

Fieldwork

## Eelgrass in Puget Sound—A New Study of Flow, Sediment Transport, and *Zostera marina*

By Jessie Lacy

Meadows of eelgrass (*Zostera marina*) provide essential habitat to a wide range of fish and wildlife in the nearshore parts of Puget Sound, WA. Birds and fish, including juvenile salmon and Pacific herring, feed on the diverse assemblage of plants and invertebrates living on the eelgrass, and the meadows provide refuge from predators for juvenile fish. Eelgrass is responsible for much of the primary production of organic carbon (the source of energy for many other organisms) both within Puget Sound and in adjacent marine waters. Eelgrass is also believed to buffer wave energy and tidal currents, reduce sediment resuspension, and retain sediment. This stabilization of the substrate may help to prevent beach erosion. Nutrients and organic matter retained along with the sediment contribute to the productivity of the nearshore.

Eelgrass is threatened by human activities that increase water turbidity (such as agriculture or road building), block light (construction of docks), or disturb the bottom (anchoring or dredging). These impacts have caused significant declines in eelgrass in many U.S. coastal waters. The Washington State Department of Natural Resources, which monitors the distribution of eelgrass in Puget Sound, has not yet found evidence of large-scale loss; however, losses have occurred in some areas, and the increasing urbanization of the region poses threats to eelgrass and the entire nearshore ecosystem.

As part of the Coastal Habitats in Puget Sound project, U.S. Geological Survey (USGS) scientists are investigating the

*(Eelgrass continued on page 2)*



Puget Sound region



Study site in Indian Cove, Shaw Island, San Juan Islands, WA.

*(Left to right) Kevin O'Toole, Jessie Lacy, and Guy Gelfenbaum deploying an instrumented frame in Indian Cove.*



*Image from the underwater video camera.*

## Sound Waves

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## Submission Guidelines

**Deadline:** The deadline for news items and publication lists for the November 2004 issue of *Sound Waves* is Thursday, October 14.

**Publications:** When new publications or products are released, please notify the editor with a full reference and a bulleted summary or description.

**Images:** Please submit all images at publication size (column, 2-column, or page width). Resolution of 200 to 300 dpi (dots per inch) is best. Adobe Illustrator® files or EPS files work well with vector files (such as graphs or diagrams). TIFF and JPEG files work well with raster files (photographs or rasterized vector files).

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## U.S. Geological Survey Earth Science Information Sources:

Need to find natural-science data or information? Visit the USGS Frequently Asked Questions (FAQ's) at URL <http://ask.usgs.gov/faqs.html>

Can't find the answer to your question on the Web? Call **1-888-ASK-USGS**

Want to e-mail your question to the USGS? Send it to this address: [ask@usgs.gov](mailto:ask@usgs.gov)

## Fieldwork, continued

*(Eelgrass continued from page 1)*

dynamics of seawater flow over and through eelgrass meadows to quantify the influence of eelgrass on waves and currents and to determine whether it retains sediment. Our first study site is in Indian Cove, Shaw Island, in the San Juan Islands. Eelgrass grows taller (greater than 1 m) and in deeper water in the San Juan Islands than elsewhere in the sound because the water is clearer there.

**Jessie Lacy, Guy Gelfenbaum, Jodi Harney, Kevin O'Toole, Hal Williams, Jodi Eshleman, and Dave Gonzales**

deployed two instrumented frames in Indian Cove from the research vessel *Karluk* for a two-week experiment in July. One frame was deployed within the eelgrass meadow, which extends to a depth of 5 m MLLW (mean lower low water); the other was deployed outside the meadow. Our goal was to measure velocity and suspended-sediment concentration above and within the eelgrass meadow, and to determine the influence of eelgrass on currents and waves by comparing velocities measured at the two stations. Underwater video cameras were mounted on the frames to record how the posture of the eelgrass varies with current strength. This information is important in defining the vertical extent of the velocity measurements above the meadow, because the vegetation interferes with the acoustic velocimeters. The video also captured images of many fish in the eelgrass.



**Jodi Harney** taking a digital photograph of beach sediment.

The frame within the meadow was in very shallow water (2.5 m MLLW), and the top half of the 2.2-m-high frame was exposed at low tide during spring tides. The *Karluk* was able to access the site at high tide because of the large tidal range in Puget Sound (about 3 m in the San Juan Islands).

We took high-resolution digital photographs of bed sediment within and outside the eelgrass meadow to determine grain size, using technology developed by **Dave Rubin, Hank Chezar, and Jodi Harney**. **Jodi Harney** took images of the sea floor by deploying an underwater camera from the *Karluk*. With these images, we will gauge the influence of eelgrass on bed-sediment grain-size distribution.

Before the deployment, **Jessie** and seagrass ecologist **Sandy Wyllie-Echeverria** of the University of Washington mapped the seaward edge of the eelgrass meadow, using boat-mounted underwater video and a global positioning system (GPS). **Jessie** mapped the landward edge of the meadow from shore at low tide.

**Sandy** and his family, who have been monitor-

*(Eelgrass continued on page 3)*



Frame in seagrass meadow exposed at low tide.

## Fieldwork, continued

(Eelgrass continued from page 2)

ing eelgrass colonization in Picnic Cove on Shaw Island for more than 10 years, showed **Jessie** their techniques for estimating eelgrass density. We counted stems in 20 quadrats, each 1 m<sup>2</sup>, during an extreme low tide. Both plant density and plant morphology are expected to be important factors in the influence of eelgrass on waves and currents.

Not only does eelgrass influence waves and currents, but waves and currents also influence eelgrass. Current strength and wave energy play a role in limiting the distribution of eelgrass and may govern the patchiness of meadows. The role of storms

in disturbing or destroying eelgrass is poorly understood, as is the relation between meadow density and the ability to survive storms. In future experiments, we plan to use similar techniques to investigate these interactions between waves, currents, and eelgrass. Measurements of flow in and above eelgrass meadows can help to distinguish between natural and human-induced stresses on eelgrass populations. ❁



**Sandy and Victoria Wyllie-Echeverria** counting eelgrass stems.

## Microbial Ecology of Deepwater Corals in the Aleutian Islands

By **Christina Kellogg**

The Aleutian Islands are a string of volcanic islands that stretch from Alaska toward Russia, dividing the North Pacific Ocean from the Bering Sea. This is not the first place that comes to mind when you think of collecting corals for research. Since 2002, however, fisheries scientists from the National Oceanic and Atmospheric Administration (NOAA)'s Auke Bay Laboratory have been documenting deep-water coral and sponge reefs in waters hundreds of meters deep off these islands. The diversity and abundance of

these high-latitude reefs rival those seen in tropical coral reefs.

This summer, **Christina Kellogg**, of the U.S. Geological Survey (USGS)'s Center for Coastal and Watershed Studies in St. Petersburg, FL, was invited to participate in a cruise aboard the research vessel *Vele-ro IV* to collect deep-water coral samples for microbial-ecology studies. The corals were collected with the submersible *Delta*, using a custom device designed by **Chris** and her husband, **Peter Richardson**, that allows half of the sample to be preserved

at depth. This design “stops the clock” on the sample and allows **Chris** to determine whether any dramatic shifts occur in the microbial community as a result of changes in temperature, pressure, and light during transport of the corals to the surface.

Coral-associated microbes have just begun to be studied in shallow-water corals, and it has been suggested that microbes may perform various functions,



**Christina Kellogg** removes coral samples from her collection device after a dive.

including nutrient cycling, nitrogen fixation, and production of antibiotics to protect the coral from disease-causing micro-organisms. The deep-water corals that make up the Aleutian reefs are mainly gorgonians (soft corals) that live in cold dark waters and lack the photosynthetic algal symbionts (zooxanthellae) that tropical corals depend on for their energy. The absence of zooxanthellae makes the

(Aleutian Corals continued on page 4)



The submersible *Delta* is launched on a dive to document bottom communities with a video camera and to collect coral specimens.

(Aleutian Corals continued from page 3)

potential role of microbes (bacteria, fungi, archaea) even more interesting. The microbes may help feed these corals, similar to the chemosynthetic bacterial symbionts that feed hydrothermal-vent worms. The microbial communities of these cold-adapted corals are also likely to contain novel organisms, which will not only increase our understanding of microbial diversity but could also be a source of novel enzymes or pharmaceuticals. ❁



**Christina Kellogg** enjoys the balmy summer weather in the Aleutian Islands.



*Fanellia sp.*, one of the deep-water gorgonian corals collected during the cruise.

## Hyperspectral Data Analysis for Mapping Coastal Landslide Hazards Along the Big Sur Coast

By Cheryl Hapke and Krystal Green

Researchers from the U.S. Geological Survey (USGS)'s Coastal and Marine Geology Program and the University of California, Santa Cruz (UCSC)'s Earth Sciences Department joined together in late July to collect field data along the Big Sur coast. The team consisted of **Cheryl Hapke** and **Krystal Green** (USGS) and **Ty Kennedy-Bowdoin**, a UCSC graduate student. The purpose of the fieldwork was to collect spectra—measurements of

reflected sunlight—from the various rock types and fault materials along the coast with a field spectrometer.

This research, which is part of the Coastal Landslides project, involves the processing and analysis of hyperspectral remote-sensing data collected via aircraft (by HyVista Corp.) in July 2003 along the Big Sur coast. Hyperspectral data provide a digital image of surface reflectance from more than 100 different spectral

channels—discrete parts of the electromagnetic spectrum—ranging from the visible near-infrared (wavelength, 0.4-1.9  $\mu\text{m}$ ) to the short-wave infrared (wavelength, 2.0-2.5  $\mu\text{m}$ ). In comparison, standard aerial photography has three channels: red, green, and blue (all in the visible region; wavelength, 0.4-0.7  $\mu\text{m}$ ). Because of the large number of channels, hyperspectral data are ideal for mapping the composition of geologic materials on the basis of their spectral signatures, and are especially good for detecting altera-



**Cheryl Hapke** examines the mineralogy of a serpentinite outcrop at Sand Dollar Beach. Fibrous asbestos minerals are common in the serpentinite and help to give it its characteristic “soapy” feel.



**Ty Kennedy-Bowdoin** and **Krystal Green** collect spectra from a metamorphosed quartz diorite exposed at Garrapata State Beach. **Ty** is wearing the spectrometer on his back and holds the sensor to capture the reflectance from the rock surface. **Krystal** holds the laptop into which the data are directly recorded.

tion minerals and providing high-resolution information about the chemistry and spatial distribution of minerals.

The geology of the Big Sur area is highly complex, consisting of folded and faulted metamorphic rocks of the Sur complex and highly sheared metasedimentary and metavolcanic rocks of the Franciscan Complex. Because the Big Sur coast is remote and in many areas inaccessible, detailed geologic mapping is difficult, and so the geologic maps that do exist for the area are somewhat generalized. A focus of

(Big Sur Coast continued on page 5)

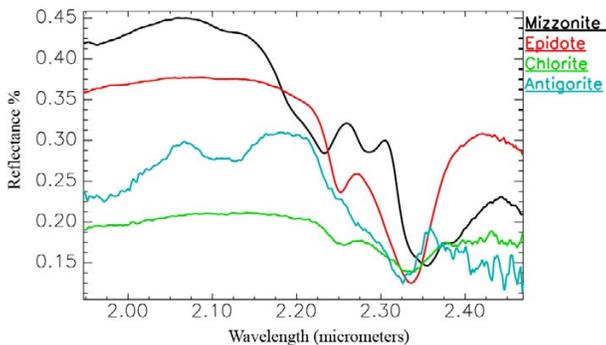
## Fieldwork, continued

(Big Sur Coast continued from page 4)

our current research is to better understand the processes and hazards related to large coastal landslides that are common along this stretch of coast. Landslide occurrence is related to the underlying geology, specifically to variations in the strength of the rocks, which is a function of the rock type, the degree of weathering, and the presence (or absence) of such geologic structures as joints, faults, and shear zones.

The objective of our hyperspectral analysis is to refine existing geologic maps and to identify and map the spatial distribution of previously unmapped or unknown faults and shear zones through the detection of alteration minerals. Although existing spectral-map libraries can be used to identify minerals, the spectra of a particular mineral can vary depending on the specific host rock. Therefore, collection of spectral data in the field is crucial to ground-truth the remotely sensed data.

From July 26 to 29, **Cheryl, Krystal,** and **Ty** collected numerous rock samples and recorded the spectra of the various rock types and fault materials along the Big Sur coast, using a field spectrometer. The field spectrometer, which belongs to the Naval Postgraduate School and is on loan to the UCSC Earth Sciences Department, weighs about 50 lb and is carried in a backpack. A hand-held sensor records the reflectance of sunlight off the surface of rock outcrops, which is output directly



This plot displays the spectral signatures of common metamorphic minerals of the Big Sur coast. Mizzonite occurs in metamorphosed limestone and is found in the rocks of the Sur complex. Chlorite and epidote are common constituents of greenstone, which is abundant in the Landels-Hill Big Creek Reserve just north of Lucia; these minerals are a result of the regional metamorphism of basaltic rocks. Antigorite is a secondary serpentine mineral, an abundant mineral in the serpentinites of the southern part of the Big Sur coast.

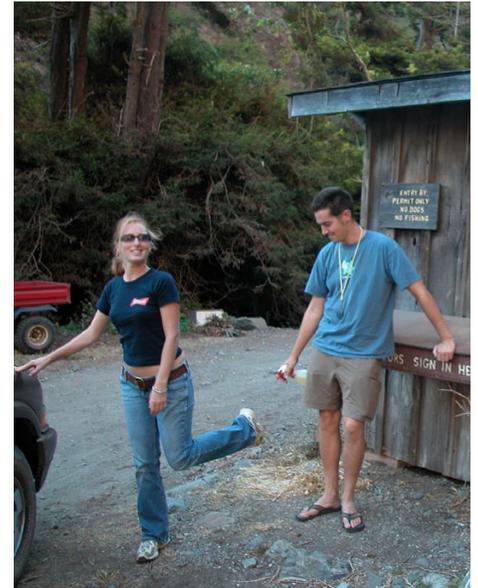


The Whale Point Research Cabin, located within the Landels-Hill Big Creek Reserve, is available by reservation for university or government researchers working in the area. The roof in the foreground is the Steward's Cabin, where one of the full-time caretaker-researchers lives.

into dedicated software in a laptop computer. Rock and sand samples were also collected at the outcrops so that additional analyses (measurement of rock strength and X-ray diffraction for clay identification) can be conducted. Initial processing has already identified mizzonite, chlorite, and antigorite, alteration minerals common in metamorphic rocks.

The research team stayed at the Landels-Hill Big Creek Reserve's Whale Point Research Cabin, about 80 km south of Monterey. The cabin, perched on top of a high ridge, has all the necessary amenities for fieldwork, including electricity for recharging the field equipment, kitchen facilities, and a hot (outdoor!) shower. The Landels-Hill Big Creek Reserve, one of more than 30 wildland sites in the University of California's Natural Reserve System and one of four such reserves managed by UCSC, is guarding against an epidemic of sudden oak death. As a result, upon returning from the field each day, we had to sweep the vehicles clean and disinfect the bottoms of our shoes before entering the reserve.

The data collection was highly successful, and future work will include in-



Ty sprays disinfectant on the bottom of Krystal's shoes. Because of the threat of sudden oak death, we were required to clean the vehicles and disinfect our shoes each day before re-entering the reserve.

corporating the results of the hyperspectral analysis into current landslide-distribution maps. The spectra collected in the field will provide additional data to expand existing spectral libraries for numerous applications, including an important goal of our project: helping the California Department of Transportation (Caltrans) best manage the scenic Coast Highway (California Highway 1) while protecting the valuable natural resources of the Monterey Bay National Marine Sanctuary. ❁

## Manatee Population Rising in Some Regions, Likely Stalled or Declining in Others

By Michael C. Runge

Manatee populations are growing at healthy rates in two of four regions off the Florida coast but may be stalled or declining in the other two regions, according to a recently released report by the U.S. Geological Survey (USGS).

In three USGS-led studies—the first comprehensive population analysis published in 9 years—scientists documented population-growth, survival, and reproduction rates of the endangered Florida manatee. The Florida Fish and Wildlife Conservation Commission, Mote Marine Laboratory, and the Florida Park Service collaborated in the research, published in the July issue of the journal *Marine Mammal Science*.

### Population-Growth Rates

“Over the past 10 years, the annual population-growth rate in two of the regions is healthy, one region appears to be declining, and one region is probably holding steady. That’s what the science says,” said **Michael Runge**, lead scientist for the USGS. “We estimate that manatee populations in the Northwest and Upper St. Johns River regions have been growing annually at 3.7 percent and 6.2 percent, respectively. These estimates are in line with previous studies and, leaving a margin for error, suggest healthy growth of those populations.”

The report concludes that the estimated annual growth rate for the population in Florida’s Atlantic region is 1.1 percent, but the margin of error in this estimate is large enough that it is possible the population is stable or slightly declining. In the Southwest region, the estimated population growth rate is negative (–1.1 percent per year); however, the margin of error in this estimate is larger than in the other regions.

“The estimates for the Atlantic and Southwest are of concern, because these regions



*Close-up of manatee face. Photograph courtesy of the Sirenia Project, USGS.*

make up most of the manatee population,” said **Runge**.

These findings estimate annual population-growth rates over the past decade, using survival and reproductive rates from the two companion studies. The modeling work indicates that these growth rates are largely driven by adult survival, a result that has implications for both monitoring and management.

“First, we need better estimates of adult survival, especially in the Atlantic and Southwest regions; this involves a strong commitment to the continuation of long-term monitoring,” **Runge** said. “Second, recovery of the species may largely depend on achieving and maintaining high adult-survival rates.”

### Survival Rates

One companion study, led by USGS scientist **Catherine Langtimm**, estimated the survival rates of adults and calves. Every year, scientists from several Federal, State, and private agencies photograph individual manatees. Many manatees can be uniquely identified by their scar patterns, and this identification provides the information to estimate survival rate in a statistically sound manner. The estimated annual adult-survival rates over the past decade were

95.6 percent in the Northwest region, 96 percent in the Upper St. Johns River region, 93.7 percent in the Atlantic region, and 90.8 percent in the Southwest region.

“Field efforts by the Florida Fish and Wildlife Conservation Commission and the Mote Marine Laboratory over the years have allowed us to estimate survival rates in the Southwest for the first time,” said **Langtimm**. “While this monitoring achievement is exciting, the survival rates themselves are disappointing in the Southwest.”

**Langtimm** and collaborators were also able to make formal statistical estimates of calf survival for the first time. In the Upper St. Johns River region, the only region where scientists could reliably identify calves, annual survival rates were 81 percent for first-year calves and 92 percent for second-year calves.

### Reproduction Rates

The other companion study, led by USGS scientist **William Kendall**, estimated manatee reproductive rates from photo-identification data in the Northwest and Atlantic regions. When field personnel take photographs, they record whether a female is with a first-year calf. Because scientists can identify individual adult females from scar patterns, they can reconstruct the female’s reproductive history and estimate reproductive rates. **Kendall** and colleagues found that adult females in the Northwest region without a dependent first-year calf have a 43-percent probability of producing a calf over the next year; this probability is 38 percent in the Atlantic region. Similar estimates are not yet available for the Upper St. Johns River or Southwest regions. Scientists expect that this new analytical method is applicable to many other marine-mammal populations. ❁

## Online Mapping Service for the Gulf of Maine

By Fran Lightsom

U.S. and Canadian partners have developed a new online mapping service that brings together U.S. Geological Survey (USGS) data and data sets from other government agencies and research institu-

tions that are active in the Gulf of Maine. The final project meeting of “Building a Spatial Data Framework in the Gulf of Maine to Support Benthic Mapping for Resource Management” was held August

9 in the conference center of the New England Aquarium. The meeting featured a presentation of the Gulf of Maine Mapping Portal (GoMMaP), which allows

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## Research, continued

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online users to create their own maps by selecting regions, base maps, and data. The portal is also a Web service that allows other organizations to present customized Internet mapping services as part of their Web sites. USGS data, including freshwater features and seabed sediment

type, are among the basic maps offered by GoMMaP. USGS interpretations of coastal geomorphology and coastal vulnerability to sea-level rise are also available. After GoMMaP is released publicly at the Gulf of Maine Summit, to be held October 26-29 in St. Andrews, New Brunswick,

Canada, the portal will go online at URL <http://www.gommap.org/>. This project was jointly sponsored by the Federal Geographic Data Committee (FGDC) and the Canadian agency GeoConnections. USGS contributions were arranged by **Brad Butman** and **Valerie Paskevich**. ❁

## Outreach

# Scientists Come to the Point to Talk About Snakes and Birds at Cabrillo National Monument

By **Carlton Rochester** and **Mark Mendelsohn**

On August 2, 2004, **Carlton Rochester**, a U.S. Geological Survey (USGS) scientist working at the Western Ecological Research Center (WERC) in San Diego, CA, presented the third annual "Snake Talk" for 8 members of the Youth Conservation Corps (YCC) and 30 members of the California Conservation Corps (CCC) at Cabrillo National Monument, located at the tip of Point Loma peninsula, San Diego. The presentation included three live snake species. A San Diego gopher snake was presented as an example of a common native species that the two workgroups might encounter within the park. Two coastal rosy boas were shown as examples of a snake species that is present but not common within the park, where just one individual has been detected. Finally, a California glossy snake represented a species that is suspected to have lived on Point Loma peninsula historically but has not been detected in more than 7 years of USGS reptile and amphibian research in the park.

From 1995 through 2002, the USGS conducted pitfall-trap sampling at 17 points throughout Cabrillo National Monument. These efforts resulted in 1,900 reptile and amphibian captures, representing 13 species. Since 2002, the National Park Service has continued these pitfall-trap efforts. The USGS supports the National Park Service by providing tools and resources needed to collect the data, such as digital data forms used to collect field data on handheld computers.

On July 8, 2004, another WERC scien-

tist, **Mark Mendelsohn**, gave a brief presentation for eight YCC members on studies of the local bird community at Cabrillo National Monument. His presentation included an interactive discussion of graduate research on the greater roadrunner in San Diego County, contrasted with other bird species that currently inhabit the peninsula. The enthusiastic YCC members were exposed to the data-collection step of the scientific method, including field techniques of using vocalizations played from a portable device to entice birds to respond and thus facilitate detection, and the important skill of writing a species account while observing wildlife.



*San Diego gopher snake. For information about this species and other reptiles and amphibians of coastal southern California, visit URL <http://www.werc.usgs.gov/fieldguide/>. Photograph by **Christopher W. Brown**, USGS.*

A full year of surveys of the greater roadrunner at Cabrillo National Monument and many other sites across the county has been completed, and analysis begun, in an effort to reveal the causes of declining roadrunner numbers in the region. ❁



*Greater roadrunner, photographed by **Mark Mendelsohn**. **Mark's** Master's thesis research highlights the importance of maintaining large open spaces for this species, which is negatively affected by habitat fragmentation in San Diego County. More information about the greater roadrunner is available at URL <http://www.mbr-pwrc.usgs.gov/infocenter/i3850id.html>.*

## USGS Partners with St. Petersburg, FL, Elementary School

By Jennifer Leigh Oates

*“Mentoring provides a unique opportunity to change lives—a child’s and your own. I encourage everyone to mentor. In this complex world, it is a simple way to make a difference.”*

**Mayor Rick Baker**

The mayor of St. Petersburg, FL, strummed his guitar while students from Perkins Elementary School’s orchestra and chorus sang “We Are The World.” At an April 14 ceremony, **Mayor Rick Baker** announced the successful recruitment of partners for all of St. Petersburg’s 27 elementary schools, 9 middle schools, 5 high schools, and 3 secondary schools. Partners will work with the schools in various ways, some providing financial support, others sending employees to lend volunteer support. The ceremony gave partners and school principals the opportunity to



St. Petersburg mayor **Rick Baker** plays “We Are The World” on his guitar while students from Perkins Elementary School sing.

meet and get excited about the countless partnership possibilities. The U.S. Geological Survey (USGS) will be a partner to Bay Point Elementary Magnet School, known as the “Center for the Advancement of Science and Technology.” Echelon Real Estate Services and the USGS will work together to meet the financial and scientific needs, respectively, of the students and teachers at Bay Point.

The purpose of the Mayor’s Mentors & More Initiative is to help students excel and to augment the limited resources available to local schools. **Mayor Baker**

believes that it is important for the community to get involved in improving education. By increasing school standards, he hopes to attract larger companies to the St. Petersburg area. **Mayor Baker** said that major concerns for companies considering relocation to St. Petersburg are “Where will my employees’ children be attending school?” and “Can we expect a qualified workforce from local schools?”

Other partners with Pinellas County elementary schools include the University of South Florida, the U.S. Coast Guard, and numerous private firms.

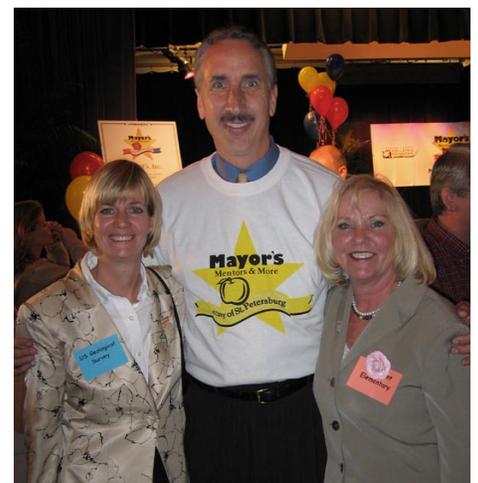
**Mayor Baker** and his staff would like to see the idea of corporate mentoring take root in other cities. To support the spread of community responsibility across America, the mayor decided to make information and advice available from his office. To learn more, visit the Mayor’s Mentors & More Web site at URL <http://www.stpete.org/mentors.htm>. ❁

### Local School Welcomes USGS as its Partner in the Mayor’s Mentors & More Initiative

By Jennifer Leigh Oates

Teachers gathered in the cafeteria at Bay Point Elementary Magnet School on July 29 to meet **Lisa Robbins**, director of the U.S. Geological Survey (USGS)’s Center for Coastal and Watershed Studies in St. Petersburg, FL, and to hear what the USGS can do to enhance the learning experience for students. Bay Point is known as the “Center for the Advancement of Science and Technology.” **Jennifer Oates** accompanied **Lisa** to the welcome breakfast, prepared by the local PTA. **Lisa** stressed the need for teachers to use the USGS as a resource. Educational handouts, coloring sheets, CDs, and posters were given to teachers to use in the classroom. The teachers were appreciative and eager to hear about USGS student and teacher resources available online (at URL <http://www.usgs.gov/education/>). Teachers unable to devote an entire day to a field trip be-

cause of standardized test requirements in Florida were intrigued by the virtual tours available on the USGS’s SOFIA Web site (at URL [http://sofia.usgs.gov/virtual\\_tour/](http://sofia.usgs.gov/virtual_tour/)). When asked what they needed, teachers mentioned grade-level tours of the USGS facility and scientific-research presentations. Scientists in the St. Petersburg center have been asked to participate, and some have offered to be mentors or give presentations. As a parent and educator, **Lisa** feels strongly about the USGS partnership with Bay Point. Principal **Gaye Lively** and Science Resource Specialist **Ron Woolums** are the two contacts at Bay Point. For more information about Bay Point, visit the school’s Web site at URL <http://www.geocities.com/Athens/Acropolis/8714/>. For more information about the Mayor’s Mentors & More Initiative, visit URL <http://www.stpete.org/mentors.htm>.



(Left to right) **Lisa Robbins** (chief of the USGS’s Center for Coastal and Watershed Studies), **Rick Baker** (mayor of St. Petersburg), and **Gaye Lively** (principal of Bay Point Elementary School) embrace after a ceremony dedicated to helping St. Petersburg students.

## USGS Participates in Earth Force Teacher Training

By Jennifer Leigh Oates

Eighteen middle- and elementary-school teachers gathered at a summer training session at Weedon Island Preserve in St. Petersburg, FL, on July 27. **Cindy Benkert**, a member of Suncoast Earth Force, organized presenters from the Tampa Bay area to share information and resources from the U.S. Geological Survey (USGS)'s Center for Coastal and Watershed Studies, MacDill Air Force Base, and the Tampa Bay History Center. Representing the USGS was **Jennifer Oates**, who gave a PowerPoint

presentation on educational resources available online and locally at the center, and distributed a bag of educational materials to each teacher. She received teachers' requests for a Spanish-speaking classroom presenter, WETMAAP (Wetland Education Through Maps and Aerial Photography) workshops, presenters during the Great American Teach-in, teacher tours, meetings with scientists, and invitations to the annual St. Petersburg USGS Open House. The two South Florida ecosystems posters that **Jen-**

**nifer** brought were so popular that they had to be given away in a raffle.

Earth Force is a national nonprofit organization that provides opportunities for young people to understand, improve, and sustain the natural environment in their community. Its award-winning programs are aimed at teaching youths of high-school age essential academic skills, including critical thinking, teamwork, problem solving, and decision making. For more information, visit URL <http://www.earthforce.org/>. ☼

### Meetings

## Upcoming! AGU Chapman Conference on Salt Marshes

By Donald R. Cahoon

The American Geophysical Union (AGU) Chapman Conference on "Salt Marsh Geomorphology: Physical and Ecological Effects on Landform" will be held in Halifax, Nova Scotia, Canada, on October 9-13, 2004. The preliminary program and field trip and registration information are available on the conference Web site at URL <http://www.geol.sc.edu/chapman/>. The goal of this conference is the integration of physical and ecological sciences to enhance our understanding of the interactions between salt-marsh geomorphology and intertidal sedimentary processes.

This meeting will promote discussion between ecosystem and physical scientists who

otherwise may not communicate with each other about their respective fields of research. We hope that the meeting structure of plenary sessions, small breakout-group meetings, and two field trips will facilitate that discussion and, ultimately, help define how physics and ecology interact to produce and maintain salt marshes. At the end of the meeting, we expect to have a clearer view of where the sciences of salt-marsh physics and ecology are, where they need to be, and how to get there. The invited speakers and contributors were selected because of their potential to stimulate cross-disciplinary discussion.

As of August 9, 2004, 66 abstracts had been submitted from 16 countries, evaluat-

ing the interrelations among physical forcings, ecological processes, and sedimentary processes and their combined influence on coastal landforms. The U.S. Geological Survey (USGS) is a sponsor of the conference, along with the American Society of Limnology and Oceanography (ASLO), the International Association of Geomorphologists (IAG), several academic institutions, and other Federal agencies.

For further information about the conference, contact the conference organizers through the Web site: **Dr. Ray Torres**, University of South Carolina, **Dr. Danika van Proosdij**, **Dr. Sergio Fagherazzi**, or **Dr. Charles Hopkinson**. ☼

## National Marine Educators Attend Conference in St. Petersburg, FL

By Jennifer Leigh Oates

Educators and scientists traveled to St. Petersburg, FL, to participate in the 28th annual National Marine Educators Association (NMEA) conference on July 18-22. The U.S. Geological Survey (USGS)'s Center for Coastal and Watershed Studies participated with eight presenters. Teachers were eager to gather lesson plans, lists of useful Web sites, handouts, coloring sheets, and CDs from the booths and conference sessions. The 2005 NMEA conference will be held in Maui, Hawai'i. For more information, visit the NMEA Web

site at URL <http://www.marine-ed.org/>.

**Lisa Robbins** (USGS, St. Petersburg) participated in two conference sessions. **Robbins** was a panelist in a session called "Beach Literacy in America," with members from the Clean Beaches Council, the Pinellas County Health Department, and Sea Grant programs at the Virginia Institute of Marine Science and the University of Virginia. Discussion topics included beach water quality, habitat conservation, erosion management, safety education, and litter education and prevention. As

an invited general-session speaker at the Florida Marine Research Institute, **Robbins** joined **Peter Betzer** from the College of Marine Science, University of South Florida (USF), to discuss the importance of "building bridges" between scientific research, the public, and students.

Educators toured the USGS facility in St. Petersburg, where they examined core samples in the sediment lab, touched corals, learned how to forecast hurricanes, and saw how easily ground water can be

*(Marine Educators continued on page 10)*

## Meetings, continued

(Marine Educators continued from page 9)

contaminated. The four hands-on scientific sessions gave educators the opportunity to ask USGS scientists questions and gather educational information. **Dennis Krohn** (USGS, St. Petersburg) gave an introductory presentation to the visitors. **Jim Flocks** (USGS, St. Petersburg) spoke in the sediment lab, where he had sections of “working” cores displayed to allow educators to see how variations in the sediment reflect the history of the Earth over thousands of years. He showed how cores are X-rayed, sliced, and archived and explained causes of subsidence in Louisiana (visit URL <http://coastal.er.usgs.gov/projects/location/louisiana.html> for more information).

**Don Hickey** (USGS, St. Petersburg) had a table of corals and educational materi-



**Don Hickey** fielded NMEA educators' questions about African dust.

als, and an elaborate exhibit board for educators to examine. **Hickey** discussed USGS coral-reef research and diseases affecting reefs. Several educators wanted to know how the African dust theory played a role in the declining health of reefs (for more information, visit URLs <http://walrus.wr.usgs.gov/coralreefs/intro.html> and [http://coastal.er.usgs.gov/african\\_dust/](http://coastal.er.usgs.gov/african_dust/)).

**Karen Morgan** (USGS, St. Petersburg) gave an overview of **Abby Sallenger's** “National Assessment of Coastal Change Hazards” Web site (at URL <http://coastal.er.usgs.gov/national-assessment/>). **Morgan** discussed how she forecasts the impacts of storms, using LIDAR (Light Detection And Ranging) images from Hurricane Isabel as an example.

**Ann Tihansky** (USGS, Tampa, FL) spoke about ground-water contamination and water sources. The educators enjoyed watching a video that documented the discovery of wells and showed how carefully divers must maneuver through shallow underground waterways. Discussion focused on where, how, and why sinkholes are formed.

**Brian Bossak** (USGS, St. Petersburg) and **Tara Miller** (ETI Professionals contractor at USGS, St. Petersburg) together presented a session titled “Geographic Information Science: Applications to Coastal Hazard Research.” **Bossak** gave an overview of geographic information systems (GIS) and their uses in coastal studies,



**Jim Flocks** showed visitors in the sediment lab how core samples are collected and analyzed.

LIDAR data and how it can be integrated within a GIS, and current work at the USGS (such as the development of a digital tool integrating GIS information, remote-sensing data, and storm parameters to estimate coastal storm impact; see URL <http://geology.usgs.gov/postdoc/profiles/bossak.html>). **Miller** discussed the completion of the Gulf of Mexico part of the National Assessment of Shoreline Change Project headed by USGS principal investigator **Bob Morton**. The project marks the first-ever analysis of historical shoreline change along the entire conterminous United States and parts of Alaska and Hawaii. The analysis looks at shoreline change from early maps made in the 1800s to today, using LIDAR measurements made as recently as 2002 (for more information, visit URL <http://coastal.er.usgs.gov/shoreline-change/>).

For more information about the NMEA 2004 Conference, visit URL [http://www.floridamarine.org/features/category\\_main.asp?id=2088](http://www.floridamarine.org/features/category_main.asp?id=2088). ❁



**Karen Morgan** explained how LIDAR was used to detect shoreline changes after Hurricane Isabel.



**Brian Bossak** and **Tara Miller** talked about digital tools used in coastal studies.

## Woods Hole Scientific Community Diversity Initiative and Sea Education Association Diversity Workshop

By Jamey M. Reid

On July 27, 2004, the leaders of the six scientific organizations in the Woods Hole, MA, area officially established the Woods Hole Scientific Community Diversity Initiative. A memorandum of understanding (MOU) was signed with the purpose of working cooperatively to increase diversity in the local area and in the sciences. The participating organizations include the Marine Biological Laboratory, the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration (NOAA), the Sea Education Association (SEA), the U.S. Geological Survey (USGS)'s Woods Hole Science Center, the Woods Hole Oceanographic Institution, and the Woods Hole Research Center.

The goals of the initiative include:

1. to provide advice to Woods Hole scientific organizations;
2. to be a resource through sponsored activities and referrals; and
3. to cooperatively undertake recruitment, retention, and mentoring programs that will result in a diverse group of students, employees, and researchers in ocean sciences, biological sciences, geosciences, ocean engineering, and marine and environmental policy.

The participating agencies acknowledge that significant barriers exist between the present situation and their future goals, and they are prepared to gather the resources



NOAA scientist **Ambrose Jearld** and SEA assistant scientist **Suzanne Renssalaer** prepare to deploy a *Shipek* grab sampler.

needed to overcome those barriers. The MOU is designed to “create pathways of opportunity that will attract people from underrepresented groups by showing that the Woods Hole scientific and educational community has opportunities beginning with primary education and leading to higher education, postgraduate work, research, and lifetime careers both in Woods Hole and in the global scientific community.”

The signing of the MOU kicked off the 2004 SEA Diversity Workshop, the third in a series of four workshops funded by the Andrew Mellon Foundation. The workshop brings together participants from Morehouse College, the Marine Biological Laboratory, Clark Atlanta University, the USGS, Cornell University, the ACE Foundation in Bermuda, Carlton College, NOAA, Harvard College, the National Science Foundation, Howard University, the Los Angeles Maritime Institute, Hampton University, and the Andrew Mellon Foundation.

Participants in this year's workshop attended mini-lectures in oceanography and nautical science and participated in a three-day cruise on the sailing school vessel (SSV) *Corwith Cramer*, one of SEA's research sailing vessels. The participants experienced, firsthand, everything students encounter during the SEA programs, including sailing, deploying oceanographic equipment, and conducting laboratory procedures, as well as cooking, cleaning, and doing what it takes to maintain the ship. Members of the ship's crew walked participants through man-overboard, fire, and abandon-ship drills. During the cruise, the participants had frank discussions about diversity-related issues and barriers. In three short days, it became clear that the impact of a SEA semester in the life of a student goes far beyond science and adds to overall life skills as well. Students emerge with not only a better understanding of oceanography but also a tremendous increase in confidence and self-esteem—two traits that are important in self-development. In addition, they learn survival, teamwork, and leadership skills. All of this



USGS participant **Jamey Reid** (center of photograph) and Howard University associate provost **Joseph Reidy** (lower left) climb the ship's rigging.

packaged together enables these students to become highly competitive as they seek future work and success in the sciences.

The participants held a wrapup session when they returned to the SEA campus. The session resulted in a list of actions for SEA to incorporate into its diversity plan, as well as actions for the participants to take with them to their home organizations in support of SEA. SEA will reconvene the workshop in 2005, bringing together all of the participants from the first three workshops. ❁



SEA Diversity Workshop participants say good-bye to the sailing school vessel (SSV) *Corwith Cramer*.

## Oceanographer Joins the Western Coastal and Marine Geology Team

By Guy Gelfenbaum

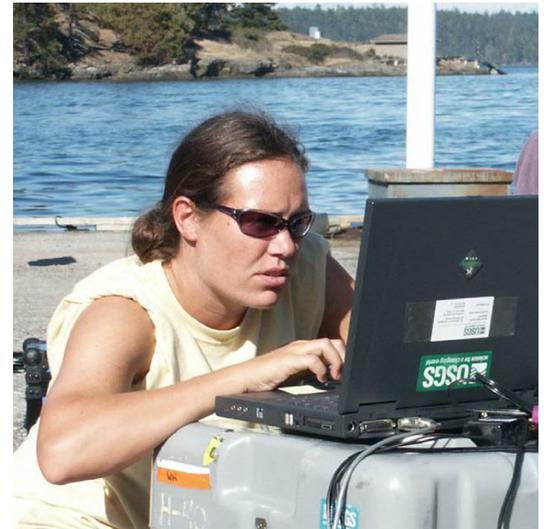
**Jodi Eshleman** has recently joined the U.S. Geological Survey (USGS)'s Western Coastal and Marine Geology Team as an oceanographer who will be working with **Guy Gelfenbaum**.

**Jodi** received a B.S. degree in civil engineering from Lehigh University and recently completed an M.S. degree in coastal engineering at the University of Florida. While working on her Master's research, she spent 8 months at the U.S. Army Corps of Engineers' Field Research Facility in Duck, NC, where she gained valuable field experience collecting cross-shore profiles with the amphibious LARC and CRAB vehicles, and a backpack-mounted GPS (global positioning system). This experience will be beneficial at the USGS, where **Jodi** will be working

with **Guy**, **Peter Ruggiero**, and **Dan Hanes** in the Coastal Evolution Modeling project to collect nearshore bathymetric data with the Coastal Profiling System (a waverunner equipped with a GPS receiver and an echo sounder to measure depth).

In addition, **Jodi** will be primarily involved in the new Coastal Habitats in Puget Sound project. Her efforts will focus on all aspects of the project, from data collection in the field to processing, analyzing, compiling, and presenting the results of the study.

Please come by Room 1213 in the Menlo Park, CA, office and welcome **Jodi** to the USGS. ☼



**Jodi Eshleman** programs a current meter before data collection as part of a recent field investigation of eelgrass in Puget Sound, WA (see article "Eelgrass in Puget Sound," this issue).

### Publications

## Recently Published Articles

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- Calderon, K., Dadisman, S.V., Kindinger, J.L., Davis, J.B., Flocks, J.G., and Wiese, D.S., 2004, Archive of digital boomer seismic reflection data collected during USGS cruises 93LCA01 and 94LCA01 in Kingsley, Orange, and Lowry Lakes, northeast Florida, 1993 and 1994: U.S. Geological Survey Data Series DS-100 [DVD].
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- Poppe, L.J., Eliason, A.H., and Hastings, M.E., 2004, A Visual Basic program to generate sediment grain-size statistics and extrapolate particle distributions: *Computers & Geosciences*, v. 30, no. 7, p. 791-795.
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- Shinn, E.A., Griffin, D.W., and Seba, D.B., 2004, Atmospheric transport of mold spores in clouds of desert dust: *Archives of Environmental Health*, v. 58, no. 8, p. 498-504.
- Warner, J.C., Sherwood, C.R., Arango, H.G., and Signell, R.P., 2004, Performance of four turbulence closure models implemented using a generic length scale method: *Ocean Modeling*, v. 8, no. 1-2, p. 81-113. ☼

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- Conrad, J.E., Sliter, R.W., and Ryan, H.F., Characteristics of the southern part of the Palos Verdes fault from high-resolution and multichannel seismic reflection data [abs.]: Southern California Earthquake Center (SCEC) Annual Meeting, Palm Springs, CA, Sept. 19-22, 2004.
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- Griffin, D.W., and Gray, M.A., Source tracking and microbial water quality in three Florida Springs [abs.]: USGS Suwannee River and Estuary Initiative Integrated Science Workshop, Cedar Key, FL, September 22-24, 2004.
- Hall, D.K., Williams, R.S., Jr., Steffen, K., and Chien, J.Y.L., Analysis of summer 2002 melt extent on the Greenland ice sheet using MODIS and SSM/I data: Institute of Electrical and Electronic Engineers' International Geoscience and Remote Sensing Symposium (IGARSS 2004), Anchorage, Alaska, September 20-24, 2004, Proceedings.
- Hapke, Cheryl, and Green, Krystal, Coastal landslide activity and coastal cliff retreat: U.S. Geological Survey Fact Sheet.
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- Poore, R.Z., Pavich, M.J., and Grissino-Mayer, H.D., Record of North American southwest monsoon from Gulf of Mexico sediment cores: Geology.
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- Raabe, E.A., Slow energy, fast transgressions; status of knowledge in Florida's Big Bend [abs.]: Geological Society of America Annual Meeting, Denver, CO, November 7-10, 2004.
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