

Research

U.S. Geological Survey and the American Geological Institute Receive Valuable Seismic Data from Chevron Corp.

By Catherine Puckett (USGS) and Michael Barrett (Chevron Corp.)

Valuable seismic data covering thousands of miles of offshore California and other parts of the U.S. west coast will be rescued from deteriorating magnetic tapes and made widely available to researchers around the world, thanks to collaboration among the U.S. Geological Survey (USGS), the American Geological Institute (AGI), and Chevron Corp. The unique agreement by which Chevron is donating the data to AGI for subsequent management and distribution by the USGS, originally signed on March 4 of this year at the USGS headquarters in Reston, VA, will enable access to the data by academic, government, and industrial researchers, marine geologists, and environmental engineers throughout the world.

In a ceremony at the USGS office in Menlo Park, CA, on May 16, Chevron Corp. donated to AGI and USGS the first of the data, collected from the 1960s to the 1980s for the purposes of oil and gas exploration and development. The USGS will house the data in a newly created repository called the National Archive of Marine Seismic Surveys (see URL <http://walrus.wr.usgs.gov/NAMSS/>). The ceremony was attended by **Don Paul**, Chevron Corp.'s vice president and chief technology officer; **Bill Kempner**, a geophysicist with Chevron Corp. in Bakersfield who negotiated the transfer of data; and **Stephen Testa**, president of AGI.

Chevron originally acquired the marine seismic data beginning in the 1960s by using high-energy acoustic signals, and although the commercial value of these data has diminished due to technological advances and offshore-development moratoria, their scientific value is still exceedingly high, said **Jonathan Childs**,



*Chevron Corp. donates valuable offshore seismic data to the USGS and the American Geological Institute (AGI) in a ceremony at the USGS office in Menlo Park, CA. Left to right: **Michael Carr**, USGS Associate Western Regional Geologist; **Samuel Johnson**, chief scientist of the USGS Western Coastal and Marine Geology Team; **Jon Childs**, USGS researcher in coastal and marine geology; **Stephen Testa**, president of AGI; **Bill Kempner**, geophysicist with Chevron Corp.; and **Don Paul**, Chevron Corp.'s vice president and chief technology officer.*

a USGS researcher in coastal and marine geology.

"These data represent a national scientific heritage of inestimable value," said **Childs**, who noted that their value to current and future research efforts is compounded by the fact that increasing environmental concerns over the use of sound in the oceans because of possible effects on marine mammals make it highly unlikely that such data could ever again be acquired.

Such commercial data as these, **Childs** said, have rarely been available for research purposes, but they are highly relevant to studies concerning offshore geologic hazards (such as submarine faulting and landslides), offshore extension

of aquifers and saltwater intrusion, basic geologic framework and tectonics, and more unconventional resources, such as gas hydrates.

Samuel Johnson, chief scientist for the USGS Western Coastal and Marine Geology Team, emphasized the value of this type of information. "USGS use of industry offshore seismic data has led to major advances in understanding active faults in Washington's densely populated Puget Lowland, for example. Documenting faults on the seismic lines triggered a surge of new work that completely changed earthquake-hazard assessments in the region and will lead to safer communities."

(Seismic Data continued on page 2)

Sound Waves

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Submission Guidelines

Deadline: The deadline for news items and publication lists for the August 2005 issue of *Sound Waves* is Tuesday, July 12.

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

Research, continued

(Seismic Data continued from page 1)

At the ceremony handing over the seismic information today, **Don Paul** said, "Over the decades, the magnetic tapes containing the seismic data have been stored in special warehouses, but they are rapidly approaching the point where they will no

longer be viable. The data need to be transferred to a new digital recording medium to preserve this unique, irreplaceable asset; otherwise it will be permanently lost. We are extremely pleased that USGS will make these valuable data available." ❁

Fieldwork

Joint Spanish-United States Cruise Investigates Tsunami and Earthquake Hazards in the Northeastern Caribbean

By Uri ten Brink

A survey to map tsunami and earthquake hazards in the northeastern Caribbean was carried out between March 28 and April 17, 2005, aboard the Spanish research vessel *Hesperides* and the Puerto Rican commercial tugboat *Kruger B*. The survey was conducted jointly by the University of Madrid, the Spanish Royal Naval Observatory, the U.S. Geological Survey (USGS) Woods Hole Science Center, and the Puerto Rico Seismic Network (operated by the University of Puerto Rico). It included detailed sea-floor mapping of a 24,000-km² area south and southwest of Puerto Rico known as the Muertos Trough, where the Caribbean plate is pos-

sibly being thrust or subducted under Puerto Rico and the Dominican Republic. The area has never been mapped before, and so the level of recent tectonic activity there is unknown.

The second part of the survey was centered in a section of the Puerto Rico Trench north of the Virgin Islands, previously mapped by the USGS (see "Mapping of the Puerto Rico Trench, the Deepest Part of the Atlantic, Is Nearing Completion," *Sound Waves*, October 2003, at URL <http://soundwaves.usgs.gov/2003/10/fieldwork.html>). The purpose of this part of the survey was to understand the reason for the high level of

(Spanish-U.S. Cruise continued on page 3)



A recent Spanish-United States cruise investigated tsunami and earthquake hazards in the northeastern Caribbean.

Fieldwork, continued

(Spanish-U.S. Cruise continued from page 2)

earthquake activity in the area and its potential hazard to Puerto Rico and the Virgin Islands. Ten USGS ocean-bottom seismometers were deployed here to 6,000-m depth to record acoustic waves generated by the *Hesperides*. The seismometers will stay on



Antonio Pazos, a scientist from the Spanish Royal Naval Observatory in Cádiz, during a shipboard celebration of *La Feria de Sevilla*, a Spanish festival held each spring.

the sea floor for a period of 7 months to record local seismicity. This deployment will also help calibrate the University of Puerto Rico Seismic Network to locate earthquakes in the Puerto Rico Trench. Seismic-reflection data, which provide vertical cross sections through the crust, were also collected and will augment ongoing USGS research in the area.

The third part of the survey included the deployment of land seismometers on the Dominican Republic, which recorded acoustic waves generated by the *Hesperides* south of the island. The survey included two stops, one in Ponce, Puerto Rico, and one in Roadtown, British Virgin Islands, where press conferences were held and school groups visited the ship. The USGS was represented by **Uri ten Brink**, **Thomas O'Brien**, and **Edward Sweeney**. Woods Hole Oceanographic Institution (WHOI) technicians **Vic Bender** and **Dave DuBois** and University of Puerto Rico scientist **Jay Pulliam** (also affili-



USGS-WHOI ocean-bottom seismometer, one of 10 instruments deployed in the Puerto Rico Trench.

ated with the University of Texas Institute for Geophysics) deployed the ocean-bottom seismometers. ❁

Habitat Mapping to Assess Health of Oyster Fishery in Apalachicola Bay, Florida

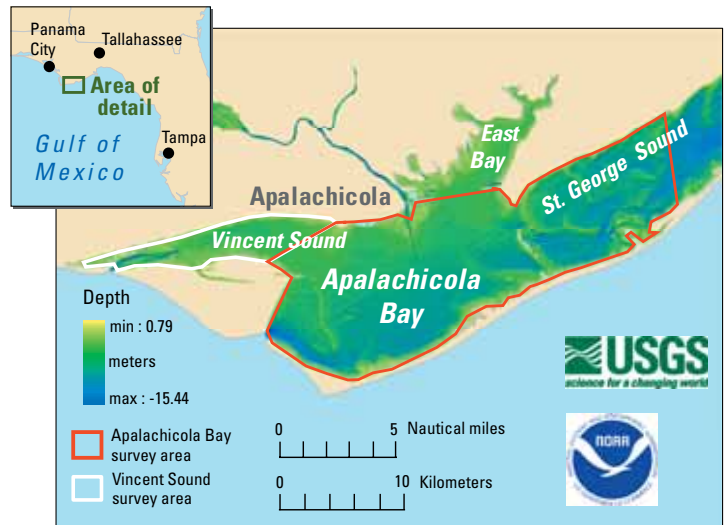
By Dave Twichell

Apalachicola Bay lies in the heart of Florida's "Forgotten Coast," midway between Tallahassee and Panama City. The area is in transition, and the bay separates barrier islands undergoing rapid development from mainland communities whose economies are still based largely on the oyster and shrimp fisheries. The bay, which is about 10 km wide by 45 km long and has an average depth of 3 m, is home to the largest oyster fishery in the State (90 percent of Florida's oysters are harvested here).

To help in assessing the health of this fishery, the U.S. Geological Survey (USGS), the Apalachicola National Estuarine Research Reserve, and the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center have started a 2-year habitat-mapping program. The first phase of acoustic mapping was completed by USGS Woods Hole Science Center staff during a 4-week effort in March and April. **Dave Twichell** led the group, **Barry Irwin** skippered the re-

search vessel *Rafael*, **Chuck Worley** and **Emile Bergeron** provided technical support, **Brian Andrews** processed the data, **Bill Danforth** completed software improvements that were enthusiastically endorsed by **Brian**, and **Dave Nichols** and **Jane Denny** worked behind the scenes to ensure a successful field program.

Shallow-water mapping is a challenge, and the seemingly unending chain of fronts that pushed through northern Florida during the survey period brought wind and floods that made for frequent stretches when the bay was acoustically inhospitable. Despite



The USGS is participating in a cooperative study of oyster habitats in Apalachicola Bay on Florida's panhandle coast.

the harsh weather, a large part of the bay was surveyed, and the data are leading to an improved understanding of oyster-bed distribution.

(Habitat Mapping continued on page 4)

(Habitat Mapping continued from page 3)

Oyster-bed distribution is controlled by both salinity and sea-floor geology. Oyster beds generally occur in areas where the salinity is 5 to 25 ppt, on three types of shallow bars formed by different geologic processes. Some oyster beds occupy shoals that originally formed as flood-tidal deltas shoreward of abandoned inlets. Others occupy linear

shoals perpendicular to the prevailing westward currents. These shoals are asymmetric, with their steep sides facing westward, and appear to have originated as sand waves. The third and smallest type of shoal consists of circular mounds of dredged material dumped within 300 m of the intercoastal waterway, a passage through protected waters for small

to midsize boats. Although dredging can be viewed with environmental disapproval, here the human engineering appears to be providing new oyster habitats! A videotaping and sampling program to be conducted in May and June is the next phase of the project, and we hope it will shed further light on oyster-bed formation. ❁

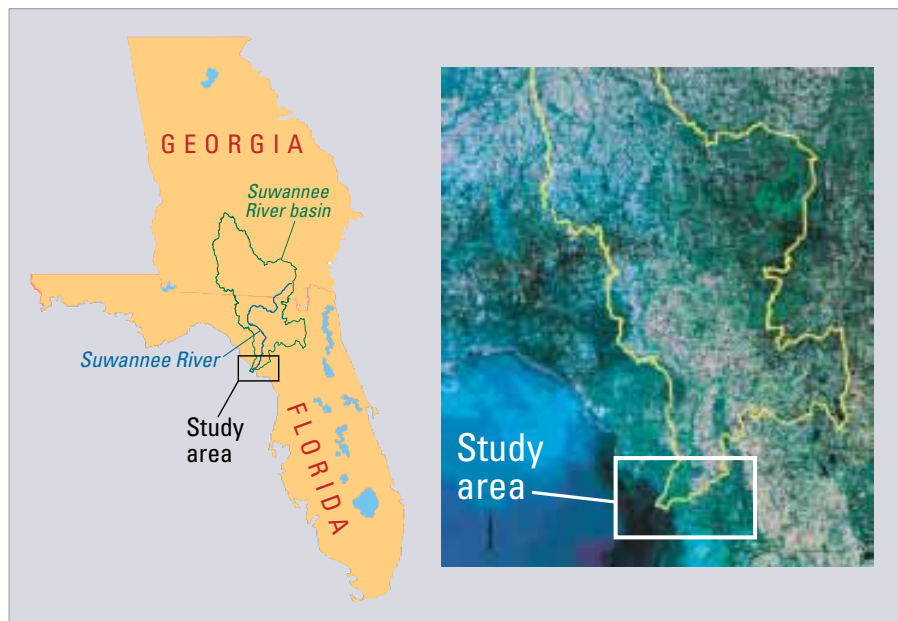
In Search of Submarine Ground-Water Discharge Along the Suwannee River Delta, Florida

By Peter Swarzenski, Chris Reich, Kevin Kroeger, Brian Blake-Collins, and Jason Greenwood

In March 2005, researchers from the U.S. Geological Survey (USGS), Florida State University (FSU), and the University of South Florida (USF) traveled to the Suwannee River delta to search for sites of submarine ground-water discharge. Much evidence suggests that submarine ground-water discharge can be important not only for estimating how much water of different types (for example, ground water, river water, seawater) moves across land/sea margins, but also for estimating the amounts of ground-water-borne constituents being delivered to the coastal ocean. Our goal in March was to use a suite of newly developed tools, more or less simultaneously, to identify sites of submarine ground-water discharge and possibly also to quantify discharge rates.

We have developed the following tools with our collaborators to study submarine ground-water discharge:

1. Airborne thermal imagery, which detects temperature differences between water masses. Because ground-water temperatures remain relatively constant throughout the year, the temperature difference between surface water and ground water is greater during seasons when surface water is warmed or cooled; thermal images taken during these times will show where ground water is flowing into surface water. (USF)
2. Streaming resistivity profiling, which detects pore-water conductivity on the basis of variations in electrical resis-



Study area at the Suwannee River delta on Florida's west coast, shown on a map (left) and a satellite image (right). (The satellite image, a mosaic of several Landsat Thematic Mapper images from the early 1990s, was developed by the Florida Suwannee River Water Management District.)

- tance; ground water generally has lower salinity and lower conductivity (higher resistivity) than seawater. (USGS)
3. Analysis of radon-222 (^{222}Rn), a naturally occurring radioactive gas with a short half-life (3.8 days) that is much more concentrated in ground water than in surface water. (FSU and USGS)
4. Analysis of methane (CH_4), another naturally occurring gas that is more concentrated in ground water than in surface water. (FSU)
5. Analysis of nutrients, stable isotopes,

and noble gases whose concentrations differ in ground water and surface water. (USGS)

Some Highlights of the Fieldwork and Preliminary Observations

Sarah Kruse (USF) deployed a series of temperature loggers randomly throughout the delta and lower river to aid in calibration of the thermal imagery. **Kevin**

(Suwannee River Delta continued on page 5)

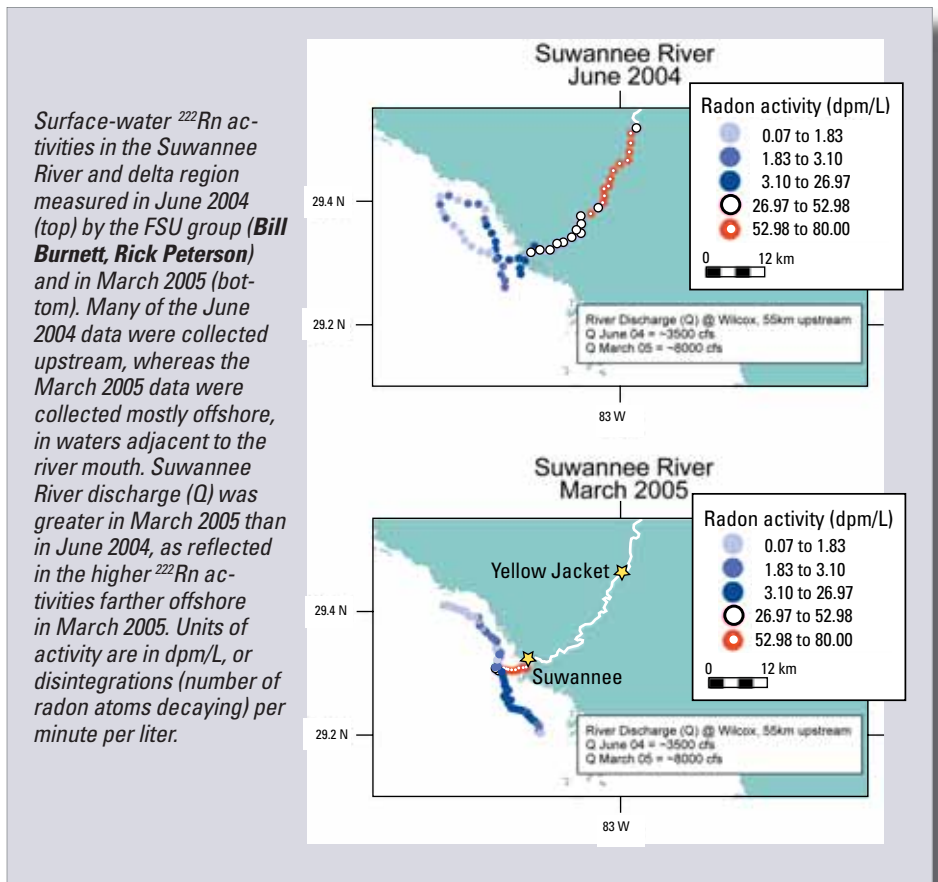
Fieldwork, continued

(Suwannee River Delta continued from page 4)

Kroeger and Chris Reich (both of USGS) used drive-point piezometers to obtain ground-water samples across a salinity gradient within a marsh site and a river-bank site. Ground-water samples were collected for later analyses of nutrients, trace elements, N₂ and Ar gas, and ²²²Rn. **Matt Weiss** (USF) operated an electromagnetic-resistivity array to map subsurface salinity anomalies in relation to the dynamic position of the freshwater/saltwater interface. Salinity data from the piezometer profiles were used to ground-truth the electromagnetic-resistivity data.

Jason Greenwood and Brian Blake-Collins (USGS contractors through ETI Professionals, Inc.) worked with **Rick Peterson** (FSU) to map about 50 km of continuous streaming resistivity and ²²²Rn data offshore from the mouth of the Suwannee River and upriver. The ²²²Rn data they collected in March 2005 are compared with ²²²Rn data collected in June 2004 on the accompanying maps.

Interestingly, ²²²Rn and CH₄, both of which have been shown to be effective tracers of submarine ground-water discharge, diverge in the upstream section of the survey. Such results suggested that a sinkhole may have developed somewhere upstream in the watershed, producing a slug of ground water rich in ²²²Rn but low in CH₄. Some recent evidence, indeed,



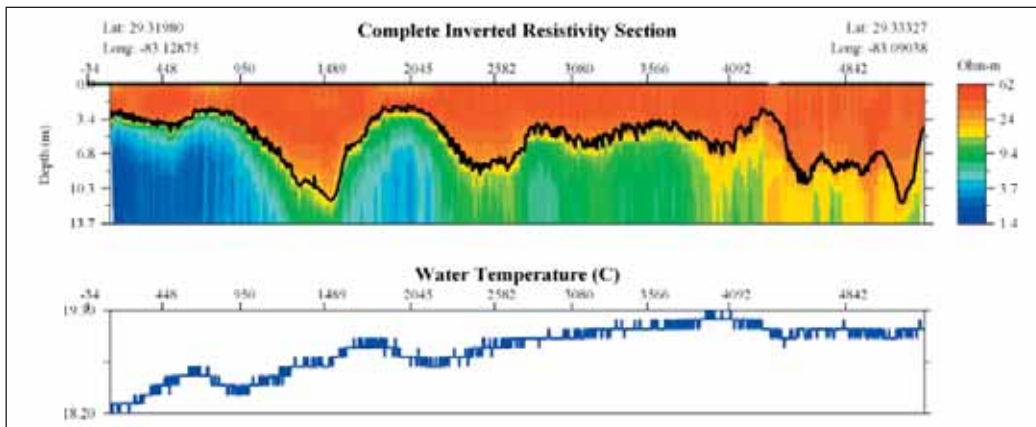
confirms the formation of a large sinkhole in the Suwannee River watershed.

Streaming resistivity profiling in the lower reaches of the Suwannee River revealed

new details about the position and dynamics of the freshwater/saltwater interface, as shown in the plot of resistivity data that accompanies this article. As expected, the

resistivity (inverse of conductivity or salinity) of pore water in the Suwannee riverbed is clearly lower (more saline) at the mouth of the river and becomes higher (that is, fresher) upstream.

Preliminary results from this field effort confirm the usefulness of the new techniques and approaches in refining studies of water exchange across land/sea margins and of submarine ground-water discharge. For further information, please contact members of the USGS submarine ground-water discharge team: **Peter Swarzenski** (pswarzen@usgs.gov), **Kevin Kroeger**, **Chris Reich**, **Jason Greenwood**, and **Brian Blake-Collins**. ☼



Inverted streaming resistivity profile collected on March 2, 2005, along a 5-km-long line moving upstream from the town of Suwannee (left) toward Yellow Jacket (right). Blue hues denote higher pore-water salinities; orange/yellow hues denote freshened water masses (lower salinities). Surface-water temperature, depth, and salinity are accounted for in this inversion. Water depth is shown as a black line. As expected, the resistivity (inverse of conductivity or salinity) of pore water in the Suwannee riverbed is clearly lower at the mouth of the river (more saline) and becomes higher (that is, fresher) upstream.

USGS Scientist Featured on National Geographic Television Series “Strange Days on Planet Earth”

By Ann B. Tihansky

Ginger Garrison, a marine biologist with the U.S. Geological Survey (USGS) Florida Integrated Science Center in St. Petersburg, FL, is conducting research on coral disease and the effects of anthropogenic activity on the health of coral-reef environments. Aspects of her research are featured in a National Geographic television series that began airing on Public Broadcasting Service (PBS) stations on April 20. The series, titled “Strange Days on Planet Earth,” highlights the possible effects of global warming. **Ginger** is featured in the episode titled the “One Degree Factor,” in which she discusses the hypothesis that African dust plays an adverse role in coral disease and human health. This episode was filmed in July 2003 in the Virgin Islands and in Trinidad. A Web site about the National Geographic Series is posted at URL http://www.pbs.org/strangedays/index_flash.html.

Currently, the USGS scientists working on the Coral Mortality and African Dust project (**Gene Shinn, Ginger Garrison, Dale Griffin, Chuck Holmes, Christina Kellogg, Bill Foreman, Mike Majewski, Carl Orazio, David Alvarez, Scott Carr,** and **Mike Gray**) are collaborating



*Curious tourist divers (upper right) watch as USGS scientist **Ginger Garrison** conducts underwater research at a coral reef in the Virgin Islands National Park. Photograph courtesy of **Steve Simonsen** (see URL <http://www.stevesimonsen.vi/>).*

with the National Institute of Meteorology and Geophysics in the Republic of Cape Verde; the Environmental Management Authority and the University of the West Indies in Trinidad; the University of the Virgin Islands; the University of Hawai‘i and the State of Hawai‘i; the University of South Carolina, Aiken; Texas A&M University, Corpus Christi; and the University of Mali in Mali, West Africa, to study the effects of African and Asian dust on

downwind ecosystems and human health. On Sal Island (Cape Verde) in May 2005, **Ginger** sampled air for chemical contaminants and microorganisms, surveyed coral reefs for the presence of disease, and characterized benthic cover on coral reefs. She also is conducting global-change and coral-reef research in American Samoa with USGS scientists **Chris Kellogg, Chuck Birkeland,** and **Greg Piniak**, looking at microbes and coral resilience. ❁

Earth Day Celebration at McMullen-Booth Elementary School, Florida

By Dennis Krohn

The U.S. Geological Survey (USGS) Center for Coastal and Watershed Studies participated in the annual Earth Day celebration at McMullen Booth Elementary School in Clearwater, FL, on April 22. Students particularly enjoyed a volcano model created by award-winning USGS employee **Dave Wegener** (see “Heroes Among Us” in this issue’s Awards section). USGS volunteer **Kathy Krohn** showed off the volcano and staged several mock eruptions while handing out literature about USGS activities around the Tampa Bay area. This year’s new and improved volcano model

featured a subwoofer for sound effects and a remote control to start the eruption. Reports from the field are that the younger children stared wide eyed at the eruption, whereas the older children wanted to know how the model worked. Both age groups enjoyed the exhibit. ❁

***Barbara Babler**, McMullen Booth’s physical-education (PE) instructor, stands in front of the smoking USGS volcano model, named “Mount Babler” by her grateful PE students (who were excused from their regularly scheduled PE class to visit the Earth Day exhibits).*



Oyster-Reef Restoration Is Part of Earth Day Celebration

By Dennis Krohn

Tampa Bay Watch, a nonprofit group dedicated to preserving the Tampa Bay estuary, teamed up with the Boy Scouts of America to help shore up erosion and provide habitat for oyster beds on the east side of Tampa Bay as part of this year's celebration of Earth Day. **Rob Parris**, an Eagle Scout candidate from Troop 339, organized the effort to provide 2 days of volunteer help to bag as much as 24 tons of fossilized shell material to use as the basis of a submerged 100-yd-long reef on the west side of Whiskey Stump Key. The site has historic significance because it was preserved in 1934 as one of the first wildlife refuges in the Tampa Bay area. (See article about a similar effort, "Growing Oyster Habitat in Tampa Bay," in *Sound Waves*, April 2005.)

The shell material was initially dumped in big piles next to the boat landing on the Alafia River. Volunteers placed the shells into net bags and hand-trucked them to waiting boats. **Keith Ludwig** of the U.S. Geological Survey (USGS) Center for Coastal and Watershed Studies in St. Petersburg, FL, volunteered to pilot a USGS drilling barge and transport the bagged shells approximately 5 mi from the Alafia River landing to Whiskey Stump Key.



A bucket brigade is used to carry the bags of shell material to the oyster-reef-restoration site off Whiskey Stump Key.

With its shallow draft, large capacity, and low sides, the barge is the perfect craft to haul the bagged shell material out to the reef site.

Earth Day, April 22, was cool with little wind, making conditions ideal to build the reef. More than 70 volunteers showed up and quickly filled the available watercraft. After the first trip, an award ceremony was held for **Parris**, a sophomore at Chamberlin High School, whose leadership of the project helped him achieve the rank of Eagle Scout. Representatives

from the National Oceanic and Atmospheric Administration (NOAA), Tampa Bay Watch, Audubon of Florida, **Senator Bill Nelson's** office, **Congressman Mike Bilirakis's** office, Tampa Electric, and the Pinellas County Environmental Fund, among others, gave speeches crediting the good work **Parris** had done working with adults from a host of organizations to lead this year's event.

After a catered lunch, the volunteers were reenergized and made a second trip to the Whiskey Stump Key site. Volunteers from Tampa Electric's Environmental, Health, and Safety Division were well represented on the second leg, which more than doubled the morning's output.



*Volunteers from Tampa Electric's Environmental, Health, and Safety Division make the afternoon run to the oyster reef. From left to right, **Therese Sanchez**, **Dru Latchman**, **Shelley Aubuchon**, and **Amy Baker**. **Keith Ludwig** (USGS) pilots the barge.*



Above: Approximately 24 tons of fossilized shell material were dumped at the Alafia River boat ramp on the east side of Tampa Bay, where more than 70 volunteers from Tampa Bay Watch and other groups placed the shell material into net bags.

*Right: Event organizer **Rob Parris** finally gets a chance to eat.*



For more information on Whiskey Stump Key and the oyster-reef restoration project, visit these Web sites:

- Tampa Bay Watch,
URL <http://www.tampabaywatch.org/powerpdl.htm>
- Audubon of Florida,
URL <http://www.audubonofflorida.org/conservation/coastal.htm>
- NOAA Restoration Center,
URL <http://www.nmfs.noaa.gov/habitat/restoration/> 🌐

Department of Commerce Science and Technology Fellows Visit the USGS in Menlo Park, CA

By Helen Gibbons

A group of senior-level employees from various Federal agencies visited the U.S. Geological Survey (USGS) center in Menlo Park, CA, on May 18 during a field trip to promote interagency understanding and cooperation. The visitors are participants in the 2004-05 U.S. Department of Commerce Science and Technology Fellowship (ComSci) Program (see URL <http://www.technology.gov/comsci/>). The 14 ComSci Fellows who toured the center represent such agencies as the National Institute of Standards and Technology, the National Oceanic and Atmospheric Administration, the Federal Highway Administration, the National Institutes of Health, the National Aeronautics and Space Administration (NASA), and the Defense Intelligence Agency, to name a few. Their whirlwind (2-hour) tour of the center included briefings on topics in which they had expressed particular interest, such as earthquakes, tsunamis, and how water quality and monitoring efforts in San Francisco Bay compare with those in the Chesapeake Bay.

Jan Thompson, an ecologist in the USGS Water Resources Discipline, compared the San Francisco and Chesapeake Bays, explaining to the ComSci Fellows that although the two large estuaries look similar in many ways—both are ringed by urban development, for example—they are very different ecologically. Fine sediment from surrounding watersheds makes San Francisco Bay a turbid system with limited light, resulting in a shortage of biologically available carbon (provided by aquatic plants) despite the large amount of nutrients that flow into the bay from wastewater-treatment plants and agricultural runoff. The carbon shortage leads to a shortage of food for fish, one of the reasons why there are no commercial fisheries in the bay. The Chesapeake Bay, in contrast, has historically been a more productive system with extensive commercial fisheries, partly owing to clearer water, which produces more plants at the base of the food web. Today, the clearer water and excessive nutrients result in too much

The ComSci Fellows began their tour in the USGS Visitors Center. Pictured here (left to right) are Major Shawn Filby of the National Reconnaissance Office, Dr. Steven Chase (almost hidden) of the Federal Highway Administration, and Dr. Paul Brand of the National Institute of Standards and Technology, pointing to a favorite travel destination.



carbon, with an overabundant growth of aquatic plants. The result is episodic anoxia, in which an excess of plant material is left unconsumed and dies, settling to the bottom, where bacterial decomposition of the plants uses up the oxygen in a water mass, killing the organisms. The two bays also differ sociopolitically. Monitoring of water quality in the Chesapeake Bay, for example, is paid for largely by the Federal Government and several States that surround the bay, whereas monitoring in San Francisco Bay is paid for largely by water contractors who tap numerous reservoirs filled with snowmelt that historically drained into the bay. The ComSci Fellows were keenly interested in **Thompson's** comparison of the two estuaries, as well as in their tour of her lab, where her studies include ecosystem effects of invasive spe-



USGS ecologist Jan Thompson (left) welcomes the ComSci Fellows to her lab.

cies, a problem common to both bays but more acute in San Francisco Bay, which is known as the most invaded aquatic system in North America.

Eric Geist, a geophysicist in the Western Coastal and Marine Geology Team, explained to the ComSci Fellows how modern technological tools are used along with computer models to analyze tsunamis. Analyzing past tsunamis provides critical information for an ongoing interagency effort to develop forecast models for short-term tsunami warnings and inundation models for long-term mitigation planning. **Geist** demonstrated his computer model of the December 2004 Indian Ocean tsunami (see URL <http://walrus.wr.usgs.gov/tsunami/sumatraEQ/model.html>) and gave the ComSci Fellows a brief overview of how a tsunami is triggered by sea-floor deformation during an earthquake, how tsunami waves shorten and steepen as they enter shallow water, and how the waves interact with coastline topography to produce reflections and other secondary waves. Using the December 2004 Indian Ocean tsunami as an example, **Geist** showed the fellows how

- data from the Global Seismic Network provide information about fault-rupture processes used to model tsunami generation;

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(ComSci Fellows continued from page 8)

- bathymetric and topographic databases are used to model tsunami propagation through the ocean and inundation over coastal land; and
- technological advances—such as bottom-pressure recorders, cabled deep-sea observatories, and satellites—improve scientists' ability to directly measure tsunami wave heights and test model predictions.

Geist emphasized that interagency collaboration is essential for the effective mitigation of tsunami hazards.

Additional briefings for the ComSci Fellows included presentations on earthquake and geographic research and a demonstration of the USGS "one stop" source for geospatial data, The National Map (see URL <http://nationalmap.gov/>).

The ComSci Program was established in 1964 to provide senior-level executive-branch employees with an opportunity to study national and international issues relating to the development, application, and management of science and technology. Each class of fellows takes a week-long field trip to investigate academic, private-

sector, and government science, technology, and technology policy; this year's class chose the San Francisco Bay area for their field trip. In addition to the USGS, some of the organizations they planned to visit included the Golden Gate Bridge Transportation Authority; the Exploratorium; the University of California, Davis, Department of Viticulture and Enology; the Stanford Linear Accelerator; Agilent Technologies; Sun Microsystems; the NASA Ames Research Center; Intuitive Surgical Robotics; the Lawrence Livermore Laboratory; and Genentech, Inc. ☼

USGS and the American Ground Water Trust Expand Teacher Institute Program

By **Ann B. Tihansky**

In January 2005, the U.S. Geological Survey (USGS) and the American Ground Water Trust (AGWT) established a formal partnership through a technical agreement to advance the public's understanding of the issues and science relating to water resources. The initial effort will concentrate on expanding the American Ground Water Trust's "Ground Water Institute for Teachers" program, which focuses on educating teachers about ground water and hydrology. The goal is to offer one workshop in each State every year.

USGS hydrologist **Ann Tihansky** and AGWT director **Andrew Stone** coordinated efforts with **Robert Ridky**, USGS National Education Coordinator, and **Lisa Robbins**, director of the USGS Center for Coastal and Watershed Studies in St. Petersburg, FL (a unit of the USGS Florida Integrated Science Center), to define a partnership that will further science education.

For the past 5 years, the AGWT has introduced ground-water concepts, ongoing research techniques, and resource-management issues to 790 teachers at 31 institutes in 17 States. The USGS has helped run many of these institutes. Now, with formalization of the partnership, several goals have been established, including expansion of the program so that at least one institute is offered in each State every year in conjunction with the use of USGS



*The USGS/AGWT partners (left to right): **Robert Ridky**, USGS National Education Coordinator; **Lisa Robbins**, USGS center director; **Andrew Stone**, AGWT director; and **Ann Tihansky**, hydrologist and USGS coordinator of the USGS/AGWT partnership.*

ground-water experts across the Nation to enhance public understanding of ground-water issues and research. The expansion may also include workshops for tribal partners and other entities that would benefit from similar educational programs. **Ridky** said of the partnership, "It's an exemplary initiative because it effectively integrates education and research and links, in a meaningful way, with our professional associates."

The USGS will be a highly visible partner in the nationwide 2-day training workshops. USGS involvement with AGWT in developing the teacher-institute programs will serve to deliver a consistent science message nationwide and will connect

teachers to locally relevant science programs conducted at the Federal level. All institute participants will receive a package of USGS educational materials and publications that highlight the latest science and research technologies used to address relevant water-resource issues and management practices. Local USGS scientists will be part of each program in several ways: leading field trips, presenting research, assisting in planning, and providing materials.

The first of the 2005 institutes will be held at the USGS office in St. Petersburg on June 9 and 10.

Other institutes are planned for the two other main USGS Florida Integrated Science Center offices in Miami and Gainesville, and at nine other locations throughout the United States, including Fresno, CA, Branchville, NJ, Denver, CO, Lowell, MA, Allentown, PA, San Antonio, TX, and Claremont, CA.

For more information about the Ground Water Institute for Teachers, visit URL <http://www.agwt.org/teachers/Institutehome.htm>, or contact

- **Ann Tihansky**, USGS (727) 803-8747 ext. 3075, tihansky@usgs.gov
- **Andrew Stone**, AGWT (603) 228-5444, astone@agwt.org ☼

Youth Enrichment Service E-Team Visits USGS Center in Woods Hole, MA

By Glynn Williams and Ellen Mecray

The U.S. Geological Survey (USGS) Woods Hole Science Center hosted the Youth Enrichment Service (YES) E-Team on April 20, 2005. YES is a 33-year-old, Boston-based community nonprofit organization. This year, the YES E-Team toured the Woods Hole Science Center's Marine Operations Facility.

The YES E-Team is composed of youths, ages 13 to 17, that sign up to tour Massachusetts and examine ongoing environmental programs. The team visits and talks with professionals who are using modern technology to better understand the world through field and laboratory study.

YES E-Team members and staff travel outside the Boston area to visit locations where scientists collect, analyze, study, produce, and archive data collected in laboratories and in the field. The E-Team curriculum requires students to use mathematics and the scientific method to solve problems. They are required to prepare for field trips by using USGS maps, weather summaries, and preprinted materials. Their experiences are enhanced beyond the school walls when they have the opportunity to meet professionals working in fields to which they aspire.

At the Marine Operations Facility, the

students listened to science staff and toured the facilities, contemplating and asking questions about what they saw. In addition, the presenters were asked to "mentor" the students by sharing personal experiences and interests to which the students might relate. This extra touch gives the students a chance to see that the science can be mixed with other personal interests. The Marine Operations Facility tour was meant to provide the students with an open visit to a functioning facility showing off large-scale marine technology. The tour also offered the students a chance to see scientists and marine technicians at work. ☼

Awards

"Heroes Among Us"—USGS Personnel in St. Petersburg, FL, Win Awards

By Sandy Coffman

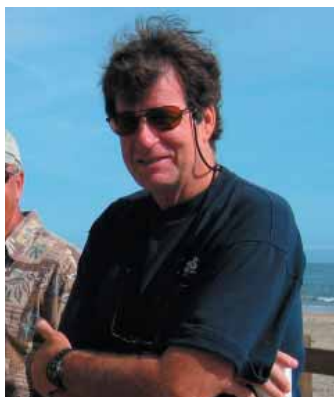
The Federal Executive Council of Tampa Bay held their "Employees of the Year 2005" awards luncheon on May 5. The theme was "Heroes Among Us." In 1961, **John F. Kennedy** established the Federal Executive Councils for involvement within their local communities. The Federal Executive Council of Tampa Bay is "dedicated to emergency preparedness, domestic violence prevention, mentoring youth, and improving employee morale through recognition of exemplary civilian and military service of our most valuable Federal assets, our employees." More than 200 hundred people attended the awards ceremony, which featured awards in both civilian and military categories: Outstanding Manager Supervisor, Outstanding Scientific/Professional, Outstanding Partnership, Outstanding Award for Volunteer Service, and Outstanding Technician, Trade, or Craft. The judges considered job competence and accomplishments, as well as effect on the community. U.S. Geological Survey (USGS) nominees from the USGS Center for Coastal and Watershed Studies in St.

Petersburg, FL, in the civilian category were **Abby Sallenger** for Outstanding Scientific/Professional, **Kim Yates** for Outstanding Partnership, and **Dave Wegener** for Outstanding Technician, Trade, or Craft. All three USGS nominees were recognized for their accomplishments.

Abby Sallenger received the Outstanding Scientific/Professional Award in recognition of his leadership of a research team conducting a National Assessment of Coastal Change Hazards and his attendance at many scientific meetings and conferences. Most notably, **Abby** was

an invited speaker for 1,000 emergency managers at the National Hurricane Conference in New Orleans in March 2005, where he presented findings from the historically significant hurricane season of 2004 in a talk entitled "Coastal Impacts of the 2004 Hurricanes." **Abby's** presentation led to interviews and several articles, one of which was carried by the Associated Press and appeared in numerous newspapers nationwide. In the international arena, **Abby** was the keynote speaker for the 5th International Conference on Coastal Dynamics, held April 4-8, 2005, in Barcelona, Spain. In his talk, "Large-Scale Coastal Change During Extreme Storms," he shared USGS technological innovations and research with the international scientific community. Work done by **Abby's** research team raises community awareness of the importance of science in understanding hurricanes and their impact on coastal communities. In addition, other Federal and local agencies and coastal communities nationwide

Abby Sallenger
at a USGS Coastal and Marine Geology gathering in Santa Cruz, CA.



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Awards, continued

(Heroes Among Us continued from page 10)

depend on the data and results from his USGS research efforts.

Kim Yates received an Honorable Mention in the Partnership category. She is the project leader of a USGS flagship effort in creating integrated-science programs. The Tampa Bay Study (see URL <http://gulfsci.usgs.gov/tampabay/>) is a pilot study for a larger Gulf of Mexico Integrated Science Program (URL <http://gulfsci.usgs.gov/>). **Kim** has pioneered efforts that integrate biologic, geologic, geographic, and hydrologic scientific studies. She not only has overseen the integration of scientific disciplines but



Kim Yates (right) and **Peter Betzer**, Dean of the College of Marine Science, University of South Florida, imitate corals at a USGS open house in St. Petersburg, FL.

also has enlisted the involvement of many partners to ensure that all parties share in the vision. Numerous local, county, and State government agencies, academic institutions, and community groups are involved in the USGS Tampa Bay Study. These partnership efforts raise awareness and share resources that further scientific understanding of the Tampa Bay estuary.

Dave Wegener received an award for Outstanding Technician, Trade, or Craft. **Dave** is an indispensable asset to the St. Petersburg center for his technical skills in designing and fabricating innovative equipment that allows scientists to measure and monitor variables that have not been measured or monitored before. He has repeatedly been recognized inhouse for his experimental-instrument designs with materials that can withstand a range of difficult field environments and conditions. His contributions elevate scientific knowledge and extend far beyond the USGS office. **Dave** has designed and built scientific displays ranging from museum exhibits to interactive displays that illustrate how volcanoes work and how



Dave Wegener in his shop at the USGS Center for Coastal and Watershed Studies in St. Petersburg, FL.

ground water moves. A master craftsman whose skills include the creation of special awards, **Dave** commented that the award plaque he received at this event was the first he had ever received that he didn't have to make. In true **Dave** style, he attended the awards luncheon and then quickly departed for Orlando to attend the first Florida Integrated Science Center Science Meeting so that he could help set up more than 40 display boards (which he had made) for poster presentations. ❁

Staff and Center News

Clean-Room Construction Begins at the USGS Woods Hole Science Center

By Sarah Kelsey and Ellen Mecray

Plans for the U.S. Geological Survey (USGS) Woods Hole Science Center's clean-room facility have been in the making for years, and this spring those plans were put into action! Construction began on April 27, 2005, and we are pleased with the progress that has been made. Existing laboratory space in the Gosnold Building (one of the two main buildings that house the USGS Woods Hole Science Center) is being renovated to create two nonmetallic clean rooms for preparation and analysis of geochemical samples. The work includes construction of a changing vestibule and a separate weighing room; the selection and installation of nonmetallic floor and ceiling finishes, doors, frames, windows, and lighting; and the installation of nonmetal-

lic fume hoods and cabinetry. The rooms will have new mechanical, electrical, and plumbing systems, including a new high-efficiency particulate-air (HEPA)-filtered air-handling system. The facility will also be wired for voice and data systems, specific laboratory equipment, and electronic security at the entryways.

Geochemists at the Woods Hole Science Center need a particle-free, nonmetallic clean room for their research projects in inorganic environmental chemistry. These clean rooms will be used by multiple geochemists, both inside and outside of the USGS, for the purpose



A view of the larger clean room undergoing renovation. The facility will have two rooms, the larger at Class 100,000 and the smaller at Class 10,000. The total area of the facility will be 500 ft². Photograph by **Sarah Kelsey**.

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(Clean Room continued from page 11)

of analyzing sediment and water samples for environmental contaminants.

This state-of-the-art clean-room facility will insure the integrity of sediment and water samples during the sample-preparation phase of the analysis. The space will allow samples to be acid-digested in a particle- and trace-metal-free clean environment, using modern polypropylene chemical hoods and laboratory furniture. The renovated space expands the laboratory-

research capabilities of the Woods Hole Science Center to include water samples as well as a suite of contaminants for which sensitive analytical methods are currently being developed.

This project, which is part of a long-term vision for geochemistry in the USGS Coastal and Marine Program, is supported through the efforts and contributions of several science projects, as well as managers at the center, Region, and Program levels. ❁



Sarah Kelsey (left) and **Ellen Mecray** in the future clean-room facility. Photograph by **Sandy Baldwin**.

USGS National Education Coordinator Visits Office in St. Petersburg, FL

By **Ann B. Tihansky**

Robert Ridky, U.S. Geological Survey (USGS) National Education Coordinator, visited the USGS Center for Coastal and Watershed Studies in St. Petersburg, FL, on March 17 to share his ideas about USGS research and education in a presentation titled “Integrating Education and Research at USGS: Need, Purposes, and Approach.” He highlighted the increasing

national need for public understanding of Earth science and technology at a time when statistics show a decrease in student enrollment in Earth-science fields. Nearly all Federal agencies have recommended increased spending on Earth-science education.

Ridky met with **Andrew Stone**, director of the American Ground Water Trust

(AGWT); **Lisa Robbins**, director of the USGS center in St. Petersburg; and **Ann Tihansky**, USGS hydrologist, to exchange ideas, goals, and visions for a newly established partnership between the USGS and the AGWT (see “USGS and the American Ground Water Trust Expand Teacher Institute Program” in this issue’s Outreach section). ❁

Kurt Rosenberger Joins the Western Coastal and Marine Geology Team

By **Marlene Noble**

Kurt Rosenberger, a physical and geological oceanographer, has recently joined the Western Coastal and Marine Geology team in Menlo Park, CA. **Kurt** received his M.S. in geological oceanography at the University of Rhode Island. For his Master’s thesis, **Kurt** analyzed current-meter data to investigate physical processes governing the exchange of water between Narragansett Bay and Rhode Island Sound—information important for computer models used to predict how the bay will respond to environmental or manmade changes. After receiving his Master’s degree, **Kurt** became an oceanographer at the Science Applications International Corp. (SAIC) office in Newport, RI, where he was involved in numerous coastal-monitoring programs around the United States,



Kurt Rosenberger during fieldwork off Palos Verdes in southern California.

including a collaborative project between the USGS, the U.S. Environmental Protection Agency (EPA), and SAIC to study contaminated sediment off Palos Verdes, CA. **Kurt** has extensive experience in:

- using moored instruments and various sea-floor-characterization techniques (such as sidescan sonar and sediment coring) to study sediment transport,
- managing oceanographic and geologic data, and
- programming in Matlab.

At the USGS, **Kurt** will work with **Chris Sherwood**, **Jingping Xu**, **Marlene Noble**, **Joanne Thede Ferreira**, **Anne Gartner**, and many of the marine-facilities experts in both Redwood City, CA, and Woods Hole, MA. **Kurt** is already planning a trip to the USGS Woods Hole Science Center to meet with **Marinna Martini**, **Fran Lightson**, and others to build upon his knowledge of oceanographic-data-analysis techniques.

Please come by Room 1209 in Menlo Park and welcome **Kurt** to the USGS. ❁

Recently Published Articles

- Andrews, B., and Butman, B., 2005, Mapping the geology of the seafloor, *in* Coastlines, Winter 2004-2005: Massachusetts Office of Coastal Zone Management, p. 28-29 [URL <http://www.mass.gov/czm/coastlines/2004-2005/habitat/czs.htm>].
- Beach, K.S., Walters, L.J., Paul, V.J., Becerro, M.A., and Ritson-Williams, R., 2005, Beyond algal occupation on coral reefs; are there short-term impacts of chemically defended seaweed on zooxanthellae photosynthesis in adult *Porites astreoides*? Benthic Ecology Meeting, Williamsburg, VA, April 6-10, 2005, Program and Abstracts, poster 106 [URL <http://www.vims.edu/bem2005/>].
- Colman, J.J., Bratton, J.F., Charette, M.A., and Crusius, J., 2005, Flow-model, salt-balance, seepage-meter, radon, and geophysical estimates of ground-water discharge to a marine embayment [abs.]: American Society of Limnology and Oceanography Aquatic Sciences Meeting, Salt Lake City, UT, February 20-25, 2005, abstract 578 [URL <http://www.aslo.org/meetings/slc2005/>].
- Dartnell, Peter, Cochrane, Guy, and Dunaway, M.E., 2005, Multibeam bathymetry and backscatter data; northeastern Channel Islands region, southern California: U.S. Geological Survey Open-File Report 2005-1153 [URL <http://pubs.usgs.gov/of/2005/1153/>].
- de Blij, H.J., Muller, P.O., and Williams, R.S., Jr., 2004, Physical geography; the global environment: New York, Oxford University Press, 702 p.
- Ferrigno, J.G., Williams, R.S., Jr., and Foley, K.M., 2003, Coastal-change and glaciological map of the Saunders Coast area, Antarctica; 1972-1997 [abs.]: International Glaciological Society International Symposium on Antarctic Glaciology, 7th, Milan, Italy, August 25-29, 2003.
- Hall, D.K., Williams, R.S., Jr., Steffen, K., and Chien, J.Y.L., 2004, Analysis of summer 2002 melt extent on the Greenland Ice Sheet using MODIS and SSM/I data: Institute of Electrical and Electronics Engineers (IEEE) International Geoscience and Remote Sensing Symposium (IGARSS 04), Anchorage, AK, September 20-24, 2004, Proceedings, 4 p.
- Hutchinson, D.R., and Williams, R.S., Jr., 2004, The importance of public science at the frontiers of democracy [abs.]: Conference on Public Science in Liberal Democracy; the Challenge to Science and Democracy, Saskatoon, Saskatchewan, Canada, October 14-16, 2004, Abstracts.
- Krebs, J.M., Brame, A.B., and McIvor, C.C., 2005, Estuarine fish assemblages in natural and altered wetland habitats of Tampa Bay, Florida; summary of year 1: American Fisheries Society, Florida Chapter Annual Meeting, 25th, Altoona, FL, February 22-24, 2005 [URL <http://www.sdafs.org/flafs/>].
- Kuffner, I.B., Walters, L.J., Becerro, M.A., Paul, V.J., Ritson-Williams, R., and Beach, K.S., 2005, Perpetuating phase shifts; inhibition of coral recruitment by macroalgae and cyanobacteria: Benthic Ecology Meeting, Williamsburg, VA, April 6-10, 2005, Program and Abstracts, oral presentation [URL <http://www.vims.edu/bem2005/>].
- Lacy, J.R., and Sherwood, C.R., 2004, Accuracy of a pulse-coherent acoustic Doppler profiler in a wave-dominated flow: Journal of Atmospheric and Oceanic Technology, v. 21, no. 9, p. 1448-1461 [URL <http://ams.allenpress.com/amsonline/?request=get-archive&issn=1520-0426>].
- Lacy, J.R., Sherwood, C.R., and Gelfenbaum, G., 2004, Estimating hydrodynamic roughness in a wave-dominated environment with a high resolution acoustic Doppler profiler [abs.]: Eos (American Geophysical Union Transactions), Ocean Science Meeting Supplement, v. 84, no. 52, abstract OS21I-10 [go to URL <http://www.agu.org/meetings/os04/waisos04.html> and search on "lacy"].
- Molnia, B.F., Williams, R.S., Jr., and Ferrigno, J.G., 2004, Alaska—a review and analysis of the 14 glacierized regions [abs.]: International Glaciological Society International Symposium on Arctic Glaciology, Geilo, Norway, August 23-27, 2004, abstract 153.
- Nielsen, S.G., Rehkämper, M., Porcelli, D., Andersson, P., Halliday, A., Swarzenski, P., Latkoczy, C., and Günter, D., 2005, The thallium isotope composition of the upper continental crust and rivers—an investigation of the continental sources of dissolved marine thallium: *Geochimica et Cosmochimica Acta*, v. 69, p. 2007-2019 [URL http://www.elsevier.com/wps/find/journaldescription.cws_home/212/description].
- Pendleton, E.A., Thieler, E.R., and Williams, S.J., 2005, Coastal vulnerability assessment of Cape Hatteras National Seashore (CAHA) to sea-level rise: U.S. Geological Survey Open-File Report 2004-1064 [URL <http://pubs.usgs.gov/of/2004/1064/>].
- Sherwood, C.R., Trembanis, A., and Traykovski, P., 2005, Process model of sorted bedforms [abs.]: Eos (American Geophysical Union Transactions), Joint Assembly Supplement, v. 86, no. 18, abstract OS31A-05 [Go to URL <http://www.agu.org/meetings/sm05/waissm05.html> and search on "Trembanis"].
- Sherwood, C.R., Warner, J.C., Arango, H.G., Blaas, M., and Harris, C.K., 2003, Modeling the turbidity maxima of idealized estuaries with a community coastal sediment transport model [abs.]: Estuarine Research Federation Biennial Conference, 17th, "Estuaries on the Edge, Convergence of Ocean, Land, and Culture," Seattle, WA, September 14-18, 2003, v. 35, no. 6.
- Song, J., and ten Brink, U.S., 2005, Graphical user interface (RayGUI 2.0) for interactive seismic ray tracing: Eos (American Geophysical Union Transactions), v. 86, no. 9, p. 90.
- Varekamp, J.C., Mecray, E.L., and Zierow, T., 2005, Once spilled, still found; metal contamination in Connecticut coastal wetlands and Long Island Sound sediment from historic industries, *in* Whitelaw, D.M., and Visgilio, G.R., eds., Our changing coastline—private rights and public trust (Advances in Ecological Economics Series): Northampton, MA, Edward Elgar Publishing.

(Recently Published continued on page 14)

(Recently Published continued from page 13)

Walters, L.J., Downs, C.A., Kuffner, I.B., Becerro, M.A., Paul, V.J., and Ritson-Williams, R., 2005, Cellular-level impacts of macroalgae and cyanobacteria on competent larvae of the hard coral *Porites*

astreoides: Benthic Ecology Meeting, Williamsburg, VA, April 6-10, 2005, Program and Abstracts, poster 113 [URL <http://www.vims.edu/bem2005/>].

Williams, R.S., Jr., 2004, Sveinn Pálsson's

Icelandic Ice Mountains; his place in the history of science from an 18th and 19th century time-line perspective [abs.]: Symposium on the Life of Sveinn Pálsson, Reykjavik, Iceland, February 17, 2004. ☼

Publications Submitted for Director's Approval

Anderson, G.H., and Smith, T.J., III, Data from the mangrove hydrology sampling network for the Lower Shark River, Everglades National Park; water years 1996-2002: U.S. Geological Survey Open-File Report 02-457.

Barnard, P.L., and Hanes, D.M., Integrating engineering, geology, and nearshore processes; utilizing high-resolution survey techniques and numerical modeling to support evolving dredge-disposal practices, Ocean Beach, San Francisco, California [abs.]: American Shore and Beach Preservation Association Fall Conference, San Francisco, CA, October 10-12, 2005.

Brock, J.C., Thompson, P., Ceasar, N., Nagle, D., Hickey, T.D., and Muller-Karger, P., USGS seeks Caribbean region applications of a novel along-track reef imaging: Association of Marine Laboratories of the Caribbean Scientific Meeting, 32nd, Curaçao, Netherlands Antilles, June 13-17, 2005.

Butman, B., What's going on down there? New views of the sea floor of Massachusetts Bay and the Stellwagen Bank National Marine Sanctuary [abs.]: Cape Cod Museum of Natural History [lecture for "Ocean Treasure" course].

Dartnell, Peter, Larson, Gary, Collier, Robert, Buktenica, Mark, and Gardner, James, Multibeam mapping of Crater Lake, OR, and application of sonar data to model a submerged moss community [abs.]: American Association for the Advancement of Science (AAAS), Pacific Division Annual Meeting, 86th, Ashland, OR, June 12-16, 2005.

Dillon, W.P., Oceanic gas hydrate character, distribution, and potential for concentration: Economic Geology of Natural Gas Hydrates.

Eshleman, Jodi, Ruggiero, Peter, Kingsley,

Etienne, Gelfenbaum, Guy, and George, Doug, Capital Lake 2004 data summary: U.S. Geological Survey Digital Data Series.

Gelfenbaum, Guy, Jaffe, Bruce, Morton, Bob, Moore, Andrew, Nishimura, Yuichi, Kamataki, Takanobu, Tanioka, Yuichiro, Higman, Brentwood, Ruggiero, Peter, Prasetya, Gegar, Kongo, Widjo, Dengler, Lori, and Yulianto, Eko, The December 26, 2004, Indian Ocean tsunami; initial findings on coastal geologic response and tsunami deposits from Aceh Province, Sumatra [abs.]: International Tsunami Symposium, 22nd, Chania, Greece, June 27-29, 2005.

Harney, Jodi, Cochrane, Guy, Dartnell, Pete, and Etherington, Lisa, Geologic characteristics of benthic habitats in Glacier Bay, Alaska, derived from geophysical data, videography, and sediment sampling: U.S. Geological Survey Scientific Investigations Report.

Katz, B.G., and Raabe, E.A., Suwannee basin and estuary; an integrated watershed science program: U.S. Geological Survey Open-File Report, 19 p.

Klerks, P.L., Felder, D.L., Strasser, K., and Swarzenski, P.W., Effects of ghost shrimp on zinc and cadmium in Tampa Bay sediment, Florida: Marine Geology.

Krebs, J.M., Brame, A.B., and McIvor, C.C., Wetland habitat use by the nekton community at Mobbly Bayou County Preserve; summary of 2004 data: U.S. Geological Survey Open-File Report.

McIvor, C.C., and Raabe, E., Gulf of Mexico Integrated Science—Tampa Bay Study; characterization of tidal wetlands: U.S. Geological Survey Open-File Report, 2 p.

Morton, R.A., and Peterson, R.L., Alabama-Mississippi coastal classification maps—Perdido Pass to Cat Island: U.S. Geological Survey Open-File Report.

Peters, Robert, Jaffe, B.E., and Gelfenbaum, Guy, Distribution and sedimentary characteristics of tsunami deposits along the Cascadia margin of western North America: Sedimentary Geology.

Poppe, L.J., and Foster, D.S., Character and distribution of exposed glaciodeltaic deposits off outer Cape Cod, Massachusetts: GeoMarine Letters.

Smith, T.J., III, and Whelan, K.R.T., Development of allometric relationships for three mangrove species in South Florida for use in the Greater Everglades Ecosystem Restoration: Journal of Coastal Conservation.

Swarzenski, P., Orem, W., McPherson, B., Baskaran, M., and Wan, Y., Biogeochemical transport in the Loxahatchee River estuary, Florida; the role of submarine groundwater discharge: Marine Chemistry.

Valentine, P.C., Fuller, S.J., and Scully, L.A., Distribution of boulder ridges and bedrock outcrops in the Stellwagen Bank National Marine Sanctuary region: U.S. Geological Survey Scientific Investigations Map I-2840-F, scale 1:160,000, 3 sheets [CD-ROM].

Valentine, P.C., Fuller, S.J., and Scully, L.A., Sea-floor slope and sun-illuminated topography in the Stellwagen Bank National Marine Sanctuary region: U.S. Geological Survey Scientific Investigations Map I-2840-E, scale 1:160,000 [CD-ROM].

Valentine, P.C., Scully, L.A., and Fuller, S.J., Sea-floor ruggedness in the Stellwagen Bank National Marine Sanctuary region: U.S. Geological Survey Scientific Investigations Map I-2840-D, scale 1:160,000, 5 sheets [CD-ROM].

(Publications Submitted continued on page 15)

Publications, continued

(Publications Submitted continued from page 14)

Valentine, P.C., Unger, T.S., and Baker, J.L., Backscatter intensity in the Stellwagen Bank National Marine Sanctuary region: U.S. Geological Survey Scientific Investigations Map I-2840-C, scale 1:160,000 [CD-ROM].

Valentine, P.C., Unger, T.S., and Baker, J.L., Sun-illuminated sea-floor topography in the Stellwagen Bank National Marine Sanctuary region: U.S. Geological Survey

Scientific Investigations Map I-2840-B, scale 1:160,000 [CD-ROM].

Ward, G.A., Smith, T.J., III, and Whelan, K.R.T., Long-term and species-specific recruitment, growth, and survivorship of mangrove saplings; relationship to stand-level dynamics in a neotropical forest: *Journal of Ecology*.

Winters, W.J., Waite, W.F., Mason, D.H., and Gilbert, L.Y., Physical properties

of pressurized sediment from Hydrate Ridge, *in* Drilling gas hydrates on Hydrate Ridge, Cascadia continental margin, sites 1244-1252: Ocean Drilling Program Proceedings, Scientific Results, v. 204.

Yates, K.K., Dufore, C., Smiley, N., and Jackson, C., Diurnal variation in carbonate and oxygen system parameters in Tampa Bay and Florida Bay: *Journal of Marine Chemistry*. ❁