



# Sea Grant

## National Sea Grant Office's Annual Program Update February 5-13, 2014



# Annual Program Update Schedule

## Conf. Call #: 1-877-928-0279

### PC: 6412407

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#### Wednesday, February 5, 2014

9:00am – 9:30am  
9:30am – 10:00am  
10:00am – 10:10am  
10:10am – 10:40am  
10:40pm – 11:10am  
11:10am – 12:30pm

#### **ROOM: SSMC3, 15836**

[Rhode Island Sea Grant \(Grimes\)](#)  
[Louisiana Sea Grant \(Kim\)](#)  
Break  
[WHOI Sea Grant \(Liffmann\)](#)  
[Connecticut Sea Grant \(Grimes\)](#)  
Closed Session

#### Thursday, February 6, 2014

9:00am – 9:30am  
9:30am – 10:00am  
10:00am – 10:30am  
10:30am – 10:40am  
10:40pm – 11:10am  
11:10am – 12:30pm  
12:40pm – 1:10pm  
1:10pm – 1:40pm  
1:40pm – 2:10pm  
2:10pm - 2:40pm  
2:40pm – 2:50pm  
2:50pm - 4:10pm  
4:10pm – 4:40pm

#### **ROOM: SSMC3, 15836**

[Florida Sea Grant \(Kim\)](#)  
[MIT Sea Grant \(Liffmann\)](#)  
[Maryland Sea Grant \(Carlson\)](#)  
Break  
[North Carolina Sea Grant \(Ban\)](#)  
Closed Session/Lunch  
[Virginia Sea Grant \(Carlson\)](#)  
[South Carolina Sea Grant \(Ban\)](#)  
[Oregon Sea Grant \(Brown\)](#)  
[Hawaii Sea Grant \(Liffmann\)](#)  
Break  
Closed Session  
[Guam Sea Grant \(Liffmann\)](#)

#### Monday, February 10, 2014

9:00am – 9:30am  
9:30am – 10:00am  
10:00am – 10:30am  
10:30am – 10:40am  
10:40pm – 11:10am  
11:10am – 11:40am  
11:40am – 1:00pm

#### **ROOM: SSMC3, 8836**

[Delaware Sea Grant \(Carlson\)](#)  
[New York Sea Grant \(Eigen\)](#)  
[New Jersey Sea Grant \(Carlson\)](#)  
Break  
[Wisconsin Sea Grant \(Carlson\)](#)  
[Minnesota Sea Grant \(Eigen\)](#)  
Closed Session/lunch

#### Tuesday, February 11, 2014

9:00am – 9:30am  
9:30am – 10:00am  
10:00am – 10:10am  
10:10am – 10:40am  
10:40pm – 11:10am

#### **ROOM: SSMC3, 5836**

[Michigan Sea Grant \(Liffmann\)](#)  
[Pennsylvania Sea Grant \(Eigen\)](#)  
Break  
[Ohio Sea Grant \(Eigen\)](#)  
[Lake Champlain Sea Grant \(Garber\)](#)

SEA GRANT AT A GLANCE – February 2014

<b>11:10am – 11:40am</b>	Closed Session
<b>11:40am – 12:30pm</b>	Lunch
<b>12:30pm – 1:00pm</b>	<a href="#">Washington Sea Grant (Brown)</a>
<b>1:00pm – 1:30pm</b>	<a href="#">California Sea Grant (Berg)</a>
<b>1:30pm-2:00pm</b>	<a href="#">Alaska Sea Grant (Liffmann)</a>
<b>2:00pm – 3:30pm</b>	Closed Session

**Wednesday, February 12, 2014**

<b>9:00am – 9:30am</b>	<b>ROOM:SSMC3, 5836</b>
<b>9:30am – 10:00am</b>	<a href="#">Illinois-Indiana Sea Grant (Eigen)</a>
<b>10:00am – 10:10am</b>	<a href="#">Georgia Sea Grant (Liffmann)</a>
<b>10:10am – 10:40am</b>	Break
<b>10:40am – 11:10am</b>	<a href="#">Puerto Rico Sea Grant (Garber)</a>
<b>11:40am – 12:30pm</b>	<a href="#">Maine Sea Grant (Hayes)</a>
	Closed Session

**Thursday, February 13, 2014**

<b>9:00am – 9:30am</b>	<b>ROOM: SSMC3, 15836</b>
<b>9:30am – 10:00am</b>	<a href="#">National Sea Grant Law Center (Brown)</a>
<b>10:00am – 10:10am</b>	<a href="#">National Sea Grant Library (Brown)</a>
<b>10:10am – 10:40am</b>	Break
<b>10:40pm – 11:10am</b>	<a href="#">New Hampshire Sea Grant (Hayes)</a>
<b>11:10am – 12:30pm</b>	<a href="#">Mississippi-Alabama Sea Grant (Kim)</a>
<b>12:30pm – 1:00pm</b>	Closed Session/Lunch
<b>1:00pm – 1:30pm</b>	<a href="#">USC Sea Grant (Berg)</a>
<b>1:30pm – 3:00pm</b>	<a href="#">Texas Sea Grant (Kim)</a>
	Closed Session

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## ALASKA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	DAVID CHRISTIE; PAULA CULLENBERG
Extension	DAVID CHRISTIE; GAY SHEFFIELD; PAULA CULLENBERG; RAYMOND RALONDE; TERRY JOHNSON
Communication	K. M. BYERS
Education	DAVID CHRISTIE

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Paula Cullenberg
Extension	Paula Cullenberg; Ray RaLonde; Torie Baker
Communication	
Education	Paula Cullenberg

Total funding (SG + Match + Pass Through) in 2012: **\$2,501,289**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,223,947**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	12	1.4	4.76
Communication	7	1.65	1.78
Extension	19	1.59	9.4
Education	3	0.11	0.87
Research	23	5.18	3.22

**3. AK SG Distribution of effort by functional area**

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	17%	22%
Research (including Research Assistantships)	24%	33%
Extension	37%	42%
Communication	18%	0%
Education	0%	0%
PD	5%	4%

**4. Distribution of effort by focus area**

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	13%	24%
SSSS / SFA	0%	28%
SCD / RCE	0%	28%
HRCC	10%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	20%
other	77%	

**5. Upcoming Research Projects (from 2014 omnibus proposal)**

R/101-09: Habitat Degradation Due to Melting Glaciers (Brenda Konar)

R/111-03: Sustainability of Coastal Communities and Sea Otters: Harvest and Future Management of Sea Otters (Ginny Eckert)

R/111-04: Recovering Humpback Whales and the Future of Alaska's Hatcheries, Fisheries and Coastal Communities (Jan Straley)

R/31-23: Long-Term Records of Abundance and Effects of Large Scale Climate Change on Alaska Peninsula Sockeye Salmon (Nicole Misarti)

R/31-24: Applying Regime Shift Indicators to Understand the Potential Impacts of a Multi-Year Cold Event on the Bering Sea Ecosystem (Michael Litzow)

R/32-05: Economic Viability of a Directed Skate Fishery in the Gulf of Alaska (Andrew Seitz)

R/32-06: Graying of the Fleet in Alaska's Fisheries: Defining the Problem and Assessing Alternatives (Courtney Carothers)

R/33-03: Industry-Based Documentation of the Effectiveness of F3 'Whale Pingers' at Reducing Humpback Whale Interactions with Alaska Salmon Fisheries (Kate Wynne)

## 6. Program metrics (2012)

Number of peer reviewed publications: **2**

Leveraged funds (managed): **\$ 1,160,526**

Leveraged funds (influenced): **\$**

Volunteer Hours:

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	1		
Masters	2	3	7
PhD	2	2	3
Other professional degree			

Total K-12 students reached through educators: **310**

Curricula developed:

Number of Cumulative Clean Marina Program – Certifications:

Number of HACCP -- Number of people with new certifications: **85**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

SEA GRANT AT A GLANCE – February 2014

<b>Measure</b>	<b>Actual</b>
Businesses Created	<b>2</b>
Businesses Retained	<b>21</b>
Economic Benefit	
Jobs Created	<b>10</b>
Jobs Retained	<b>300</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>1</b>
Number of hazard resiliency trainings	<b>17</b>
Number of coastal communities who have adopted/implement 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.	<b>13</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>95</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>212</b>
Patents	<b>1</b>
Tool Used by Stakeholders	<b>10</b>

## 8. Selected impacts (2012)

### Alaska Sea Grant helps Pickled Willys LLC launch successful seafood business

Alaska Sea Grant technical assistance helped Pickled Willys LLC become a successful new local business with three employees, which processes locally caught seafood into a host of value-added products for a national market.

Pickled Willys LLC, based in Kodiak, Alaska, is a small start-up company that processes locally caught seafood into a host of value-added products for a national market. Over a three-year period, an MAP team provided critical technical assistance to Pickled Willys. The company received HACCP training, business management and marketing training, and technical assistance in smoking and other processing, and assisted in the development of quality and safety standards and procedures. The team also helped the company navigate state and federal

regulatory requirements.

Pickled Willlys LLC launched in 2011, selling specialty pickled seafood products. Aside from their own retail operation in Kodiak, their products are sold in 13 retail markets across six states. The company has three full-time employees with a payroll of \$190,000 at their main retail store in Kodiak. This year they sold 2,400 cases of pickled seafood valued at \$288,000 wholesale and 4,800 pounds of frozen crab tails valued at \$48,000 wholesale.

### **Alaska Sea Grant helps an entrepreneur navigate zoning restrictions to open a processing plant**

A processor in the Bristol Bay region received a processing license and built a plant in Naknek, called Nakeen Homepack. The processor faced opposition that contended that Nakeen was in a subdivision with restrictions and covenants that prohibited fish processing. Alaska MAP provided information and assistance that enabled the processor to operate.

The processor was granted a site development permit and operated during the 2012 salmon season. Nakeen processed over 30,000 pounds of salmon and hired five seasonal employees. The company produced primarily frozen vacuum-packaged salmon, and also produced custom packaged salmon products for direct-market fishermen.

### **Alaska Sea Grant helps ecotourism operation and engages citizen scientists**

Sea Grant helped Allen Marine Tours, a Southeast Alaska charter boat and nature ecotourism company, incorporate invasive species monitoring into its 2012 tourism offerings. This resulted in four new seasonal jobs and a 20-fold increase in the local invasive species monitoring effort.

Scientists state that more monitoring of the region's thousands of miles of coastline for invasive marine species is needed, particularly in southern Southeast Alaska, the gateway to new invasives. Invasive species such as European green crab and non-native tunicates pose a significant threat to the region's ecosystem, as well as to commercial shellfish farms and aquaculture operations.

Experiential invasive species education on Allen Marine Tour's Alaskan Wilderness Survival excursions reached 375 visitors in 2012, up from 134 people who took the tour in 2011. The increase allowed the company to hire four new employees for the season, and significantly increased monitoring for marine invasive species. Of the 134 people who took the Alaskan Wilderness Survival tour in 2011, 74 completed evaluation forms. Of these, 82 percent rated the nonindigenous species component as excellent and 18 percent rated it as good. The Alaska Sea Grant YouTube channel showcases a video of two visitors' favorable responses to the tour.

In the Ketchikan area, sampling for invasive European green crab has been limited to three or four times during the summer. Allen Marine Tours recorded 84 sampling events in 2012 and 76 sampling events in 2011, a twenty-fold increase in effort that has enhanced the probability of early detection of invasive species at no cost to resource agencies.

## **9. Selected research accomplishments (2012)**

**Diet patterns in Southeast Alaska sea otters**

Data on historic sightings of sea otters in Southeast Alaska were collected as part of an ongoing research project on the impacts of sea otter recolonization in southern Southeast Alaska.

The Southeast Alaska sea otter population is growing, with as yet unquantified impacts to the environment and commercial fisheries. Predation on commercially important shellfish species is of increasing concern and represents a potentially negative economic consequence. Decision-makers need science-based information that can be used to craft well-informed policies in response to sea otter recolonization.

A three-year project was initiated in 2010 to analyze otter diet, support agency population surveys, and convey project data to managers and fishermen in order to inform management plans. Petersburg Marine Advisory Program agent Sunny Rice continues coordinating stakeholder input and project outreach in collaboration with researchers from the U.S. Fish and Wildlife Service and the University of Alaska Fairbanks.

During this period, Rice conducted 35 interviews with area residents and commercial fishermen, collecting 266 individual historic sightings of otters throughout the region. These observations will be used to inform the project's population dynamics model. Observations indicated that the range of sea otters has extended beyond the area surveyed in 2010. Rice also made a presentation on project methods during a panel on interdisciplinary research at the Alaska chapter of the American Fisheries Society meeting in Kodiak in October 2012. About 75 people attended that talk.

### **Alaska king crab rehabilitation program reaches major milestone**

After several years of research, scientists in the Alaska King Crab Research, Rehabilitation and Biology (AKCRRAB) program have succeeded in rearing large enough numbers of red and blue king crab in a hatchery to allow them to plan a pilot stocking of hatchery-born crab into the wild in 2013.

From the mid-1960s to the early 1980s, Alaska's king crab fisheries in the Gulf of Alaska and in the Bering Sea sustained a multimillion-dollar industry that was the envy of the world. But by 1983, these once massive crab populations were all but gone. Despite more than a quarter century of closed or tightly restricted fisheries, their populations have not recovered.

To investigate the feasibility of using stock enhancement techniques to assist the natural recovery of red and blue king crab stocks, Alaska Sea Grant in 2006 joined with key private and public partners to create the AKCRRB program. The program conducts extensive research aimed at hatching and rearing wild red and blue king crab in a large-scale hatchery setting. The coalition of state, federal, and stakeholder groups views the effort as important to the region's long-term economic development and sustainability.

Following many years of advances and some setbacks, AKCRRAB scientists succeeded in understanding the biological and environmental requirements for raising large numbers of red and blue king crab in a hatchery. For the first time, AKCRRAB scientists in 2013 will launch a pilot program to stock hatchery-born red king crab into the wild. This is a momentous achievement that is at the heart of the AKCRRAB mission and represents the largest single step thus far toward a large-scale restocking program.

## **10. RFP process (2013)**

## SEA GRANT AT A GLANCE – February 2014

Twenty-seven totaling \$4.7 million were submitted in response to the Alaska Sea Grant Announcement of Funding Opportunity for 2014–2016. The Alaska Sea Grant director and review panel, which consisted of several Advisory Committee members and the MAP marine education specialist, screened preliminary proposals.

Eleven full proposals totaling over \$1.8 million were received and sent to three to five peer reviewers who had agreed to review the proposal

These proposals and their peer reviews were considered by a five-person advisory panel that met in Corvallis, Oregon, on 26 August 2013. Eight were recommended for funding.

## CALIFORNIA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	RUSSELL MOLL
Extension	MONIQUE MYERS; RICHARD M. STARR; RICK STARR
Communication	
Education	DEBORAH FAUQUIER; KALIN KROETZ; LEWIS BARNETT; RUSSELL A. MOLL; TALI VARDI

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	James Eckman
Extension	Carolynn Culver; Carrie Pomeroy; Monique Myers; Richard Starr; Theresa Talley
Communication	James Eckman; Marsha Gear
Education	James Eckman; Shauna Oh

Total funding (SG + Match + Pass Through) in 2012: **\$6,833,371**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$6,112,784**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	8	5.1	2.9
Communication	4	3.6	0.4
Extension	16	7.2	8.8
Education	3	0.25	0
Research	78	9.79	6.48

### 3. CA SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	22%	19%
Research (including Research Assistantships)	28%	36%
Extension	26%	27%
Communication	13%	11%
Education	5%	6%
PD	4%	1%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	41%	50%
SSSS / SFA	24%	25%
SCD / RCE	9%	15%
HRCC	1%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	10%
other	25%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/AQ-133: Development of Sustainable Tuna Aquaculture in the United States Using Yellowfin Tuna as a Model (Mark Drawbridge)

R/G-2: Sea Grant Trainees (James Eckman)

R/HCME-1: Climate and the Santa Barbara Basin Fish Assemblage in the Last Two Millennia: Management Implications (David Checkley)

R/HCME-2: Importance Estuarine Acidification (EA) for Commercial Oyster Production and Native Oyster

Restoration (Edwin Grosholz)

R/HCME-3: Context and scale of seagrass effects on estuarine acidification: An academic-industry partnership to explore mitigation potential (Tessa Hill)

R/HCME-4: Ocean Forcing of San Francisco Bay: Intrusion of Upwelled Water (John Largier)

R/HCME-5: Geochemistry, physics, and ecology of an intermittent estuary on the California coast: a multi-disciplinary investigation into an annual organism die-off (Céline Pallud)

R/HCME-6: The effect of sea otter reestablishment in southern California on the remnant populations and recovery of black abalone, an endangered species (Peter Raimondi)

R/HCME-7: The Spread and Ecological Consequences of the Invasive Seaweed *Sargassum horneri* (Dan Reed)

R/R-1: Future Competitive Project Funding (James Eckman)

R/RCC-3: Spatial Redistribution of Fishing Effort: Identifying Drivers and Testing Model Predictions for Informing Expectations in Marine Spatial Planning (Crow White)

R/RCC-4: Statewide high-resolution assessment of California coastal cliff erosion and retreat (Adam Young)

R/SOC-4: Scaling Up Cost-Efficient Community Engagement in Coastal Resource Management (Heidi Ballard)

R/SOC-5: The environmental and economic impacts of moorage marinas in the West Coast (James E. Moore)

R/SSFS-1: Determining the genetic and molecular bases of oyster resistance to an oyster-killing virus, Ostreid herpesvirus 1 (Dennis Hedgecock)

R/UG-9: Isaacs Fellows (James Eckman)

## 6. Program metrics (2012)

Number of peer reviewed publications: **69**

Leveraged funds (managed): **\$ 5,916,579**

Leveraged funds (influenced): **\$**

Volunteer Hours: **21,446**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	31	25	13
Masters	5	1	
PhD	26	8	2

SEA GRANT AT A GLANCE – February 2014

Other professional degree			
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Total K-12 students reached through educators: **13,275**

Curricula developed: **18**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications: **264**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **1,048,000**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **526**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>1</b>
Businesses Retained	
Economic Benefit	<b>200,000</b>
Jobs Created	<b>8</b>
Jobs Retained	<b>8</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement 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.	<b>46</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>4</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>171</b>
Number of stakeholders who modify their practices using knowledge gained in	<b>2,344</b>

fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	<b>3</b>

## 8. Selected impacts (2012)

### Title: Balancing Ecosystem Health & Boating Operations (Healthy Coastal and Marine Ecosystems)

- California Sea Grant Extension and a University of California economics professor received funding to identify cost-effective strategies for reducing copper pollution in San Diego Bay.
  - Showed that boats need to be hauled out and stripped every 15 years, on average
  - Owners would save \$19 million if all 8,000 recreational boats in the bay were converted to copper-free paints over a 15-year period
- The Water Resources Control Board took Sea Grant's recommendation for a 15-year phase-in of new regulations and is now mandating a 76-percent reduction in copper loads by 2022.
- Sea Grant shared the results with Washington's boating industry, which decided that an outright ban on copper bottom paints would actually lower its environmental-compliance costs.
  - Have since signed into law a bill prohibiting the use of copper paints on most recreational boats.

### Title: Hybrid Oyster Nets Bigger Yields (Safe and Sustainable Seafood Supply)

- With California Sea Grant funding, USC shellfish geneticists bred and genetically manipulated a higher yielding - “bigger, better” - Pacific oyster.
- California Sea Grant Extension has since led field-testing of the experimental- “double-cross hybrid” - seed at three oyster farms in California.
  - The experimental seed was raised alongside industry-standard seed, selectively bred for fast growth and high survivorship.
- Yields from the new oyster seed outperformed industry-standard seed by 2 percent, 6 percent and 8 percent at the three farms.
- Applied across the U.S. West Coast, the higher-yielding seed could add about \$21 million to the \$84-million-a year oyster industry’s value over a decade.

### Title: Saving Whales from Ship Strikes (Healthy Coastal and Marine Ecosystems)

- Since 2011, three California Sea Grant State Fellows have been placed with NOAA Channel Islands National Marine Sanctuary to help it save whales.
  - Fellows have mapped whale foraging and high-use areas in relation to shipping lanes, studied the transit ways and speeds of container vessels moving through the channel, and participated in various education and outreach projects to the shipping industry.

- Based on their work and that of others, the sanctuary has identified two strategies for protecting whales:
  - reduce overlap between whales and ships, and
  - reduce ship speeds through sensitive areas.
- Shipping lanes through the Santa Barbara Channel have been adjusted north by 1 mile.
- NOAA has also asked skippers to voluntarily slow down in the channel, but only 1 percent of the industry is participating.
- As slower vessels would not only help whales but also reduce air pollution, the 2013 State Fellow and colleagues have put forth a plan that would pay ships to reduce their speeds to 12 knots, using funds generated through the Air Resource Board's \$1-billion cap-and-trade program, established under the Global Warming Solutions Act (Assembly Bill 32). A decision on the proposal will be announced summer 2013.

## 9. Selected research accomplishments (2012)

### **Title: Using SPATT to monitor HAB toxins in fresh and salt water (New Technologies and Products)**

- Traditional algal-toxin monitoring uses mussels as sentinels of dangerous algal blooms, but toxins in shellfish tissue can go undetected. Mussels may also die during “red tides”• and are sensitive to salinity extremes.
- Researchers developed an “artificial mussel”• for continuously monitoring algal toxin levels in fresh and saline waters using an adaptation of a technology known as Solid Phase Adsorption Toxin Testing (SPATT), first developed in New Zealand in 2004.
- The “artificial mussel”• is now fully field-tested and is being deployed by a long-list of users including:
  - 1) The City of San Jose, to solve mysterious inland fish kills,
  - 2) US Geological Survey, to establish a baseline characterization of phytoplankton toxins in San Francisco Bay,
  - 3) the Southern California Coastal Water Research Program, to document the transfer of freshwater toxins to the marine environment;
  - 4) the EPA, to help with the remediation of Pinto Lake in Watsonville, in 2010 placed on the federal 303(d) list of “impaired waters”• because of high algal toxin levels and
  - 5) the State Water Board’s Central Coast Ambient Monitoring Program, to screen for algal toxins in most of the region’s watersheds.
- The SPATT tool has also helped scientists link the deaths of at least 21 federally protected endangered Southern sea otters to microcystins.

### **Title: Integrated culture of seaweeds and red abalone in Monterey Harbor; Seaweed Strain Selection and Preservation to Optimize Harvest Yields for Abalone Culture (Safe and Sustainable Seafood Supply)**

- California Sea Grant funded a seaweed biologist to help abalone farmers figure out a way to cost-effectively feed their animals in winter or during other times of kelp shortages, such as when heavy winter surf rips apart California’s giant kelp beds, or during El Nino warming events.
- A silage technique for preserving and storing kelp was developed and tested at the Monterey Abalone Company.
- Through the technique, the company is able to store a two-month supply (about 30 tons) of food for its

abalone, reducing feed and labor costs by about \$50,000 annually.

- Graduate student on the project subsequently developed a “salted” kelp product that is now being fed to abalone in winter.

## 10. RFP process (2013)

### Core Research Program

#### Preproposals:

- Received 126 preproposals in March 2013
- All preliminary proposals were read and evaluated two panels:
  - May 3, 2013 - Resources Agency Sea Grant Advisory Panel (RASGAP) for management relevance to the state resources agencies
  - April 30-May 1, 2013 - California Sea Grant Committee Panel (CASGCP) for evaluation of scientific and technical merit
- 26 encouraged to submit full proposals

#### Full proposals:

- 25 full proposals received June 2013
- Review process consisted of:
  - soliciting three or more ad hoc (online) peer reviews per proposals from experts in the proposal topic
  - review by the CASGCP - August 15, 2013
  - review by the RASGAP - September 3, 2013

#### Findings:

- Nearly all submitted proposals were of “fundable quality”
- 10 full proposals were selected for recommendation - assuming adequate available funds
  - One proposal qualified as social science

### West Coast Regional Social Science Competition

Joint call with WA, OR, CA, and USC pledging up to \$700,000 to address specific social science issues of regional priority

#### Preproposals:

- Received 15 Letters of Intent
- Each letter was reviewed and discussed jointly by the Directors and Associate Directors of the program based on RFP criteria
- Seven were encouraged to submit full proposals

#### Full proposals:

- 7 full proposals received
- Review process consisted of:
  - Distribution to a minimum of three external/ad hoc reviewers each
  - Review by a technical review panel

#### Findings:

SEA GRANT AT A GLANCE – February 2014

- Based on recommendations, two of the seven were identified as highly recommended

## CONNECTICUT Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	NANCY BALCOM; SYLVAIN DE GUISE
Extension	JULIANA BARRETT; MICHAEL DIETZ; NANCY BALCOM; ROBERT POMEROY; SYLVAIN DE GUISE; TESSA GETCHIS
Communication	PEG VAN PATTEN
Education	DIANA PAYNE

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	Nancy Balcom; Sylvain De Guise
Extension	Bruce Hyde; Juliana Barrett; Michael Dietz; Nancy Balcom; Robert Pomeroy; Tessa Getchis
Communication	Margaret (Peg) Van Patten
Education	Diana Payne

Total funding (SG + Match + Pass Through) in 2012: **\$1,760,235**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,480,520**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	5	1.36	2.16
Communication	1	0.93	0.07
Extension	10	1.13	3.89
Education	1	0.49	0.26
Research	18	2.7	0.95

### 3. CT SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	35%	32%
Research (including Research Assistantships)	30%	29%
Extension	19%	20%
Communication	10%	8%
Education	5%	6%
PD	1%	5%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	47%	25%
SSSS / SFA	26%	25%
SCD / RCE	11%	30%
HRCC	0%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	20%
other	16%	

\*One of our thematic areas for 2014-2017 is Healthy Coastal Ecosystems and Economy, to which we are allocating 35%. To better match up to the national focus areas, we linked 25% of our HCEE effort to the national HCE focus area, and 10% to the national focus area RCE. This is why it looks like a big drop from 47% to 25% under HCE, and a big increase from RCE from 11% to 30%.

\*\*In 2012, one of our program's thematic areas was Marine and Aquatic Science Literacy. There was no equivalent national focus area to link to, therefore MASL was included, along with climate change, in the 16% effort included under "other".

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/ES-25: The Future of Long Island Sound Tidal Marshes: Understanding Marsh Migration into Different Upland Types (Shimon Anisfeld)

R/FR-1 : Connecticut Sea Grant Future Research, 2016-2018 (Sylvain De Guise)

R/LR-25: The Effects of Timing and Duration of Climatic Heat-Waves in Long Island Sound to a Zooplankton Population (Hans Dam)

R/LR-26: Assessment of Juvenile Horseshoe Crab Age Class Structure and Nursery Habitat Requirements in Long Island Sound (Mark A. Beekey)

R/NERR14-1MIT-CT: Coastal Hazards and Northeast Housing Values: Comparative Implications for Climate Change Adaptation and Community Resilience (Robert J. Johnston)

R/NERR14-2WHOI-CT: Buy out or Build Back? A Comparative Assessment of Approaches to Employing Public Funding to Vulnerable Coastal Properties in the Northeastern United States (Porter Hoagland)

R/RR-1 : Connecticut Sea Grant Support for Northeast Sea Grant Consortium Regional Research, 2014-2018 (Sylvain De Guise)

R/SS-5: Human Dimensions of LIS Ecosystems: An Evidence-based Socio-Ecological Model for Education and Management (Christopher Elphick)

## 6. Program metrics (2012)

Number of peer reviewed publications: **12**

Leveraged funds (managed): **\$ 801,907**

Leveraged funds (influenced): **\$ 269,500**

Volunteer Hours: **1,195**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	6	2	0
Masters	4	1	1
PhD	2	9	4
Other professional degree	0	0	0

Total K-12 students reached through educators: **590**

Curricula developed: **9**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications: **48**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **2**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **3,235**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	2
Businesses Retained	29
Economic Benefit	
Jobs Created	3
Jobs Retained	244
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	1
Number of hazard resiliency trainings	4
Number of coastal communities who have adopted/implement 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.	6
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	4
Number of fishers who adopt and implement responsible harvesting techniques and practices.	45
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	231
Patents	
Tool Used by Stakeholders	18

## 8. Selected impacts (2012)

**(1) Connecticut Sea Grant's collaboration with CTDOT to assess natural phenomena as determiners of mean high tide contributes to the re-definition of the Connecticut coastal jurisdiction line**

- CT Sea Grant macroalgae and coastal plant experts joined the CT Department of Transportation (DOT),

and the Connecticut Association of Land Surveyors (CALs) to properly identify and name nine natural phenomena above mean tide level and get elevations of their upper and lower elevation limits.

- The group concluded that while regulators and environmental scientists may use natural phenomena for guides for the location of MHW, they should rely on accepted surveying practices to make authoritative MHW determinations for the purposes of boundary determination and shorelines regulatory purposes.
- In 2012 the CT Department of Energy and Environmental Protection (DEEP) submitted a Bill, which subsequently passed, that supported the use of coastal jurisdiction line (CJL) and mean high water (MHW) elevations determined from NOAA data based on the mean low low water (MLLW) datum. This 2012 Public Act redefines the coastal permit jurisdiction based on elevations and accepted surveying practices.

**(2) Connecticut Sea Grant continues partnership with Coast Guard Auxiliary to carry outreach message to boaters and anglers that bait worm seaweed packaging is vector for marine species**

- An EPA - Connecticut Sea Grant research project investigated the potential for the brown seaweed harvested from the coast of Maine and packaged with the bait worm to serve as a vector for marine invasive species.

- The results found 13 species of macroalgae and 23 species of invertebrates associated with purchased bait boxes.

- Two species of potentially toxic marine algae, previously unidentified in Long Island Sound, were found both prior to and after incubation at various temperatures, indicating these HABs are brought to and can survive in receiving waters.

- An outreach program was initiated by CTSG in collaboration with resource managers, US Coast Guard Auxiliary (USCGAUX), bait retailers and New York Sea Grant to educate coastal anglers and boaters about best management practices that minimize the movement of marine organisms.

- The USCGAUX in one Division alone discussed the reasons not to dump bait overboard with more than 400 boaters and during 500 program visits to various marinas, bait retailers, and marine dealers. Surveys of 395 boaters and anglers in 2011 and 2012 were completed:

- 95.7% of 231 anglers indicated they disposed of unused live bait

- 96.4% of 226 anglers disposed of the seaweed packing material in ways that minimized risks.

- Only 11% of 359 boaters or boater/anglers could not name a way to avoid accidentally transporting organisms via their boats.

- In addition, from 2011 to 2012, familiarity with the outreach materials improved from 15-16% recognition and ability to name where and in what form they had been seen, to between 59 and 63% recognition.

**(3) Connecticut Sea Grant research and extension efforts lead to first permitted kelp farm in Long Island Sound with initial harvest of 120 pounds sold to five New York City restaurants**

- CT Sea Grant researchers adapted techniques developed in China and Japan for sugar kelp species, and built upon them utilizing results from several Sea Grant projects to develop scalable technology for the mass culture of kelp. The researchers established a kelp culture to serve as a seed bank for aquaculturists.

- Connecticut Sea Grant extension educators worked with the Thimble Island Oyster Farm and the Connecticut Department of Agriculture, Bureau of Aquaculture on the permit application for kelp culture, which was approved in 2012 as a winter crop.

- In May 2013, The Thimble Islands Oyster Farm harvested their first crop of kelp. Over 120 pounds was sold as fresh, wet product to five restaurants in New York City. The farmer is integrating his shellfish and seaweed crops, plans to grow 12 tons of kelp in 2014, and is also considering another species of

seaweed, Gracilariaria, as a future summer crop.

## 9. Selected research accomplishments (2012)

### (1) Connecticut Sea Grant cutting-edge research on the uptake by oysters of nanoparticles commonly used in sunscreens indicates increased bioavailability to the benthic food web

- CT Sea Grant researchers conducted the first comprehensive study to examine ingestion, bioaccumulation and elimination of manufactured nanoparticles in oysters.
- The researchers' findings suggest that, in the natural environment, aquatic organisms will encounter titanium oxide and zinc oxide nanoparticles agglomerated in micron-sized aggregates or incorporated into marine snow.
- These larger particles enhance the gill capture efficiency of suspension-feeding bivalves thereby increasing ingestion; they also sink more rapidly than small particles.
- Together, these effects increase the bioavailability of some nanoparticles entering near-shore, coastal environments to the benthic food web.

### (2) Connecticut and New Hampshire Sea Grant research produces cultivation manual and video for four species of seaweed

- Connecticut and New Hampshire Sea Grant researchers developed a written technical manual and accompanying training video for the culture of four species of seaweed for human consumption.
- The peer-reviewed manual and accompanying video cover topics such as general culture system requirements, and the biology, culture and cultivation system for each species.
- As interest continues to grow in New England for the cultivation of seaweed for human consumption, these materials will provide critical information to prospective growers on the actual culture requirements and techniques.

## 10. RFP process (2013)

- Priorities – Based on the focus areas in their 2014-17 Strategic Plan (Hazard Resilient Coastal Communities, Healthy Coastal Ecosystems and Economy, and Seafood Production and Consumption)
- Process:
  - Each full proposal is sent out for peer review to those with demonstrated expertise in the subject matter covered by the proposal.
  - Three peer reviews were received for each proposal. PIs were sent copies of the blinded peer reviews and given an opportunity to submit a rebuttal.
  - Technical Review Panel:
    - Prior to the panel meeting, all panel members received copies of the proposals, peer reviews, and responses to the peer reviews from proposal authors.
    - Lead Technical Review Panel member introduces and discusses the project and his or her thoughts
    - Everyone shares their thoughts on the proposal by going around the room.
    - Each Technical Review Panel Members scores the proposal
    - Selection follows panel rankings

## DELAWARE Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	NANCY TARGETT
Extension	JAMES FALK; WENDY CAREY
Communication	BILIANA CICIN-SAIN; NANCY M. TARGETT; RONALD OHREL
Education	

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Nancy Targett
Extension	James Falk; Wendy Carey
Communication	Katy O'Connell
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$2,518,229**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,034,000**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	5	0.24	2.13
Communication	4	0	1.75
Extension	6	0.26	3.07
Education	1	0	0.79
Research	40	10.63	0.03

**3. DE SG Distribution of effort by functional area**

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	7%	10%
Research (including Research Assistantships)	49%	56%
Extension	30%	21%
Communication	0%	12%
Education	13%	0%
PD	1%	2%

**4. Distribution of effort by focus area**

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	30%	35%
SSSS / SFA	8%	10%
SCD / RCE	23%	35%
HRCC	28%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	20%
other	10%	

**5. Upcoming Research Projects (from 2014 omnibus proposal)**

R/GS-1: Delaware Sea Grant Graduate Education (Nancy Targett)

R/HCE-13: Quantifying Carbon Accumulation and Storage in Delaware Estuarine Wetlands (Christopher Sommerfield)

R/HCE-14: A semi-automated zooplankton analysis system for Delaware Bay and coastal waters: method development and implementation (Jonathan Cohen)

R/HCE-15: Investigating the role of groundwater-borne nutrients in structuring the phytoplankton community of the Inland Bays, DE (Joanna York)

R/HCE-16: Assessing ecosystem health and processes with a combined package of biological, chemical and physical sensors (George Luther)

R/HCE-17: Optical Observing Systems for Delaware’s Coastal Research and Management (Xiao-Hai Yan)

R/HCE-18: Quantifying inundation and hydrodynamics in an anthropogenically-altered tidal wetland (Thomas McKenna)

R/RCE-1: Social Dimensions of Offshore Wind Power Development off the Delmarva Peninsula (Jeremy Firestone)

R/RCE-2: Extending models of surface hydrodynamics in complex natural and modified tidal marsh environments (James Kirby)

R/RCE-3: A bioeconomic analysis of ecosystem-based horseshoe crab fishery management (Sunny Jardine)

R/RCE-4: Bioremediation of Wastewater and Industrial Emissions by *Heterosigma akashiwo* for the Production of Biofuels at Commercially Relevant Scales (Jennifer Stewart)

R/RCE-5: Development of a High Water Mark Database and Display System for Coastal Flooding Events in Delaware (John Callahan)

## 6. Program metrics (2012)

Number of peer reviewed publications: **13**

Leveraged funds (managed): **\$ 1,895,484**

Leveraged funds (influenced): **\$ 123,523**

Volunteer Hours: **11,275**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	1	0	0
Masters	4	1	0
PhD	2	4	1
Other professional degree	0	0	0

Total K-12 students reached through educators: **3,643**

Curricula developed: **1**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications: **67**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **1**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **7**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>3</b>
Number of hazard resiliency trainings	<b>13</b>
Number of coastal communities who have adopted/implement 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.	<b>3</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>1</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>190</b>
Patents	<b>2</b>
Tool Used by Stakeholders	<b>2</b>

## 8. Selected impacts (2012)

CITIZEN MONITORING. Delaware Sea Grant Training Provides Community Residents with Skills and Expertise to Manage and Operate Town Water Quality Monitoring Program. DE SG has a strong 20-year history of supporting citizen monitoring. Two impacts in 2012: South Bethany volunteers now "own" their monitoring program, designing the program to address their own priorities, including documenting their restoration efforts (17142); thanks in part to citizen monitors' sampling, Rehoboth and Dewey Beach got NRDC 5-star ratings, and NRDC ranked Delaware recreational beaches as #1 in the nation (17143).

CLIMATE ADAPTATION. The City of Lewes has adopted a unified Hazard Mitigation and Climate Adaptation Action Plan that aims to improve community sustainability and resilience. By gathering further knowledge about the City's vulnerability, creating an engaged and committed community, and by taking proactive steps to reduce vulnerabilities, Lewes is better prepared for increased threats that climate change poses to its natural hazard risks (17144).

## 9. Selected research accomplishments (2012)

HORSESHOE CRAB POPULATION PROTECTION. Horseshoe crab populations have been declining in Delaware for several decades due to harvesting for eel and conch bait. Controls on their harvesting since the 90s have not stopped the decline. A series of biochemical research projects identified the chemical in horseshoe crabs that makes it irresistible to eel and conch, and developed a bait as effective as horseshoe crab that uses less than 10% of the previously needed amount of horseshoe crab tissue. A New Jersey firm started commercial production of this artificial bait in 2013 (17163).

SOCIETAL PERCEPTIONS OF WIND POWER. While public perceptions research on wind energy has been conducted regarding commercial projects on land and in the ocean, very little is known about how the public perceives small-scale projects many of which are intended for research and development (e.g., the Lewes Wind turbine), and the reasons for their support or opposition. Still-ongoing research is for the first time capturing public opinion of such wind power development in near-shore waters and coastal communities, and associated transmission facilities (17066, 17608).

## 10. RFP process (2013)

Four focus areas (same as national), 2-4 goals per F.A., multiple priorities in each goal.

E.g., in SFA focus area, goal: "Working to establish a safe, secure, and sustainable supply of seafood to meet public demand"

Priorities: Research, development, and transfer of new technologies to enhance the competitiveness and environmental sustainability of the domestic seafood industry; Outreach activities that help develop and support a viable and sustainable domestic aquaculture industry.

Project size was expected to range between about \$45,000 - \$70,000 per year.

Thirty one preproposals were received. Eleven evaluated as high, 11 medium, 9 low for relevance.

Twenty four full proposals were submitted, nine of which were evaluated in the top tier and recommended for

funding.

States in the Mid-Atlantic region (DE, MD, NC, NJ, NY, PA, VA) also held a regional research competition.

## FLORIDA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	
Extension	ADAMS, CHARLES M.; ANKERSEN, THOMAS; DAVIDSON, GARIN; FLETCHER, PAMELA; RUPPERT, THOMAS; SWETT, ROBERT
Communication	
Education	ELIZABETH MARTIN COUNCILL; GALKIEWICZ, JULIA; JONES, ROBERT C.; LAPUTZ, SARAH; MARK D. FITCHETT

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	Havens, Karl E.; Main, Martin B.; Sidman, Charles F.; Zimmerman, Dorothy
Extension	[within management project, lead by Martin Main]
Communication	[within management project, lead by Dorothy Zimmerman]
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$4,778,021**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$3,229,500**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	5	3	2
Communication	3.5	2.6	0.86
Extension	29	12.5	16.5
Education	3.5	1.75	1.75
Research	116	13.25	6.14

### 3. FL SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	24%	30%
Research (including Research Assistantships)	32%	48%
Extension	34%	6%
Communication	10%	14%
Education	0%	0%
PD	0%	2%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	40%	30%
SSSS / SFA	24%	25%
SCD / RCE	21%	20%
HRCC	15%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	25%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/C-P-42: State and Local Policy Innovation and Implementation for Coastal Communities (Ankersen, Thomas T.)

R/C-P-43: Assisting Coastal Communities Plan and Manage Their Working Waterfronts and Waterways: The Boating and Waterway Planning Program (Swett, Robert A.)

R/C-S-56: The effects of projected sea-level rise on Everglades coastal ecosystems: Evaluating the potential for and mechanisms of peat collapse using integrated mesocosm and field manipulations (Troxler, Tiffany)

R/GOM/GSEAP-3: AOML/Sea Grant Gulf of Mexico and SE Region Project (Main, Martin B.)

R/LR-A-52: Sustainable Production of Marine Fish and Sea Vegetables in a Marine Aquaponics System (Main, Kevan L.)

R/LR-B-67: A Quantitative Framework to Evaluate Vessel Collision Risk for Marine Mammals in Florida (Martin, Julien)

R/LR-B-69: Developing a Size-structured Stock Assessment Model for the Spiny Lobster, *Panulirus argus*, in Southeast United States (Zhang, Yuying)

R/LR-B-70: An Integrative Assessment of Estuarine Impacts on Coral Health and the Implication for Water Resource Management in Southeast Florida (Voss, Joshua)

R/LR-Q-35: Evaluation of Rapid Brevetoxin Tests for Use in Shellfish Regulation, Shellfish Industry, and Aquaculture (Flewelling, Leanne J.)

## 6. Program metrics (2012)

Number of peer reviewed publications: **10**

Leveraged funds (managed): **\$ 1,358,313**

Leveraged funds (influenced): **\$ 2,653,526**

Volunteer Hours: **8,278**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	3.75	5	6
Masters	21.75	10	9
PhD	14	15	9
Other professional degree	10	6	6

Total K-12 students reached through educators: **3,194**

Curricula developed: **8**

Number of Cumulative Clean Marina Program – Certifications: **327**

Number of HACCP -- Number of people with new certifications: **3,000**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **152**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of

Sea Grant activities:

**7. Program performance measures (2012)**

<b>Measure</b>	<b>Actual</b>
Businesses Created	<b>5</b>
Businesses Retained	<b>2,018</b>
Economic Benefit	<b>262,863,000</b>
Jobs Created	<b>12</b>
Jobs Retained	<b>9,102</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>24</b>
Number of hazard resiliency trainings	<b>55</b>
Number of coastal communities who have adopted/implement 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.	<b>10</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>9</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>1,507</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>5,000</b>
Patents	<b>1</b>
Tool Used by Stakeholders	<b>24</b>

**8. Selected impacts (2012)**

HCE Impact - Building public awareness about critical coastal environments to support more effective and integrated decision-making.

- 2012 publication of “Tropical Connections” builds public awareness about critical coastal environments to support more effective and integrated decision-making for South Florida
- Improving the understanding of the linkages among people and their environment is a critical

- component in the local decision-making process, yet, a comprehensive resource was lacking
- FLSG partnered with the Florida Fish and Wildlife Conservation Commission and > 160 researchers and resource managers to help fill this information gap
- The book uses illustrations, pictures and graphs to convey scientific information in a format that is easy to read and understand that addresses this gap

HCE Impact - Teach Aquaculture curriculum creates new education opportunities to advance STEM literacy and promote the viability of the domestic seafood industry

- Interest among instructors and school administrators in teaching aquaculture to boost STEM scores in FL middle schools / high schools, but, no formalized curriculum to address state standards
- FLSG researchers, aquaculture specialists with FL Department of Agriculture and Consumer Services and the Harbor Branch Oceanographic Institute developed standardized aquaculture curriculum
- Teach Aquaculture curriculum supports a statewide effort to improve STEM education while promoting the viability of the domestic seafood industry
  - Instructors use to teach science, math, and vocational skills through hands-on experiences operating a full-scale aquaculture facility in their school.
  - Since 2009, > 800 users from 43 states and 5 foreign countries have registered and downloaded curriculum modules
  - Number of middle and high schools in Florida with a Teach Aquaculture curriculum increased from 18 in 2007-08, to 43 in 2009-10, to 65 in 2011-12

SCD Impact - FLSG Boating decision-support system helps government agencies conduct science-based waterway maintenance and public access planning

- Recreational boating valuable for FL residents and tourists
  - Boat registration increase put demands on resource managers
- FLSG has partnered with the Florida Fish and Wildlife Conservation to conduct regional spatial profiles of recreational boating
  - Thousands of boaters in the study regions have responded to the map-based survey
  - Data used to develop a Recreational Boating GIS to map boating traffic corridors
  - Gives insight on where problems may occur with areas of environmental concern, such as manatee and seagrass protection zones
- In December 2012, NMFS issued a biological opinion using information generated from FLSG's Recreational Boating GIS
  - Ultimately, this allowed for the renewal of USACE Regional General Permits and Programmatic General Permits for for waterway maintenance and marina / private dock construction

## 9. Selected research accomplishments (2012)

SCD Impact - FLSG supports testing of a new spray adhesive product that shows promise as a cost-effective home retrofit to increase resiliency to hurricane

- Value of Florida's residential structures vulnerable to hurricane damage is estimated at \$1.5 trillion
- Most damage due to water intrusion due to wind damage to roofs
- Spray adhesives can be low cost solution to protect both old and new homes
- FLSG researchers are testing durability of spray-applied polyurethane foam adhesives
  - Working with the building industry and state regulatory agencies to establish guidelines for the hurricane retrofit of existing roofs
  - Results show that roof panels containing the spray adhesive tend to hold 20% more moisture than panels that were not treated

- Spray adhesives appear to reduce effects of prolonged water intrusion/exposure and makes roofs more durable to withstand uplift during storms and hurricane conditions (vs. conventional roof construction)
- Findings help develop new design guidelines for spray foam adhesives in construction that are being developed by Florida's Building Commission

HCE Impact - FLSG mobilizes a rapid response to a commercial fishery collapse in Apalachicola Bay

- Apalachicola is a fishing community in the Big Bend region that relies on its oyster fishery
- The reason for a recent collapse of that fishery was unknown (e.g., drought, predation, oil, food web changes, overharvest)
- In 2012, FLSG lead a team of university-based experts to determine the causes and solutions to a collapse in the Apalachicola Bay oyster fishery
  - Consulted with researchers, agency personnel, oystermen, and communityTeam developed findings and will work with agencies and the local community toward long-term sustainability and funding for next steps

## 10. RFP process (2013)

The RFP identified nine priority areas, which reflected the research priorities in our 2014-17 FSG Strategic Plan and broadcasted widely

Florida SG Requires researchers to:

- Work with end-users to develop relevant proposals and address Strategic planning priorities
- Include a specific outreach plan in full proposals

RFP released in Jan 2013

- 59 statements-of-interest

Two-stage research review process:

Initial review of statements of interest and full proposals by in-state and out-of-state subject matter experts that had academic, industry and state agency affiliations.

- Regular research projects
  - Final review of statements of interest and full proposals by a panel of out-of-state subject matter experts who discussed, ranked and selected projects for funding.
- Research-to-application projects (one project)
  - Aimed to support a PI who had reached a point where additional funds are required to conduct a final demonstration project or other activities to allow the new information, tools, models, methods or other technology to be transferred to the private sector or to a
  - Statements for R-A projects were reviewed by 7 members of FLSG Advisory Council, including members from the private sector, from resource management agencies, and from NGOs, in addition to one review by the regular research panel

## GEORGIA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	CHARLES HOPKINSON; DAVID BRYANT
Extension	CHARLES HOPKINSON; DARIN FIGURSKEY; DAVID BRYANT; GENO OLMI; JASON EVANS; JESSICA WHITEHEAD; KEITH GATES; LISA LIGOURI; RICHARD BANDY; ROB MCDOWELL; STEPHANIE FAUVER; THOMAS BLISS
Communication	DAVID BRYANT; JILL GAMBILL
Education	CHARLES HOPKINSON; MARYELLEN TIMMONS

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Charles Hopkinson; David Bryant
Extension	Lisa Liguori
Communication	Jill Gambill
Education	Maryellen Timmons

Total funding (SG + Match + Pass Through) in 2012: **\$2,175,609**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,766,738**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	6	1.3	0.7
Communication	3	1.5	0
Extension	8	4.4	0.9
Education	5	4	0.3
Research	26	6.6	2.8

**3. GA SG Distribution of effort by functional area**

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	12%	16%
Research (including Research Assistantships)	30%	28%
Extension	41%	33%
Communication	8%	12%
Education	8%	8%
PD	2%	3%

**4. Distribution of effort by focus area**

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	9%	18%
SSSS / SFA	24%	25%
SCD / RCE	28%	48%
HRCC	39%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	9%
other	0%	

**5. Upcoming Research Projects (from 2014 omnibus proposal)**

R/FCF-16: Future Competitive Funding 2016 (Charles Hopkinson)

R/SCD-ram-14: Planning for Competitive Port Expansion on the U.S. Eastern Seaboard: The Case of the Savannah Harbor Expansion Project (SHEP). (Stephen Ramos)

R/SCD-she-14: Coastal Georgia Regional Wastewater Planning (Laurie Fowler)

R/SSS-fri-14: Black Gill Disease in Georgia Shrimp: Causes, Distribution and Transmission (Marc Frischer)

R/SSS-sta-14: Evaluation of a turtle excluder device (TED) design for use in the cannonball jellyfish fishery operating in Georgia’s territorial waters. (David Stasek)

R/SSS-yan-14: Can the Local Food Movement Be an Opportunity For Georgia Seafood Producers to Participate in the Inland Seafood Market? (Tracy Yandle)

## 6. Program metrics (2012)

Number of peer reviewed publications:

Leveraged funds (managed): **\$ 1,823,038**

Leveraged funds (influenced): **\$**

Volunteer Hours: **1,810**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate		5	0
Masters	14	3	3
PhD	17	3	1
Other professional degree			

Total K-12 students reached through educators: **8,978**

Curricula developed: **14**

Number of Cumulative Clean Marina Program – Certifications:

Number of HACCP -- Number of people with new certifications: **42**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	<b>16</b>

SEA GRANT AT A GLANCE – February 2014

Economic Benefit	<b>\$1,932,000</b>
Jobs Created	
Jobs Retained	<b>862</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>2</b>
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement 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.	<b>3</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>2</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>53</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>108</b>
Patents	
Tool Used by Stakeholders	

## 8. Selected impacts (2012)

### Georgia Sea Grant research changes shellfish regulation to allow for increased production

The size limit for commercial harvest of oysters in Georgia historically has been set at three inches, in line with other oyster growing regions, to insure that oysters reach sexual maturity before harvest. This is an attempt to restore beds that were overharvested in the early twentieth century. Local shellfish growers maintained that Georgia oysters reproduced well before reaching three inches and that the three-inch limit curtailed their ability to capitalize on the “cocktail” oyster market, that valued smaller, more delicate, oysters.

Georgia Sea Grant funded research to determine the age at which local oysters reproduce and to identify constraints on recruitment. Research shows that, unlike oysters in the northern US, Georgia oysters grow year round and reach sexual maturity within three months, with spat settling in the spring, maturing by summer and spawning through October. This cycle can take years in colder climates.

In 2012, as a result of Georgia Sea Grant research, the Georgia DNR reduced the minimum size limit for commercial oyster harvest from three to two inches. This change removes a hurdle for Georgia shellfish growers and enables

a significant increase in the production of oysters for the single shell, “cocktail” market.

### **Georgia Sea Grant Instrumental in Offering New Turtle Excluder Device Option**

All commercial shrimpers must use turtle excluder devices approved by the National Marine Fisheries Service (NMFS) or face costly fines. The late Sinkey Boone, inventor of the original TED, designed a device that improved on his original TED by allowing sea turtles to escape more quickly, while also reducing unwanted bycatch of finfish, sharks, rays and ecologically important invertebrates like horseshoe crabs. However, the testing necessary for NMFS approval of the device was never done.

Georgia Sea Grant and UGA Marine Extension Service specialists compared the Big Boy TED to the industry standard during 44 two-hour trawls. The new TED reduced overall bycatch biomass by 46.6 percent. Working directly with the National Marine Fisheries Service to test the device, MAREX was instrumental in securing approval for the device.

In June 2012, the National Oceanic and Atmospheric Administration (NOAA) approved the “Boone Big Boy” TED for use in the national shrimp fishery.

### **Georgia Sea Grant Interns Become Seasoned Ocean Literacy Educators Through Instruction, Mentoring and Experience**

The Ocean Research Advisory Panel and the National Oceanographic Partnership Program cite a shortage of well-trained teachers as an impediment to developing national ocean literacy.

Four Sea Grant Marine Education Interns were hired and trained to teach marine and aquatic literacy. Interns are post-graduates who are interested in careers in marine science and education. They undergo a 50-week, intensive, hands-on course of mentoring and instruction. As part of their training, the interns taught 26,350 people through onsite Pre-kindergarten-college classes, summer marine science camp programs, community festivals (e.g., Earth Day, Coast Fest, Skidaway Marine Science Day) and public programs. Interns taught eight public programs and field-tested their educational curricula at local area schools. Interns also conducted outreach at local schools by judging science fair projects and teaching during science nights.<sup>1</sup>

The four interns are now experienced and highly-qualified ocean literacy educators. They were pre and post tested to determine if they learned more science during their one year teaching internship at our facility. The average gain from pre and post scores was 20 points (pre test 74%, post test 94%). In addition, the average score given by teachers whose students were taught by the interns in all K-12 program was "Excellent."

## **9. Selected research accomplishments (2012)**

### **Georgia Sea Grant-sponsored study confirms oysters ability to assimilate pharmaceuticals associated with human sewage**

Pharmaceuticals are biologically active molecules, designed to affect biological processes at very low doses. Exposure to these compounds poses risks to both aquatic organisms and human health. Faulty septic tanks in coastal areas may release these chemicals into aquatic environments. Field and controlled laboratory studies explored the accumulation of five pharmaceuticals by oysters (*Crassostrea virginica*). Three sites in Coastal

Georgia showed significant ( $p < 0.05$ ) seasonal variation of pharmaceutical and lipid concentrations in oyster tissue. Controlled laboratory studies indicated a significant ( $p < 0.05$ ) increase in uptake over 96 hr exposure, as well as microbial interactions. The presence of an algal food source significantly ( $p < 0.05$ ) decreased ibuprofen concentrations in oysters.

This study confirms the ability of oysters to assimilate pharmaceuticals associated with human sewage pollution and may vary by seasonal fluctuations in lipid content.

### **Georgia Law Students Gain Valuable Experience Helping Local Governments Anticipate Legal Challenges in Dealing with SLR**

State law that may uniquely constrain, prohibit, or favor various sea level rise planning and adaptation strategies. Lawyers with training and experience in navigating these challenges and opportunities are of immense value to those wishing to influence public policy.

In July 2012, PI Evans worked with UGA faculty member Laurie Fowler (Institute of Ecology and College of Law) to develop a full-term project on sea level rise policy and legal issues for Fowler's Environmental Practicum, a graduate course in the UGA law school, that was held during UGA's Fall 2012 semester. A group of eight advanced law students were assigned a series of legal questions about sea level rise planning that local governments often face, with the specific goal of uncovering aspects of Georgia law.

Eight law students gained hands-on experience advising practitioners about legal aspects of SLR adaptation.

## **10. RFP process (2013)**

Pre-proposals--end of February 2013

Full proposals-- due mid-May

Submission and written peer review process- June and July

Reviewers' feedback and potential investigators' response--early August

Technical Review Panel--late August

## HAWAII Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	E. GORDON GRAU
Extension	DARREN LERNER; DOLAN EVERSOLE; E. GORDON GRAU
Communication	E. GORDON GRAU
Education	E. GORDON GRAU

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Darren T. Lerner; E. Gordon Grau
Extension	Darren K. Okimoto; E. Gordon Grau
Communication	E. Gordon Grau; Lucinda Knapman
Education	Darren T. Lerner; E. Gordon Grau

Total funding (SG + Match + Pass Through) in 2012: **\$3,766,488**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$3,105,375**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	10	5	4.8
Communication	4	2.75	1.25
Extension	23	4.04	14.8
Education	23	8	6.25
Research	24	0	3.61

### 3. HI SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	24%	13%
Research (including Research Assistantships)	42%	72%
Extension	27%	0%
Communication	7%	14%
Education	0%	0%
PD	1%	1%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	15%	0%
SSSS / SFA	10%	10%
SCD / RCE	26%	90%
HRCC	27%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	0%
other	22%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/IR-27: Ocean Acidification Monitoring Network, Oahu, Hawaii (Eric Heinen De Carlo)

R/IR-28: Groundwater Inundation: Doubling Community Damage from Sea Level Rise (Charles Fletcher)

R/IR-29: Humankind's Biogeochemical Experiment: Ocean Acidification and "Coral Reef" Dissolution (Michael Guidry)

R/IR-30: Forecasting climate change impacts on coastal ecosystem services in Hawaii through integration of ecological and social participatory models (Christopher Lepczyk)

R/IR-31: Global and regional vulnerability to 21st century climate shifts in current areas of plant growth (Camilo Mora)

R/IR-32: Coral adaptation and acclimatization to global change: resilience to hotter, more acidic oceans (Robert J. Toonen)

R/PT-1: Project-Related Travel (E. Gordon Grau)

R/SB-10: Groundwater-derived nutrient uptake in coastal ecosystems as driver of reef accretion-erosion balance (Megan Donahue)

R/SB-11: Groundwater-derived nutrient uptake in coastal ecosystems as a driver of shifts in the accretion-erosion balance (Henrieta Dulaiova)

R/SB-12: Quantifying transport and differentiation of land-use impacts of groundwater nutrient loadings to the coastal zones of Maui (Craig R. Glenn)

R/SB-13: Groundwater-derived nutrient uptake in coastal ecosystems as a driver of shifts in the accretion-erosion balance (Florence Thomas)

R/SS-11: Evaluation of the economic feasibility and marketing potential of the new Hawai'i oyster industry (Pingsun Leung)

R/SS-12: The development of acclimation salinity-based rearing strategies to maximize growth in Mozambique tilapia, *Oreochromis mossambicus* (Andre P. Seale)

R/SS-13: Defining ecosystem-based management boundaries using genetics and fisheries data (Robert J. Toonen)

R/SS-14: Leveraging a new observation network to understand management options for a key resource - Onaga (*Etelis coruscans*) (Kevin Weng)

R/TR-13: Disease Outbreak Investigation on the Reefs of Kauai (Greta Aeby)

R/TR-14: The effects of anthropogenic noise on humpback whale mother-calf pairs (Whitlow W.L. Au)

R/TR-15: Maintaining healthy coastal ecosystems: understanding disease risk of Hawaii's coral reefs and sources of coral pathogens (Sean Callahan)

R/XX-1: Future Competed Research Projects 2016-18 (E. Gordon Grau)

## 6. Program metrics (2012)

Number of peer reviewed publications: **101**

Leveraged funds (managed): **\$ 976,605**

Leveraged funds (influenced): **\$**

Volunteer Hours: **12,115**

## Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	17	8	3
Masters	5	4	1
PhD	13	4	4
Other professional degree	0	0	0

Total K-12 students reached through educators: **6,692**Curricula developed: **7**

Number of Cumulative Clean Marina Program – Certifications:

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **2,135**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **11**

**7. Program performance measures (2012)**

<b>Measure</b>	<b>Actual</b>
Businesses Created	
Businesses Retained	
Economic Benefit	<b>8,207,077</b>
Jobs Created	<b>61</b>
Jobs Retained	<b>6</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>9</b>
Number of hazard resiliency trainings	<b>22</b>
Number of coastal communities who have adopted/implement sustainable -	<b>21</b>

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.	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>34</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>135</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>135</b>
Patents	
Tool Used by Stakeholders	<b>35</b>

## 8. Selected impacts (2012)

### **Hawaii Sea Grant provided technical support in shoreline processes, coastal hazards, and climate adaptation to the County of Maui**

State and county land use planners who administer Hawaii's Coastal Zone Management Program are not trained with specific technical expertise in coastal issues. There is a continuing need for staff in these agencies to have a basic understanding of shoreline processes, coastal hazards, and climate change impacts in order to make informed decisions on land use planning. Since 1996, Hawaii Sea Grant has been providing specialized technical expertise to the County of Maui Planning Department.

In 2012, the Hawaii Sea Grant Extension agent served as the primary contact for the public on 25 projects by providing consultation on permitting procedures and best management practices. The agent also advised county shoreline planners on 50 shoreline development applications and gave five presentations to the community that reached over 200 stakeholders. These actions directly reduced the daily workloads of county planners who are typically overburdened with processing permit applications. Another benefit experienced was that projects were streamlined for both planners and applicants since many issues or challenges were identified early and solved up front. Overall, implementation of these best management practices resulted in better land use planning decisions by county planners.

### **Hawaii Sea Grant supported the genetic stock improvement of tilapia for aquaculture industry**

Hawaii Sea Grant collaborated with several agencies to transfer fast-growing tilapia from Samoa to American Samoa to enhance fish farm productivity. Tilapia is the dominant aquaculture product in American Samoa. This species is hardy, fast-growing, and in high demand. To date there has not been an organized breeding program to maintain a population of tilapia with these characteristics. Furthermore, new genetic stocks of tilapia have not arrived in over 12 years and the species on island has become inbred. Inbreeding results in poor growth and greater susceptibility to disease. The local tilapia stock currently takes approximately 12 months to reach a

harvest size of 0.5 pounds in comparison to the normal three months for fish grown elsewhere.

The Hawaii Sea Grant Extension Agent coordinated a shipment of Genetically Improved Farmed Tilapia (GIFT) from Apia, Samoa in partnership with the Secretariat of the Pacific Community and the Samoa Ministry of Agriculture and Fisheries. The GIFT has been selectively bred for fast growth and has a large body size in relation to the head. After stocking a pond with these fish, a local tilapia farmer observed rapid spawning which expanded his stock to over 500 fish within a few months. His target market prefers smaller sized fish (0.5 pounds). Utilizing the high protein feed produced at the college's feeds lab, he is now able to harvest GIFT after a grow-out period of three to four months, which essentially triples his fish production rate.

### **Hawaii Sea Grant supported the adoption of the State of Hawaii's climate change adaptation planning priority guidelines**

Hawaii Sea Grant, through its participation in the Hawaii Ocean Resources Management Plan working group, helped support the adoption of Act 286, Climate Change Adaptation Planning Priority Guidelines for the state. The Plan, mandated by Hawaii Revised Statutes, uses an integrated, place-based approach to management of ocean resources in the islands. Climate change impacts and adaptation are highlighted in the ORMP and represent an overarching challenge for state as to how to best address this issue.

One of the working group's tasks is to provide climate policy guidance to the Hawaii Coastal Zone Management Program. Historically, climate policy in Hawaii has focused on greenhouse gas mitigation rather than addressing climate impacts or adaptation strategies in land use practices. In 2009, the working group produced a report entitled "A Framework for Climate Change Adaptation in Hawaii." The report identified a methodology and approach for developing policies for adapting to climate change in Hawaii and was shared with decision-makers for policy consideration.

In July 2012, the Governor signed into law Act 286, the Climate Change Adaptation Planning Priority Guidelines which encourages collaboration and cooperation among county, state, and federal agencies, policy makers, businesses, and other community partners to plan for the impacts of climate change. This was in part, due to the efforts of the working group and the 2009 climate framework report.

## **9. Selected research accomplishments (2012)**

### **Hawaii Sea Grant research characterizes and quantifies the impact of mangrove removal on sediment retention, sediment redox state and nutrient dynamics in He'eia Fishpond, a working native Hawaiian fishpond and education center.**

UH Sea Grant researchers are assisting Paepae O He'eia in determining the effect of invasive mangroves on pond ecology. The desire to rid Hawaiian ecosystems of invasive species is a widely held goal of many individuals and groups. The study seeks to determine the effect of mangrove on pond ecology and serves a broader field of inquiry of interest beyond the confines of He'eia Fishpond.

The researchers evaluated methods for selective quantitation of reactive iron minerals in marine sediments (MacDonald 2012). In coastal systems such as those of the Hawaiian Islands, which are fed by eroded, oxidized sediments derived from iron-rich volcanic soils, the ability to identify and quantify reactive iron phases in marine

sediments is of particular importance. These phases have a strong ability to sequester the essential nutrient phosphorus, and render it unavailable for biological uptake. The ultimate goal is to use these methods to better understand coupled iron-phosphorus cycling in these and other sediments. They anticipate publishing this work in the peer-reviewed literature during 2013. There is broad interest in the scientific community about this topic, and we expect that it will have substantial impact on how future work to understand coupled iron-phosphorus cycling in marine sediments will be undertaken.

**UH Sea Grant researchers are determining the source(s) of microbial pollution into Hilo Bay, Hawaii**

Sewage pollution poses a continuous human health threat at beaches throughout the United States, resulting in their diminished recreational use and loss of tourist dollars. In Hawaii, sewage pollution has been a historical problem, with cesspools being a chronic sewage source to many coastal waters. Cesspools are more widely used in Hawaii than any other state and are thought to contribute to the high prevalence of waterborne pathogens.

This research project will determine the source(s) of microbial pollution into Hilo Bay, track it spatially and temporally, and examine whether water quality parameters measured at a buoy can be used to predict their concentrations. No study to date has used these tools together to track sewage inputs to coastal waters and monitor microbial water quality. In the future, this approach may be used nationally and internationally to better manage coastal waters and warn recreational users of health hazards. In turn, disease outbreaks related to sewage pollution should decrease, and tourist revenue and ecosystem health should improve.

A real-time predictive model for microbial water quality in Hilo Bay will be produced.

## **10. RFP process (2013)**

- For the 2014-16 biennium, RFP issued September 28,2012. Distributed to all departments at UH Mānoa, UOG, and all other universities in HI. Widespread notification of current and past researchers.
- 57 preliminary proposals received. Access via eProjects provided to appropriate extension faculty, peer reviewers, the Sea Grant Advisory Council , and the Science Panel. Considered the scientific merit of the preliminary proposals, the Advisory Council provided feedback on the need and relevance of the projects to Hawai'i, and the Science Panel considered the scientific merit while incorporating the reviews conducted by the peer reviewers and the Advisory Council resulting in a directive on which proposals to advance to the full proposal stage.
- 35 invited to submit full proposals. 32 proposals received by April 26,2013. Peer reviews by national and international leaders of the respective fields via eProjects.
- An external Science Panel reviewed peer recommendations and made its own assessment and recommendation to HI SG management.
- 17 proposals recommended and included in 2014-16 Omnibus proposal.

## ILLINOIS-INDIANA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	BRIAN MILLER
Extension	BRIAN ANDERSON; BRIAN MILLER; KWAMENA QUAGRAINIE; LAURA KAMMIN; LESLIE DORWORTH; MARGARET SCHNEEMANN; MARTIN JAFFE; MARTY JAFFE; P. M. CHARLEBOIS; ROBERT MCCORMICK
Communication	BRIAN MILLER; IRENE MILES
Education	ROBIN GOETTEL; TIM EDER

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Brian Miller; Lisa Merrifield
Extension	Brian Anderson; Brian Miller; Kara Salazar; Kwamena Quagraine; Leslie Dorworth; Lisa Merrifield; Margaret Schneemann; Martin Jaffe; Molly Woloszyn; Patrice M. Charlebois
Communication	Irene Miles
Education	Terri Hallesy; Tim Eder

Total funding (SG + Match + Pass Through) in 2012: **\$2,803,406**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,511,444**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	5	1.75	1.6
Communication	4	3.1	0.4
Extension	16	3.09	11.13
Education	2	0	2

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Research	3	0	1.55
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### 3. IL-IN SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	14%	9%
Research (including Research Assistantships)	19%	31%
Extension	53%	45%
Communication	10%	13%
Education	2%	1%
PD	1%	1%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	36%	25%
SSSS / SFA	6%	22%
SCD / RCE	50%	31%
HRCC	8%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	22%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/HCE-01-14: Research: Lamberti (Lamberti, Gary A.)

R/P-01-14: Research Program: Administration (Tomas Hook)

R/P-04-14: Research: Future Projects (Brian Miller)

R/SS-02-14: Research: Prokopy (Linda S. Prokopy)

R/SS-03-14: Research: Cutts (Bethany B. Cutts)

## 6. Program metrics (2012)

Number of peer reviewed publications: **1**

Leveraged funds (managed): **\$ 1,582,458**

Leveraged funds (influenced): **\$**

Volunteer Hours: **1,010**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	77	1	
Masters	11		
PhD	8		
Other professional degree			

Total K-12 students reached through educators: **25,183**

Curricula developed: **15**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **1**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **328**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>13</b>
Businesses Retained	
Economic Benefit	
Jobs Created	

Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement 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.	<b>92</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>15</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>150</b>
Patents	
Tool Used by Stakeholders	<b>11</b>

## 8. Selected impacts (2012)

### 13 new aquaculture businesses get off the ground - Safe and Sustainable Seafood

- Illinois-Indiana Sea Grant holds aquaculture workshops to assist potential producers and help on-going operations, especially in business plans and marketing
- In 2012, a total of 13 new aquaculture businesses started up in Illinois and Indiana: five tilapia operations, four shrimp operations, and four aquaponic operations.

### Lawn to Lake leads to water savings- Sustainable Coastal Development

Population increase of nearly 4 million people by 2050 which may result in as much as a 64 percent increase in water demand in Northeastern Illinois

- IISG led Lawn to Lake, a program that promotes practices that reduce water use in lawn and landscape care to help communities address peak outdoor water demands.

- Management changes resulted in an estimated 18,000 lawn acres for a water savings of 984,665 gallons per day over the 2012 summer season (for a total of 88.8 million gallons).

#### **Keeping Pharmaceuticals out of the water supply -HCE**

- In 2012, IISG partnered with law enforcement agencies and community groups to start permanent medicine collection programs. IISG also assisted with single day collection events in six communities and helped promote the fall DEA collection program in 11 communities. IISG assisted with collections, wrote press releases, provided brochures and purchased locked medicine collection boxes.
- In 2012, over 12,000 pounds of pills were properly disposed of through the 17 permanent collection programs and six single day events. The medicine was destroyed using high-heat incineration, reducing the potential for diversion or accidental poisonings and keeping the chemicals out of local water.

### **9. Selected research accomplishments (2012)**

#### **Asian carp force native fish to change their diets - Healthy Coastal Ecosystems**

- Researchers at the University of Illinois Illinois Natural History Survey found that Asian carp do more than compete for food. They actually force native fish to change their diets, feeding on species lower on the food chain than they naturally would.

#### **Nanomaterial changes stream bacteria - HCE**

- Researchers are studying the impacts of nanomaterials on aquatic bacteria before they become a problem.
- Researchers from Loyola and Northwestern University used discovery grant funds to begin investigating the impacts of nanomaterials on bacteria in Chicago-area streams. Learning how bacteria that live on stream floors are affected by common nanomaterials, such as those found in sunscreen and cosmetics, could help prevent them from damaging aquatic environments in the future.

### **10.RFP Process (2013)**

Two RFP's

#### **Emerging Lake Michigan Food Webs - Joint with Wisconsin**

Nearshore offshore food web connections

Food Web Differences across Lake Michigan Regions or Habitats

Influence of short term episodic events in structure the Lake Michigan Food Webs

Food Web Interactions during the understudied isothermal winter period.

#### **Social Science**

Projects evaluated jointly with Minnesota and Wisconsin

Indicators of Great Lakes Literacy and evaluation of education networks to address Great Lakes Literacy

SEA GRANT AT A GLANCE – February 2014

Contaminant removal programs currently underway, especially those related to areas of concern and unwanted pharmaceuticals

Spread and impacts of aquatic invasive species

Adaptation to climate change in Lake Michigan Coastal Areas

## LOUISIANA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	CAFFEY, R.; NIELAND, D.; WILSON, C.
Extension	CAFFEY, R.; DAIGLE, M.; J. SUPAN; M. DAIGLE; WILKINS, J.
Communication	KRON, R.
Education	D. NIELAND; LEA, K.; LINDSTEDT, D.; NIELAND. D.

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Matthew Bethel; Rex Caffey; Robert Twilley
Extension	James G Wilkins; James Wilkins; Lauren Land; Melissa Daigle; Rex H. Caffey; Roy Kron
Communication	[Publications and Information Dissemination is within Extension project, PI Roy Kron]
Education	Dianne Lindstedt; Kathryn Lea; Matthew Bethel

Total funding (SG + Match + Pass Through) in 2012: **\$2,567,536**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,274,755**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	7	0.18	5.71
Communication	7	1.35	5.65
Extension	18	2.28	15.72
Education	1	0.21	0.79
Research	53	13.93	2.75

### 3. LA SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	10%	9%
Research (including Research Assistantships)	47%	43%
Extension	30%	37%
Communication	6%	0%
Education	3%	6%
PD	5%	6%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	39%	50%
SSSS / SFA	26%	50%
SCD / RCE	18%	50%
HRCC	18%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	50%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/CFT-03: Field testing and technology transfer of an alternative bait for the blue crab fishery (Julie A. Anderson)

R/E-24: A Novel Technique to Measure Nitrogen Fluxes in Newly Formed and Restored Marshes and Tidal Creeks: Developing Realistic Ecological Metrics for Eutrophication Assessment and Nutrient Budgets (Victor Rivera-Monroy)

R/EMD-02: Forecasting Land Building and Hurricane Flood Risk Reduction by River Diversion in Mississippi River Delta (Qin Jim Chen)

R/EMD-03: Impact of Climate Change on Louisiana Coastal Ecosystem: Development of Research-Driven Student-Centered Learning Modules (Emad Habib)

R/NIS-01: Response of Louisiana black mangrove to climate changes: Learning from the past to predict the future (Kam-biu Liu)

R/OA-16: Improving region specific eastern oyster models by quantifying physiological responses to regional environmental and climatic variability using a Dynamic Energy Budget approach (Jerome F. La Peyre)

R/ODR-04: Functional marker assisted selective breeding to produce dermo resistant eastern oysters (Qinggang Xue)

## 6. Program metrics (2012)

Number of peer reviewed publications: **16**

Leveraged funds (managed): **\$ 1,519,089**

Leveraged funds (influenced): **\$ 709,414**

Volunteer Hours: **8,017**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	26	8	3
Masters	16	13	4
PhD		3	
Other professional degree	3	7	4

Total K-12 students reached through educators: **33,467**

Curricula developed: **65**

Number of Cumulative Clean Marina Program – Certifications: **3**

Number of HACCP -- Number of people with new certifications: **54**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **292,697**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **60**

## 7. Program performance measures (2012)

<b>Measure</b>	<b>Actual</b>
Businesses Created	<b>32</b>
Businesses Retained	<b>472</b>
Economic Benefit	<b>49,669,903</b>
Jobs Created	<b>127</b>
Jobs Retained	<b>2,731</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>8</b>
Number of hazard resiliency trainings	<b>33</b>
Number of coastal communities who have adopted/implement 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.	<b>16</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>17</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>1,859</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>3,966</b>
Patents	<b>1</b>
Tool Used by Stakeholders	<b>9</b>

## 8. Selected impacts (2012)

### SSSS Impact - Blue crab fishery certified as sustainable

- LASG research and extension provided necessary data for the Louisiana blue crab fishery to be recognized with the seal of 'sustainability' by Marine Stewardship Council (MSC)
- During the initial assessment and annual audits, Louisiana Sea Grant researchers provided critical data, integrating results and activities from their research and extension:
  - Data on alternative baits and preliminary by-catch data
  - Derelict Crab Trap Rodeos hosted by LASG provide cleanup of fishing gear (required by MSC)
  - During the annual audits, updated results with the bait research and a scientific ghost fishing experiment to keep the industry certified

HCE Impact - LASG's Legal Program Information Leads to Parish Ordinance Protecting Chenier Ridges

- The Louisiana Sea Grant Law & Policy Program worked with the Department of Natural Resources (2010-2011) to provide legal research on how to protect these important landforms
  - Procedures in place for coastal use permits
  - Model language for local ordinances.
- Based on this information, Cameron parish passed an ordinance to protect the cheniers and classifies cheniers as critical landforms that:
  - Are critical components of the ecology of coastal Louisiana
  - Serve as critical wildlife habitat
  - Offer substantial protection against coastal storm surge and flooding.
- The ordinance then prohibits to the maximum extent possible surface alterations that would have a high adverse impact on the landforms.

SSSS Impact - Louisiana Wild Certified Seafood Program Development

- The LA legislature designated that a Louisiana Wild Certified Seafood (LWCS) program be developed and implemented to certify that seafood is harvested, landed and processed in Louisiana and be marketed to differentiate this product
  - LSU AgCenter and Louisiana Sea Grant (LSG) scientists assisted in the development and training for this program and provide seafood technology expertise
  - LASG helped develop training and outreach materials to increase participation and economic support of the seafood industry in Louisiana
  - LSG seafood technologist coordinated fisheries and seafood science with regulatory personnel from the three state agencies to develop a basic seafood certification program
  - Implementation of the LWCS program was achieved in October 2012 by LDWF.

**9. Selected research accomplishments (2012)**

HCE Impact - Ecosystem Service Value Trajectory Economics Simulation Tool

- LASG resource economists worked with LA Coastal Protection and Restoration Authority and presented a draft tool after a 2-year developmental period
- Decision support tool for examining the comparative efficiency of coastal restoration projects under a time-dynamic, risk-dependent context
- Helps compare options w.r.t. how it affect flow of ecosystem services (and benefit-to-cost ratio)
- Allow for increase efficiency for millions of dollars of coastal restoration funding
- Next steps are to apply to large-scale projects in the LA Coastal Master Plan

SCD Accomplishment - Oral History Project continues to record south LA life

The culture of south LA is being lost at a rapid pace

LA Sea Grant's oral history project has made some recent progress in 2012 to capture this way of life:

- Four oral history interviews were submitted to NOAA's Voices of the Fisheries website
- Discussions initiated with ConocoPhillips for access to archives that include detailed descriptions of the coastal landscape dating back a century
- The McIlhenny Co. has opened its archives related to the canning and oyster industry in south LA
- Researchers continue to provide images, text, and interviews for multimedia cover of south Louisiana's wetlands and people.

## 10. RFP process (2013)

- Priorities –  
November 2012 with a Call for Statements of Interest that cited topics in our current Strategic Plan Outline as candidate areas for research funding:
  - 1) Healthy Ecosystems and Habitats
  - 2) Sustainable Fisheries and Aquaculture
  - 3) Resilient Communities and Economies
  - 4) Education and Workforce Development

Note the language for education and outreach: “Louisiana’s Sea Grant's goal is to ensure that 25 percent of its research funding supports students (and their associated costs) who are working within a project... Proposals with either no or little student/extension contribution will be given very low priority.”

- RFP widely circulated throughout the Louisiana academic community via the internet and our extensive list serve of the academic research community.
- Composition of review panels:  
LASG has a two-step review process:
  1. Pre-proposal review by panel of experts
    - each pre-proposal reviewed by at least six LASG Extension Staff and provided to panel
    - panel recommends to encourage or discourage submitting a full proposal
  2. Full proposal Technical Review
    - both external (mail) and panel (out-of-state and in-state) reviews for each proposal
      - Discusses each proposal, then ranks each as:
        - Highly Recommended for Funding
        - Recommended for Funding if funds exist
        - Not Recommended for Funding

## MAINE Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	PAUL ANDERSON
Extension	ESPERANZA STANCIOFF; KRISTEN GRANT; PAUL ANDERSON; RICHARD WAHLE
Communication	CATHERINE SCHMITT
Education	

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Paul Anderson
Extension	Esperanza Stancioff; Kristen Grant; Natalie Springuel; Sarah Bisson
Communication	Catherine Schmitt
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$3,038,524**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,581,026**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	5	1.36	1.74
Communication	3	2.15	0.85
Extension	5	2.87	1.63
Education	1	0.19	0.31
Research	12	3	0.62

### 3. ME SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	23%	27%
Research (including Research Assistantships)	32%	23%
Extension	29%	28%
Communication	13%	17%
Education	0%	0%
PD	3%	5%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	12%	18%
SSSS / SFA	53%	23%
SCD / RCE	16%	43%
HRCC	19%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	16%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/12-16-01 Brawley: Supporting Sea Vegetable Aquaculture in Maine (Susan Brawley)

R/12-16-02 Chen: Evaluate performance of length-structured models for assessment of northern shrimp and Atlantic herring in the Gulf of Maine (Yong Chen)

R/12-16-03 Zou: Coastal Flooding and Erosion from Severe Storms in a Changing Climate (Qingping Zou)

R/12-16-04 Wilson: Variation in Habitat Use of Juvenile Life Stages of River Herring (Karen Wilson)

R/12-16-PD: Sea Grant Program Development Funds (Paul Anderson)

R/NERR14-1WH-ME: Coastal hazards and Northeast housing values: comparative implications for climate change adaptation and community resilience. (Robert Johnston)

R/NERR14-2WH-ME: Buy out or build back? A comparative assessment of approaches to employing public funding to vulnerable coastal properties in the Northeastern United States (Porter Hoagland)

## 6. Program metrics (2012)

Number of peer reviewed publications: **16**

Leveraged funds (managed): **\$ 110,211**

Leveraged funds (influenced): **\$ 487,548**

Volunteer Hours: **12,016**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	34	2	1
Masters	3	8	4
PhD	1	7	0
Other professional degree	0	0	0

Total K-12 students reached through educators: **4,751**

Curricula developed: **2**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **90**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>4</b>
Businesses Retained	<b>145</b>

SEA GRANT AT A GLANCE – February 2014

Economic Benefit	<b>3,955,362</b>
Jobs Created	<b>7</b>
Jobs Retained	<b>151</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>5</b>
Number of hazard resiliency trainings	<b>51</b>
Number of coastal communities who have adopted/implement 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.	<b>41</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>7</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>73</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	<b>15</b>

## 8. Selected impacts (2012)

**HCE: Maine Sea Grant assisted with production of the report, Sources to Seafood: Mercury Pollution in the Marine Environment, which was featured at a United Nations meeting that established a globally binding treaty on mercury.**

- Mercury is a potent neurotoxin that is especially toxic to women and children. The primary route of exposure to mercury is through seafood, yet the majority of mercury research has focused on freshwater environments.
- The Coastal and Marine Mercury Ecosystem Research Collaborative (C-MERC), led by Dartmouth College’s Superfund Research Program, pulled together an interdisciplinary team of mercury researchers to synthesize knowledge of global mercury sources, transport, and accumulation in the marine environment, and human exposure risks.
- Sea Grant funds supported synthesis workshops, and Maine Sea Grant was contracted to help produce the final report that summarized 11 peer-reviewed journal articles by more than 75 authors and presented new analysis on the pathways of mercury pollution in the marine environment and responses to pollution controls.
- The report, Sources to Seafood: Mercury Pollution in the Marine Environment, was released in parallel

with a special issue of the journal *Environmental Research* in November 2012.

- Authors presented the report to the EPA, NOAA, the US Senate (17 members via Senator Carper), and the US State Department in December.
- In January, 300 copies of the report were distributed to the United Nations Environment Program Intergovernmental Negotiating Committee, who on Saturday, 19 January 2013, agreed to the text of a global legally-binding instrument on mercury and created the Minamata Convention on Mercury.

**SSSS: Maine Sea Grant has stimulated the US aquaculture industry by being a leading innovator in emerging sea vegetable culture.**

- Maine is also home to the first commercial kelp farm in the US, with innovations in culture technologies and product types.
- There is very little expertise and few resources available for the development of seaweed aquaculture in the US, which can
  - stimulate growth in the existing sea vegetable industry,
  - encourage the development of new products,
  - allow for diversification and integration on existing sea farms,
  - encourage new entries into the aquaculture industry, and
  - play a role in ecosystem services.
- Maine Sea Grant created a new extension position specializing in seaweeds and established a sea vegetable research and educational nursery to support the new industry and provide educational and training opportunities for interested individuals or groups.
- Collaboration with new farmers resulted in seven shellfish farms cultivating sugar kelp during the 2011-2012 winter and four shellfish farmers cultivating sugar kelp and other red seaweeds (dulse and laver) on their sites during 2012-2013 in an attempt to develop successful husbandry techniques and sea vegetable products for market.
- The development of seaweed cultivation is also stimulating new research, including utilizing the technology for bioremediation, for feed production for other cultured organisms, and new product development.

**SCD: Maine Sea Grant aided the permitting process of the first-ever grid-connected tidal power device in the U.S. by linking the developer with researchers and assisting in the creation of environmental monitoring and community engagement programs.**

- The high tides of Cobscook Bay are ideal for the development of tidal power.
- Understanding the potential impacts of hydrokinetic devices on fish, seabirds, and marine mammals is required by regulatory agencies to further advance the development of this technology.
- Community support is also crucial for project success.
- Maine Sea Grant connected the developer, Ocean Renewable Power Company, to scientific expertise and technicians in the area for the implementation of fish, seabird, and marine mammal monitoring programs.
- Sea Grant research provided data on fish numbers, relative size, and behavior in proximity to the tidal energy device, using side-looking acoustic sonar.
- Research results are included in permit application and approval documents.
- Sea Grant facilitated a transparent community process that linked stakeholders with researchers to share knowledge of the local marine resources that informed the scientific methodology.
- In September 2012, ORPC's Cobscook Bay Tidal Energy Project became the first ocean energy project in the United States that delivered electricity to the grid.
- During the development, construction, and installation period of the overall project (2011– 2016),

forecasters predict 125 full-time equivalent jobs in Maine, which will generate \$8.1 million in earnings, with a multiplier effect of \$22 million in local spending.

- During the operating period, predictions are for 19 new full-time equivalent jobs annually, translating to \$700,000 in annual earnings, with a multiplier effect of \$1.1 million in local spending.

## 9. Selected research accomplishments (2012)

Local stakeholders need cooperative approaches to resolving coastal access issues. Maine Sea Grant's website "Accessing the Maine Coast," designed to meet this need, has provided legal guidance in a major coastal access lawsuit.

Maine Sea Grant-supported monitoring and pollution source-tracking efforts contribute to local initiatives to improve water quality in several Maine communities. Maine beaches participating in the Sea Grant-coordinated Healthy Beaches Program were worth approximately \$ 156 million to beach users in 2012.

## 10. RFP process (2013)

- Priorities –  
Safe and Sustainable Seafood  
Sustainable Coastal Development  
Healthy Coastal Ecosystems  
Hazard Resilient Coastal Communities
- Process to develop RFP priorities:  
MESG gathers input from its stakeholders and Policy Advisory Committee.
- Proposals Reviewed:
  - o 39 Pre-proposals from 9 institutions with 15 from UMaine
  - o 12 Full proposals from 3 institutions with 10 from UMaine
  - o 5 Funded proposals from 2 institutions with 4 from UMaine
    - 1 of the pre- and full proposals was a bi-state proposal, with PIs from Maine and NH submitting the same proposal to both MESG & NHSG for both programs to review. This proposal was not recommended for funding by either program.
- Composition of review panels:  
MESG has developed a review process that includes:
  1. reviews of preliminary proposals by a panel of stakeholders,
  2. written reviews of full proposals by peers outside the state, and
  3. an in-person review by a panel of technical experts.
- Final programmatic decisions of selected proposals are made by the Director.

## MARYLAND Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	EDWARD HOUDE; FREDRIKA MOSER; HOWARD TOWNSEND; JAMES FALK; JAMES M. WALLACE; JEFFREY CORNWELL; <b>JOHATHAN G. KRAMER</b> ; KATHY FULLER; KEVIN SELLNER; LAURA LAPHAM ; MICHAEL VOILAND; MICHAEL WILBERG; PETER M. ROWE; RALEIGH HOOD; RICHARD DEVOE; ROBERT LATOUR
Extension	<b>ANDREW LAZUR</b> ; ANDY LAZUR; DOUGLAS LIPTON
Communication	<b>JOHN GREER</b>
Education	FREDRIKA MOSER

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Fredrika Moser
Extension	Andrew Lazur
Communication	Jeffrey Brainard
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$2,674,066**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,183,902**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	17	1.41	8.98
Communication	7	1.38	0.57
Extension	15	4.4	9
Education	11	2.43	0.52

SEA GRANT AT A GLANCE – February 2014

Research	43	6.26	2.37
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### 3. MD SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	10%	12%
Research (including Research Assistantships)	44%	46%
Extension	25%	21%
Communication	19%	16%
Education	0%	0%
PD	3%	5%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	22%	35%
SSSS / SFA	41%	30%
SCD / RCE	20%	20%
HRCC	17%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	15%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/E-1: Maryland Sea Grant Research Fellows Program (Michael R. Allen)

R/EH-15: Retrospective Analysis of Nutrient and Sediment Loadings to the Chesapeake Bay: Exploration of Trends and Affecting Factors (William P. Ball)

R/EH-16: From genes to ecosystems: integrating measures of aquatic biodiversity and ecosystem health within urbanizing Bay watersheds (Stephen Keller)

R/FISH-105: Understanding Atlantic menhaden population dynamics through use of data from a large-scale historical tagging study (Michael Wilberg)

R/FISH-106: Evaluating the relative impacts of the recreational and commercial sectors of the blue crab fishery in Maryland (Anson Hines)

R/PO-6: Understanding the Effectiveness of the Watershed Stewards Academies in Maryland (Dana R. Fisher)

R/SD-1: Role of a resilient submersed plant bed in mitigating the effects of increasing river-borne particulate inputs to Chesapeake Bay: Sediment dynamics (Lawrence Sanford)

R/SV-2: Role of a resilient submersed plant bed in mitigating the effects of increasing river-borne particulate inputs to Chesapeake Bay: Nutrient cycling (Michael Kemp)

R/X-xx: Maryland Sea Grant Future Research Projects (Fredrika Moser)

## 6. Program metrics (2012)

Number of peer reviewed publications: **25**

Leveraged funds (managed): **\$ 2,176,489**

Leveraged funds (influenced): **\$**

Volunteer Hours: **1,077**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	6	3	
Masters	10	3	2
PhD	4	10	2
Other professional degree	1	2	

Total K-12 students reached through educators: **901**

Curricula developed: **7**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications: **74**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **125**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of

Sea Grant activities: **13****7. Program performance measures (2012)**

<b>Measure</b>	<b>Actual</b>
Businesses Created	<b>43</b>
Businesses Retained	<b>46</b>
Economic Benefit	<b>11,584,774</b>
Jobs Created	<b>99</b>
Jobs Retained	<b>204</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>4</b>
Number of hazard resiliency trainings	<b>7</b>
Number of coastal communities who have adopted/implement 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.	<b>2</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>1</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>181</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>135</b>
Patents	
Tool Used by Stakeholders	<b>19</b>

**8. Selected impacts (2012)**

MD Sea Grant extension agents supported the Maryland Crabmeat Quality Assurance Program with technical and programmatic advice and development of a training handbook. An economic analysis estimated that the 20 businesses that participated in the program in 2012 boosted their revenues by \$5M and helped retain 146 full time jobs (17284).

Blue crab populations in the Chesapeake Bay in 2012 were found to be more than double that of 2008. This is probably due (at least in part) to aggressive management by Maryland and Virginia resource managers (eg, ban on winter harvest of females, and crab licence buy-backs (17215)), which were in turn implemented as a result (at least in part) of specific findings and recommendations of MD Sea Grant blue crab researchers studying dispersal and post-settlement factors affecting population recovery (17061).

Extension agents gave technical assistance to Maryland watermen to help them apply for and receive start-up loans worth \$717,000 to launch new oyster aquaculture businesses, creating 36 businesses and 80 jobs in Maryland (17285).

## **9. Selected research accomplishments (2012)**

Field experiments in the Chesapeake Bay suggests that increases in carbon dioxide and nitrogen will increase invasions of *Phragmites Australis*, while carbon dioxide alone has a weak stimulatory effect on Phragmites expansion. Preliminary data suggest that altering land management practices to limit nitrogen availability may potentially limit future Phragmites expansion and invasions (16972).

Research and monitoring of oyster restoration success led to a predictive model of most likely restoration locations, now being used by USACE in a restoration project on the Choptank River (16879).

Conducting an IEA for the Potomac River, one of the Chesapeake Bay's major tributaries, an important pilot effort in developing an IEA (or IEAs) for the entire Bay (16975).

## **10. RFP process (2013)**

Three of four national focus areas were represented in their call for proposals (all but ELWD). Each area had one or more "research emphasis": understand large-scale ecosystems; inform EBFM; understand environmental-socioeconomic responses to environmental change, restoration and TMDLs.

Within these, 15 priorities of about this level of specificity: "Developing tools/strategies and increasing understanding to address the socioeconomic and ecological consequences of water resources management options". Geographical focus of the RFP, like MD's Plan, was the Chesapeake Bay.

Expected size of projects: about \$70K per year.

Twenty nine preproposals reviewed for relevance by academic advisory board and extension staff, and subjected to external written peer review. Eighteen were encouraged, and 17 full proposals were submitted. Seven were selected for funding.

The states in the Mid-Atlantic region (DE, MD, NC, NJ, NY, PA, VA) also held a regional research competition.

## MIT Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	C. CHRYSSOSTOMIDIS
Extension	C. CHRYSSOSTOMIDIS
Communication	C. CHRYSSOSTOMIDIS
Education	C. CHRYSSOSTOMIDIS

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Chrys Chryssostomidis
Extension	Chrys Chryssostomidis; Judith Pederson; Juliet Simpson; Madeleine Hall-Arber
Communication	Chrys Chryssostomidis; Lillie Paquette
Education	Chrys Chryssostomidis; Kathryn Shroyer

Total funding (SG + Match + Pass Through) in 2012: **\$3,886,372**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$3,986,531**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	9	3.95	2.35
Communication	3	1.45	0.15
Extension	12	4.05	0.6
Education	2	1.25	0.15
Research	74	9.28	5.05

### 3. MIT SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	26%	26%
Research (including Research Assistantships)	52%	46%
Extension	14%	16%
Communication	5%	4%
Education	3%	5%
PD	0%	3%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	48%	53%
SSSS / SFA	14%	15%
SCD / RCE	19%	15%
HRCC	19%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	17%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/FCP: Future Competitive Funding (Chrys Chryssostomidis)

R/P-NERR-14-1: Buy Out or Build Back? A Comparative Assessment of Approaches to Employing Public Funding to Vulnerable Coastal Properties in the Northeastern United States (Porter Hoagland)

R/P-NERR-14-2: Coastal Hazards and Northeast Housing Values: Comparative Implications for Climate Change Adaptation and Community Resilience (Robert Johnston)

R/RC-132: Are blue mussels declining in the Gulf of Maine?: population trajectories, connectivity, and spatiotemporal variation in reproduction (Cascade Sorte)

R/RC-133: Development and Validation of the Coastal Biosensors for Endocrine Disruption (C-BED) Assay (Helen Poynton)

R/RC-134: High Productivity on a Coastal Bank: Physical and Biological Interactions (Pierre Lermusiaux)

R/RC-135: Climate Change Adaptation Initiative: Participatory hazard mitigation using the Vulnerability and Consequence Adaptive Planning Scenario (VCAPS) process (Chrys Chryssostomidis)

R/RC-136: Enhanced monitoring of harmful algal bloom dynamics and toxicity using real-time observations from co-deployed, automated biosensors (Donald Anderson)

R/RC-137: Using a Global-Regional-Coastal FVCOM System to Assess the Impact of Sea Level Rise on Hurricane and Nor'easter-induced Flood Risk over Massachusetts Coast (Changsheng Chen)

R/RCM-35: Laboratory Development of a Quantum Cascade Laser-Based Sensor System for Measurement of  $\delta^{13}C$  (CO<sub>2</sub>) in Seawater and Air (Anna Michel)

R/RCM-36: Food Web Structure as a Driver of Multiple Ecosystem Functions in New England Salt Marsh Ecosystems (Jarrett Byrnes)

R/RCM-37: Functional consequences of invasion-mediated biodiversity changes in a marine ecosystem (A. Randall Hughes)

R/RT-2: Focused Research (Chrys Chryssostomidis)

R/RT-2/RC-117: Consortium for Ocean Sensing In the Nearshore Environment (COSINE) (Robert Chen)

R/RT-2/RCM-34: Marine Center for Development of Biomimetic Underwater Sensors (Michael Triantafyllou)

## 6. Program metrics (2012)

Number of peer reviewed publications: **16**

Leveraged funds (managed): **\$ 1,656,967**

Leveraged funds (influenced): **\$ 1,318,975**

Volunteer Hours: **2,625**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	30	4	1
Masters	7	6	2
PhD	13	4	1
Other professional degree	4	0	0

Total K-12 students reached through educators: **37,554**

Curricula developed: **475**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **83**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>4</b>
Number of hazard resiliency trainings	<b>12</b>
Number of coastal communities who have adopted/implement 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.	<b>20</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>450</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>1,200</b>

Patents	
Tool Used by Stakeholders	<b>17</b>

## 8. Selected impacts (2012)

### **Analysis of Social Impact Assessments: Herring**

MIT Sea Grant provided a social impact assessment of proposed herring management regulations in order to mitigate negative impacts on the fisheries' stakeholders while maintaining a healthy fishery.

Although herring is neither overfished, nor is overfishing occurring, conflicting demands for access to herring make careful management a high priority. MIT Sea Grant collaborated with the New England Fisheries Management Council to include social assessments when developing policy through participation on the Plan Development Team and by writing the social impact assessment for Amendment 4 to the Herring Fishery Management Plan. Interviews with herring stakeholders about plan options and reviews of comments from public hearings contributed data to the assessment.

The New England Fisheries Management Council had information about the variety of stakeholders who are affected by regulatory change in herring management. This information may have contributed to choices of options in the amendment that had less impact on stakeholders than other options. National Marine Fisheries Service accepted the Environmental Impact Assessment, of which the SIA was one section, for Amendment 4, thus contributing to maintenance of the healthy herring fishery.

### **Development of Remotely Operated Fish Sound Locator (ROFSL)**

A device was invented and calibrated to locate fish based on the sounds that they produce, and software to process these vibrations was also created.

Sea Grant funded scientists at the University of Massachusetts at Amherst developed a Remotely Operated Fish Sound Locator (ROFSL) hardware device, and associated "FishLocator" software to aid researchers in the identification of unknown fish sounds in both laboratory and field environments. The system also allows researchers to track and study the behavior of soniferous fishes with high precision in small spatial areas.

### **Using Technology to Assess the Invasive Sea Squirt, *Didemnum vexillum*, Impacts on Fisheries and Ecosystems**

A new method to detect *Didemnum vexillum* in situ proved effective; details are published in a peer-reviewed journal article. A radiometer was attached to a hybrid autonomous underwater vehicle and reflectance specific to *Didemnum* was identified.

Detecting marine organisms quickly and efficiently will aid understanding distribution and abundance of organisms. MIT Sea Grant's hybrid underwater vehicle, Reef Explorer 2 (REX 2) AUV was deployed in a marina in Hull, Massachusetts that has *Didemnum vexillum*, an invasive sea squirt, growing on pilings and pontoons through the late fall and early winter. For each cruise a spectralon 99% reflectance calibration plate was used to remove the spectral characteristics of the illumination sources, water color and green plankton. The identifying

features for Didemnum were a low plateau reading between 450 and 500 nm rising to a high plateau between 600 and 650 nm. The video from REX 2 the AUV was posted on YouTube and shared.

## 9. Selected research accomplishments (2012)

### **Combating Nitrogen-Driven Coastal Eutrophication: a Selective Ion Array Approach to Rapid In-Situ Measurement of Nitrate and Ammonium**

Constructing and using multi-ion sensor hardware, developing a feedback-based neural network architecture for separating useful information from these mixed signals, extending methods for use in saline environments, and adapting these for use on an autonomous underwater vehicle will assist in tracking sources of nitrogen (prime cause of eutrophication) in coastal waters.

The researchers are making excellent progress toward the project's objectives. Specific accomplishments include: 1) development of a full ion balance electrode array, 2) testing of this array with a large number of two-salt standards (>100) and simulated surface water samples (>70), 3) demonstration of a neural network algorithm incorporating feedbacks based on chemical understanding of the system, and 4) development of a methodology for extending these tasks to the saline environment.

Knowledge of the major ion makeup of natural waters is central to understanding and/or remediating many environmental situations. For example, analysis of total cationic and total anionic concentrations gives important information on the processes that control the master variable, pH of water, and enhances understanding of the numerous processes and controls operating in natural aquatic ecosystems. Such knowledge can, in a practical sense, help pinpoint the direct cause of numerous adverse water quality impacts, leading to more appropriate responses. In particular, in a coastal water setting, such water analysis when made in situ can greatly assist in the tracking of sources of nitrogen, prime causes of coastal eutrophication, in both nitrate and ammonium forms.

### **FVCOM Software and Applications**

The Finite Volume Community Ocean Model (FVCOM) was developed with an aim at providing managers with a scientific and visual tool that can assist them in making strategic or emergency decisions regarding marine environmental issues.

Marine resources in coastal and estuarine regions are variable and manifested through strong nonlinear interactions of physical, biological, and chemical processes. Observations taken at a few monitoring stations do not measure the dynamics. A reliable numerical model system is needed to understand the dynamics of the ecosystem encompassing the shelf, rivers, tidal creeks and inter-tidal salt marsh complex if we plan to make a short-term or long-term prediction of coastal and estuarine environmental conditions.

This model system has been validated by the comparison with historic data and calibrated through a data assimilation approach. It is an open source community model (over 1000 users in 38 countries) that is used by government agencies for building the environmental forecast system, academic universities/institutions for

studying the mechanisms driving the variability of the ecosystem, and private companies for the assessment services for local water quality conditions and renewable energy sitings.

### **Sea Grant Sponsored Research Develops Sensory Technology to Aid Marine Industries**

Electronic pressure sensors and pressure-signal processing algorithms detect, locate and classify distant underwater objects, and detect and track distant vortices.

Electronic pressure sensors, and pressure-signal processing algorithms, are developed to mimic the touch-at-a-distance functionality of the lateral-line sensory organ in fish. The organ allows some fish to form three-dimensional maps of their surroundings, enabling actions from schooling, to tracking prey, to recognizing nearby objects. Used on the hull of a vehicle, the electronic sensory system could to detect, locate and classify distant underwater objects. Sensors can also detect and track distant vortices.

These functionalities benefit autonomous underwater vehicles and remotely operated vehicles. The knowledge of distant objects enable collision avoidance and navigation. Identifying and tracking vortices enable the optimization of flapping foil performance, and the detection of the imminent stall of control surfaces. Vortices in wakes also provide information about the object that generated the wake at distances much larger than the near-field pressure perturbations. The electronic sensory system could work better than sonar and vision in turbid cluttered environments such as surf zones. Further, being passive, the sensors require little power and do not radiate a signature; both are important to many vehicles.

Other marine industries could benefit as well. For example, the oil industry could use the electronic sensory system in pipelines to sense and control flow, and competitive sailing teams could use it to guide sail arrangements to optimize lift production, particularly during maneuvering.

## **10. RFP process (2013)**

- RFP—January of each year. Pre-proposals due February
- Joint Advisory Committee (JAC)— reviews pre-proposals in April and issues recommendations re full proposals
- PIs—Submit full proposals in early June
- Peer reviews— June-July; blinded reviews sent to PIs in early August
- Mid-August— Proposals, reviews and rebuttals to TRP
- Mid September—TRP recommends, JAC advises, and MIT SG (with NSGO consent) selects proposals.

## MICHIGAN Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	JAMES DIANA; JENNIFER READ; JENNIFER READ DONAHUE; WILLIAM TAYLOR
Extension	CHARLES PISTIS; ROCHELLE STURTEVANT
Communication	ELIZABETH LAPORTE; JAMES DIANA; JENNIFER READ
Education	CHARLES PISTIS; JENNIFER READ DONAHUE; STEPHEN STEWART

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Catherine Riseng; Jim Diana; William Taylor
Extension	Mark Breederland; Rochelle Sturtevant; Steve Stewart; William Taylor
Communication	Elizabeth LaPorte; Jim Diana
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$2,520,778**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,167,262**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	6	9.6	3.4
Communication	4	3.7	3.6
Extension	12	5.1	3.3
Education	1	0	0.5
Research	16	18.4	3.7

### 3. MI SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	20%	19%
Research (including Research Assistantships)	12%	22%
Extension	54%	46%
Communication	14%	13%
Education	0%	0%
PD	0%	0%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	25%	32%
SSSS / SFA	14%	16%
SCD / RCE	29%	26%
HRCC	12%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	26%
other	19%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/CA-1: Omnibus FY14-18 - Climate Adaption (Jim Diana)

R/CCD-29: Coastal Community Development (William Taylor)

R/CCD-30: Development of Stable Open Channel Design Criteria (Carol J. Miller)

R/PM-56: Placeholder for Future Projects (Jim Diana)

R/SS-1: Governance Approaches to Foster Great Lakes Literacy, Identity and Stewardship: An Integrated Assessment (Shari L. Dann)

R/SS-2: Where People Meet the Muck: An Integrated Assessment of Beach Muck and Public Perception at the Bay City State Recreation Area, Saginaw Bay, Lake Huron (Donna Kashian)

## 6. Program metrics (2012)

Number of peer reviewed publications: **5**

Leveraged funds (managed): **\$ 1,434,681**

Leveraged funds (influenced): **\$ 237,000**

Volunteer Hours: **64,278**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	6	1	
Masters	7	1	
PhD			
Other professional degree			

Total K-12 students reached through educators: **14,944**

Curricula developed: **64**

Number of Cumulative Clean Marina Program – Certifications: **41**

Number of HACCP -- Number of people with new certifications: **33**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **401**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **234**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	<b>5</b>
Economic Benefit	<b>546,000</b>

SEA GRANT AT A GLANCE – February 2014

Jobs Created	
Jobs Retained	<b>58</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>42</b>
Number of hazard resiliency trainings	<b>57</b>
Number of coastal communities who have adopted/implement 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.	<b>45</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>7</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>527</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>322</b>
Patents	
Tool Used by Stakeholders	<b>27</b>

## 8. Selected impacts (2012)

### **Build it and They Will Come: Michigan Sea Grant Restores Spawning Habitat in the St. Clair River**

Michigan Sea Grant led a team that restored an acre of spawning habitat, which is already enhancing the reproduction of lake sturgeon — and the effort has strengthened the connection between our natural resources and the public.

Beginning in the late 1800s, the Detroit and St. Clair rivers were straightened and deepened to accommodate commercial shipping vessels. These changes required extensive dredging that destroyed historically very productive spawning grounds and continues to limit recovery of threatened fish such as lake sturgeon. Habitat degradation is one reason that both rivers were identified as Areas of Concern under the Great Lakes Water Quality Agreement.

Since 2002, Michigan Sea Grant has been working with a diverse team to develop methods for restoring spawning habitat in the St. Clair – Detroit River system. Michigan Sea Grant led a team that built a pilot reef project in 2004. In 2012, MSG applied lessons learned from previous research and again worked with a team to construct a 1-acre spawning reef. The restoration effort has been very visible to the public and has included two events that allowed stakeholders to talk with scientists, visit the restoration site, and view live lake sturgeon and the

research vessels. MSG helped produce a short video about the restoration and has used social media to leverage outreach. The public response has been remarkable and the video, pictures and project details have been promoted through a number of media outlets.

Lake Sturgeon began spawning on the newly constructed reef almost immediately, energizing scientists and the public. USGS biologists observed many spawning-ready sturgeon, collected numerous sturgeon eggs and gathered fantastic video footage of the reefs in spring of 2012. The success of this project has encouraged local and federal leaders to prioritize funding for similar work as part of a systematic effort to remove the St. Clair and Detroit Rivers from the list of Areas of Concern.

### **Marshes Under Attack: Michigan Sea Grant Helps Restore Threatened Coastal Marshes**

Michigan Sea Grant and partners worked together to reclaim endangered coastal wetlands from the invasive Phragmites, restoring biodiversity and boosting the health of the marsh.

Michigan Sea Grant partnered with several key Great Lakes organizations in order to eradicate Phragmites strongholds from certain coastal areas along Lake St. Clair, a historically important marsh region. Actions included aerial spraying of herbicide as well as a prescribed burn to remove the dead stalks and allow native plant seeds to germinate in the restoration area. MSG undertook the Phragmites removal and education project with specialists from Huron-Clinton Metroparks, the Michigan DNR and DEQ, and Ducks Unlimited.

During the course of the project, MSG and partners restored 864 acres of coastal marshes along the Lake St. Clair coast. Marsh plants and animals have begun to return to the area, including sensitive and threatened species. MSG helped plan the restoration, worked with natural resource professionals to help document the process during and after the removal, and executed outreach on the project.

### **Going with the Flow: Improving Water Management in the Clinton River**

Michigan Sea Grant research is improving water flows in a highly managed river system, and the modeling tools are being used in other similar rivers.

Many rivers in Michigan have dams, creating chains of (impounded) lakes at their headwaters. Water flows will become increasingly hard to manage in these systems because climate change is expected to make extreme weather events more common. The problem is particularly challenging when residents expect lake levels to be steady, as is the case in the Clinton River region. Because dams are common throughout the state, this research could also be applied to other river and impoundment systems.

In 2009, Michigan Sea Grant began funding an Integrated Assessment about managing water flows in the Clinton River. Researchers from Lawrence Technological University developed a unique hydrologic model to evaluate different scenarios for managing lake water levels and better protecting downstream river health. A diverse advisory board, including the county water resource commissioner and residents, were actively engaged and met regularly throughout the project to discuss project results. MSG helped researchers communicate potential scenarios; for example, developing graphics that showed the effect of dams with high and low levels of precipitation.

The water resource commissioner's office began piloting new water management strategies in lakes that the model

identified as having extra storage capacity. Residents and recreation enthusiasts understood the need for such projects and their impact, not just on their lake but throughout the watershed, and have already noticed improvements downstream in the Clinton River. The hydrologic model and the graphics are also being applied to the Huron River, where the watershed council is partnering with the University of Michigan to conduct a similar integrated assessment about river flows and climate scenarios. Further, the water resource commissioner has reported that he better understands the options available for modifying water management without upsetting residents.

## **9. Selected research accomplishments (2012)**

### **Stable and Natural: Securing our Shorelines**

Michigan Sea Grant evaluated the success of past soft shoreline projects and developed several references to guide pre-construction planning for large restorations and promote natural shorelines on private property.

Soft shoreline engineering (bioengineering) is recognized as an effective way to use native plants and other natural materials to prevent erosion, enhance fish and wildlife habitat, and prevent the spread of invasive plants; however, these relatively new strategies are not always implemented and monitored to ensure long-term success.

With funding from Sea Grant's Coastal Community Development program, MSG evaluated the long-term success of 20 soft shoreline projects conducted over the past 15 years along the Detroit River and western Lake Erie. MSG surveyed the plant species present at each site, observed habitat and aesthetic benefits, and noted any erosion or degradation of the shoreline. This information guided the development of a booklet for homeowners about soft shorelines and several training events.

MSG developed a protocol for evaluating projects that includes pre-construction site characteristics, initial goals, pre- and post-photos, and current conditions. Since completion of this project, the cities of Detroit and Ecorse have begun planning for additional soft shoreline engineering projects using lessons learned and recommendations from this project. The booklet has been used and distributed by partner organizations to improve stewardship.

### **A Shift in Approach: Dangerous Currents Outreach**

Michigan Sea Grant has helped guide the dangerous currents message in order to provide more effective educational training, and to ultimately save lives by creating more effective messages.

In 2012, there were nearly 100 deaths related to currents (87 in 2011; 74 in 2010) in the Great Lakes, with about half of them happening in Lake Michigan. A recent trend of warmer air and water temperatures have extended the swimming season in the Great Lakes, and the number of beach visitors continues to grow — potentially exposing more people to the risk. Although public outreach methods have been implemented, initial research indicates a general lack of awareness of dangerous currents persists.

Michigan Sea Grant has worked to develop training programs aimed at targeting parks staff, first responders and others. MSG has received funding from MDEQ and has formed a partnership with the National Weather Service and several non-governmental organizations to tackle the issue. As part of the public outreach effort, MSG is

coordinating efforts with Michigan Technological University researchers focusing on gathering information about rip currents at the time they happen (perishable data). MSG will translate and communicate the research and results to stakeholder groups.

MSG has been successful in changing the discussion and activities focusing solely on rip currents to a broader discussion about a variety of dangerous currents and coastal hazards, such as structures, and breaking waves. MSG influenced the locations of research to include beaches in the Upper Peninsula — often overlooked — including two key areas where multiple incidents have occurred.

## **10. RFP process (2013)**

- Call for Integrated Assessment pre-proposals --end of year
- Pre-proposals due—mid-February; notification-early March
- Full proposals due—late April (2013=five)—
- Three peer reviews—Spring
- Technical Review Panel meeting and recommendations-- August (three for funding)
- MI SG (with NSGO consent) selects proposals--September

## MINNESOTA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	GUNDERSON, J.
Extension	GUNDERSON, J.; JEFFREY L. GUNDERSON; JESSE SCHOMBERG
Communication	MOEN S.
Education	GUNDERSON, J., HAGLEY, C.; JEFFREY L. GUNDERSON

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Jeffrey L Gunderson
Extension	Jesse Schomberg
Communication	Sharon Moen
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$1,361,533**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,558,800**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	5	2.6	1.2
Communication	3	0.96	1.55
Extension	8	2.5	3.95
Education	1	0.3	0
Research	24	2.26	1.14

### 3. MN SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	25%	13%
Research (including Research Assistantships)	45%	47%
Extension	16%	29%
Communication	10%	10%
Education	5%	0%
PD	0%	1%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	39%	40%
SSSS / SFA	10%	5%
SCD / RCE	35%	45%
HRCC	16%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	10%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/CC-05-14: Building Climate Readiness in Nature-Based Tourism-Dependent Coastal Communities (Dr. Mae Deavenport)

R/CC-06-14: Factor Contributing to Community Resilience in Extreme Climatic Conditions (Dr. Karlyn Eckman)

R/CE-04-14: The biogeochemical habitat of wild rice (Dr. John Pastor)

R/CE-05-14: Long-term aquatic conditions to inform delisting efforts on the St. Louis River (Dr. Euan D. Reavie)

R/CE-06-14: A Metagenomics-Based Approach to Determine sources of Fecal Bacteria in Lake Superior Watershed and on Beaches (Dr. Michael J. Sadowsky)

R/GRA-1: Research Assistanships (Jeffrey L Gunderson)

## 6. Program metrics (2012)

Number of peer reviewed publications: **4**

Leveraged funds (managed): **\$ 383,849**

Leveraged funds (influenced): **\$ 500,000**

Volunteer Hours: **993**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	23	8	4
Masters	7	7	5
PhD	2	2	1
Other professional degree	0	0	0

Total K-12 students reached through educators: **11,099**

Curricula developed: **3**

Number of Cumulative Clean Marina Program – Certifications: **6**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **1,700**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **32**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	

## SEA GRANT AT A GLANCE – February 2014

Economic Benefit	<b>5,747,545</b>
Jobs Created	<b>100</b>
Jobs Retained	<b>2</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>3</b>
Number of hazard resiliency trainings	<b>4</b>
Number of coastal communities who have adopted/implement 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.	<b>10</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>2</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>25</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>1,104</b>
Patents	
Tool Used by Stakeholders	<b>17</b>

### 8. Selected impacts (2012)

#### **Dredging, restoration and Area of Concern mitigation - HCE**

Innovation and cooperation allow dredging to continue in the Port of Duluth-Superior while substantially reducing disposal costs and creating revenue and opportunities within the community.

Maritime commerce in the Great Lakes depends on dredging but material disposal typically costs twice as much as dredging itself.

The Duluth-Superior Contained Disposal Facility (CDF) is at capacity; a new CDF would cost over \$35 million.

If Duluth-Superior can't supply a 20-year dredge disposal plan, the U.S. Army Corps of Engineers (USACE) would halt dredging, thereby crippling the largest commercial port in the Great Lakes.

RESPONSE – MNSG's maritime transportation specialist Chairs the Duluth-Superior Harbor Technical Advisory Committee (HTAC) and is a member of the Dredging Subcommittee. He has worked on improving

communications and coordination of effort.

**RESULTS** – MNSG’s contributions to the HTAC helped to enable a major physical restructuring and improvement to the Erie Pier Recycle-Reuse Facility (changing it from a Contained Disposal Facility and helping to create a new paradigm for dredge material handling through USACE).

The 21st Ave. W. Environmental Restoration Project is a showcase for the efficient reuse of dredge materials and for HTAC. Through this project, 20-years of dredge material will create 74 acres of new wetland, and providing habitat, public access, and recreational opportunities.

In 2012, USACE made the 21st Ave. W. Project a priority and allocated funds, which were supplemented with state agency and Great Lakes Restoration Initiative money. These activities have created an estimated \$5 million worth jobs in the engineering and construction fields for the Duluth-Superior port.

### **Great Lakes shipping and ballast water regulatory action - HCE**

Sea Grant’s contributions enable the Great Lakes Ballast Water Collaborative to conduct and document science-based and reality-driven discussions that influence national and international ballast water management.

**RELEVANCE**– Aquatic invasive species (AIS) are among the greatest threats to biodiversity. Ships’ ballast water has been the principle source of AIS movement.

**RESPONSE** – In August 2012, the sixth meeting of the Great Lakes Ballast Water Collaborative was held in Duluth, MN, and sponsored in part by the Mid Continental EPA Lab and MNSG. Approximately 85 representatives from the shipping industry, ballast water treatment technology industry, state and federal governments, and academia attended the two-day meeting. The goal of the meeting was to discuss ways to maintain a cost-effective modern shipping industry while preventing invasive species from entering the Great Lakes. MNSG helped to supply information on Great Lakes ballast water issues allowing the U.S. Coast Guard and the EPA to harmonize their rule making.

**RESULTS** – The harmonization of federal and state regulatory standards across the Great Lakes has been achieved for the first time!

The Duluth meeting influenced the final standards and implementation timelines of the U.S. Coast Guard and the EPA rules, which are in the federal Office of Management and Budget.

The Collaborative’s work was cited by multiple state regulatory agencies (NY, MI, WI, MN and CA) during various proceeding and regulatory challenges.

Legal challenges by NGOs to regulations in MI, NY, WI, and MN were avoided or dismissed resulting in a conservative estimate (Sea Grant Law Center) of \$2.5 million in cost savings due to the dropped regulatory challenges.

### **Citizens take action to stop the spread of aquatic invasive species**

Stop Aquatic Hitchhikers! messaging reaches millions, helps change behavior, and thereby helps prevent the spread of AIS.

Relevance - Recreational boaters and anglers potentially spread some of the most costly and environmentally destructive aquatic invasive species (AIS) in the United States. Examples of these species include zebra mussels, Eurasian watermilfoil, spiny waterfleas, and New Zealand mudsnails.

Response - MNSG helps to lead a multifaceted, multi-partner campaign to encourage boaters and anglers to make behavioral changes to stop the spread of AIS.

The national Stop Aquatic Hitchhikers! campaign generated nearly 3.6 million exposures in Minnesota in 2012. Sea Grant was awarded Great Lakes Restoration Initiative funding to further extend Stop Aquatic Hitchhikers! messaging throughout the Great Lakes.

Efforts by the Great Lakes Sea Grant Network generated 13.3 million impressions over the last two years. Nationally, the campaign generated over 1 billion impressions since 2006. The campaign communicates a simple and consistent message, and helps to avoid duplication of effort and resources.

Results: The majority of about 14,500 visitors at events where MNSG staffed a Stop Aquatic Hitchhikers! booth in 2012 pledged to take actions to prevent the spread of AIS. There was an increase of 22% in knowledge because of these events and a 33% increase in willingness to take actions to prevent the spread of AIS. Preventing zebra mussels from infesting a lake with drinking water/power facilities saves about \$30,000 in damages/protection each year. <http://www.protectyourwaters.net/>

## **9. Selected research accomplishments (2012)**

### **Researchers discover "environmental" versus "fecal contaminant" strains of enterococci beach bacteria**

Not all enterococcal beach bacteria indicate recent fecal contamination.

Researchers investigating the ability of enterococcal bacteria to survive in beach environments have discovered a number of strains that seem to persist and occur naturally.

Researchers are developing tests to help public health agencies differentiate between enterococci from fecal contamination and "environmental" enterococci.

### **Collection of Great Lakes port corrosion samples for DNA and microchemical sampling**

Microbiological corrosion of steel sheet piling experiencing accelerated rates of corrosion in the Duluth Superior harbor is investigated.

Researchers successfully deployed and then collected sacrificial steel "coupons" in the Duluth/Superior Harbor and sampled them for microchemical analysis and DNA sequencing.

These results will provide information on the types of microbes causing the corrosion and the microenvironment that allows the corrosion to flourish. In the Duluth - Superior Harbor, the cost to replace the 20 km of threatened steel structures is estimated to cost \$200-250 million.

## **10. RFP process (2013)**

- Priorities –

Sustainable economies - invasive species, value of st louis estuary,

Planning and management - understanding 2012 flood and how much the effects were driven by land use.

Safe and Sustainable Seafood

- Sustainable Harvests
- Safe Consumption
- Environmental Stressors
- Baitfish Aquaculture

Healthy Coastal Ecosystems

- Research on ecosystem of Wild Rice, Ecosystem based management approaches for Lake Superior  
North Shore Ground water-Surface water interactions

- Two Panels, Technical and Program advisory committee
- First panel ranks for technical merit and fundability. IE. if technical panel deems a proposal not fundable it is removed from consideration.
- Program Advisory Panel:
- Discusses each proposal and their relevancy to Minnesota User needs; Ranks the proposals
- Director takes advice from both rankings to develop package.

## MISSISSIPPI-ALABAMA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	LADON SWANN; STEVE SEMPIER
Extension	DAVID D. BURRAGE; JODY THOMPSON; JOHN SUPAN; LADON SWANN; MELISSA SCHNEIDER; STEPHANIE SHOWALTER; STEPHANIE SHOWALTER-OTTS; WILLIAM WALTON
Communication	
Education	CHRISTOPHER SNYDER; DAVID L. SCOTT; DESIREE BISHOP; JESSICA KASTLER; SHARON WALKER; TINA MILLER-WAY

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	D. LaDon Swann; Stephen Sempier
Extension	David Burrage; Jody Thompson; Melissa Schneider; Stephanie Otts
Communication	
Education	Chris Snyder; Desiree Bishop; Tina Miller-Way

Total funding (SG + Match + Pass Through) in 2012: **\$3,602,817**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,062,374**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	5	2.7	1.05
Communication	3	1.77	0.19
Extension	16	3.1	2.02
Education	15	1.38	0.69
Research	72	15.78	5.62

### 3. MS-AL SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	16%	23%
Research (including Research Assistantships)	43%	21%
Extension	41%	41%
Communication	0%	0%
Education	0%	11%
PD	0%	5%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	28%	15%
SSSS / SFA	37%	20%
SCD / RCE	23%	25%
HRCC	11%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	40%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/HCE-02: Crafting a Mechanistic Functional Indicator: Examining Allometric Relationships of Macrobenthos in Response to Hypoxia. (Chet Rakocinski)

R/RCE-UNK-02: 2014-2015 RFP for Resilient Communities and Economies Project. (D. LaDon Swann)

R/SFA-01: Predicting the Establishment Potential of Invasive Tiger Shrimp: The Role of Competition and Predation. (Jennifer M. Hill)

R/SFA-02: Effects of Aquaculture Practices on *Vibrio* spp. In the Eastern Oyster, *Crassostrea virginica*: Test of

Fouling Control Practices. (William C. Walton)

R/UNK-01(16-17): Future Competitive Research Funding for 2016-2017. (D. LaDon Swann)

## 6. Program metrics (2012)

Number of peer reviewed publications: **14**

Leveraged funds (managed): **\$ 1,594,951**

Leveraged funds (influenced): **\$ 129,363**

Volunteer Hours: **8,904**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	5.75	5	2
Masters	6	9.5	0.25
PhD	4	7.5	3.25
Other professional degree	4.25	2	2

Total K-12 students reached through educators: **45,211**

Curricula developed: **11**

Number of Cumulative Clean Marina Program – Certifications: **4**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **19**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **2,300**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>2</b>
Businesses Retained	<b>1</b>
Economic Benefit	<b>10,420,000</b>

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Jobs Created	<b>4</b>
Jobs Retained	<b>507</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>21</b>
Number of hazard resiliency trainings	<b>97</b>
Number of coastal communities who have adopted/implement 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.	<b>16</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>8</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>1,006</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>4,230</b>
Patents	
Tool Used by Stakeholders	<b>14</b>

## 8. Selected impacts (2012)

### SSSS: Off-bottom oyster farming is developing as a ‘blue green’ industry for the Gulf Coast

- Gulf oysters suffers from natural and manmade issues and are inexpensive and plentiful
- Off-bottom oyster farming - high value, half-shell niche market (i.e., as in NE and PNW) can yield jobs, profits, and diversification of the oyster industry.

Commercial, off-bottom oyster farming established on a commercial pilot-scale in AL and LA

With LASG, MASGC, Auburn, and LSU, two large oyster farming “parks” established:

- platforms for training and business development
- demonstrate grow-out and harvesting technology and techniques
- Technical advice and evaluations of potential sites interested individuals
- As a result, two new businesses were begun
- Total sales since project inception = \$60,000 Partially or fully supported 3 businesses.
  - One reporting a wholesale value of just over \$30,000 by the third year’s harvest
  - One reporting a wholesale value of over \$10,000 in the first year’s harvest
  - Two local wholesalers in AL profited by selling these oysters to another in TX
  - One new oyster equipment company was established in Alabama.

**HRCC - Baldwin County, AL adopts building codes to increase the resilience of the county and its residents**

- Given recent hazards and escalating insurance premiums, much attention on construction practices to strengthen homes and reduce the risk to life and property
- MACGC events (i.e., Building Code Education and Smart Home Expo) provide professional training on codes, products, and services that reduce risk from hazards
  - The City of Orange Beach partnered with MASGC, Smart Home America and the Gulf Coast Chapter of the International Code Council (ICC) to gather key players in hazard resilient construction, including the ICC and IBH
  - Coastal decision makers learn about risk assessment and specific steps that can be taken to reduce risk, reduce the insurance burden on their citizens, and allow their communities to recover from disasters more quickly
- This helped Baldwin County, AL adopt the 2012 International Residential Code and Coastal Code Supplement, making them a leader in coastal resiliency
  - Standards to make construction more storm resilient, including a sealed roof deck
  - Homeowners can drastically reduce risk for approximately \$700
- Municipalities not yet adopting are gathering information to likely adopt in spring 2013
- Economic impact can be estimated by calculating the average number of permits pulled and thus the number of homes that are more resilient as a result
  - For example, in a 50-year storm event, assuming levels of damage and construction changes, estimated savings for the community in prevented losses could be \$6 million, not including displacement cost for people.

**SSSS: Marine Safety Training for Vessel Operators and Crew**

- Mandatory Marine safety training was provided to the professional and recreational boating public
- Coast Guard Authorization Act of 2010 expand the number of vessels in the commercial fishing fleet nationwide subject to training and safety equipment carriage requirements
- Commercial fishing still is the most dangerous occupation in the United States
  - NIOSH data for commercial fishing industry in the Gulf of Mexico for 2000-2009 list 112 commercial fishing fatalities.
- MASGC developed training for safety drill conductors on commercial fishing vessels
  - MASGC, MSU, and Auburn led implementation of the U.S. Coast Guard requirement of having a trained safety drill conductor on commercial fishing vessels
  - Organized and implemented two 12-hour Commercial Fishing Vessel Drill Conductor courses for Vietnamese-American fishermen in 2012
  - Provided most of the oral and written material in the Vietnamese language
  - The participants learned about survival equipment, disaster procedures and on-board drills
  - After completion, the fishermen met Coast Guard requirements to become certified Commercial Fishing Vessel Safety Drill Conductors

**9. Selected research accomplishments (2012)**

**SCD: City of Semmes, Alabama Applies Conservation Policies to Comprehensive Plan**

- MASGC supported city of Semmes in developing subdivision regulations that focus on conservation, stream conservation, stream buffer and low-impact development (LID) policies
- Semmes is a new city (incorporated in 2010) in the 8-Mile Creek watershed, Mobile County, AL, with 3,015 people
- Semmes has written and reviewed subdivision regulations that promote model conservation policy for protecting streams, open space and fostering conservation development

- MASGC-funded PIs met with Mayor, Planning Commissioner, and ADEM Nonpoint Education of Municipal Officials Coordinator to discuss how LID policies can influence subdivision regulations based on MASGC-funded research results
- 2008 project “Identifying Flood Generating Areas in 8-Mile Creek Watershed through a Novel Approach found that:
  - An efficient and cost effective way to minimize the adverse impacts of urbanization on hydrology is to proactively develop flood management plans synergistically with land use management plans
  - Informed management decisions may benefit from the identification of the portions of a watershed that have the highest contribution to the increased peak flow rates. Used an index-based approach to identify flood generating areas in a watershed
  - Method relies on the use of distributed watershed models and is designed to help managers and decision-makers with their future development plans to minimize the adverse impacts of urbanization on flooding
  - As a result, actions and policies suggested by MASGC PIs were adopted by the Semmes city council and planning commission
  - LID practices, green subdivision development, model stream buffer policies included in the subdivision regulations for Semmes and included special watershed protections
    - buffer widths of 150’ for public drinking water source and associated tributaries and wetlands
    - buffer widths of 100’ for perennial streams and associated wetlands and
    - 75’ buffer width for natural drainage features and adjacent and associated wetlands
  - These policies will promote water quality, natural resource planning and low impact development in the new city

**HCE: Low levels of human associated fecal contamination occur in Little Lagoon, but are unlikely to represent a threat to human health**

From project titled, “Residence Time as a Factor Controlling HABs and Fecal Coliform Bacteria in Little Lagoon, AL”

- Levels of fecal coliforms above the regulatory thresholds led to concerns about the source of the fecal contamination
  - Human-associated fecal contamination is threat to human health; however, fecal contamination associated with wildlife or domestic animals is not likely to represent a threat
  - Identifying the source of the fecal contamination would enable stakeholders (regulatory authorities and users of Little Lagoon) to better evaluate the risk posed by the contamination
- A yearlong sampling program investigated the sources of fecal-associated organisms (Bacteroidales) by determining the percentage of genes originating from humans, dogs and cows
  - The low levels of human associated-Bacteroidales genes suggest that fecal contamination in Little Lagoon is not from human sewage and likely represents a low risk to human health
  - The low, consistent level of human associated fecal markers likely represents a background level due to the presence of people around the lagoon
  - The detection of fecal coliforms above the regulatory threshold are not likely associated with human fecal matter.

## 10. RFP process (2013)

December 2012 with the distribution of MASGC’s RFP

MASGC research in the following focus areas:

- Healthy Coastal Ecosystems – 9 very specific research topics
- Safe and Sustainable Seafood Supply – 13 very specific research topics

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- Resilient Communities and Economics – 11 very specific research topics

50 Pre-proposals reviewed by Research Technical Review Panel

- Encouraged 27 for full proposal submission and provided feedback to all

23 Full proposals received and sent for external mail review and reviewed by Technical Review Panel (3-5 merit reviews/proposal, including one mail review)

- 2012 omnibus panel included out-of-state members, including university, NOAA, and other SG programs
- Fundable (two tiers), may be fundable, not fundable
- Fundable were reviewed for relevancy by thirty stakeholder advisors to MASGC
- After recommendation, Work with MASCG outreach staff and others to develop and finalize education and outreach plans
- “Outreach and Education - Successful proposals will develop an engagement plan in collaboration with extension, outreach and education professionals during meetings convened after the proposal review process. Final funding decisions will be contingent on development of an acceptable extension, outreach and education plan”

[Second call for RCE Hazard Resilience in Coastal Communities (addressed through separate CSP competition) due 2/28/14]

## NEW HAMPSHIRE Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	JONATHAN PENNOCK; KENNETH LA VALLEY; STEPHEN JONES
Extension	JULIA PETERSON
Communication	STEVE ADAMS
Education	MARK WILEY

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Jonathan Pennock; Stephen Jones
Extension	Julia Peterson
Communication	Steve Adams
Education	Mark Wiley

Total funding (SG + Match + Pass Through) in 2012: **\$2,400,432**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,481,250**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	5	0.58	0.77
Communication	3	1.92	0.75
Extension	7	3.83	1.33
Education	5	1.72	0.42
Research	25	2.6	0.56

### 3. NH SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	10%	14%
Research (including Research Assistantships)	35%	36%
Extension	21%	19%
Communication	16%	16%
Education	16%	10%
PD	3%	4%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	23%	15%
SSSS / SFA	40%	45%
SCD / RCE	10%	15%
HRCC	7%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	25%
other	20%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/HCE-1: What Happens to the Nutrients that Have Accumulated in the Sediments of the Great Bay?  
Quantifying nutrient release and removal due to diffusion and sediment resuspension (Linda Kalnejais)

R/HCE-2: Gene Expression During Development of Clam Leukemia: Interactive effects of temperature and ocean acidification on viral loading and onset of disease (Charles Walker)

R/NERR14-1WH-NH: Coastal Hazards and Northeast Housing Values: Comparative implications for climate change adaptation and community resilience (Robert Johnston)

R/NERR14-2WH-NH: Buy Out or Build Back? A comparative assessment of approaches to employing public

funding to vulnerable coastal properties in the Northeastern United States (Porter Hoagland)

R/RCE-1: Analysis and Communications of Flood Damage Cost Avoidance in the Lamprey River Watershed of New Hampshire (Cameron Wake)

R/SFA-1: Diversifying the New England Sea Vegetable Aquaculture Industry: Modification of kelp nursery and grow-out technology for nori production (Christopher Neefus)

## 6. Program metrics (2012)

Number of peer reviewed publications: **7**

Leveraged funds (managed): **\$ 1,421,890**

Leveraged funds (influenced): **\$ 2,591,710**

Volunteer Hours: **8,697**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	27	2	29
Masters	10	2	3
PhD	2	5	2
Other professional degree	1	17	0

Total K-12 students reached through educators: **7,345**

Curricula developed: **4**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications: **3**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **11**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>4</b>

SEA GRANT AT A GLANCE – February 2014

Businesses Retained	<b>8</b>
Economic Benefit	<b>4,250,149</b>
Jobs Created	<b>13</b>
Jobs Retained	<b>24</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>32</b>
Number of hazard resiliency trainings	<b>65</b>
Number of coastal communities who have adopted/implement 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.	<b>1</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>2</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>20</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>1,000</b>
Patents	
Tool Used by Stakeholders	<b>64</b>

## 8. Selected impacts (2012)

**SSSS: As a result of NH SG assistance, the N.H. oyster aquaculture industry continues to create jobs for coastal N.H., provide a fresh, locally raised product, and help clean up Great Bay.**

- In N.H.'s Great Bay Estuary, a growing eastern oyster aquaculture industry has provided opportunities for commercial fishermen to diversify, and the filter feeding oysters have helped reduce the high nutrient levels from runoff.
- The N.H. aquaculture lease process was modified for the bay in 2010.
- N.H. Sea Grant has been instrumental in helping new farmers through the permitting process and with the development of profitable oyster farms.
- In 2012, the number of permits jumped from five to eight farms, with over 20 acres in production, creating 10 additional jobs.
  - There are now 22 people working in the Great Bay shellfish industry.
- The farms are seeded out with more than six million oysters with a farm gate value of over \$4 million.
  - This is a 66% increase since 2011 when about four million oysters were in culture.

**SCD/HRCC: Newfields, NH used assistance from NHSG to take concrete steps in stormwater management and emergency preparedness planning and preparation to become more resilient in the face of a changing climate.**

- Recent studies, including one conducted by Clean Air-Cool Planet (2011), indicate that many of N.H.'s 42 small coastal communities are experiencing the effects of a changing climate, but are unsure what to do about it.
- In 2012, New Hampshire Sea Grant staff leveraged funds to modify a version of the NOAA Roadmap (a participatory community-based process) to assist Newfields, a coastal watershed community, to assess its climate vulnerabilities, identify priorities and take steps to improve its preparedness for climate effects.
- Newfields formed committees that developed an adaptation action plan with two foci: stormwater management and emergency preparedness.
  - Their stormwater management strategies include hosting Forging the Link (an education program about the economics of low impact development), inventorying their stormwater infrastructure, updating their master plan for climate effects, and adopting subdivision and site plan review regulations to reduce polluted runoff.
  - The town is actively improving preparedness through a new emergency communication system and development of a calendar for town residents with storm-related tips.
  - Residents are also purchasing discounted generators through a bulk purchase approved by the town's selectboard, representing a combined \$600 in savings of purchase and installation costs and further economic benefit from recaptured lost productivity during power outages.

**HCE: New Hampshire Sea Grant's Coastal Research Volunteers implemented a pilot storm drain monitoring program based on citizen volunteer sampling and assessment efforts that will help all of the state's coastal communities with required storm drain monitoring.**

- Fecal pollution sources are also a source of nutrients that are currently an ecosystem health concern in N.H. coastal communities.
- Coastal N.H. is facing new EPA requirements to identify and eliminate pollution sources from storm drains, yet many small towns have limited capacity and expertise to conduct monitoring and pollution source evaluations.
- In 2012, NHSG's Coastal Research Volunteer (CRV) program, with funding from the N.H. Coastal Program, designed and conducted a pilot storm drain monitoring program.
  - Run by citizen volunteers with technical support from NHSG and UNH, the effort proved the feasibility of using volunteers to help communities address environmental problems.
- In Exeter, one of 11 sites was found to be a source of high levels of bacteria and nitrogen through repeated sample analyses, providing the basis for Exeter to follow through with attempts to identify the actual source and eliminate it.
- In Greenland, one of nine sites was found to be a significant source of high levels of bacteria due to inappropriate pet waste dumping.
- The CRV and local volunteers worked with the town administrator and the local Winnicut River Watershed Coalition to educate residents in the surrounding neighborhood and eliminate the improper pet waste disposal.
- The volunteers also collaborated in the production of a manual on storm drain monitoring involving volunteers.

## 9. Selected research accomplishments (2012)

Using NHSG development funds, researchers equipped remote controlled planes with video cameras in order to conduct aerial horseshoe crab spawning surveys over the Great Bay Estuary. This technique allowed researchers to conduct surveys quickly and more extensively than in person, providing scientists and resource managers with detailed information for improved monitoring of their populations.

With funding provided by NHSG, researchers conducted genetic sequencing analysis of *V. parahaemolyticus*, and results suggest that N.H. strains may evolve into pathogenic strains. Results from this research provide shellfish managers and scientists with an improved understanding of pathogen origin and the potential for future outbreaks.

## 10. RFP process (2013)

- Priorities –
  - Safe and Sustainable Seafood
  - Sustainable Coastal Development
  - Healthy Coastal Ecosystems
  - Hazard Resilient Coastal Communities
  - Marine Literacy
- Process to develop RFP priorities:  
NHSG gathers input from its stakeholders and Policy Advisory Committee.
- Proposals Reviewed:
  - 31 pre-proposals submitted, 30 from UNH and 1 from Dartmouth;
  - 14 full proposals were submitted, all from UNH, with PIs from 9 different departments and research centers.
  - 4 proposals were funded.
    - 1 of the pre- and full proposals was a bi-state proposal, with PIs from Maine and NH submitting the same proposal to both MESH & NHSG for both programs to review.
    - This proposal was not recommended for funding by either program.
- Composition of review panels:  
NHSG has developed a review process that includes:
  - reviews of preliminary proposals by a panel of in-state stakeholders,
  - written reviews of full proposals by peers outside the state, and
  - an in-person review by a panel of technical experts.
- Final programmatic decisions of selected proposals are made by the Director.

## NEW JERSEY Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	ANTONUCCI; ROWE
Extension	JOHN KRAEUTER; MICHAEL DANKO; MILLER; OBROPTA; PETE ROWE; PETER ROWE; ROWE
Communication	KOSKO
Education	ANTONUCCI; CLAIRE ANTONUCCI

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Augustine Anfuso; Claire Antonucci; Lisa Aromando; Peter M. Rowe
Extension	Christopher C. Obropta, Ph.D., P.E.; Jon K. Miller; Lisa M. Calvo; Michael Danko; Peter M. Rowe
Communication	Kim Kosko
Education	Claire Antonucci; Cynthia Valkos; Diana Burich; Mindy Voss; Rosemary Higgins

Total funding (SG + Match + Pass Through) in 2012: **\$1,697,115**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,562,184**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	7	2	4.3
Communication	2	0.76	0.95
Extension	6	2.39	1.06
Education	47	1.33	3.99
Research	31	2.15	1.81

### 3. NJ SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	15%	13%
Research (including Research Assistantships)	28%	31%
Extension	32%	28%
Communication	16%	12%
Education	9%	15%
PD	0%	1%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	27%	26%
SSSS / SFA	18%	17%
SCD / RCE	16%	27%
HRCC	21%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	30%
other	18%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/Future Research: Future Research Projects (Peter M. Rowe)

R/Guo: Advancing Eastern Oyster Aquaculture through Marker-assisted Selection (Dr. Ximing Guo)

R/Jackson: Facilitating Natural Dune Building (Nancy Jackson)

R/Kopp: Development of historically-calibrated sea level rise projections for risk management along the New Jersey Shore (Robert E. Kopp)

R/MARR14NJ-NJ: Understanding the impacts of climate change on the distribution, population connectivity, and fisheries for summer flounder (*Paralichthys dentatus*) in the Mid-Atlantic (Malin Pinsky)

R/Program Development: Future Program Development Projects (Peter M. Rowe)

R/Wiedenmann: Determining Sustainable Catch Limits for Data-Poor Fisheries in New Jersey: Validation and Refinement of a Data-Poor Harvest Control Rule (John Wiedenmann)

## 6. Program metrics (2012)

Number of peer reviewed publications: **3**

Leveraged funds (managed): **\$ 1,348,035**

Leveraged funds (influenced): **\$ 347,280**

Volunteer Hours: **3,146**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	140	6	0
Masters	7	1	0
PhD	1	0	0
Other professional degree	1	0	0

Total K-12 students reached through educators: **18,320**

Curricula developed: **3**

Number of Cumulative Clean Marina Program – Certifications: **47**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **3**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **111**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	

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Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>12</b>
Number of hazard resiliency trainings	<b>12</b>
Number of coastal communities who have adopted/implement 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.	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	<b>1</b>

## 8. Selected impacts (2012)

Hurricane Sandy response. (Among other activities,) the coastal processes specialist advised New Jersey Department of Environmental Protection on the coastal impacts of several proposed shore protection systems, and spoke with communities on beach nourishment, dune building, and other options for shore protection. NJ Sea Grant’s input helped to ensure that several seawalls/bulkheads being proposed were done so in a well thought out sustainable manner. As a result of several of the community based meetings that were held, many people signed over the easements required for participation in the Federal beach replenishment program (18005).

The rip current app developed in 2011 was piloted with several communities in NJ. The app allows lifeguards to enter some basic information about any rip currents they observe, collects that information, queries external databases, and creates a fully searchable database which can be viewed in real time. A total of 12 communities signed up for the app in 2012, far exceeding expectations, and the app is now used by a dozen NJ beach patrols (17999).

Through education and workshops on rain barrels and rain gardens, citizens conducted projects capturing about 2 million gallons of stormwater in 2012 (impacts 18019-18024).

## **9. Selected research accomplishments (2012)**

RESEARCH TO SUPPORT SUMMER FLOUNDER STOCK ASSESSMENT. Research evaluated the effectiveness of minimally-invasive techniques to obtain sex-ratio data and to compare them to the standard method requiring dissection. The ultimate goal is to determine if survey sex-at-length keys can be used to assign sex-at-length to recreational and commercial landings. This is the first step in what will ultimately lead to a stock assessment for summer flounder that incorporates a sex-structured model. Other research projects also support this goal (18108).

RESEARCH TO MEASURE AND IMPROVE THE EFFECTIVENESS OF RAIN GARDENS AT REMOVING NITROGEN. The New Jersey Sea Grant Consortium (NJSGC) water resources extension agents are working with the research staff at the Rutgers Cooperative Extension Water Resources Program to design and monitor rain gardens with increased nitrogen removal efficiency. In 2012, the research rain garden installed on the Georgian Court University campus in Lakewood, New Jersey underwent its first year of monitoring for the effectiveness of nitrogen removal (18025).

## **10. RFP process (2013)**

The most recent RFP encouraged "few but larger multi-investigator, multi-institution, trans-disciplinary" proposals.

Emphasis was on three of the four new focus areas: HCE, SFA, RCE, and had 7-9 priorities listed under each Area, some rather specific "restoration technologies to integrate biota into structural shoreline treatments", and some rather broad "relationship between coastal stressors and long term human and ecosystem health".

RFP said "NJSGC will review any proposal dealing with issues of major concern to the state and region", but especially called out climate change impacts, Ocean Observing Systems, issues of urban-industrial estuaries.

Twenty three preproposals, eleven full proposals, fund two, partially fund two more.

The states in the Mid-Atlantic region (DE, MD, NC, NJ, NY, PA, VA) also conducted a regional research competition.

## NEW YORK Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	JAMES AMMERMAN
Extension	BUNTING-HOWARTH, KATHERINE; CHARLES R. ONEILL; DAVID G. WHITE II; HELEN DOMSKE; KATHERINE E. BUNTING-HOWARTH
Communication	BARBARA A. BRANCA; BRANCA, BARBARA A.
Education	AMMERMAN, JAMES

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	William M. Wise
Extension	Katherine E. Bunting-Howarth
Communication	Barbara Branca; Paul Focazio
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$4,015,231**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$3,618,991**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	6	3.5	2
Communication	4	1	2
Extension	26	5.06	17.57
Education	3	0.4	0.35
Research	81	17.64	4.63

### 3. NY SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	17%	21%
Research (including Research Assistantships)	40%	28%
Extension	34%	45%
Communication	7%	6%
Education	0%	0%
PD	3%	0%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	35%	23%
SSSS / SFA	28%	22%
SCD / RCE	25%	36%
HRCC	12%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	19%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/CMB-40: Assessing bloom dynamics of the toxic dinoflagellate *Cochlodinium polykrikoides* and impacts on fisheries: Are there mitigation options? (Ying Zhong Tang)

R/CMC-12: The role of submarine groundwater discharge (SGD) in promoting hypoxia in Smithtown Bay (Henry J. Bokuniewicz)

R/BBF-22: Atlantic salmon restoration in Great Lakes tributaries: An ecological and bioenergetics approach (Neil H. Ringler)

R/BBF-23: The potential impact of VHSV on future population recovery of St. Lawrence River muskellunge

(Rodman G. Getchell)

R/FBM-36: QPX distribution and persistence in the environment (Bassem Allam)

R/MARR14NJ-NY: Understanding the impacts of climate change on the distribution, population connectivity, and fisheries for summer flounder (*Paralichthys dentatus*) in the Mid-Atlantic (Janet A. Nye)

R/NERR14-1WH-NY: Coastal hazards and northeast housing values: Comparative implications for climate change adaptation and community resilience (Robert J. Johnston)

R/NERR14-2WH-NY: Buy out or build back? A comparative assessment of approaches to employing public funding to vulnerable coastal properties in the northeastern United States (Porter Hoagland)

R/PS-8: Sea Grant Scholars (Cornelia G. Schlenk)

R/RP-1: Future Competitive Applications: Research Placeholder (William M. Wise)

## 6. Program metrics (2012)

Number of peer reviewed publications: **8**

Leveraged funds (managed): **\$ 813,239**

Leveraged funds (influenced): **\$**

Volunteer Hours: **783**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	10	0	1
Masters	4	2	1
PhD	8	6	1
Other professional degree	0	0	0

Total K-12 students reached through educators: **13,535**

Curricula developed: **4**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications: **252**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **15**

Number of Resource managers who use ecosystem-based approaches in the management

of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **4**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>155</b>
Businesses Retained	<b>313</b>
Economic Benefit	<b>4,805</b>
Jobs Created	
Jobs Retained	<b>198</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>1</b>
Number of hazard resiliency trainings	<b>5</b>
Number of coastal communities who have adopted/implement 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.	<b>5</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>2</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>45</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>1,231</b>
Patents	
Tool Used by Stakeholders	<b>3</b>

## 8. Selected impacts (2012)

### 1. Quick Response by New York Sea Grant Provides Information to Better Manage Hurricane Sandy Impacts -HRCC

Hurricane Sandy inflicted tremendous damage along the New York and New Jersey coastlines. The force of the storm's waves and surge opened several breaches through the barrier islands protecting Long Island's south shore. Of particular concern to coastal land managers was a breach in the Fire Island National Seashore in a

federal wilderness area. The breach was in a barrier fronting a portion of the mainland containing 13,000 homes collectively valued at \$10 billion dollars. Under state and federal policies, the breach was to be monitored for 45 to 60 days to determine whether it posed a threat to the mainland and should be artificially closed or allowed to close naturally.

## **RESPONSE**

- The National Park Service (NPS), which was responsible for making the decision regarding closure, asked New York Sea Grant's Coastal Processes Specialist to assist their interagency Breach Assessment Team composed of 35 federal, state and local officials.
- NYSG worked with researchers at Stony Brook University to identify ongoing field projects that provided some of the needed data, synthesizing and disseminating it to the Assessment Team within two weeks of the storm.
- NYSG coordinated with researchers and managers to develop and fund a quick response project to collect critical real-time data on physical changes associated with the breach when it became apparent other agencies were not able to respond in a timely manner.
- NPS used NYSG information to evaluate the condition of the breach and its impacts, and decided not to close it immediately, which would have cost approximately \$6 million. The initial data showed the feature was fairly stable and having minimal impacts on main land tide levels.
- Recognizing the value of the information, NPS is funding continuation of the data collection program to monitor the breach and its physical impacts to ensure it did not cause increased flooding on the mainland.

## **2. Launch Stewards Engaging Public in Watercraft Inspection to Slow Spread of AIS -HCE**

- Recreational boating is a key pathway for the spread of AIS to the inland lakes of the Great Lakes basin.
- Organisms, e.g., spiny water flea, Eurasian water-milfoil, and zebra and quagga mussels, can be transferred on boats and trailers.
- Currently, there are believed to be more than 180 AIS in self-sustaining populations in the Great Lakes basin. Cost estimates of AIS impacts to the Great Lakes region exceed \$100 million annually.

## **RESPONSE**

- The New York Sea Grant (NYSG) created a Launch Stewards Program to educate and empower boaters in an effort to protect New York waters from aquatic invasive species (AIS).
- The launch stewards, primarily college students, educate recreational boaters on how to look for, remove and dispose of unwanted debris through voluntary watercraft inspections.
- The stewards offer inspections throughout the summer at locations along the southern and eastern shores of Lake Ontario, Oneida Lake, and other waters.
- To help boaters easily recognize stewards anywhere in New York, the stewards across the state are consistently using the national Stop Aquatic Hitchhikers! campaign messaging and branding.
- In 2012, the NYSG Launch Stewards: monitored 12 launch sites, educated 5,701 people and conducted 2,456 watercraft inspections. Of the inspected boats, 72% were NYS-registered boats and 10% of the boats had visible debris, e.g. Eurasian milfoil, water chestnut, and curly leaf pondweed.
- Participating boaters indicated the educational outreach made them more aware of ways they can help limit the spread of AIS with 81% reported using preventative measures such as inspecting, washing and/or drying the boat, and draining bilge and bait buckets.

### **3. Sea Grant Research helps Develop a Biological Control Method for Zebra and Quagga Mussels**

- Zebra mussels (*Dreissena polymorpha*) and later quagga mussels (*Dreissena rostriformis*) have established themselves as costly aquatic invasive species.
- By forming dense colonies on hard surfaces through attachment with their byssal threads, these mussels have clogged the pipes and waterworks of numerous facilities. The control and maintenance involved with keeping pipes clear has added to operating costs.
- Sea Grant funded research led by Dr. Daniel Molloy of the New York State Museum, to develop an environmentally safe and cost effective control agent of dreissenid mussels.
- The research involved a promising strain of *Pseudomonas fluorescens*, a common soil bacteria that earlier research showed produces a toxin that kills exotic dreissenid mussels.
- Molloy's experiments demonstrated that the bacterial strain CL0145A kills the mussels by producing a biotoxin rather than through infection. The biotoxin is specific to dreissenid mussels and does not harm other mollusks or aquatic species. The work further provided information on effective bacterial culture methods that yield quantities of the biotoxin.
- Results of this work led to further research funded by NSF that allowed testing of the bacterial biotoxin in more realistic settings such as water pipe systems.
- Further refinement yielded a commercial patented product for the biocontrol of zebra mussels in enclosed water systems which is available for sale as Zequanox from Marrone Bio Innovations
- Approved by the EPA in 2012, Zequanox now offers water treatment facilities, and businesses such as energy producers and manufacturing companies, an effective and safe alternative to expensive and toxic, broad-spectrum chemicals, mechanical removal and UV light systems to control populations of invasive mussels.

## **9. Selected research accomplishments (2012)**

### **1. Stock Identification of Summer Flounder using Microsatellite Analysis**

- Sea Grant research suggests that summer flounder are not a single stock off the northeast coast
- Summer flounder or fluke (*Paralichthys dentatus*) is a major component of the inshore recreational fishery from Cape Cod, MA, to Cape Hatteras, NC, including Long Island,
- Fluke are also harvested by commercial fisheries in this area, both inshore during the warmer months and offshore on the continental shelf from mid fall through early winter
- Summer flounder is currently federally managed as a single stock coast wide. This single stock management model along with harvest allocations based on individual states' landing data from 1998 are used to determine each state's annual permitted landings.
- NYSG funded this study to evaluate the single stock model of summer flounder using a sensitive genetic approach: analysis of microsatellite DNA.
- Results of analysis reveal significant genetic heterogeneity among spawning fluke on the continental shelf suggesting that fish within this area belong to more than one genetic stock. Preliminary analysis of pooled collections suggests a distinction between fluke located north or south of the Hudson Canyon.
- If confirmed by additional analyses, these results suggest that the single stock model now used by federal management may not best represent the coast wide stock structure of fluke.

### **2. Towards an Integrated Multi-model Storm Surge Prediction System for Coastal New York – HRCC**

- Several groups (NWS, universities, technical institutes) are currently running storm surge models, but there has been little inter-comparison or integration of these models.
- Since each storm has its own unique characteristics and behavior, no one model is always the most accurate at predicting surge events. A good solution is a forecast obtained by combining model outputs to produce the most reliable predictor for a wide range of storm event scenarios.
- Sea Grant funded this project to create a more accurate ensemble-based and wave setup-enabled storm

surge model prediction system to be used consistently by NWS and regional offices of emergency management to improve predictions associated with extreme weather events, including coastal flooding issues.

- The project contributes to NYSG's focus area of improved hazard resilience in New York coastal communities by helping the NYC metropolitan region to better predict and respond to surges from extreme storms through the expected use of the improved storm surge model prediction system. Timely information from the Storm Surge Group at Stony Brook University was delivered to stakeholders via social media that corrected misinformation about storm surge levels during hurricane Sandy. Also, work began on the integration of the Stony Brook Storm Surge ensemble and NOAA ETSS models. The research team also did time series analysis of observed sea levels at Montauk Point, Bellport, Point Lookout, Sandy Hook and wave heights at two NOAA buoy stations (44065 and 44025). The team also developed an interpolation routine for the new Penn State Atmospheric Model to improve the ADCIRC ocean model and MM5 weather model.

Future Changes in East Coast Storms and Their Impact on Coastal Inundation and Long Island Sound Mixing

## 10. RFP process (2013)

- PAC was involved in development of the Strategic Plan, RFP used the Strat Plan directly
- RFP distributed to more than 1100 researchers and administrators, continually updated and pre-release updated for MSI's
- 2 Q&A webinars about the RFP
- New: had a separate RFP for an Integrated Assessment proposals
- New: participated in Mid-Atlantic Regional Research Call
- Participated in NE Regional Research Call
- Preproposal review by Program Advisory Council, NYSG extension, and 3 additional outside scientific peers
- Full proposals each had 3 mail peer reviewers and 2 Technical Panelists; additional reviews by NYSG extension staff and a PAC member
- PIs were allowed to provide a Response to the 3 mail peer reviews for consideration by the Technical Review Panel
- 55 regular preproposals -- 11 full proposals invited and received -- 5 funded
- 2 Integrated Assessment preproposals -- 1 full proposal invited -- 0 funded

## NORTH CAROLINA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	MICHAEL P. VOILAND; SUSAN N. WHITE
Extension	GLORIA PUTNAM; JOHN F. THIGPEN; MARC J. TURANO
Communication	KATHLEEN MOSHER PATTERSON
Education	JEFFREY BUCKEL; MICHAEL P. VOILAND

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	Susan White
Extension	Jack Thigpen; Susan White
Communication	E-Ching Lee; Kathleen Patterson
Education	Jeffrey Buckel; Susan White

Total funding (SG + Match + Pass Through) in 2012: **\$3,242,373**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,547,000**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	6	2.48	1.41
Communication	3	0.93	1.65
Extension	15	5.8	4.5
Education	1	0	1
Research	182	29.36	26.3

### 3. NC SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	7%	9%
Research (including Research Assistantships)	35%	37%
Extension	43%	36%
Communication	11%	14%
Education	0%	0%
PD	4%	5%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	28%	22%
SSSS / SFA	27%	38%
SCD / RCE	17%	30%
HRCC	14%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	10%
other	13%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/14-EL-1: Building Ocean and Climate Literacy in North Carolina through a Project WET Climate Literacy Module (Markus Peterson)

R/14-HCE-1: Metapopulation Dynamics Guides Oyster Restoration and Habitat Protection (David Eggleston)

R/14-HCE-2: Integrating Eukaryotic and Prokaryotic Plankton Community Transcriptomics into an Ecological Network Analysis of the Neuse River Estuary (Adrian Marchetti)

R/14-HCE-3: Effects of sea-level rise on coastal freshwater wetland animals (Michael McCoy)

R/14-HCE-4: Rapid Detection of Fecal Indicator Bacteria in Water by Enzymatic Hydrolysis of Specific

Chromogenic Substrates (Jill Stewart)

R/14-HRCC-1: Studying stormwater runoff to better protect public health at North Carolina beaches (Rachel Noble)

R/14-HRCC-2: Strengthening the Hurricane Wave and Surge Forecast Guidance provided to Coastal Communities in North Carolina (Joel Dietrich)

R/14-SCD-1: Development of Tourism Trails to Benefit Rural Coastal Economies and to Preserve National Resources and Coastal Heritage (Karen Amspacher)

R/14-SCD-2: Labor Implications of Sustainable Coastal Development: Relations between Coastal and Inland Communities (David Griffith)

R/14-SSS-1: Validating a New and Reliable Method to Determine the Age of Blue Crabs (Robert Roer)

R/14-SSS-2: Population connectivity of southern flounder in the US South Atlantic (Frederick Scharf)

R/MARR14NJ-1: Understanding the impacts of climate change on the distribution, population connectivity, and fisheries for summer flounder (*Paralichthys dentatus*) in the Mid-Atlantic - North Carolina (Joel Fodrie)

R-16: Future Competitive Funding (Susan White)

## 6. Program metrics (2012)

Number of peer reviewed publications: **34**

Leveraged funds (managed): **\$ 302,310**

Leveraged funds (influenced): **\$ 972,646**

Volunteer Hours: **875**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	20	10	3
Masters	16	14	2
PhD	14	15	1
Other professional degree	0	5	1

Total K-12 students reached through educators: **43,250**

Curricula developed: **8**

Number of Cumulative Clean Marina Program – Certifications: **16**

Number of HACCP -- Number of people with new certifications: **38**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **1**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **33**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>1</b>
Businesses Retained	<b>7</b>
Economic Benefit	<b>2,743,600</b>
Jobs Created	<b>2</b>
Jobs Retained	<b>63</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>11</b>
Number of hazard resiliency trainings	<b>12</b>
Number of coastal communities who have adopted/implement 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.	<b>29</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>1</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>10</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>526</b>
Patents	
Tool Used by Stakeholders	<b>31</b>

## 8. Selected impacts (2012)

**1) Fortifying Existing Coastal Buildings (HRCC):**

- Using North Carolina Sea Grant recommendations, coastal property owners may accomplish significant improvements, often at modest costs, to reduce wind and water damage to their home from Hurricane wind and rain. By implementing these changes the homeowner can also lower their insurance costs.
- NCSG coastal construction specialist works with local, state and federal partners to promote N.C. Department of Insurance and IBHS Fortified building standards for new and existing buildings.
- Adaptations based on NCSG recommendations reduce future wind and water damage, lower insurance costs and provide for more resilient communities.

**2) Helping Counties Consider Development Strategies (SCD):**

- Ongoing interactions by NCSG extension specialists have assisted Currituck County officials to achieve water quality and other environmental protection efforts. Despite a general decline in the state's economy, development in Currituck County has continued in recent years and concern about maintaining the quality of the environment, especially water quality, has risen.
- Over several years, NCSG, along with other partners, assisted with development charettes, outreach activities, and a developer survey to raise awareness and implementation of environmentally sensitive development approaches.
- In April 2012, Currituck County Commissioners adopted a new Unified Development Ordinance, or UDO, that contains sustainability incentives, riparian buffer requirements, wetland setbacks, and provisions for vegetation around stormwater ponds. As noted by the Currituck County Planning Director, the NCSG work in the county helped officials adopt these more progressive development standards. The results of a Low Impact Development survey developed, issued and summarized by NCSG also were integrated into the county's stormwater manual.

**3) Developing a GIS-based Tool for N.C. Shellfish Lease Siting (SSSS)**

- Shellfish growers need data to help them identify promising sites for their aquaculture operations. Therefore the pre-lease selection process is long and complicated, and often involves picking a site without knowing if it will be successful for shellfish aquaculture.
- With funding from the Aquaculture NIS funding, NCSG researchers developed a GIS-based site-selection tool that provides valuable information to the growers prior to ground-truthing locations, include potential bottom lease sites.
- At least three shellfish growers have used the GIS-based tool and successfully selected sites and have submitted lease applications. This tool has saved these participants weeks of effort. In the reporting year, this tool has been presented at the Town of St. James public/professional environment outreach event and the N.C. Aquaculture Shellfish workshop, sponsored by NCSG

## **9. Selected research accomplishments (2012)**

**1) Sustaining NC Salt Marshes (HCE):** Coastal modelers are increasingly being sought out to predict the future status of coastal environments such as marshes, estuaries and floodplains under changing environmental conditions (e.g. sea level rise). Investigating the process and formation of a new marsh provided significant detailed information to refine existing models of marsh formation and maintenance under accelerating sea-level

rise conditions. By examining coastal marsh-building processes quantitatively on a contemporary time scale, NCSG researchers identified new insights as to how marshes are responding to human and climate impacts. Those findings now provide additional support for coastal modeling needs in refining predictions of land loss and marsh accretion as well as provide additional useful information regarding marsh restoration efforts.

**2) Identifying Audience Focus, Reactions to Climate Change Education Materials (HRCC):** Communication about sea level rise and climate change in coastal regions must be considered in an environment of converging risks and divergent opinions about the role of government in regulating land use and planning for mitigation and adaptation. This approach suggests that, to be productive, communicators need to adopt an empathetic, audience-driven communication strategy that recognizes peoples' affective responses to threatening information as well as the comprehensibility of information about science, infrastructure, and economics impacts. NCSG research findings will be used in workshops, hosted by NCSG and partners, for local officials and non-formal educators.

## **10. RFP process (2013)**

- March of odd years, NCSG issues request for preproposals
- 40-65 preproposals generally submitted; each include statement of relevance and purpose
- Preproposals reviewed by state agency officials, NCSG Advisory Board, coastal stakeholders, and NCSG extension staff
- 20-35 asked to submit full proposals
- Extensive peer (at least 5) and extension staff review
- Technical Review Panel evaluates proposals and peer review comments
- Selected projects must align with and enhance the overall NCSG omnibus strategy and needs of the state of North Carolina

## OHIO Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	AMY TOWNSEND-SMALL; CAROL A. STEPIEN; CHRISTINA DIERKES; CHRISTOPHER SPIESE; CHRISTOPHER WINSLOW; ELIZABETH A DAYTON; ETHAN J KUBATKO; FRANK LICHTKOPPLER; HANPING WANG; HAROLD W WALKER; JEFF MINER; JEFFREY M. REUTTER; JEFFREY REUTTER; JILL JENTES BANICKI;
Extension	CHRISTINA DIERKES; CHRISTOPHER WINSLOW; FRANK LICHTKOPPLER; JEFFREY REUTTER; JILL JENTES BANICKI; JOE LUCENTE; KRISTIN STANFORD; MATT THOMAS; SARAH ORLANDO; TORY GABRIEL
Communication	CHRISTINA DIERKES; GEORGE OOMMAN; JILL JENTES BANICKI
Education	CHRISTOPHER WINSLOW; FRANK LICHTKOPPLER; JEFFREY REUTTER; JOE LUCENTE; SARAH ORLANDO; TORY GABRIEL

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Christopher J. Winslow; Jeffrey M. Reutter; Jill Jentes Banicki
Extension	Christopher J. Winslow; Frank Lichtkoppler; Joseph Lucente
Communication	
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$2,412,665**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,790,858**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	31	4.88	14.59
Communication	4	1.26	1.33

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Extension	16	2.38	3.72
Education	42	0.43	4.99
Research	62	67.91	51.45

### 3. OH SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	14%	15%
Research (including Research Assistantships)	41%	39%
Extension	40%	36%
Communication	5%	7%
Education	0%	0%
PD	0%	4%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	33%	27%
SSSS / SFA	21%	17%
SCD / RCE	21%	22%
HRCC	25%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	34%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/ER-097: Should nitrogen be managed Lake Erie? The potential role of nitrogen fixation by cyanobacteria.  
(Darren L. Bade)

## SEA GRANT AT A GLANCE – February 2014

R/ER-102: Understanding dam removal impacts on a formerly prolific Great Lake’s walleye population (Chris Vandergoot)

R/ER-103: The role of nitrogen concentration in regulating cyanobacterial bloom toxicity in a eutrophic lake (Justin Chaffin)

R/ER-104: Source tracking and toxigenicity of Planktothrix in Sandusky Bay (George S. Bullerjahn)

R/ER-105: Ohio Sea Grant College Program Future Competitive Grants (Jeffrey M. Reutter)

R/ES-012: Impacts of Climate Change on Public Health in the Great Lakes due to Harmful Algae Blooms (Jay F. Martin)

R/MD-002: Beneficial reuse of dredged material in manufactured soil blending: Economic/logistical and performance considerations (Elizabeth A. Dayton)

R/ME-038: Linking Agricultural Production and Great Lakes Ecosystem Services: Modeling and Valuing the Impacts of Harmful Algal Blooms in Lake Erie (Elena G. Irwin)

R/PS-048: Relative contributions of hypoxia and natural gas drilling to methane emissions from Lake Erie (Amy Townsend-Small)

R/PS-049: Mapping drain tile and modeling agricultural contribution to nonpoint source pollution in the western Lake Erie basin (Kevin Czajkowski)

R/PS-050: Delivery of sediment amendments using far-field ultrasound (Linda Weavers)

### 6. Program metrics (2012)

Number of peer reviewed publications: **17**

Leveraged funds (managed): **\$ 2,298,241**

Leveraged funds (influenced): **\$ 12,138,900**

Volunteer Hours: **2,477**

#### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	44	1	0
Masters	8	1	2
PhD	4	6	2
Other professional degree	0	0	0

Total K-12 students reached through educators: **6,812**

Curricula developed: **16**

Number of Cumulative Clean Marina Program – Certifications: **39**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **364**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **17**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	<b>1,704,527</b>
Jobs Created	<b>2</b>
Jobs Retained	<b>36</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>6</b>
Number of hazard resiliency trainings	<b>6</b>
Number of coastal communities who have adopted/implement 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.	<b>12</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>7</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>3,501</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>9,619</b>
Patents	

Tool Used by Stakeholders	73
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## 8. Selected impacts (2012)

### Community Partnerships Lead to Ashtabula River Clean-Up and Area of Concerns Delisting - HCE

- In 2012, OHSG efforts helped one local community significantly reduce the risk of a serious environmental threat to the Lake Erie ecosystem and restore ten acres of wetlands.
- Ashtabula River was designated as one of 43 Areas of Concern (AOC).
- 6 beneficial uses of the Ashtabula River Area of Concern have been impaired,
- Ohio Sea Grant has worked with the local community to remediate the environmental damage to the Ashtabula River.
- Ohio Sea Grant helped to reorganize the Ashtabula Remedial Action Plan (RAP) in 2009. Ohio Sea Grant research, information transfer, have supported community and governmental efforts to implement The construction of over 2,500 feet of fish habitat and about ten acres of wetlands on the lower Ashtabula River is complete.

### Ohio Sea Grant Partners with Ohio Division of Wildlife to Revise and Improve Ohio's Aquatic Invasive Species Comprehensive Management Plan - HCE

- In 2012, Ohio Sea Grant partnered to co-chair the state advisory committee and revise the state's Comprehensive ANS Management Plan used to coordinate interagency management under the leadership of the Ohio Department of Natural Resources.
- Ohio's current Comprehensive Management Plan (OCMP) for AIS was drafted in 1995.
- Since that time, spread and numbers of AIS have increased, as many as 136 in Lake Erie alone.
- Ohio Sea Grant (OSG) developed a partnership with the Ohio Department of Natural Resources' Division of Wildlife (ODW) and Ohio State University Extension (OSUE) to co-chair the state's AIS advisory committee and provide public, academic, industry, and interagency input to AIS policies and the OCMP. The ODW administrator charged with AIS management requested OSG rewrite the OCMP, issuing grants totaling \$41,000 (February 2008–June 2012) for those purposes.
- A draft revised OCMP was submitted to ODW to coordinate interagency management actions upon detection of new AIS. Following approval, state implementation is expected within 2013.

### Climate Webinar Series Educates Thousands about Global Change Issue - HRC

- In 2012, the OSU Climate Change Outreach Team, a multi-departmental effort that created the monthly Global Change, Local Impact climate webinar series, have helped nearly 21,000 unique web visitors better understand the regional impacts of climate change.
- The team, representing 10 departments within Ohio State including Ohio Sea Grant and Cooperative Extension, works with 16 state and regional partners to coordinate climate education and outreach initiatives within the state and region including a monthly climate webinar series focussing on regional climate impacts.
- More than 2,650 participants representing 200 organizations from around the country have attended the 10 monthly webinars in 2012 with 93% acknowledging they learned new information and would share it.

- The National Park Service and USEPA, as well as 8 secondary schools and college courses are using the webinars as teaching tools and the website is used as a professional development resource for natural resources professionals with 21,000 unique visitors.
- More than 5,775 people have participated in the 26 webinars since the series inception in 2009 and another 14,000 have accessed its webinar archives.

## 9. Selected research accomplishments (2012)

### **Beneficial reuse of dredged material in manufactured soil blending: Economic/logistical and performance considerations**

In 2012, Beneficial reuse of Toledo Harbor dredge material in manufactured soil blending will reduce open lake disposal of dredge material. Soil blends developed at OSU will be used by the City of Toledo to provide a soil material for Lucas County Land Bank vacant after demolition of "blighted" properties, consuming up to 100,000 cubic yards/yr of Toledo Harbor dredge material.

Approximately 750,000 to a million cubic yards of Toledo Harbor dredge material is generated annually and is subject to open lake disposal. Beneficial reuse of Toledo Harbor dredge material in manufactured soil blending will reduce open lake disposal of dredge material.

RESPONSE: In collaboration with Joe Cappel of the Toledo Port Authority, OSU has undertaken characterization of dredge material and has established a soil blending protocol. In collaboration with Kurtz Bros. Inc, Cleveland, OH soil blenders, OSU is evaluating the use of Toledo Harbor dredge material in soil blends for landscape/horticulture applications.

RESULTS: The soil blend, developed at OSU, will be used by the City of Toledo to provide a soil material for Lucas County Land Bank vacant after demolition of "blighted" properties. This project should consume up to 100,000 cubic yards/yr of Toledo Harbor dredge material

### **Solving the Harmful Algal Bloom Problem (Ohio Phosphorus Task Force II)**

- Coordinated development of 12 scientists from 9 universities and agencies collaborating on 8 projects.
- Received \$750,000 from USEPA and Lake Erie Protection Fund
- Served on Ohio Phosphorus Task Force I & II and the Agricultural Nutrient Reduction Work Group, and led the subcommittee that developed the nutrient loading targets to solve the problem.
- The Ohio Farm Bureau now understands the role of agriculture in the problem and is actively encouraging farmers to take the recommended actions. A major shift in the attitude of farmers and farming industries has been achieved.
- Legislation is pending in the Ohio Legislature to address the issue. Certification programs are being developed for crop applicators.
- The Scott's company has removed phosphorus from lawn care products

## 10. RFP process (2013)

- RFP– anything in strategic plan is eligible
- Priorities

## SEA GRANT AT A GLANCE – February 2014

- o Nutrient Loading and Harmful Algal Blooms
- o Coastal Economic Development
- o Healthy Coastal Ecosystems at Old Woman Creek NERR
  
- Composition of review panels:
  - o Pre-proposal process
  - o A Single review Panel

Outside reviewers for technical merit

Management team for Extension and outreach component of project

Review of other Sea Grant program to minimize the duplication of research.

## OREGON Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	STEPHEN B. BRANDT
Extension	JAY L. RASSMUSSEN
Communication	JOSEPH CONE
Education	BRANDT, STEPHEN

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Rich Holdren, Interim Director
Extension	David Hansen, Sea Grant Extension Program Leader
Communication	Joseph Cone, Assistant Director and Communications Leader
Education	Shawn Rowe, Free-Choice Learning Education Leader, Sarah Kolesar, Research and Fellowship Program Coordinator

Total funding (SG + Match + Pass Through) in 2012: **\$4,185,520**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$3,549,000**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	6	1.68	3.37
Communication	6	2.71	2.31
Extension	21	5.32	6.76
Education	12	3.02	6.17
Research	21	1.81	15.16

**3. OR SG Distribution of effort by functional area**

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	15%	14%
Research (including Research Assistantships)	35%	38%
Extension	28%	28%
Communication	13%	13%
Education	1%	0%
PD	8%	7%

**4. Distribution of effort by focus area**

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	22%	25%
SSSS / SFA	28%	25%
SCD / RCE	10%	25%
HRCC	18%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	25%
other	21%	

**5. Upcoming Research Projects (from 2014 omnibus proposal)**

R/BT-52: Elicitation of Antibiotic Natural Products in Multispecies Cultures of Deep-sea Vent-derived Microorganisms (Kerry McPhail)

R/CNH-25: Preparing for Climate Change in Oregon Estuaries: Flooding, Ecological Impacts, and an Integrated Approach Toward Adaptive Management (David Hill)

R/ECO-27: Sea grass as possible ocean acidification refugia for shellfish in a high CO<sub>2</sub> world (George Waldbusser)

R/ECO-28: Understanding oceanic and terrestrial controls on dissolved oxygen variability in the Coos Bay

estuary (David Sutherland)

R/IEd-14: Scaling Up Cost-Efficient Community Engagement in Coastal Resource Management (Shawn Rowe)

R/RCF-33: Evaluating the population genetic structure and diversity of Dungeness crab (*Cancer magister*) (Kathleen O'Malley)

R/RCF-34: Exploring Albacore stock structure in the North Pacific with radionuclide tracers (Lorenzo Ciannelli)

R/RCF-35: Enhancing Razor Clam Management Using Molecular Probes for Pathogen Detection (Jeremy Weisz)

R/SAQ-20: Protecting West Coast oyster hatcheries from the effects of increasing ocean acidification (Chris Langdon)

## 6. Program metrics (2012)

Number of peer reviewed publications: **17**

Leveraged funds (managed): **\$ 2,183,052**

Leveraged funds (influenced): **\$ 8,473,533**

Volunteer Hours: **151,244**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	38	34	22
Masters	20	40	23
PhD	19	21	4
Other professional degree	2	3	2

Total K-12 students reached through educators: **28,322**

Curricula developed: **74**

Number of Cumulative Clean Marina Program – Certifications: **10**

Number of HACCP -- Number of people with new certifications: **11**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **72,993**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **379**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	2
Businesses Retained	112
Economic Benefit	58,402,724
Jobs Created	44
Jobs Retained	657
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	19
Number of hazard resiliency trainings	37
Number of coastal communities who have adopted/implement 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.	54
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	70
Number of fishers who adopt and implement responsible harvesting techniques and practices.	1,336
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	34,412
Patents	2
Tool Used by Stakeholders	41

## 8. Selected impacts (2012)

OSG engagement efforts for conservation farming benefit native fish populations.

Seasonal waterways near farms in the Willamette Valley are an important refuge for native fish species. Engagement with grass seed growers and other farmers on conservation efforts continued through 2012. Presentations were given at farm meetings, the study was featured on Oregon Public Broadcasting (<http://watch.opb.org/video/2198227280/>), and 300 DVD copies of a 13-minute film (Flooded Fields and Drainage Ditches of the Willamette Valley) that summarized study results were distributed among the farming community. Combined viewership for these showings totaled over 1 million people nationally. **A recent opinion**

**survey of 27 farmers revealed that approximately 1/3 of them either adopted conservation practices or increased the area of their farms managed with such practices after learning about the fish habitat in the wetlands and waterways in farms like theirs.** In addition, **vegetable producers in the Willamette Valley have expressed an interest in working with OSG to establish fish and wildlife habitat conservation strategies that will allow them to meet Food Alliance Certification standards.** Funding is being sought to establish habitat conservation demonstration sites on several local vegetable-producing farms.

OSG investments in free-choice learning faculty positions and public marine science programming resulted in the first university focus area and graduate program in free-choice science learning.

OSG faculty and affiliates in three OSU colleges have instituted M.S. and Ph.D. programs in free-choice learning since 2007. More than 30 advanced-degree graduates now work in universities, museums, zoos, aquariums, and state and federal agencies to bring research-based decision making to the field of informal ocean science education. The OSG faculty has also been instrumental in developing an online M.S. degree (now in its fourth cohort), and a new non-credit, online certificate program that enrolled 25 professionals nationwide in its first cohort. National recognition for this work has also come with a \$2.6 million NSF grant (the largest external grant in OSG history) for OSG's Free-Choice Learning Lab at HMSC.

OSG led an inclusive community process that resulted in legislation establishing three marine reserves and seven marine protected areas along the Oregon coast.

**RELEVANCE:** In 2006 the state of Oregon initiated a process to establish marine reserves along the Oregon coast which was a controversial issue. At the invitation of the governor's office, OSG took a leadership role in the process used to identify and evaluate potential marine reserves sites to ensure it was unbiased and inclusive.

**RESPONSE:** OSG partnered with the Oregon Department of Fish and Wildlife (ODFW) to convene three community teams consisting of a wide variety of stakeholders, which met more than 33 times to evaluate three proposed marine reserve sites at Cape Perpetua, south of Yachats; Cascade Head, near Lincoln City; and Cape Falcon, south of Cannon Beach. OSG also worked with the Scientific and Technical Advisory Committee (STAC) to establish minimum size and spacing considerations for marine reserves.

**RESULTS:** The teams developed recommendations for reserves that were adopted by the Ocean Policy Advisory Council and forwarded to the Oregon legislature. The teams used OPAC's STAC (also led by OSG) recommendations in their deliberations. **In February 2012 the legislature passed Senate Bill 1510, which established the three new reserves, the first in the state. The bill also established seven marine protected areas near the three marine reserve locations.**

Widespread engagement processes help regional stakeholders to understand and respond to hypoxia and ocean acidification

**RELEVANCE:** Changing ocean conditions such as hypoxia and ocean acidification (OA) are current topics of high stakeholder interest that directly affect Northwest communities such as the fishing industry and shellfish growers, but communicating accurate, concise information is often a challenge in a rapidly evolving field.

**RESPONSE:** OSG-funded research teams partnered with regional stakeholders to apply engagement and social science practices to understand effects of hypoxia and OA on communities and identify communication needs. Activities included a scoping meeting with diverse partners to identify hypoxia events and disseminate

current information to users, presentations to state and regional lawmakers, and participation on the Washington State Blue Ribbon Panel on Ocean Acidification. Additionally, one project employed discussions and survey research to ensure relevant OA-related Web content for end users, including shellfish hatcheries and growers, resource managers, and the general public.

**RESULTS:** Hypoxia scoping meetings resulted in an active list-serv with more than 105 recipients in Oregon and Washington, and promoted in-season exchange of data and observations that were previously not possible. Researchers are involved in efforts also underway in California to address hypoxia and OA. **Survey results revealed that the shellfish industry often uses online resources to understand OA, but they feel it is difficult to distill the information into a useful operational form.** A preliminary Web interface built on those assessments provides real-time estimates of larval shellfish condition based on oceanographic data.

Rapid response to arrival of a Japanese tsunami marine dock off Oregon identified a major new invasive-species pathway

**RELEVANCE:** The devastating March 2011 Japanese tsunami swept millions of tons of debris into the ocean. When a 65-foot Japanese dock beached near Newport, Oregon, in June 2012, scientists were surprised by the diversity and magnitude of marine life present on the structure. Although some species were recognized as well-documented pelagic colonizers, an intact subtidal community of Asian species inhabited the debris, including potentially aggressive invasive species. This new pathway of invasion for flora and fauna associated with current and potential debris items is both startling and significant.

**RESPONSE:** OSG recognized an immediate, rapid-response need to assess the potential invasive risk of marine debris-related organisms, and dedicated program resources to sample and identify the species. A multidisciplinary expert team assembled to assess dock biodiversity, process samples, perform a rapid assessment survey of the potential debris field, develop a digital online library of dock biota, and disseminate results to scientific, management, and public audiences locally and internationally.

**RESULTS:** An assessment of species richness and biodiversity from the Japanese dock identified 87 living, non-pelagic, non-algal species. An additional 11 species either pelagic or dead were also collected, along with at least 30 algal species. A comprehensive voucher collection of debris-associated specimens, including a genomics database, was curated and findings verified and shared through presentations and publications, as well as via a project website (<http://blogs.oregonstate.edu/floatingdock/>) and digital photo library (<http://www.flickr.com/photos/80098236@N07/>). Additional funding from NSF allowed for subsequent sampling of 28 additional pieces of Japanese tsunami debris, and both NOAA and OSG are currently supporting efforts to assess public perceptions and to increase awareness of the debris.

**Update: As additional debris continues to arrive, OSG has monitored for invasive species and supported educational and research efforts aimed at increasing awareness of issues related to the debris itself and possible introductions. Another large amount of debris is expected to arrive over the next few months.**

Oregon Sea Grant's leadership on a national climate survey provides nine states with actionable insights

**RELEVANCE:** Effective engagement on climate change is challenging because of the complexity of the issue, long-term perceptions of risk, and the political baggage of the topic. Empirical studies of how OSG stakeholders, defined by their communities of place or practice, deal with this subject are vital to effective science communication and engagement. With a technically difficult and socially contentious subject such as planning for climate change, such study is especially important.

**RESPONSE:** OSG funding from the national SG Hazard Resilient Coastal Communities Focus Team was used to organize and develop a survey that might be used in any Sea Grant state to learn the knowledge,

attitudes, actions, and information needs of coastal professionals and elected officials regarding planning for climate change. In consultation with approximately a dozen states, OSG developed the survey instrument, using questions from several sources, notably California Sea Grant. OSG established an online collaboration tool (Basecamp) for the project and a group SurveyMonkey site for deployment.

**RESULTS:** By January 2013, eight SG programs (OR, CT, MD, IL-IN, LA, MN, WA, HI) covering nine states had implemented the national survey locally with a total of approximately 700 coastal professionals and elected officials. The states individualized their surveys based on their own local priorities and contact information, and they were also responsible for conducting their own analyses. Questions focused on the status of local climate planning, so results were intended to inform the development of local SG programming. OSG will provide a final report, summarizing this unique national SG initiative, in 2013.

**Update: The results of this work, along with other climate change studies carried out throughout the Sea Grant network, were published as [Climate Field Notes](#).**

## 9. Selected research accomplishments (2012)

Oregon Sea Grant develops reliable, operational wave forecasting for Oregon's coast to help improve safety for commercial and recreational boaters

Forecast visualizations are already available online for the entire Oregon coastline and are being used by recreational beach users and the scientific community. The model has been nested into the global and Eastern North Pacific (ENP) forecast system used by the National Weather Service. Work is underway to determine whether the forecast information can be used to assess the effects of local waves on coastal vulnerability to climate change and flood hazards.

Oregon Sea Grant discovers that Pacific salmon use geomagnetic imprinting for open-ocean migration and homing

Results show that salmon use geomagnetic imprinting to navigate from open-ocean to their freshwater natal streams, helping to solve a century-old enigma. Results provide the first empirical support for the magnetic imprinting hypothesis of natal homing and imply that sockeye salmon use geomagnetic cues to guide the open-sea portion of their spawning migration. Results lead to the possibility of forecasting salmon movements by using geomagnetic models, which would be a great benefit to hatchery and resource managers.

## 10. RFP process (2013)

Similar to 2011 -

Biennial Research Competition based on all focus areas of strategic plan; placed an emphasis on social science proposals.

evaluated the proposals for scientific excellence and societal relevance through a rigorous process of:

1. two to five external peer reviews (between three to fourteen peer reviewers were invited to respond to each proposal),
2. a science panel review based primarily on scientific and technical merit, and
3. the OSG Advisory Council review based primarily on societal value

8 Proposal were selected for funding, but OSG requested the chance to set aside a portion of research funds to use for social science projects from a dedicated call to be carried out in 2014,

as the response from the social science community was not very strong. This dedicated call has gone out, and projects should be selected this spring.

West Coast Regional Social Science Panel:

They support Oregon investigators associated with proposals submitted under a request for regional social science research proposals for California, Oregon, and Washington Sea Grants. All regional social science proposals had:

- three to four external mail peer reviews,
- a science panel review, and
- a combined evaluation by the four West Coast Sea Grant Directors and program personnel.

## PENNSYLVANIA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	ROBERT LIGHT, PH.D.; SEAN RAFFERTY
Extension	ANN FAULDS; ROBERT LIGHT, PH.D.; SEAN RAFFERTY
Communication	ROBERT LIGHT, PH.D.; SEAN RAFFERTY
Education	DAVID BOUGHTON; ROBERT LIGHT, PH.D.; SEAN RAFFERTY

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Ann Faulds; Robert W. Light; Sarah Whitney; Sean Rafferty
Extension	David Skellie; Eric Obert; Marti Martz; Sean Rafferty
Communication	Ann Faulds; Anna McCartney
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$1,313,964**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,036,672**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	7	1.65	0.55
Communication	1	0.19	0.81
Extension	9	1.91	3.26
Education	5	1.3	1
Research	4	1.25	0.1

### 3. PA SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	12%	31%
Research (including Research Assistantships)	29%	21%
Extension	43%	37%
Communication	4%	2%
Education	12%	0%
PD	0%	2%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	0%	50%
SSSS / SFA	0%	5%
SCD / RCE	0%	28%
HRCC	0%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	17%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/1-1416-1C: DNA Mutation Analysis in Brown Bullhead Fish from Presque Isle Bay (Steven Mauro)

R/1-1416-2C: Assessing the ecological integrity of Presque Isle Bay by comparing tumors rates and intersex within fish (Sean Rafferty)

R/1-1416-3C: PCR tracking of predation on non-native species in Lake Erie (Kelly Grant, Ph.D.)

R/1-1416-4C: ` (Andrew J. Mowen, Ph.D)

R/1-1416-5C: Evaluations of Effectiveness of FreshFaceForward: Personal Care Products (PCPs) Social Change Campaign (Anne Zaphiris, Ph.D)

R/1-1416-6C: Quantifying seasonal movement dynamics and thermal habitat use of smallmouth bass in the Susquehanna River basin (Tyler Wagner)

R/1-1416-7C: A Real-time PCR Method for the Early Detection of Aquatic Invasive Species in Pennsylvania Watersheds (Benoit Van Aken)

R/1416-NC: Support for the Natural History Museum at the Tom Ridge Environmental Center at Presque Isle (non-competitive) (Mark Lethaby)

R/1418-0: Research - Pennsylvania Sea Grant 2014-2018 (Jeanette Schnars)

## 6. Program metrics (2012)

Number of peer reviewed publications:

Leveraged funds (managed): **\$ 1,153,250**

Leveraged funds (influenced): **\$**

Volunteer Hours: **11,777**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	8	0	0
Masters	2	1	1
PhD	0	2	0
Other professional degree	0	0	0

Total K-12 students reached through educators: **8,167**

Curricula developed: **15**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **602**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **9**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>1</b>
Number of hazard resiliency trainings	<b>3</b>
Number of coastal communities who have adopted/implement 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.	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>6</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>52</b>
Patents	
Tool Used by Stakeholders	<b>5</b>

## 8. Selected impacts (2012)

Rapid Response Plan and Procedures for Agencies Responding to Aquatic Invasive Species in Pennsylvania- HCE

- 2009, PASG started development a rapid response document for agencies aquatic invasive species in the Commonwealth
- In 2012, the document was restructured to include a three-tiered approach, with each section becoming increasingly more detailed; allowing users to decide how much detail they will need to complete each of the action steps.
- The ultimate goal of the rapid response plan model is to capitalize on the window of opportunity to stop the establishment of new harmful invasive species shortly after introduction.

- effort supports the Pennsylvania Aquatic Invasive Species Management Plan

PASG helped the City of Chester to incorporate climate adaptation planning objectives into its Vision 2020 Comprehensive Plan - HRCC

- Conducted County Roadmap for Adapting to Coastal Risks Workshop
- The 2020 plan will soon be adopted and will help to make the tidal riverfront community more resilient as it serves as model for other local municipalities.

NIE pages and associated website lead to watershed restoration efforts, increased workshop attendance, and increased citizen involvement in protecting the Pennsylvania Lake Erie watershed - Other

- The Erie Times-NIE "Learn about your environment project" is an effective communication tool for PASG and other NOAA-supported programs
- PASG staff leads the Coastal Resource Management funded Erie Times News NIE project to educate students and citizens about water quality, invasive species, climate change, and other coastal zone issues. Staff secures funding for the program, completes all reporting, and during the school year, produces 34 full pages in the Erie Times-News with up-to-date scientific information.
- Results: During each school year, PASG staff produces 34 full pages in the Erie Times-News, which provides 6,000 students and 135,000 potential Erie Times-News readers (per issue) with up-to-date scientific information:
  - 1) attendance at several workshops was filled;
  - 2) several local businesses installed rain gardens;
  - 3) volunteers were recruited for the weed warrior program, tree planting programs, and Pennsylvania Lake Erie Coastal Cleanup;
  - 4) PASG staff were invited to give presentations related to environmental topics; and
  - 5) fund- raising opportunities were presented to PASG.

## 9. Selected research accomplishments (2012)

Water quality sampling effort establishes baseline data for Presque Isle Bay tributaries SHC

- PASG Staff assessed the water chemistry at 16 locations along Scott Run, Cascade Creek, Mill Creek, and Garrison Run.
- Analysis suggest that water quality in the watershed should support and protect aquatic life, nutrient concentrations should not result in eutrophication
- Streams within the watershed may not be safe for recreational uses such as swimming as a result of elevated E. coli levels, the source of E. coli contamination is likely non-human.
- The concentrations of chemicals of potential concern will serve as baseline data for comparing future assessments.

GLRI-funded research helps support Presque Isle Bay delisting targets SHC

- From 2010-2012, PASG and our partners received GLRI funding to assess the potential causes of liver and skin tumors in brown bullhead and to assess the potential risk to humans and the ecosystem.
- The studies investigated the presence of DNA adducts in bullhead livers exposed to PAHs and the role viruses play in the formation of bullhead skin tumors. The studies revealed a lack of DNA adduct formation and the absence of viruses.
- The risk assessments revealed a lack of threat to human or ecosystem health based on the

concentrations of chemicals in the sediment of Presque Isle Bay.

- The results were used to support the DEP's decision to petition EPA to delist the fish tumors or other deformities beneficial-use impairment and Presque Isle Bay Area of Concern.

## 10. RFP process

### • Delaware River Watershed:

- **Proposals that investigate the impact of brownfield or grayfield restoration on water quality in the Pennsylvania portion of the Delaware River watershed.**
- **Proposals that model potential future flooding risk in the Chester Creek (Delaware County, Pennsylvania) in light of projected climate change.**

### • Lake Erie Watershed:

- **Proposals that evaluate the ecological integrity of Lake Erie and/or Presque Isle Bay using fish communities and habitat to address species-specific bioindicators, intersex individuals, geography of habitat, and habitat use.**
- **Social science proposals that:**
- **evaluate the impact of forecasted lower lake levels in Lake Erie, including one or more areas: recreational boating and fishing, navigation, beach swimming and health advisories, and tourism.**
- **evaluate the impact of recent education campaigns that address behavior change related to either the use and disposal of personal care products or current unwanted pharmaceutical removal programs, such as collection events/return boxes at police stations.**

### Susquehanna River Watershed:

- **Proposals that determine the causes, impacts, and implications of smallmouth bass virus in the Susquehanna watershed.**
- **Proposals that improve prevention, early detection, rapid response, or control/management of aquatic invasive species impacting the Erie, Delaware, and Susquehanna watersheds in Pennsylvania.**

The 2014-2016 RFP that we just issued award letters to our applicants

o PASG/NOAA funds = \$149,000

o PSU = \$120,000 for 2 years (\$60,000 each year)

• The 2012 Mini-grant RFP we worked on with USGS at PSU

o PASG = \$120,000

o USGS = \$93,000

• 6/11/2013 PASG issued a request for Pre-proposals. I have attached the RFP.

• Pre-proposals were due July 2, 2013

• We received 15 pre-proposals from 12 different universities/organizations

o 15 Pre-proposals: Total request = 370,747.22

• Comments from the PASG staff were requested and discussed on July 9, 2013

o We selected 8 proposals to invite for full proposal applications (attachment of RFP)

§ 8 proposals: Total request = \$235,262; Match = \$92,250

o The majority of the other seven proposals that were not invited for full proposal did not fit into the focus areas of the RFP

## SEA GRANT AT A GLANCE – February 2014

- Applicants were notified on July 15, 2013, and full proposals were due on August 19, 2013
- On September 17, 2013 outside reviewers were asked to assist with reviews of full proposals (attached RFP with Review Form at end of document)
  - o Reviews were due on October 7, 2013
  - o There were some delays due to the government shut down during this time
- A conference call with reviewers to discuss full proposals took place on October 10, 2013
- Applicants were notified on November 25, 2013 that their full proposals had been selected and award contracts (pending budget approvals) would be issued early 2014
  - o 7 of the 8 full proposals were selected
  - o 7 proposals: Total request = \$206,662; Match = \$77,950
- Award letters were issued to those selected applicants on January 30, 2014

## PUERTO RICO Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	RUPERTO CHAPARRO
Extension	MANUEL VALDES PIZZINI, PHD
Communication	CRISTINA OLAN
Education	LESBIA MONTERO

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Ruperto Chaparro, MA
Extension	Manuel Valdes Pizzini, PhD
Communication	Cristina Olan, MA
Education	Lesbia Montero

Total funding (SG + Match + Pass Through) in 2012: **\$2,084,758**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,596,088**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	6	2.67	2.83
Communication	14	2	5.94
Extension	9	4.6	3.94
Education	5	1.75	0.68
Research	53	5.3	3.2

### 3. PR SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	20%	22%
Research (including Research Assistantships)	24%	17%
Extension	30%	34%
Communication	16%	19%
Education	4%	5%
PD	5%	2%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	31%	40%
SSSS / SFA	8%	0%
SCD / RCE	17%	40%
HRCC	27%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	20%
other	17%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/101-1-14: Connectivity between shallow and mesophotic ecosystems in Puerto Rico and the US Virgin Islands: using corals and commensal fauna (Nikolaos Schizas, PhD)

R/21-1-14: Genetic structure and diversity of bottlenose dolphin, *Tursiops truncatus*, off Puerto Rico (Grisel Rodriguez)

R/31-1-14: The Immune Response of *Diadema antillarum* and Recovery from Caribbean-wide Mass Mortality (Gregory Beck, PhD)

R/31-2-14: Reef health, fish diseases, and habitat connectivity: understanding the role of ectoparasites as

vectors for disease, energy transfer, and barometers of reef ecosystem health (Paul Sikkel, PhD)

R/84-1-14: Evaluation of Perceptions and Experimental Planting Techniques at Parque La Esperanza, Cataño, Puerto Rico (Concepcion Rodriguez-Fourquet, PhD)

## 6. Program metrics (2012)

Number of peer reviewed publications: **4**

Leveraged funds (managed): **\$ 474,369**

Leveraged funds (influenced): **\$**

Volunteer Hours: **6,000**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	10	11	5
Masters	6	5	2
PhD	3	4	0
Other professional degree	0	0	0

Total K-12 students reached through educators: **10,000**

Curricula developed: **40**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	

SEA GRANT AT A GLANCE – February 2014

Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>16</b>
Number of hazard resiliency trainings	<b>32</b>
Number of coastal communities who have adopted/implement 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.	<b>36</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>12</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>5,000</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>78,000</b>
Patents	
Tool Used by Stakeholders	<b>2</b>

## 8. Selected impacts (2012)

### **Public Policy Recommendations for Climate Change Adaptation in Puerto Rico (SCD - CCCAI project)**

Sea Grant Puerto Rico is a respected leader in climate change and coastal hazards adaptation strategies for Puerto Rico, thus establishing the Public Policy for Climate Change and Coastal Hazards Adaptation in Puerto Rico.

This effort established a dialog with experts from different academic disciplines to generate recommendations for a climate change adaptation public policy for Puerto Rico.

As a result of Sea Grant’s effort and leadership a meeting with the President of the Puerto Rico Planning Board was scheduled to present the climate change and coastal hazards adaptation recommendations to be adopted by the Puerto Rico Land Use Plan to be completed by October of 2013.

This document will be presented to the Puerto Rico Planning Board, the Department of Natural and Environmental Resources, the Puerto Rico Senate and the House of Representatives, to be considered and adopted as the Climate Change Adaptation Public Policy for Puerto Rico.

2014: This week, a presentation is scheduled with the Director of the Emergency Management Office of Puerto Rico and he will coordinate a presentation for the Governor. Included in the presentation are a group coordinated by Sea Grant which includes the Seismic Network, CaRICOOS, the Department of Marine Science, the Department of Engineering and Sea Grant.

#### **Río Loco Watershed Conservation Buffers (HCE - CCD project)**

Efforts to promote the implementation of conservation buffer zones (through focus groups and workshops) at the Río Loco and Guánica Bay has reduced sedimentation and erosion problems and improved the health of coral reefs and other coastal and marine resources at the watershed. The two demonstration projects developed with the farmers have reported a diminution of sediments from the site and other farmers are evaluating the adoption of this technique to reduce erosion and sedimentation problems in their farms. Both buffers are impacting approximately 50 acres of farmlands in the watershed. Farmers have realized that there are advantages for them in the implementation of the buffers zones, besides reducing landslides and the loss of fertile soil, actions that reduce damage and negative impacts to coral reefs.

The Río Loco/ Guánica Bay Watershed traverses the municipalities of Guánica, Yauco, and a portion of the Lajas Valley in the south coast of Puerto Rico. Current land uses of the approximately 57,000 acres of the watershed are agricultural lands (43%), forests (48%) and urban development (9%). The byproducts and impacts of agricultural production in the watershed are impacting the quality and the health, of coastal and marine ecosystems, characterized by coral reefs and associated habitats.

#### **Identifying coastal wetlands and salt flats in Puerto Rico (HCE - CCD project)**

Sea Grant Puerto Rico in collaboration with the Natural Resources Conservation Service Caribbean Office are promoting the characterization, mitigation, and the restoration of coastal wetlands and salt flats, and its importance related to impacts associated to climate change. As a result of these efforts, 1,233 acres of conservation buffers to reduce erosion were implemented around the island of Puerto Rico.

## **9. Selected research accomplishments (2012)**

#### **Movement Patterns of Bonefish (*Albula spp.*) Inhabiting Reef Flats in Culebra, Puerto Rico: From Ecological Connectivity to Sustainable Use of a Recreational Fishery (HCE)**

Preliminary assessment of bonefish movements indicates a relatively high degree of fidelity to the flat where individual fish were caught and tagged. This is the first time fine-scale movement patterns have ever been quantified for bonefish.

#### **Character and Timing of a Reef Give-up Event on the Southwest Puerto Rico Shelf (HCE)**

This study draws attention to the long time span that the reefs on the Puerto Rico shelf have required in order to establish critical habitat for many of the commercial fish species. Additionally, continued water quality degradation, increased bio-erosion of reef framework, global warming, coral bleaching and ocean acidification are expected to take a toll within a period of time much shorter than the time needed for critical habitat to develop.

## **10. RFP process (2013)**

- Request for proposals
  - Thematic areas included those identified in 2014-2017 University of Puerto Rico Strategic Plan (UPR SG)

## SEA GRANT AT A GLANCE – February 2014

- o Sent to stakeholders on and off island and UPR SG web page
- Evaluation of pre-proposals (30)
- Invitation to submit full proposals (17)
- Individuals reviews of full proposals (14 proposals with minimum 3 peer reviews)
- Technical review panel convene via teleconference (Oct 1, 2013)
- Selection for funding of full proposals

## RHODE ISLAND Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	ALAN DESBONNET
Extension	JENNIFER MCCANN; PAMELA RUBINOFF; SUSAN FARADY
Communication	ALAN DESBONNET
Education	ALAN DESBONNET

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Dennis Nixon; Monica Allard-Cox
Extension	Jennifer McCann; Susan Farady
Communication	
Education	Dennis Nixon

Total funding (SG + Match + Pass Through) in 2012: **\$3,214,021**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$3,118,512**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	4	1.6	2.65
Communication	2	1.5	0
Extension	20	5.31	1.24
Education	6	1.25	0.25
Research	27	7.87	1.65

**3. RI SG Distribution of effort by functional area**

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	23%	14%
Research (including Research Assistantships)	34%	27%
Extension	26%	26%
Communication	5%	11%
Education	6%	15%
PD	6%	7%

**4. Distribution of effort by focus area**

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	77%	45%
SSSS / SFA	11%	20%
SCD / RCE	8%	20%
HRCC	4%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	15%
other	0%	

**5. Upcoming Research Projects (from 2014 omnibus proposal)**

R/F-1416-31-1: Quahog larval dispersion and settlement in Narragansett Bay. (Scott Rutherford)

R/F-1416-32-1: A model for understanding public support for aquaculture and estimating social carrying capacity in Rhode Island waters. (Tracey Dalton)

R/F-1416-32-2: An inventory map and valuation of social uses of Rhode Island coastal waters: a mixed methods approach. (Robert Thompson)

R/F-1416-42-1: N cycling processes across an oyster aquaculture chronosequence. (Robinson Fulweiler)

R/F-1416-42-2: Could diseases in blue mussels affect commercial culture in the Northeast region? (Roxanna

Smolowitz)

R/F-1416-54: Developing information to manage the Rhode Island whelk fishery. (Kathleen Castro)

## 6. Program metrics (2012)

Number of peer reviewed publications: **3**

Leveraged funds (managed): **\$ 778,773**

Leveraged funds (influenced): **\$**

Volunteer Hours: **1,619**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	8	3	5
Masters	6	7	0
PhD	3	5	0
Other professional degree	0	21	6

Total K-12 students reached through educators:

Curricula developed:

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications: **131**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **100**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	<b>100,000</b>

Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>4</b>
Number of hazard resiliency trainings	<b>15</b>
Number of coastal communities who have adopted/implement 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.	<b>13</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>1</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>100</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>350</b>
Patents	<b>2</b>
Tool Used by Stakeholders	

## 8. Selected impacts (2012)

### (1) RI Sea Grant Helps Develop New Guidelines for Offshore Development

- As the nation quickly moves forward in a new era of renewable energy, states are looking offshore for development, making guidance more imperative for appropriate monitoring and assessment of development impacts to communities and the environment.
- Rhode Island Sea Grant was sought out by the federal government to help devise management tools and models similar to those of the Ocean Special Area Management Plan, which Sea Grant agents helped create and implement for Rhode Island's offshore waters. Sea Grant extension agents utilized their expertise to develop monitoring techniques and tools on a national scale to aid regulators in creating monitoring programs within respective regions.
- As a result of their efforts, the federal government and states now have a set of guidelines to develop monitoring programs and tools that will establish development requirements of future projects to ensure the continued use of coastal and ocean resources, and to protect the ecological integrity of the environment. The resulting guidelines are also being incorporated by Rhode Island regulators in designing a monitoring program for a proposed offshore wind farm proposal near Block Island.

### (2) RI Sea Grant Assists in New Waterfront Project to Enhance Public Access to Shore

- Sea Grant, in partnership with the RI Coastal Resources Management Council (CRMC), developed the Urban Coastal Greenway (UCG) Policy which requires public access as part of any development or redevelopment along urban waterfront in Rhode Island.
- The UCG is considered by NOAA to be the most advanced urban waterfront planning tool in the nation. Developed as part of the Metro Bay Special Area Management Plan (SAMP), it is an alternative regulatory approach for coastal vegetated buffers for the urban environment.
- The policy promotes vegetated buffers in urban areas, but allows development provided there is allowances for public access as part of the development project. It also includes regulations for stormwater management and sustainable landscaping, which is increasingly important because climate change will stress an already stressed water supply.

### **(3) RI Sea Grant helps Protect Vital Fishing Grounds from Leasing**

- Fisheries activities have struggled to remain resilient amidst a changing regulatory and environmental landscape. Rhode Island fisheries are particularly vulnerable to such changes having limited fishing grounds due to geographic constraints of state waters, making fishing areas more critical to identify and preserve.
- Sea Grant agents worked with the fishing community to develop and establish a Fisheries Advisory Board within the Ocean Special Area Management Plan to preserve the interests of the fishing community. This relationship resulted in the disclosure of fishing grounds by fishermen to regulators in a first-ever partnership that produced maps identifying valuable fishing grounds.
- As a result of this effort, Cox's Ledge, a highly valued fishing ground was identified and officially removed from the federal government's lease plan for offshore development in Rhode Island and Massachusetts waters.

## **9. Selected research accomplishments (2012)**

### **(1) RI Sea Grant Research Finds Bacteria found growing on the invasive tunicate *Didemnum* may inhibit predation. - HCE**

- *Didemnum* is a highly invasive colonial tunicate that is impacting intertidal community structure by replacing native species. This species is not heavily preyed upon, and it is suspected that epibiont bacteria may be the cause, but this has not been well studied.
- RI Sea Grant has funded research to study the epibiont/bacterial growth associated with *Didemnum*, describe associated species complexes, and set the stage for further research as warranted by the results.
- Several species found have been reported from previous studies, but new, previously unreported epibionts have been described as have new associations between colonial tunicate colonies and bacterial complexes. These results suggest that more detailed research is needed to determine if these newly described associations are related to the inhibition of predation on *Didemnum*, and how this relates to predation.

### **(2) RI Sea Grant Legal Program develops Case Studies for Climate Change Adaptation**

- Many communities are challenged by climate change adaptation is no model exists that address these new conditions of sea level rise and increased storm intensities.
- Rhode Island Sea Grant has matched law fellows to research current efforts being made by various communities and develop a comprehensive paper that can be used to share lessons learned and begin a process to develop better climate adaptation modeling for communities.
- Sea Grant Legal Fellows produced 18 case studies on innovative climate change adaptation strategies and provided resources for climate change planning that are available on the Northeast Climate Change Adaptation website for communities to use as a guide as they develop their own

adaptation strategies.

## 10. RFP process (2013)

- Priorities –Shellfish (bivalve and gastropod) Management Planning
  - Biological/Ecological issues
  - Economic issues
  - Societal issues
  - Legal and Policy issues
- Process to develop RFP priorities: RISG gathers input from its program-wide SAC, stakeholder surveys, stakeholder retreats/workshops, and specialized advisory panels to RISG extension programs
- Composition of review panels:
  - RISG has developed a review process that includes: individual science review, relative science review, and a relevancy review.
  - RISG includes representatives from local resource management institutions to serve on the final review panel of experts to provide a “relevancy review” and guidance.
  - Scientific panel:
    - Discusses each proposal; Ranks them (High, Med, Low); Removes the ones that aren’t fundable (low)
    - Re-rank the high/med proposals
  - Relevancy panel:
    - Discusses each proposal and their relevancy to RI/User needs; Rank the proposals (High, Med, Low)
  - All panelist (science and relevancy) – rank the proposals based on the science and relevancy

## SOUTH CAROLINA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	M. RICHARD DEVOE
Extension	M. RICHARD DEVOE; ROBERT H BACON
Communication	SUSAN FERRIS HILL
Education	

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	Judy Linder, Administrative Manager; M. Richard DeVoe; Susannah Sheldon, Program Manager; TBH, Assistant Director for Development and Extension, Ryan Bradley, Accountant Fiscal Analyst
Extension	TBH, Assistant Director for Development and Extension, April Turner, Coastal Community Specialist; Elizabeth Fly, Climate Specialist; Julie Davis, Living Marine Resources Specialist; M. Richard DeVoe, Executive Director; Michael Slattery, Coastal Processes Specialist, Samantha Bruce, Geospatial Specialist
Communication	John Tibbetts, Writer and Editor ; Patty Snow, Web Designer and Developer; Susan Ferris Hill
Education	Elizabeth Vernon Bell

Total funding (SG + Match + Pass Through) in 2012: **\$2,563,867**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,994,832**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	5	1	4
Communication	3	1.4	1.6

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Extension	5	4	1
Education	2	0.25	1.75
Research	1	0.25	0.75

### 3. SC SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	17%	29%
Research (including Research Assistantships)	41%	37%
Extension	32%	20%
Communication	9%	14%
Education	0%	0%
PD	0%	0%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	16%	21%
SSSS / SFA	24%	20%
SCD / RCE	25%	44%
HRCC	21%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	15%
other	14%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/CF-20: *Vibrio parahaemolyticus* Virulence and Its Magnification in the Eastern Oyster, *Crassostrea virginica*  
(Charles R. Lovell)

R/CH-4: Wind and rain resistant design for coastal cross laminated timber buildings (Scott D. Schiff)

R/CP-20: Clonal aging and the molecular basis for sudden marsh dieback (James Morris )

R/ER-41: Evaluating the cause and effect after twenty years of assessing the impacts of coastal development on tidal creek headwaters (Denise M. Sanger)

R/ER-42: Hydrology and pollutant removal performance in detention ponds typical of the lower coastal plain of South Carolina (Erik M. Smith)

R/ER-43: Evaluating wetland function in coastal South Carolina to support low impact development decision making (Daniel Hitchcock)

R/ER-44: Development and validation of a novel molecular tool to rapidly detect and quantify harmful algal bloom (HAB) species linked with fish kills and public health concerns (Diane Greenfield )

R/ER-45: Particle contamination: Direct effects on salt marsh-tidal creek organisms and indirect effects on the bioavailability and toxicity of polynuclear aromatic hydrocarbons (PAHs) (Stephen J. Klaine)

## 6. Program metrics (2012)

Number of peer reviewed publications: **7**

Leveraged funds (managed): **\$ 1,108,877**

Leveraged funds (influenced): **\$**

Volunteer Hours: **7,264**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	13	4	5
Masters	8	14	12
PhD	2	3	3
Other professional degree	0	0	0

Total K-12 students reached through educators: **6,275**

Curricula developed: **6**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **884**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **2**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	<b>120,754</b>
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>4</b>
Number of hazard resiliency trainings	<b>8</b>
Number of coastal communities who have adopted/implement 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.	<b>3</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>5</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>50</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>100</b>
Patents	
Tool Used by Stakeholders	<b>18</b>

## 8. Selected impacts (2012)

### 1) Policy Implications from Comparative Research on the Survival and Growth of Diploid and Triploid Single Eastern Oysters in South Carolina (SSSS):

- South Carolina estuaries continue to provide excellent growing conditions for native oysters despite

population decline along much of the mid-Atlantic coast. Considerable economic potential exists for the production of locally-derived single oysters raised from hatchery seed. Maximizing this economic potential for locally-derived oysters requires the optimization of grow-out techniques and the evaluation of potential merits of the use of triploids compared to diploids.

- South Carolina Sea Grant funded research to evaluate triploid Eastern oyster performance for aquaculture in South Carolina. This also project highlighted the need to re-visit the SCDNR policy, to include issues such hatchery certification process, importation of eyed larvae and small seed, shellfish disease management, and genetics of imports.
- A new demand for triploid oysters in South Carolina has resulted from this project. Two commercial shellfish growers involved in this project applied for applications to import their own triploid oysters for commercial grow-out in February 2013 and it is likely that in the future more commercial growers will want to import more triploid oysters due to their now proven high growth rates in South Carolina waters.

## **2) Using Participatory Scenario Building to Encourage Climate-Resilient Zoning in the Coastal Carolinas (HRCC):**

- The S.C. Sea Grant Consortium received a Coastal Community Climate Adaptation Initiative (CCCAI) grant to help Beaufort County, SC develop scenarios that address climate change resilience in its zoning and ordinances. As part of its 2012 Comprehensive Plan, Beaufort County recognized flooding and sea level rise as a threat, and that planning, site review and infrastructure locations needed to include potential impacts of sea level rise.
- The Beaufort County Planning Department partnered with the S.C. Sea Grant and the Social and Environmental Institute to develop a plan for making the county's zoning more resilient to climate change by using two participatory tools.
- The team completed initial scoping for the project, including a preliminary assessment of initial concerns and of county plans that are relevant for climate adaptation. A compilation of Beaufort County's plans and ordinances that may be impacted by climate change has been completed and will inform both interviews in March 2013 and a Vulnerability, Consequences, and Adaptation Planning Scenario (VCAPS) exercise in April 2013. The VCAPS process allows community staff and decision-makers to diagram the impacts of potential climate stressors on municipal management issues and the consequences these impacts would have. The Coastal Community Future Adaptive Capacity Scenario (CC-FACS) process will use the VCAPS diagrams to create scenarios that visualize possible consequences of adaptation actions.

## **3) Understanding demand for value-added products and services associated with for-hire boat trips on the South Carolina (SC) coast (SCD):**

- Charter captains prioritized training in marketing and customer service in addition to adding low-cost value-added products and services associated with for-hire boat trips on the South Carolina (SC) coast. Recreational charter fishing boat operators on the SC coast provide access to offshore waters, but increasingly they must adapt to higher fuel costs, regulatory limitations, competition, and customers seeking lower prices.
- Sea Grant researchers interviewed charter captains about the value-added services that they are currently (or considering) providing; that are in demand by anglers and non-anglers; and then define any benefits or concerns with providing value-added products and services.
- The results identifying training needs in natural history and interpretation but they also found that training in marketing and customer service was important.

## 9. Selected research accomplishments (2012)

**1) Managing Reproductive Behavior in Fisheries and on Fish Farms (SSSS):** The research is expected to result in a gene expression profiling tool to enhance the efficient production of hybrids for grow-out facilities and to inform fisheries management policies. Patterns of gene expression are being identified in order to detect "fingerprints" of gene expression genes that can predict egg quality and potential reproductive fitness of wild and farmed striped bass. During the spring of 2012, researchers induced both domesticated and wild striped bass from the Roanoke River in N.C. to complete maturation and ovulation for hatchery evaluations of egg quality (fertility, embryo and larval development, etc.). The fish were subjected to ovarian biopsy prior to the experiment and a sample of their eggs was collected at spawning and subsequently preserved. In fall 2012, researchers collected biopsies from the vetted samples from the spring spawning activity to assess the subsequent development and maturation as required by the grant objectives.

**2) Biomedical Industry Cooperation with Sea Grant Researchers Confirms Efficacy of Current Management Strategies for the Commercial Horseshoe Crab Fishery (SSSS):** Due to increasing numbers of horseshoe crabs being bled annually by the biomedical industry on the U.S. east coast, an Ad Hoc Biomedical Workgroup was convened by the Atlantic States Marine Fisheries Commission (ASMFC). An appreciable number of short-term bleeding effect studies have been conducted on horseshoe crabs, but few published long-term studies exist, which would aid in better assessing potential impacts on the population in South Carolina. A biomedical company (Endosafe) allowed Sea Grant researchers to tag horseshoe crabs at their facility, and provided bled crabs gratis as part of a long-term study to document potential differences in tag return rates (survival) between bled and unbled horseshoe crabs. Endosafe recorded all tagged animals brought to the facility by harvesters, and provided SCDNR with data in a timely manner. Endosafe also agreed to not bleed any of the tagged animals, thus harvesters returned them to the wild along with routinely bled animals. Study results suggested that there are no long-lasting impacts on the horseshoe crabs due to biomedical bleeding; therefore, the horseshoe crab fishery continues to operate without the need for significant management changes. Through its cooperation in this study, the biomedical company Endosafe contributed valuable information to the long-term management goal of a sustainable fishery for horseshoe crabs.

## 10. RFP process (2013)

- Strategic and Implementation Plan serves as foundation for priorities in RFP followed by input from management community
- Applicants submit pre-proposal (concept letter) reviewed by expert panel of managers and scientists
- Approximately 25 full proposals are requested from pool
- Technical and conceptual peer review from academia, government and industry throughout U.S (usually outside of S.C.)
- Proposal Technical Review Panel (TRP) convened to review and evaluate full proposals.
- Research and outreach proposals are selected based on TRP recommendations and program priority needs for inclusion in program plan

## USC Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	DUGUAY
Extension	FAWCETT; GRIFMAN
Communication	GRIFMAN; JULIETTE HART
Education	GRIFMAN; LINDA DUGUAY

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	LINDA DUGUAY; PHYLLIS GRIFMAN
Extension	JAMES FAWCETT; PHYLLIS GRIFMAN
Communication	LINDA DUGUAY; PHYLLIS GRIFMAN
Education	PHYLLIS GRIFMAN

Total funding (SG + Match + Pass Through) in 2012: **\$1,894,209**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,429,683**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	2	0	0.95
Communication	3	1.5	0
Extension	5	3	0.75
Education	1	0.5	0.5
Research	8	0.75	0.2

### 3. USC SG Distribution of effort by functional area

SEA GRANT AT A GLANCE – February 2014

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	11%	15%
Research (including Research Assistantships)	42%	33%
Extension	22%	30%
Communication	13%	18%
Education	0%	0%
PD	2%	3%

#### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	17%	40%
SSSS / SFA	4%	10%
SCD / RCE	0%	25%
HRCC	18%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	25%
other	61%	

#### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/HCE-37: TROPHIC TRANSFER OF DOMOIC ACID IN FOOD WEBS OF THE

FUTURE GREENHOUSE COASTAL OCEAN (Dave Hutchins)

R/HCE-38: A New Method for Monitoring Urban Beach Ecosystems (KAREN MARTIN)

R/RCE-02: The environmental and economic impacts of moorage marinas in the West Coast (James Moore)

R/RCE-03: Developing a Model Ordinance for California Local Governments to

Integrate Sea-Level Rise Adaptation into Existing Land Use Plans (SEAN B HECHT)

R/TBD: UNALLOCATED RESEARCH (TBD)

## 6. Program metrics (2012)

Number of peer reviewed publications: **8**

Leveraged funds (managed): **\$ 278,936**

Leveraged funds (influenced): **\$ 30,498**

Volunteer Hours: **611**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	4	0	0
Masters	1	0	0
PhD	1	2	1
Other professional degree			

Total K-12 students reached through educators: **95,926**

Curricula developed: **5**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

<b>Measure</b>	<b>Actual</b>
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	

SEA GRANT AT A GLANCE – February 2014

Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement 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.	<b>**175</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>1,158</b>
Patents	
Tool Used by Stakeholders	

## 8. Selected impacts (2012)

### **Title: California Climate Adaptation Needs Assessment Survey (HRCC)**

A USC SG-led statewide survey of coastal managers were presented to the California Natural Resources Agency, illustrating concerns about SLR and needs for information, training, and resources. As a result, in 2012 \$2.5 million was allocated by the CA Ocean Protection Council and Coastal Conservancy for developing vulnerability studies and plans for adaptation.

### **Title: MPA Watch (HCE)**

In 2011-12 a statewide network of Marine Protected Areas was designated pursuant to the Marine Life Protection Act. In Southern California, USC SG sponsored development of “MPA Watch,” a citizen education and training program for observing and reporting on coastal activities to augment CA Dept of Fish and Wildlife enforcement, which is spread very thinly across the region. “MPA Watch” has trained hundreds of citizen monitors and has now been adopted throughout the system of MPAs along the entire CA coast.

### **Title: Climate Change and Hazard Resilience Education for Educators (Cross-cutting)**

Over 225 formal and informal educators implemented resources integrating current ocean science issues into their classroom instruction after participating in science-based workshops led by USC Sea Grant and COSEE West partners addressing Ocean Acidification, Using Data from Ocean Observing Systems, Fisheries and the Importance of Estuaries, Aquatic Invasive Species and New Marine Protected Areas. This bridge provided access to current science in order to increase ocean and climate literacy and career education in STEM fields for over 6,750 students.

## 9. Selected research accomplishments (2012)

### **Title: Resolving the annual pattern of algal toxins in coastal waters of LA (HCE)**

This project pioneered the use of a rapid and cost effective methodology (solid phase adsorption toxin tracking, or SPATT) for in situ toxin sampling that can be successfully used to reveal seasonal and annual dynamics of harmful algae and algae toxins off Southern California. Use of the new methods is employed to predict significant occurrences of HABs and (at the discretion of coastal community managers) can be used for public warnings.

### **Title: Environmental Endocrine Disruption in Urban Ocean Fish: Mechanisms, Causes and Wider Impact (HCE)**

This project highlights the effectiveness of using proteomics technology for biomarker screening as a rapid and cost-effective, data-rich tool for environmental managers to evaluate impacts of water quality on organisms. This information is being used by sanitation authorities (i.e., Orange County Sanitation District) of changes that can be made to regional monitoring, and has been shared with managers in other jurisdictions to inform water quality testing. Moreover, it highlights the need for better methods of identifying and eventually mitigating the presence of endocrine disruptors (from pharmaceuticals, pesticides, etc.) in the waste stream.

## 10. RFP process (2013)

### Primary Areas of Concern:

- Healthy Coastal Ecosystems
- Sustainable Fisheries and Aquaculture
- Resilient Communities and Economies
- Environmental Literacy and Workforce Development

### Preproposals:

- Call for preliminary proposals - January 31, 2013
- Received 31 preproposals from 13 institutions by the deadline of March 15, 2013
- Preproposal review process:
  - Reviewed by USC Sea Grant Academic Advisory Panel
  - Reviewed by the California Natural Resources Agency Sea Grant Advisory Panel (RASGAP)
- Encouraged 11 to submit full proposals

### Full Proposals

- 11 full proposals received by the deadline of June 27, 2013
- Full proposal review process:
  - Submitted for a minimum of four mail/ad hoc peer reviews
  - Technical Review Panel convened on August 19, 2013
  - Reviewed and ranked by RASGAP on September 3, 2013

### Findings

- Four proposals recommended for funding
- Additional two projects selected for funding contingent on availability of funds through the NSGO Social Science NSI.

### West Coast Regional Social Science Competition

Joint call with WA, OR, CA, and USC pledging up to \$700,000 to address specific social science issues of regional priority (\$50K/year from USC)

Preproposals:

- Received 15 Letters of Intent
- Each letter was reviewed and discussed jointly by the Directors and Associate Directors of the program based on RFP criteria
- Seven were encouraged to submit full proposals

Full proposals:

- 7 full proposals received
- Review process consisted of:
  - Distribution to a minimum of three external/ad hoc reviewers each
  - Review by a technical review panel

Findings:

- Based on recommendations, two of the seven were identified as highly recommended

## TEXAS Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	PAMELA PLOTKIN
Extension	LOGAN RESPESS; PAMELA PLOTKIN
Communication	JIM HINEY
Education	ALYSON AZZARA; APRIL BAGWILL; JOHN JACOB; KATHLEEN WELDER; KEVIN CONWAY; LIAM CARR; PAMELA PLOTKIN; STEPHANIE SHOWALTER

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Pamela Plotkin
Extension	Pamela Plotkin
Communication	
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$3,623,651**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,826,001**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	4	1.07	2.93
Communication	4	0	4
Extension	11	4.66	5.44
Education	0	0	0
Research	14	1.2	1.52

### 3. TX SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	15%	11%
Research (including Research Assistantships)	52%	44%
Extension	26%	45%
Communication	7%	0%
Education	0%	0%
PD	0%	0%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	34%	25%
SSSS / SFA	14%	25%
SCD / RCE	21%	25%
HRCC	17%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	25%
other	14%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/CS-14: If we lose Folletts Island, we lose coastal communities and Christmas Bay: A geological framework and numerical model study of the sustainability of Folletts Island. (Jens Figlus)

R/EQ-8: Identification of organic matter sources contributing to hypoxia formation in two eutrophic South Texas estuaries: relationships to watershed land use practices (Michael Wetz)

R/ES-15: Mangroves are invading Texas salt marshes: what are the consequences? (Steven Pennings)

R/ES-16: Evaluating Groundwater/Surface-Water Inflow and Nutrient Transport to Texas Coastal Embayments (Dorina Murgulet)

R/ES-17: Texas Sea Grant's Climate Literacy and Capacity Building Program (Mona Behl)

R/F-12: Economic Valuation of Brown and White Shrimps as Forage Species in the Coastal Areas of Texas (Masami Fujiwara)

R/F-13: Assessment of Population Genetic Differentiation of the Blue Crab (*Callinectes sapidus*) in the Gulf of Mexico using Next Generation Sequencing Technologies (Luis Hurtado)

## 6. Program metrics (2012)

Number of peer reviewed publications: **1**

Leveraged funds (managed): **\$ 293,387**

Leveraged funds (influenced): **\$ 1,474,206**

Volunteer Hours: **63,120**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	5.75	6	3
Masters	7.75	16.25	7
PhD	4	19	3
Other professional degree	0.25	0	0

Total K-12 students reached through educators: **12,905**

Curricula developed: **17**

Number of Cumulative Clean Marina Program – Certifications: **88**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **77**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **50**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	

SEA GRANT AT A GLANCE – February 2014

Businesses Retained	
Economic Benefit	<b>9,963,965</b>
Jobs Created	
Jobs Retained	<b>200</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>11</b>
Number of hazard resiliency trainings	<b>56</b>
Number of coastal communities who have adopted/implement 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.	<b>3</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>16</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>354</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>336</b>
Patents	
Tool Used by Stakeholders	<b>12</b>

## 8. Selected impacts (2012)

### SSSS: TXSG's sustainability training nets \$9.5 million for Texas shrimpers

- Wild, domestic shrimp stocks are healthy, but U.S. shrimpers are struggling as they compete in a global market that is dominated by foreign farm-raised shrimp
- TXSG led regional petition for domestic shrimpers to USDA's Trade Adjustment Assistance (TAA) program (TX to NC)
- TXSG developed a sustainability training program under the TAA Program
- TXSG developed in-person and online training modules, including:
  - (a) Reducing Fuel Use in the Shrimp Fisheries,
  - (b) Steps Necessary to Produce Great-tasting, Premium-quality Wild Shrimp,
  - (c) Understanding New Regulatory Requirements for TEDs, and
  - (d) Developing a Business Plan
- 2012 - 99.2% (842) Texas shrimpers had completed the 12-hour intensive training, while 91.3% (769) went on to complete their long-term business plans

- The trainings enabled Texas shrimpers to get their TAA funding (~\$9.5 million)
- Learned how to lower input costs while maximizing dockside prices, thus ensuring a viable and sustainable wild-caught shrimp fishery

**SSSS: Cameron County shrimp fleet sustainability boosted by technology transfer of fuel-efficient trawl gear**

- For Gulf shrimp trawlers, fuel costs are a major operating expense
  - A single Gulf shrimp trawler can consume up to 80,000 gallons of diesel per year
- Since 2008, TXSG has worked with shrimpers in the Gulf of Mexico and South Atlantic regions to transfer technology of fuel-efficient trawl gear
- In 2012, experimental fuel-efficient trawl gear sponsored by Texas Sea Grant saved Cameron County, Texas, shrimpers \$9.8 million in fuel costs
- As a result:
  - fuel savings range from 20 to 39%
  - > 80% of vessels in the Cameron County, Texas, shrimp trawling fleet, which has grown from 132 to 172 vessels, have switched to the new fuel-efficient gear
  - In 2012, the Cameron County shrimp fleet saved 3.1 million gallons of fuel valued at \$9.8 million by adopting this new gear
- Since 2008, countywide fuel savings were estimated to be 12.8 million gallons valued at \$35.5 million
  - Additional savings are accrued through reductions in both the frequency of oil and filter changes and major engine overhauls
  - An estimated 200 jobs were saved because without these fuel savings, many of the boats would have remained idle during the 2008 through 2012 shrimp seasons.

**SSSS TXSG conducts informal TED inspections to ensure compliance**

- Turtle Excluder Device (TED) compliance is a continuing and critical issue for the Gulf of Mexico shrimp fishery
- Non-compliant TEDs not only restrict a sea turtle's ability to escape the nets and increase the risk of drowning; it can also result in hefty fines for vessel captains and owners
  - Fines for non-compliant TEDs can exceed \$500 and could withhold captain licenses and seizures of the shrimp catch (and the crew shares)
- TXSG conducted informal TED compliance inspections in both English and Spanish for captains, vessel owners and net shops all along the Gulf coast
- As a result, several boats were non-compliant and corrective measures were demonstrated. Had these boats been boarded by federal or state regulators while fishing, the resulting fines could have been as high as \$220K, not including the potential loss of the catch
  - Texas Sea Grant informal TED inspections helped 98.5% of Texas offshore shrimp fleet avoid costly fines and thereby sustain the fishery
  - From October 2011 through December 2012, fisheries authorities boarded 199 Texas offshore shrimp vessels in the Gulf of Mexico. While some vessels received warnings or minor citations, only three vessels (1.5%) received a serious violation.

**9. Selected research accomplishments (2012)**

**SCD - Survey gauges Texans' attitudes toward their water resources and uses**

- About 1,300 people move to Texas daily at a time when the state is suffering a decade-long drought of record, further stressing the state's limited water supply
  - Decisions need to be made how water resources are allocated among personal, agricultural, industrial, municipal, recreational and environmental uses
- TXSG-funded survey quantified Texans' concerns and preferences related to their water resources and the state's water policies
  - Texans are very concerned about the quality and quantity of their water resources, including

- preserving water for environmental services
- willing to support conservation measures, water-related infrastructure improvements, and a combination of tax cuts and incentives to guarantee the security of Texas' water supply
- Survey results were presented directly to state Legislators to aid them as they consider water-related legislation
  - PI presented survey results to the Texas Legislature, at their request, in late April
  - Results from the 410 completed interviews were intended to aid Texas state leaders as they make water policy and resource allocation decisions during the 83rd Legislative Session in 2013

**SSSS - Significant portion of Texas southern flounder do not follow life history models of juvenile residence in low-salinity habitats**

- Southern flounder is broadly distributed and economically valuable and most sought-after flatfish on the Texas coast
  - Population sizes in Texas have declined dramatically over the past two decades, putting the long-term sustainability of the species at risk
  - A key uncertainty is the degree to which juvenile southern flounder require low-salinity habitats for successful recruitment
  - knowing which habitats are most vital can aid efforts to protect critical areas
- TXSG-funded researchers used otolith microchemical analysis to assess habitat use among salt and freshwater habitats
  - Importantly, found that some TX populations of southern flounder in Texas do not follow the standard model
    - exhibit a wide range of diversity in their migratory and low-salinity residence patterns
    - Average proportion of the wild-caught flounder's lifetimes spent in low salinity habitats was 15%, a significant portion of the sampled flounder, 41%, never moved into low salinity habitats, while other flounder spent a majority of their lives in low salinity
  - standard model of southern flounder life history — that juveniles use low-salinity habitats during the post-settlement phase — may not apply to all populations in Texas
  - Good baseline for future studies:
    - Ba/Ca was the best for fresh water vs. estuarine residency determinations
    - Chemical signatures of rivers consistently different from estuarine habitats

**10. RFP process (2013)**

- RFP release in December 2012 and advertised broadly
- Used eSea Grant for this cycle
- 122 Pre-proposals reviewed by 4 extension team members to ensure relevance, adherence to strategic plan for research
  - 120 encouraged to submit a full proposal
- 91 Full Proposals received and sent for out-of-state experts for review
- Held two full proposal panels for natural science and social science
  - primarily out-of-state university researchers
  - Recommended proposals be funded, not funded, or undecided

## LAKE CHAMPLAIN Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	Mary Watzin, Breck Bowden (Sept 2012)
Extension	Jurij Homziak
Communication	
Education	

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	William B. Bowden
Extension	Jurij Homziak
Communication	Elissa Schuett
Education	Erin De Vries

Total funding (SG + Match + Pass Through) in 2012: **\$637,142**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$645,001**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	1	0.2	
Communication	1	0.1	
Extension	5	1.75	
Education	10	0.5	1
Research	4	1.5	1

### 3. LC SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	7%	3%
Research (including Research Assistantships)	21%	15%
Extension	66%	77%
Communication	0%	4%
Education	0%	0%
PD	6%	0%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	62%	15%
SSSS / SFA	0%	11%
SCD / RCE	0%	41%
HRCC	30%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	33%
other	7%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/2014: Analysis of sediments, nutrients, and greenhouse gases associated with green stormwater infrastructure (Stephanie Hurley)

R/2015: Analysis of sediments, nutrients, and greenhouse gases associated with green stormwater infrastructure (Stephanie Hurley)

R/2016: Future competed research ()

R/2017: Future competed research ()

## 6. Program metrics (2012)

Number of peer reviewed publications: **1**

Leveraged funds (managed): **\$ 20,000**

Leveraged funds (influenced): **\$**

Volunteer Hours: **150**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	6	6	
Masters			
PhD	1		
Other professional degree			

Total K-12 students reached through educators: **1,350**

Curricula developed:

Number of Cumulative Clean Marina Program – Certifications:

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

<b>Measure</b>	<b>Actual</b>
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	

Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement 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.	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>2</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	

## 8. Selected impacts (2012)

### Sea Grant Helps Reduce and Restrict Phosphorus Fertilizer Use (HCE)

Over 10+ years the “Don’t P on Your Lawn” campaign:

- significantly reduced phosphorous fertilizer sales,
- increased the sales of non-phosphorous alternatives and
- led to VT legislation that restricts lawn phosphorous use.

Phosphorous from lawn fertilizer is a leading contributor to eutrophication of Lake Champlain. It is a long-standing problem: In 1996 VT was one of 3 states with >30% non-farm phosphate use; in 2003 60% of lawns tested statewide (76% in its most urban county) had excess phosphorous.

In 2002, Lake Champlain Sea Grant helped found the Green Lawn Coalition, to improve the no phosphorous message in the basin. It’s “Don’t P on your Lawn” first identified key “drivers of change” for DIY lawn care, then enabled local groups to do outreach and education, trained garden retailer sales staff in no phosphorous lawn care, and increased public awareness through professionally designed social marketing based ad campaigns.

### Bioengineering (SCD)

This shoreline stabilization approach is to be included in Burlington Bike Path rehabilitation plan, the revision of the Burlington Open Space plan (specifically the lakeshore “north 40”), and in criteria for zoning approval for shoreline stabilization projects. Meetings are underway with city officials and others to ensure inclusion in the plans.

### Protection from Invasive Species (HCE)

New York now joins a number of states which have the authority to systematically evaluate, prohibit and/or regulate potential invasive species which routinely cross international, national, and state borders in the global supply chain.

The New York Invasive Species Council (est. 2007) was charged with: submitting to the legislature and the governor, a report recommending a four-tier system for nonnative animal and plant species. Lake Champlain Sea Grant staff member Mark Malchoff was asked to serve on the “Four Tier Team” from its inception and chaired the Fish and Aquatic Invertebrates Workgroup reporting to the Invasive Species Advisory Committee (ISAC). Each workgroup developed an assessment protocol to determine the “invasiveness rank” of organisms (especially trade organisms) predicted to be introduced to NY water in the future. Without such criteria, government has little ability to regulate the importation of new plants and animals by various industry segments. The resulting “4-Tier” report formed the basis of an invasive species bill, signed into law by Governor Cuomo on July 24, 2012, calling for DEC and Dept of Agriculture and markets to develop a joint list of non-native species (plants and animals) that are prohibited or regulated and to promulgate the regulation/s by 1 September, 2013 (see: <http://www.governor.ny.gov/press/07242012-protection-from-invasive-species>).

## 9. Selected research accomplishments (2012)

### **Adapting to climate change with low impact development stormwater management in the Lake Champlain Basin (HRCC)**

This research, a PhD dissertation, has thus far accomplished a multi-phase process of designing and re-designing the outdoor laboratory on the University of Vermont campus, applying for the appropriate permits, developing a Request for Proposals and soliciting bids from contractors, and ultimately selecting a contractor (EcoSolutions of Burlington, Vermont) and constructing the project in the fall. The largest obstacle was the timeline of the University in their approvals of the construction plans. There were also substantial utility conflicts that were not on the “As Built” plans and therefore two of the cells were not able to be constructed and the cell depths had to be changed from 4’ to 3’. Various details in the projects design also required necessary re-design, including the design of the inflow and outflow monitoring devices on the cells.

## 10. RFP process (2013)

- Request for proposals in April based on input from the LC SG Program Advisory Committee and strategic plan.
- Full proposals were received (3) and reviewed (external reviews and Program Advisory Committee)
- Selection for funding of full proposal made (1)

## VIRGINIA Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	COURTNEY HARRIS; TROY HARTLEY
Extension	ARIEL PINTO; BENJAMIN MCFARLANE; DANIEL KAUFFMAN; LARRY ATKINSON; MICHAEL JAHNCKE; TANYA DENCKLA COBB; THOMAS MURRAY; TIMOTHY BEATLEY; TOM RIPPEN; TROY HARTLEY; VICKI CLARK
Communication	MARGARET PIZER; MARK BUTLER
Education	JOHN HOENIG; LISA LAWRENCE; ROBERT LATOUR; SUSAN PARK; TROY HARTLEY; VICKI CLARK

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Susan Park; Troy Hartley
Extension	Daniel Kauffman; Hans-Peter Plag; Larry Atkinson; Mary-Carson Saunders Stiff; Michael Jahncke; Michael Schwarz; Robert Lane; Shana Jones; TBD Faculty of Practice; Thomas Murray; Troy Hartley
Communication	Janet Krenn
Education	Lisa Ayers Lawrence

Total funding (SG + Match + Pass Through) in 2012: **\$3,455,698**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,329,500**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	2.29	1.83	0.46
Communication	2.08	1.92	0.17
Extension	6.59	5.13	1.46

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Education	2.6	2.19	0.41
Research	9.41	7.9	1.51

### 3. VA SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	15%	19%
Research (including Research Assistantships)	27%	37%
Extension	47%	28%
Communication	8%	12%
Education	0%	0%
PD	3%	3%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	19%	20%
SSSS / SFA	46%	50%
SCD / RCE	6%	15%
HRCC	12%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	15%
other	16%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/718505: Virginia Sea Grant Research Administration (Susan Park)

R/MARR14NJ-VA

: Understanding the impacts of climate change on the distribution, population connectivity, and fisheries for

summer flounder (*Paralichthys dentatus*) in the Mid-Atlantic Bight (Virginia component) (Chris Kennedy)

## 6. Program metrics (2012)

Number of peer reviewed publications: **3**

Leveraged funds (managed): **\$ 14,400**

Leveraged funds (influenced): **\$ 426,615**

Volunteer Hours: **21,250**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	21	0	6
Masters	29	10	14
PhD	17	13	4
Other professional degree	2	0	2

Total K-12 students reached through educators: **6,194**

Curricula developed: **3**

Number of Cumulative Clean Marina Program – Certifications: **70**

Number of HACCP -- Number of people with new certifications: **141**

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	<b>344,000</b>
Jobs Created	

Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	<b>3</b>
Number of coastal communities who have adopted/implement 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.	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>141</b>
Patents	<b>1</b>
Tool Used by Stakeholders	<b>3</b>

## 8. Selected impacts (2012)

Extension staff helped aquaculturists validate and demonstrate methods for hybrid striped bass aquaculture and provided technical assistance during the process of retrofitting, troubleshooting, and optimizing an aquaculture facility for hybrid striped bass. Results: one venture produced over 60,000 pounds of hybrid striped bass in 2012, with a market value in excess of \$240,000, and several other groups are starting or planning to start striped bass aquaculture operations (17803).

Virginia localities, especially in rural communities, face the challenge of helping citizens repair failing septic systems when there is no clear title to the property. Virginia Sea Grant Partners, working with the Law Center, found a novel way to tie septic system responsibility to property tax bills, and worked with county commissioners and state lawmakers to get a bill through the Virginia General Assembly that would allow such a program to be created to finance septic repairs. The bill (HB1448) passed unanimously in 2012 (17817).

A Virginia Sea Grant panel created in 2011 to describe oyster flavors has shaped oyster marketing, branding, and the general vocabulary of the sector in Virginia. Nine (non-SG) online publications were aired in 2012 with a viewership of more than 1.3M citing oyster flavor language and concepts

introduced by this panel and workshop. Ten growers have been quoted in the press using these concepts and terminology (17816).

## **9. Selected research accomplishments (2012)**

Non-lethal metrics for assessing condition of juvenile summer flounder, striped bass, and Atlantic croaker were developed, including a non-destructive "Distell Fatmeter". The new techniques can cut the time and expense of standard stock assessment techniques, and eliminate the need for sacrificing specimens (17784).

In support of science for ecosystem based fisheries management (EBFM), VA Sea Grant helped fund the largest trophic study of Chesapeake Bay fishes. Among other things, these efforts include the operation of a multi-species trawl survey that collects critical biological data for use in single-species and multi-species management and eventually EBFM. Virginia Sea Grant funded research to synthesize the vast dietary information contained in the survey's database, to characterize the dietary similarities across 47 species in the Bay, identified unique groupings of fishes that function similarly in the ecosystem, and revealed synchronous trends among species that are responding to similar forcing in the complex system. This study represents the largest single diet study of fishes ever conducted in the Chesapeake Bay (17788).

Human adenovirus (HAdV) has many features that make it a good potential candidate viral indicator for wastewater effluent monitoring. VASG-supported research identified whether HAdV was present in the effluent from three local wastewater treatment plants (WWTP) and if HAdV could be detected in sentinel shellfish exposed to WWTP effluent outfall. The results may improve the assessment of the quality of wastewater effluent in the Hampton Roads Sanitation District (17809).

## **10. RFP process (2013)**

Virginia did not conduct a state research competition in 2013. After consulting with their advisory body and stakeholders on how best to maintain the relevance of their effectively shrinking pool of research funds, VA SG chose to invest its research funding into regional research, and especially into research fellowships, to support students in research projects that had received funding from another source.

It was Virginia's turn to conduct the regional research competition for all the States in the Mid-Atlantic region (DE, MD, NC, NJ, NY, PA, VA). The topics of this competition were:

Climate impacts and adaptation (e.g., sea level rise adaptation solutions).

Coupled social-ecological systems science that links social science and natural science research.

Land-estuarine or land-sea interactions.

"Cross-disciplinary, integrative research that analyzes and synthesizes existing data to address major,

large-scale issues of relevance to coastal and marine communities, and translates these research results into useful information for coastal managers and stakeholders.”

## WASHINGTON Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	PENELOPE D. DALTON
Extension	C. A. PETER GRANGER
Communication	DANIEL WILLIAMS
Education	RAECHEL WATERS

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Penelope Dalton
Extension	Penelope Dalton; TBD/All outreach components have been combined under reorganized approach
Communication	Penelope Dalton; Megan Matthews;/All outreach components have been combined under reorganized approach
Education	Penelope Dalton; TBD/All outreach components have been combined under reorganized approach

Total funding (SG + Match + Pass Through) in 2012: **\$6,020,611**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$4,555,296**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	8	0.9	4.01
Communication	8	2.32	1.52
Extension	25	7.28	8.21
Education	27	5.39	5.15

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Research	81	11.06	3.67
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\*In 2012, WA SG added extension liaison positions to PMEL (1 FTE) and NWFSC (1 FTE), working on ocean acidification, tsunamis and coastal hazards, and fisheries social science.

### 3. WA SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	8%	9%
Research (including Research Assistantships)	44%	51%
Extension	29%	39%**
Communication	6%	0%
Education	6%	0%
PD	7%	2%

\*\*Combines all outreach - as part of Washington SG's reorganization, all outreach activities are within a single outreach project, which used the A/ code.

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	31%	33%
SSSS / SFA	34%	30%
SCD / RCE	17%	24%
HRCC	10%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	13%
other	8%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/2016-18-1: Competitive Research Funding 2016-2018 (Penelope Dalton)

R/COCC-4: Effects of Waterfront Stormwater Solution Prototypes on Water Quality Runoff in Penn Cove, Town

of Coupeville. (Nancy Rottle)

R/HCE-3: Shifting baselines in Puget Sound: population abundance of Pacific herring and its use by Native Americans over the millennia (Lorenz Hauser)

R/HCE-4: Measuring what matters: linking life history traits and disease resistance with genomic variation in Chinook salmon conservation hatcheries (Kerry Naish)

R/HCE-6: Understanding Potential Impacts of Seasonal Hypoxia Along the Quinault Reservation Coast (Ervin Joe Schumacker)

R/OLWD-1: Scaling Up Cost-Efficient Community Engagement in Coastal Resource Management (Julia Parrish)

R/RCE-1: The environmental and economic impacts of moorage marinas on the West Coast (Christine Bae)

R/RCE-2: Planning for Coastal Community Resilience to Tsunamis Using Transportation and Disaster Recovery Modeling (Scott Miles)

R/SFA-1: Impacts of ocean acidification on wild and farmed mussels in Puget Sound, WA (Emily Carrington)

R/SFA-2: Crossbreeding and Selection for Resistance to Ocean Acidification in Pacific Oysters (Jonathan Davis)

R/SFA-3: A low-cost sensor network for early detection of Alexandrium and Heterosigma Harmful Algal Blooms in the Puget Sound region (Daniel Grunbaum)

R/SFA-4: Toward Sustainable Geoduck Aquaculture Management in Puget Sound: Assessing Policy and Social Dimensions (Clare Ryan)

R/SFA-5: An ecosystem modeling approach to investigate direct and indirect effects of geoduck aquaculture expansion in Washington State (Glenn R. VanBlaricom)

#### **Jointly funded with the Puget Sound Partnership**

*R/HCE-1: Marine Survival of Puget Sound Chinook Salmon: Size-selective Mortality, Critical Periods, and Growth Limitation (David Beauchamp)*

*R/HCE-2: Evaluating Puget Sound Marine Protected Areas to Increase Social Ecological Resilience (Patrick Christie)*

*R/HCE-5: Fine Scale Monitoring of Puget Sound Ecosystems using Benthic Foraminifera (Elizabeth Nesbitt)*

*R/HCE-7: Effects of sediment porewater sulfide on eelgrass health, distribution and population growth in Puget Sound (David Shull)*

*R/RCE-3: The Biological Effectiveness of Bioretention for Stormwater Pollution Control (John Stark)*

## **6. Program metrics (2012)**

Number of peer reviewed publications: **25**

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Leveraged funds (managed): **\$ 682,275**

Leveraged funds (influenced): **\$ 3,468,019**

Volunteer Hours: **18,658**

Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	55	21	25
Masters	16	11	10
PhD	8	13	2
Other professional degree	0	0	0

Total K-12 students reached through educators: **4,393**

Curricula developed: **11**

Number of Cumulative Clean Marina Program – Certifications: **62**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **12**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **1,332**

## 7. Program performance measures (2012)

<b>Measure</b>	<b>Actual</b>
Businesses Created	<b>2</b>
Businesses Retained	
Economic Benefit	<b>29,602,100</b>
Jobs Created	<b>20</b>
Jobs Retained	<b>227</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>3</b>

Number of hazard resiliency trainings	<b>7</b>
Number of coastal communities who have adopted/implement 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.	<b>24</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>9</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>1,992</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>1,587</b>
Patents	<b>3</b>
Tool Used by Stakeholders	<b>51</b>

## 8. Selected impacts (2012)

Washington Sea Grant spurs an unprecedented state effort to address ocean acidification, with potential national impact (SSSS, HCE)

- WSG has awarded more than \$1 million research into acidification's effects on shellfish and on the zooplankton.
- The WSG-organized Symposium on Ocean Acidification (November 2011) provided an impetus for Governor Chris Gregoire to establish the Washington State Blue Ribbon Panel on Ocean Acidification. Sea Grant staff worked with the governor's office to identify panel members and obtained and administered panel financial support. WSG also coordinated the panel's logistics and proceedings and its working groups on science, adaptation and remediation, and education and outreach. Staff oversaw the preparation of the comprehensive science summary and materials for the final report and its public release in November 2012
- Result: The report spurred substantial executive and legislative initiatives and brought national attention and extensive media coverage to the acidification issue.
- Result: Gov. Gregoire directed state agencies to implement the panel's recommendations and included \$3.3 million for acidification research in the state budget.
- Result: A panel member introduced legislation to create a state board coordinating acidification research and action and authorize rural sewer systems to capture acidifying wastes.
- Result: Responding to the governor's executive order, the U.S. EPA set out to review its criteria for water-body impairment and perhaps recognize acidification.
- Links to publications from the Blue Ribbon Panel:
  - [Washington State Blue Ribbon Panel on Ocean Acidification \(2012\): Ocean Acidification: From Knowledge to Action, Washington State's Strategic Response.](#) H. Adelman and L. Whitely Binder (eds). Washington Department of Ecology, Olympia, Washington. Publication no. 12-01-015.
  - [Feely, R.A., T. Klinger, J.A. Newton, and M. Chadsey \(2012\): Scientific Summary of Ocean Acidification in Washington State Marine Waters.](#) NOAA OAR Special Report.

- Update: Meg Chadsey was hired to be the PMEL-WASG Liaison for Ocean Acidification in 2012, after helping coordinate the 2011 Symposium on Ocean Acidification and the 2012 Washington State Blue Ribbon Panel on Ocean Acidification.
- Update: Melissa Poe was hired to be the NWFSC-WASG Liaison for fisheries social science in 2012. Her areas of focus include the effects of ocean acidification and climate change on Washington and Oregon coastal communities and their capacity for mitigation, adaptation and resilience.

Washington Sea Grant supports efforts to keep working waterfronts viable locally and across the nation, while improving fisheries safety and seafood related business practices. (SSSS, SCD, HCE)

- WSG-brokered lane agreements between West Coast crab fishermen and towboat companies continue to improve maritime safety and save an estimated \$1.6 million per year.
- WSG USCG certified safety workshops and courses save lives and help fishermen operate safely at sea in response to increasingly strict enforcement standards.
- In 2009, responding to the deaths of six Columbia River tribal fishermen, WSG and the Columbia River Inter-Tribal Fish Commission (CRITFC) began providing safety training there. In 2012 WSG organized and taught one non-certified course for 155 Columbia River tribal fishermen. In 2012 three Makah fishermen survived a nighttime boat crash by sounding a mayday, donning survival suits, and deploying their raft – procedures they had learned in a WSG safety course just one month earlier. Since WSG began safety training on the Columbia River, there have been no deaths in that formerly high-fatality fishery. CRITFC credits this turnaround to WSG training together with more risk awareness and use of personal flotation devices.
- WSG workshops instill the expertise fishermen need to work on their own vessel systems, reducing their expenses and helping sustain an important state industry.
- WSG training gave seafood counter professionals the knowledge they need to maintain quality and safety, inform customers, and improve profitability, and also educated customers about seafood handling.
- WSG's Wild Seafood Exchange reaches out to new fishing communities, continues to bring fishermen and buyers together, and teaches fishermen how to market their catches directly.
- WSG training and business assistance helped tribal fishermen open new markets, upgrade their products, obtain higher catch prices, and create jobs.
- WSG's technical expertise, conferences, and outreach programs enhanced shellfish growers' capacity to increase their industry's production and sustainability.
- A larval sampling program supported by WSG enabled oyster growers in Washington's Willapa Bay to place clean shells at the optimal time for Pacific oyster settlement.
- A WSG-funded study provided Manilla clam growers extremely valuable information about the recruitment timing and post-settlement survival.
- WSG hosted the Third National Working Waterfronts and Waterways Symposium to further the national dialogue on promoting and preserving working waterfronts

Shores are inherently dynamic systems, impacted by processes coming from land and sea. Washington Sea Grant has developed an integrated program that examines current and future shoreline impacts around the state and makes them meaningful to the communities that use them.

- Monitoring the shoreline effects of the Elwha River dam removal, confirms replenishment of an eroded beach, and guides Lower Elwha Klallam's decision to conserve the natural shoreline rather than armor it.
- Washington Sea Grant designed and managed the de-armoring and restoration of a heavily impacted waterfront property on Bainbridge Island, including the conversion of adjacent lawn areas to native shrubs and trees that will absorb runoff, protect water quality, and provide shaded habitat. This is being used as a model for further shoreline restorations in the area.
- Clean Marina Washington certified one marina in 2012 and began the process for seven more; 62 marinas, harboring at least 15,000 boats, are currently certified, resulting in significantly fewer

hazardous and polluting discharges.

- For the past 10 years, WSG has also chaired the Pacific Oil Spill Prevention Education Team (POSPET), guiding the creation of an effective oil spill-prevention network and outreach program.
- A Washington Sea Grant-supported project has developed a new modeling system that forecasts cyclical and climate-driven changes in regional ocean conditions, including upwelling, circulation, wind, temperature, ecological conditions and detailed ocean biochemistry on seasonal time scales. The NWFSC is using the new biochemistry-forecasting system in integrated ecosystem assessments, and the research is informing the efforts of the state climatologist and efforts by local tribes to understand climate impacts.
- WSG staff perform shoreline assessments and review development proposals for a wide range of public and private parties. They also organize and conduct public presentations on shoreline planning and related issues. In 2012 WSG staff advised about 25 private waterfront owners, reviewed a Nature Conservancy proposal to restore intertidal habitat in the Port Susan estuary, and introduced 75 botanists and other members of the Washington Native Plant Society to marine riparian issues. Following WSG consultation, the Suquamish Tribe opted not to build a bulkhead, which provided a demonstration opportunity when WSG subsequently led representatives of local cities on a tour of the Suquamish site; this example has led to several other shoreline restoration projects.
- Washington Sea Grant is leading a project to measure bluff retreat along 28 miles of highly erosive shoreline in the Elwha-Dungeness drift cell, using a boat-based LiDaR (Light Detection and Ranging) system. This is one of the first applications of such a system supported by the U.S. Environmental Protection Agency, and the first such survey undertaken in Washington. The project team completed 10 miles of LiDaR surveying in 2012. The data it collects will support Clallam County's efforts to determine safe bluff setbacks for its master plan. The project will also offer a model for other coastal jurisdictions, and provide useful insights into the role that bluff erosion plays in maintaining coastal habitats.
- Washington Sea Grant-funded researchers surveyed paired beaches, one armored and one not, at 31 sites in Central and South Puget Sound. Investigators have already derived some important preliminary findings and found clear and striking differences between armored and unaltered shorelines. Armored beaches have significantly less riparian vegetation and beach wrack (which provides food and habitat for many invertebrates, which in turn support birds, juvenile salmon and other fishes). They also have fewer logs, which buffer storm effects.
- Update: Jaimie Mooney was hired to be the PMEL-WASG Liaison for tsunamis and coastal hazards in 2012, after working as a Marc Hershman Marine Policy Fellow in 2010 with a focus on Coastal Hazards and Coastal Community Resilience and then at the Washington Emergency Management Division. She is actively involved in the Sea Grant Climate Network leadership, representing the West Coast region.

## 9. Selected research accomplishments (2012)

### Geoduck Research Program

Washington Sea Grant-supported research investigates the ecological impacts of geoduck aquaculture - In 2007, the Washington Legislature enacted Second Substitute House Bill 2220 (Chapter 216, Laws of 2007) to commission studies assessing possible effects of geoduck aquaculture on the Puget Sound and Strait of Juan de Fuca environments. The bill called on Washington Sea Grant, based at the University of Washington (UW), to establish a six-year research program, reporting the results back to the Legislature by December 1, 2013.

- research found significant but transient effects from geoduck aquaculture on mobile marine animals and no significant effects on benthic communities. Growers and state resource managers will use these and previous study findings to site geoduck farms and determine best practices.
- research determined the effects of geoduck aquaculture on eelgrass meadows and associated fauna, providing data to set state and federal buffer zones.
- research identifies previously unreported geoduck pathogens, seasonal and geographic factors influencing them, and molecular diagnostic tools to screen for disease.

- *researchers completed sampling at cultured and reference beaches at three locations. They found that target fish abundance did not vary between the two types of sites, despite the greater habitat complexity of the cultured beaches, but fish appeared to grow faster on the cultured beaches than on the reference beaches. Fish did not move between cultured and uncultured plots. They consumed different types of prey in the two habitats, but their tissues were chemically similar, suggesting that food-web energy pathways remained similar in both despite some differences in prey chemistry. (Funded by NSGAI)*
- Update - December 2013 Final Report to Washington Legislature:  
<http://wsg.washington.edu/research/pdfs/reports/Geoduck-Final-Report-Dec2013.pdf>

Washington Sea Grant integrates research and outreach to enhance monitoring of harmful algal blooms.

- Aquaculture operations in Puget Sound are impacted by two harmful bloom-forming algae:
  - *Heterosigma akashiwo*, which affects farmed salmon and other finfish
  - *Alexandrium catenella*, which produces saxitoxins that accumulate in bivalves and other filter feeders, causing paralytic shellfish poisoning
- Traditional testing is expensive and time consuming
- Washington Sea Grant has supported multiple efforts to improve the situation:
- **SoundToxins** - partnering with NOAA, this program engages Puget Sound residents, tribal members and government staff in monitoring to provide early warning of HAB events.
  - WSG provides financial support
  - Ensures volunteer coordination and training
  - SoundToxins participants collect seawater samples from 24 sites around Puget Sound
  - WSG forwards them to a laboratory to be analyzed for toxin-producing algae
  - Washington State Department of Health (DOH) was able to prioritize its costly shellfish sampling, and cut sample numbers in half, from about 3,000 samples in past years to just 1,500 in 2012
  - SoundToxins data proved so reliable DOH could substantially reduce testing in areas where SoundToxins volunteers reported no observable HABs
- Continuous automated high-resolution, low-cost micro-imaging for on-site monitoring
  - WSG-supported research has developed and deployed technology that uses embedded computers with high-definition cameras to detect, quantify and characterize harmful algal cells
  - Imagers work autonomously
  - Either store data onboard or integrate into a sensor network that streams real-time data to an online server
  - In 2011 a prototype imager deployed at a Puget Sound fish farm detected *Heterosigma* cells in the water column and remotely streamed real-time cell counts over the Internet.
  - The image data matched traditional microscope counts at all algal concentrations from blooms to very low levels.
  - In 2012 researchers upgraded the profiler technology and built a second prototype that targeted *Alexandrium* cells when they emerged from the sediment.
  - In field tests, the imager distinguished chains of *Alexandrium* cells and measured their abundance and swimming velocities.
  - Costing less than \$500 and requiring only minimal power, the imager demonstrated novel capabilities for monitoring and predicting harmful blooms.
- Washington Sea Grant seed money spurred commercialization of technology for detection of seafood-related toxins, resulting in three patents, a new company, and a portable and affordable instrument.
  - Real time detection of shellfish-contaminating toxic algae would enable more effective closures of more limited duration
  - Equipment to perform such tests was bulky, expensive, and not practical

- In 1994, a Washington Sea Grant-supported research team began adaptation of surface plasmon resonance (SPR) optical biosensors for the rapid detection and identification of marine contaminants.
  - continuous nondestructive measurement of samples, relying on antibodies bound to a biosensor surface for detection of a specific toxin.
  - wide-ranging application to medical, environmental and national security issues, e.g. detecting faint traces of pesticides and weapons agents such as sarin gas, ricin and anthrax.
- Working with Texas Instruments, team reduced the system from the size of a large television to a lunchbox.
- Established Seattle Sensor Systems, which sells a portable SPR instrument today for \$35,000, less than a fifth the cost of original system
- In 2012, received the last of three patents for their portable and cartridge-based SPR sensing systems.

## 10. RFP process (2013)

2014-2016 Biennial Research Competition:

- Preproposals reviewed by Preliminary Proposal Review Panel
- Full Proposals
  - 3+ peer reviews
  - PIs have a chance to respond to comments
  - Scientific Review Panel sees reviews and comments, provides technical merit
  - Washington Sea Grant Advisory Committee reviews for societal relevance

West Coast Regional Social Science Panel:

They support Washington investigators associated with proposals submitted under a request for regional social science research proposals for California, Oregon, and Washington Sea Grants. All regional social science proposals had:

- three to four external mail peer reviews,
- a science panel review, and
- a combined evaluation by the four West Coast Sea Grant Directors and program personnel.

[Project Selection Criteria](#) - for all research and education projects, including PD:

*The best Sea Grant research projects combine scientific excellence and a focus on problems or opportunities of broad societal concern, such as resource management, public interest or industry application. Research projects are also judged on their scientific quality, the significance of their expected scientific contributions, and their national competitiveness.*

*The best Sea Grant education projects also focus on problems or opportunities of broad societal concern, such as resource management, public interest or industry application. Education projects must be innovative, objective and impartial and have potential as models or for long-term use. They require linkage of the information or programming to a strong science base and must consider the importance of the target audience and readiness of that audience to receive the information or programming.*

*All Sea Grant research and education projects are required to develop milestones and to meet several shared criteria:*

- *Importance of the marine resource/marine environmental need or opportunity that the project addresses;*

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- *Potential for societal impact or to make a significant contribution to resource conservation;*
- *Appropriateness as a university-sponsored activity;*
- *Interaction with other projects and activities and potential for leverage of funds; and*
- *Capabilities of project team.*

## WISCONSIN Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	ANDERS ANDREN
Extension	DAVID HART; FRED P. BINKOWSKI; JAMES HURLEY; PHILIP B.MOY; PHILIP MOY
Communication	JOHN KARL; KEITH MEVERDEN; MOIRA HARRINGTON
Education	ANDERS ANDREN; CAROLINE JOYCE; MARY LOU REEB

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	James Hurley
Extension	Philip Moy
Communication	John Broihahn; John Karl; Moira Harrington
Education	Cheryl Bauer-Armstrong; Richard Hall

Total funding (SG + Match + Pass Through) in 2012: **\$3,455,797**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$2,943,200**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	7	0	2.41
Communication	12	0.42	6.73
Extension	38	4.57	8.58
Education	5	0.1	0.39
Research	53	11.11	4.49

### 3. WI SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	8%	6%
Research (including Research Assistantships)	42%	44%
Extension	24%	29%
Communication	11%	17%
Education	4%	2%
PD	11%	3%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	44%	40%
SSSS / SFA	25%	20%
SCD / RCE	31%	30%
HRCC	0%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	10%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/HCE-12: Changing Benthic Metabolism in the Great Lakes (J. Val Klump)

R/HCE-13: Assessment of Beach Remediation Efforts at Select Lake Michigan Beaches (Gregory Kleinheinz)

R/HCE-14: An Ancient but Unrecognized Mechanism for Harvesting Light Energy in Great Lakes Bacterioplankton (Katherine McMahon)

R/HCE-15: A Tale of Two Beaches: Bridging the Research and Policy Gap to Improve Urban Beach Ecosystem Health (Sandra McLellan)

R/HCE-16: Role of Invasive Quagga Mussels in Regulating Organic Carbon Dynamics in Lake Michigan (Laodong

Guo)

R/HCE-17: Constructing a Lake Michigan Nearshore Ecosystem Model (Harvey Bootsma)

R/HCE-18: Integrating Prior Vegetation Surveys to Test Spatial and Temporal Patterns of Wetland Floristic Quality in the St. Louis River Estuary (Nicholas Danz)

R/HCE-19: Modeling the Chequamegon Bay Ecosystem to Facilitate Climate Adaptation (Randy Lehr)

R/HCE-20: Investigate the Proliferation of Antimicrobial Resistance in Lake Michigan Coastal Waters (Krassimira Hristova)

R/HCE-21: Measuring iodine-131 in Coastal Lake Michigan: A Point Source Tracer for Wastewater (James Waples)

R/HCE-22: The Basis for Microbially Mediated Mercury Methylation in Oxygen Depleted Zones of the Great Lakes (Katherine McMahon)

R/HCE-23: An In Situ Molecular Detection System for Microcystin Monitoring (Matthew Smith)

R/RCE-01: Estimating the Economic Benefits of the Wisconsin Great Lakes Sport Fishery (Daniel Phaneuf)

R/RCE-02: Development of Geo-Indicators for Assessment of Coastal Bluff Ecosystem in Lake Michigan for Regional Integrated Bluff Management (IBM) (Chin Wu)

R/SCD-06: Algal Bioremediation of Wastewater Inputs to Great Lakes Ecosystems (Erica Young)

R/SFA-08: Genetic Analysis of Virulence Factors of the Fish Pathogen *Flavobacterium Columnare* (Mark McBride)

R/SFA-09: Quantifying Coastal Wetland – Nearshore Linkages in Lake Michigan for Sustaining Sport Fishes (Patrick Forsythe)

## 6. Program metrics (2012)

Number of peer reviewed publications: **12**

Leveraged funds (managed): **\$ 219,552**

Leveraged funds (influenced): **\$**

Volunteer Hours: **3,761**

### Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	33	13	

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Masters	5	15	7
PhD	5	8	1
Other professional degree	0	0	0

Total K-12 students reached through educators: **3,105**

Curricula developed: **7**

Number of Cumulative Clean Marina Program – Certifications: **3**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **1,230**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **1,038**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	<b>1</b>
Businesses Retained	<b>53</b>
Economic Benefit	<b>22,244,000</b>
Jobs Created	<b>36</b>
Jobs Retained	<b>190</b>
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>4</b>
Number of hazard resiliency trainings	<b>4</b>
Number of coastal communities who have adopted/implement 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.	<b>70</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>17</b>

Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>2</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	<b>12</b>

## 8. Selected impacts (2012)

**PREVENTING INVASIVE SPECIES SPREAD BY ANGLERS.** Working with the other Great Lakes Sea Grant programs, the National Professional Anglers Association, the Masters Walleye Circuit, the Bass Federation and Wildlife Forever, WI targeted fishing tournaments and professional anglers as a vector in the spread of aquatic invasive species, as role models for other anglers when they spread AIS-fighting messages. They enlisted the help of organizers of fishing tournaments (including tournaments targeted to children) in an outreach campaign about to prevent AIS. Virtually all participants polled were aware of the campaign, and almost 90% had actually changed their behavior (16883).

**RESTORATION OF AN "AREA OF CONCERN".** The Lower Green Bay and Fox River Area of Concern includes an 18-county area that affects the work and recreation of 1.23 million people. Wisconsin Sea Grant prepared and disseminated a State of the Bay report that analyzes data and assesses the status of restoration targets for the area. The report results were incorporated into the Remedial Action Plan Update that has been submitted to the U.S. Environmental Protection Agency. The plan will guide future remediation efforts (16994).

**WHAT'S EATING THE PORTS OF DULUTH/SUPERIOR?** The Ports of Duluth, Minn., and Superior, Wis., have been plagued with accelerated structural corrosion on steel plates at a rate generally seen in saltwater environments, not freshwater, putting them at risk of needing to replace all the pilings and structures, which would cost over \$100M. Past monitoring and research by WI SG lead to recommended protection strategies. In 2012, WI's coastal engineering specialist used NOAA ShipTime support to assess the success of these protection measures, showing that the existing coating systems have indeed provided protection and mitigated the corrosion effects. The validated coating system is now being considered by other Wisconsin ports (16669).

## 9. Selected research accomplishments (2012)

**RESTORATION RESEARCH INCORPORATES THE EFFECTS OF INVASIVE SPECIES, CLIMATE.** The Sheboygan River estuary is another Area of Concern (AOC), in Wisconsin. WI SG researchers studied the effects of invasive species establishment (prolific filter-feeding Zebra and Quagga mussels) and climate patterns

(episodic storms, snowmelt discharge, Lake Michigan water level changes) to develop and validate hydrodynamic and biological models of the fate and transport of contaminated sediments (16709).

**WORKING WITH NOAA IN THE ST. LOUIS RIVER ESTUARY.** Relevance: The St. Louis River estuary is one of two Great Lakes sites in the National Estuary Research Reserve System (NERRS). Although it is the largest American river that flows into Lake Superior and has been an important transportation hub for many decades, the biogeochemical processes that support this system are relatively unknown. The area is designated as an Area of Concern that an EPA scientist estimated could reap economic benefits of \$341 million annually if remediated. An additional factor in this project was a record flood in the region. WI and MN SG researchers and NERR personnel have been establishing spatial and temporal patterns of nutrients in the water column, analyzing benthic denitrification, measuring primary production and assessing the impact of the June 2012 major flood on processes in estuary (16708).

## **10. RFP process (2013)**

Wisconsin's RFP covered all four focus areas, HCE, RCE, SFA and ELWD. For each focus area, about 6 or 8 research priorities were listed, which tightened the focus down to the Great Lakes, but were not so specific that the competition could be said to be targeting one or a few research issues.

Examples of priorities from the ELWD focus area:

Work with education partners to develop K-12 curricula that address the Great Lakes Literacy Principles and adhere to science and environmental education standards approved by the Wisconsin Department of Public Instruction.

Assess the applicability of new and traditional media tools—as well as innovative learning tools such as virtual globes or Augmented Reality Interactive Storytelling (ARIS) platforms—to reach relevant audiences, and apply those tools to build marine-science literacy.

The size of proposals could be up to \$120,000 per year, and applicants were not required to come up with their own matching funds.

Seventy four preproposals, 28 full proposals received, and 15 new projects selected for funding.

WI held a separate evaluation panel for social science projects. All their panels had active representation by their Advisory Board.

WI also participated in two joint RFPs: (1) a joint RFP with MN SG for economic or social science proposals addressing the Lake Superior Region, and (2) a joint RFP with IL-IN SG for research on changing Lake Michigan food webs.

## WHOI Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	JUDITH MCDOWELL
Extension	DIANE MURPHY; GREG BERMAN; GREGORY BERMAN; JEFFREY DONNELLY
Communication	JEFFREY BRODEUR; KATHERINE MADIN
Education	JUDITH MCDOWELL

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Judith E. McDowell
Extension	Diane Murphy; Greg Berman; Jeffrey Brodeur
Communication	
Education	Kathy Patterson; Laela Sayigh; M. Carla Curran

Total funding (SG + Match + Pass Through) in 2012: **\$1,792,834**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$1,777,532**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	4	0.25	0.75
Communication	3	0.87	0.63
Extension	4	2	2
Education	1	0.33	0.67
Research	30	3.42	1.7

### 3. WHOI SG Distribution of effort by functional area

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management	0%	0%
Research (including Research Assistantships)	57%	59%
Extension	23%	38%
Communication	19%	0%
Education	0%	1%
PD	1%	1%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	24%	25%
SSSS / SFA	34%	25%
SCD / RCE	14%	25%
HRCC	8%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	25%
other	20%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

R/M-63-14: Shifts in greenhouse gas emissions and productivity of coastal wetlands in response to anthropogenic N loading and rising sea level (Serena Moseman-Valtierra)

R/M-64-14: Examining Significant Changes to the Nitrogen Cycle in Waquoit Bay (R.W. Fulweiler)

R/M-64-15: Examining Significant Changes to the Nitrogen Cycle in Waquoit Bay (R.W. Fulweiler)

R/M-65-14: The Impacts on Increased Nitrogen Loadings on Decomposition in Salt Marshes: Does Eutrophication Enhance Marsh Accretion or Erosion? (Anne Giblin)

R/M-65-15: The Impacts on Increased Nitrogen Loadings on Decomposition in Salt Marshes: Does

Eutrophication Enhance Marsh Accretion or Erosion? (Anne Giblin)

R/M-66-14: Nitrogen Pollution and Recovery from Nitrogen Pollution in a Seagrass-Dominated Estuary: A Whole Ecosystem Experiment (Robert W. Howarth)

R/M-66-15: Nitrogen Pollution and Recovery from Nitrogen Pollution in a Seagrass-Dominated Estuary: A Whole Ecosystem Experiment (Robert W. Howarth)

R/M-66-16: Nitrogen Pollution and Recovery from Nitrogen Pollution in a Seagrass-Dominated Estuary: A Whole Ecosystem Experiment (Robert W. Howarth)

R/M-67-14: Behavioral Responses of Competent Larval Oysters (*Crassostrea virginica*) to Chemical Settlement Cues in Turbulent Flow (Jeanette Wheeler)

R/M-67-15: Behavioral Responses of Competent Larval Oysters (*Crassostrea virginica*) to Chemical Settlement Cues in Turbulent Flow (Jeanette Wheeler)

R/NERR-1-WH-14: Coastal Hazards and Northeast Housing Values: Comparative Implications for climate Change Adaptation and Community Resilience (Robert J. Johnston)

R/O-48-14: Reconciling Distributional Patterns With Foraging Processes in an Ecological Hotspot: Aggregation of Humpback Whales, Prey Abundance and the Distribution, and Shoaling of Non-Linear Internal Waves (Jesus Pineda)

R/O-49-15: Development of an Automatic Mass Stranding Alert System (Laela Sayigh)

R/O-49-16: Development of an Automatic Mass Stranding Alert System (Laela Sayigh)

R/O-50-15: "Rust Tides" of the Toxic Dinoflagellate *Cochlodinium polykrikoides* in Buzzards Bay (Jefferson Turner)

R/O-50-16: "Rust Tides" of the Toxic Dinoflagellate *Cochlodinium polykrikoides* in Buzzards Bay (Jefferson Turner)

R/O-51-14: Modeling Shoreline Morphological Evolution (Steve Elgar)

R/O-51-15: Modeling Shoreline Morphological Evolution (Steve Elgar)

R/P-80-14: Molecular Risk Assessment in Wildlife Using a Non-Destructive Assay (Sibel Karchner)

R/P-80-15: Molecular Risk Assessment in Wildlife Using a Non-Destructive Assay (Sibel Karchner)

R/P-NERR-1-WH-15: Coastal Hazards and Northeast Housing Values: Comparative Implications for climate Change Adaptation and Community Resilience (Robert J. Johnston)

R/P-NERR-2-WH-14: Buy Out or Build Back? A Comparative Assessment of Approaches to Employing Public Funding to Vulnerable Coastal Properties in the Northeastern United States (Porter Hoagland)

R/P-NERR-2-WH-15: Buy Out or Build Back? A Comparative Assessment of Approaches to Employing Public

Funding to Vulnerable Coastal Properties in the Northeastern United States (Porter Hoagland)

## 6. Program metrics (2012)

Number of peer reviewed publications: **1**

Leveraged funds (managed): \$

Leveraged funds (influenced): \$

Volunteer Hours: **1,680**

### Student support

	New Students	Continuing Students	Degrees Awarded
Undergraduate	4	0	0
Masters	8	1	0
PhD	1	1	1
Other professional degree	0	0	0

Total K-12 students reached through educators: **4,050**

Curricula developed:

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities: **28**

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities: **420**

## 7. Program performance measures (2012)

Measure	Actual
Businesses Created	
Businesses Retained	
Economic Benefit	<b>2,630,682</b>
Jobs Created	

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Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	<b>14</b>
Number of hazard resiliency trainings	<b>27</b>
Number of coastal communities who have adopted/implement 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.	<b>17</b>
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	<b>8</b>
Number of fishers who adopt and implement responsible harvesting techniques and practices.	<b>300</b>
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	<b>18,000</b>
Patents	
Tool Used by Stakeholders	<b>8</b>

## 8. Selected impacts (2012)

Sea Grant Extension continues supporting SE Massachusetts Counties (Barnstable and Dukes) in informing critical management decisions in the coastal zone; \$79 million worth of property impacted.

Massachusetts is a “home-rule” state, with local town officials often being the first and last permitting agency for projects within 100’ of the coastline. Many officials lack the background to deal with projects impacting coastal processes, and each year dozens of coastal dunes and coastal banks are threatened by projects that could degrade their functions.

To address this concern, WHSG and CCCE’s Coastal Process Specialist sits on multiple regional associations and addresses hundreds of individuals each year through presentations. In addition, in 2012 he provided technical analyses to local boards and commissions on 22 proposed projects (assessed valuation of \$79 million) located on or adjacent to coastal landforms.

### Water quality data acquisition system

Water quality is of paramount importance to the region, especially as it relates to water bodies which support aquaculture. Five water quality monitors--in Wellfleet, Orleans, Barnstable, Cotuit and a shellfish grower’s property--are documenting site conditions for a wide variety of uses. The YSI units are deployed adjacent to large-scale aquaculture zones, and provide data used to correlate with growing conditions, timing of oyster

overwinter removal/deployments, disease and fouling events, etc.

Much of this effort has been taking place since 2001, and over 200 shellfish farmers now benefit from this information. In 2012, data collection continued at the standard sites and one unit was redeployed closer to an area experiencing unexplained hard clam mortalities for >25 growers. This in-situ placement was critical in documenting site conditions that may influence clam health, disease status and subsequent clam mortalities. Two of the sites provide real-time data relayed to a website. YSI water temperature data are used by State regulatory agencies to address public health concerns, and the suite of measurements is being used in Wellfleet to help analyze water quality improvement projects.

#### Management of Shellfish Diseases

Numerous diseases affect shellfish in this region. Though these diseases do not affect humans, they pose a significant hurdle to shellfish farmers and to sustainable management of the public shellfisheries. WHSG/CCCE is working with growers, resource managers and scientists to develop reasonable protocols for movement of shellfish as well as improved culture methods to reduce losses.

An ongoing, disease monitoring program was initiated in 2010 to better gauge the prevalence and intensity of occurring diseases. Initial disease testing in 2010 identified two diseases as leading causes of hard clam mortalities in a large aquaculture zone; this area continues to be examined through 2013. Neoplastic disease was revealed to be a significant factor and this information was shared with 50+ shellfish growers and presented at several meetings (>50 audience). The disease monitoring program was expanded in 2012 to include surveillance of disease in both wild and cultured stocks of oysters in nine towns, including 25 sites throughout the region. This information helped town shellfish officers and growers plan for future planting and farm practices aimed at reducing future disease impacts.

## 9. Selected research accomplishments (2012)

### **Giardia and Cryptosporidium in Cape Cod Seals and their flounder prey: Issues of fish, seal, fishermen and consumer health**

The objective of this research project is to better understand the ecology of the zoonotic parasites Giardia and Cryptosporidium in marine vertebrates, and the potential human health risk associated with them. To accomplish this the researchers are determining the prevalence of the enteric parasites, Giardia and Cryptosporidium, in local seal populations their fish prey, shellfish, water and sediment and determining the potential for transmission between marine animals and humans by examining the genetic types present, their prevalence in the population, and their persistence over time.

Our prior data regarding Giardia and Cryptosporidium in seals has been useful for determining the overall prevalence of the organisms. We collected more seal feces and environmental samples in late 2012 from haul-out areas near Truro and Jeremy Point. This fall we will also requested fish samples from the NMFS surveys to help expand our seal prey survey.

All of the collected samples have been processed and amplified for the *gdh* genes of Giardia. The previous

flounder samples have been amplified for the oocyst wall protein gene of *Cryptosporidium* and the *tpi* gene for *Giardia*. We are in the process of completing amplification of the environmental and seal samples for *tpi* and COWP. Positive reaction products have been collected and will be sent for sequencing. Products from the previous flounder sample have already been sequenced, and confirm the identification of the products as the correct targets.

### **Modeling as a tool to better understand bay scallop recruitment and to manage bay scallop populations**

Bay scallops constitute a major resource for the fishing economy of southeastern Massachusetts. However, the value of this resource varies significantly from year to year, particularly in local embayments where yearly harvests may differ by an order of magnitude. Such variations have led to efforts to enhance scallop populations in specific embayments through seeding, but these have met with varying degrees of success. Regulators would clearly benefit from understanding the factors that influence juvenile scallop recruitment, and development of a system to predict the impact of management decisions on scallop populations.

A physical-biological model, aimed at examining the transport of larval scallops from spawning grounds to suitable juvenile habitat, has been developed. The PIs used the model to determine the patterns of successful larval transport to suitable juvenile habitat, and to identify those factors that are of primary importance in influencing this transport.

Model results have indicated that the circulation of Buzzards Bay during the time of scallop larval spawning and settlement is dominated by the effects of the predominantly northeastward sea breeze. Connectivity matrices indicate a strong tendency for self-recruitment within most coastal areas, especially those where the spawning and settlement zone significantly overlap. The matrices further indicate a relatively large probability of transport from mid-bay spawning areas to settlement zones in the upper-bay, carried by the sea breeze-driven circulation described above.

## **10. RFP process (2013)**

- Individuals or groups within the scientific community initiate the development of the research program. The WHOI SG proposal solicitation process was initiated in early January 2013 with the mailing of a general announcement and call for pre-proposals to all colleges and universities, all non-profit marine research institutions, and other non-profit groups in the Commonwealth of Massachusetts. Also posted elsewhere.
- Coordinated with all of the Northeast Sea Grant Programs to encourage regional collaboration.
- A general information meeting on the application process was held during early February.
- The Woods Hole Sea Grant Office received fifty-eight pre-proposals. A panel of technical and extension specialists reviewed all pre-proposals. Judged for appropriateness of individual pre-proposals for Sea Grant support, as well as potential opportunities for matching funds, opportunities for students, outreach aspects of individual projects, and potential linkages between different projects and principal investigators.
- Twenty-four pre-proposals were recommended for further consideration and twenty-four full proposals were received.
- Each full proposal was sent to 3-5 external reviewers for evaluation. Principal investigators were asked to provide

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responses to reviewers' comments and suggestions, but were not allowed to alter the proposal.

- A Proposal Review Panel determined the final selection of proposals and nine of the 24 were recommended for inclusion in the 2014-2017 Omnibus.
- Research projects under four categories: (1) Health Coastal Ecosystems; (2) Sustainable Fisheries and Aquaculture; (3) Resilient Coastal Economies; and (4) Environmental Literacy and Workforce Development.
- The Northeast Sea Grant Consortium (NESGC) received thirty pre-proposals and nine full proposals responding to this regional RFP and two regional projects were selected to be included in the Woods Hole Sea Grant Omnibus Proposal.

## NATIONAL SEA GRANT LAW CENTER at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Stephanie Showalter-Otts
Extension	N/A
Communication	N/A
Education	FRALEY, JILL M.; HARTLEY, TROY W.; ROWE, PETER M.

PIs in 2014 omnibus proposal

<b>FUNCTION</b>	<b>PIs of PROJECTS</b>
Management	Stephanie Showalter-Otts
Extension	N/A
Communication	N/A
Education	N/A

Total funding (SG + Match + Pass Through) in 2012: **\$406,142**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$375,000**

### 2. Staffing (2012)

<b>Sea Grant Staffing</b>	<b>No. of individuals</b>	<b>SG FTEs</b>	<b>Match/other FTEs</b>
Administrative	2	1.4	0.3
Communication	1	0.75	
Extension	1	1	
Education	N/A	N/A	N/A
Research	N/A	N/A	N/A

### 3. Distribution of effort by functional area

Functional Area	In 2012	Proposed for 2014-17 (from omnibus)
Management	95%	100%
Research	0%	0%
Extension	0%	0%
Communication	0%	0%
Education	5%	0%
Placeholder		0%

### 4. Distribution of effort by focus area

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	26%	25%
SSSS / SFA	23%	25%
SCD / RCE	23%	40%
HRCC	29%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	10%
other	0%	

### 5. Upcoming Research Projects (from 2014 omnibus proposal)

N/A

### 6. Program metrics (2012)

Number of peer reviewed publications: **4**

Leveraged funds (managed): **\$ 23,000**

Leveraged funds (influenced): **\$**

Volunteer Hours:

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Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	0	0	0
Masters	0	0	0
PhD	0	0	0
Other professional degree	2	1	1

Total K-12 students reached through educators:

Curricula developed:

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

<b>Measure</b>	<b>Actual</b>
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement sustainable - economic and environmental - development practices and policies (e.g., land-use planning, working waterfronts, energy efficiency, climate change planning,	<b>1</b>

smart growth measures, green infrastructure) as a result of Sea Grant activities.	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	

## 8. Selected impacts (2012)

1. National Sea Grant Law Center workshop on the legal and regulatory framework governing boat movements in the West leads to regulatory reform. (HCE)

- One of the primary pathways for continued spread of quagga and zebra mussels throughout the West is the movement of trailered watercraft.
- The legal authorities to stop watercraft for inspection, query watercraft operators, or quarantine watercraft vary with each state’s unique set of laws.
- Perceived legal barriers and inconsistencies in approaches across jurisdictions limit enforcement of existing state and federal laws.
- The National Sea Grant Law Center, the National Association of Attorneys General, Oregon Sea Grant, and the Western Regional Panel on Aquatic Invasive Species partnered to host a co-learning workshop for Assistant Attorneys General, natural resource agency attorneys, law enforcement supervisors and the AIS coordinators in the 19 Western States and their federal natural resource agency partners.
- Background papers were drafted for workshop attendees, which were further developed into five articles published in the Arizona Journal of Environmental Law and Policy.
- As the result of discussions between attorneys general, law enforcement, and AIS coordinators initiated during the workshop and continuing to date, Oregon amended its administrative rules (OR. ADMIN. R. 635-056-0050) to prohibit the possession and transport of both live or dead dreissenid mussels.
  - Oregon had previously only prohibited the possession and transport of “live” mussels.
  - Viability standards, such as Oregon’s, were a major focus of workshop discussions due to the significant enforcement challenges they raise (e.g., how can a boat inspector know whether a mussel is “alive”?).
  - Oregon’s rule change eliminated a legal barrier to enforcement of the state’s dreissenid mussel laws and made its administrative rules more consistent with majority of western states.
- Updates since this was submitted:
  - <http://seagrant.noaa.gov/News/FeatureStories/TabId/268/ArtMID/715/ArticleID/176/Law-Center-Leads-Efforts-to-Draft-Model-Law-Addressing-Aquatic-Invasive-Species-in-Western-States.aspx>

## 9. Selected research accomplishments (2012)

1. National Sea Grant Law Center research on financing challenges associated with heirs' property in Virginia leads to legal reform to reduce barriers to septic tank repair financing which will lead to increase participation in the loan program and future water quality improvements in Chesapeake Bay. (HCE)

- An inability to document clear title to their property has prevented some homeowners in Virginia from participating in the Middle Peninsula Planning District Commission's Revolving Loan and Grant Program for onsite septic repair.
- The Middle Peninsula Planning District Commission commissioned a white paper from the National Sea Grant Law Center to assist the MPPDC in its efforts to address failing septic systems associated with heirs' property.
- The research was funded by a grant the MPPDC received from the Virginia Coastal Zone Management Program.
- The NSGLC's report, [Failing Septic Systems and Heirs' Property: Financial Lending Challenges and Possible Solutions](#), provided information on the legal challenges associated with heirs' property ownership and steps that the MPPDC can take to help heirs' property homeowners obtain septic tank repair financing.
- Recognizing that formally clearing title may not be an option for all homeowners as it is a time-consuming and expensive legal process, the NSGLC's report recommended the MPPDC consider modifying their onsite septic repair loan program to a property tax assessed financing program modeled after Virginia's Property Assessed Clean Energy (PACE) Program, which would reduce some of the documentation burdens on homeowners.
- Because Virginia is a "Dillon Rule" state, legislative authorization needed to be obtained before local governments could impose a special assessment for septic tank improvements.
- On February 21, 2013, the Virginia Legislature enacted H.B. 1448 authorizing local governments to create loan programs to enable to repair of property owners' failed septic tanks and providing for the repayment of the loan through water or sewer billings, real property tax assessments, or other billings.
- To address the heirs' property situations, the legislation permits a local government to set a minimum ownership interest or minimum level of proof of ownership when it is difficult or impossible to identify all the individuals having an ownership interest in the property.

## 10. Advisory Requests

### Active:

- The **NOAA Aquaculture Office** requested in an investigation into the permitting process for unmanaged finfish species in US federal waters. A couple of years ago, the NSGLC researched a similar question related to offshore mussel aquaculture.
- An **Oregon Sea Grant** extension agent requested information on issues associated with fishermen conducting scientific research from vessels previously used for commercial purposes.
- A **Minnesota Sea Grant** extension agent requested a memo on the current state of ballast water permitting and legal issues created as a request of the lack of approved technology.

### Recently Completed:

- A **Michigan Sea Grant educator** requested an analysis of liability associated with the installation of beach safety kits with rescue equipment at Michigan Department of Natural Resources-managed public beaches.

(NSGLC-14-04-01).

Completed in 2013:

- **NOAA's Office of Ocean & Coastal Resource Management** requested information on the effect of Hurricane Sandy on coastal property lines in New Jersey. Hurricanes often result in the sudden and perceptible loss of or addition to land by the action of the water, or "avulsion." (NSGLC-13-04-01).
- A **Maine Sea Grant** extension agent requested an analysis of whether the developers of tidal projects in Maine must obtain an easement from the waterfront property owners for the changes to the tide (time, duration, and/or level of high tide). (NSGLC-13-04-02).
- The **Accomack-Northampton Planning District Commission** (Virginia) sought information on the repurposing of existing piling foundations that once supported hunting blinds for camping platforms. (NSGLC-13-04-03).
- To gain an understanding of existing programs that could serve as models for a Living Shoreline Revolving Fund in Virginia, the **Middle Peninsula Planning District Commission** (Virginia) partnered with the NSGLC to review national and state examples of revolving loan fund programs to promote living shorelines or similar coastal erosion control methods. The NSGLC's report, "Incentivizing the Use of Living Shorelines in Virginia Through a Revolving Loan Fund," examined four federally funded revolving loan funds; seven state-funded programs, including four in the state of Virginia; and two non-governmental programs. (NSGLC-13-04-04).
- A **South Carolina Sea Grant** extension agent requested information on the current state of the law with respect to the commercial use of residential docks along small tidal creeks in Beaufort County, SC. (NSGLC-13-04-05).
- The **Extension Disaster Education Network (EDEN)** requested an article on local governments and hazard mitigation planning for its eXtension website. Available at <http://www.extension.org/pages/70031/local-governments-and-hazard-mitigation-planning#.Uu-nufa9pEI>. (NSGLC-13-04-06).
- A **Maryland Sea Grant extension agent** requested information on how Maryland approaches liability for stormwater runoff, specifically channeling runoff from a public park and road onto private property. (NSGLC-13-04-07).

## GUAM Sea Grant at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	
Extension	DR. LAURA BIGGS; LAURA BIGGS
Communication	
Education	

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	
Extension	
Communication	
Education	

Total funding (SG + Match + Pass Through) in 2012: \$

Average yearly funding (SG + Match) requested in 2014 omnibus: \$

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	0.7		0.7
Communication	2	0.25	0.25
Extension	0.5	0.5	0
Education	0.5	0.5	0
Research	0.25		0.25

**3. GU SG Distribution of effort by functional area**

Functional Area	In 2012 (from PIER, core+climate)	Proposed 2014 (from omnibus)
Management		2%
Research (including Research Assistantships)		0%
Extension		39%
Communication		9%
Education		51%
PD		0%

**4. Distribution of effort by focus area**

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	0%	
SSSS / SFA	0%	
SCD / RCE	0%	
HRCC	0%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	
other	0%	

**5. Upcoming Research Projects (from 2014 omnibus proposal)****6. Program metrics (2012)**

Number of peer reviewed publications:

Leveraged funds (managed): **\$ 189,950**

Leveraged funds (influenced): **\$**

Volunteer Hours: **300**

Student support

SEA GRANT AT A GLANCE – February 2014

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	0	0	0
Masters	0	0	0
PhD	0	0	0
Other professional degree	0	0	0

Total K-12 students reached through educators: **3,275**

Curricula developed: **4**

Number of Cumulative Clean Marina Program – Certifications: **0**

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

<b>Measure</b>	<b>Actual</b>
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement 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.	

Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	

## 8. Selected impacts (2012)

None

## 9. Selected outreach accomplishments (2012)

### **Palau Ridge to Reef Campaign elicits government support and statewide awareness of marine issues.**

The Republic of Palau is the westernmost island group of the Micronesia sub-region of the Pacific Islands region, made up of more than 580 islands of which eight are home to resident human communities. The project site, Babeldaob Island, is the largest island with total land area of 409 km<sup>2</sup>. Babeldaob contains the largest contiguous forest, largest freshwater lake (a Ramsar site), and richest biological and ecological diversity in the region of Micronesia. Establishing a relationship with conservation entities in Palau is essential to the ultimate goal of becoming a Sea Grant Institution and the regional success of UOGSG.

In the fall of 2010, UOGSG visited with seven public and private sector entities in Palau to establish a Palau Sea Grant Advisory Board. The advisory board reviewed ongoing efforts, established priorities, and decided on a regional action plan. The efforts would be targeted at expanding an existing 5th grade Ridge to Reef curriculum to K-8 and integrating watershed restoration projects that supported the Ridge to Reef theme.

UOGSG provided financial support for supplies, teacher stipends, and Palau Conservation Society (PCS) staff efforts. This has kindled conservation consciousness with a special focus on the protection of sea cucumbers, a species of concern due to overexploitation. Although the amount of funds was small, they made an impact in Palau classrooms and communities. Teachers were able to extend their curriculum to include actual applications of best management practices and community outreach within their respective communities. The student knowledge and understanding were greatly improved as they contributed to their communities' resource management and conservation efforts.

### **Education partnerships increase Guam-centric curriculum and teaching in public schools**

There is a significant lack of locally trained students making their way through K-12 and skilled enough to eventually occupy STEM field faculty positions at the University of Guam. Public school curriculum, particularly

at the elementary level, does not afford many opportunities to teach content that is relevant to the region or its unique ecosystems. Many students consequently enter middle school and high school without a strong foundation of STEM content. Overall, elementary aged children (100%) are scoring below the 50th percentile on standardized test (SAT-10). GDOE teachers seek professional development opportunities that will enable them to diversify their toolkits and bring inquiry-based learning STEM content into their classrooms.

UOGSG partners with GDOE and Western Pacific Coral Reef Institute (WPCRI) to develop curriculum and support training opportunities for GDOE teachers. Funding was provided for a curriculum specialist to assist in curriculum development. A two-day professional development workshop for 100 GDOE elementary school teachers that focused on STEM methods and content entitled 'Navigating Environmental Literacy Symposium' was held. Content focused on marine resources, specifically, Marianas island ecology, sea floor mapping, and charting. UOGSG staff provided toolkits for teachers that included basic instructional supplies, curriculum guides, Mariana Island Cards, supplies for mapping activities, videos, etc.

Teachers reported using the materials in their classrooms in the '12-'13 academic year and were able to increase the amount of locally relevant content that was taught in their classrooms as a result. This symposium is one in a series that UOGSG plans to conduct as well as overlay longitudinal analysis to better understand impacts in classroom learning and teaching.

## **10. RFP process (2013)**

None. The Guam Sea Grant Program does not have a competed research portfolio.

## NATIONAL SEA GRANT LIBRARY at a glance

### 1. Management, Extension, Communication, and Education project PIs

PIs of 2012 projects

FUNCTION	PIs of PROJECTS
Management	Cynthia Murray
Extension	
Communication	
Education	

PIs in 2014 omnibus proposal

FUNCTION	PIs of PROJECTS
Management	Cynthia Murray
Extension	
Communication	
Education	

Total funding (SG + Match + Pass Through) in 2012: **\$ 235,000.00**

Average yearly funding (SG + Match) requested in 2014 omnibus: **\$ 235,000.00**

### 2. Staffing (2012)

Sea Grant Staffing	No. of individuals	SG FTEs	Match/other FTEs
Administrative	2	2.0	
Communication			
Extension			
Education			
Research			

**3. Distribution of effort by functional area**

Functional Area	In 2012	Proposed for 2014-17 (from omnibus)
Management	100%	100%
Research	0%	0%
Extension	0%	0%
Communication	0%	0%
Education	0%	0%
Placeholder		0%

**4. Distribution of effort by focus area**

Focus Area	In 2012	Planned for 2014-17 (from strategic plan)
HCE	0%	0%
SSSS / SFA	0%	0%
SCD / RCE	0%	0%
HRCC	0%	- merged to RCE in 2014 plan -
ELWD	- not in 2012 plan -	0%
other	0%	

**5. Upcoming Research Projects (from 2014 omnibus proposal)**

N/A

**6. Program metrics (2012)**

Number of peer reviewed publications: 459 (received)

Leveraged funds (managed): \$

Leveraged funds (influenced): \$

Volunteer Hours:

SEA GRANT AT A GLANCE – February 2014

Student support

	<b>New Students</b>	<b>Continuing Students</b>	<b>Degrees Awarded</b>
Undergraduate	0	0	0
Masters	0	0	0
PhD	0	0	0
Other professional degree	0	0	0

Total K-12 students reached through educators:

Curricula developed:

Number of Cumulative Clean Marina Program – Certifications:

Number of HACCP -- Number of people with new certifications:

Number of Acres of degraded ecosystems restored as a result of Sea Grant activities:

Number of Resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities:

## 7. Program performance measures (2012)

<b>Measure</b>	<b>Actual</b>
Businesses Created	
Businesses Retained	
Economic Benefit	
Jobs Created	
Jobs Retained	
Number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	
Number of hazard resiliency trainings	
Number of coastal communities who have adopted/implement 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.	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	
Number of fishers who adopt and implement responsible harvesting techniques and practices.	
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	
Patents	
Tool Used by Stakeholders	

## 8. Selected impacts (2012)

The NSGL houses the only complete collection of Sea Grant works which now includes 45,431 titles. This collection represents a wealth of information covering just about every discipline of marine science, including oceanography, fisheries, aquaculture, marine education, coastal zone management, marine recreation and law.

- During the past 12 months, the NSGL acquired 1,719 new Sea Grant titles,
- The NSGL also continued to collect pre-existing electronic documents and now almost 24,000 documents are electronically archived, with the majority digitally available
- Library staff answered 523 requests for information
  - Requests included hard-copy loans, literature searches, and miscellaneous reference questions.
- Over 929,000 digital Sea Grant documents were downloaded from the NSGL server.

The NSGL recently purchased a new library system and the NSGL catalog should be available for online searching soon. The software has already been installed and the existing database records are currently being migrated to the new system.

NSGL sends bibliographic data files quarterly to NISC for incorporation of new Sea Grant titles into their respective databases. NISC (National Information Services Corporation) is an exclusive combination of the world's premier bibliographic databases on marine, oceanographic and related freshwater resources and is one of the world's major oceanic resources for marine science professionals.

For the fourth consecutive year the NSGL was included in the Ranking Web of World Repositories <<http://repositories.webometrics.info/>>, which measures global visibility and impact of scientific repositories with the aim of supporting Open Access initiatives and free access to scientific publications. The NSGL is currently in the top 100 of all US and North American repositories and the top 23% of all repositories worldwide that meet their parameters.

## 9. Selected research impacts (2012)

N/A

**10. RFP process (2013)**

N/A