

COASTAL CONNECTIONS

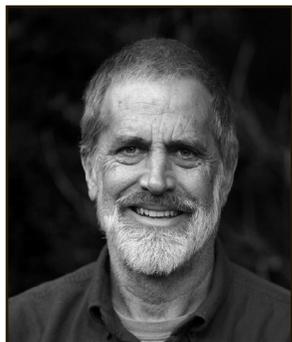


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C O A S T A L M A N A G E M E N T P R O F I L E



Mike Graybill
Manager, South Slough
National Estuarine Research
Reserve (NERR)

Where you live: About five miles from the reserve, on the shoreline of Coos Bay estuary in Oregon.

Job description: The mission of South Slough is to “improve the understanding and stewardship of Pacific Northwest estuaries and coastal watersheds.” As the manager, my challenge is to figure out, with the help of the staff, how to make the greatest possible progress toward that mission with the resources we have and the creativity we can bring to bear.

Education: B.S. in biology, Kutztown University; M.S. in biology, Oregon Institute of Marine Biology (OIMB) at the University of Oregon.

Family: Wife, Jan Hodder, a marine biologist working at OIMB.

Work-related accomplishment: Up to now, most activities at South Slough NERR have

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FOCUS

URGENCY MEETS OPPORTUNITY: Seizing the Moment to Map Coastal Inundation

Coastal events such as tsunamis, hurricanes, and record-breaking rainfall can bring on devastating consequences for communities and ecosystems affected by coastal inundation, a condition in which normally dry land is flooded by water.

While inundation can present significant management challenges—which are made all the more pressing by the prospect of sea level rise—the tools available to predict its occurrence and diminish its impacts have never been better, say Doug Marcy and Matt Pendleton, who teach Coastal Inundation Mapping, a course offered by the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center.

Then and Now

“In the past couple of decades, we’ve seen changes in both the frequency and variety of coastal inundation scenarios,” says Marcy, a hazards specialist. “From the 1970s to the 1990s, more focus was placed on inland and riverine flooding, because that’s where we were experiencing the highest disaster-related fatalities from tropical cyclones. Then the devastating Indian Ocean tsunami of 2004 raised concerns about the potential for tsunami-generated inundation on the West Coast and Pacific Islands. And with Hurricane Katrina in 2005, the Mississippi Gulf Coast experienced the worst storm surge ever recorded, with inundation that traveled 13 miles inland.”

Furthermore, says Marcy, future inundation events are a primary concern for scientists, public officials, and managers because sea level rise and other climate-related impacts may change the frequency and intensity of storms, resulting in more overall damage.

Fortunately, local and state agencies dealing with inundation are benefiting from a corresponding “surge” in visualization tools like Google Earth and geographic information system (GIS) applications that provide easier ways of sharing data and information. In addition, geospatial technology and storage capacity have improved so quickly that even smaller agencies can now manage high-resolution elevation data that were once considered expensive and too much of a strain on storage capacity.

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focused on the “wet” part of the estuary. Now, as we’re about to celebrate our 35th anniversary, we are working on a restoration plan for the upland, forested habitat.

Personal accomplishment:

Not only do I admire trees as defining elements of an ecosystem, I also admire the properties of the wood. I enjoy making wooden rowboats, canoes, and kayaks. My next woodworking project will be a dugout canoe. There are splendid Native American-built boats in this area, and I hope to learn some traditional techniques. I also enjoy pruning my fruit trees and gardening.

“The whole climate change dialogue is really changing the way that we look at forest restoration and how we manage carbon. It’s an exciting time for our reserve,” says Mike Graybill.

Accordingly, the South Slough reserve’s Upland Habitat Restoration Plan will include a study of the ways in which forested uplands operate as efficient “carbon recovery machines,” says Graybill.

“As a society, we’ve always valued forests for the wood they provide. Now it’s important to study how the distribution and manipulation of forests can help us understand global carbon flux. Potentially, forest research could teach us how to remove the carbon we’ve already put into the atmosphere,” Graybill emphasizes. “We also hope to learn more about the uses of forest resources for biofuel. Finally, we need to pay careful attention to forests, because they may be early sentinels of climate change impacts.”

Focus continued from Page 1

The result? Inundation maps overlaid with multiple types of data can help coastal professionals increase hazards awareness and preparedness, determine potential flooding impacts, encourage long-term planning and coastal resilience, and pave the way for community risk and vulnerability assessments.

“Now is a great time to learn these mapping skills,” says Pendleton, a geospatial analyst. “Our training helps to demystify the technologies and applications connected with mapping inundation. Course participants are introduced to all of the data and resource information we’ve collected from NOAA and other agencies— water level data, elevation data, flood models, geodetic and tidal datums, and the like.”

The following stories illustrate how resource managers and agencies at all scales of government can use inundation maps as a way to reduce hazard impacts and increase community resilience.

Helping Connecticut Communities Plan for Hazards

When NOAA Coastal Management Fellow Joel Johnson decided to take the Center’s Coastal Inundation Mapping course, he’d already started to create inundation maps. However, the course helped Johnson deepen and refine his mapping knowledge.

For his fellowship, Johnson is developing the Coastal Hazards Analysis and Management Program (CHAMP), which is administered by the Connecticut Department of Environmental Protection’s Office of Long Island Sound Programs.

Johnson’s inundation maps of the pilot community are now showcased on the Web portal at http://depweb.dms.uconn.edu/map_info_page.html.

“The pilot effort is done, so we’re going ahead with mapping coastal inundation scenarios for 33 other towns in Connecticut,” notes Johnson. “Our website’s visualization tool will enable users to select a coastal area in Connecticut, view inundation scenarios, and start planning for them. We hope municipal officials will use it to visualize and plan for accelerated sea level rise.”

Enabling a North Carolina Town to Bounce Back from Disasters

In the 1990s, portions of North Carolina were hit hard by a series of storm events, such as Hurricane Floyd, that caused significant river flooding. Consequently, emergency and floodplain managers, as well as state residents, asked for maps and information to help them make decisions before floods overwhelmed their areas.

In response, the Center joined with other state and federal partners to map the projected depth of floodwaters and the areas affected by inundation in Tarboro, North Carolina.

As a first step, the project partners sought high-resolution elevation data and reliable hydraulic models available through the Federal Emergency Management Agency’s Digital Flood Insurance Rate Maps and Flood Insurance Studies. Without these data sets, accurate modeling and mapping of water surface profiles would have been impossible.

Lidar data enabled project partners to model and map

flooding of the Tar River. The data and resulting maps showed how streets, buildings, airports, and other structures are likely to be impacted by floodwaters. This information will enhance the state's response to river flooding events and increase the community's resilience to natural disasters.

Visualizing Shallow Coastal Flooding and Sea Level Rise in Charleston, South Carolina

Shallow coastal flooding is caused by higher-than-average tides and can be worsened by heavy rainfall and onshore winds. The peninsular city of Charleston in South Carolina is projected to experience many more of these flooding events as sea level rises.

To illustrate the point, the Center partnered with South Carolina's Department of Natural Resources to obtain lidar data showing land elevation, and the Center processed the lidar data, making it available on the Digital Coast website. The Center also analyzed tidal frequency.

With this information, the project partners created maps showing the scale of potential flooding with a sea level rise scenario of 1.6 feet (0.5 meters) over the next 100 years. Under this scenario, the extent of flooding would be much greater during abnormally high tides. Another expected impact of this rise in sea level would be an increase in the frequency of flooding. With a projected 1.6-foot rise in sea level, the areas now susceptible to an abnormally high tide just two days per year would be susceptible to flooding 289 days per year.

The state shared these findings with Charleston's Mayor Joe Riley and city planners. The data can help Charleston officials make decisions regarding stormwater, wastewater, and flood-affected infrastructure.

To learn more about the Center's Coastal Inundation Mapping course, visit www.csc.noaa.gov/training/coastalin.html. This article is the first in a series to address a range of inundation mapping tools and methodologies.

Mapping and Visualization: Additional Center Resources

NOAA Digital Coast Website

This site, hosted by the Center and composed of contributions from many state and federal partners, provides access to a wide variety of coastal management resources, including mapping and visualization tools and high-resolution elevation data (www.csc.noaa.gov/digitalcoast/).

Geospatial Technology Training

The Center provides eight trainings on specific geospatial technology skills, with topics such as Coastal Inundation Mapping, Remote Sensing for Spatial Analysts, Conservation Data Documentation, Coastal Applications Using ArcGIS, and others (www.csc.noaa.gov/bins/training.html).



The image at left is a Google Earth depiction of present-day Scituate, Massachusetts, with blocks added to indicate buildings. The image at right is a coastal flood warning visualization generated by the National Weather Service, which depicts inundation of the area following a storm surge.

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Please send us your questions and suggestions for future editions. To subscribe or contribute to the newsletter, contact our editors at

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NEWS AND NOTES

Participants Will Ride the Wave of Change at Coastal Zone 09

The coastal and ocean landscape is changing, whether it's the climate, shoreline, habitat, or even the people setting and implementing policy. "Revolutionary Times: Catching the Wave of Change" is the theme of Coastal Zone 09, which will take place on July 19 to 23 in Boston, Massachusetts. This biennial conference, organized by the Center, is the nation's largest multidisciplinary gathering of coastal professionals, with workshops, poster sessions, and a forum for exhibitors. To learn more, visit www.csc.noaa.gov/cz/.

Climate Literacy Guide Now Available

Climate Literacy: The Essential Principles of Climate Science presents information that can help individuals and communities understand Earth's climate, impacts of climate change, and approaches for adapting and mitigating change. NOAA and the American Association for the Advancement of Science sponsored the workshop that began the development of the guide. The National Science Foundation and many science agencies, nongovernmental organizations, and individuals also contributed through extensive review and comment periods. To download the guide, visit www.climatescience.gov.

Transitions

Susan Cone is the new education coordinator at the Rookery Bay National Estuarine Research Reserve. She previously worked as the program coordinator in the reserve's Environmental Learning Center... The Gulf of Mexico Fishery Management Council has a new executive director. **Steve Bortone**, formerly the director of Minnesota Sea Grant, took the council helm in May. . . **Terry Thompson** has been named manager of the Kachemak Bay Reserve in Alaska. Thompson previously worked for the reserve as an education coordinator and acting manager. . . **Lee Edmiston**, formerly the research coordinator for the Apalachicola Reserve, now directs the Office of Coastal and Aquatic Managed Areas for Florida's Department of Environmental Protection.