# COASTAL SERVICES

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Linking People, Information, and Technology

## TECHNOLOGICAL DISASTERS:
### Lessons from Alaska and Oregon on Dealing with Oil Spills

### Florida Community Is Progressively Planning to Adapt to Climate Change

### Merging Blue and Green Infrastructure in Maryland

# From the Director

With so much of our national focus on the Gulf of Mexico as a result of the *Deepwater Horizon*/BP oil spill, many coastal resource managers are taking the time to look at their own vulnerabilities and preparations for a technological disaster.

To assist with these efforts, we asked coastal managers in Oregon and Alaska who have dealt with serious oil spills what lessons they learned that could help other states prepare. It turns out that there is much that managers can do now to not only be prepared in the event that a disaster does happen, but also to help keep a spill from occurring in the first place.

Another article in this edition of *Coastal Services* looks at how officials in Punta Gorda, Florida, embraced the opportunity to work with coastal resource managers to develop a climate change adaptation plan. Their plan—and the method for developing it—are providing a case study for other coastal communities.

We also look at how Maryland coastal resource managers have expanded an existing statewide "green infrastructure" program to incorporate what they are calling "blue infrastructure," or aquatic priorities in the nearshore coastal zone, such as submerged aquatic vegetation, oyster reefs, tidal wetlands, fish spawning and nursery areas, and shoreline buffers.

This new blue infrastructure information is helping the state target lands for protection and restoration, and will help with coastal and ocean planning efforts such as finding the best location for renewable energy projects, locating sand resources needed for beach replenishment, and helping local communities identify areas vulnerable to sea level rise and erosion.

The NOAA Coastal Services Center is providing spatial analysis advice and assistance to the Coastal Services Center fellow working in Maryland to develop additional criteria that the state will use with blue and green infrastructure data to direct its coastal land conservation activities. The work will help Maryland achieve its climate change adaptation objectives.

We hope that you find the articles in this edition of *Coastal Services* interesting and informative. ❖

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.

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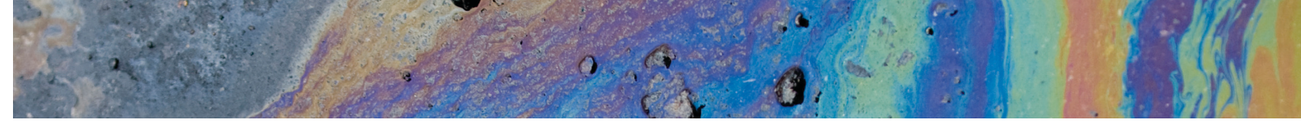


## News and Notes

# Planning for Coastal Hazards: Overcoming the Barriers

One of the best ways to implement hazard mitigation planning is through the local planning office.

For this reason, the NOAA Coastal Services Center has renewed its commitment to serve this important community. To get more information about this group, the Center recently commissioned a study to determine how land use planners view hazard mitigation planning.

Fortunately, community planners are very enthusiastic about this topic, but there are many barriers that stand in the way. *Hazard and Resiliency Planning: Perceived Benefits and Barriers among Land Use Planners* investigates those barriers and offers actions that coastal programs can take to remedy the situation.

### Barriers

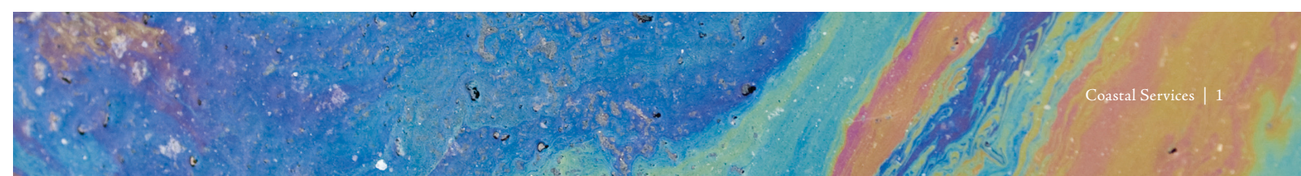
- **Disconnect with local emergency planning** – hazard plans are generally developed by emergency planners, without strategic input from land use planners. This results in few hazard plans actually being implemented.
- **Lack of available local, actionable data** – effective hazard planning requires specific local data. Data for some communities do not exist, while other planners may have challenges locating, using, and interpreting available data.
- **Lack of public support and political will** – elected officials and community members who favor growth in at-risk coastal areas can influence the planning process.
- **Existing development and property rights** – imposing new regulations on at-risk areas where development already exists can be controversial and costly.
- **Competing workplace priorities** – longer-range, strategic tasks like hazard planning are often superseded by more urgent, day-to-day activities.
- **Limited budgets** – lack of public support and political will results in funds not being available for the comprehensive planning needed to address coastal hazards.

### Fostering Behavior Change

Social scientists say the best way to change behavior is to decrease barriers and increase benefits. The report recommended many actions, including these listed below.

- Help local planners and community leaders identify specific hazard-related data and information needs. Focus on data that could motivate communities to take action, or data that would inform the work of those committed to hazard planning. Offer assistance when needed.
- Consolidate existing resources relevant to local hazard planning to provide an easier way for planners to locate and use the resources. Publicize these resources to the broader planning community.
- Prepare detailed case studies and helpful outreach materials that demonstrate the economic, environmental, and social benefits of hazard and resilience planning.
- Provide guidance to community planners on implementing hazard mitigation policies in the immediate aftermath of a disaster, when elected officials and the public are more receptive to planning for these events.
- Encourage local planners to use the development or renewal of community master plans as an opportunity to incorporate risk and resilience planning principles.
- Facilitate communication between emergency planners and land use planners. ❖

*To view the Hazard and Resiliency Planning: Perceived Benefits and Barriers among Land Use Planners study, go to the social science section of the NOAA Coastal Services Center's website at www.csc.noaa.gov/publications/.*



# Florida Community Is Progressively Planning to Adapt to Climate Change

For some communities, it seems the 25- to 100-year planning horizon for climate change impacts poses too great a challenge for local decision makers. Officials in Punta Gorda, Florida, however, embraced the opportunity to work with coastal resource managers to develop a climate change adaptation plan, and are already working to incorporate adaptation measures into strategic planning goals.

> *"The adaptation plan is serving as a sourcebook of ideas to make the city more resilient."*
>
> *Lisa Beever, Charlotte Harbor National Estuary Program*

"The adaptation plan is serving as a sourcebook of ideas to make the city more resilient," says Lisa Beever, director of the Charlotte Harbor National Estuary Program and facilitator of the city's adaptation planning process. "The plan prioritizes adaptation strategies and addresses the most significant vulnerabilities."

The development of Punta Gorda's climate change adaptation plan was completed as part of the Climate Ready Estuaries program initiated in 2007 by the U.S. Environmental Protection Agency and the National Estuary Programs. Charlotte Harbor was one of six estuaries selected to be a case study to develop plans to help protect sensitive coastal ecosystems, infrastructure, and economies from the effects of climate change.

To develop Punta Gorda's climate change adaptation plan, public workshops were held to identify the city's overall climate change vulnerabilities, as well as the mitigation strategies and adaptation techniques that could be used to address them. A process for the city to implement identified actions was also developed.

## Hurricane Lessons

One of the reasons that Punta Gorda was amenable to working with Charlotte Harbor to develop a climate adaptation plan was the fact that the community was devastated by Hurricane Charley in August 2004, says Mitchell Austin, the city's urban planner, whose first day on the job was the Monday after the storm.

At its peak intensity, Charley attained 150 mile per hour winds, making it a strong category 4 on the Saffir-Simpson Hurricane Scale. The storm made landfall in southwestern Florida at maximum strength, making it the strongest hurricane to hit the U.S. since Hurricane Andrew struck the state in 1992.

Charley caused $14.6 billion in property damage on the peninsula of Florida alone.

"It's an eye-opening experience," says Austin. "It totally changes your perspective on what is and what is not possible."

## More Resilient

As part of the recovery from Charley, Punta Gorda incorporated a variety of adaptation measures that will not only better prepare the community for future storms, but also increase its resilience to climate change impacts.

One city initiative in 2007 included working with Florida Sea Grant and the University of Florida Conservation Clinic in the Levin College of Law to develop comprehensive planning language addressing sea level rise implications for infrastructure.

## Picking on Punta Gorda

When Charlotte Harbor began looking for a southwestern Florida community to work with to develop a climate change adaptation plan, Florida Sea Grant Marine Agent Betty Staugler suggested Punta Gorda.

"Since they already had comprehensive planning language for sea level rise, we were bringing resources they needed to help implement that policy," Beever says. "It was a ready-made partnership that Florida Sea Grant helped to foster."

On December 17, 2008, the Punta Gorda City Council voted unanimously to participate in the project.

## Fun and Games

Charlotte Harbor invited city residents and other stakeholders to a series of workshops to help prepare the city for changes in the weather.

These changes could include more drought, less availability of potable water, sea level rise, shorter winter seasons, higher humidity, higher maximum temperatures, more hot days and heat waves, higher and stronger storm surges, and increased precipitation, including heavy and extreme precipitation events, increased storm frequency, and stronger storms.

Three public workshops were held to derive vulnerabilities, adaptation options, and priorities.

The key to the workshops' success, says Beever, was the use of four different public participation games that helped gather critical data.

"When you are building plans with citizenry participation, it is really important to respect their time and input," Beever says. "Games do help respect their time and make the process pleasant and meaningful."

## Acceptable Options

During the workshops, the citizens prioritized eight major areas of climate change vulnerability for the city. These included fish and wildlife habitat degradation, inadequate water supply, flooding, unchecked or unmanaged growth, water quality degradation, education and economy and lack of funds, fire, and availability of insurance.

*A series of public workshops were held to identify climate change vulnerabilities and prioritize mitigation strategies.*

A total of 104 acceptable and 34 unacceptable recommended adaptation options were identified and prioritized by group agreement, Beever says.

The top agreed-upon adaptation strategies included seagrass protection and restoration, Xeriscaping and native plant landscaping, explicitly indicating in the comprehensive plan which areas will retain natural shorelines, constraining locations for certain high-risk infrastructure, and restricting fertilizer use.

The plan underwent public, city staff, and council review before it was unanimously accepted in November 2009. "The city council directed staff members to incorporate components of the plan into their normal work process, including their comprehensive planning update," Beever says.

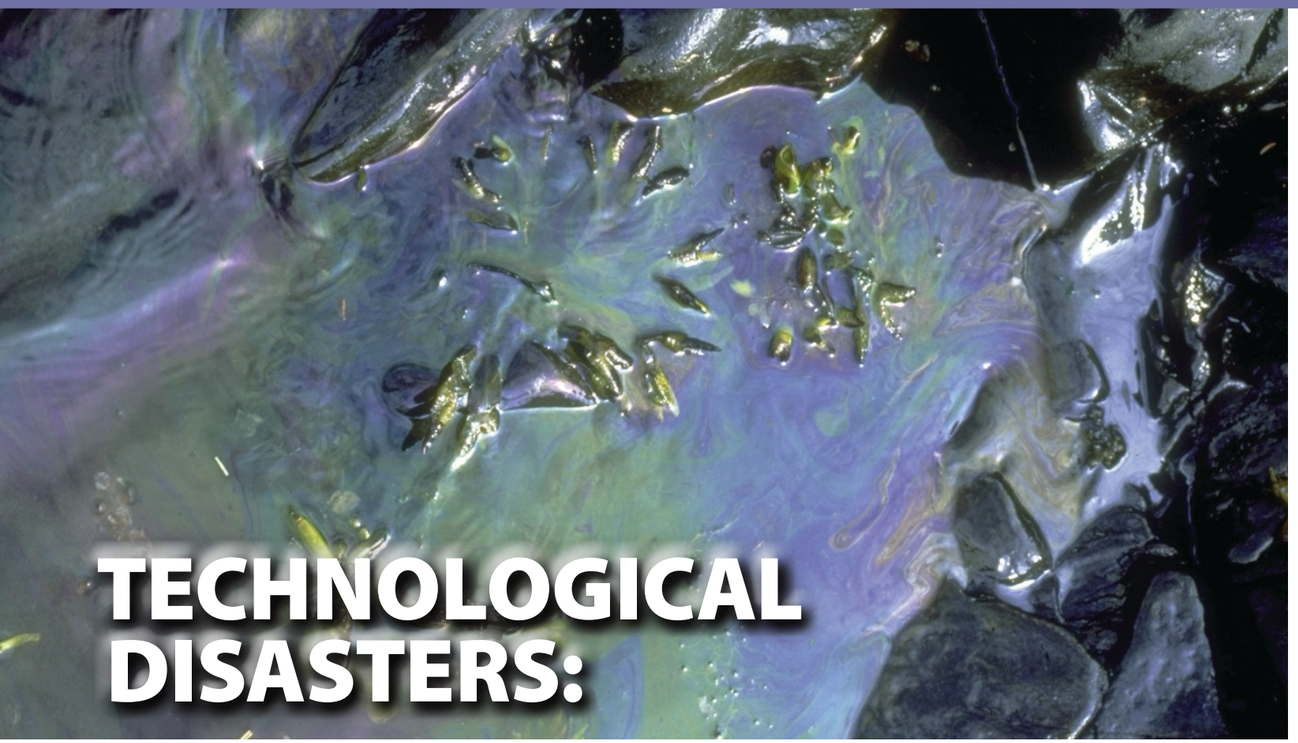
## Incremental Steps

"Climate change is a really complicated long-range challenge," Austin says. "However, there are tiny incremental pieces that can make a huge difference in the long run. If we start taking these on today, it's not going to be that hard or unpalatable, and it is only incrementally more costly than what we are doing anyway."

He adds, "To us, this plan means having some basis to start. We now have the data and analysis, and we have a framework to think about which of the menu of options as far as adaptation make sense at any point in time." ❖

*For more information, go to www.chnep.org/projects/climate/CRE.htm. You may also contact Lisa Beever at (239) 338-2556, ext 235, or lbeever@swfrpc.org, or Mitchell Austin at (941) 575-3335, or maustin@ci.punta-gorda.fl.us.*

Photo courtesy of City of Punta Gorda



# TECHNOLOGICAL DISASTERS:

## Lessons from Alaska and Oregon on Dealing with Oil Spills

Since April 20, when an explosion and subsequent fire damaged the *Deepwater Horizon*/BP oil rig, the eyes of the nation have been on the Gulf Coast. While the events surrounding the *Deepwater Horizon* spill are extraordinary, many coastal resource managers are using the incident as an opportunity to look at their own vulnerabilities and preparations for a technological disaster.

"We are using the *Deepwater Horizon* event as a wake-up call to make sure new staff members are prepared," says Steve Rumrill, research coordinator for the South Slough National Estuarine Research Reserve (NERR). "This is an opportunity for us to make sure that they're up to speed for an immediate response, as well as the long-term damage assessment activities that go along with a spill."

To help managers with their self-assessment, we asked staff members at South Slough NERR who went through the most serious oil spill in Oregon's recent history in 1999, and officials in Alaska who dealt with the grounding of the *Exxon Valdez* in 1989, as well as other oil spills, what lessons they learned that could apply in other parts of the country.

### Oil Spill Impacts

While there have been several spills in Alaska that have significantly impacted coastal resources, the worst of these occurred just past midnight on March 24, 1989, when the *Exxon Valdez* ran aground, rupturing eight of its eleven cargo tanks and dumping at least 11 million gallons of crude into Prince William Sound. Over the next few months, the oil spread across 1,200 miles of Alaska coastline—impacting three national parks, three national wildlife refuges, and a national forest.

According to Joe Banta, project manager for Environmental Monitoring at the Prince William Sound Regional Citizens' Advisory Council, the *Exxon Valdez* spill occurred just prior to the most biologically active season of the year.

"It happened right before herring season, which were at historic highs," Banta says. "The herring fishery crashed a couple of years after the spill, basically never to return," taking the herring fishing industry with it.

> *"We are using the Deepwater Horizon event as a wake-up call."*
>
> *Steve Rumrill, South Slough National Estuarine Research Reserve*

The spill also profoundly affected the social and economic fabric of coastal towns in the path of the oil slick, says Torie Baker, who works with Cordova and Prince William Sound as part of the Alaska Sea Grant Marine Advisory Program. Significant increases in alcohol and drug abuse, domestic violence, and employment problems were reported.

### Identifying the Risk

A state does not need to have active offshore oil drilling for its coastal resources to be at risk of a spill, advises Rumrill.

"Any ships coming into port laden with hazardous materials are a risk," Rumrill says. "Hazardous materials can also be found on railroad cars and in trucks that move throughout our coastal areas. We need to think beyond ships and big-scale oil rigs and think about the potential for smaller, more chronic spills, as well."

"In reality, oil comes in a lot of different forms," says Banta. "It can be a refined product on land in a storage facility. But it is very toxic and can have a huge impact on local resources. It really behooves us to understand the scenarios and to do what we can do to make sure facilities are well built and wisely operated. Trying to catch up after the fact is a most difficult thing to do."

### Before A Spill

While the list of recommendations from Alaska and Oregon managers was long, a number of lessons rose to the top. These include things that can be done before a spill, such as conducting broad baseline environmental assessments and getting to know the players and structure of the U.S. Coast Guard's Incident Command System and the Natural Resource Damage Assessment process.

*Continued*

### PREPARING FOR THE WORST IN OREGON

On February 4, 1999, the most serious oil spill in Oregon's recent history occurred when the 639-foot freighter called the *New Carissa* ran aground about 150 yards off a stretch of remote beach three miles north of Coos Bay. Over the next 106 days, as salvage operations were hindered by severe winter storms, the *New Carissa* would leak between 70,000 and 140,000 gallons of oil, killing about 3,100 shorebirds and seabirds.

Potential environmental risks from the grounding included impacts to the nearby South Slough National Estuarine Research Reserve (NERR), which is within Coos Bay near Charleston, Oregon.

"Oil released by the *New Carissa* provided a serious wake-up call," says Steve Rumrill, the research coordinator for South Slough Reserve. "We were unprepared for an oil spill in the estuary."

Over the following three months, the reserve staff provided important environmental information to and learned how to work within the Coast Guard's Incident Command System, labored to prevent spilled oil from entering the estuary, and participated in the Natural Resource Damage Assessment process.

Although the reserve escaped severe environmental damage in this instance, the spill made staff members keenly aware of the estuary's vulnerability. The reserve is now prepared to respond immediately to an oil spill and is part of the state's oil spill response plan.

"Coastal resource managers shouldn't shy away from participating in emergency response," Rumrill says. "Our role is clear, and there is a place for us." ❖

*To read more about South Slough Reserve's oil spill response and preparations, go to www.csc.noaa.gov/magazine/2006/02/article2.html.*

Photo courtesy of the Exxon Valdez Oil Spill Trustee Council

"Incident Command is uniform throughout the U.S," says Rumrill. "Everyone needs to be familiar with the decision-making structure of Incident Command and needs to make sure that the Incident Command folks in their area are aware of the data sets, modeling, and resource expertise that they have to offer."

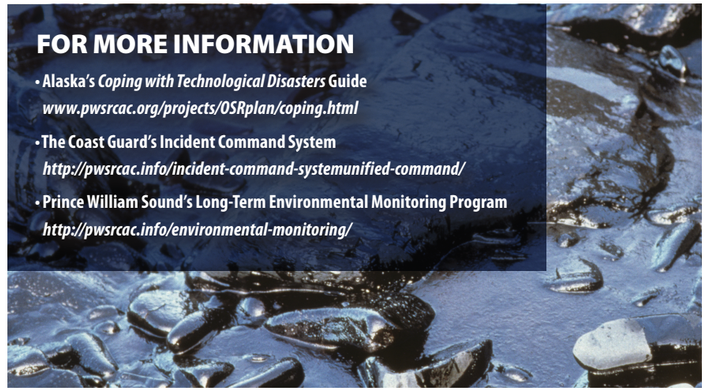
Managers also need significant baseline environmental data before an incident that cover multiple seasons and conditions, says Molly McCammon, director of the Alaska Ocean Observing System. "Trying to get things back to what they would have been like if a spill had not occurred without really having any data to back that up is very difficult."

McCammon adds, "I cannot emphasize enough how essential it is to have a really robust ocean monitoring program."

Other advice for coastal managers is to focus efforts on preventing a spill in the first place, says Zygmunt Plater, a professor at Boston College Law School who chaired the Alaska Sea Grant Legal Research Team after the *Exxon Valdez* spill, which identified legal tools the state could use to strengthen its oversight of the marine transport of hazardous substances.

"We need to make sure that there are good response systems in place," Plater says. "Immediate response within the first 48 hours is our best chance."

In Alaska, citizens' advisory councils that were established after the *Exxon Valdez* incident are working particularly well and are recommended as models for elsewhere.



**FOR MORE INFORMATION**

- Alaska's *Coping with Technological Disasters* Guide
  *www.pwsrcac.org/projects/OSRplan/coping.html*
- The Coast Guard's Incident Command System
  *http://pwsrcac.info/incident-command-systemunified-command/*
- Prince William Sound's Long-Term Environmental Monitoring Program
  *http://pwsrcac.info/environmental-monitoring/*

"Work with your partners to prepare now while you have the luxury of doing it in advance," advises Baker. "Take a moment to look at some 'what if' scenarios given your current network of collaborators."

### After a Spill

Immediately after a spill, being able to work with and provide maps, data, and expertise to the Incident Command is cited as critical, as is quick initiation of, and involvement in, the Natural Resource Damage Assessment process. Managers may even find themselves manning booms to help protect resources.

"Don't be hesitant to get involved in the resource assessment," Rumrill says. "You have to work within the system to be effective."

"Communication is paramount," adds Reid Brewer, the Unalaska agent for the Alaska Sea Grant Marine Advisory Program. "When these things happen, it is important that there be local input into the Incident Command structure."

In the long term after a spill, communicating with and supporting hard-hit communities and coastal industries is critical to recovery. "The best thing you can do is be as transparent as you can be," Brewer says. "The best thing to do is to continue to work with people and provide an open two-way communication forum."

While each major spill is different, it is clear that coastal managers, resources, and communities all will be impacted in the event that the worst does happen. Efforts to support prevention and being prepared to respond should an event take place will go a long way to limit the long-term impacts. ❖

*For more information on Alaska's experience, contact Joe Banta at (907) 277-7222, or banta@pwsrcac.org, Molly McCammon at (907) 644-6703, or mccammon@aoos.org, Reid Brewer at (907) 581-4589, or reid.brewer@alaska.edu, Torie Baker at (907) 424-7542, or torie@sfos.uaf.edu, or Zygmunt Plater at (617) 552-4387, or plater@bc.edu. For more information on South Slough National Estuarine Research Reserve's experience, contact Steve Rumrill at (541) 888-2581, ext. 302, or Steve.Rumrill@state.or.us.*



# Merging Blue and Green Infrastructure in Maryland

Maryland coastal resource managers have expanded an existing statewide "green infrastructure" program to incorporate what they are calling "blue infrastructure," or aquatic priorities in the nearshore coastal zone, such as submerged aquatic vegetation, oyster bars, tidal wetlands, fish spawning and nursery areas, and shoreline buffers.

This information is not only helping state managers target lands for protection and restoration, it is also being shared with local managers through the state's Coastal Atlas.

"We are helping to ensure the protection of Maryland's critical ocean and estuarine resources, and the coastal economies that depend on them," says Catherine McCall, natural resource planner for the Maryland Chesapeake and Coastal Program. "The Coastal Atlas has been developed to provide direct access to available data needed for coastal and ocean planning efforts."

The new data will be used for everything from finding the best location for renewable energy projects, to locating sand resources needed for beach replenishment, to helping local communities identify areas vulnerable to sea level rise and erosion.

"The Coastal Atlas will assist users in identifying potential conflicts so that they can then be avoided early in the planning process," McCall says.

### Adding Blue to Green

While green infrastructure can be used to refer to anything from a street-side rain garden to a statewide land conservation network, the term is commonly defined as an interconnected network of protected land and water that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to a community's health and quality of life.

Benefits of a holistically conceived green infrastructure program include improving stormwater and wastewater management, helping to mitigate impacts from natural hazards and adapt to climate change, and providing other ecological and recreational services.

"We have a very good handle on our green infrastructure program network in Maryland and are targeting land acquisition, but what has been missing is the nearshore information and what is happening in the water," McCall says.

### Assessment

To get this information, McCall and a staff geographic information system (GIS) analyst worked to assess the state's blue infrastructure and used marine spatial planning tools to evaluate compatible coastal uses.

> *"We are helping to ensure the protection of Maryland's critical ocean and estuarine resources, and the coastal economies that depend on them."*
>
> *Catherine McCall, Maryland Chesapeake and Coastal Program*

To do the analysis, they divided the shoreline into unique 1-kilometer segments that were easily reviewable. Working with resource managers from across the state, they looked at everything from oyster, clam, and mussel habitats, submerged aquatic vegetation beds, access structures, and fish spawning and nursery areas. They came up with a five-tier rating system that coded resources from low to high ecological integrity.

The completed Blue Infrastructure Near-shore Assessment identifies the priority coastal habitat, critical aquatic resources, and associated human uses in the tidal waters and nearshore area of Maryland's Chesapeake and coastal bays, tidal waters, and ocean.

Linking the blue infrastructure with the green infrastructure has "created a framework to identify coastal habitats and areas where conservation and restoration activities can be targeted to maintain and improve coastal resources," McCall says.

*Continued on Page 9*

Photo courtesy of Maryland Chesapeake and Coastal Program

# Ohio Groups Unite to Advance Lake Erie Education and Outreach

A conversation between colleagues in Ohio sparked the creation of a multi-organizational partnership focused on empowering citizens to take action to improve water quality in Lake Erie and the surrounding watershed. By working together, the partnering agencies are presenting a unified message that Lake Erie and the Great Lakes are important to the environment and economy of the region and nation.

> *"We saw an opportunity to leverage the expertise in each agency."*
>
> *Melinda Huntley, Ohio Sea Grant College Program*

"There were natural synergies between our agencies," says Chris Riddle, grants manager for the Ohio Lake Erie Commission. "By working together, we feel like we are all focused on the same page and headed in the same direction."

The Lake Erie Partnership for Education and Outreach is made up of Ohio's Coastal Management Program, Old Woman Creek National Estuarine Research Reserve (NERR), Ohio Sea Grant, and the Ohio Lake Erie Commission.

The idea for the partnership came from a conversation between Brenda Culler, public information officer for the Ohio Office of Coastal Management, and Melinda Huntley, tourism extension program director for the Ohio Sea Grant College Program.

"We saw an opportunity," says Huntley, "to leverage the expertise in each agency."

While the group already worked together, members didn't have a good grasp of the scope, mission, and projects being undertaken by each organization. To address this, they first focused on "learning exactly what each of us was doing, how we fit together, and where there were natural opportunities or gaps that we were missing out on," Riddle says.

The group then developed a unified strategic plan for education and outreach based on environmental indicators measured every four years by the Ohio Lake Erie Commission.

To help with messaging, the agencies developed an environmental literacy framework for Lake Erie, which they modeled on NOAA's ocean literacy principles.

Since May 2009, the group has sought feedback from multiple stakeholders on the "Lake Erie Literacy Principles and Concepts," and these principles are expected to be finalized this fall. The Centers for Ocean Sciences Education Excellence–Great Lakes is creating Great Lakes literacy principles that are modeled after those created for Lake Erie.

In the coming year, the partners will be working with Ohio public television to develop video vignettes that illustrate the eight Lake Erie literacy principles by breaking down complicated science and concepts into practical real-world applications.

"We have proven repeatedly that what we accomplish together is greater than the sum of its parts," says Heather Elmer, the coordinator of Old Woman Creek NERR's Coastal Training Program. "Our partnership will benefit Ohioans living along the coast, the resources, and everyone in the Lake Erie Watershed." ❖

*For additional information on the Lake Erie Partnership, go to http://ohiodnr.com/tabid/21178/Default.aspx. For additional information, contact Brenda Culler at brenda.culler@dnr.state.oh.us, Melinda Huntley at (419) 609-0399, or huntley@coastalohio.com, Heather Elmer at (419) 433-4601, or heather.elmer@dnr.state.oh.us, or Chris Riddle at (419) 245-2514, or chrisriddle@ameritech.net.*

Photo courtesy of Ohio Coastal Management Program



*Continued from Page 7*

## Sharing the Data

To get the information into the hands of local decision makers for coastal and ocean planning activities, the Maryland Chesapeake and Coastal Program incorporated the blue infrastructure assessment into the state's existing Coastal Atlas, which is an online mapping and planning tool that can be used to visually analyze and explore data.

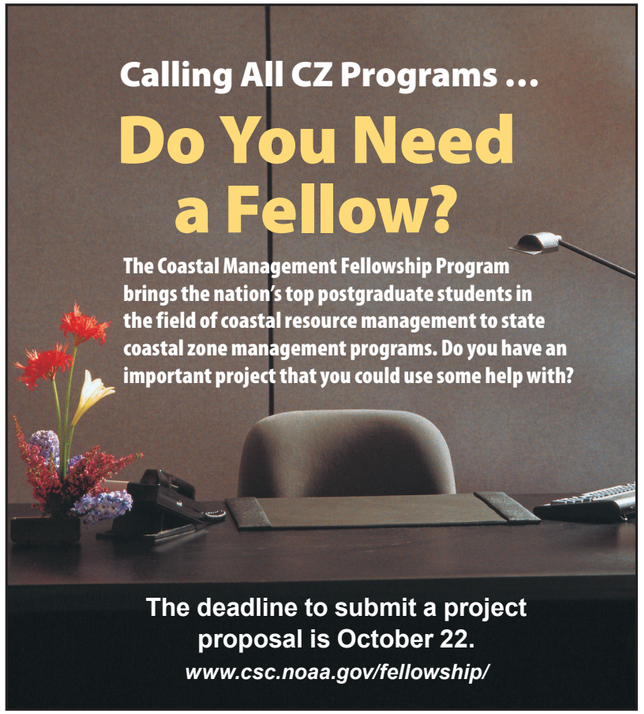
"The Coastal Atlas now has three components," explains McCall. "The ocean atlas can be used to evaluate offshore wind energy, the shoreline component can be used to address shoreline stabilization issues, as well as sea level rise, and now we have a new estuaries component, where we have merged all the blue infrastructure assessment data."

Training for all county decision makers in the state on using the blue infrastructure data was set to begin in August.

"I feel good about it," McCall says. "I think we've taken a look at a very broad suite of information and on-the-ground experiences that different resource managers have had, and we've been able to take that data, information, and experiences and combine it into a package that helps us more clearly to convey what our conservation priorities and targets are, and why."

She adds, "Blue infrastructure has really helped us focus our efforts." ❖

*To view Maryland's Coastal Atlas, go to http://dnr.maryland.gov/ccp/coastalatlas/index.asp. To view the new estuaries component, go to http://dnr.maryland.gov/ccp/coastalatlas/estuaries.asp. For more information on Maryland's Blue Infrastructure Near-Shore Assessment, contact Catherine McCall at (410) 260-8737, or cmccall@dnr.state.md.us.*

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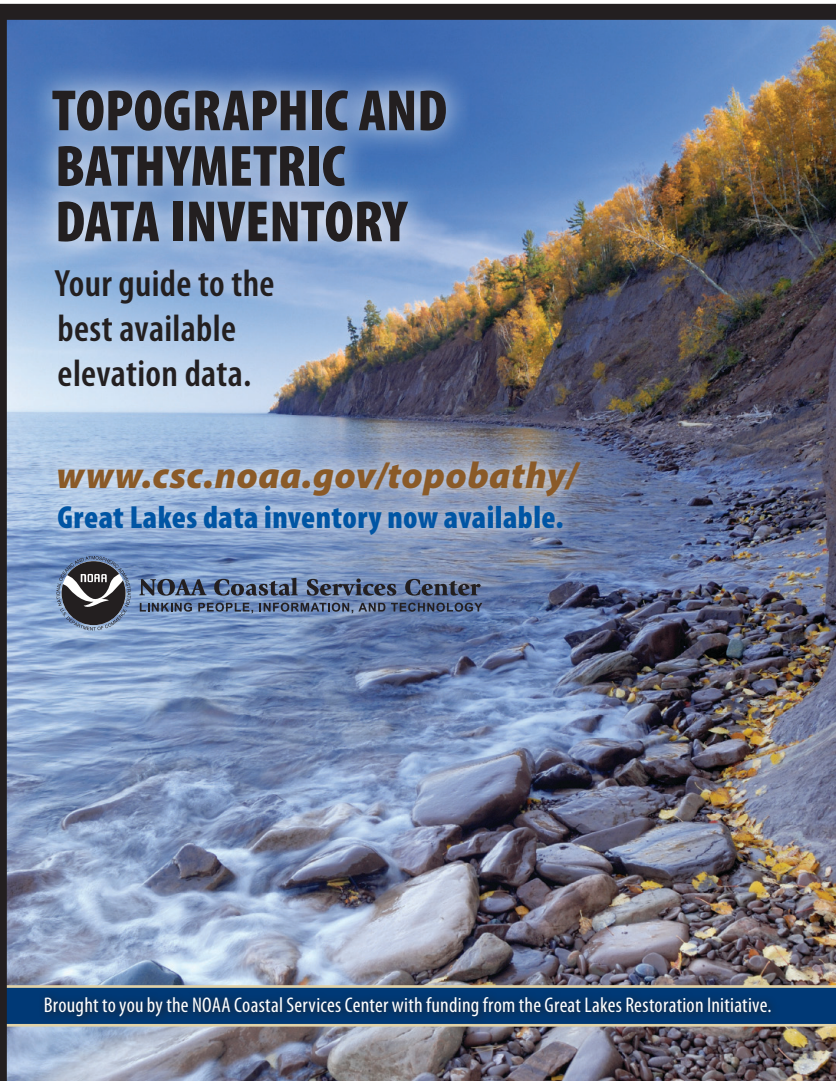

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