

COASTAL SERVICES

VOLUME 15, ISSUE 3 • JULY/AUGUST 2012

LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

TRADE-OFF ANALYSIS: HOW NEW TOOLS MAY HELP BALANCE TRADE- OFFS FOR OCEAN USERS

**ACCESSING INFORMATION ON TSUNAMI
ZONES IN OREGON AND WASHINGTON
TO HELP RESIDENTS BETTER PREPARE**

**THE BIG BUSINESS OF ECOTOURISM
ALONG ALABAMA'S BIRDING TRAIL**

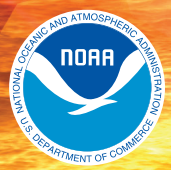


TABLE OF CONTENTS

- 1 FROM THE DIRECTOR
.....
- 2 TRADE-OFF ANALYSIS:
NEW TOOLS MAY HELP BALANCE
TRADE-OFFS FOR OCEAN USERS
.....
- 6 PROVIDING ACCESS TO
INFORMATION ON TSUNAMI ZONES
IN OREGON AND WASHINGTON
.....
- 8 ECOTOURISM THRIVES ALONG
ALABAMA'S COASTAL BIRDING TRAIL
.....
- 10 LEARNING STEWARDSHIP IN NEW YORK
BY HELPING WITH WETLAND LOSS IN
LOUISIANA
.....
- 12 NEWS YOU CAN USE
.....
- 13 END NOTE
.....



Volume 15 | Issue 3 | July/August | 2012
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

National Oceanic and Atmospheric Administration

U.S. Secretary of Commerce

Rebecca M. Blank, acting

Under Secretary of Commerce for Oceans and Atmosphere and Administrator, National Oceanic and Atmospheric Administration (NOAA)

Dr. Jane Lubchenco

Assistant Administrator for Ocean Services and Coastal Zone Management, National Ocean Service

David M. Kennedy

NOAA Coastal Services Center

Acting Director: Jeff Payne

Acting Deputy Director: Nicholas Schmidt

COASTAL GEOSPATIAL SERVICES

Acting Division Chief: Hamilton Smillie

INTEGRATED INFORMATION SERVICES

Division Chief: Tony LaVoi

MANAGEMENT AND BUDGET

Division Chief: Paul Scholz

REGIONAL COASTAL SERVICES

Division Chief: Rebecca Smyth

COASTAL MANAGEMENT SERVICES

Division Chief: Ginger Hinchcliff

Communications Director: Donna McCaskill

Magazine Writer and Editor: Hanna Goss

Contributing Writer: Kitty Fahey

Copy Editor: Gerald Esch

Designer: Frank Ruopoli

Back issues of *Coastal Services* can be viewed at
www.csc.noaa.gov/magazine

To subscribe to *Coastal Services*, go to
www.csc.noaa.gov/magazine/subscribe.html

To suggest content for *Coastal Services*, contact Hanna Goss at
(828) 246-0958 or Hanna.Goss@noaa.gov

For information about the NOAA Coastal Services Center:

Phone: (843) 740-1200

Internet: www.csc.noaa.gov

Twitter: [@coastalservice](https://twitter.com/coastalservice)

Facebook: www.facebook.com/NOAACoastalServices

Coastal Services is produced bimonthly as a trade journal for coastal resource managers. Editorial content is unofficial and not authority for action. Views and opinions expressed may not reflect those of the Department of Commerce or NOAA. The mission of the NOAA Coastal Services Center is to support the environmental, social, and economic well being of the coast by linking people, information, and technology.

FROM THE DIRECTOR

Offshore wind farms, liquefied natural gas pipelines, fiber-optic cables, desalination plants, aquaculture, commercial fishermen, and others all require the use of the ocean. As a result, coastal resource managers have to make decisions that take into account natural resource, ecological, and economic trade-offs in order to reduce conflicts and optimize marine management.

Many coastal managers are interested in ways to better understand, visualize, and communicate with stakeholders about trade-offs in ocean management. The cover story of this edition of *Coastal Services* looks at new tools being developed for this purpose in Massachusetts.

These tools—two of many being developed around the country—could help analyze the trade-offs required for multiple ocean users and aid coastal managers with decision-making for all ocean-based services.

While under the best of circumstances these types of tools can't tell resource managers what decisions they should make, they may assist managers in designing and conducting the stakeholder process and leading talks that clearly communicate trade-offs.

Also in this edition of *Coastal Services*, our writers look at a new regional tsunami portal for the Pacific Northwest that displays coastal evacuation zones and allows users to search by street address to determine if they're in an inundation zone. The portal can also be accessed by free smartphone apps for the iPhone and Android, making it easy for users to plan ahead to evacuate in the event of a distant tsunami.

Articles in this edition also look at an Alabama birding trail that is showing how local business interests, scientists, and wildlife organizations can partner to promote healthy ecosystems while stimulating the tourism industry, and how the *Deepwater Horizon*/BP oil spill inspired a stewardship program for New York educators focused on wetland loss and restoration.

We are continuing to move forward with the integration of NOAA's Office of Ocean and Coastal Resource Management and the Coastal Services Center. One visible way we are managing (and learning) together is through implementing the Regional Ocean Partnership Funding Program grants through a collaborative approach.

More exciting news on the integration will be coming in the months ahead. ❖

Jeff Payne, Acting Director



TRADE-OFF ANALYSIS:

New Tools May Help Balance Trade-offs for Ocean Users

“These tools won’t give resource managers the answers or tell them what decision they should make, but they should assist managers in designing and conducting the stakeholder process and leading talks that more meaningfully and concretely include trade-offs.”

Stephanie Moura, SeaPlan

New tools to help analyze the trade-offs required for multiple ocean users are being developed in Massachusetts with the hopes that they will aid coastal resource managers with making decisions for offshore wind energy siting and other ocean-based services.

“During our work in Massachusetts, coastal managers showed interest in developing tools to better understand, visualize, and communicate with stakeholders about trade-offs in ocean management,” says Stephanie Moura, executive director of SeaPlan, a private nonprofit that is leading the development of the tools.

In 2010, the commonwealth of Massachusetts released the nation’s first comprehensive ocean management plan that provided new protections for critical environmental resources while setting aside approved areas and creating standards for the development of renewable energy facilities and other offshore infrastructure.

Offshore renewable energy was “the essential driver” for coastal and marine spatial planning efforts in Massachusetts, says Moura, whose organization was created to advance ecosystem-based management of the commonwealth’s coastal ocean waters and is now expanding to other regions.

“The tools we’re working on would provide two different approaches to solving the same problem,” Moura says.

MULTIPLE USERS

The problem, Moura says, is that offshore wind farms, liquefied natural gas pipelines, fiber-optic cables, desalination plants, aquaculture, commercial fishermen, and others are all calling dibs on using the ocean, and coastal resource managers have to make decisions that take into account the multiple natural resource (or ecological) and economic trade-offs involved to reduce conflicts and optimize marine management.

“Our goal is to develop tools that would allow people to have a greater ability to visualize and compare scenarios and have a more robust scenario analysis,” Moura says.

Coastal managers broke ground with the Massachusetts Ocean Management Plan by going through an extensive 18-month stakeholder process and creating “spatially explicit” GIS maps that depicted the relative compatibility of specific uses and ecological resources to outline a regulatory and implementation framework.

The intention behind creating the tools is to offer resource managers ways to make the process of describing relationships among natural and human system components, and quantifying trade-offs, clearer in the future, says Les Kaufman, a professor of biology at the Boston University Marine Program, and the lead on one of the tools.

“The next level is to create more sophisticated equations showing what people need from nature and calculating the likely consequences of policy changes in terms of all the ecosystem services you can expect from an area,” Kaufman says.

Making the trade-offs more explicit could help managers improve

communication about decision-making, avoid unnecessary conflicts, and focus debate on finding the most efficient solutions, says Crow White, a postdoctoral research fellow for the University of California, Santa Barbara’s Sustainable Fisheries Group and the team leader behind one of the tools.

Moura adds, “These tools won’t give resource managers the answers or tell them what decision they should make, but they should assist managers in designing and conducting the stakeholder process and leading talks that more meaningfully and concretely include trade-offs.”

Another caveat is that all models are simplifications of reality, and model results are further impacted by the quality of data that goes into them.

TOOL TIME

While there are a number of efforts going on around the country to develop tools to aid ocean planning, SeaPlan developed its pilot study to test two tools using “real-life” data from Massachusetts, such as whale and fisheries data, and sites for offshore wind potential.

“The research teams worked on the two tools side by side using the same data sets,” Moura says.

The method that is easiest to share with coastal managers was developed by Crow’s team at the Bren School of Environmental Science and Management at the University of California, Santa Barbara.

This method takes trade-off analysis used in economics since the 1950s

and translates its use for the ocean environment to simultaneously assess multiple ecosystem services and the values they provide to sectors or stakeholder groups using a quantitative framework, Crow explains.

“Economics has a rich history of quantifying and balancing trade-offs, and resource economics has done this with ecosystem services for over a decade,” Crow says. “It’s just now beginning to be done in the ocean environment.”

It’s important to note, he says, that the framework can be applied even when sectors—such as conservation—aren’t measured in dollars.

While White’s method is ready to be used by resource managers, he says the average coastal manager would need additional technical support to implement it.

Currently, White’s team is focused on further research and improvements in the method that will help capture the ocean system more realistically by expanding the number of stakeholder groups and natural resource considerations.



BOOKKEEPING SYSTEM

The second tool is the more sophisticated and data-intensive Multi-scale Integrated Models of Ecosystem Services (MIMES) developed by Kaufman's team from Boston University.

"Our idea," says Kaufman, who is also a senior marine scientist for Conservation International, "was to take everything we know about the coastal ecosystem and human economy and use a model as a type of bookkeeping system for this knowledge that enables us to visualize likely consequences of any change in policy."

The model is so robust, Kaufman says, that it could eventually incorporate Crow's trade-off analysis framework.

While the model is ready, "one final piece we're working on," Kaufman says, "is creating a user interface like a computer game to make it easier for managers to engage with MIMES and understand the potential consequences of a policy change. We'll be beginning trial use of the model within a few months."

NEXT PHASE

While both tools still need development before they're "fully portable and applicable for use by coastal managers," Moura says, "both are sufficiently developed to help guide stakeholder engagement efforts to discuss trade-offs."

"We think it's promising, and we're supportive of exploring the concept," says Bruce Carlisle, director of the Massachusetts Office of Coastal Zone Management. "We are interested in getting our heads around the mechanics, underpinnings, and assumptions of these models to better understand their potential for future applications."

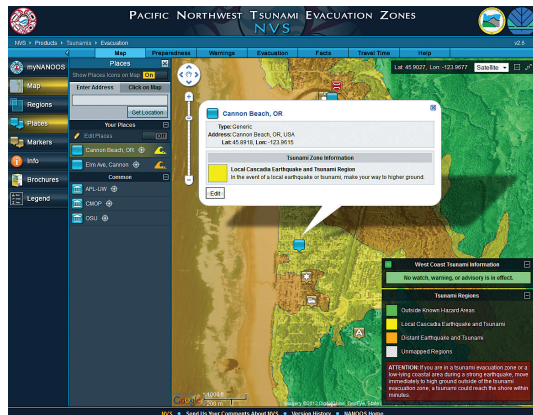
Moura says she's excited about the potential of the tools to provide pragmatic assistance to coastal managers working on ocean management. "One of the reasons we're excited about the innovation of the trade-offs approach is because we're really aiming towards a healthy economy and a healthy ocean, and we need both those things."

She adds, "We need jobs, we need food, and we need a healthy economy, and in order to have that, we have to have a healthy ocean. Improving our ocean planning tools will help us get at all of those things." ❖

For more information on the trade-off analysis tools, contact Stephanie Moura at (617) 737-2600, ext. 101, or smoura@seaplan.org. For more information on the tools themselves, contact Crow White at (808) 265-6868 or cwhite@bren.ucsb.edu, or Les Kaufman at (617) 407-3685 or lesk@bu.edu. You may also contact Bruce Carlisle at (617) 626-1205 or bruce.carlisle@state.ma.us. To read a paper on White's tool that appeared in the "Proceedings of the National Academy of Sciences of the United States of America," go to www.pnas.org/content/early/2012/02/27/1114215109.full.pdf+html. To see other tools that have been applied to trade-offs in the ocean, go to www.centerforoceansolutions.org/news-events/featured-stories/new-decision-guide-details-rigorous-analysis-decision-support-tools-marine-spatial-planning.

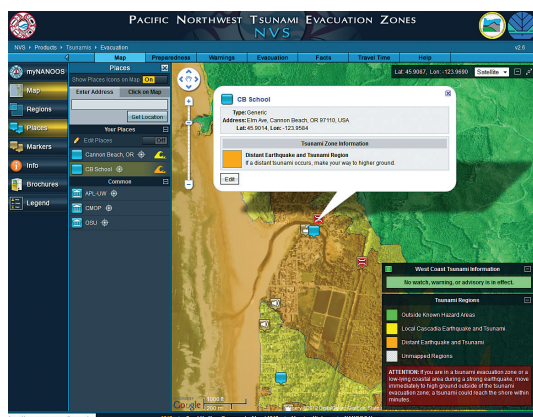


Providing Access to Information on Tsunami Zones in Oregon and Washington



“We recognized, and Japan demonstrated, that people need more and more information at their fingertips.”

*Jonathan Allan,
Oregon Department of Geology and Mineral Industries*

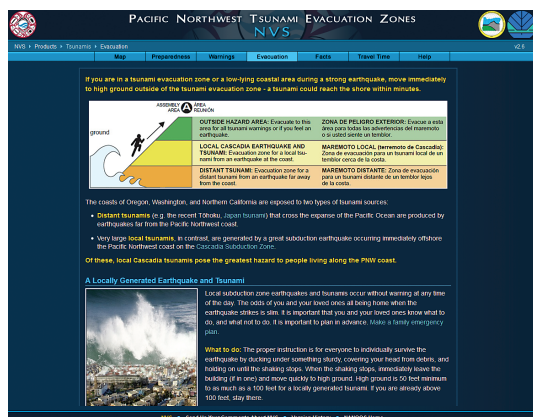


The need for timely and accurate coastal hazard information for the U.S. West Coast was powerfully demonstrated on March 10, 2011, when a magnitude-9 earthquake struck off the coast of Sendai, Japan. Tsunami waves triggered by the earthquake not only devastated Japan, but caused millions in damage to coastal areas in Oregon and California.

Oregon residents and others eager for tsunami information overloaded an existing online portal providing information on tsunami zones in the state. While coastal managers were able to meet the demand for information that day, it underscored the process they were engaged in to create a new tsunami portal for Oregon and Washington.

The new regional tsunami portal, released in November 2011, displays coastal evacuation zones and allows users to search by street address to determine if they're in an inundation zone. The portal can also be accessed by free smartphone apps for the iPhone and Android.

“The portal and smartphone apps work seamlessly,” says Jonathan Allan, a geomorphologist in the coastal field office of the Oregon Department of Geology and Mineral Industries, and one of the partners who helped develop the portal for the Northwest Association of Networked Ocean Observing Systems (NANOOS), part of the U.S. Integrated Ocean Observing System funded through NOAA.



The new portal includes an address search function, the ability to zoom in to a region of interest, information on critical facilities, and links to watches and warnings.

SCREEN SHOTS COURTESY OF OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

“The smartphones have a huge advantage in that they're using cellphone GPS data, so users traveling up and down the coast can immediately tell if they're in an inundation zone or not, and can prepare their procedures for evacuating,” Allan says.



An iPhone view of the portal.

LEARNING FROM CATASTROPHE

The earthquake that triggered the catastrophic tsunami that killed 15,846 in Japan was the fourth largest on record. The tsunami inundation wave height reached 19.5 meters (over 63 feet) on the Sendai Plain in Japan, traveling as much as 5 kilometers (about 3 miles) inland.

The tsunami traveled eastward across the Pacific Ocean, eventually impacting coastal communities in Hawaii and the U.S. West Coast.

Predictions and warnings from both NOAA's Pacific, and West Coast and Alaska Tsunami Warning Centers meant coastal communities in Washington and Oregon were on guard by the time the tsunami arrived some 9.5 hours

after the quake. Harbors along the Oregon and California coasts reported damage to their docks and boats that amounted to millions of dollars.

Heavy user traffic on the Oregon tsunami portal site temporarily crippled the NANOOS GeoServer, Allan says. A short-term fix was implemented to deal with the problem on the day of the tsunami, but it was a wake-up call.

"That event serves as a reminder of the U.S. West Coast's vulnerability to an earthquake within the Cascadia subduction zone" that stretches from Northern California along the coasts of Oregon and Washington, says Jan Newton, director of NANOOS and a principal oceanographer at the Applied Physics Laboratory at the University of Washington. "It highlighted the need to have even better hazard information available to the public to plan for such events."

Newton cautions that "planning ahead is absolutely critical" because in the event of a local earthquake, a catastrophic tsunami would hit the Pacific Northwest coast within minutes, not hours.

FIRST DRAFT

Because of the extreme risk of tsunamis to the region, in 2009 the Oregon Department of Geology and Mineral Industries took a tsunami Web hazard template from the NOAA Pacific Services Center and, working with NANOOS, modified, updated, and operationalized it to include

a synthesized tsunami evacuation GIS layer for the Oregon coast.

Oregon's first tsunami portal went live in June 2009, and "it worked fairly well," Allan says. Efforts were already underway to upgrade and expand the site to Washington when the March 2011 tsunami struck.

Beginning in January of that year, the NANOOS working group that Allan chairs had begun identifying the strengths and weaknesses of the original portal and creating a guidance document that included integrating Washington tsunami evacuation zones and bringing the portal more in line with the overall goals of an "integrated" product with the NANOOS visualization system (NVS) framework, which would add new functions.

In February 2011, the portal's GIS layer was updated to include new maps for distant and local tsunami inundation for the southern Oregon coast.

The need for the mobile applications, which were already being created in parallel with the portal's upgrades, was underscored by the March tsunami event, Allan says. "We recognized, and Japan demonstrated, that people need more and more information at their fingertips. This is another mechanism for getting information to the public."

NEW AND IMPROVED

With its release, the new Pacific Northwest Tsunami Evacuation Zones

continued on page 11

Ecotourism Thrives along Alabama's Coastal Birding Trail

"The key to this project's success lies in the diversity of our partnership."

Colette Boehm,
Gulf Shores and Orange Beach Tourism

The U.S. Gulf Coast region is a prime destination for millions of birds that typically spend winters in Latin America and then fly in the spring to the Gulf Coast and sites inland to breed and nurture their young. The growing popularity of an Alabama birding trail that provides spectacular views of this migration demonstrates how local business interests, scientists, and wildlife organizations can partner to promote healthy ecosystems while stimulating the tourism industry.

"The key to this project's success lies in the diversity of our partnership," says Colette Boehm, special projects director for Gulf Shores and Orange Beach Tourism in Baldwin County, Alabama. "When we started planning the trail more than a decade ago, the tourism industry and conservation and wildlife organizations were not always the best of buddies. Now we've strengthened these partnerships and even gone on to work together on a local Civil War trail and a national scenic byway project."

The Alabama Coastal Birding Trail, which opened in 2002, is made up of six large "loops" that wind through areas of Orange Beach, Gulf Shores, and nearby Dauphin Island. Each loop of the driving trail can take a half day or more



A young visitor helping to band a male hooded warbler along the birding trail.

PHOTO BY COLETTE BOEHM AND COURTESY OF GULF SHORES AND ORANGE BEACH TOURISM

to complete. Hummingbirds, tricolored herons, snow geese, eastern kingbirds, and dozens of other species can be seen.

The trail's diverse partnership includes the tourism agency, the U.S. Fish and Wildlife Service, Mississippi-Alabama Sea Grant, Alabama Department of Conservation and Natural Resources, Alabama Ornithological Society, and Dauphin Island Audubon Bird Sanctuary. Many local volunteers also offer their time and expertise.

In addition to birds, the trail attracts large numbers of visitors, which means money in state coffers.

BIG BUSINESS

According to Boehm, the trail is becoming an increasingly important part of the state's coastal tourism industry, which in 2009 attracted

more than four million visitors who spent more than \$2 billion dollars.

"Locally, we see more and more interest in bird-watching and viewing of marine mammals," notes Boehm.

In 2000, the agency's survey found that slightly under 100,000 people who stayed overnight in Baldwin County participated in wildlife viewing. By 2007, that number had shot up to 400,000. This surge in interest is also reflected nationally. Surveys by the U.S. Fish and Wildlife Service reveal that the number of U.S. wildlife watchers increased five percent from 1996 to 2001 and increased eight percent from 2001 to 2006 (the latest figures available).

FORGING A STRONG PARTNERSHIP

The idea for Alabama's coastal birding trail was hatched in the late 1990s

when a Gulf Shores and Orange Beach Tourism employee attended a seminar on the Great Texas Coastal Birding Trail. A survey showed that annual tourism revenue from bird-watching generated more than the golf tourism sector, and “that got our attention, because we’re also a golf destination,” says Boehm. “Summer fun on the beach is our bread and butter, but as a marketing organization we want people to come all year long. Spring and fall are excellent times for birding, so the trail seemed like a great fit.”

Trail plans could not have gone forward without the advice of many experts. For instance, bird-watching and natural resources information collected by the U.S. Fish and Wildlife Service proved essential. Alabama Ornithological Society members weighed in on early trail-siting discussions. And the U.S. Department of Transportation played an essential role in supplying road information and assisting with directional signage.

In 2007, the trail’s tourism, science, and natural resource partnerships became even stronger with the establishment of the Nature Tourism Initiative, an in-kind partnership of Mississippi-Alabama Sea Grant and Gulf Shores and Orange Beach Tourism. The initiative promotes sustainable wildlife and fishing practices that help preserve healthy ecosystems and stimulate the local economy.



Ecotourists spy birds from offshore.

PHOTO BY JOANNE McDONOUGH AND COURTESY OF MISSISSIPPI-ALABAMA SEA GRANT

“As part of this initiative, several programs and activities make use of the birding trail,” says Joanne McDonough, a nature tourism specialist for the Nature Tourism Initiative. “For instance, bird identification is part of our Coastal Nature Guide Certification Program, which is popular with tour operators.” During the certification program, scientists explain how protecting local habitats and wildlife will help support continued clean air and water, safe food, and storm resilience.

SAVING TIME AND EFFORT

After 10 years of trail operation, the partners have learned a few lessons in efficiency. The initial planning and posting of directional signage was an overwhelming task that became easier only when the partners sought the help of the U.S. Department of Transportation. “On a later project, the Civil War trail, we knew to bring transportation to the table at the beginning,” emphasizes Boehm.

Creating and maintaining a trail this large requires regular updates, corrections, and repairs. To that end, updated trail map and signage information will be available online and in print materials sometime this year.

“Now we realize that it’s a whole lot easier to update paper and online materials than it is to redo signage and markers on the actual trail,” says Boehm. “For anybody trying a similar project, try to minimize your trail signage when you can, and put as much information as possible into a format that’s easy to revise.”

BRIGHT FUTURE

“We see tremendous opportunities for growth in the birding trail,” says McDonough. “We have a captive audience through our certification course, which enables us to set a good example for natural resource stewardship. Canoeing and kayaking launch areas are being added to the trail.”

Boehm adds, “Bird-watchers have told us they really appreciate this resource in a place where there are also beaches and nice places to stay and eat. Those things appeal to families, so we expect to have more families visiting the birding trail as part of their vacations.” ❖

For more information on the Alabama Coastal Birding Trail, contact Joanne McDonough at jmcdonough@gulfshores.com or (251) 974-1510. You can also learn more by visiting www.alabamacoastalbirdingtrail.com or www.gulfshores.com.

Learning Stewardship in New York by Helping with Wetland Loss in Louisiana

"This is an audience that really wants to make a difference and can inspire others to get involved."

Meghan Marrero,

Mercy College and New York State Marine Education Association

What started out as a volunteer effort to help Louisiana coastal managers after the 2010 oil spill from the *Deepwater Horizon*/BP oil rig turned into a stewardship program for New York educators focused on wetland loss and restoration.

"What we learned was that a far greater issue than the oil spill is wetland loss in Louisiana and that it relates to the habitat loss occurring in New York," says Larissa Graham, the Long Island Sound outreach coordinator for New York Sea Grant.

In February, Graham and Meghan Marrero, president of the New York State Marine Education Association, led 14 New York educators to Louisiana to rebuild wetland habitats.

"The problems affecting Louisiana are also very real here at home," Graham says. "These educators are using what they learned during this trip to become stewards of our New York coastline."

Offshoots of the trip so far include classroom and community

presentations, and small-scale restoration projects. The educators also wrote posts on a blog created by New York Sea Grant to document the trip.

The idea for the stewardship program came out of a trip in 2011 that was organized by Graham and Marrero to take volunteers to Louisiana to help with the oil-spill cleanup. "There was the feeling that we had to do something because the situation down there was so overwhelming," Graham says.

But 10 months after the spill, she says, "there wasn't much that we could help with. Habitat loss was a much more significant problem."

Louisiana is losing the equivalent of about a football field of wetlands every 38 minutes. If these rates continue, the state shoreline will advance inland as much as 33 miles in some areas by 2040.

Similar concerns over wetland loss are mirrored in areas of New York, such as Jamaica Bay, where salt marshes are being lost at a rate of about 44 acres per year.



PHOTO COURTESY OF NEW YORK SEA GRANT

After observing the similarity in problems, Graham and Marrero saw an opportunity to create a stewardship program and worked with Louisiana Sea Grant and area national estuary programs to help organize the trip. Over five days, the New York educators got hands-on experience planting, harvesting seeds, and prepping planting materials.

While they worked, participants learned from experts about Louisiana's wetlands and the processes affecting them, which are similar to those in New York.

"Our students and the public will benefit from what we've learned in Louisiana, and engage in stewardship projects closer to home, where the environment also needs our help," says Marrero, who is an associate professor of secondary education at Mercy College.

Marrero adds, "I would encourage other managers to think about bringing in educators. This is an audience that really wants to make a difference and can inspire others to get involved." ❖

For more information on the New York to Louisiana stewardship program, contact Larissa Graham at (631) 632-9216 or larissa.graham@cornell.edu, or Meghan Marrero at (914) 674-7889 or president@nysmea.org. To view the trip blog, go to <http://nysmea.blogspot.com>.

continued from page 7

NVS portal and accompanying smartphone apps display Oregon and Washington coastal evacuation zones for distant and local earthquakes and tsunamis, and contain a situational awareness feature linked directly to NOAA's West Coast and Alaska Tsunami Warning Center. This enables statements, advisories, watches, or warnings to be displayed both verbally and graphically on the tsunami portal as they occur.

During a tsunami event, having access to ongoing conditions is important to both emergency managers and the public, Newton says.

NANOOS developed the portal and launched it in partnership with the Oregon Department of Geology and Mineral Industries and Washington State Department of Natural Resources, the agencies responsible for the original development of the evacuation zones. NOAA's National Tsunami Hazard Mitigation Program provided funding for the tsunami inundation models used to map the evacuation zones.

"This was very much a strong collaborative effort that's generated an outstanding response," Allan says. On the day the regional portal was announced, about 1,500 users clicked on the site.

"NANOOS is all about bringing together data and making it accessible to the public in a way that really resonates with people and is useful," Newton says. "This was a particularly successful and relevant application of what we do."

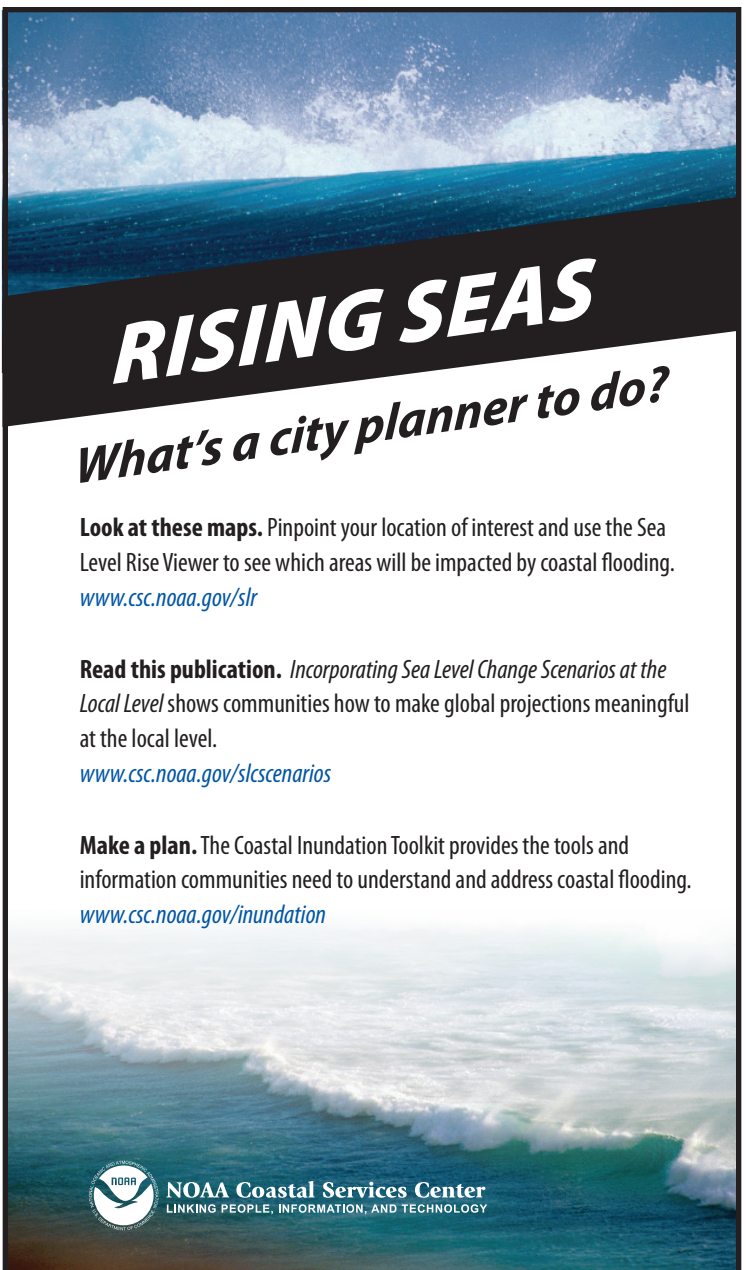
She adds, "I think what we accomplished here is an outstanding product that could definitely be a model for others." ❖

For more information on the Pacific Northwest Tsunami Evacuation Zones NVS portal, contact Jan Newton at (206) 543-9152 or newton@apl.washington.edu, or Jonathan Allan at (541) 574-6658 or jonathan.allan@dogami.state.or.us. To view the portal, go to <http://nvs.nanoos.org/tsunami>. The mobile app for iPhone and Android phones can be found by searching for TsunamiEvac-NW. Other smartphone users can log on to the site from their browsers.



NEED SOME HELP?
Put an order in for a Coastal Management Fellow.
Proposals from state coastal programs due in October.

www.csc.noaa.gov/fellowship




RISING SEAS
What's a city planner to do?

Look at these maps. Pinpoint your location of interest and use the Sea Level Rise Viewer to see which areas will be impacted by coastal flooding.
www.csc.noaa.gov/slr

Read this publication. *Incorporating Sea Level Change Scenarios at the Local Level* shows communities how to make global projections meaningful at the local level.
www.csc.noaa.gov/slscenarios

Make a plan. The Coastal Inundation Toolkit provides the tools and information communities need to understand and address coastal flooding.
www.csc.noaa.gov/inundation

 **NOAA Coastal Services Center**
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

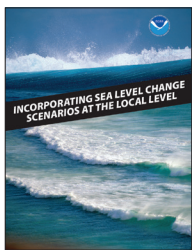
NEWS YOU CAN USE

FROM THE NOAA COASTAL SERVICES CENTER

Incorporating Sea Level Change Scenarios at the Local Level

Most experts agree that average sea levels have risen worldwide since the beginning of the twentieth century. In the last few decades the rate of that change has accelerated. Knowing these facts marks the first step—but only the very first—in calculating likely sea level rise impacts for your unique coastal community.

“The global projection is a starting point,” says Doug Marcy, a coastal hazards specialist at the NOAA Coastal Services Center. “Local data must be incorporated to make a meaningful projection for your community.”



Marcy and his fellow scientists at NOAA are encouraging communities to use the scenario approach in their planning strategies. Instructions for this task are provided in a new NOAA publication, *Incorporating Sea Level Change Scenarios at the Local Level*.

“Projections represent an imperfect science,” continues Marcy, “and there are many moving parts. For long-range planning in particular, focusing on a range of possibilities, and the associated range of impacts, makes more sense as opposed to using one number.”

Generally the more pertinent the information that is included in the projections, the more accurate the effort. This publication provides the information needed to create appropriate scenarios for community use. A few tips from the guide:



Use the Sea Level Rise and Coastal Flooding Impacts Viewer (www.csc.noaa.gov/slr) to see, using pictures and maps, how various rates of change will impact your community.

Consider the scale and details that will go into your scenarios – Have you collected the most detailed, reliable, and comprehensive data? Which sorts of local vulnerabilities are most important for you to document? Should the scenario include just one coastal community or several nearby?

Include all pertinent sea level rise variables – Are you factoring in high daily tides, king tides, extreme storm events, riverine floods, and other important influences?

Consider how your community will respond to the scenarios – Will officials make plans through an executive order, regulations, or just a recommendation? How will cost factors play into the local approach?

“The eight-step approach recommended in our guide takes work and time,” admits Marcy. “But it will be much better than a ‘one size fits all approach’ in terms of helping your community stay more resilient in the long term.” ❖

“*Incorporating Sea Level Change Scenarios at the Local Level*” is available for download at www.csc.noaa.gov/slcscenarios.

Economics: National Ocean Watch (ENOW)

NATIONAL SUMMARY

The Living Resources Sector



Living Resources



Marine Construction



Marine Transportation



Offshore Mineral Extraction



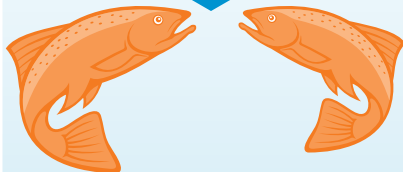
Ship and Boat Building



Tourism and Recreation

2008 Employed and Self-Employed

Nearly half of the living resources sector's workforce is self-employed.



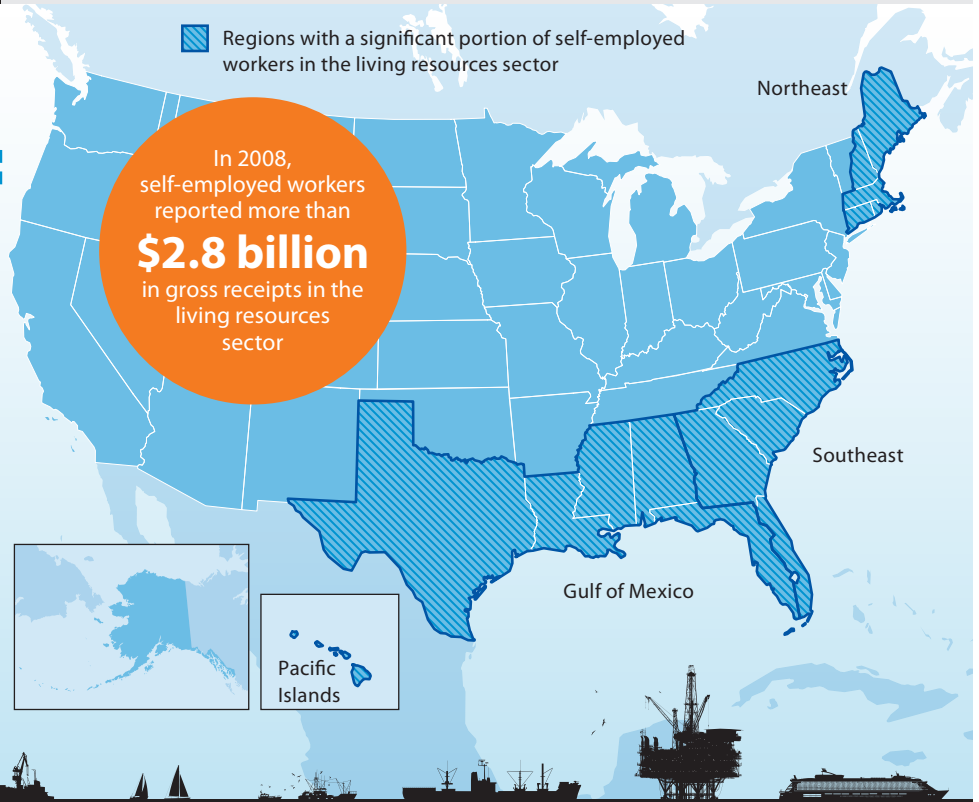
58,470 workers

Employed

55,070 workers

Self-Employed

Regions with a significant portion of self-employed workers in the living resources sector



2005-2009 Economic Trends

Percentage Change in Employment



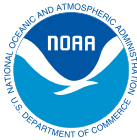
Living Resources	-9.4%
Marine Construction	0.2%
Marine Transportation	-3.3%
Offshore Mineral Extraction	14.4%
Ship and Boat Building	-11.9%
Tourism and Recreation	2.7%
All Ocean Sectors	1.4%
United States Total	-2.3%

Percentage Change in GDP



Living Resources	0.3%
Marine Construction	39.9%
Marine Transportation	26.9%
Offshore Mineral Extraction	195.6%
Ship and Boat Building	1.8%
Tourism and Recreation	11.8%
All Ocean Sectors	64.9%
United States Total	1.7%

To obtain additional ocean and Great Lakes data, go to www.csc.noaa.gov/enow



NOAA Coastal Services Center

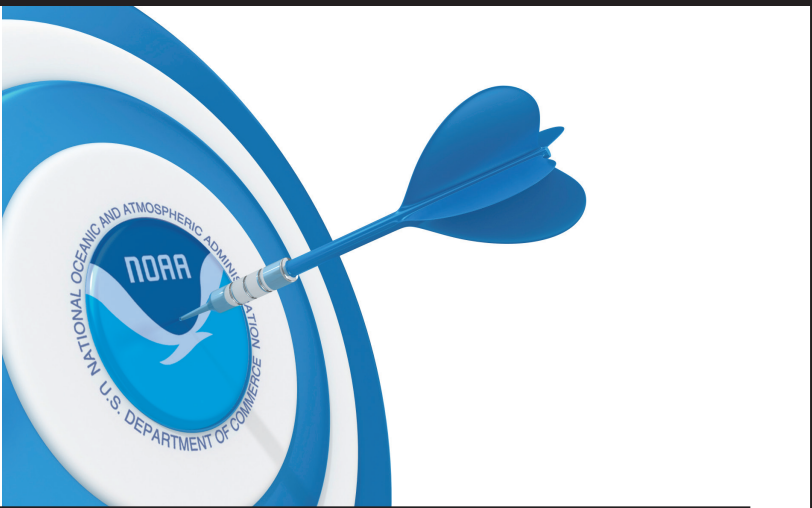
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

2234 South Hobson Avenue
Charleston, South Carolina 29405-2413
(843) 740-1200
www.csc.noaa.gov

Regional Offices:
NOAA Pacific Services Center,
NOAA Gulf Coast Services Center, and
Offices in the Great Lakes, Mid-Atlantic,
Northeast, and West Coast

10% total recovered fiber/all post-consumer fiber. This recycled paper meets EPA and FTC guidelines for recycled coated paper.

PRST STD
Postage & Fees Paid
NOAA Coastal
Services Center
Permit No. 132



Did we hit our mark? ←

In the Planning for Meaningful Evaluation course, instructors lead you and your co-workers through exercises designed to improve evaluation skills.

Planning for Meaningful Evaluation
www.csc.noaa.gov/training

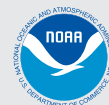
Prerequisites include the Project Design and Evaluation course or logic model experience.



Digital Coast Webinar Series

www.csc.noaa.gov/digitalcoast/webinar

Webinars focus on the tools, data, and topics featured in the Digital Coast. Sessions are held monthly, and there is no registration fee. Visit the website to register and see the course schedule.



NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY