

# COASTAL SERVICES

VOLUME 12, ISSUE 4 • JULY/AUGUST 2009

LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

## **LIVING SHORELINES:**

**Following Nature's  
Lead to Help Prevent  
Erosion in Virginia**

**Adapting to Climate  
Change Is the Focus of  
Washington Workshop**

**Bringing New York's  
Dive Industry to the  
Economic Surface**



# FROM THE DIRECTOR

In the coming years, much of the country's shoreline will be impacted by sea level rise caused by climate change. The decisions made by coastal resource managers today about how to address erosion and sea level rise may impact our coastal areas for generations to come.

For many, the common response is to protect shorelines by building hard structures, such as bulkheads, stone revetments, and seawalls, but this type of shoreline armoring can cause changes to the coastal environment that threaten landscapes, public access, recreational opportunities, natural habitats, and fish populations.

The cover story of this edition of *Coastal Services* looks at a new management approach in Virginia that is broadening erosion control options to include "living shorelines," which provide erosion control benefits while also enhancing the natural shoreline habitat.

Not only do living shorelines function in an ecological fashion that is of value to the environment, but they also may allow for the gradual landward retreat of fringe wetlands as sea levels rise, and are proving to be resilient in severe storm events.

Readers of this edition can also learn about a workshop developed in Washington State that may help

coastal managers around the country better understand climate change and the planning processes and tools necessary to prepare for the future.

I would encourage readers interested in getting more information on climate change to attend Coastal Zone 09, a biennial international symposium on coastal and ocean management hosted by the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center.

Held in Boston, Massachusetts, from July 19 to 23, the theme for this meeting is "Revolutionary Times: Catching the Wave of Change." The conference includes 18 sessions on climate change and hazards topics, as well as a national climate change plenary that will feature an expert panel, including Dr. Jane Lubchenco, under secretary of commerce for oceans and atmosphere and NOAA administrator.

For more information on CZ09, point your browser to [www.csc.noaa.gov/cz/](http://www.csc.noaa.gov/cz/).

I look forward to seeing you there. ❖



Margaret A. Davidson

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.



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Ocean Service  
Coastal Services Center

Lafayette River Partnership volunteers plant and fertilize *Spartina* as part of a living shoreline wetland restoration effort in Norfolk, Virginia.

COVER PHOTO BY KEVIN DU BOIS AND COURTESY OF THE CITY OF NORFOLK

## National Oceanic and Atmospheric Administration

U.S. Secretary of Commerce  
Gary Locke

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  
John H. Dunnigan

NOAA Coastal Services Center  
Director: Margaret A. Davidson

Deputy Director: Jeff Payne

Coastal Geospatial Services,  
Division Chief: Nicholas Schmidt

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

Copy Editor: Gerald Esch

Graphic Designer: Frank Ruopoli

Back issues of *Coastal Services* can be  
viewed at [www.csc.noaa.gov/magazine/](http://www.csc.noaa.gov/magazine/)

To subscribe to *Coastal Services*, please  
direct correspondence to:

Hanna Goss  
NOAA Coastal Services Center  
2234 South Hobson Avenue  
Charleston, SC 29405-2413  
Phone: (828) 246-0958  
Fax: (843) 740-1313  
E-mail: [Hanna.Goss@noaa.gov](mailto:Hanna.Goss@noaa.gov)

For more information about the  
Coastal Services Center, call  
(843) 740-1200 or visit our home page  
on the Internet: [www.csc.noaa.gov](http://www.csc.noaa.gov)

*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.

## NEWS AND NOTES

### Economics and Coastal Resource Management

Managing coastal resources often means making hard decisions about the best way to use those resources.

For example, should a community

- Maintain green space or build more homes?
- Develop a new marina or keep the existing oyster beds?
- Construct a mall that would draw in new industry or preserve the wetland?

Although there is no simple way to answer these questions, economic methods can help coastal resource managers understand the trade-offs and make better-informed decisions.

A new publication from the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center provides basic information about the economic principles used in the field of coastal resource management. "Introduction to Economics for Coastal Managers" will be available in the fall of 2009.

According to the publication, competing demands for coastal resources are at the heart of most coastal resource management

issues, and community leaders are often asked to decide what makes the most sense for a community in terms of social, environmental, and economic needs.

When making these decisions, officials can use economic tools to express the value of various alternatives in common terms (usually dollars) so that an "apples to apples" comparison can be made.

This is important because development tends to generate benefits that are easy to count and understand, while conservation tends to generate benefits that seem less tangible but which are nonetheless extremely important, including storm protection, water filtration, aesthetics, recreational benefits, and wildlife habitat.

Just as coastal management is complex, so is the use of economics. No single method is appropriate for all situations, so an understanding of the relevant economic methods is helpful.

This publication provides that overview, covering market and non-market values, benefit-cost

analysis, cost-effectiveness analysis, and incremental analysis. Several case studies give readers the real-life examples that move the concepts from theory to practice.

"Only when the true value of a coastal resource is known can one make the best decisions for the long term," says Pete Wiley, the NOAA employee who co-authored the document with fellow NOAA economist Jeff Adkins.

"The decision might be to leave the resource alone, develop it, or design a partial development plan with fewer impacts," Wiley says. "The goal is to fully understand the benefits and costs of each alternative so that wise decisions can be made.

"We don't want to trade off things in the short term that will actually serve the community more when taking a long-range view. That's not what coastal management is about." ❖

To obtain a free copy of "Introduction to Economics for Coastal Managers," contact the NOAA Coastal Services Center by e-mailing [Donna.McCaskill@noaa.gov](mailto:Donna.McCaskill@noaa.gov)



# Adapting to Climate Change Is the Focus of Washington Workshop

The Planning for Climate Change Workshop, which was created and piloted by the Padilla Bay Reserve, Washington Sea Grant, King County, and the University of Washington's Climate Impacts Group, lays out current climate change research findings and anticipated impacts, and then addresses the fundamentals of how to plan for climate change.

"The point of the workshop is to help demystify to some degree what planning for climate change involves," says Lara Whitely Binder, outreach specialist for the Climate Impacts Group. "The fundamental skeleton of the training class is very transferable."

Geared toward planners at the city and county levels, and those at the state level who support them, the workshop gives "some how-to's on conducting things like vulnerability and risk assessments, engaging stakeholders who may be skeptical of the need for climate adaptation, and what tools and resources stakeholders need to be engaged," says Katrina Hoffman, coastal resources specialist for Washington Sea Grant. "I tell folks that this is a practical workshop."

## Adaptation vs. Mitigation

One of the key components of the workshop, says Angell, is that

it focuses on adaptation—what people can do to prepare for or respond to climate change impacts. It does not address mitigation, or the actions required to reduce greenhouse gas emissions that contribute to climate change.

"We are acutely aware that fortune favors the prepared," says Elizabeth Willmott, Climate Change Program coordinator for King County. "It's very important to reduce greenhouse emissions—that's number one—but the impacts are going to happen inevitably, even if we stopped emitting greenhouse gases today."

Willmott adds, "In general, folks on the front lines aren't grappling yet with this issue in a full and rich way, and they need a fundamental amount of education about climate change."

## Determining Needs

After receiving a grant from the National Oceanic and Atmospheric Administration's Coastal Services Center to create a climate change adaptation workshop that could be customized by reserves in the National Estuarine Research Reserve System and other coastal managers, Angell first conducted a needs assessment with national reserve managers and coastal training program coordinators about their target audiences' needs.

She followed that up with a needs assessment of the target audience in Washington. The national results mirrored the state survey.

"Our goals were really supported by the needs assessments," Angell says. "People were interested in adaptation and planning, and what steps they should start doing to prepare."

## Following the Guidebook

The workshop also relied heavily on the publication, *Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments*, which the Climate Impacts Group and King County wrote in 2007. ICLEI—Local Governments for Sustainability published the guidebook and was a contributing partner in its national distribution.

The guidebook includes information on creating a climate change preparedness team, identifying community vulnerabilities to climate change, and identifying, selecting, and implementing adaptation options—all the steps necessary in creating a climate change preparedness plan.

Guidance on where to find and how to evaluate climate change information is provided, as is a checklist on "How to Prepare for Climate Change." Information on implementing the resulting climate change plan and measuring its progress are also included.

## Trial Run

In March, the partners held two pilot workshops at different

*"This workshop was developed to address the 'Now what do we do?' question."*

*Cathy Angell, Padilla Bay National Estuarine Research Reserve*

locations in Washington. Survey feedback from the first workshop was overwhelmingly positive but did result in some minor adjustments being made to the second workshop, Angell says.

The training covered current climate change research findings and anticipated impacts, including flooding, storm surge, drought, and sea level rise. Participants were introduced to the fundamentals of conducting a vulnerability assessment, looked at how current regulations address climate change, and were shown how other governments are preparing for climate change.

The instructors helped participants become familiar with key data sources and covered specific strategies for engaging stakeholders in climate change preparedness. Each participant received a copy of the *Preparing for Climate Change* guidebook.

"It seems simple, but sometimes this information can be overwhelming to people," says Willmott. "What the training really does is break it down and simplify it so coastal managers can understand that this is really like planning for any other uncertainty."

## Sharing with Others

All the workshop materials—including the agenda, PowerPoint presentations, and streaming video of each of the workshop sessions—are posted on the reserve system's national website, [www.nerrs.noaa.gov](http://www.nerrs.noaa.gov).

While some of the pieces are "plug and play," Angell encourages others interested in using the materials to do their own needs assessment, use local case studies, and bring in local scientists to discuss climate change research and anticipated impacts.

"It's really critical that people relate to how it's going to apply to them," she says. "I think it's important to lay a foundation of local science."

Whitely Binder encourages other coastal managers to experiment with the various components and come back to the website to provide feedback.

She adds, "It would be interesting to hear what is successful and what isn't in other regions. We want this to continue to evolve." ❖

*To view components of the Planning for Climate Change Workshop, go to [www.nerrs.noaa.gov](http://www.nerrs.noaa.gov). To download *Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments*, go to [www.cses.washington.edu/cig/fpt/guidebook.shtml](http://www.cses.washington.edu/cig/fpt/guidebook.shtml). For more information on the workshop, contact Cathy Angell at (360) 428-1075, or [cangell@padillabay.gov](mailto:cangell@padillabay.gov), Katrina Hoffman at (360) 416-7048, or [kathoff@u.washington.edu](mailto:kathoff@u.washington.edu), or Lara Whitely Binder at (206) 616-5349, or [lwb123@u.washington.edu](mailto:lwb123@u.washington.edu).*



Coconut fiber “biolog” that will anchor sand fill and protect wetland plants is installed in a Norfolk, Virginia, living shorelines project.

## Living Shorelines: Following Nature’s Lead to Help Prevent Erosion in Virginia

When imagining shoreline erosion, many people first think of pounding waves eating away at vulnerable oceanfront beaches. But sheltered coastal areas—such as bays and estuaries—also experience land loss from erosion and sea level rise. A frequent response of property owners and coastal resource managers is to armor shoreline with bulkheads and other hard structures, solving the erosion problem, but also potentially harming the coastal environment.

A new management approach in Virginia is broadening erosion control options to include “living shorelines,” which provide erosion control benefits while also enhancing the natural shoreline habitat.

“People are not used to living on the water’s edge and seeing the land that they paid so much for eroding away—or look like it’s eroding away,” says Shep Moon, coastal planner for Virginia’s Coastal Zone

Management Program. “They look around at what their neighbors have and see a bulkhead or revetment, and that’s what they want.”

To introduce living shorelines into Virginia’s shoreline management vernacular, coastal managers have taken a multifaceted approach that includes research, information sharing, training, policy guidance and changes, demonstration projects, and outreach.

“We’re seeing more interest in living shorelines and use of living shoreline treatments,” says Tony Watkinson, deputy chief of the Habitat Management Division of the Virginia Marine Resources Commission. “I think the promotion of the concept and education of the public and property owners has helped with their acceptance of the techniques and realization that it addresses what they’re trying to do.”

### Common Response

Virginia’s approximately 5,000 miles of shoreline features marshes, beaches, and tidal mudflats that provide habitat for a wide variety of plants and animals. These marshes and other low-lying lands also are predicted to be one of the areas of the country hardest hit by relative sea level rise caused by climate change and geologic subsidence.

A common way of protecting the shoreline from erosion and sea level rise is to build hard structures, such as bulkheads, stone revetments, and seawalls.

Armoring the shorelines of a few properties is of little concern, but a large number of hard structures along a shoreline may threaten landscapes, public access, recreational opportunities, and natural habitats, and could reduce the number of species that depend on these habitats.

### Cumulative Harm

Researchers at the Center for Coastal Resources Management at the Virginia Institute of Marine Science maintain a database of permitting activity in the state’s tidal shorelines. With questions about the potential impact of hard structures, the researchers used this database to conduct a cumulative impact assessment that combined the total effect of multiple structures on multiple shorelines.

“The data was shocking,” says Karen Duhring, a shoreline advisory scientist for the Center for Coastal Resources Management. “Permitting these on a piecemeal basis doesn’t capture the cumulative harm.”

The study found that an average of 16 to 18 miles of new shoreline structures were being

## “The data was shocking.”

*Karen Duhring, Center for Coastal Resources Management*

permitted in Virginia each year from 2000 to 2007. “We don’t know how many were actually built,” Duhring notes, “but those were permitted by coastal regulators.”

“We knew why shorelines were being hardened,” Moon says. “We just needed to find ways to promote better alternatives.”

### Natural Mimic

While the definition is still under debate, living shorelines are erosion management techniques—such as the strategic placement of plants, stone, sand, and other structural and organic materials—that are used primarily in areas with low to moderate wave energy, and are designed to mimic natural coastal processes.

“They do a couple of different things,” says Walter Priest, habitat restoration specialist for the National Oceanic and Atmospheric Administration’s Restoration Center. “They allow the shoreline to continue to function in an ecological fashion that is still of value to the environment.” They may also allow for the gradual landward retreat of fringe wetlands as sea levels rise, and are proving to be resilient in severe storm events.

“The concept of living shorelines has been around for a while,” Moon says, “but with simpler methodologies of basically marsh grass planting and stabilization using natural techniques.”

Coastal managers in Maryland have been incorporating living shorelines since the 1980s, which has

helped generate North Carolina’s and Virginia’s interest in the concept.

### Developing a Strategy

In 2005, the Virginia Coastal Zone Management Program began working with many partners to promote the use of living shorelines in the state. To spur the initiative, the program included numerous living shoreline projects in its overarching shoreline management strategy that is funded with \$750,000 in Section 309 grant monies over the five years beginning in 2006.

“There’s been a lot going on” in the three years since funding began, Moon notes.

### Taking the Initiative

The living shoreline initiative was kicked off in December 2006 with a two-day Living Shoreline Summit for shoreline management contractors,

landowners, environmental groups, coastal resource managers, scientists, and others on the concept and construction of living shorelines, with case studies.

“Coming away from the workshop, I decided to try to implement living shorelines at the local level,” notes Kevin Du Bois, an environmental engineer for the City of Norfolk. “I think that was their hope—that people would leave the meeting looking for potential living shoreline projects.”

Since the summit, Norfolk has implemented a dozen successful public and private living shoreline projects.

The Center for Coastal Resources Management has created an on-line course for marine contractors, as well as training programs to help marine contractors and others directly involved with the planning and construction of living shoreline projects.

*Continued on Page 9*

### Additional Resources

The Virginia Institute of Marine Science’s website on living shorelines,  
<http://ccrm.vims.edu/livingshorelines/>

The Virginia Living Shoreline Summit proceedings,  
[www.cbtrust.org/site/c.enJIKQNoFiG/b.2055179/k.4E47/  
Living\\_Shorelines\\_Grant\\_Program.htm](http://www.cbtrust.org/site/c.enJIKQNoFiG/b.2055179/k.4E47/Living_Shorelines_Grant_Program.htm)

The National Oceanic and Atmospheric Administration’s restoration portal,  
[https://habitat.noaa.gov/restorationtechniques/public/shoreline\\_tab1.cfm](https://habitat.noaa.gov/restorationtechniques/public/shoreline_tab1.cfm)

The Virginia Coastal Zone Management Program’s information website on living shorelines,  
[www.deq.state.va.us/coastal/livingshore.html](http://www.deq.state.va.us/coastal/livingshore.html)

# Bringing New York's Dive Industry to the Economic Surface

*"Twenty years ago it might have been possible to shield the location of wrecks, but now people are going to find them."*

Mark Peckham, New York Historic Preservation Field Services Bureau



Divers can explore ships like the Great Lakes schooner Emma C. Neilson off New York's coast.

As zebra mussels have clarified Great Lake waters around New York and new technologies have made locating shipwrecks easier, scuba divers have flocked to the state's shoreline, bringing in millions in tourism dollars. Recognizing the opportunity to develop the niche market, New York Sea Grant has worked to help foster and support the state's growing diving industry, while at the same time helping to interpret and protect the underwater cultural and natural resources.

"Recreational tourism is a major component of the economy for communities along New York's Great Lakes," says David White, recreation and tourism specialist for New York Sea Grant. "Fishing, boating, sailing—all of these recreational opportunities help maintain the economic development in these communities. Diving is an excellent next step in enhancing the recreational tourism base."

Working with a multitude of partners, Sea Grant's efforts have ranged from preparing communities to better meet the needs of visiting divers, to using research to help promote the industry, to supporting site interpretation through dive trails and signage, to hosting conferences that educate divers and historians on how to protect the fragile resources.

"One thing we're finding now is that wrecks are being discovered at an exponential rate," says Mark Peckham, National Register Program coordinator for New York's Historic Preservation Field Services Bureau. "Twenty years ago it might have been possible to shield the location of wrecks, but now people are going to find them."

He adds, "It's incumbent on us to try to find creative ways of managing the situation."

## Clear Opportunity

Dramatically improved water clarity was a surprise benefit of the economically destructive zebra mussels that invaded the Great Lakes region beginning in 1988. Improved visibility and a diverse selection of submerged cultural and natural resources began to draw divers to New York's coastline.

Even 10 years ago, divers were packing an economic wallop in the state. A New York Sea Grant survey conducted in 1999 showed that divers living within the Great Lakes region spent \$61 million a year on

such items as boat and auto fuel, lodging, and food, and \$47 million on diving-related expenditures.

The cold fresh water of the Great Lakes has helped preserve centuries-old ships and artifacts, says Peckham, who is also a diver. More than 10,000 wrecks are estimated to be off New York's coast.

"That 1999 report documented the interest and spending of those interested in our underwater treasures," says White. "That was our prompt to develop a submerged cultural resources program. Diving and shipwrecks became a real opportunity for us."

## Getting in Front

As with any niche market, White says, it is important that communities "get in front of it," meaning that before undertaking efforts to draw divers to the region, communities needed to understand and be prepared to meet divers' needs.

"You won't get repeat business if you're not prepared to meet their needs," White explains. "If you're taking the opportunity to prepare to invite them, you better make sure they have a good experience."

Sea Grant participated in educational workshops for communities who needed to address everything from providing local venues where divers could refill air tanks, to ensuring hotels had places to store bulky, wet diving equipment, to arranging for hospitals to respond to dive-related emergencies.

"If you are not a diver, you don't know what a diver needs," White says. "You have to translate that concept for communities."

## Seeking Designations

Another key effort, says White, was working with many partners to get New York's first Submerged Cultural Preserve and Dive Site designated on Lake Ontario in 2000.

This designation spurred Sea Grant and partner efforts to establish the "Dive the Seaway Trail" initiative, which promotes five model scuba diving sites that can be found along the Great Lakes Seaway Trail, a 518-mile National Scenic Byway.

Introduced in 2007, the dive sites are marked, buoyed, and maintained by community-based stewards along the St. Lawrence River, Lake Ontario, Niagara River, and Lake Erie. The sites offer dives for all skill levels, and a series of Great Lakes Seaway Trail outdoor "storyteller" panels help interpret the sites from shore.

"This is a great way to educate the public and help preserve the sites," Peckham says. "If you make recreational opportunities available to the sport diving community, then you take some of the pressure off more sensitive sites."

Seaway Trail President and CEO Teresa Mitchell says working with Sea Grant to help develop "Dive the Seaway Trail" and accompanying signage has provided them with additional marketing angles to promote the region. The Seaway Trail also showcases the area's lighthouses, birding opportunities, as well as many other natural, historic, and cultural features.

Sea Grant is also helping to support a New York state initiative to create a Blue Water Cultural Trail, which would create a series of heritage preserves in state waters.

## Bringing People Together

Another significant outreach effort for Sea Grant is organizing an annual Great Lakes Underwater Conference, which is a daylong seminar open to divers, historians, and other members of the public interested in underwater issues and opportunities in the Great Lakes.

White notes that the conference, co-sponsored by the Oswego Maritime Foundation and a Great Lakes Seaway Trail byway organization, has set attendance records in 2008 and 2009.

"Education is really the key," notes Peckham. "We're not able to put fences around sensitive sites or police them. The diving public serves as the stewards of these sites, and the only way that can effectively happen is if you educate them to care for these resources."

White says Sea Grant will continue its efforts to promote New York's submerged cultural resources through research, partnership building, and program and outreach development.

He adds, "We are constantly surprised at how many local, state, regional, and international connections can be made to our Great Lakes resources." ❖

*More information on the "Dive the Seaway Trail" initiative can be found at [www.seawaytrail.com](http://www.seawaytrail.com). For more information on New York Sea Grant's efforts to promote and preserve submerged resources, contact Dave White at (315) 312-3042, or [dgw9@cornell.edu](mailto:dgw9@cornell.edu).*

## Removing a Derelict Vessel Stranded for 26 Years on Rota Island

During a storm on July 20, 1982, a commercial fishing vessel transporting cargo from Guam to Japan wrecked on a reef just off Rota Island in the Commonwealth of the Northern Mariana Islands. As the all-metal vessel sat deteriorating on the reef for 26 years, rusting debris scattered throughout Tatqua Beach and lagoon, creating a visual scar and making the area dangerous to walk, swim, or fish.

**“People physically picked up wreckage in the lagoon waters.”**

*William Pendergrass,  
Commonwealth of the Northern  
Mariana Islands Coastal  
Resources Management Office*

In 2007, the islands’ Coastal Resources Management Office decided to remove the remains of the *Nam Sung 62* vessel using donated equipment, volunteer efforts, and very little grant monies. Nineteen months later, there is no sign of the debris, and wildlife and people are returning to the beach.

“It was hard work and required dedicated people working together,” says William Pendergrass Rota Coastal Resources Management coastal coordinator.

Cleaning up about 200 tons of debris from the *Nam Sung 62* was done in three unofficial phases, Pendergrass says.

The first phase was organizing volunteers to take part in the September 2007 Ocean Conservancy’s International Coastal Cleanup. During the event, 165 students and volunteers worked to clean debris from Tatqua Beach.

“People physically picked up wreckage in the lagoon waters,” Pendergrass recalls. “Sometimes two or three people at a time were dragging the pieces into shore.”

A grant of \$6,000 from the National Fish and Wildlife Foundation in partnership with the National Oceanic and Atmospheric Administration’s Marine Debris Program helped facilitate phase two of the project, where Pendergrass worked with local agencies, businesses, and organizations to break down and remove larger pieces of the vessel.

Partner organizations included Rota Marianas Visitors Authority, D&J Enterprises, Rota Resort and Country Club, Guam Pacific Power Corporation, Rota Department of Public Works, and the Rota Department of Public Safety.

“The hardest part,” says Pendergrass, “was undergoing the permitting and regulatory compliance process.”

Part of the challenge was the need to create a removal plan that set the example for others on the island. For instance, all work during this phase was done only at low tide to ensure minimal environmental impacts, and a nearby road was bypassed to protect a threatened species.



*The rusting skeleton of the 270-ton, 165-foot long Nam Sung 62.*

Using volunteers to provide the labor was also challenging because the work was physically grueling. Groups of eight or nine volunteers worked four different times from April to August 2008 before all but the two largest pieces of the hull remained, meeting the grant requirements.

But Pendergrass wanted the entire vessel removed. With an additional \$4,401 from the Coastal Resources Management Office, Pendergrass again worked through the regulatory process and gathered volunteers. The final remains of the *Nam Sung 62* were removed on April 8, 2009.

“You wouldn’t even know that there had been something out there today,” Pendergrass says. “The people are swimming, fishing, and walking on the beach again. It was a satisfying project.” ❖

*For more information on the removal of the Nam Sung 62, contact William Pendergrass at (670) 532-0466, or [william.pendergrass@crm.gov.mp](mailto:william.pendergrass@crm.gov.mp).*

PHOTO COURTESY OF THE COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS COASTAL RESOURCES MANAGEMENT OFFICE

*Continued from Page 5*

A living shoreline brochure and website was created for land use decision makers, landowners, and contractors.

Institute scientists are also conducting a wide variety of research, including evaluating and documenting the habitat value of living shorelines, and refining the design of living shoreline techniques.

### **In the Hopper**

There are many more projects already completed or in the hopper, Moon notes, including a living shoreline design manual being created by Scott Hardaway, a geologist at the Virginia Institute of Marine Science, and ongoing reporting of research findings that will inform policy.

“There are so many different initiatives that are a part of this,” Moon says. “We’re working with waterfront property owners, decision makers—local and state—and contractors and agents. We realized up front that we really had to include everybody in the process.”

He adds, “It’s all evolving at the same time. It has to work that way. You can’t create demand without supply, and you can’t do any of that without having the policies in place.” ❖

*For more information on Virginia’s living shorelines management approach, contact Shep Moon at (804) 698-4527, or [shep.moon@deq.virginia.gov](mailto:shep.moon@deq.virginia.gov), or Tony Watkinson at (757) 247-2255, or [tony.watkinson@mrc.virginia.gov](mailto:tony.watkinson@mrc.virginia.gov). For information on Virginia Institute of Marine Science research or training, contact Karen Duhring at (804) 684-7159, or [karend@vims.edu](mailto:karend@vims.edu). To learn more about local implementation, contact Kevin Du Bois at (757) 621-2564, or [kevin.dubois@norfolk.gov](mailto:kevin.dubois@norfolk.gov). For more information on living shoreline techniques, contact Walter Priest at (804) 684-7385, or [Walter.Priest@noaa.gov](mailto:Walter.Priest@noaa.gov).*

## Climate Change Adaptation Resources for Coastal Communities

Learn What Others Are Doing.  
Share Strategies.  
Get Basic Information.

<http://community.csc.noaa.gov/climateadaptation>

## Are Your Natural Resources Being Loved to Death?

Through this two-day course, brought to your location, your organization can identify unacceptable levels of visitor-use impacts and determine specific strategies and tactics to address these issues.

**Managing Visitor Use in Coastal  
and Marine Protected Areas**

[www.csc.noaa.gov/training/](http://www.csc.noaa.gov/training/)

NOAA Coastal Services Center  
2234 South Hobson Avenue  
Charleston, SC 29405-2413

**PRST STD**  
**Postage & Fees Paid**  
**NOAA Coastal**  
**Services Center**  
**Permit No. G-19**



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

# HD.gov

Working to Improve the People Side of Coastal  
Resource Management.

Bring new social science tools and information  
to your program efforts through *HD.gov*.

