longline fishing fleet solutions developed by Washington Sea Grant reduced bycatch of endangered short-tailed albatrosses by nearly 100 percent, preventing the closure of a fishery worth \$300 million annually. Connecticut Sea Grant training programs have led to the reopening of 1,219 acres of shellfish grounds.

A number of Sea Grant programs are working on both wild fish restoration and aquaculture development. In South Carolina, field trials performed by the S.C. Sea Grant Consortium and its partners have determined that stocking red drum in estuaries contributes significantly to restoring the state's most popular coastal recreational fish population. In Florida, Sea Grant research and outreach are enhancing the production and profitability of the Florida hard clam industry, which produces more than 500 jobs, \$1.3 million in business taxes and \$25 million in income annually. Wisconsin Sea Grant research has opened the door to commercial yellow perch aquaculture, leading one private company benefiting from the research and technical assistance to invest \$50 million in the industry with plans to expand within the next five years to employ 100 people and harvest 8.5 million pounds annually, at a value of more than \$1 billion.

In addition to its efforts to enhance the supply of U. S. seafood, Sea Grant provides training activities that prevent seafood-related illnesses, thereby saving consumers millions of dollars. Sea Grant extension professionals across the country have been core partners in the National Seafood Hazard Analysis and Critical Control Point (HACCP) Alliance. This intergovernmental partnership with industry and academia has provided seafood safety training to about 90 percent of all nationally-based seafood processing firms and more than 26,000 people since 2001. The U.S. Department of Health and Human Services estimates that the HACCP program has prevented between 20,000 and 60,000 seafood-related illnesses a year, translating into savings of about \$155 million annually. The U.S. Department of Agriculture awarded the Seafood HACCP Alliance its "Group Award for Excellence." New York Sea Grant has taken a lead role nationally in providing on-line training in HACCP. Appendix 3 provides a link to additional impacts.



Louisiana Sea Grant

↑ Louisiana Sea Grant's Lucina Lampila, an associate professor with Louisiana State University shows how experts sniff fresh seafood for signs of oil contamination. The Gulf Sea Grant programs have conducted seafood safety sensory trainings and offered workshops on safe handling procedures for processors in several states.

← Oyster shells are recycled to restore reefs in North Carolina as part of a federal stimulus project in April 2010. North Carolina Sea Grant will work with the N.C. Coastal Federation to evaluate the economic benefits of the restored oyster reefs.

**IN 2009, 160 COASTAL COMMUNITIES  
ADOPTED OR IMPLEMENTED HAZARD  
RESILIENCY PRACTICES TO PREPARE FOR  
AND RESPOND TO OR MINIMIZE COASTAL  
HAZARDOUS EVENTS AS A RESULT OF  
SEA GRANT ACTIVITIES.**

Madeline Gotkowitz, University of Wisconsin-Extension



# HAZARD RESILIENCE IN COASTAL COMMUNITIES

## NATIONAL GOALS →

- **Widespread understanding of the risks of living, working and doing business along the coasts**
- **Community capacity to prepare for and respond to hazardous events**
- **Effective response to coastal disasters**

Sea level rise, the increased number and intensity of coastal storms, the ongoing threat of oil spills and other natural and human hazards are putting more people and property at risk along the nation's coasts, with major implications for human safety and the economic and environmental health of coastal areas. Sea Grant is using its established presence in coastal communities to help local citizens, decision-makers and industries plan for hazardous events and optimize the ability of their communities to respond and rebuild.

North Carolina Sea Grant helped lead a two-year review of the state's ocean policies, which resulted in numerous recommendations, including the creation of a coastal vulnerability index. Texas Sea Grant's policy guidance on creating a resilient coast is contributing to planning for "smart growth" along the Gulf coast, as is the Louisiana Sea Grant Legal Program's guidebook on coastal hazard mitigation. Hawaii, Alaska and Oregon Sea Grant have research and education programs underway to prepare their states and communities for anticipated tsunamis.

A central focus of Sea Grant's work in building hazard resilience in coastal communities involves helping communities prepare for and respond to the impacts of climate change. Connecticut Sea Grant, Mississippi-Alabama Sea Grant and many other state programs are working with local communities to develop climate change management strategies as part of local planning processes.

In response to the new national emphasis on climate change, Sea Grant has allocated \$6 million to climate change initiatives that provide \$1.5 million for community preparedness activities; \$2.9 million for local and regional climate change mitigation and adaptation research; \$200,000 in regional climate engagement grants to strengthen partnerships between Sea Grant and NOAA regional teams; and \$500,000 for small business alternative and renewable energy projects. The Sea Grant Association is maintaining an up-to-date summary of Sea Grant climate change work in regions around the country entitled: [Sea Grant's Role in Understanding and Preparing for Climate Change along America's Coast](#). Appendix 3 provides a link to additional impacts.



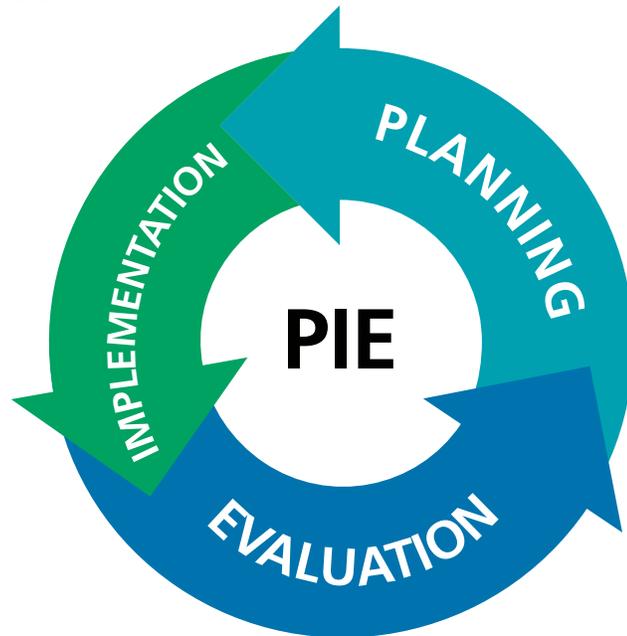
↑ Broadkill Beach, Delaware. Coastal communities are increasingly vulnerable to shoreline erosion and hazardous events brought on by climate-related and land-use changes. Sea Grant's work with NOAA's National Weather Service and the National Ocean Service, regional ocean observation systems, and other partners to make hazard-related data and data-derived products available during crisis events.

← Communities need information and tools to help assess the risks they face and to identify options to minimize those risks. Sea Grant works with partners to develop risk assessment tools, economic and environmental impact models, and other mechanisms to help families, businesses and communities understand their risks and take them into account in making decisions.

Sea Grant’s new Planning, Implementation and Evaluation System enables programs to report national successes. In 2009, for instance, **31,817 acres** of degraded ecosystems were restored across the nation as a result of Sea Grant activities.

## A new Planning, Implementation and Evaluation System

The adoption of the national strategic plan and the four national priority areas is just one part of Sea Grant’s new Planning, Implementation and Evaluation system (PIE), developed in response to the NRC recommendations regarding Sea Grant’s evaluation processes. PIE is fully outlined in: *An Enhanced and Integrated Strategic Planning and Program Assessment Strategy for the National Sea Grant College Program*. The system includes development of a national strategic plan every four years, adoption of individual state plans aligned with the national plan, and a peer-review evaluation process at the end of the four-year process to assess the success of state programs in meeting goals and objectives.



↑ Ohio Sea Grant Director, Jeffrey M. Reutter presents to a site review team (SRT). Once every four years, a SRT visits each Sea Grant Program. The SRT reviews and discusses broad issues related to: 1) Program Management and Organization; 2) Stakeholder Engagement; and, 3) Collaborative Network/NOAA Activities.

During 2009, all state Sea Grant plans went through a rigorous review process by a sub-committee of the Sea Grant Advisory Board and the National Sea Grant Office to be sure they were aligned with the national strategic plan and that state efforts will continue to advance national priorities. As part of the new evaluation and accountability process, Sea Grant is also developing and implementing a National Information Management System (NIMS) that will provide a uniform, centralized reporting process to track Sea Grant performance over the four-year planning period.

Sea Grant’s new PIE system aligns the resources of the entire Sea Grant network to address national priorities and presents a way for Sea Grant and outside evaluators to measure the program’s success in achieving stated objectives. At the same time, the process respects the federal/university partnership structure of Sea Grant. It allows individual Sea Grant programs the flexibility needed to develop state plans that pursue national goals and objectives in ways that also address urgent state and local concerns.

## Ongoing commitment to regional leadership

Part of Sea Grant’s focus on national priorities is its ongoing leadership role in regional approaches to planning and problem solving. In recent years, coastal scientists and resource managers have realized that many of the critical issues facing the coastal zone such as fisheries management, nutrient enrichment and invasive species cannot be addressed solely at the local or state levels or through a single national approach. This has led NOAA and others to emphasize that these issues require regional approaches that encompass ecosystems, watersheds and coastal socio-economic factors. Sea Grant has been a leader in bringing stakeholders, managers and scientists together to address regional issues. State Sea Grant staff members typically work collaboratively beyond state boundaries in support of regional and national goals.

In 2006, in response to recommendations by the U.S. Commission on Ocean Policy and the Pew Oceans Commission, a competitive National Sea Grant Strategic Initiative was developed. The initiative supported the creation of regional science priority plans to highlight the science gaps considered most critical to the successful implementation of regional ecosystem-based approaches to coastal marine spatial planning and management. These plans, created by regional Sea Grant teams in partnership with other NOAA coastal programs, EPA, U.S. Fish and Wildlife and numerous other public and private stakeholders at the regional, state and local levels, have provided a framework for science and policy initiatives on the West Coast, in the Gulf of Mexico, in the Gulf of Maine and in NOAA regions throughout the United States.

Sea Grant regional planning efforts have been integrated with NOAA regional teams as well as several regional governor’s associations such as



↑ Fisher Patrick Riley discusses fuel savings and additional savings associated with the switch to new shrimp fishery gear and netting developed by Texas Sea Grant and partners. His fleet is seeing between 25 and 28 percent fuel savings.



↑ The map shows NOAA regions along with highlights denoting Sea Grant regions.

“Sea Grant continues to be a catalyst for answering practical research questions in a rigorous way, providing us with a platform for co-management of Maine’s fisheries.”

Robin Alden, Penobscot East Resource Center

the Northeast Regional Ocean Council organized by northeast governors from New York to Maine. The Western Governors Association for the states of California, Oregon and Washington has asked Sea Grant to serve as the lead coordinating body for regional coastal science priorities. Rhode Island Sea Grant has been the leader in the development of the Rhode Island special area management plan, one of the leading efforts for state-based, and now regionally-focused, coastal marine spatial planning efforts.

A key player in developing regional approaches to climate adaptation and mitigation, Sea Grant is representing NOAA in a partnership with the state Land Grant institutions and other federal agencies to develop and implement strategies designed to minimize the economic and environmental impacts associated with changing climate in the coastal zone.

### New roles for the National Sea Grant Advisory Board

The 2008 Sea Grant reauthorization called for the National Sea Grant Advisory Board to provide strategic advice and direction to Sea Grant. The Advisory Board has responded in a number of ways.

The Advisory Board appointed a committee to revisit Sea Grant funding allocation policies and is continuing a long-standing tradition of conducting in-depth reviews of the Program. In 2009, the Advisory Board issued three reports on topics it deemed important to the future of Sea Grant:

- [Sea Grant Research: A Report of the National Sea Grant Advisory Board](#)
- [Communications/Engagement: A Report from NOAA’s National Sea Grant Advisory Board](#)
- [National Sea Grant Advisory Board Futures Committee Report](#)

[Sea Grant Research: A Report of the National Sea Grant Advisory Board](#) resulted from a year-long examination of Sea Grant’s operation and funding, as well as a review of the status of Sea Grant research. As part of this effort, extensive interviews were conducted within and outside of NOAA to measure how Sea Grant is perceived. The information gathered by the research report committee was used to develop a range of options for Sea Grant to consider with regard to future organization, operation, research and collaboration. [Communications/Engagement: A Report from NOAA’s National Sea Grant Advisory Board](#) identified actions needed to allow Sea Grant to build on its leadership role in engaging stakeholders in coastal communities. The [National Sea Grant Advisory Board Futures Committee Report](#) recommended some near-term strategic directions for the program.

These reports have informed the Advisory Board’s assessment of the current state of Sea Grant and the recommendations in this report. Links to the full reports may be found in Appendix 2. This process of self-examination will continue. A Futures II committee has been established and charged with assessing the role and capacity of Sea Grant to address such emerging issues as climate change, green energy sources and economic stress in coastal regions, as well as the implications of changes taking place within NOAA.



▲ The National Sea Grant Advisory Board, 2010.



# CONSTRAINTS ON REALIZING SEA GRANT'S POTENTIAL

## SEA GRANT KNAUSS FELLOWSHIP: *BUILDING A POWERFUL WORKFORCE*

The National Sea Grant College Program supports the Dean John A. Knauss Marine Policy Fellowship. The fellowship brings to Washington highly qualified graduate students with an interest in national policy decisions affecting natural resources. This prestigious program places 40-48 highly qualified Master and Ph.D.-level students within the Executive and Legislative branches of government for a one year fellowship in marine policy. This program has over 800 alumni who currently hold positions within the federal and state government, as well as universities, non-governmental organizations and private businesses. During 2007-2010, the National Sea Grant Program trained 184 new Sea Grant Knauss fellows who have joined an extensive fellowship alumni network.



Sea Grant fellow, Long Zhou (Rhode Island Sea Grant) meets Dr. Jane Lubchenco, Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator.

*While Sea Grant has many accomplishments to be proud of and a demonstrated ability to respond to emerging needs and demands, a number of factors are limiting full utilization of Sea Grant capabilities.*

The health and productivity of America's oceans, coasts and Great Lakes are central to the health and vitality of the nation. NOAA's mission, "To understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs," is more vital than ever. Sea Grant, with its integrated research, outreach and education capabilities and its on-the-ground presence in coastal communities, is positioned to play a major role in fulfilling NOAA's mission, but a number of factors have inhibited the program from realizing its potential.

### Unrealized opportunities in the Sea Grant-NOAA relationship

The 2008 Congressional declaration of policy regarding Sea Grant states:

*"The vitality of the Nation and the quality of life of its citizens depend increasingly on the understanding, assessment, development, management, utilization, and conservation of ocean, coastal, and Great Lakes resources . . . (which) requires a broad commitment and intense involvement on the part of the Federal Government in continuing partnership with State and local governments, private*

*industry, universities, organizations and individuals concerned with or affected by ocean, coastal, and Great Lakes resources. The National Oceanic and Atmospheric Administration, through the National Sea Grant College Program, offers the most suitable locus and means for such commitment and engagement." (PL 110-394, Congressional declaration of policy)*

Sea Grant is a federal-state-university partnership, built from a bottom-up relationship between state and local capacity and national leadership. This is an excellent way to address the nation's complex array of ocean and coastal resource management and protection challenges, which are at varying times international, national, regional and local in nature. During its earliest years, NOAA was regarded as a science agency. Local capacity and service to the public were not highlighted. This left Sea Grant's outreach and education functions somewhat disconnected from NOAA's central focus and resulted in Sea Grant not being fully embraced by NOAA leadership.

Conditions today are different, not only opening doors to new possibilities, but calling strongly for a direct connection between federal agencies and the people those agencies serve, something Sea Grant's extensive experience with stakeholder engagement can provide. Sea

Grant's emphasis on national priorities, directly linked to NOAA's goals, and its extension agents located in all coastal states, help to strengthen the connection between the federal agency and local users of the Agency's services. As the outreach/engagement functions of NOAA increase, as articulated in *Engaging NOAA's Constituents: A Report from the NOAA Science Advisory Board* (2008), the Sea Grant Program can play a significant role in carrying out these functions. Realizing Sea Grant's potential will require NOAA leadership at all levels to fully embrace the importance of engaging the public in carrying out its mission and to use existing capacity in Sea Grant to provide these critical stakeholder connections.

"As the outreach/engagement functions of NOAA increase, the Sea Grant Program can play a significant role in carrying out these functions."

## Ability to demonstrate national impact

Historically, some national leaders and decision-makers have viewed Sea Grant more as a collection of independent state programs than as a national program with state-local presence. Before its recent adoption of integrated strategic planning and program assessment, it was difficult for Sea Grant to demonstrate cumulative national benefits from the work of individual Sea Grant programs around the country. Planning was carried out at the state level and, while there were substantial accomplishments, there was a limited amount of data available on cumulative investments and impacts at the national level.

The adoption of national priorities for the entire Sea Grant program, the alignment of state plans with the national plan, and the incorporation of performance measures in both state and national plans are important steps forward in demonstrating national impact. However, the

ability to measure cumulative national impacts with regard to performance measures remains a work in progress. Progress in developing the National Information Management System (NIMS) has been slowed by a lack of resources available to support this necessary initiative at both the national and state levels and by the challenges of integrating information from 32 different programs into a single national system. Having a fully operational NIMS in place is critical to being able to measure Sea Grant's success in making meaningful contributions to national goals.

## Coastal program integration challenge

In the years since NOAA was created, its coastal programs have continued to evolve. In some instances, in order to meet particular needs, new programs were developed rather than assigning these tasks to existing programs. The result of these changes over time is that some of the distinctions between and relationships among programs have been blurred, leading to a greater likelihood of overlap in mission and perceived duplication of effort.

There is a strong mandate from the administration to integrate the nation's coastal programs. NOAA has embraced this goal and established working groups to identify ways to achieve greater integration among its coastal programs and with coastal programs of other agencies. NOAA's Coastal Services Center, the Office of Ocean and Coastal Resource Management, the National Centers for Coastal Ocean Science, the National Marine Fisheries Office of Habitat Protection and Sea Grant are working to integrate their efforts more effectively. The purpose of this collaborative planning

is to ensure that the individual NOAA coastal programs are focused on national priorities and that their work is synergistic, outcome-oriented and built around each program's strengths in ways that avoid duplication. The short-term goal is to collaborate on strategic planning, budgeting and implementation. The long-range goal is to develop a joint coastal strategic plan that articulates agreed-upon priorities, functional responsibilities, outcomes and metrics.

While Sea Grant and its partners have been working diligently on coordination and integration efforts, significant progress has yet to be achieved. Sea Grant and all of NOAA's coastal programs would benefit from clear guidance on how the Agency wants to move forward with more effective coastal program integration.

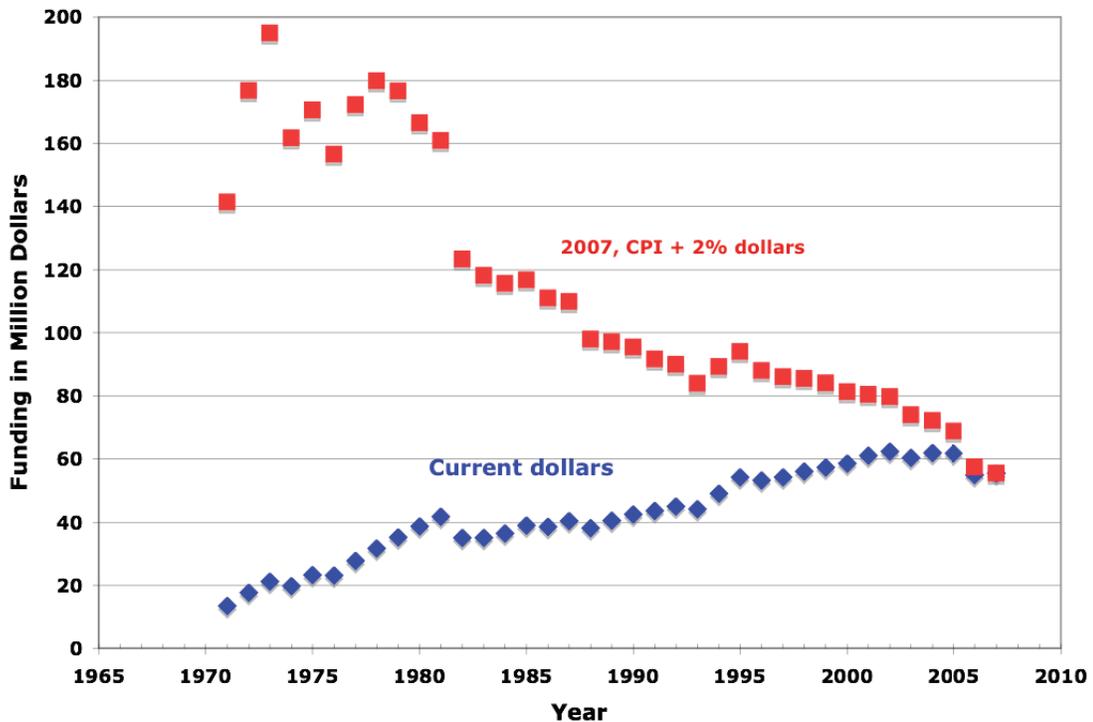
### Decline in Sea Grant buying power and loss of national capacity

The buying power of federal Sea Grant funding has decreased dramatically over the last two decades, leaving state Sea Grant programs with only about one-third the buying power they had in the early 1980s. While a review of annual appropriations over time shows a modest rise in federal allocations for Sea Grant, those same dollars, when adjusted for inflation, show a

“Most state Sea Grant programs are currently struggling to maintain the staff necessary to respond effectively to new national, regional and local priorities and requests.”

significant decline in federal support and buying power. This loss of buying power, described in greater detail in *Sea Grant Research: A Report of the Sea Grant Advisory Board*, 2009, is illustrated in the chart below.

**Overall Sea Grant Funding**



This decline places significant constraints on Sea Grant's ability to respond with sound science and on-the-ground presence to growing coastal challenges. The decline has continued during a period when Sea Grant has been working to strengthen its national focus, dedicating significant energy at both the national and state levels to accomplish this. Loss of federal funding on an inflation-adjusted basis has significantly decreased the ability of state programs to work with stakeholders to address the nation's coastal, ocean and Great Lakes priorities through their research, extension and education programs. Most state Sea Grant programs are currently struggling to maintain the staff necessary to respond effectively to new national, regional and local priorities and requests.

“At the current level of staffing, the National Sea Grant Office lacks the capacity to carry out all of its leadership functions for the Sea Grant network.”

According to the NSGAB's *Communications/Engagement* report of 2009, this decline in Sea Grant buying power has had major effects on the capacity of the National Office as well. With a cap of 5% on what may be spent on administrative costs at the national level, the National Office has seen its staffing decline significantly over time. Presently, the National Office has roughly half the staff it had in 1991: 29 full-time equivalent staff positions in 1991 versus 16 today. There has been a 36% loss in capacity just since 2005.

### National Sea Grant Office Workforce

Year	Full Time Staff (FTEs)
1991	29
2005	22
2010	16

The Sea Grant Advisory Board reviewed the role of the National Sea Grant Office in 2002 in *Building Sea Grant: The Role of the National Sea Grant Office* and concluded that staff erosion in the National Office had seriously diminished the

ability of the National Office to provide the leadership necessary to support the Sea Grant network and respond to increasing demands at the federal level. This was revisited by the Administrative Review Committee of the then Sea Grant Review Panel in 2008 in a report entitled *Staffing the National Sea Grant*

*Office*. That report recommended an increase of staffing to 29.5 FTEs to allow the NSGO to fulfill its core responsibilities. The erosion of national capacity discussed in these reports has continued, as demonstrated below. The new planning, implementation and evaluation process, designed to emphasize national priorities, has created significant new demands on the National Office and state program staffs. The design and implementation of network-wide planning efforts, liaison work, site visits to state programs, and the collection and management of network-wide performance data have all added to the work loads of already burdened staff.

At the current level of staffing, the National Sea Grant Office lacks the capacity to carry out all of its leadership functions for the Sea Grant network. It is becoming increasingly difficult for the National Office to employ the number and kinds of personnel needed to participate effectively at the federal level and to respond to a growing number of information requests and calls for assistance. The National Office is working actively with NOAA on its new climate initiatives and coastal program integration efforts, but they are participating in these and other high-level NOAA activities with about one-quarter the number of FTEs per dollar of grants managed as other similar NOAA programs.



# OUTLOOK AND RECOMMENDATIONS

*Sea Grant is in a strong position to harness its full range of resources to advance national priorities and respond to national crises while continuing to be responsive to state and local needs, if NOAA and Congress choose to capture this opportunity.*



There is reason for optimism about the role Sea Grant can play helping NOAA carry out its mission in the decade ahead, tempered by a realistic outlook on the external and internal factors that will affect this. The recommendations in this report suggest what must be done to ensure that Sea Grant will fulfill the promise it carried when it was established: to help the country respond in an integrated way with the sound science and collaborative decision-making processes needed to protect and use the nation's ocean, coastal and Great Lakes resources for the benefit of present and future generations.

## Outlook

In 2000, the Sea Grant Review Panel (now the Advisory Board) issued a report entitled *A Mandate to Engage Coastal Users*. It opened with the following prospect for what the nation would face in the coming years:

*"In 1999, world population reached 6 billion people. It has doubled in less than 40 years, is continuing to increase rapidly, and is projected to reach 8 to 10 billion people in the next 50 years. The accompanying pressure on world resources will be extreme, but none more so than on coastal resources. Today, over half the population of the United States lives in coastal counties; it is estimated that by 2025 roughly three-fourths of all Americans will live in coastal areas. As the demand for seafood increases, fisheries*

*are being depleted or eliminated. When world production of oil peaks in the first decade of the 21st century, there will be increased pressure to drill in offshore and coastal areas. The conflict in use of the coastal areas between recreational and industrial users can only increase. The world economy is expanding, and by 2020 goods traded worldwide are expected to triple. With the U.S. as a major consumer of goods, the pressure on American ports will be immense. And then there are the threats from coastal hazards, the rise in sea level associated with global climate change, inadequate water supplies and water treatment—the list goes on. The economic, environmental, and social demands on our coastal oceans and shorelines will be unparalleled in human history, and these demands will be similar throughout the world. The need for solutions to coastal problems, resolution of conflicts and help in general will continue to grow as the threats to coastal areas increase. It will be imperative that all governments—local, state, and federal—engage their citizens and attend to their needs."*

While some of the specific numbers would change, this assessment of the situation we face holds as true today as when this was written ten years ago. The outlook for Sea Grant and other NOAA ocean and coastal agencies is one of increased complexity and pressure. Population

**“ Just the other day I had an email from a company in Germany that wants to import our whitefish. This is a 19th century industry that is now competing in the 21st century. That never would have happened before this initiative was launched by Michigan Sea Grant.”**

**Jill Bentgen,**  
Founder of Mackinac Straits  
Fish Company

growth and the demands this is placing on the coastal zone, climate change impacts, increased demands and conflicts related to the use of limited natural resources, over-use of ocean fisheries, and pollution of the environment all point to unprecedented challenges for Sea Grant in the years ahead.

The nation, NOAA and Sea Grant must respond to this increasingly complex array of coastal issues during a period of major resource constraints. The current administration has indicated that it will ask for a reduction of 5% in many agency budgets. State and higher education budgets are stretched tighter than they have been in decades. It is essential for Sea Grant to concentrate its energies in areas of highest priority where opportunities for meaningful impacts are greatest. Plans must be generated on the assumption that resources will not increase significantly. At the same time, Sea Grant must make it clear that continued loss of buying power and the administrative cap of 5% will diminish Sea Grant's ability to serve NOAA and respond to the nation's needs.

### **A way forward for Sea Grant**

In moving forward, it is important to have a vision for what the National Sea Grant College Program can become. While it may not be possible to realize this vision in the near-term, it can inspire and guide actions of the program today and serve as a beacon for Sea Grant as the program continues to evolve.

*Looking to the future, Sea Grant will be an integral component of NOAA, contributing significantly to fulfilling NOAA's mission. Sea Grant will do this not by making radical changes in what it does and how it does it, but by building on its strengths and recent commitment to a stronger national focus.*

Sea Grant will be a strong, well-integrated national program. It will draw its expertise from its university bases throughout the United States and from NOAA, its federal parent agency. It will have a strong National Office that provides direct contact with other elements of NOAA, with other federal agencies, and with

the Congress of the United States, linking them to a robust Sea Grant network at the state level.

Sea Grant will concentrate its energies where it has the most to offer to advance national priorities. It will use its model of integrating research, outreach and education to translate sound scientific information into tools, products and services that benefit the country and its coastal communities. It will concentrate these efforts on identified national priorities such as climate adaptation and community coastal development and response to coastal hazards, where its ability to facilitate honest exchange of information, informed decision-making and rapid response are most valuable. It will continue to educate the next generation of informed citizens, environmental professionals and the ocean-coastal-Great Lakes related workforce.

Sea Grant will lead engagement with coastal stakeholders, including fishermen, coastal industries, local governments and citizens. As a main program in NOAA dedicated to transferring ocean and coastal knowledge to users, Sea Grant Extension will become a central part of NOAA's day-to-day work. Extension work will expand and its benefits will more closely mirror those envisioned in the founding legislation.

Sea Grant will respond immediately to problems and crises with broad-based expertise. Experts from the entire Sea Grant network will be mobilized to respond to needs wherever they occur. Sea Grant will be one all-encompassing program, addressing national needs without sacrificing state program responsiveness.

Sea Grant will grow in size and capacity to help address the increasing array of coastal, ocean and Great Lakes challenges facing the nation. Sea Grant will grow selectively, by building capacity in areas such as applied research, technology transfer, and stakeholder engagement where it already has a strategic advantage. Sea Grant will continue to build the specific expertise and array of skills needed to address emerging coastal issues to be of maximum benefit to the nation as a science-based first responder.

## THE NATIONAL SEA GRANT ADVISORY BOARD RECOMMENDATIONS

The National Sea Grant Advisory Board believes that realizing this vision and positioning Sea Grant to respond to the nation's coastal challenges and possibilities will require clear demonstration of Sea Grant's contributions to achieving national goals, a more effective integration and coordination of the nation's coastal agencies and programs, achieving maximum benefit from existing Sea Grant resources and the addition of strategically-directed new resources for Sea Grant.

**1. The entire Sea Grant network must focus its efforts on advancing national priorities, while remaining sensitive to local needs.**

Sea Grant is a national program built on a foundation of strong federal-state-university partnerships. Partnerships remain strong when the needs of all parties continue to be met. The new Planning, Implementation and Evaluation system adopted in 2009 represents a conscious commitment on the part of the Sea Grant National Office and its state/university partners to undertake the significant coordination and accountability activities required to ensure that the program maintains a strong focus on national priorities, while also responding to the most urgent priorities found at the regional, state and local levels.

**2. The ability to track and report the cumulative measurable impacts of Sea Grant activities on achieving national goals should be a high priority for Sea Grant.**

The Sea Grant network needs to work together to make the National Information Management System (NIMS) fully functional as quickly as possible. It is fundamental to the new planning and accountability process and to being able to communicate the national benefits of Sea Grant activities and programs in measurable ways.

**3. NOAA coastal programs, including Sea Grant, should be more fully integrated in order to maximize NOAA's contributions to national goals.**

It is essential in this era of limited resources that NOAA build on the specific strengths of existing coastal programs, use them to meet emerging needs and provide clear direction on future roles and responsibilities. Sea Grant should continue joint planning with other coastal programs and communicate more effectively within NOAA and beyond about what it has to offer with regard to research, outreach and education to advance the over-all NOAA coastal, ocean and Great Lakes agenda.

**4. Sea Grant should capitalize on its nationally recognized leadership in stakeholder engagement within coastal and Great Lakes communities as federal-state-local communication and collaboration become more critical to addressing needs and responding to crises.**

With its presence in all coastal counties and its strong outreach, education and communication staff, Sea Grant can play a significant role for NOAA as demand for these services increases. Sea Grant's ability to provide rapid response in recent crises such as Hurricane Katrina and the Deepwater Horizon oil spill demonstrate the value of its national network and local presence in engaging with stakeholders to respond to crises and pursue other shared goals.

**5. Sea Grant should continue to re-examine its priorities and methods of operation in order to respond to the nation's most urgent needs.**

The National Sea Grant Office, state Sea Grant programs and the National Sea Grant Advisory Board should review the full range of Sea Grant activities and determine which could be reduced, redirected, expanded or terminated so new opportunities can receive investments. Sea Grant research programs should be targeted to address Sea Grant and national strategic priorities such as climate-related research, coastal and offshore energy development, sustainable fishing technologies and socio-economic issues related to sustainable growth in coastal environments.

**6. Significant additional resources should be provided to the National Sea Grant College Program in order to reverse the erosion of buying power and maintain a dynamic program with rapid response capability.**

The 21st century has brought unparalleled challenges to coastal America. Twice in recent years, the nation has faced dramatic human and natural resource crises in the Gulf of Mexico. Both times, Sea Grant, with staff already in these coastal communities, was among the first to respond by communicating with and bringing together affected constituents. Sea Grant participated in or led scientific and technical reviews of the extent of damages and efforts to design effective responses to repair damaged communities, natural resources and economies. Even in a time of serious budget constraints, consideration should be given to providing Sea Grant with additional resources. Twenty years of level funding combined with significant inflation over that same time period have left state Sea Grant programs and the National Sea Grant Office with substantial reductions in buying power. This has had pronounced effects on the National Office's ability to provide leadership and coordination and the ability of state programs to leverage additional funds and carry out their responsibilities. Sea Grant urgently needs additional funding to continue its critical 21st century involvement in coastal crisis response and management and its leadership role in meeting the nation's growing coastal, ocean and Great Lakes challenges.

**The National Sea Grant Advisory Board welcomes this opportunity to provide Congress with a report on the State of Sea Grant and looks forward to working with Congress, NOAA and the entire Sea Grant team to maximize the benefits this program can provide to this nation and its coastal communities.**

# APPENDIX 1

## Sea Grant Programs

### GREAT LAKES REGION

Illinois-Indiana Sea Grant College Program  
Lake Champlain Sea Grant Project  
Michigan Sea Grant College Program  
Minnesota Sea Grant College Program  
New York Sea Grant Institute  
Ohio Sea Grant College Program  
Pennsylvania Sea Grant Institutional Program  
Wisconsin Sea Grant Institute

### NORTHEAST REGION

Connecticut Sea Grant College Program  
Lake Champlain Sea Grant Project  
Maine Sea Grant College Program  
Massachusetts Programs:  
Massachusetts Institute of Technology  
Sea Grant College Program  
Woods Hole Oceanographic Institution  
Sea Grant Institutional Program  
New Hampshire Sea Grant College Program  
New York Sea Grant Institute  
Rhode Island Sea Grant College Program

### MID-ATLANTIC REGION

Delaware Sea Grant College Program  
Maryland Sea Grant College Program  
New Jersey Sea Grant Consortium  
Virginia Sea Grant Institutional Program

### SOUTHEAST, GULF OF MEXICO AND CARIBBEAN REGIONS

#### Southeast

Florida Sea Grant College Program  
Georgia Sea Grant College Program  
North Carolina Sea Grant College Program  
Puerto Rico Sea Grant College Program  
South Carolina Sea Grant Consortium

#### Gulf of Mexico

Louisiana Sea Grant College Program  
Mississippi-Alabama Sea Grant Consortium  
Texas Sea Grant College Program

### PACIFIC REGION

Alaska Sea Grant College Program  
California Programs:  
California Sea Grant College Program  
Southern California Sea Grant  
Institutional Program  
Hawaii Sea Grant College Program  
Oregon Sea Grant College Program  
Washington Sea Grant College Program  
Guam Sea Grant Project

# APPENDIX 2

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***NOAA FY 2010 Budget Summary***,

[http://www.corporateservices.noaa.gov/~nbo/10bluebook\\_highlights.html](http://www.corporateservices.noaa.gov/~nbo/10bluebook_highlights.html)

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# APPENDIX 3

## **Sea Grant Program Impacts**

<http://www.seagrant.noaa.gov/newsevents/impacts2010.html>



## The State of Sea Grant 2010: Impacts, Challenges and Opportunities

Biennial Report to Congress by the National Sea Grant Advisory Board, November 2010



## Sea Grant Program Impacts

<http://www.seagrants.noaa.gov/newsevents/impacts2010.html>

### Alaska Sea Grant

#### **Sea Grant helps rebuild crab stock in Alaska**

Developing technology for successful king crab hatchery rearing is important to Alaska's long term economic development and sustainability. Through the Alaska King Crab Research Rehabilitation and Biology Program (AKCRRAB) Alaska Sea Grant and its partners are evaluating the feasibility of rehabilitating depressed king crab populations throughout Alaska via large-scale releases of hatchery-cultured crabs. As of July 2010, AKCRRAB Program has produced over 100,000 juvenile crabs. ([More information](#))

### Connecticut Sea Grant

#### **Sea Grant unravels a muddy mystery**

Findings of Connecticut Sea Grant researchers investigating sudden vegetation dieback (SVD) are among the first to show a possible interaction between the epiphytic fungus *Fusarium* and the root-knot nematode, *Meloidogyne spartinae*, in a natural ecosystem. Their on-going study suggests plant pathogens may contribute to SVD, but are not the cause. It is more likely that *Fusarium*, along with other stressors, causes a tipping point that has led to SVD in many Connecticut marshes. ([More information](#))

### California Sea Grant

#### **Sea Grant research leads to banning of septic tanks in Malibu**

California Sea Grant research has shown that septic tanks leak nitrogen and phosphate into coastal waters via groundwater. These "nutrients" can trigger algal blooms and may contribute to the methylation of inorganic mercury into the toxic form that poses health risks to pregnant women and young children. Findings were incorporated into the Bolinas Lagoon Ecosystem Restoration Project and Marin County Local Coastal Plan as evidence that septic systems are capable of measurably degrading groundwater quality. The results from this project were part of the scientific basis for a November 2009 vote by the Los Angeles Regional Water Quality Control Board to ban septic tanks in Malibu. Because of concerns about water quality and public health, the California legislature has directed the State Water Resources Control Board to establish state regulations for septic systems. California and Michigan are currently the only two states in the country that do not have statewide regulations for septic systems.

### Delaware Sea Grant

#### **Improvements to the Delaware Bay Observing System**

Delaware Sea Grant researchers have developed new types of microelectrodes for biogeochemical measurements made at coastal observing systems in Delaware Bay. The electrodes placed on fixed moorings have shown that dissolved oxygen concentrations in the lower bay are above saturation throughout the productive parts of the year. The lower portion of the bay produces oxygen via photosynthesis. The research indicates that the oxygen is well mixed so that low oxygen conditions, which are harmful to marine life, do not occur. The research also demonstrates that the new electrodes are well-suited for placement on fixed moorings in the marine environment due to their versatility, rugged nature and long life. The [Delaware Bay Observing System](#) has been enhanced by this recent discovery since prior to this research it was not possible to perform these measurements. ([More information](#))

### [Florida Sea Grant](#)

#### **Research sustains the Florida clam aquaculture industry**

The Florida hard clam industry support 560 jobs, \$1.3 million in business taxes, and \$25 million in income annually. Currently, the industry is built upon a single species and is susceptible to environmental factors and fluctuating prices. Florida Sea Grant has funded research and outreach to enhance the production and profitability of this industry by developing methods for growing a native clam, the sunray venus clam (*Macrocallista nimbosa*), which soon may be produced and sold commercially in Florida. Initial market analysis indicated a positive demand for the clam. Diversifying the shellfish culture industry by developing farming technology and markets for other bivalve species will increase economic stability and growth of the industry.

### [Georgia Sea Grant](#)

#### **Georgia coastal hazards analysis and research results in new tools and baseline information for coastal planners and decision-makers**

Sea Grant-funded research and outreach has resulted in the development and implementation of a new software tool for performing shoreline change analysis. "Ambur" (Analyzing Moving Boundaries Using "R"- a statistical computing and graphics environment) can perform shoreline analyses that extend completely around each of the islands for all of the oceanfront Georgia barrier islands. As part of the shoreline analyses outreach effort, Georgia Sea Grant has produced maps of historic shorelines for each of the Georgia barrier islands, as well as summary maps showing location and magnitude of erosion and accretion on each island.

### [Guam Sea Grant](#)

#### **Sea Grant helps lead regional efforts in the Pacific**

Guam and Commonwealth of the Northern Mariana Islands (CNMI) stakeholders participated in two new Sea Grant initiatives in 2007, the NOAA Regional Research Planning and Coordination project and the NOAA Pacific Integrated Ocean Observing System project, a joint collaboration between the University of Hawaii Sea Grant Program, the East-West Center, and the School of Ocean, Earth Science and Technology at the University of Hawaii. Hawaii Sea Grant supported individuals at the Marine Laboratory of the University of Guam and the Coastal Resources Management Office in CNMI in conducting local stakeholder meetings and gathering information on research needs for the NOAA Insular Pacific Regional Research Needs Assessment project. Both individuals also serve as local representatives for the Pacific Integrated Ocean Observing System project and have conducted meetings with their respective stakeholders and produced draft reports on research needs for their locales.

### [Hawai'i Sea Grant](#)

#### **Sea Grant develops new tsunami forecasting model for Pacific**

To reliably estimate tsunami waveforms during the early stages of an event, Sea Grant researchers developed a tsunami forecasting model that uses data from tide gauges and deep-ocean pressure sensors. This research has contributed to the National Marine Environmental Forecasting Center of China, and the model was adopted by the Chilean Navy as a primary tool for their tsunami forecasting.

### [Illinois/Indiana Sea Grant](#)

#### **Online GIS resource leads to natural resource protection strategies**

Local planners striving to balance growth with natural resources need tools that help them make informed choices. Illinois-Indiana Sea Grant helped develop and promote Local Decision Maker, a GIS-based web tool that is rich with research data on environmentally-sensitive areas, open space, streams and rivers, potential sources of contamination, and endangered species. The site goes beyond natural resources to include critical information on economic development, labor markets and schools. Pilot testing of Local Decision Maker in three Indiana counties has led to strategies to protect natural areas and to plan for buffers for animal feeding operations.

### [Lake Champlain Sea Grant](#)

#### **Research supports non-chemical management of invasive species**

Sea Grant researchers found that a commonly used chemical lamprey control treatment has significant and unexpected environmental impacts on non-targeted marine invertebrates. These sub-lethal impacts could affect food sources of fishes in treated rivers and the results support the use of non-chemical techniques to reduce sea lamprey. The effects of the chemical management approach on non-target species are more clearly understood as a result of this work, allowing decision makers to better understand the impacts of treatment.

### [National Sea Grant Law Center](#)

#### **Research and outreach on ballast water regulatory regime**

The Law Center's white paper entitled [\*Michigan's New Ballast Water Regime: Navigating the Treacherous Waters of States' Rights, Federal Preemption, and International Commerce\*](#) has had immediate impact in the Great Lakes shipping community. The white paper was requested by Minnesota Sea Grant in response to new legislation to regulate ballast water that did not clearly define roles and responsibilities of federal and state governments. The Law Center's paper was widely distributed in the region, prompting numerous media articles and presentations by Minnesota Sea Grant. Without the white paper, each interested party (state and federal agencies, businesses, non-profit organizations, etc.) would have been forced to compile the legal information and policy analysis on their own. Thousands of dollars, both public and private, and hundreds of hours were saved as a result.

### [Louisiana Sea Grant](#)

#### **Reaching out to underserved communities in Louisiana**

The Vietnamese fishing community has been underserved and under-appreciated in their adopted homeland in Southeast Louisiana. Working in collaboration with local and regional partners, Louisiana Sea Grant has engaged this community on issues such as marine debris identification and removal, vessel safety programs, improved gear recommendations, community processing and marketing of fishery products. Over 500 attendees at various outreach meetings have either increased their knowledge, their income, or their quality of life in response to these instructional gatherings. Introductions of technological improvements to the Vietnamese community such as Electronic Log Books for their fishing activities has increased the traceability and accountability of their catch allowing them to command a higher price from discerning buyers. Since the beginning of efforts in the Vietnamese community, Louisiana Sea Grant and other agencies have seen the benefits of such outreach and accelerated their presence in the previously underserved population. This work in the Vietnamese fishing community was recently recognized with the LSU AgCenter Diversification Award.

### [Maine Sea Grant](#)

#### **Sea Grant identifies strategies for adapting to climate change in coastal communities**

One of the challenges society faces in a changing climate is applying global-scale information and data to the local environment. In order for communities to change and adapt to new climate regimes, they need information, tools, and resources that are applicable at the state, town, and even ecosystem level. Based on the results of the joint Maine-[Oregon Sea Grant](#) project, Coastal Community Resilience: Developing and Testing a National Model of State-based Outreach, Maine Sea Grant and the Marine Extension Team have emerged as a resource on coastal climate change impacts and adaptation, providing social science research results and expert consultation to Maine communities and other states. One of the investigators on the project is now a full-time climate change educator with Sea Grant Extension, one of only two in the nation. A new related project, funded by the National Science Foundation through the Sustainability Solutions Initiative Experimental Program to Stimulate Competitive Research (EPSCoR), is developing a climate change vulnerability and community assets assessment with pilot communities in Maine in order to develop adaptation tools and approaches. A second related project resulting from this work is a new partnership with Inner City Fund International and the Casco Bay Estuary Partnership's Climate Ready Estuaries initiative in Casco Bay. ([More information](#))

### [Maryland Sea Grant](#)

#### **Oyster restoration efforts bolstered by record production of hatchery reared spat**

A Sea Grant led program at The University of Maryland Center for Environmental Science (UMCES) is the main source of oyster spat for Maryland. The hatchery is located at the UMCES' Horn Point Laboratory on Maryland's Eastern Shore. This effort supported the planting of nearly 750 million hatchery-reared oysters in the Maryland portion of the Bay in 2009, marking a new record in the state's oyster restoration efforts. This effort supports oyster restoration to improve oyster harvest and increase ecosystem services provided by healthy oyster habitat. ([More information](#))

### [Michigan Sea Grant](#)

#### **Small Harbors Coalition supports safe navigation**

Michigan Sea Grant and its partners provided initial leadership and now provide technical support for the Michigan Small Harbors Coalition. The coalition is a group of more than 60 municipalities, harbor commissions and other entities with responsibility for managing the state's federally authorized shallow draft harbors. Coming together in 2007, the Coalition has worked collaboratively to seek increased federal funding for maintenance dredging that will enhance safety and economic value of the state's small harbors. As a result of the Coalition's effort Michigan harbor maintenance budgets increased by \$6 million. ([More information](#))

### [Minnesota Sea Grant](#)

#### **Sea Grant helps orchestrate Erie Pier dredge material reuse**

Minnesota Sea Grant worked with the US Corps of Engineers to reengineer how dredge material is handled in the US. This project has the potential to create a multi-billion dollar impact as confined disposal facilities become full and outdated. Staff initiated a relationship with the National Sea Grant Law Center to engage the help of law students to review the policies that might govern the movement and use of dredge material. Staff also initiated a cost market analysis to create an understanding of the value of recycle-reuse of dredge material. The Law Center's final report, "Converting the Erie Pier Confined Disposal Facility to a Processing and Reuse Facility: Is an Interstate Compact a Necessary Component?" was published in the *Journal of Maritime Law and Commerce*.

### [MIT Sea Grant](#)

#### **SeaPerch Institute enters second year and reaches over 425 teachers**

In 2009, Massachusetts Institute of Technology (MIT) Sea Grant piloted the SeaPerch Institute (SPI). SeaPerch is an innovative underwater robotics program that trains teachers to teach their students how to build an underwater Remotely Operated Vehicle (ROV). The Institute allows Sea Grant educators and engineers to work more closely with selected schools and thoroughly embed Sea Perch into a school's curriculum. The SPI is leveraging the success of the Sea Perch Program which started in 2003 as an innovative way to ignite children's enthusiasm for science, technology and engineering. Sea Grant educators have run over 24 two-day "train the trainer" workshops across the country and internationally, educating over 425 teachers. These teachers then return to their schools to teach their students to build an ROV. ([More information](#))

### [Mississippi-Alabama Sea Grant](#)

#### **Sea Grant helps shrimp farmers improve shrimp survival by 20%**

When post-larvae (PL) or baby shrimp are moved from the nursery to low-salinity conditions of the growing ponds poor survival is often observed. PL shrimp are a significant expense, and if the quantity surviving is not known, ponds cannot be properly managed. Improved techniques were required to increase survival and subsequently improve management and profit margins. Mississippi-Alabama Sea Grant research is helping local shrimp farmers improve the survival of PL shrimp as they grow by gaining more awareness of how changes in temperature and salinity impact shrimp survival. This has resulted in better survival during the production season, allowing farmers to increase their production at harvest from an average of 2,500-2,700 pounds/acre a couple of years ago to greater than 3,000 pounds/acre in 2009 or 10- to 20-percent increase in production. This resulted in \$84,000 savings. In short, Mississippi-Alabama Sea Grant improved acclimation techniques utilized by inland shrimp farmers in Alabama, thus increasing survival and production of shrimp at harvest.

### [New Hampshire Sea Grant](#)

#### **Sea Grant research develops new grid systems on shrimp trawls**

Sea Grant-developed grid systems reduced Gulf of Maine shrimp count (average size increased) by 15 to 20 count/pound. New Hampshire Sea Grant fisheries extension staff worked with fishermen to employ this gear with impressive results. The gear was utilized by 4 commercial shrimp fishermen who switched from the more traditional shrimp harvesting nets. A newly-developed topless shrimp trawl reduced Gulf of Maine herring by-catch by 90% without loss of shrimp. A rope separator haddock trawl was completed that has reduced cod by-catch by 60% with only a 16% loss of haddock. It also eliminated nearly all other species including flounders, lobsters, skates and dogfish.

### [New Jersey Sea Grant](#)

#### **Sea Grant Clean Marina efforts improve coastal water quality and enhance recreational boating**

Recreational boating activities often contribute to nonpoint source pollution. The New Jersey Marine Sciences Consortium/New Jersey Sea Grant Program continued its partnership with the New Jersey Department of Environmental Protection to implement the New Jersey Clean Marina Program to minimize the impact recreational boating activities have on the environment. Sea Grant has offered Clean Marina-related workshops to over 140 marinas, sent guidebooks to 230 marinas and recognized over 30 marinas as a Clean Marina. Marinas have implemented Clean Marina best management practices to reduce spills that occur during fueling, capture water from hull washing, rent dustless sanders, improve recycling efforts, collect mercury containing devices, develop emergency response plans, educate boaters and installed pumpout facilities. ([More information](#))

### [New York Sea Grant](#)

#### **Sea Grant takes lead in addressing and preventing viral hemorrhagic septicemia**

Viral hemorrhagic septicemia (VHS) is a serious viral disease of freshwater, marine and hatchery-raised fish. A new strain of VHS in the Great Lakes causes mortalities in several economically important species. With partial New York Sea Grant research support, researchers refined the molecular technique used to diagnose VHS and generated key research information necessary for operators of fish-rearing facilities to prevent and/or contain the virus. Since 2009, New York Sea Grant has coordinated workshops with the Lake Champlain and Pennsylvania Sea Grant programs that focused on biosecurity concepts. Forty-five operators of state, federal and private fish-rearing facilities as well as fish health experts were provided with the new protocol for the containment and prevention of the new VHS virus. Based on workshop evaluations, 100% of the workshop attendees indicated that they would utilize these guidelines in their own fish-rearing facilities and share them with other aquaculture practitioners. Through its research and outreach, New York Sea Grant is rapidly conveying information about VHS and its transmission directly from the laboratory to managers, helping to prevent the disease from negatively impacting Great Lakes recreational and commercial fisheries. ([More information](#))

### [North Carolina Sea Grant](#)

#### **Sea Grant encourages seasonal choices for North Carolina seafood**

North Carolina Sea Grant has long been dedicated to focusing consumer attention on the importance of seasonal fisheries in communities from Currituck to Calabash. At varied events each year, thousands of visitors take home Sea Grant's "Local Catch" wallet cards and charts to learn more about North Carolina seafood. The Carteret Catch local seafood program, initiated by Sea Grant and partners, has inspired other education and branding efforts, including Brunswick Catch, Ocracoke Fresh and Outer Banks Catch, the latter having received a \$150,000 grant from an statewide foundation. ([More information](#))

### [Ohio Sea Grant](#)

#### **Sea Grant helps Ohio tourism team with online economic development toolbox**

Tourism brings in \$38 billion annually to Ohio businesses, attractions, hotels, restaurants and retail shops. Product development was recognized by the Ohio State University (OSU) Extension Tourism Team as an important way to encourage tourism growth in Ohio. The Ohio Department of Development's Tourism Division provided matching funding to an OSU Extension grant. The team assembled information on many topics, including starting a new business, collaborative marketing, identifying trends, gathering community input, creating new products and much more. Ohio Sea Grant's Tourism Program Director presented at town hall meetings throughout the state to announce the availability of this economic development tool. A new electronic toolbox was developed to provide an up-to-date site for tourism professionals to keep pace with the ever-changing needs of the dynamic tourism industry. The toolbox includes links on starting a business and other educational materials. New material is created and added by team members to meet clientele needs. Training videos and podcasts are available at the toolbox. This is an industry resource that is helping to create a stronger Ohio economy. ([More information](#))

### [Oregon Sea Grant](#)

#### **Ultraviolet light water treatment helps protect West Coast oysters**

When *Vibrio tubiashii* threatened the \$85 million West Coast commercial oyster industry, Oregon Sea Grant provided funds to come up with a solution. Researchers developed and successfully tested a water treatment system that uses ultraviolet light to kill the pathogen. The Whiskey Creek Hatchery – the largest independent producer of shellfish larvae on the West Coast, providing seed stock to at least 60 US-based growers – invested \$100,000 of its own money to install the system and effectively protected its stock. The system has also been installed in Puget Sound hatcheries. Oregon Sea Grant continues to work with the shellfish industry to help it deal with challenges and untapped production opportunities.

### [Pennsylvania Sea Grant](#)

#### **Engagement increases student/teacher connections to coastal areas**

Sea Grant educators successfully piloted the Watershed and Airshed Education Program to increase understanding of the connections between the water, the atmosphere and the land. With leveraged funds from the DuPont Company, staff engaged 227 middle and high school youths and their teachers who live in Chester and Philadelphia in classroom, laboratory and field programs at local natural areas. The results showed that the financial, technical and instructional assistance from Sea Grant became a catalyst for schools to improve science and environmental education instruction and motivated teachers to improve their teaching practices. The program had a significant impact on impoverished schools where many students had never been on a field trip, and for teachers who have never taught science using field or lab activities. ([More Information](#) )

### [Puerto Rico Sea Grant](#)

#### **Sea Grant provides instrumental science and extension research for adaptive fisheries management**

After the sweeping fisheries regulations of 2004, and the ensuing banning of beach seines (a traditional fishing gear of the Caribbean), without scientific support, Sea Grant was summoned by the Department of Natural and Environmental Resources and the fishers to engage in a research project to understand the impact of the gear, and to offer recommendations supported by the best research available. The study was conducted throughout 2009 with more than 150 fishers participating on a voluntary basis to deploy the gear. The study is the first scientific report produced in Puerto Rico providing information which eventually will allow resource managers to decide the best management for this type of fishery. A series of recommendations, under different fishing scenarios, were also included. A video CD was also provided, displaying the effect of the seine, especially on seagrass areas.

### [Rhode Island Sea Grant](#)

#### **Trawl uses fish behavior to reduce bycatch and preserve haddock fishery**

By fostering collaboration between commercial fishermen, a commercial net maker, and fisheries researchers, Rhode Island Sea Grant brought the “Eliminator Trawl” into fisheries management. This trawl net dramatically reduces the bycatch of cod by exploiting fish behavior: cod tend to swim down when being pursued by a net, while haddock swim upward. The net is designed to allow the cod to escape through the lower portion of the net while the haddock are caught. The Eliminator Trawl, which won the 2007 World Wildlife Fund International Smart Gear award, allows fishermen to once again pursue haddock, which had been closed to fishing due to bycatch of cod. This innovation is estimated to have a \$30 million impact on the New England economy.

## [South Carolina](#)

### **Long Bay hypoxia research examines causes of “dead zone”**

In 2004, anglers were startled by unusually large catches of flounder in the coastal ocean waters off Myrtle Beach, SC, often called Long Bay. Hypoxic, or low-oxygen, levels in the water had created a “dead zone” that drove fish toward the shoreline. Again, in August 2009, water quality monitoring indicated that Long Bay experienced an anoxic event. In response, the S.C. Sea Grant Consortium convened a Long Bay Working Group (LBWG) to collaborate on research, monitoring and educational efforts, and to develop strategies to support management responses. The Consortium and its partners are supporting scientists studying the physical, biological, chemical and geological coastal ocean processes in Long Bay in order to try to identify the causes of these phenomena. The LBWG is developing tools for use in forecasting future low-oxygen events in Long Bay. These efforts have fostered additional studies, including research to evaluate the contribution of groundwater discharge to water-quality issues, as well as two pilot studies using autonomous underwater vehicles to validate and expand the findings. The research results are being used by coastal and fishery managers and local communities. ([More information](#))

## [Texas Sea Grant](#)

### **Sea Grant reduces fuel consumption and saves jobs**

Texas Sea Grant facilitated the testing of new, fuel-efficient trawl gear by 15 elite producers throughout the Gulf and South Atlantic states. So far, reported fuel savings range from 20 to 39 percent. For the median trawler, expected annual fuel savings amount to roughly 19,000 gallons per season. Assuming \$3.50 per gallon for industrial diesel, the average for the first five months of 2008, this experimental trawl gear saves the vessel owner about \$67,000. In Brownsville, Texas, where more than 85 percent of the vessels have adopted the experimental gear, fuel savings were an estimated 2.5 million gallons valued at \$8.75 million last year alone. An estimated 200 jobs were saved because without the fuel savings, many of the boats would have remained at dock during the 2008 season.

## [USC Sea Grant](#)

### **Visitor impact study leads to great stewardship of rocky intertidal marine protected areas**

A researcher from USC Sea Grant documented visitor impacts on near-shore ecosystems to identify changes in the abundances of marine life. As a result of the study, Orange County shoreline communities adopted policies to foster the management and stewardship of their rocky-intertidal Marine Protected Areas. The cities of Laguna Beach, Newport Beach and Dana Point established positions for shore or reserve managers who patrol the Orange County coast during low tides to educate and advise visitors on proper stewardship. The programs have now grown to include a cadre of docents who volunteer their time to educate shore visitors on appropriate tide pool etiquette. ([More information](#))

### [Virginia Sea Grant](#)

#### **Sea Grant enhances marina-related business in Virginia coastal economies by over \$32 million**

The viability of coastal communities in Virginia depends on their ability to use coastal natural resources sustainably. To do this, communities require data to make informed economic policy decisions, and technical assistance to access financial resources. The Virginia Sea Grant Coastal Community Development program conducts socioeconomic research and provides assistance to coastal communities so that they can sustainably develop the economic potential of their waterfronts. Sea Grant completed a survey on the impact of personal property taxes on boat-owners that helped the Hampton City Council make decisions about their tax policies. Based on this work, the City Council voted to extend their \$0 personal property tax on recreational watercraft, retaining an annual estimated \$30.8 million in economic activity of boat owners and the retention of 394 full time jobs. Sea Grant also provided technical support to Virginia marinas applying for federal Boating Infrastructure Grants (BIG), generating \$0.5 million in new BIG investments at Commonwealth marinas. That direct funding translated into \$1.13 in economic impact to Virginia plus \$0.3 million in program match from local marinas and communities, for a total of \$1.43 million during 2009. This level of economic output in the marina sector is associated with 18 full time jobs.

### [Washington Sea Grant](#)

#### **Deep-sea habitats and inhabitants astound scientists on Sea Grant-funded cruise**

Reef-building glass sponges were thought to be extinct until Canadian scientists discovered them off the coast of British Columbia in the late 1980s. With funding from Sea Grant, University of Washington researchers expanded our understanding of glass-sponge reefs and the range and conditions under which their unusual builders can operate. Glass sponges remain fixed in place during their 100- to 200-year life spans. They feed by filtering bacteria from seawater. In the case of the Washington reefs, the bacteria may be living on methane or natural gas that the crew discovered as it seeped out of the ocean floor near the reefs. The Washington reef could represent a new kind of undersea community and has many implications for marine spatial planning, climate change and fisheries. ([More information](#))

### [Woods Hole Sea Grant](#)

#### **Probes help predict red tides**

Sea Grant researchers have developed molecular probes that help identify the species responsible for harmful algal blooms (HABs). The probes are used to rapidly characterize bloom conditions and the potential threat of toxin accumulation in shellfish stocks, a serious public health risk. The probes have been commercialized by Saigene, Inc., and were very effective in predicting extensive red tide conditions experienced off the New England coast.

### [Wisconsin Sea Grant](#)

#### **Sea Grant research leads to fewer beach closings**

Across the nation, beach closings due to contamination from sources such as storm water, sewage and bird waste have long posed a challenge for public health officials, regulatory agencies, water resource managers and policymakers. Now, thanks to a Sea Grant researcher who developed DNA-based methods to track sources of pollution, problems are accurately pinpointed and addressed. In Wisconsin's largest city, Milwaukee, formerly unused lakefront recreational areas are now jammed with beachgoers from a nearly 1.6 million-population metropolitan area. Bradford Beach, the largest, has been cleaned up with \$1.5 million in combined public-private money that funded work such as installation of storm water outflow infrastructure along the beach, rain gardens and the use of trained border collies that chase off sea gulls, whose waste is a significant source of contamination. ([More information](#))



## U.S. Senator Sheldon Whitehouse Rhode Island

Rhode Islanders know they can count on Sheldon Whitehouse as a tireless advocate, fighting on the issues that touch our lives every day – from jobs and economic development, to health care, the environment and the future for their children. Sheldon Whitehouse makes a difference for the people of Rhode Island.

In the Senate, and before that as Rhode Island's Attorney General and U.S. Attorney, Sheldon has focused on the well-being of families, children, and seniors; protecting consumers; helping small businesses grow and create jobs; and assisting the unemployed and all those hit by the recession, a changing economy and hard times.

Job creation is Sheldon's immediate top priority. Earlier this year, he launched his "Making it in Rhode Island" initiative, listening to Rhode Island small businesses and manufacturers, the backbone of our state's economy, and offering a plan to boost local manufacturing. Sheldon's plan will make Rhode Island businesses more competitive, provide continued access to capital, and eliminate the tax incentives encouraging companies to move jobs overseas. Sheldon knows how imperative it is we keep good jobs here at home.

Tough economic times make it tougher for families to make ends meet. Sheldon understands that the loss of a job can mean the loss of a home and is continuing to work to expand efforts to help people avoid foreclosure. He has also been working to lower taxes for the middle class and protect Social Security from cuts.

We live in one of the most beautiful states in the nation, and Sheldon understands that the quality of our lives is tied directly to the quality of our environment. As a member of the Senate Environment and Public Works Committee, Sheldon has championed efforts to protect our environment, including our oceans and marine ecosystems, which are so important to our tourism and fishing industries. He is also a forceful advocate for urgent action to address the threat of climate change, especially its impact on our coastal communities.

And Sheldon understands the impact of high health care costs on everyone in Rhode Island – from families and seniors who need care to all those who provide it. He is a leader in the effort to expand the use of information technology in health care, to lower costs, and to improve the quality of care, helping Rhode Island become a national leader in the development and implementation of this technology.

A graduate of Yale University and the University of Virginia School of Law, Sheldon served as a policy advisor and counsel to the Governor of Rhode Island and as the state's Director of Business Regulation before being nominated by President Bill Clinton to be Rhode Island's United States Attorney in 1994. He was elected State Attorney General in 1998, a position in which he served from 1999-2003. On November 7, 2006, Rhode Islanders elected Sheldon to the United States Senate, where he is a member of the Budget Committee; the Environment and Public Works (EPW) Committee; the Judiciary Committee; the Health, Education, Labor, and Pensions (HELP) Committee; and the Special Committee on Aging. He chairs the Judiciary Subcommittee on Crime and Terrorism and the EPW Subcommittee on Oversight.

He lives in Newport with his wife, Sandra, a marine biologist and environmental advocate, and their two children.



Dr. Barry Costa-Pierce has been the director of Rhode Island Sea Grant and Professor of Fisheries and Aquaculture with a joint faculty appointment in the Dept. of Marine Affairs at URI since 2001. Costa-Pierce and students work on a wide range of ecological and social issues in aquaculture worldwide (see <http://ecologicalaquaculture.org>). Since 1999 has been an Editor of *Aquaculture* and is the Chair Elect of the Board of Directors for the international charity “Aquaculture without Frontiers” (see <http://aquaculturewithoutfrontiers.org>). From 1998-2001 he was the director of Mississippi-Alabama Sea Grant. For 10 years he was a research scientist for the International Center for Living Aquatic Resources Management (ICLARM), based first in Indonesia, directed he ICLARM’s Africa office where he worked for the FAO, World Bank, USAID, GTZ, and the Asian Development Bank. In the U.S., Costa-Pierce has taught at the Scripps Institution of Oceanography, California State Polytechnic University, the Oregon Institute of Marine Biology, and the University of Minnesota. He was also “Student Recommended Faculty in Global Sustainability” at the University of California, Irvine.

# NOAA National Sea Grant College Program



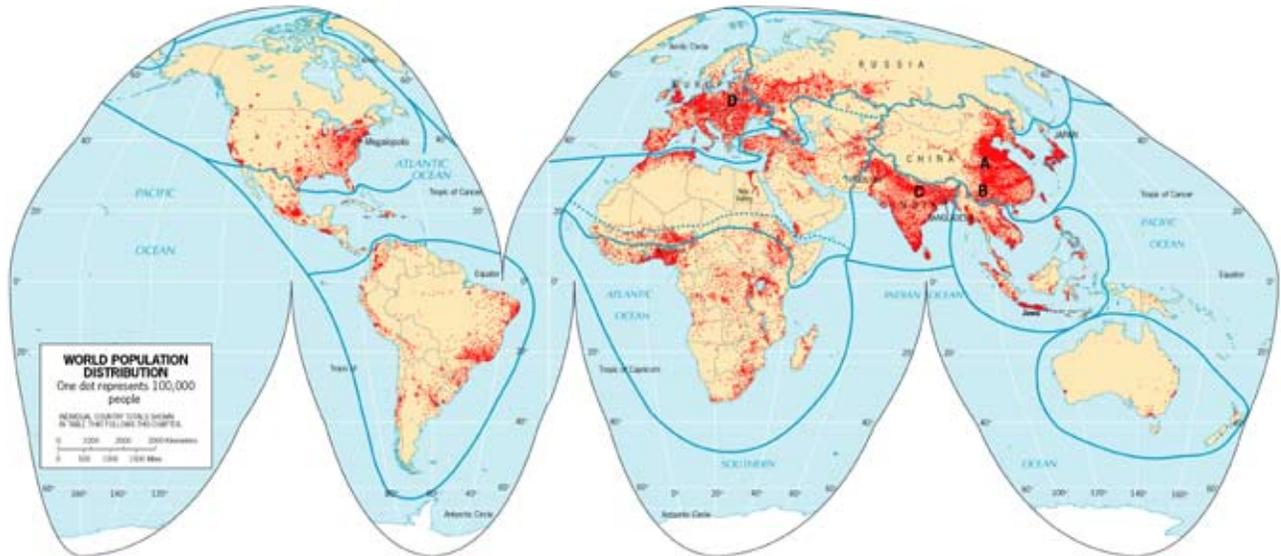
Strategic Plan 2009 — 2013

*Meeting the Challenge*



Sea Grant

# World Population Density



Around the world hundreds of thousands move to the coast every year, making it increasingly important that we find adequate ways to balance human social and economic activities. Along with other coastal nations, America must use its coastal land, water, energy, and other natural resources in ways that preserve the health and productivity of coastal ecosystems.

# Introduction

America's coasts are invaluable economic, cultural and environmental resources that are at risk in this first decade of the 21<sup>st</sup> century. Increased rates of climate-related environmental changes have made coastal communities vulnerable in ways never before imagined. Overfishing and habitat degradation have contributed to declines in many U.S. fisheries. Heightened concerns about human health and safety are bringing greater attention to port security, coastal infrastructure deterioration, and seafood safety. As hundreds of thousands more Americans move to the coast every year, it is increasingly important that we find adequate ways to balance human social and economic activities. America must use its coastal land, water, energy, and other natural resources in ways that preserve the health and productivity of coastal ecosystems and optimize benefits to U.S. citizens.

According to the U. S. Commission on Ocean Policy report, the U. S. coastal zone contributed \$4.5 trillion to the U. S. economy in 2005. The challenges we face on our coasts have significant implications for the nation as a whole, as well as for the people who live and work in coastal communities. Leaders at all levels—national, state, and local—must work with citizens, private sector businesses, and other organizations to utilize our intelligence, ingenuity, and financial resources to turn a time of potential crisis into a time of opportunity. As individuals and as a nation we must take immediate steps to educate ourselves about the magnitude of the threats we face and respond to these in bold and creative ways.

The world around us is changing. Globalization of technology, people, finance, products, and decision-making means factors beyond our national borders are affecting the vitality of U.S. coastal communities and economies. Businesses are functioning in an increasingly competitive global economy and many policy decisions are taking place at an international level. The need for collaborative problem-solving at the state, regional, national, and international levels has never been greater.

Severe challenges present the greatest opportunities for change, and Sea Grant is prepared to respond. One of the demonstrated strengths of individual Sea Grant programs is the ability to move rapidly to mobilize universities and other partners to address challenges across the country and around the world. Likewise, one of the strengths of the Sea Grant network is the ability, through the organization's coordinated state and regional structures, to implement the national goals of the National Oceanographic and Atmospheric Administration (NOAA) at local, state, and regional levels.

At this time of great risk and opportunity, the Sea Grant network and its individual programs will address the goals set forth in this plan with innovation and creativity, reflecting the particular needs of their own states and communities, as well as the nation as a whole.



## SEA GRANT VISION AND MISSION

*The National Sea Grant College Program envisions a future where people live along our coasts in harmony with the natural resources that attracted and sustain them. This is a vision of coastal America where we use our natural resources in ways that capture the economic and recreational benefits they offer, while preserving their quality and abundance for future generations.*

This vision reinforces the vision articulated in NOAA's 2006-2011 Strategic Plan: “. . . 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.”

*Sea Grant's mission is to provide integrated research, extension and education activities that increase citizens' understanding and responsible use of the nation's ocean, coastal and Great Lakes resources and support the informed personal, policy and management decisions that are integral to realizing this vision.*

Sea Grant advances NOAA's mission “. . . to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs.”

## ESSENCE OF SEA GRANT

Sea Grant was created almost 42 years ago to unite the academic power of the nation's universities with a wide range of public and private sector partners. Through these partnerships, Sea Grant provides integrated research, outreach, and education programs aimed at creating tangible benefits for ocean, coastal and Great Lakes environments and communities. Located within NOAA, Sea Grant brings together government, universities, and citizens living and working in America's coastal and Great Lakes states to use their resources to respond to problems and opportunities in these complex and dynamic environments.

Sea Grant is a national network comprised of the National Sea Grant Office, 32 university-based state programs, the National Sea Grant Advisory Board, a National Law Center, a National Sea Grant Library, and hundreds of participating institutions. This network enables NOAA and the nation to harness the best science, technology, and human expertise to balance human and environmental needs in coastal communities. Sea Grant's alliance with major research universities provides access to more than 3,000 scientists, outreach specialists, educators, and students. Sea Grant's university-based programs are fundamental to the development of the future scientists and managers needed to conduct research and to guide the responsible use and conservation of our nation's coastal, ocean and Great Lakes resources. With its strong research capabilities, local knowledge, and on-the-ground workforce, Sea Grant offers NOAA and this country an unmatched ability to identify and capitalize on opportunities, and, to generate practical solutions to real problems in real places.

Sea Grant is required to match every \$2 of federal funding with \$1 of non-federal funds; many state programs far exceed this match. By leveraging additional money, Sea Grant expands the reach and effectiveness of NOAA and other partners in planning for and managing the future of America's ocean, coastal, and Great Lakes resources. The match required for federal funding also ensures that this country receives the maximum benefit from each dollar invested in Sea Grant.

## **SEA GRANT CORE VALUES**

A strong set of core values has been the foundation of Sea Grant's work from its inception. Sea Grant was founded on a belief in the critical importance of strong partnerships. The organization's partnerships with leading research universities, with other NOAA programs, and with a wide range of public and private partners at the federal, state, and local levels, have proven to be a highly effective way to solve problems and create opportunities. In addition, Sea Grant's integration of research, extension, and education activities is at the heart of its mission. As a pioneer in what is referred to as "translational research: from discovery to application," Sea Grant ensures that unbiased, science-based information is accessible to all.

The diverse capabilities of Sea Grant's state programs enable the organization to be creative and responsive in generating policy-relevant research and in disseminating scientific and technological discoveries to a wide array of audiences. Because it is science-based, non-regulatory, and has an established presence in local communities, Sea Grant is a trusted broker, working to increase coastal, ocean and Great Lakes literacy among decision-makers and the public as a whole. Sea Grant's commitment to these core values is vital to achieving the goals set forth in this plan.

## **SEA GRANT IN NOAA**

The goals and strategies outlined in this plan incorporate many NOAA priorities: promoting the health of coastal ecosystems; increasing the accessibility and application of quality research to support wise decision-making; increasing the number of fish stocks managed at sustainable levels; and, expanding literacy about coastal ecosystems.

The urgent need for practical solutions to coastal problems requires coordination, cooperation, partnerships, and effective investment. Sea Grant provides NOAA with access to Sea Grant's university-based capabilities in order to achieve shared goals. The National Marine Fisheries Service-Sea Grant Joint Graduate Fellowship, with its programs in population dynamics and marine resource economics, is just one example of the importance and effectiveness of this partnership. Sea Grant also works closely with National Ocean Service coastal programs to set national priorities for coastal management and to ensure closer coordination of coastal activities. Numerous partnerships exist between Sea Grant and the National Weather Service on subjects such as climate change, ocean and coastal observing, and rip currents.



NOAA's Coastal Services Center, the Office of Ocean and Coastal Resource Management, the National Centers for Coastal Ocean Science, and Sea Grant, are working to integrate their efforts more effectively. The purpose of collaborative planning among these programs is to ensure that NOAA's coastal programs are focused on national priorities, and that their work is coordinated, outcome-oriented, and built around each program's strengths. Additional NOAA programs will be brought into this effort to create a more inclusive coastal enterprise. Two of the focus areas of this plan, sustainable coastal development and hazard resilience in coastal communities, are designed to advance these integration efforts.

## **PLANNING PROCESS AND STRATEGIC APPROACH**

This five-year strategic plan establishes direction for the Sea Grant network to address critical national needs in coastal, ocean and Great Lakes environments. The plan capitalizes on Sea Grant's unique capacities and strengths, allows for flexibility and creativity on the part of state Sea Grant programs, and supports many of the priorities in NOAA's strategic plan.

The collective Sea Grant network brought its wealth of experience to the task of creating this plan. The planning process began with a review of the U.S. Commission on Ocean Policy Report and the U.S. Ocean Action Plan, the NOAA Strategic Plan, the Ocean Research Priorities Plan and Implementation Strategy, the NOAA 5-Year Research Plan, Sea Grant state strategic plans, and other recent coastal/ocean plans and reports that set national, state and regional priorities. To elicit input and guidance, a national stakeholder's workshop was convened in Washington, DC in July 2007, with representatives from NOAA programs, other federal agencies, and non-profit organizations that focus on coastal, ocean and Great Lakes issues. In addition, to obtain the benefit of a wide range of stakeholder viewpoints, state Sea Grant programs were asked to share the outcomes of recent stakeholder meetings, surveys, and regional research agendas and initiatives, and to poll their advisory committees. The Sea Grant network convened for Sea Grant Week in San Diego, CA in October 2007 to identify priority goals and strategies for this strategic plan.

Three cross-cutting goals and four specific focus areas emerged from the strategic planning process. These goals and focus areas reflect America's most urgent needs in the coastal, ocean and Great Lakes arenas, NOAA priorities, and Sea Grant's strengths and core values. This strategic plan provides a national guide for the work of the state Sea Grant programs. The state programs will also develop their own strategic plans that contribute to the realization of national goals, while reflecting the specific needs and priorities of their states and regions. In addition, all parts of the Sea Grant network will work together to create a national implementation plan to accompany this document, establishing measurable objectives that will be used to evaluate progress in achieving the national strategic goals.

# Cross-Cutting Goals

Managing coastal, ocean and Great Lakes resources in ways that balance human needs with environmental health requires progress in three fundamental areas:

- We need better information about how coastal, ocean and Great Lakes ecosystems function and how human activities affect coastal, ocean and Great Lakes habitats and living resources;
- We need citizens who understand the complexities of coastal environments and the interactions between human use and the health of coastal ecosystems;
- We need management and decision-making processes that are based on sound information, involve everyone who benefits from the beauty and bounty of America's coastal resources, and include mechanisms to evaluate trade-offs between human and environmental needs.

To facilitate progress in these areas and to help the nation understand, manage, and use its coastal, ocean and Great Lakes resources wisely, Sea Grant has identified three cross-cutting goals central to all that Sea Grant does. The three goals reflect the value of Sea Grant's integrated approach to research, extension, and education. They provide the foundation of Sea Grant's work and are integral to the success of this five-year plan.



# Cross-Cutting Goals

## Goal

**Sound scientific information to advance understanding of the nature and value of our coastal, ocean, and Great Lakes resources; to identify new ways to conserve and use these resources; and to support evaluation of the environmental impacts and socio-economic trade-offs involved in coastal decision-making.**

Short-term economics often influence coastal decision-makers to make their decisions without understanding the long-term social, environmental, and economic consequences of their decisions. Ecosystem functioning and values, emerging economic opportunities, and the social and economic costs and benefits of various human activities need to be translated into factors understood by the general public in order for sustainable uses of coastal environments to become a reality. Sea Grant has a long history of generating cutting-edge research and supporting technological innovations related to informed conservation and use of coastal, ocean and Great Lakes resources.

## Strategies

- Support research to generate the scientific, technical, and legal information needed to increase understanding of coastal, ocean, and Great Lakes processes; support the development of new businesses, products, tools, and technologies; and answer the most pressing questions related to coastal, ocean and Great Lakes resource conservation, use, and management at the state and regional levels.
- Play a leadership role within and outside of the Sea Grant network in increasing the amount of socio-economic research available to help decision-makers evaluate socio-economic trade-offs and assess risks to the future health and productivity of coastal, ocean and Great Lakes resources.
- Integrate, translate, and disseminate research findings and technological discoveries to the citizens, industries, and leaders who need them to capitalize on opportunities and make wise management decisions.

# Cross-Cutting Goals

## Goal

**An informed public that understands the value and vulnerability of coastal, ocean, and Great Lakes resources, and demands informed science-based decisions about the conservation, use, and management of these resources, and a well-trained workforce that will make this a reality.**

The 2004 U.S. Commission on Ocean Policy Report emphasized that restoring and sustaining our coastal, ocean and Great Lakes environments requires an informed citizenry that understands the value and vulnerability of these resources. We also need scientists, planners, developers, engineers, and people involved in all water-related enterprises who understand the interactions between human activities and ecosystem health. NOAA has made ocean and aquatic literacy a strategic priority. Sea Grant has been a leader in K-12, undergraduate, graduate, professional, and technical education in coastal, ocean and Great Lakes-related areas for decades. Sea Grant is committed to playing a leadership role in partnership with the NOAA Office of Education and others to advance coastal, ocean and Great Lakes literacy. This can be done by capitalizing on Sea Grant's strong university partnerships, and by using its education and extension capacities to develop educational programs for schools, professional education, and workforce training.

## Strategies

- Advance coastal, ocean and Great Lakes literacy through formal and informal learning opportunities in our schools, museums, aquariums, and other educational forums, such as the on-line, digital collections of the Aquatic Commons and the National Sea Grant Library.
- Use Sea Grant's strong university partnerships to create new research and education opportunities in marine and aquatic science for undergraduate and graduate students and to develop information products and training opportunities that will help build the workforce capacity for coastal-related jobs and professions.
- Collaborate within NOAA and with other partners to build public awareness about critical ocean, coastal, and Great Lakes issues, using the integrated research, extension, education, and communication capacities of the entire Sea Grant network.



# Cross-Cutting Goals

## Goal

**Decision-making processes that involve the full-range of coastal interests, that integrate efforts of public and private partners at the federal, regional, state, and local levels, and provide mechanisms for establishing common understandings and generating outcomes that balance multiple interests.**

The continued migration of people to our coastal areas increases the complexity of coastal decision-making and creates greater potential conflict among users at a time when coastal decision-making remains fragmented and narrowly focused. Sea Grant's long-standing relationships with a wide variety of stakeholders in coastal communities and its reputation as a source of unbiased information enable the organization to play a leadership role in promoting effective information sharing, consensus building, and integration of efforts in the coastal arena. Sea Grant can enhance its effectiveness by working closely with other NOAA coastal programs through regional research alliances and by employing international, national, and regional ocean observation systems.

## Strategies

- Use Sea Grant's research, extension, and education capabilities to encourage and support the creation of public decision-making processes that minimize overlap, maximize effectiveness, and provide an integrated response to coastal problems and opportunities.
- Build consensus on complex issues such as coastal land use, energy development, public access, invasive species control, and climate change impacts by supporting cutting-edge research, building broader understanding among various constituency groups, and convening diverse groups of stakeholders to work together to find common solutions.
- Strengthen partnerships to promote national, regional, and issue-related collaboration among federal and state programs and other partners in order to support more effective and integrated coastal decision-making.

These three cross-cutting goals have been a foundation of Sea Grant's work since it was established, and they are fundamental to success in the focus areas outlined in this plan. The more specific goals and strategies outlined in the focus areas build on these cross-cutting goals, generating the knowledge and creative solutions needed to address challenges and opportunities related to healthy coastal ecosystems, sustainable coastal development, a safe and sustainable seafood supply, and hazard resilience in coastal communities.

# Focus Areas

Over the next five years, Sea Grant will concentrate effort in four areas: **healthy coastal ecosystems; sustainable coastal development; a safe and sustainable seafood supply; and hazard resilience in coastal communities.** These four interrelated focus areas emerged from the strategic planning process as areas of critical importance to the health and vitality of the nation's coastal resources and communities. They respond to issues of major importance to NOAA, are consistent with the work of the NOAA coastal program integration effort, and are topical areas in which Sea Grant has made substantial contributions in the past and is positioned to make significant contributions in the future.

In each of the four focus areas, Sea Grant has identified goals to pursue and strategies designed to take advantage of its strengths in integrated research, outreach, and education, and its established presence in coastal communities. Understanding relationships and synergies across focus areas is vital to achieving the focus area goals. Sea Grant is one of many partners working to address these complex and interrelated issues. Understanding how activities in one area can support and complement other activities, and using partnerships to accomplish shared goals, are strategies inherent to Sea Grant, and will be central to achieving the goals outlined in this plan.



# HEALTHY COASTAL ECOSYSTEMS

Healthy coastal ecosystems are the foundation for life along the coast. However, increasingly rapid coastal development, global overfishing, and other human activities are leading to water quality degradation, decline of fisheries, wetlands loss, proliferation of invasive species, and a host of other challenges that need to be understood in order to restore and maintain these ecosystems. Ecosystem functioning does not respect traditional political boundaries, and responsible management of ecosystems requires new kinds of thinking and actions. Sea Grant is a leader in regional approaches to understanding and maintaining healthy ecosystems, with planning efforts underway across the country to identify information gaps, set research priorities, and coordinate information and technology transfer to those who need it. Sea Grant has fostered efforts to address widespread problems such as invasive species that are found in geographically-dispersed areas, and has hired staff, shared among several state programs, to tackle these problems. Sea Grant's regional consortia, nationwide networks, and international contacts are particularly well-suited to helping the nation address ecosystem health at the appropriate local, state, regional, national and global levels.



# HEALTHY COASTAL ECOSYSTEMS

## Goal

### **Sound scientific information to support ecosystem-based approaches to managing the coastal environment.**

To realize the full potential of ecosystem-based management approaches, we need research that will lead to better understanding of present day conditions, basic ecosystem processes, the impacts of coastal and upland land uses on the health of coastal, ocean and Great Lakes environments, and the importance of healthy ecosystems to healthy fisheries. We also need to know more about how to transform our new knowledge and understandings into sound management principles and practices. Sea Grant will continue to build the scientific foundation needed by supporting research that provides accurate information related to ecosystem health and by accelerating the transfer of this information to coastal residents, resource managers, businesses and industries.

## Strategies

- Conduct research on ecosystem processes, the relationships between coastal stressors—water quality degradation, contaminants, harmful algal blooms, invasive species, and wetlands loss—and long-term human and ecosystem health, and communicate this information to public and private planners, decision-makers and managers.
- Contribute to the development of baseline data, standards, and indicators to support ecosystem-based approaches to land use, water, fisheries, and other resource management, working with programs such as NOAA's National Centers for Coastal Ocean Science, ocean observing programs, and others.
- Develop methodologies that can be used to evaluate ecosystem-based management approaches to assess their effectiveness once they are in place, and to guide future management efforts, working with the National Marine Fisheries Service and other federal, state and local partners.

# HEALTHY COASTAL ECOSYSTEMS

## Goal

**Widespread use of ecosystem-based approaches to managing land, water and living resources in coastal areas.**

Achieving widespread use of ecosystem-based management approaches will require extensive efforts to communicate the effects of ecosystem degradation on natural resources, local economies, and human health to a wide range of audiences in ways that motivate them to respond. Sea Grant's strong research and extension capabilities provide scientific information and technical assistance on ecosystem-based management approaches. At the same time, the organization's outreach and education capabilities engage citizens in stewardship activities that promote healthy ecosystems. All these programs can result in regional and other collaborative approaches to address problems that extend beyond traditional geographic or governmental boundaries.

## Strategies

- Work with partners within and outside of NOAA to develop data, models, and training activities that support ecosystem-based planning and management approaches, and share these with a wide variety of constituencies.
- Support the development of regional coastal observation systems and other collaborative efforts that advance our capability to predict the effects of human activities and environmental changes on coastal resources in order to take steps to mitigate their effects.
- Provide life-long learning programs for people of all ages that enhance understanding of coastal, ocean and Great Lakes environments and promote stewardship of healthy ecosystems.

# HEALTHY COASTAL ECOSYSTEMS

## Goal

### **Restored function and productivity of degraded ecosystems.**

Past activities and events have led to deterioration of nursery areas for wild fish populations, loss of wetlands, closure of beaches and shellfish beds, and proliferation of invasive species. Sea Grant will help reverse these trends by identifying and assessing impaired ecosystems, and supporting the development of new policies, technologies, and processes that promote restoration of ocean, coastal, and Great Lakes ecosystems in ways that balance the needs of the natural systems with the needs of the humans who inhabit them. Sea Grant will use its nationwide network of extension, education and communication specialists to provide the technical assistance needed, and to share new information and technologies with local, state, regional, national, and international partners.

## Strategies

- Support research to improve the effectiveness of ecosystem restoration and identify promising new restoration approaches and technologies.
- Invest in the development and dissemination of new information, policies, technologies and methods to address water quality degradation, prevent the introduction and spread of aquatic non-native species, and minimize the negative impacts of these on coastal, ocean and Great Lakes food webs.
- Provide technical support for citizens and businesses that need help with specific mitigation/restoration problems, giving them access to the latest information and techniques.

## Sustainable Coastal Development

Coastal communities in America provide vital economic, social, and recreational opportunities for millions of Americans, but decades of population migration have transformed our coastal landscapes and intensified demand on finite coastal resources. The increase in population has resulted in new housing developments and recreation facilities, a new generation of energy development activities, port expansions, and other business activities. These changes are placing tremendous pressure on coastal lands, water supplies, and traditional ways of life. To accommodate more people and activity, and to balance growing demands on coastal resources, we must develop new policies, institutional capacities, and management approaches to guide the preservation and use of coastal, ocean and Great Lakes resources. Sea Grant will engage a diverse and growing coastal population in applying the best available scientific knowledge, and use its extension and education capabilities to support the development of healthy coastal communities that are economically and socially inclusive, are supported by diverse and vibrant economies, and function within the carrying capacity of their ecosystems.



# Sustainable Coastal Development

## Goal

**Healthy coastal economies that include working waterfronts, an abundance of recreation and tourism opportunities, and coastal access for all citizens.**

Marine resources and coastal amenities sustain local and national economies through fisheries and aquaculture, seafood processing, trade, energy production, tourism, and recreation enterprises. Urban ports and waterways continue to accommodate expanding international trade, staging areas for off-shore industries, growth in tourism and recreational boating, and changes in fishing fleets. At the same time, changing development patterns along the coast are threatening to displace traditional water-dependent industries and cut off water and beach access for coastal residents. Vacant industrial buildings and obsolete infrastructure facilities can be recaptured for new marine enterprises, public access, and planned mixed-use developments that bring enjoyment to residents and visitors alike. Sea Grant's long-standing relationships with coastal communities and industries make it ideally suited to provide information, tools, and techniques to support working waterfronts, responsible energy development, the development of accessible recreation and tourism activities, and adoption of sustainable development practices.

## Strategies

- Support research and outreach activities that provide local communities with information and techniques to help them enhance their waterfront-related economic activities such as commercial and recreational fishing, aquaculture, tourism, and energy and port development, without diminishing the long-term health of the natural coastal environment.
- Support local, regional, and national efforts to preserve and increase public access to the nation's beaches and waterfronts through assessment of access needs, analysis of legal issues, and technical assistance.
- Use Sea Grant extension and education capabilities to engage coastal communities in planning processes that support the efforts of community leaders to identify and pursue sustainable economic development policies and programs.

# Sustainable Coastal Development

## Goal

**Coastal communities that make efficient use of land, energy and water resources and protect the resources needed to sustain coastal ecosystems and quality of life.**

The biggest challenge facing many coastal cities and towns today is how to manage growth in ways that do not diminish the health of the ecosystems these communities depend on. One way this is reflected nationally and internationally is in the high-level of concern about climate change and its associated effects. To respond to the challenges of growth at a local and regional level, communities are looking for ways to use land and water, generate energy, and dispose of waste that will preserve environmental health and economic vitality. Determining the amount of the land, water, and other natural resources needed to sustain healthy communities is an essential first step in establishing sustainable policies and growth practices. Only when the dimensions of this environmental footprint are identified can coastal communities understand what their carrying capacity is and what will be needed for generations to come. Sea Grant and its university partners are in a unique position to conduct research and develop models and forecasts that will help communities with this process.

## Strategies

- Strengthen Sea Grant's research activities and extension capacity to help coastal communities determine the sustainable carrying capacity of their land, water, and other resources through resource assessments, scenario building, modeling, and other techniques.
- Support innovative research on land-use practices and building designs that promote energy and water conservation, coastal-ocean related renewable energy technologies, and the creation of other tools to help communities grow in sustainable ways.
- Work with NOAA's Climate Program Office, coastal programs, and other partners to help communities evaluate their ecological footprints and grow in environmentally sustainable ways.

# Sustainable Coastal Development

## Goal

**Coastal citizens, community leaders, and industries that recognize the complex inter-relationships between social, economic and environmental values in coastal areas and work together to balance multiple uses and optimize environmental sustainability.**

According to NOAA's "Population Trends Along the Coastal United States: 1980-2008," coastal counties constitute only 17 percent of the land area of the U.S. (not including Alaska) but account for 53% of the population and are among the most rapidly growing areas in the country. The pressures on our oceans, coasts, and Great Lakes resources continue to grow. Citizens and decision-makers have an urgent need for tools that will help them evaluate the implications of land-use changes, coastal development pressures, and increased resource use in approaching the policy and management decisions they face. Regional cooperation and coordinated land-use and watershed planning are essential. Sea Grant's well-established role as a trusted broker among a wide range of interests makes it a key player in providing sound information for decision-makers, convening stakeholders to seek common ground, and facilitating the development and implementation of new coastal policies, plans, management approaches, and consensus-building strategies.

## Strategies

- Work with NOAA's Office of Ocean and Coastal Resource Management and Coastal Services Center, EPA's Offices of Smart Growth, and other federal, state and local partners to disseminate assessment tools, model plans and ordinances, best management practices, alternative development approaches, and other techniques that will enable the citizens of our coastal zones to develop their coastal economies in environmentally-sound ways.
- Build local capacity to evaluate cost-benefit trade-offs in the coastal zone through a greater emphasis on socio-economic research, impact studies, and other methods of evaluating alternative future scenarios for coastal communities.
- Foster regional cooperation and partnerships among local government officials, community stakeholders, and regional planning organizations to promote sustainable growth plans and strategies that protect local and regional natural resources that will ensure an abundance of these resources is available to serve future generations.

## Safe and Sustainable Seafood Supply

The U.S. has witnessed the decline of many of its major fisheries while seafood consumption is on the rise, resulting in a seafood trade deficit of \$8 billion per year, according to U.S. Department of Agriculture Foreign Agricultural Service statistics. At the same time, Sea Grant, through its research, extension, and education activities, and work with partners, has produced important discoveries that have aided the stabilization and recovery of many endangered fisheries. According to the NOAA Aquaculture Program, aquaculture is in its infancy in the U.S., amounting to just over \$1 billion of a \$70 billion worldwide industry. Aquaculture creates important new opportunities to meet the increased demand for seafood, but a number of questions need to be addressed for its full potential to be realized. Seafood safety is a growing concern as international trade increases and fish diseases and contamination become bigger problems. Sea Grant has key roles to play in advancing public understanding of the nature of these problems and opportunities. Through the use of its research, extension, and education capacities, Sea Grant will support the kind of informed public and private decision-making that will lead to a sustainable supply of safe seafood long into the future.



# Safe and Sustainable Seafood Supply

## Goal

### **A sustainable supply of safe seafood to meet public demand.**

Ensuring a sustainable supply of safe seafood requires an understanding of the effects of overfishing, past management decisions, and climate change on U.S. wild fish populations as well as the role ecosystem-based fisheries management can play. It also requires better understanding of the range of complex issues related to developing the domestic aquaculture industry. Sea Grant will make major contributions by supporting research that provides the knowledge needed to understand the factors stressing fisheries and the complexities of aquaculture development. Sea Grant will also translate and transfer useful research findings through extension and education activities to ensure responsible and productive use of these resources in the future.

## Strategies

- Use Sea Grant's research, extension, education, and communication capabilities to develop and disseminate essential knowledge about natural and human threats to the long-term viability of wild fish populations, to identify ways to minimize these threats, and to use ecosystem-based fisheries management and other innovative approaches to accomplish this.
- Conduct integrated research, education, and outreach activities to support a viable domestic aquaculture industry with acceptable environmental impacts, in ways that are consistent with national objectives, building on the leadership role Sea Grant plays in this area.
- Work with NOAA's National Marine Fisheries Program, other federal and state partners, and the seafood industry to enhance the management and productivity of wild fisheries.

# Safe and Sustainable Seafood Supply

## Goal

**A healthy domestic seafood industry that harvests, produces, processes, and markets seafood responsibly and efficiently.**

A healthy seafood industry requires harvesting techniques that minimize by-catch and damage to marine habitats. It requires development of value-added products, enhanced quality assurance, and education about how to market under-utilized species. Sea Grant will involve harvesters, recreational fishermen, producers and managers in being responsible stewards as well as successful entrepreneurs. Sea Grant will support development of new technologies and participate in collaborative efforts to increase the range of seafood products produced, enhancing American competitiveness in global markets.

## Strategies

- Engage harvesters, recreational fisherman, producers and managers in the development of research and management innovations related to the condition, use, and conservation of the natural resources they depend on.
- Support research, development, and transfer of new technologies to keep the domestic seafood industry financially competitive and environmentally responsible.
- Work with the seafood industry to develop new products and innovative marketing approaches to increase seafood availability and profitability.

# Safe and Sustainable Seafood Supply

## Goal

**Informed consumers who understand the importance of ecosystem health and sustainable harvesting practices to the future of our domestic fisheries, who appreciate the health benefits of seafood consumption, and who understand how to evaluate the safety of the seafood products they buy.**

Increased attention to the safety of domestic and international seafood has created an urgent need for rapid assessment techniques, certification programs, and standards for domestic and international seafood products, so consumers will have reliable information to inform their buying decisions. Sea Grant will involve industry representatives in the application of seafood safety standards, train inspectors and wholesalers in how to assess seafood quality, and develop educational materials related to seafood safety, quality, and security and make these materials readily available to consumers.

## Strategies

- Enhance training and technical assistance programs related to the application of standards for safe domestic and imported seafood.
- Develop educational programs and materials that enhance the American public's understanding of what is required to maintain sustainable domestic fisheries and to build the public's awareness of differences in the quality, safety, and nutritional benefits of different seafood products so they will be informed advocates and consumers.
- Work in close coordination with the National Marine Fisheries Service and other federal partners to develop information portals that give access to factual information on seafood safety.

## Hazard Resilience in Coastal Communities

Sea level rise, the increased number and intensity of coastal storms, the ongoing threat of oil spills, and other natural and human hazards are putting more people and property at risk along the nation's coasts, with major implications for human safety and the economic and environmental health of coastal areas. It is essential that residents of coastal communities understand these risks and learn what they can do to reduce their vulnerability and respond quickly and effectively when events occur. Sea Grant will use its integrated research, training, and technical assistance capabilities, and its presence in coastal communities to play a major role in helping local citizens, decision-makers, and industries plan for hazardous events and optimize the ability of their communities to respond and rebuild.



# Hazard Resilience in Coastal Communities

## Goal

**Widespread understanding of the risks associated with living, working, and doing business along the nation's coasts.**

Communities and businesses are increasingly vulnerable to hazardous events brought on by climate-related changes, land-use changes, and increased economic activity in coastal and Great Lakes waters. There is a great need for information and tools to help communities assess the risks they face and identify the options available to them to minimize those risks. Sea Grant will support the work of NOAA's Climate Program Office and its climate impact and adaptation-related activities. Sea Grant will work with other federal, state, and local partners, the banking and insurance industries, and others to develop forecasting and risk assessment tools, economic and environmental impact models, and other mechanisms that will help families, businesses, communities, and regions understand their risks and take them into account in making personal, business, and community-related decisions.

## Strategies

- Conduct research to assess hazard-related risks and increase the availability and usefulness of hazard-related information and forecasting for citizens, industries, and decision-makers in coastal communities.
- Work with marine commercial enterprises to assess the risks associated with doing business in coastal areas in the context of hurricanes and other coastal storms, climate-related changes, and dramatic changes in port and international trade activities.
- Work with the NOAA Climate Change Program, NOAA's National Weather Service and other public and private sector partners to develop comprehensive education/literacy programs focused on the immediate and long-term effects of climate-related changes and other hazardous events on human safety and coastal property, and how to prepare for and survive those hazards.

# Hazard Resilience in Coastal Communities

## Goal

### **Community capacity to prepare for and respond to hazardous events.**

It is not enough for communities and businesses to understand their vulnerabilities, they must act on this knowledge and become more resilient or the human and economic losses will continue to mount. Individuals, businesses, and communities need to develop comprehensive emergency preparedness and response plans that increase their resiliency and enable them to respond effectively. Sea Grant will contribute to this by building a sound knowledge base to improve forecasting capabilities, by identifying development and best management practices that reduce the vulnerability of people, buildings and businesses to coastal hazards, and by advancing ways communities can manage and recover from these events when they occur.

## Strategies

- Help public and private decision-makers create and adopt policies, plans, and ordinances to reduce risks, manage catastrophic events and speed recovery.
- Create and disseminate, in partnership with NOAA's National Weather Service and other entities, integrated demographic and coastal hazard information databases that help measure human vulnerability in specific coastal regions, support hazard-related planning activities, and facilitate disaster relief efforts.
- Conduct research and communicate information on how the use of natural features and new technologies can help communities prepare for and mitigate the impacts of hazardous events.

# Hazard Resilience in Coastal Communities

## Goal

### Effective response to coastal catastrophes.

Coastal, ocean, and Great Lakes catastrophes require the nation to mobilize a full-range of public and private partners and resources to mount an effective response. Sea Grant is supporting the development of linked regional, national, and international coastal observation networks, thereby improving the availability of information needed to respond to crises as they unfold. Sea Grant's knowledge of local contexts and communities can optimize response effectiveness by facilitating immediate links to local partners and capabilities. Sea Grant has a national network of scientists and outreach workers with broad knowledge and experience, and it will provide multi-disciplinary technical assistance to first responders, helping to minimize damage and promote recovery.

## Strategies

- Work with NOAA's National Weather Service and the National Ocean Service, regional ocean observation systems, and other partners to make hazard-related data and data-derived products available and relevant to support decision-making during crisis events.
- Contribute to the nation's rapid response capability by developing ways to mobilize Sea Grant's national network of scientific and technical expertise to inform response strategies and activities.
- Make Sea Grant's local knowledge and contacts available to work with federal, state, regional, and local agencies, non-governmental organizations, and international partners that have hazardous event responsibilities, to facilitate the speed and quality of response to these crises.

## Making it Happen

This strategic plan is designed to harness Sea Grant's unique combination of research, extension, and education capabilities with its strong federal-university-private sector partnerships to respond to the challenges inherent in the conservation and use of our nation's complex coastal, ocean and Great Lakes environments. The plan outlines ways to discover and grasp opportunities that will enhance the lives of Americans and people throughout the world. The National Sea Grant Office will initiate full network participation in the development of an implementation plan to accompany this Strategic Plan. The implementation plan will identify measurable outcomes by which to assess progress.

All state Sea Grant programs will align their own strategic plans with the national strategic and implementation plans so the energy, diversity, and creativity of individual Sea Grant programs and university partnerships may be mobilized to achieve these national goals. State plans will align with the strategic directions set forth in this plan and identify how state programs will contribute to the realization of the national goals in measurable ways. At the same time, these plans will respond to unique challenges and needs in the particular states and regions they serve.

The National Sea Grant Office will track and coordinate state-level accomplishments and impacts to highlight Sea Grant's contributions to achieving national goals. The National Sea Grant Office will also track and disseminate success stories so they can be replicated throughout the Sea Grant network and beyond. The National Sea Grant Advisory Board will continue in its advisory role to help state programs and the National Sea Grant Office advance Sea Grant's goals.

Effective implementation of this plan will require additional resources for state Sea Grant programs to provide the integrated research, extension, and education activities needed now. Also, effective plan implementation will require an enhanced National Office that can provide strong national leadership and support the state programs in achieving their objectives.

Sea Grant will revisit this plan and its priorities often to ensure that the organization is maintaining focus, staying alert to new trends and opportunities, and accomplishing its five-year goals. The coordinated planning and implementation processes set in motion by this plan position Sea Grant to play a leadership role in responding to the urgent challenges facing this country and its ocean, coastal, and Great Lakes states and communities. Sea Grant is dedicated to working with a wide array of NOAA programs and other partners to transform a time of crisis in this country into a new era of opportunity in coastal resource protection, management, and use that will serve the nation well into this new century and beyond.

## REVISION OF PROPOSED PANEL STATEMENT ON 'DIVERSITY'

The panel believes that attention to "Diversity" in staffing and all components of the Sea Grant programs-research, extension, communications and education, is essential to long term success and public appreciation of the program. To that end, the panel recommends specific actions to recognize the many accomplishments and nurture continued progress in building inclusive Sea Grant organizations and programs.

For the near term, the panel recommends:

- 1) Success in achieving diversity goals in all program components be identified in the PAT process.
- 2) The SGA consider adding an award for diversity to their ongoing recognition program.
- 3) The NSGO highlight commendable accomplishments of increasing diversity in all program components with the national media and within the Department of Commerce.
- 4) Continued attention to fuller engagement of minority serving institutions within the Sea Grant network.
- 5) Continued monitoring of the Panel replacements to insure a diverse membership.
- 6) Assuring diverse composition of program assessment teams(PAT) , especially considering the large number of women in the Marine Sciences and related fields.

For the longer term, three to five years, the Panel recommends:

- 1) the NSGO incorporate guidelines within their program development instructions for increasing diversity in all program components and special initiatives such as the Knauss fellows.
- 2) Success in achieving diversity in all program components be incorporated into the next cycle of the Sea Grant review process.

The recommendations are offered to increase the visibility of the many successful efforts throughout the Sea Grant network and add targeted encouragement for future program and staffing innovation by managers and staff. Targeted attention to inclusiveness as a part of staffing and program decision making will help insure that the Sea Grant program fulfills its promise to the Nation.

11/1/05

# Oceanic and Atmospheric Research (OAR)

## Strategic Plan

### In Support of NOAA's NGSP

Draft for SMM comment

August 10, 2011

Provide your feedback at [OAR.PLAN@NOAA.GOV](mailto:OAR.PLAN@NOAA.GOV)

## **Vision**

To be the Nation's trusted source for oceanic and atmospheric research, technology, and related extension services that enable healthy, productive and resilient ecosystems, communities, and economies

## **Mission**

### **Innovate, Incubate, and Integrate**

*To apply innovative research and technology towards Earth-system discovery, understanding, and prediction*  
*To incubate long-term research and extend knowledge that supports NOAA services and societal needs*  
*To integrate research across NOAA, and with our external partners, to maximize NOAA's value to society*

## **Values**

- Pre-eminence in Science
- Relevance to Society
- Culture of Transparency

## Table of Contents

Letter from the NOAA Administrator .....	2
Letter from the Assistant Administrator of OAR .....	3
OAR’s Mission and Vision.....	4
Background.....	5
<b>Scientific Goal:</b> Holistic understanding and useful predictions of future states of the Earth-system .....	7
Objective 1: Increase development and utilization of accurate and reliable observing platforms and systems using integrative and cost-effective strategies .....	8
Objective 2: Improve the understanding of key processes affecting the Earth-system.....	9
Objective 3: Increase the integration of environmental models to understand complex ecosystem .....	10
Objective 4: Increase the development of next-generation forecasts, tools, and technologies to predict the effects of the Earth-system on people, places, and natural resources .....	11
<b>Service Goal:</b> Engaged, educated public capable of making informed environmental decisions .....	12
Objective 5: Enhance NOAA’s social science capabilities .....	13
Objective 6: Improve public engagement through the use of extension, education, and communications tools and resources .....	14
Objective 7: Increase the efficiency of OAR’s transition of research to applications ....	16
<b>Support Goal:</b> An efficient and high performing organization .....	17
Objective 8: Increase the coordination of research and technology planning across NOAA .....	18
Objective 9: Advance the modernization of facilities, equipment, and IT infrastructure .....	19
Objective 10: Maintain an innovative, diverse and capable workforce .....	20
Objective 11: Increase strategic engagements and external partnership.....	21
Strategy Execution and Evaluation	
References	
List of Acronyms	



Letter from the Assistant Administrator of OAR

## OAR's Vision and Mission

OAR's leadership role as a centralized research line office is critical to NOAA and to society. Through world-class research and development, OAR, along with our partners inside and outside of NOAA, characterizes and predicts complex environmental phenomenon. Moreover, OAR continues to be successful in high-risk, high-reward research and delivering products and services to society and other Line Offices in support of NOAA's mission. Over the next five years, OAR will expand its role as a leader of the scientific enterprise, and work to integrate the various research domains across the agency. Reflecting on this role, the NOAA Administrator stated in congressional testimony:

“OAR will continue to serve as NOAA's centralized research Line Office, serving all of NOAA by supporting and producing pre-eminent research and technology innovation that advances NOAA's mission. OAR will innovate—make new discoveries and find new technology applications, incubate—conduct long term research and develop technology to make new discoveries that are useful to NOAA's operations, and integrate—strengthen research and technology across NOAA and with partners.”

To support the goal of strengthening all of NOAA's research and development, the Administrator has charged OAR with supporting the Chief Scientist in evaluating NOAA's work and implementing a balanced portfolio focused on NOAA's mission priorities.

Supporting the administration and the goals outlined in NOAA's Next Generation Strategic Plan, OAR has established the following mission as a guiding framework for strategic planning over the next five years.

### **Mission Innovate, Incubate, and Integrate**

*To apply innovative research and technology towards Earth-system discovery, understanding, and prediction  
To incubate long-term research and extend knowledge that supports NOAA services and societal needs  
To integrate research across NOAA, and with our external partners, to maximize NOAA's value to society*

This mission embraces the view that advances in NOAA's four long-term agency goals – *Climate Adaptation and Mitigation, Weather-Ready Nation, Healthy Oceans, and Resilient Coastal Communities and Economies* – will require the continued strengthening and integration of NOAA's enterprise-wide science and technology, stronger partnerships and stakeholder engagement, and effective organizational and administrative functions. In pursuit of its mission, OAR has developed three primary goals:

#### **Science Goal**

Holistic understanding and effective predictions of future states of the Earth-system

#### **Service Goal**

Engaged, educated public capable of making informed environmental decisions

#### **Support Goal**

An efficient and high performing organization

This strategic plan describes OAR's long-term goals along with specific objectives that will be pursued over the next five years. Each objective will be pursued and evaluated against outcome-oriented performance measures to determine level of progress. Ultimately, this plan provides a framework by which OAR will deliver significant benefits to society through NOAA's mission of science, service, and stewardship.

## Background—History of OAR

The Line Office of Oceanic and Atmospheric Research (OAR) serves as the primary research arm of the National Oceanic and Atmospheric Administration (NOAA), and maintains a strong history of pre-eminent and innovative research. The origins of OAR date back more than 200 years to the creation of the Survey of the Coast in 1807 by Thomas Jefferson. The Coast Survey, which became the U.S. Lake Survey office in 1841, was developed to undertake “a hydrographic survey of northwestern [Great] lakes.” Research executed by the scientists of this group was innovative and holistic: the first current meters were developed to understand water flow rates, and forecasting techniques were greatly enhanced to predict water levels and the relationship to lakefront property. The same traits of world class, long-term research continue to define OAR today.

In 1965, prior to creation of NOAA, President Johnson transferred the Central Radio Propagation Laboratory from the National Bureau of Standards (the forerunner of the National Institute of Standards and Technology) to join the United States Weather Bureau and the Coast and Geodetic Survey in a new scientific agency of the Department of Commerce: the Environmental Science Services Administration (ESSA). The coupling of these divisions recognized the importance of dedicated research of both the world’s ocean and atmosphere. ESSA’s mission was to respond to the national need for adequate warnings of severe and natural hazards, for technological advances in capabilities to observe the physical environment and for investigations into the physical environment as a “scientific whole” rather than a “collection of separate and distinct fields of scientific interest.”

The need for a consolidated research agency dedicated to the study of our oceans and atmosphere was further characterized by the Stratton Commission, which was established by President Nixon to develop an implementation plan for the Marine Resources and Engineering Development Act of 1966). The final report from this commission came as document titled, “Our Nation and the Sea: A Plan for National Action” which called for the creation of NOAA with a mission to predict environmental changes on a wide range of time and space scales in order to protect life and property, and provide industry and government decision-makers with a reliable base of scientific information. It was not until 1977, that NOAA was reorganized into five principal Line Offices: the Office of Fisheries, the Office of Coastal Zone Management, the Office of Satellites, the Office of Oceanic and Atmospheric Services, and the Office of Research and Development. It was these last two line offices which provided the organizational foundation for today’s OAR. OAR is predicated upon innovative research as well as the development and the delivery of products, tools, and information services to meet the needs of the nation.

The Office of Research and Development was responsible (in NOAA laboratories and in the academic community) for environmental research that supports NOAA program needs, for implementation of the Sea Grant program, and to provide Federal leadership for interagency, international research programs like the Global Atmospheric Research Program. In 1983, the Office of Research and Development evolved into the Office of Oceanic and Atmospheric Research (OAR) and began to manage major research efforts to support improvements to NOAA’s service arms, as well as to fulfill the agency’s responsibilities for leadership in science to improve our understanding of the oceanic and atmospheric components of the global Earth-system. One stated purpose of OAR was to “strengthen NOAA’s position in fundamental

research in those areas that are pertinent to NOAA’s mission and to remove any programmatic myopia that might come from coupling development and application to the more fundamental areas of research.” The same core elements continue to define OAR today; pre-eminent research, culture of transparency, and value to society. Regardless of the organizational structure, OAR has continued to provide a leadership role in NOAA’s research portfolio and provide services to its constituents from policy makers, to the academic community, to the general public.

Moving forward, OAR will leverage its core capability as a world-class research enterprise and work to strengthen its current research focal areas, in addition to integrating the various research domains across NOAA towards the understanding and prediction of globally interconnected environmental systems. Such integration is critical to the preservation of life and property. Acute and catastrophic, natural and human-induced pressures on the Earth’s environment and ecosystems are increasing, and changing demographics are causing a rising demand for scarce resources and putting more people in the path of natural hazards. OAR strives to understand changes in our oceanic and atmospheric systems at local, regional, and global levels in support of the agency’s efforts to provide effective services and stewardship to the Nation. This approach recognizes the importance of understanding the earth-system on time scales ranging from minutes to decades and even longer when investigating processes associated with global environmental changes.

To provide science, service, and stewardship to NOAA and the nation, OAR has established three long-term goals that are discussed in this strategic plan: Earth-system understanding and prediction capability; Engaged Society; and a high performing organization. These goals embrace a view that the planet is an amalgam of complex systems – physical, chemical, biological, and social - which interact with and respond to one another through complex and dynamic processes. A key feature of this view is that people are an integral component whereby ecosystems are influenced both positively and negatively by society. The ability to predict the earth-system must include this interdependency—the balance between societal needs and the integrity of ecosystems. As a research and outreach line office, OAR is well positioned to develop a better understanding of the Earth-system through world-class research and provide predictive assessments of how long-term environmental changes will impact people, places, and natural resources.

Along with its internal and external partners, OAR will help build a future where society is able to anticipate and take appropriate precautions against oncoming hurricanes, tornadoes, tsunamis, as well as significant heat, snow, and rain events. In addition, OAR will engage society to address the global impacts of climate change on oceans, sea level rise on coastal communities, agriculture supplies, ocean and coastal biodiversity, and declining usable fresh water supplies. These issues are connected on a global scale. The ability to deliver meaningful results will depend on OAR’s capacity to simultaneously strengthen its research and development programs as well as engagement services with the public towards far reaching and meaningful goals.

## Science Goal

### *Holistic understanding and useful predictions of future states of the Earth-system*

OAR maintains the scientific expertise to understand and predict some of the most complex environmental phenomena in our world's oceans, atmosphere, coasts, and Great Lakes. Such capabilities have been developed through decades of world class research executed with great planning, foresight, and recognition that the ability to monitor, understand, and predict key aspects of the environment is essential to the preservation of life and property. Recent events, both natural and human induced, remind us of the intimate relationship between humans and the environment: Indonesian Tsunami of 2004, Hurricane Katrina in 2005, Chilean Earthquake of 2010, Deepwater Horizon Oil Spill of 2010, Japanese Tsunami and related nuclear contamination events of 2011 and countless others. These events were sudden, catastrophic and occurred across the globe. The need for global monitoring and providing relevant and rapid information to the public, policy makers and other science groups is clear. OAR will continue to engage with key stakeholders to provide relevant tools, products and services that help protect lives and property.

Albeit less acute and visually dramatic, our environment is currently facing additional unprecedented challenges and changes. The concentration of carbon dioxide is increasing in the atmosphere and the oceans, oceans are become more acidic, global sea surface temperatures are rising as are global air temperatures, polar ice caps are melting, and usable fresh water is declining. The full effects of this inter-related phenomenon are not yet fully known. However, understanding the extent, causal mechanisms, and future impacts of these conditions will require OAR to develop the capacity to integrate various research domains of expertise, whether those domains exist within OAR, across NOAA, or within other agencies. OAR must leverage its capacity as a world-class leader of innovative science to take a pro-active approach towards understanding and predicting environmental phenomena occurring on a global scale. To begin to understand and make useful predictions of future states of the Earth-system, OAR will pursue four specific objectives:

1. Increase the development and utilization of accurate and reliable observing platforms and systems using integrative and cost-effective strategies
2. Improve the accuracy and reliability of Earth-system models
3. Increase the integration of ecosystem models and prediction capabilities ranging in time-scales from minutes to decades
4. Increase the accuracy of next-generation forecasts, tools, and technologies to predict the effects of oceanic and atmospheric interactions on people, places, and natural resources

Through measurable success in these five objectives, OAR will be better equipped to monitor key environmental processes, gather and model the data, integrate the various research domains, and use the models to perform various sophisticated forecasting assessments. Ultimately, these forecasting capabilities will be designed and executed to protect lives and property and promote the sustainable use of natural resources.

## Objective 1: Increase development and utilization of accurate and reliable observing platforms and systems using integrative and cost-effective strategies

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Accomplishments across the NOAA's mission goals are dependent upon the continued innovative development and utilization of global observation platforms and systems. Deferring investments into maintaining and upgrading systems puts NOAA at risk for significant degradation of the observing systems on which it depends for data collection, leading to a greater reliance on non-NOAA sources of data—an unreliable strategy over the long-term.

Anticipating a fiscally challenging environment in the coming years, OAR must employ innovative solutions to prioritize investments and implement cost-effective strategies which reduce spending overlap. Example near-term strategies that will be developed include: Utilizing a “network of networks” for mesoscale observing of the planetary boundary layer serving multiple environmental applications and cross sharing of information and designing and evaluating new cost-efficient tools to improve observing technology and data collection. With cost-effective observation strategies in place, OAR will be well positioned to increase its investments in priority focus areas including:

- Collecting hydrography data (e.g., regarding ocean carbon uptake and storage);
- Conducting observations and assessments of oceanic, atmospheric, land, and vegetation interactions for CO<sub>2</sub> and non-CO<sub>2</sub> GHGs as well as monitoring marine aerosols and air quality;
- Enhancing and maintaining oceanic and atmospheric observing systems, including floats and moored arrays (e.g., Prediction and Research Moored Array in the Atlantic [PIRATA], The Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction [RAMA], Argo, etc...)
- Increasing ground based (*in-situ*) observing capabilities in support of ocean acidification, sea ice movement, sea level rise, incoming solar radiation (SEB), vertical temperature and water vapor measurements;
- Expanding ocean observations below the Tropic of Capricorn

While these represent just a few activities that demonstrate innovation in observation capabilities that increase our understanding of the Earth-system, investments must be made strategically and with prioritization. Furthermore, innovative ideas which increase OAR's capacity to collect relevant data more rapidly and with less cost, must continue to be explored. OAR will continue to manage a high-risk high-reward research portfolio that pursues novel concepts: deployment of animal-borne observing systems at the scale of NOAA's regional ecosystems; development of DNA-based tools for identifying managed species; development and integration of suite sensors that can be used on any NOAA vessel. Through the utilization of strategic investments into innovative global observation platforms and systems, OAR and our partners will be well positioned to gather relevant data necessary to develop a holistic understanding of the earth-system.

While data gathering for the holistic understanding of the Earth-system is essential, it is of little use if the data are not accurate, reliable, or easily manipulated into usable ensembles and which increases our understanding of the Earth-system. The second objective of OAR's strategic plan is therefore to improve the accuracy and reliability of Earth-system data and models. To accomplish this objective, OAR will:

- Improve the assimilation of a growing suite of observations and determine uncertainty
- Increase the computational power to run more accurate models
- Develop advanced models that can be tested and applied at higher resolutions to make accurate short and long-term predictions.

As a means of assessing error rates and optimizing observing systems, OAR will also promote Observing System Simulation Experiments (OSSEs) to quantitatively evaluate tradeoffs in the design and configuration of proposed observing systems (e.g. coverage, resolution, accuracy and data redundancy). In turn, this will lead to better planning and decision making for the observing system portfolio. Understanding error estimates and calibrating the data used in models will also improve model accuracy. For example, OAR is partnering with NWS and NASA to conduct research on the use of the Ensemble Kalman Filter (EnKF) that uses uncertainty estimates from an ensemble to better estimate uncertainty in a forecast and improves data assimilation.

To further increase the accuracy of environmental models, OAR will need to make significant advancements in computational power. Because of power, cooling, reliability, cost, and application scaling, it is not practical to use Central Processing Units (CPUs) to run models designed for global cloud resolving scales of 3-4 kilometer resolution. Rather, Massively Parallel Fine Grain (MPFG) computing such as with Graphical processing units (GPUs) are needed for high resolution computing. GPUs are considered by many to be the next frontier in High Performance Computing (HPC). Early results have already demonstrated a 25 fold performance improvement in GPUs relative to CPUs and are a viable solution to meet the computational needs of the next generation of prediction models. However, research and development is required to determine how to best utilize GPUs and models must also be ported to system architecture.

Lastly, to increase the fidelity of models through better representation of the Earth-system, OAR will further improve numerical modeling capacity by generating models that can be tested and forecasted on multiple geographic and time-scales. For example, OAR has developed a new global finite-volume Non-hydrostatic Icosahedral Model (NIM) for weather and climate prediction. NIM is a multi-scale model designed to extend weather forecasts into intra-seasonal predictions beyond 0-2 weeks. Using GPU technology, NIM models can generate weather models across several geographic scales, each with an associated error that allows forecasting with varying measures of accuracy. Additional models such as the ocean model, Hybrid Coordinate Ocean Model (HYCOM) developed with a number of agency partners, also help us to better understand complex global ocean events. OAR must continue to develop multiple sophisticated models to improve our ability to understand the Earth-system.

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### Objective 3: Increase the integration of environmental models to understand complex ecosystem

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By using advanced global platforms to collect and subsequently assimilate accurate and reliable data, OAR will be well positioned to integrate models across various research domains to develop a better understanding of the interrelated processes of complex ecosystems. Ecosystems encompass physical, chemical, biological and social processes which together provide a multivariate suite of benefits to society, from food production, to water regulation and treatment, to recreation. Such benefits, however, depend upon a society that is knowledgeable and interacts with ecosystems sustainability. To provide relevant information for effective management of ecosystems through sound environmental decisions, OAR will increase the integration of data models to better understand complex ecosystem processes and generate decision support tools.

To accomplish this objective, a NOAA-wide Ecosystem Research Agenda, led by OAR, will provide a vision for how science, research, tools and technologies, and information sharing must be integrated to address to emerging issues within key geographically defined regions on specific issues including, coral reef habitats, ocean acidification, biodiversity, the extended continental shelf, invasive species, and hydrothermal communities. For these and other issues, OAR will provide leadership by observing and modeling key interrelated processes, integrating multidisciplinary research, and breaking down organizational barriers to data sharing to answer the key challenges of ecosystem management.

To maximize the utility of ecosystem models, OAR will effectively engage across NOAA, with the external science community, and the public to both learn from and inform where research is needed and to communicate decisions regarding ecosystem uses and impacts. Similar to observation networks, investments in integrated ecosystem models must also be prioritized. The following are example areas of priority areas which will be set by the Ecosystem Research Agenda:

- Ocean acidification—Improve understanding of ocean acidification and its impacts as mandated by Federal Ocean Acidification Research and Monitoring Act (FOARAM).
- Great Lakes—Develop and use an integrated ecological framework to identify impacts of multiple stressors (invasive species, hypoxia, land-use, climate change, nutrient enrichment, fishery harvest) on the pelagic food web and broader ecosystem.
- Gulf of Mexico—Develop a cohesive framework to monitor and integrate models of physical (currents, salinity, water quality, contaminants), biological (harmful algal blooms, plankton, fish), and chemical (dissolved oxygen, CO<sub>2</sub>) ecosystem processes, in order to improve coastal forecast systems, and provide a decision support framework for guiding research and management actions.

An ecosystem research approach towards these issues must integrate biological, chemical, and physical observational capacities across NOAA and the larger research community to understand the dynamic processes between oceans, the atmosphere, coasts, and Great Lakes. Only by bridging the gap between science domains across NOAA and with our external partners, will OAR be successful in developing a holistic understanding of the key ecosystems within the Earth-system.

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Objective 4: Increase the development of next-generation forecasts, tools, and technologies to predict the effects of the Earth-system on people, places, and natural resources

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Understanding the interrelated processes of complex environmental systems is not sufficient to meet OAR's mission. Rather, an Earth-system analysis and prediction framework to support one-day to decadal predictions is needed. Information, tools and technologies generated from advances in Earth-system prediction capabilities will help to create a society that is more adaptive to its environment; experiences fewer disruptions, dislocation, and injuries; and operates a more efficient economy. To accomplish this objective, OAR will continue to build upon its core capacity as a leader of environmental science by:

- Accelerating the development of innovative decision support systems technologies that merge information in a way that can be quickly understood by users such as forecasters and emergency managers
- Testing new technologies and social science linkages within test bed environments
- Utilizing integrated environmental models to generate long-term forecasts of global climate change and its associated impacts on people, places, and natural resources.

New observing and modeling systems will significantly increase the information available to forecasters. OAR, working with its customers and partners, will develop approaches that allow forecasters to quickly and easily identify data relevant to specific situations and questions.

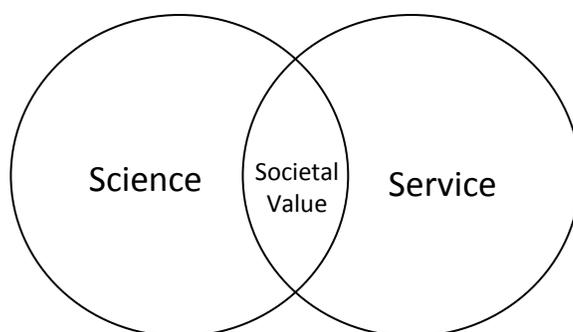
In addition to severe weather and physical events, OAR will improve its capacity to generate meaningful long-term assessments and projections of global change events including the impacts of increasing carbon dioxide in the atmosphere and oceans on biota; ; the impacts of climate change on fresh water supplies and agriculture; and the impacts of increasing water levels on coastal communities .

Climate change impacts occur over decades, thus requiring long-term research dedicated to understanding complex inter-related processes. No one single NOAA line office is able to perform all of the relevant research necessary to understand and predict the full impacts of global climate changes. However, OAR, as a dedicated research line, is committed to continue executing world-class research and integrating the research domains that are necessary for prediction of the effects of environmental changes in the Earth-system system on people, places, and natural resources.

## Service Goal

Engaged, educated public capable of making informed environmental decisions

OAR is recognized for its pre-eminent research and is dedicated to the goal of generating a holistic understanding and prediction capability of the Earth-system. To meet this goal, however, OAR will embrace and pursue its service goal of engaging society towards and facilitating an educated public that is capable of making informed environmental decisions. This goal also supports OAR's mission to *incubate long-term research and deliver information that supports NOAA services and societal needs*. By engaging the public, as well as internal and external partners, OAR will be better equipped to evaluate societal demands and respond through investments into research that is relevant to society and which encourages the public to make sound environmental decisions. The service goal embraces the view OAR delivers an optimal value to society through the integration of its science and service sectors.



To achieve its service goal, OAR will not only increase its capacity to deliver relevant information to the public, but also develop a stronger linkage to the science goal. The needs for OAR data, products, tool, and services are significant as well as diverse, whereby various stakeholders are best served through tailored delivery of information and products. While scientists typically disseminate findings through formal mechanisms such as peer-reviewed journals and professional meetings, the general public is better served through more generalized and tailored information. Neither the science nor the service sectors alone are able to meet these diverse needs. To further develop the application of delivering information to meet societal demands, OAR has defined the following specific objectives in which to enhance OAR services;

5. Enhance NOAA's social science capabilities
6. Improve public engagement through the use of extension, education, and communications tools and resources
7. Increase the efficiency of OAR's transition of research to applications

Similar to the science objective, successes in these three objectives will be monitored and measured. Through these successes, OAR will be better equipped to engage with stakeholders and improve its service offerings, deliver significant value to society, and facilitate the development of an engaged, educated public capable of making informed environmental and societal decisions.

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## Objective 5: Enhance NOAA’s social science capabilities

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OAR must enhance its social science capabilities to better address the needs of the nation. Although many applications of social science can be gathered from “off the shelf” products and tools, much of OAR’s social science needs are unique and require a specialized and dedicated approach. In fact, nearly every environmental science objective in OAR requires the services of applied social science to determine social behavior trends, costs and socioeconomic benefits, optimal delivery of information and services, and the determination of risk in environmentally sensitive societal sectors. Social science capabilities must be developed to not only answer these questions but also help prioritize future research endeavors.

The example of improving hurricane forecasting technologies demonstrates this need. While investing in hurricane forecasting technology will help protect lives and property, quantifying the extent of these benefits as a function of enhancing forecasting lead times through technology improvement, has yet to be done. In addition, realizing the benefits of hurricane forecasting technology requires that society understand and appropriately respond to it. Enhancing social science capabilities would not only help to answer the expected socioeconomic returns of the R&D investments such as with hurricane forecasting, but also determine the best mechanisms to engage relevant stakeholders and tailor technology implementation to ensure its successful adoption.

Enhancing social science capabilities will underscore the importance of engaging stakeholders, from policy makers to audiences at local and regional levels to not only identify the value but also streamline the efficient delivery of OARs products and services to user groups. Additional areas that would largely benefit from enhanced social science capabilities include but are not limited to; understanding the impacts and societal responses to extreme weather events and OAR’s tools and information to reduce risk exposure; Understanding tsunami and storm surge risk and OAR’s tools and information to reduce risk exposure and; Understanding global climate change events and what it means for society.

As social science research is a relatively new activity in some parts of OAR, several actions must be taken to enhance its social science capabilities;

- Identify and prioritize social science needs;
- Streamline efforts across OAR and NOAA to identify and prioritize areas of social science needs;
- Utilize in-house as well as external social science capabilities;
- Create a stronger linkage between social and traditional research scientists. Core research scientists must embrace and integrate social science into their research endeavors, and social scientists must work closely with scientists to fully understand the technical nature of the research enterprise.

By overcoming these challenges, OAR will better be able to develop sound social science capabilities which greatly complement the research enterprise.

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Objective 6: Improve public engagement through the use of extension, education, and communications tools and resources

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Equally important to understanding and characterizing the value of OAR to society, is the ability to deliver relevant data, information, and tools to the public in order to promote better understanding of the Earth-system. Understanding the Earth-system is necessary for policy makers and other stakeholders to make informed environmental decisions. Often times, however, such decision or lack of decision making, occur without understanding of long-term social, environmental, and economic consequences. Filling this gap and promoting a better understanding of the world around us is a strategic priority for OAR.

To improve public outreach and promote better understanding of the Earth-system, OAR must engage stakeholders through multi-directional communication. Data and information generated from pre-eminent researchers must be translated and disseminated to the public through engagement services and at the same time, OAR must communicate with the stakeholder community (from the general public, to other NOAA line offices, to the private sector) to determine the information, tools, and resources needed from the OAR's research enterprise.

Several specific priorities areas have been identified in which to improve public engagement to promote a better understanding of Earth-systems:

- Increasing extension and outreach to K-12, undergraduate, graduate, professional, and technical education programs in coastal and Great Lakes-related areas;
- Increase the development and utilization of innovative educational tools and concepts;
- Increase partnerships that leverage the transfer of OAR research to the public;

Firstly, increasing extension and outreach to K-12, undergraduate, graduate, professional, and technical education programs in coastal, ocean, and Great Lakes-related areas is a targeted approach for high impact delivery of OAR information and tools. Educational settings should be targeted as individuals are more likely to acknowledge and assimilate information presented to them. Moreover, the education and training of younger generations will ensure a future society that is environmentally aware and is able to make informed decision that reflect natural resource conservation and stewardship practices.

Secondly, OAR is well suited to promoting understanding of the Earth-system through the delivery of information and services using innovative solutions. As demonstrated through two examples; the *Okeanos Explorer* and *Science on a Sphere*, innovative solutions provide a modern outlook to education mechanisms. The NOAA Ship, *Okeanos Explorer* is the only federal vessel assigned to systematically explore our largely unknown ocean for the purpose of discovery and advancement of knowledge which uses telepresence capabilities to bring live ocean discoveries to classrooms, newsrooms, and living rooms from across the planet. *Science On a Sphere* (SOS)<sup>®</sup>, is another intuitive and captivating tool which uses computers and video projectors to visualize planetary data onto a six foot diameter sphere, analogous to a giant animated globe. Researchers at OAR developed Science On a Sphere<sup>®</sup> as an educational tool to help illustrate Earth-system science to people of all ages. Both of these concepts were are promoted as

educational tools that provide valuable information to people of all ages and scientific understanding. Further development of innovative tools and concepts would greatly enhance the public understanding of the Earth-system.

Lastly, the number strategic partnerships that leverage the transfer of OAR research to academic and public groups will be enhanced. Within OAR, the Sea Grant program is a champion of engagement and service extension efforts. The National Sea Grant College and Program Act of 1966 designates extension to impart “useful information to persons currently employed or interested in the various fields related to the development of marine resources, the scientific community and the general public.” With more than 30 Sea Grant Programs that span across 18 coastal states, it is well positioned to work more closely with OAR researchers and deliver those products, tools, and information that promote the better understanding of the Earth-system. The NOAA Office of Education, which is dedicated to the advancement of ocean, and Great Lakes literacy, extension, and outreach, is another program which could provide leveraged outreach. Partnerships with the academic community including university and cooperative institutes must also continue to be maintained.

Ultimately, OAR will be able to improve public outreach by actively engaging educational programs, creating and using innovative educational tools and concepts, and leveraging strategic partnerships. Accomplishments in these areas will help deliver relevant tools and information to multiple user groups towards the creation of a society capable of making informed environmental decisions.

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## Objective 7: Increase the efficiency of OAR's transition of research to applications

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OAR, is charged with delivering information, products, and tools to meet the needs of the other line offices of NOAA, the academic community, and the general public. A significant component of meeting this charge is to ensure the efficient transition of OAR's research to applications. To accomplish the objective of increasing the efficiency of transition of research to application, OAR will continue to transfer knowledge to the broader scientific community through peer review publications and contributions to scientific assessments (e.g. IPCC) and also increase the number of products, services, and tools to the commercial application.

The foremost aspect of demonstrating OAR's commitment to transitioning research to application is the transfer of knowledge to the broader scientific community through peer review publications. OAR is committed to ensuring the continued high standards and dissemination of its leading edge research through active publishing in both peer reviewed scientific journals as well as non-peer reviewed popular science articles. In FY 2010 alone, OAR scientists authored or contributed to over 800 peer reviewed articles in science areas relevant to NOAA's mission. This contribution is being tracked and reported on a quarterly basis to the Department of Commerce.

In addition to generating high caliber peer-reviewed publications, OAR will continue to work with partners across NOAA and the private sector to transition numerous modeling, observing, and decision support technologies from research to operations (R2O) or applications (R2A). OAR is actively working with the NOAA Line Office Transition Managers (LOTM) to optimize processes and partnerships that will improve the rate and efficiency of transitions. For example, a project database is currently in development within OAR and which is being expanded to include the portfolio of the National Weather Service. As part of its strategic plan, OAR will expand the OAR database to include all research line office research projects. A full spectrum analysis of research projects across NOAA, will allow strategic management and investment into those projects which are most promising for success. In addition, a cross NOAA review of transition projects is necessary to streamline R2A and reduce spending overlap. As research projects often require many years to develop the robust science needed for transition to operations, OAR will maintain a research portfolio that includes a mix of projects in various stages of development

The Office of Research and Technology Application (ORTA) in addition to the Small Business Innovation Research (SBIR) will also help play a key role in the transition of research to application. OAR recognizes that the private sector, especially small businesses, have the capacity and expertise to promote OARs mission through innovative discovery and development of new technologies. To realize this potential, the SBIR/ORTA program will streamline efforts with OAR leadership to develop a strategic plan that incorporates an evaluation of strategic investments to date and outline a plan to enhance its ability to invest in promising technologies that not only benefit NOAA but all of OAR. Ultimately, this program will help create new jobs and foster economic growth across the Nation in support of OAR's mission

## Support Goal

### An efficient and high performing organization

OAR is committed to the goal of a holistic understanding and prediction capability of the Earth-system. Through a stronger coordination with the goal of an engaged, educated public capable of making informed environmental decisions, OAR will be well positioned to maximize its value to society through the delivery of products, tools, and services that help protect lives and property. The ability to carry out these goals, however, is also dependent upon an efficient and high performing organization.

OAR will be challenged in the coming years with among other things, financial constraints and an aging workforce, which will impede OAR's success without adequate strategies and objectives in place. Recognizing these challenges and their potential impacts on the success of the science and service objectives, OAR has created the following objectives:

8. Increase the coordination of research and technology planning across NOAA
9. Advance the modernization of facilities, equipment, and IT infrastructure
10. Maintain an innovative, diverse and capable workforce
11. Increase strategic engagements and external partnership

The plans to coordinate the research and technology planning across NOAA are being drafted as a NOAA Administrative Order (NAO) for Optimizing NOAA's Research and Development (R&D) Enterprise. The purpose of this NAO being led by OAR is to improve the coordination of research efforts across NOAA and deliver science products and services more efficiently to OAR stakeholders. Also important to a high performing organization are advances in the modernization of facilities, equipment, and IT infrastructure which are necessary to ensure that OAR's workforce is equipped with the necessary tools to accomplish its work.

To ensure the success of OAR over the long-term, it will develop and implement a strategy to maintain an innovative, diverse and capable workforce. This is especially critical as OAR's workforce is aging. Not only does this present a risk through loss of expertise through attrition but also poses a difficulty in the retention of scientific leaders as a result of competition from other government agencies and the private sectors.

Lastly, the need to increase strategic engagement and external partnerships is paramount. For the same underlying reasons that warrant the development of a NOAA NAO on R&D, increasing engagement and partnerships beyond NOAA is necessary to increase the efficiency of carrying out OAR's mission. Innovative engagement practices must also be utilized to meet this objective. Engagement with not-for profit including non-government agencies and foundations, and also with the private sector including small businesses must all be explored for potential as mechanism to generate a high performing organization.

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## Objective 8: Strengthen research and technology through integration across NOAA

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The NOAA administrator, Dr. Jane Lubchenco, stated the following to the Committee on Science, Space, and Technology, U.S. House of Representatives on June 22, 2011:

“OAR will continue to serve as NOAA’s centralized research Line Office, serving all of NOAA by supporting and producing pre-eminent research and technology innovation that advances NOAA’s mission. OAR will innovate—make new discoveries and find new technology applications, incubate—conduct long term research and develop technology to make new discoveries that are useful to NOAA’s operations, and integrate—strengthen research and technology across NOAA and with partners.”

In support of this testimony, OAR will serve NOAA as its centralized research line office, and will be responsible for increasing the coordination of research and technology planning across the agency through the streamlining and efficient delivery of research to key stakeholders. In addition, OAR will strengthen research and technology throughout the agency through identification, development, and dissemination of best management practices. OAR already utilizes a rigorous process for the review of science and research across its laboratories. This process ensures that its science meets the highest level of scientific integrity. The same practices of science integrity and review will be utilized as a base to review the research activities across the agency.

The mechanism through which OAR will be responsible for the integral role across the agency is characterized in the NOAA administrative order (NAO): Strengthening NOAA’s Research and Development (R&D) Enterprise. This NAO establishes the principles, policies, and responsibilities for planning, monitoring, evaluating, and reporting research and development (R&D) activities comprising the entire NOAA R&D enterprise. Coordination of the research and development efforts, applies to internal and external R&D activities, and includes R&D conducted by NOAA and sponsored by others. Guidance will further be developed within a procedural Handbook that covers; R&D Planning, Enterprise R&D Monitoring Database, Program/Laboratory/Science Center Reviews, Portfolio Reviews, Benchmarking Reviews, Performance Measures, R&D Reporting. A critical component that will support coordination efforts across the agency is a project level database.

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## Objective 9: Advance the modernization of facilities and equipment

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OAR's facilities and equipment must be maintained at optimal performance levels and sustained over the long-term to achieve OAR's mission. OAR therefore recognizes the importance of the goal to advance the modernization of facilities and equipment. Three specific challenges must be overcome to meet this goal: The accurate estimation of full asset life cycle costs, cross NOAA prioritization of asset acquisition or development, and the innovative development of facilities and equipment with reduced infrastructure costs.

The first issue of estimating full asset life cycle costs requires an improved ability to assess acquisition, operational, and maintenance costs of significant assets (e.g. research vessels, planes, super-computing technology, etc...). While the acquisition or initial development costs may be more readily identified, long-term maintenance and operational costs must also be assessed in order to retain sufficient funding levels to maintain assets at their optimal performance. Accurate budget assessments prior to acquisitions or development, in addition to accurate yearly cost estimates would help resolve this issue and increase asset utilization.

In addition the ability to generate full cost-estimates, OAR must lead a cross line office prioritization of asset acquisition or development. Working with the other line offices to combine resources towards high priority mission objectives and execute collaborative projects is necessary to ensure that all Line Office needs are met—especially in a fiscally challenging environment. Open ocean research cruises, for example, may be coordinated between OAR and the other line offices to reduce cost overlap in certain priority objectives. The OAR project database, that is being expanded to include all of NOAA, will be used as an important valuation tool to identify areas of potential collaboration.

Lastly, OAR will continue to explore innovative solutions to achieve its goals and objectives but at less cost. Focal areas of innovation include but are not limited to manned (research and exploratory vessels) and unmanned system research vessels (AUVs, UASs, USVs), research equipment including sensor technology, and super computing technology (e.g. GPUs). The issue of innovation and modern facilities and equipment will be addressed annually by OAR's senior research council.

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## Objective 10: Maintain an innovative, diverse and capable workforce

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OAR is committed to the delivery of preeminent science to meet the diverse needs of society. Meeting these needs requires that OAR maintain a highly capable workforce that is enthusiastic, knowledgeable, and flexible. Specifically, OAR must maintain an optimally diverse workforce and provide training and development, both scientific and managerial, that is comparable to other government agencies and the private sector. Scientific and managerial training is needed to ensure that the workforce retains the knowledge and skill sets that would otherwise be lost through attrition and retirement.

In addition to providing leadership training, OAR must continue to acquire and retain world class talent, science and administrative career paths need to be supported with stepwise career advancement. To better support the professional development of NOAA scientists, the NOAA Research Council, OAR, and Workforce Management are working to:

- Allow NOAA scientists full participation in professional or scholarly societies, committees, task forces, and other specialized bodies of professional societies, including removing barriers for serving as officers or on governing boards of such societies (related to section on Promoting Scientific Integrity)
- Coordinate with the office of the NOAA Chief Scientist on a detailed set of formal recommendations to NOAA Senior Management on the broader uses of Senior Technologist/Senior Leader (ST/SL) positions within NOAA
- Increase the recruitment and advancement of promising young professionals to senior level positions on a limited or detail specific basis.

Empowering young professions to serve in senior level capacities with adequate an adequate support network is essential to transition the next generation of science leaders.

Accomplishments in these actions will help to ensure that the preeminence in the OAR enterprise is maintained over the longterm.

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## Objective 11: Increase strategic engagements and external partnership

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Strategic engagements are paramount to the success of OAR, whether in research or services disciplines. Partnerships are especially important in the face of budget constraints that are anticipated in the coming years. Through engagement and partnership opportunities, OAR is able to leverage its investments and generate higher value to society. Specific engagement and partnership opportunities that should be strategically promoted are with cooperative institutes, the international community, and with other agencies.

Cooperative Institutes (CI) are NOAA-supported academic institutions that have established an outstanding research program in areas directly related to NOAA's long-term mission needs. Established at research institutions, they also have strong education programs with established graduate degree programs in NOAA-related sciences. As such, CIs must remain a strategic source in which to recruit academic professionals to advance OAR's mission. CIs engage in research that requires substantial involvement of one or more research units within the research institution and one or more NOAA laboratories or programs. Thus, CIs also provide significant coordination of resources among all non-government partners and promote students and postdoctoral scientist involvement in NOAA-funded research. To realize the full benefits through cooperation with CIs, OAR must continue to strengthen its engagement efforts. This will be achieved by closer alignment between senior leadership from both OAR laboratory programs as well as political leadership across NOAA.

The international community must also be strategically engaged. While increasing the number of international partnerships is not feasible in a fiscally challenging environment, specific geographic areas of particular interest to the OAR community and warrant an increase in directed engagement efforts. These areas include neighboring countries of the Gulf regions including the Caribbean, Canada with its relationship to the Great Lakes regions, Russia and other international partners related to efforts in Alaska and polar regions. OAR is actively involved in these regions and these associate international partners are critical to leveraging OAR science and services.

Lastly, stronger engagement is needed with other agencies, especially in the engagement of domestic regional entities. Increasing the support and cooperation between federal agencies and regional ocean governance groups is a strategic priority of the National Ocean Policy (NOP). NOAA and OAR are committed to supporting the development and implementation of the NOP and especially those policies affecting Coastal Marine Spatial Planning (CMSP). By working with the other federal agencies in this process, OAR will increase coordination with regional groups and leverage its ability to deliver products and services to the general public.

By increasing strategic partnerships through the cooperative institutes and academic partners, the international community, other federal agencies, and regional entities, OAR will greatly enhance its ability to cost-effectively deliver its products and services to meet the needs of society. This ability is critical to the goal of a high performing organization.


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**About the Acting Assistant Administrator for Oceanic and Atmospheric Research**

**Craig N. McLean**



Craig McLean is the Acting Assistant Administrator of the National Oceanic and Atmospheric Administration's (NOAA) Office of Oceanic and Atmospheric Research (OAR). He is the permanent deputy for OAR's programs and administration, and responsible for daily operations and administration of NOAA's research enterprise, and the execution of NOAA programs including the Climate program, National Sea Grant, and Ocean Exploration.

He has previously served in NOAA as Executive Officer of the National Ocean Service, and was the founding Director of NOAA's Office of Ocean Exploration.

McLean served in uniform for nearly 25 years, retiring from NOAA's Commissioned Corps in the grade of Captain after service at sea, underwater, and in operational, legal, and marine resource management positions. McLean served aboard hydrographic, oceanographic, and fisheries research ships and was the first commanding officer of NOAA's largest fisheries research vessel, the 224-foot *Gordon Gunter*.

A life-long diver, he began exploring deep shipwrecks through decompression diving while in junior high school. These experiences have taken him to the Amazon River searching for freshwater dolphins, and to the *RMS Titanic* searching for solutions in shipwreck management.

Craig McLean is also an attorney and has practiced marine resource law for NOAA. He has been awarded the Departmental Silver and Bronze Medals, the NOAA Corps Commendation Medal, Special Achievement Medal, and recognized as the NOAA 2005 Senior Leader of the Year. He is a Fellow in the Explorers Club and the Marine Technology Society (MTS), Chairman of the Marine Law and Policy Committee of the MTS, and is past Chairman of the Board of the Sea-Space Symposium.



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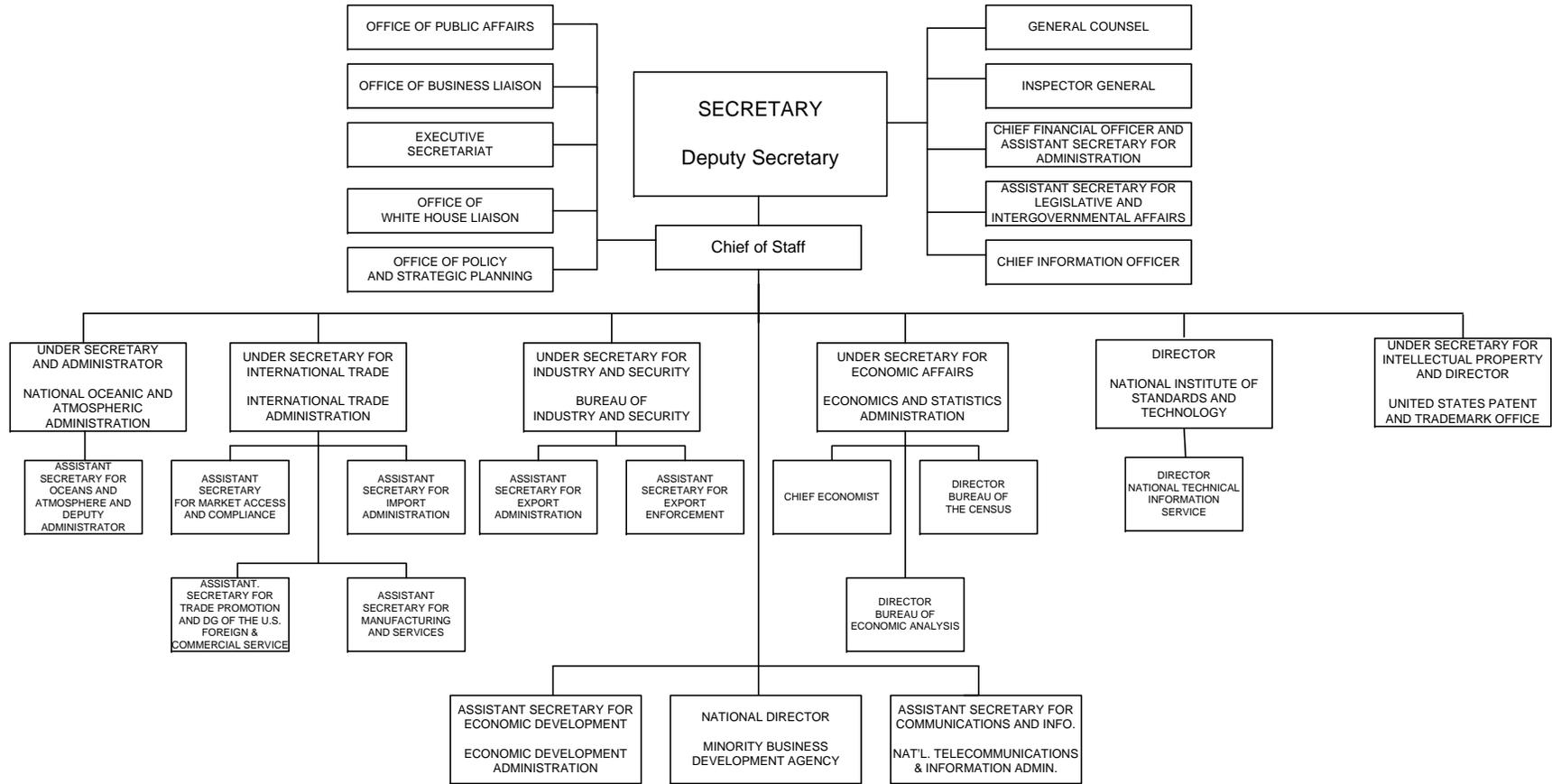
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# U.S. DEPARTMENT OF COMMERCE



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Dr. Colt has served as Chair of the Rhode Island Bays, Rivers, & Watersheds Coordination Team (BRWCT) since 2006. The BRWCT is a standing interagency commission responsible for enhancing policy and program coordination via strategic planning for Rhode Island's waters and watersheds, and their human uses. From 1999 to 2006, Dr. Colt worked as Associate Director of the Rhode Island Sea Grant College Program, serving as Interim Director 2000-2001. He received his Ph.D. in coastal environmental sciences with a focus on policy analysis from the University of Massachusetts at Boston in 1993. From 1992-1995, he worked as an Assistant Professor of Environmental Policy at Tufts University's Department of Urban and Environmental Policy. In 1995, Dr. Colt came to Rhode Island to work in engineering sales for wastewater treatment and water reuse technologies for two start-up companies. Dr. Colt has authored articles in coastal management policy, planning, and evaluation. He is the lead author of the Rhode Island Bays, Rivers, and Watersheds Systems-Level Plan: 2009-2013. A native Rhode Islander, he lives in Providence with his wife and three children.