

COASTAL SERVICES

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LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

COMING TO TERMS WITH GREEN INFRASTRUCTURE

**Creating Climate
Ready Estuaries**

**Eyeing the Bottom of the
Lakes in Michigan**



FROM THE DIRECTOR

The term “green infrastructure” is being applied at a wide range of landscape scales, from regional conservation networks to residential rain gardens. Fundamentally, green infrastructure is a planning framework for recognizing the valuable services that nature provides.

A green infrastructure network helps protect land and nearshore resources that support healthy plants and animals, clean air and water, and natural spaces for people to play.

It is also a tool that can help local communities become more resilient to natural hazards and adapt to climate change.

The cover story of this edition of *Coastal Services* provides a valuable overview of green infrastructure.

To learn more about green infrastructure and how to apply geographic information system (GIS) tools, methodologies, and analyses when conducting this planning process, the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center co-teaches a GIS Tools for Strategic Conservation Planning course with The Conservation Fund.

To register go to www.csc.noaa.gov/training/gis_tools.html.

Because conserving land is such an important tool in efforts to

address climate change, the NOAA Coastal Services Center, U.S. Fish and Wildlife Service, and U.S. Environmental Protection Agency are working together with The Nature Conservancy and Land Trust Alliance to better understand the needs of conservation organizations in the face of issues such as sea level rise and coastal inundation.

This partnership will move forward the development of a coastal climate fellow, which will provide local and regional land trusts with tools, data, and best practices.

NOAA is also partnering with the U.S. Geological Survey to demonstrate the value of collaboration to further adaptation to the impacts of a changing climate on the nation’s important coastal areas. This partnership will address the needs of national, regional, and local coastal decision makers.

NOAA is committed to working with decision makers across the public and private sectors who are planning now to prepare for, mitigate against, and adapt to the impacts of climate change. ❖



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

Make Your Meetings Better with Stealth Facilitation Skills

Some people think meetings are evil, mostly because of the difficulty in getting people to stay on task—particularly when large groups are involved. While a skilled facilitator can guide people to meet in a productive way, not all organizations have access to trained professionals.

Under these circumstances a meeting participant can apply a stealth approach by borrowing tricks from the facilitation trade. Some of the more common techniques are stated below.

1. Ask for a round of introductions.

Not only does this let people know who is in the room, but it also gets everyone talking and on an equal footing. Equally important, this is a subtle way to let everyone know their opinion matters.

2. **Offer to take notes.** The note taker can hold a powerful position. When needed, recap what has happened as a way to get people back on track. Summarizing with phrases such as “What I’ve heard is . . .” or “It seems as if we are saying . . .”

is also a diplomatic way to point out problems.

3. **Provide an organizing framework.** Starting with definitive goals, an agenda, and a process will keep people on the same page. Presenting the major ideas on a flip chart throughout the meeting is another way to accomplish this goal and is also a way to incorporate different learning styles.

4. **Ask questions that will lead the group in a clearer direction.** Tone is very important here.

Asking clarifying questions, such as the ones listed below, should be done with a gentle tone of voice.

- What are we trying to accomplish?
- What’s the goal of this effort?
- Who is the target audience?
- What do we need to do to move to the next step?

5. **Combat spinning or getting off track.** The stealth facilitator can say, “We’re raising some important issues, but I’m worried we aren’t going to finish our main task today.” Another technique is to offer a parking lot, a visible

place where important but off-topic subjects can be written down to be dealt with another day.

6. **Interrupt someone who is monopolizing the conversation.**

To give quiet participants a chance to be heard, statements such as “I don’t think we’ve heard from everybody” can be effective, particularly when coming from the person who is leading the meeting.

7. **In an argument, restate what you hear both sides saying.** Suggest a break if needed.

Effective facilitation, whether it occurs through a trained facilitator, the meeting leader, or a talented member of the audience, can turn a meeting wasteland into a productive tool. ❖

To acquire meeting-facilitation and related skills, attend the *Navigating in Rough Seas: Public Issues and Conflict Management class* provided by the National Oceanic and Atmospheric Administration Coastal Services Center. To bring this class to your organization, visit www.csc.noaa.gov/training/.

Creating Climate Ready Estuaries

Because of their vulnerability to climate change, our nation's estuaries may be harbingers for the rest of the country regarding potential impacts from sea level rise, increasing storm intensities, and other effects. But with limited data on what the actual impacts of climate change will be, how are estuary managers supposed to assess their ecosystems' vulnerabilities, develop adaptation plans, and implement adaptation measures?

"We think the vulnerability is so high for estuaries that they have to begin to plan now," says Jeremy Martinich, climate policy analyst for the U.S. Environmental Protection Agency's (EPA) Climate Change Division. "When you don't have perfect information, it creates a number of challenges."

To help coastal communities in their efforts, the EPA and the National Estuary Programs kicked off the Climate Ready Estuaries program in 2007. Six estuaries were selected to be case studies to develop plans to help to protect sensitive coastal ecosystems, infrastructure, and economies from the effects of climate change.

After just one year, the pilot programs are beginning to demonstrate results and provide lessons learned for other coastal resource managers. A Web-based toolkit has been developed

where coastal managers can get information and links to websites, reports, and other resources.

"Ready, fire, aim—that's the thought we are really trying to encourage," says Martinich. "Push to go forward with developing preliminary adaptation plans using a process that's flexible and interactive. The plan can be revisited and updated over time when new or better information comes out."

Feeling the Impacts

Not just places where rivers meet the sea, estuaries encompass whole ecosystems where millions of people live, work, and play.

Estuaries are projected to be particularly vulnerable to climate change effects, such as sea level rise, altered frequencies and intensities of precipitation, increased water temperatures, and more intense storm events.

The resulting impacts may include damage to and loss of wetlands, coastal property, and infrastructure, changes to water availability and quality, including impacts to groundwater and drinking water, and changes in habitat, fisheries, and other plant and animal distributions.

Getting Competitive

Recognizing the seriousness of the estuaries' vulnerabilities, the

"Effective adaptation will help reduce future costs because we're taking action while we still have time, and while the cost is less."

John Wilson, U.S. Environmental Protection Agency

EPA's Air and Water offices came together with the National Estuary Programs to develop a program to help local decision makers and resource managers take proactive steps to adapt to climate change.

"Effective adaptation will help reduce future costs because we're taking action while we still have time, and while the cost is less," notes John Wilson, program analyst in the EPA Office of Water's Oceans and Coastal Protection Division.

The six estuaries selected through a competitive process to pilot the program were Albemarle-Pamlico National Estuary Program in North Carolina, Charlotte Harbor National Estuary Program in Florida, Piscataqua Region Estuaries Partnership in New Hampshire and Maine, Partnership for the Delaware Estuary, Massachusetts Bays Program, and the San Francisco Estuary Project.

A Unique Process

While the estuaries received some EPA technical assistance and guidance, they were very much tasked with coming up with their own plans.

"There's a lot of wanting to be told what the process is, but we actually think that every program is so unique that they have to develop their own process," explains Martinich.

The guidance they were given included engaging old and new stakeholders, assessing vulnerability to the level of detail necessary, being explicit about the choices made based on acceptable risks and costs, clearly detailing specific implementation actions, and making sure the plan and process are flexible.

"We were also quite intent that this not just be a planning exercise and are encouraging movement toward implementation," adds Wilson.

Rising to the Surface

While it is still early in the pilot estuaries' processes, there are already lessons rising to the surface. One of these is narrowing the initial planning scope.

For instance, the Piscataqua Region Estuaries Partnership has had success conducting a vulnerability assessment on the impacts to transportation infrastructure, such as culverts, and what measures should be taken if precipitation increases in the future.

"The narrow focus initially is helping them build support for additional vulnerability and adaptation work," Wilson notes.

Searching for and adapting existing data is another take-away message.

"We got a lot of requests in the beginning for high-resolution data," says Martinich. "There was a strong feeling in many places that they just didn't have the information to do inundation mapping. In some places that was true, but what we began to find is if people dig around, there's a fair amount of data out there."

Other lessons are to look at climate change in the context of existing comprehensive planning efforts, join forces with other related efforts, and create an "adaptive" process that easily responds to changing information and events.

The Right Tool

To help pass on information to other estuaries and coastal programs about climate change impacts and adaptation, the Web-based Climate Ready Estuaries Coastal Toolkit was developed.

The site offers information on monitoring climate change, coastal vulnerability and adaptation tools, smart growth in the context of climate change, communications and outreach materials, adaptation planning, sustainable finance options, and where to find data.

"It's an evolving site," Wilson says. "We would very much like folks to suggest things we should add."

"One take-away lesson from all this," says Martinich, "is that climate change adaptation has become a high priority for coastal managers, and there's a lot of opportunities to coordinate and collaborate, and bring other folks into the process."

He adds, "While uncertainties exist, it's better to get moving and be flexible and adapt as our climate continues to change." ❖

For additional information, you may contact Jeremy Martinich at (202) 343-9871, or martinich.jeremy@epa.gov, or John Wilson at (202) 566-1158, or wilson.john@epa.gov.

Additional Resources

More information on Climate Ready Estuaries
www.epa.gov/cre/

The Climate Ready Estuaries Coastal Toolkit
www.epa.gov/cre/toolkit.html

Adaptation options relevant to estuarine management goals
www.epa.gov/cre/adaptationoptions.html

Information on the EPA's water climate change strategy
www.epa.gov/water/climatechange/

PHOTO BY JEREMY MARTINICH AND COURTESY OF U.S. ENVIRONMENTAL PROTECTION AGENCY

COMING TO TERMS WITH GREEN INFRASTRUCTURE

“We don’t want haphazard conservation any more than we want haphazard development.”

*Kris Hoellen,
The Conservation Fund*

When using the term “green infrastructure,” coastal resource managers may be referring to anything from a street-side rain garden to a statewide land conservation network. And while these examples may technically both be correct, some believe that the phrase has undergone “definition creep” and often means different things to different people.

“A lot of places wouldn’t consider rain barrels as green infrastructure,” notes Kevin Shafer, executive director of the Milwaukee Metropolitan Sewerage District, which sells rain barrels as part of its green infrastructure efforts. “By defining it and using common terminology throughout the country, we can learn more about it and help get those [green infrastructure] measures in place in a more efficient fashion.”

While the term is broadly used, what is commonly agreed upon is

that implementing a holistically conceived green infrastructure program has many benefits. These 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.

“There’s a great deal of benefit in restoring a natural landscape,” says Mike Friis, manager of the Wisconsin Coastal Management Program. “In addition to water quality benefits and resolving water quantity issues, we’re providing environmental corridors for wildlife and habitat for endangered species. This is a multifaceted approach to dealing with problems.”

What is also agreed upon is that implementing green infrastructure—or the blue infrastructure some coastal managers are creating—will not eliminate the need for more traditional “gray” infrastructure.

Defining Moment

While green infrastructure is a fairly new term, the concept dates back over a hundred years to Frederick Law Olmstead, the 19th century founder of American landscape architecture, who believed connected systems of parks and greenways were more beneficial than isolated green spaces.

Coined by Edward T. McMahon, former vice-president of The Conservation Fund and now a senior fellow at the Urban Land Institute, the phrase was trumpeted in a May 1999 report of the President’s Council on Sustainable Development, *Towards a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century*.

In the report, the council defined green infrastructure 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 the health and quality of life for America’s communities and people.”

In 2006, McMahon and The Conservation Fund’s Mark Benedict co-authored, *Green Infrastructure: Linking Landscapes and Communities*, which outlines green infrastructure principles and practices. In it, green infrastructure is defined as “an interconnected network of green space that conserves natural ecosystems values and functions and provides assorted benefits to human populations.”

A Natural Approach

For Shafer, green infrastructure means “using a natural approach to try to manage stormwater,” which for his Milwaukee agency includes selling rain barrels, creating rain and roof gardens, and implementing the Greenseams Program, where flood-prone properties with hydric soils are purchased and left undeveloped to maximize their water-absorbing capacities.

Robert Christianson, director of the St. Johns River Water Management District’s Department of Operations and Land Resources, conducts a similar land-acquisition program in Florida to prevent flooding. “The heart of the matter,” he says, “is recognizing that non-structural flood protection has to be one of the keys to our success as water managers.”

Maryland coastal managers are expanding an existing statewide green infrastructure program to better incorporate what they are calling “blue infrastructure,” or aquatic priorities in the nearshore coastal zone, such as finfish habitat and submerged aquatic vegetation.

“We are creating a framework to identify coastal habitats and areas where conservation and restoration activities can be targeted to maintain and improve coastal resources,” says Catherine McCall, natural resource planner for the Maryland Chesapeake and Coastal Program.

Big Picture

“First and foremost, green infrastructure is an *approach* to strategic conservation,” explains Will Allen, director of strategic conservation at The Conservation Fund. While it is the preferred strategy of The Conservation Fund, he notes that “there are other approaches to strategic conservation.”

For instance, open space planning and ecosystem-based management use different terminology but often have similar holistic goals.

Green infrastructure planning, Allen says, is proactive, systematic, coordinated with other policies, and most importantly, large- or broadscale.

High-Priority Systems

Fundamentally, green infrastructure means working with a broad group of stakeholders—what The Conservation Fund calls establishing a “leadership forum”—to look at existing plans and barriers, and identify high-priority natural resources, such as woodlands, wetlands, rivers, and grasslands.

“Collaboration is the key that helps green infrastructure move forward,” notes Shafer. “It’s the building block of all this. You need a lot of people to collaborate on how you’re going to implement programs, how you’re going to pay for these programs, and what the priorities and benefits will be.”

The second step is developing a “network design,” where the resources are mapped using a geographic information system (GIS) and important habitat and ecosystem functions are identified and connected. Decisions can then be made on where it makes the most sense to conserve lands.

“Developing an interconnected network is the most critical part from our standpoint,” Allen says.

Only after that process is complete should the group decide where development and gray infrastructure, such as storm drains and tunnels, should go.

“We don’t want haphazard conservation any more than we want haphazard development,” says Kris Hoellen, director of The Conservation Fund’s Conservation Leadership Network. “What tends to happen in a lot of areas is the focus is on built development, and then they look at where they have natural resources. It should be done together, with the emphasis on proactively looking at natural resources—not managing what’s left.”

A Matter of Scale

The last step in the green infrastructure planning process, Allen says, is also the one that contributes most to “definition creep.”

This step is developing an “implementation quilt,” where an array of tools can be implemented, such as installing a rain garden and green roof at the “site scale,” developing greenways or hazard mitigation at the “community scale,” and maintaining intact forests by doing land acquisition at the regional or “landscape scale.”

Continued

“This regional scale is the one we most frequently work at,” Allen says. “That, in essence, is our broad recommendation to coastal managers. Start at the watershed scale and then drill down.”

Green is Good

The green and blue infrastructure programs in Florida, Wisconsin, and Maryland have helped reduce flooding, improved water quality, and are supporting diverse plant and animal populations. Other green infrastructure benefits include enabling valuable natural processes to take place, such as sequestering large amounts of carbon and generating economic benefits through farming, forestry, fishing, and passive recreation.

Adding nearshore resources and habitat—such as submerged aquatic vegetation, oyster bars, tidal wetlands, fish spawning and nursery areas, and shoreline buffers—to green infrastructure efforts will expand the interconnected resource network and help protect coastal communities from storm surge and erosion, says McCall.

Maryland is working to incorporate sea level rise and climate change into strategic land and habitat planning using the state’s green and blue infrastructure networks. McCall says, “This will help identify coastal habitats threatened by sea level rise and will direct management and restoration activities to protect their long-term viability, and will shape policies regarding when and where lands are purchased in areas vulnerable to sea level rise.”

Marrying Green and Gray

With more than 1,881 flood-prone acres conserved in Milwaukee, green infrastructure has been an undeniable success. Friis notes, however, that what has worked best is marrying the green with the gray infrastructure.

“Green infrastructure is a valuable device, but it can be overplayed pretty quickly,” says Christianson, whose St. Johns River Water Management District has conserved 700,000 acres. “It’s important for the citizens of our area to understand the contributions from green infrastructure—and they are many—but we have to maintain [the gray infrastructure] we have, while we continue to increase our green tools.”

“Just lead with the green,” advises Allen. “That’s the best recommendation.” ❖

For more information on The Conservation Fund’s green infrastructure definition and support services, you may contact Kris Hoellen at (304) 876-7462, or khoellen@conservationfund.org, or Will Allen at (919) 967-2223, ext. 124, or wallen@conservationfund.org. For information on Greenseams, contact Kevin Shafer at (414) 225-2088, or kshafer@mmsd.com, Mike Friis at (608) 267-7982, or michael.friis@wisconsin.gov, or Peg Kohring at (269) 426-8825, or pkohring@conservationfund.org. For more information on Maryland’s blue infrastructure program, contact Catherine McCall at (410) 260-8737, or cmccall@dnr.state.md.us. For more information on the St. Johns River Water Management District’s green infrastructure efforts, contact Robert Christianson at (386) 329-4470, or rchristianson@sjrwmd.com.

Helpful Links

For more information on green infrastructure, point your browser to

Green Infrastructure: Linking Landscapes and Communities by Mark A. Benedict and Edward T. McMahon
www.conservationfund.org/pubs_product_list/131

The Conservation Fund’s strategic conservation services
<http://greeninfrastructure.net>

The Conservation Fund’s upcoming green infrastructure courses
www.conservationfund.org/training_education/upcoming_training_courses

The National Oceanic and Atmospheric Administration Coastal Services Center and The Conservation Fund’s course, “GIS Tools for Strategic Conservation Planning”
www.conservationfund.org/course/gis_tools_strategic_conservation_planning

Maryland Shorelines Online
<http://shorelines.dnr.state.md.us>

Green Infrastructure Community of Practice
www.greeninfrastructure.net/content/community-practice

Reserve Creating Fish and Human-Friendly Habitat Restoration in Oregon

In the past, severe storms felled large trees and swept them into rivers, streams, estuaries, and even into the ocean, where they created a variety of natural habitats. For about the past hundred years, the number and size of trees being carried downstream has decreased, and the trees that do make it into the water are often removed to facilitate boating and prevent damage to dams, culverts, and other development.

Returning “large wood” to the natural system has become a well-known method for restoring stream habitat, but a National Estuarine Research Reserve in Oregon has recently used this method to restore juvenile salmon habitat and to develop an environmentally friendly canoe access ramp.

“Large wood in an estuary hasn’t been much on people’s radar screens,” says Mike Graybill, manager of the South Slough National Estuarine Research Reserve in Coos Bay, Oregon. “We’re helping to influence how other people are approaching habitat work in estuaries.”

Getting at the Root

For large wood structures in estuaries, “big trees with the root wads intact are most desirable,” says Craig Cornu, the coordinator of monitoring programs at South Slough. “Whole trees placed in estuarine channels cause scour holes in the channel bottom to form, which combined with the tangle of roots and branches, provide important refuge for fish.”

Graybill notes that the benefits of large trees vary depending on the environment. For instance, large trees provide food and hiding places for a variety of species in a stream or estuarine system and can absorb wave energy along the coast during storms, helping to prevent shoreline erosion.

The goal of large wood restoration is to facilitate and mimic the environment-specific natural processes.

In the estuarine environment, Graybill notes, trees would become stranded. While the trees can and do move around, the function in the estuary is most beneficial “when they are calm and experience relatively little movement.”

Eight Months and Five Hours

A landslide in a local state park near the reserve severely damaged a road, and in order to relocate it, about 60 spruce trees were going to be harvested. The reserve was asked in February of 2004 if it had any beneficial use for the trees. The reserve selected 40 that were between 18 and 38 inches in diameter and averaged about 60 feet long—of adequate size for a large wood juvenile salmon habitat restoration project.

Partnering with the local watershed association, the reserve acquired grant funding and permits, as well as worked with the reserve’s advisory group of researchers and scientists to help finalize the design of the restoration project.

“We’re helping to influence how other people are approaching habitat work in estuaries.”

*Mike Graybill,
South Slough National Estuarine
Research Reserve*



By October, the project was a go, and in five hours a large helicopter airlifted all 40 trees from the road construction project and placed them in their assigned locations in the restoration site.

“At \$850 an hour to rent the helicopter and crew, it had to happen quickly,” Cornu says.

Preserving Human Use

In the same area where the large wood restoration project was constructed, a fragile creek bank was often used as a site to launch canoes and kayaks into the shallow tidal waters of South Slough.

Continued on Page 9

Eyeing the Bottom of the Lakes in Michigan

Teenage divers are helping Michigan coastal resource managers understand what is at the bottom of two Great Lakes. The teen-supported discoveries, which include significant cultural and archaeological findings, as well as biological features, are aiding efforts to better protect natural and cultural resources, understand lake water quality, improve decision-making about potential offshore development, such as wind farms, and provide public education.

“There is no substitute for getting a set of human eyes to look at the bottom of the lake.”

Matt Smar, Michigan Coastal Management Program

“There is no substitute for getting a set of human eyes to look at the bottom of the lake,” says Matt Smar, coastal nonpoint source coordinator for the Michigan Coastal Management Program. “They see things that lidar or sonar, or other remotely operated means of underwater exploration, just can’t pick up.”

It is the Noble Odyssey Foundation that brings its 13- to 17-year-old Sea Cadets together with scientists to explore what Lakes Huron and Michigan looked like several thousand years ago when water levels were nearly 300 feet lower than they are today.

The scuba-diving cadets have assisted in locating and characterizing underwater sinkholes and groundwater springs, and the unusual life forms that inhabit them. They have also documented a drowned river canyon, a limestone land bridge that effectively divided Lake Huron’s predecessor into at least two separate basins, and a conifer forest that grew on lands now far beneath the lake’s surface.

Since 2004, grants from the Michigan Coastal Management Program have helped fund the foundation’s summertime collaborative explorations with scientists and historians from the Thunder Bay National Marine Sanctuary, Cranbrook Institute of Science in Bloomfield Hills, Michigan, Annis Water Resources Institute at Grand Valley State University in Muskegon, Michigan, Oakland University in Rochester, Michigan, and the University of Wisconsin–Stout in Menomonie.

Working on board the 75-foot training vessel, *Pride of Michigan*, cadets from around the U.S. learn maritime skills, advanced diving skills, research skills, and surveying and mapping skills, says Luke Clyburn, president of the Noble Odyssey Foundation.

The cadets also work with professional filmmakers to document the explorations, producing DVDs and other educational materials, says Elliott Smith, science advisor to the foundation.



Noble Odyssey Foundation’s Luke Clyburn instructs cadets before a dive.

“We’re carrying on a mission of really training young people in maritime skills, but we’re also educating young people about the Great Lakes,” Clyburn says. “These kids are going to be the future leaders of our country, and they need to understand the importance of protecting our resources.”

Smar adds, “There is great value in exploration for exploration’s sake. For coastal managers who face the real potential of having to look at a permit for construction on the lake bed, we also need to know what’s down there and its importance—before we make a decision.” ❖

For more information on the Noble Odyssey Foundation, point your browser to www.nobleodyssey.org. You may also contact Luke Clyburn at (248) 666-9359, or lcllyburn@comcast.net, or Elliott Smith at (303) 880-4854, or nobleodyssey@comcast.net. For more information on the Michigan Coastal Program’s role, contact Matt Smar at (517) 335-3459, or smarm@michigan.gov.

PHOTO COURTESY OF NOBLE ODYSSEY FOUNDATION

Continued from Page 7

The reserve staff decided to use the same technology to “make sure that human uses were preserved along with habitat considerations,” Graybill says.

In 2007, the reserve worked with a contractor to design a unique facility that stabilized two large hemlock logs protruding 20 feet into the creek to provide both easy access for paddlers and additional habitat for fish.

Export Potential

While reserve staff members immediately started seeing fish using the system for habitat, they know it will take a number of years of monitoring to determine the true success of the large wood restoration projects, Cornu says.

Graybill, however, is already happy with the results.

“The things we’re learning here have export potential,” he says. “We’ve certainly seen that large wood projects have significant prospects in the Pacific Northwest.”

He adds, “I wouldn’t have any reason to believe that large wood isn’t playing similar roles in other estuaries. I would encourage other coastal managers to take a look at large wood in their systems.” ❖

For more information on the South Slough National Estuarine Research Reserve’s “large wood” habitat restoration and canoe access projects, contact Mike Graybill at (541) 888-5558, or mike.graybill@state.or.us, or Craig Cornu at (541) 888-2581, or craig.cornu@state.or.us.

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www.csc.noaa.gov/training/gis_tools.html

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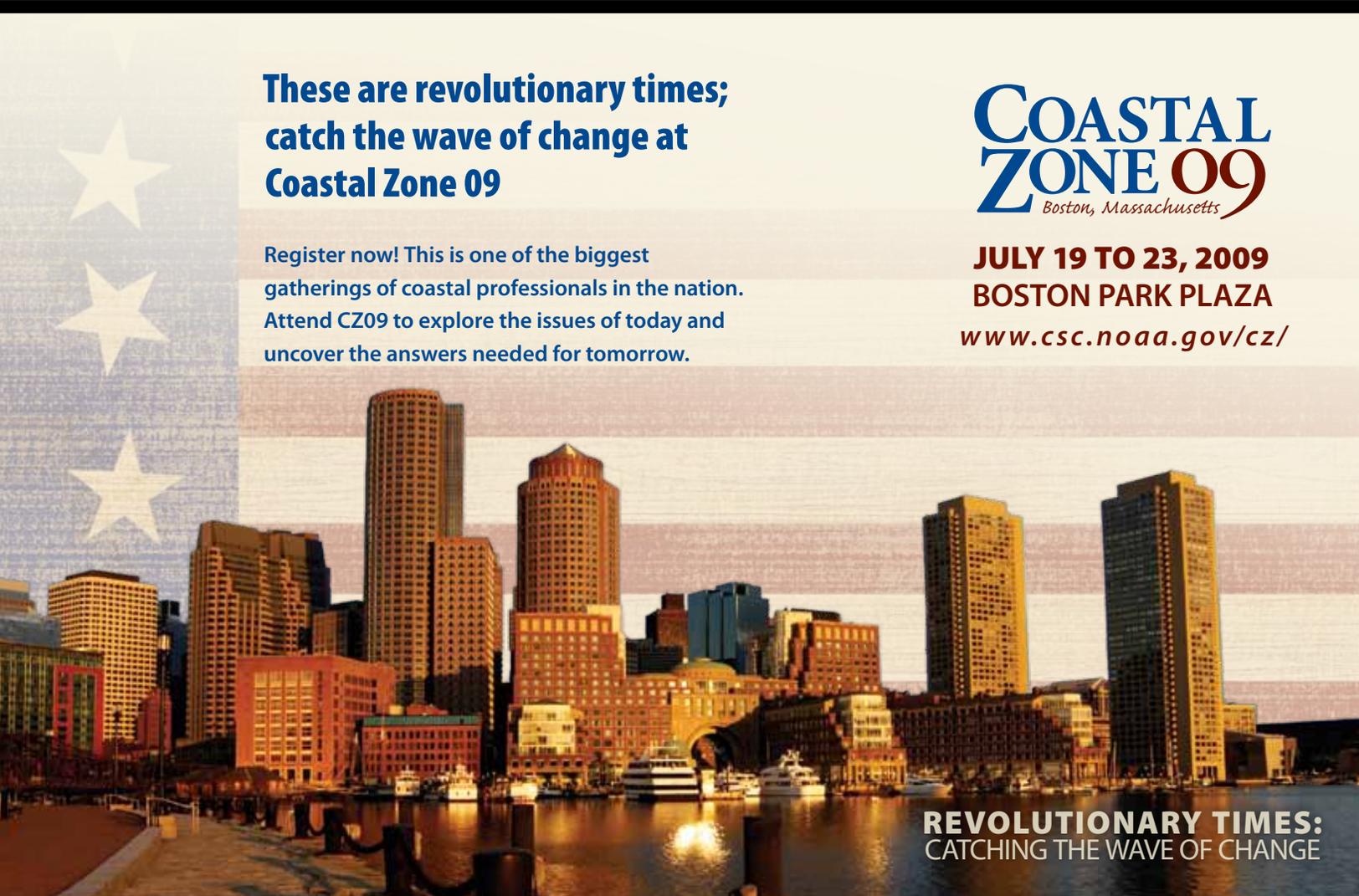
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