

Fieldwork

## Cold-Water Corals, Habitats, and Paleoclimate in the Drake Passage, Southern Ocean

By Kathy Scanlon

**Kathryn Scanlon** and **Dann Blackwood** of the U.S. Geological Survey (USGS) Woods Hole Science Center in Woods Hole, Massachusetts, participated in a research cruise to study cold-water coral habitats and paleo-oceanographic conditions in the Drake Passage between Antarctica and the southern tip of South America. The 37-day research cruise, part of a cooperative program with **Laura Robinson**, a geochemist from the Woods Hole Oceanographic Institution (WHOI),

and **Rhian Waller**, a coral biologist from the University of Hawai'i, was carried out onboard the icebreaker *Nathaniel B. Palmer* during April and May 2008. Cruise funding was from the National Science Foundation (NSF) Office of Polar Programs (OPP) Antarctic Sciences (grant ANT-0636787), awarded to **Robinson** and **Waller**. The cruise brought together experts in coral ecology, habitat geoscience, and sea-floor mapping, as well as paleoclimate, to start building a coherent

picture of the long-term temporal and spatial distributions of deep-sea corals in the Southern Ocean.



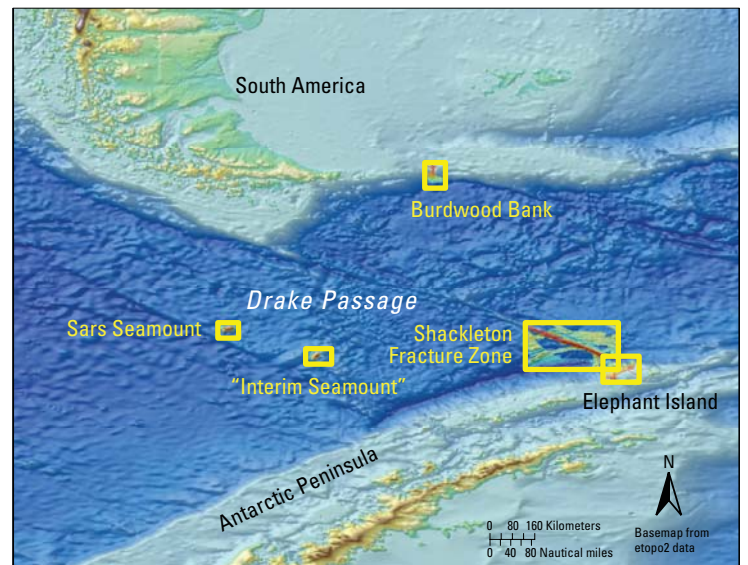
*Working conditions in the Drake Passage in the Southern Hemisphere's late autumn were challenging. The deck of the icebreaker Nathaniel B. Palmer was frequently awash with icy water during deployments and retrievals of sampling gear. Photograph by Dann Blackwood (USGS).*



*Coral team braves the wind for a group shot on deck. Front row, left to right: **Rhian Waller** (University of Hawai'i), **Kathy Scanlon** (USGS), **Tina van de Flierdt** (Imperial College London), **Kate Hendry** (University of Oxford). Back row, left to right: **Marshall Swartz** (WHOI), **Taryn Noble** (University of Cambridge), **John Swartz** (University of Pittsburgh), **Laura Robinson** (WHOI), **Dann Blackwood** (USGS), and **Daniel Wagner** (University of Hawai'i).*

The Southern Ocean is an important part of the global climate system, but our knowledge of its history is limited

*(Southern Ocean continued on page 2)*



*The five main areas where we mapped cold-water-coral habitat and collected specimens for paleoclimate studies. Sars Seamount, another seamount we dubbed "Interim," and the slope area off Burdwood Bank were mapped with multibeam sonar for the first time. We also collected multibeam bathymetry on the slope north of Elephant Island and along a segment of the Shackleton Fracture Zone, where some previous mapping had been done.*

## Sound Waves

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## Submission Guidelines

**Deadline:** The deadline for news items and publication lists for the November issue of *Sound Waves* is Friday, September 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).

Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

## 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://www.usgs.gov/search/faq.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

(Southern Ocean continued from page 1)

by a scarcity of well-dated records. The skeletons of deep-sea corals can record information on past climate, and deep-sea corals are found both living and as fossils in Antarctic waters. During the cruise, we used multibeam sonar to map the sea-floor topography of continental slopes,

fracture zones, and seamounts in order to identify likely areas for cold-water-coral habitat. We also collected long transects of overlapping sea-floor photographs by using TOWCAM, a deep-towed camera sled owned and operated by WHOI, to gain high-resolution information about

(Southern Ocean continued on page 3)



The solitary cold-water coral *Desmophyllum dianthus* was the holy grail of this research cruise. The large (max approx 10 cm long) skeletons are easy to work with, are widely distributed in the world's oceans, and have a well-understood growth pattern, making dating and geochemical analysis easier. We collected a few live specimens and numerous fossil specimens from water depths between 600 and 1,800 m. In one dredge from Sars Seamount, we collected three whole fossil *Desmophyllum dianthus* coral skeletons and numerous fragments. The dark-brown coating on the skeletons is manganese oxide, which must be carefully removed before the corals can be dated. Its thickness suggests that these specimens may be older (by as much as tens of thousands of years) than some of the other specimens we collected. Photograph by **Dann Blackwood** (USGS).



In addition to *Desmophyllum dianthus*, we obtained several other species of scleractinian, octocoral, and stylasterid cold-water corals, including these *Balanophyllia* sp. The three fossil specimens, each approximately 2 to 3 cm in diameter, are presumed to be of different ages. These and other species will be dated to determine the distribution of cold-water corals over time. Photographs by **Dann Blackwood** (USGS).

## Fieldwork, continued

(Southern Ocean continued from page 2)

the habitats. We then used small research trawls and dredges to collect living and fossil corals.

We will use the multibeam bathymetry, photographs, and specimens collected (representing at least 36 species of coral) to characterize cold-water-coral habitats in the

Drake Passage. This improved understanding will help constrain the distribution and requirements of cold-water corals in other, less severe environments. Ongoing efforts are currently underway to protect cold-water corals in many places around the world, including *Oculina* and *Lophelia* reefs off

Florida and the Carolinas, respectively, and coral gardens off Alaska.

The fossil corals will be dated, and we will make geochemical analyses of their skeletons to reconstruct the history of the Antarctic Circumpolar Current, allowing us to address the role of the Southern Ocean in climate change over tens of thousands of years.

More information about the cruise, including additional photographs by **Dann Blackwood**, can be viewed on the cruise Web site at URL [http://censeam.niwa.co.nz/outreach/nathaniel\\_b\\_palmer](http://censeam.niwa.co.nz/outreach/nathaniel_b_palmer).



Icebergs viewed from the icebreaker Nathaniel B. Palmer. Photographs by **Dann Blackwood** (USGS).



(Left to right) **Rhian Waller** (University of Hawai'i), **Laura Robinson** (WHOI), and **Kathy Scanlon** (USGS) examine a handful of sediment and broken coral just scooped out of a trawl net on deck. Photograph by **Dann Blackwood** (USGS).

► **Dann Blackwood** (USGS, center), **Marshall Swartz** (WHOI, right) and an unidentified marine tech prepare to deploy TOWCAM, a camera sled designed to photograph the sea floor in deep-water areas. The sled was towed about 4 m above the sea floor and took photographs every 10 seconds for several hours at a time. These data will be used with the newly collected multibeam bathymetry and biological specimens to characterize deep-water habitats in the Drake Passage. Photograph by **John Swartz** (University of Pittsburgh).



## USGS and University of South Florida, St. Petersburg, Bring Scientists and the Media Together for Conversations About Impacts of Sea-level Rise

By Matthew Cimitile

The U.S. Geological Survey (USGS) and the University of South Florida (USF), St. Petersburg, brought together scientists and journalists on February 6, 2008, to discuss ways of effectively communicating the complexities in the changing world of science. More than 75 participants from around the country met at the Poynter Institute for Media Studies for the first “Scientists and the Media Conversations” conference.

In an often-adversarial relationship, scientists and journalists have found clear communication challenging at times. “Scientists sometimes feel misquoted or that their thoughts have been taken out of context by reporters, while journalists may think scientists do not divulge enough information,” said **Mark Walters**, USF St. Petersburg journalism professor, veterinarian, and co-coordinator of the conference. “So, I was thinking, wouldn’t it be a neat idea to get these two camps together and discuss issues in a practical way and find some ways for them to communicate better.”

The topic of interest was the potential impact of global warming and sea-level rise on Florida’s ecology, economy, freshwater supply, and public health. With water all around and a densely populated



*NBC chief science and health correspondent **Robert Bazell** kicked off the “Scientists and the Media Conversations” conference by sharing anecdotes and personal experiences about finding out what it takes to tell science stories. Left to right: journalism professor **Mark Walters**, environmental science and policy professor **Chris D’Elia**, USGS communications officer **Hannah Hamilton**, **Bazell**, USGS communications officer **Catherine Puckett**, USGS communications officer **A.B. Wade**, USGS Florida Integrated Science Center director **Barry Rosen**, ecological economics professor **Robert Costanza**, and Florida Department of Health program coordinator **Andy Reich**.*

low-lying coast, Florida is one of the most vulnerable areas on the planet to rising sea level. A projected 1-m rise by the end of the century would drastically alter present coastal ecology, resulting in extensive salt-water intrusion of freshwater aquifers and flooding of city centers.

Rather than following a lecture format, the conference created an atmosphere conducive to the intimate exchange of ideas, discussions, and conversations to integrate the two professions. “We built this conference around conversations,” said **Walters**. “We had a stage and had four conversations, each involving a scientist, a journalist, and a moderator. In this way, speakers could talk about some of the issues on a personal level.”

Each conversation addressed one of four areas likely to be affected by sea-level rise in Florida: its ecology, economy, freshwater,

and public health. Although the focus of the conference was on the impacts of sea-level rise, the organizers hoped the meeting would help raise awareness of ways to communicate all kinds of scientific topics effectively to the public.



*Panelists on freshwater impacts—(left to right) scientist **Kimberly Taylor**, moderator **Rob Lorei**, and journalist **Cynthia Barnett**—prepare for their conversation on Florida’s freshwater resources in the face of rising sea level. Visit URL <http://soundwaves.usgs.gov/2008/08/outreach.html> to view video clips of this conversation.*



*Panelists on ecological impacts—(left to right) moderator **Brent Yarnel**, scientist **Gary Lytton**, and journalist **Craig Pittman**—pause for a photograph before exchanging ideas about the ecological impacts of climate change and sea-level rise on Florida and how this issue is reported in the media. Visit URL <http://soundwaves.usgs.gov/2008/08/outreach.html> to view video clips of their conversation.*

*(Science and Media continued on page 5)*

## Outreach, continued

(Science and Media continued from page 4)

“Such communication is critical because, as a society, we are facing a number of difficult challenges in terms of energy, water resources, and threats to public health,” said **Ann Tihansky**, science communicator at the USGS and co-coordinator of the conference. “Scientists are the people working on those problems, but they are generally not policy makers. The policy makers are representatives of the public, and in our democratic society we need to put the scientific ideas forward to help policy makers make informed decisions about what we are going to do in the future.”

Living in a technologically advanced society and with uncertainty about the future of resources, energy, and climate, the general public must be able to understand scientific processes and ideas. Better explanation and collaboration between scientists and journalists is critical for this understanding.

“I thought the conference was great because it presented an opportunity for scientists and journalists to have a dialogue with each other,” said **Robert Costanza**, professor of ecological economics at the University of Vermont. “There aren’t enough of these opportunities around to have a constructive dialogue that moves beyond argument and black-and-white answers.”

A grant from the U.S. Environmental Protection Agency to USF’s Center for Science & Policy Applications for the Coastal Environment (C-SPACE) supported the conference, with the help of ecologist **Chris D’Elia**, codirector of C-SPACE, associate vice chancellor for academic affairs for research and graduate studies, and professor of environmental science, policy, and geography at USF St. Petersburg.

Speakers for the event included NBC chief science and health correspondent **Robert Bazell**, author **Cynthia Barnett**, ecological economics professor **Costanza**, radio producer and author **Daniel Grossman**, USF professor of geological oceanography **Albert Hine**, Rookery Bay National Estuarine Research Reserve director **Gary Lytton**, *St. Petersburg Times* reporter **Craig Pittman**, Florida Department of Health program coordinator **Andy Reich**, Rookery Bay National Estuarine Research

Reserve coastal training coordinator **Tabitha Stadler**, USGS California Water Science Center program officer **Kimberly Taylor**, and journalism professor **Walters**.

Participants responded to the conference enthusiastically. In particular, they cited the importance of having this dialogue and the significance of the practical knowledge and ideas shared during the conversations. Many increased their understanding of the communication challenges that exist between scientists and the media, and believed the conference would help bridge the gap between these two groups. Many also cited the practical applications to their professions of the communication skills attained. Organizers are hoping to continue holding these discussions in the coming years to build upon the foundations laid here and to cultivate better relationships between scientists and journalists.

For further information, please visit URL <http://www.scienceandthedia.org/>.

*About the author:* Article author **Matthew Cimitile** holds a bachelor’s degree in history from the University of Tampa and is obtaining a master’s degree in environmental journalism from Michigan State University. He spent part of summer 2008 gaining experience in science communications by working with **Ann Tihansky** in the USGS Florida Integrated Science Center office in St. Petersburg. ☀



Panelists on public-health impacts—(left to right) moderator **Rob Lorei**, scientist **Andy Reich**, and journalism professor **Mark Walters**—explain effective ways of communicating the possible public-health impacts of a changing world to an audience of journalists and scientists. Visit URL <http://soundwaves.usgs.gov/2008/08/outreach.html> to view video clips of their conversation.



Panelists on economic impacts—scientist **Robert Costanza** (left) and journalist **Daniel Grossman**—discuss the importance of understanding the economic value of ecological systems in order to effectively communicate science to the public and policy makers. Visit URL <http://soundwaves.usgs.gov/2008/08/outreach.html> to view video clips of their conversation.

## USGS National Wetlands Research Center Celebrates National Women’s History Month

By Susan Horton

The scientific-journal articles were written, the greenhouse experiments were set up, and the researchers were towing airboats to their study sites in the marsh, but in spring there was a little something extra (“lagniappe” in the Cajun culture) happening at the U.S. Geological Survey (USGS) National Wetlands Research Center (NWRC) in Lafayette, Louisiana.

When **Debbie Norling**, secretary for the wetland ecology and forest ecology branches, learned that the theme for the 2008 National Women’s History Month would be “Women’s Art, Women’s Vision,” she proposed that the center host an art exhibit featuring the work of local women artists. In keeping with the scientific mission of NWRC, the theme became “Women’s Art: Women’s Vision of the Natural World.”

In less than a month, more than 35 artists had committed to participate in the exhibition, scheduled to run from March 10 to 14. The only criterion for display was that the work reflect the interpretation of nature in either subject matter or ma-



USGS National Wetlands Research Center director **Greg Smith** (second from left) with the planning team for the center’s celebration of National Women’s History Month (left to right): **Debbie Norling**, **Christina Boudreaux**, and **Susan Horton**. Photograph by **Patricia Gannon** of the Daily Advertiser, Lafayette, Louisiana.

terials used. **Norling** and **Christina Boudreaux**, a contract (IAP World Services, Inc.) visual-information specialist with the USGS Enterprise Publishing Network, transformed NWRC’s public space (lobby, large conference room, and main hallway) into a gallery featuring paintings, sculptures, block prints, wood carvings, ceramics, photographs, and textile art.

USGS outreach contractor **Susan Horton** (IAP World Services, Inc.) helped with publicity and the opening reception, held March 10. More than 200 people enjoyed the artist’s reception and the weeklong ex-

hibit in celebration of National Women’s History Month.

**Dr. Jean Kreamer**, one of the artists, told the NWRC planners: “What a wonderful show and reception! You and your team would fool the Metropolitan Museum of Art with the pros that you are, naturally. The best part of this project has been working with all of you and celebrating your great work.”

*(Women’s Art continued on page 7)*



**Sonia Daniels** (second from left), a University of Louisiana, Lafayette, art student, shares her sculpture “Mother Earth” with family and friends. Photograph by **Adele Millet**, photography student, University of Louisiana (UL), Lafayette.



Artist **Becky Collins** at the opening reception with several of her bird carvings. Photograph by **Adele Millet**, photography student, UL Lafayette.

## Outreach, continued

(Women's Art continued from page 6)



Quilt depicting plants and animals of Louisiana's wetlands. Panels were embroidered, appliquéd, crocheted, painted, or cross-stitched by USGS National Wetlands Research Center staff in 1995 for American Wetlands Month. Photograph by **Adele Millet**, photography student, UL Lafayette.



Artist **Patricia Smith Michot** holds the exhibit poster created by **Christina Boudreaux** in celebration of National Women's History Month. Two of **Michot's** paintings are shown above her. Photograph by **Adele Millet**, photography student, UL Lafayette.



Opening reception for the "Women's Art: Women's Vision of the Natural World" exhibit at the USGS National Wetlands Research Center, Lafayette, Louisiana. Photograph by **Adele Millet**, photography student, UL Lafayette.

## USGS Research and Educational Products Promoted at National Science Teachers Association Conference in Boston

By Chris Polloni, Bill Winters, and Bob Ridky

The U.S. Geological Survey (USGS) was one of 400 government organizations and vendors that had exhibits at the National Science Teachers Association (NSTA)'s 56th annual National Conference. Nearly 15,000 educators, mostly K-12 science teachers, attended the meeting in Boston on March 27-29, 2008. USGS personnel from multiple disciplines across the United States helped make the triple-wide USGS display a resounding success. The USGS exhibit was coordinated by **Bob Ridky** (USGS Science Information and Education Office) and implemented by USGS employees from around the country, including **Cher Cunningham**, **Cheryl O'Brien**, and **Janet Tilley** (Reston, Virginia); **Liz Colvard** (Menlo Park, California); **Morgan Bearden** (Rolla, Missouri); and **Pam Van Zee** (Sioux Falls, South Dakota). Providing local assistance at the booth were **Ben Gutierrez**, **Ellyn Montgomery**, **Chris Polloni**, **Nancy Soderberg**, **Kama Thieler**, and **Bill Winters** from the USGS Woods Hole Science Center in Woods Hole, Massachusetts, and **Paul Barlow**, **Gillian Fairchild**, **Denis LeBlanc**, and **Chris Waldron** from the USGS Massachusetts-Rhode Island Water Science Center in Northborough, Massachusetts.

Thousands of copies of more than 70 USGS information products were handed out to teachers, who typically had many compliments about the value of USGS educational materials in the classroom. Especially sought after were posters and copies of the maps "This Dynamic Planet" (URL <http://pubs.usgs.gov/imap/2800/>) and "Tapestry of Time and Terrain" (URL <http://tapestry.usgs.gov/>). Each day's



*Gillian Fairchild and Bill Winters keep the USGS booth well stocked with informational handouts at the NSTA conference. Photograph by Chris Polloni.*



*The extensive collection of USGS Fact Sheets and posters proved to be especially popular. Photograph by Bill Winters.*

allotment was typically gone within 5 minutes of the booth opening! A four-page information sheet was the primary tool for informing teachers of educational resources available from the USGS. In addition, a flat-screen television continually showed various USGS-produced programs. A live computer link to the wealth of online

USGS resources provided another means for distributing information. The multitude of questions from the attendees and ensuing discussions created a rare opportunity for USGS staffers to appreciate the new directions that science teachers are exploring. The display enabled us to show an important segment of our constituents how diversified, meaningful, and responsive USGS research studies and information transfer can be in shaping the growth of science education.

The USGS display staff were impressed by the enthusiasm of the teachers that they met and the fact that so many of these edu-

cators look first to the USGS for guidance regarding Earth-science educational materials. We needed to learn quickly about a wide variety of educational materials from the USGS so that we could address the visitors' far-ranging questions. The most interesting reaction was the excitement that the "topo salad-tray model" created (see example at URL <http://soundwaves.usgs.gov/2002/10/outreach.html> and instructions at URL [http://online.wr.usgs.gov/outreach/topo\\_instructions.html](http://online.wr.usgs.gov/outreach/topo_instructions.html)). After the NSTA conference, we made a model using bathymetry from Stellwagen Bank and got similar reactions from local teachers. Educators get quite excited about hands-on applications.

The NSTA, founded in 1944 and based in Arlington, Virginia, is the largest organization in the world dedicated to promoting innovation and excellence in teaching science. A few of its strategic goals are to (1) be an advocate for the importance of science, (2) enhance science education through research-based policy and practice, and (3) improve student learning by sup-

*(NSTA Conference continued on page 9)*



## Outreach, continued

(NSTA Conference continued from page 8)

porting and enhancing science teaching. Science teachers and supervisors, administrators, and scientists are among the organization's membership of more than 55,000.



Currently, the NSTA is conducting a "Building a Presence for Science" program that seeks eventually to have a point of contact in every public and private school in the United States. Such an enormous undertaking highlights the scope and importance of the NSTA in creating a dynamic national electronic network with which Federal and State agencies and other organizations can share information with science teachers.

More information about this conference is contained in a short report from the USGS Science Information and Education Office posted at URL <http://education.usgs.gov/docs/NSTA2008RWR.pdf> (2.1-MB PDF file). ❁

*Denis LeBlanc answers questions about USGS science. Photograph by Bill Winters.*



*The outreach activity "How to Make a Topo Salad-Tray Model" proved to be extremely popular. See online instructions at URL [http://online.wr.usgs.gov/outreach/topo\\_instructions.html](http://online.wr.usgs.gov/outreach/topo_instructions.html). Photograph by Bill Winters.*

## Meetings

### USGS Hosts Field Trip for Association of American Geographers Meeting

By Chris Polloni and Brian Andrews

The Association of American Geographers (AAG) held its annual meeting in Boston during the week of April 15-19, 2008 (see URL <http://www.aag.org/annualmeetings/2008/>). The U.S. Geological Survey (USGS), a corporate sponsor of this event, had an extensive exhibit booth that included a large display featuring the latest Landsat imagery of the continental United States and a special tour of recently processed color orthoimagery of Boston provided by the Massachusetts Geographic Information System (MassGIS) office. USGS scientist **John Bratton** assisted with booth configuration and setup, and several members of his family were on hand to enjoy the event.

Several papers and oral presentations were given by scientists from the USGS Coastal and Marine Geology Program (CMGP), including **Brian Andrews, Matt Arsenault, Ben Gutierrez, Fran Lightson, Herman Karl, and Elizabeth Pendleton**. Many additional CMGP scientists contributed as coauthors.



*Bratton family observing the streets of Boston spread across 15 liquid-crystal-display (LCD) screens in a tiled display navigated by **Brian Davis** of the USGS Earth Resources Observation and Science (EROS) Data Center, Sioux Falls, South Dakota. Photograph by **Chris Polloni**.*

On Monday, April 16, the USGS sponsored a field trip to its Woods Hole Science Center in Woods Hole, Massachusetts, with a full day of activities for

participants. The tour began with a presentation by center chief **Bill Schwab**, who gave an overview of research programs  
(*American Geographers continued on page 10*)

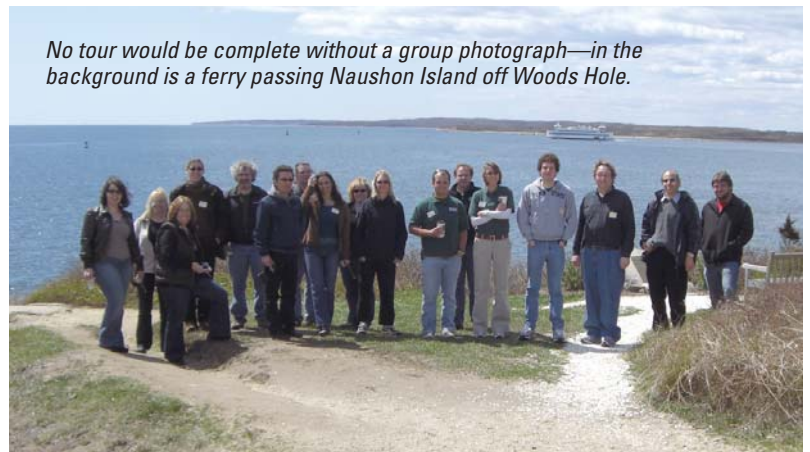
**Meetings, continued**

*(American Geographers continued from page 9)*

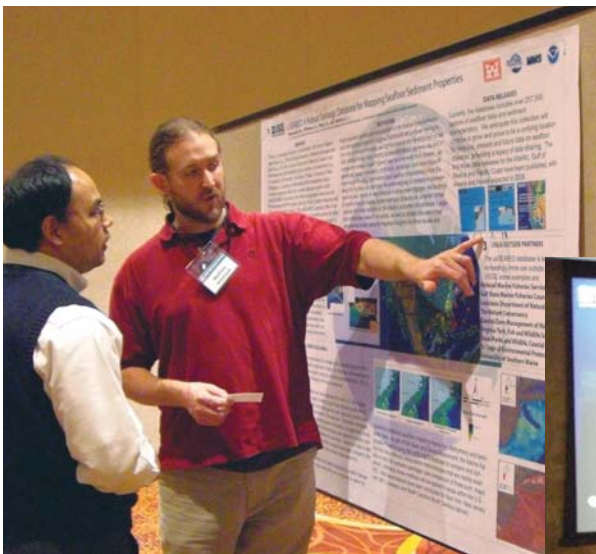
and facilities at the center. **Elizabeth Pendleton** and **Ben Gutierrez** teamed up to lead an interactive discussion of ongoing projects that address sea-level-rise issues, such as coastal vulnerability and shoreline-change hazards. The field trip included lunch in the village of Woods Hole, with a stop at Nobska Light before returning to the Woods Hole Science Center. After lunch, **Brian Andrews**, the resident geographer, provided an overview of a cooperative mapping program between the USGS Woods Hole Science Center and the Massachusetts Office of Coastal Zone Management. **Chris Polloni** demonstrated the center's GeoWall—a stereo projection system for visualizing Earth features—giving participants virtual tours of Massachusetts Bay, Boston Harbor, and the Puerto Rico Trench. **Brian Buczkowski** capped off the field-trip activities with a tour of the K.O. Emery core-storage facility, where he explained how samples are used to ground-truth mapping data, then catalogued and stored in this new state-of-the-art facility. ❁



*Field-trip participants at Nobska Point.*



*No tour would be complete without a group photograph—in the background is a ferry passing Naushon Island off Woods Hole.*



***Matt Arsenault** explaining usSEABED to a conference participant during a poster session.*



*USGS Woods Hole Science Center director **Bill Schwab** addressing field-trip participants in the center's Tilley Conference Room.*

## Report from the 2nd USGS Modeling Conference, February 10-14, 2008, in Orange Beach, Alabama

By Heather Henkel and Chris Polloni

The 2nd U.S. Geological Survey (USGS) Modeling Conference was held February 10-14, 2008, in Orange Beach, Alabama. Sponsored by the USGS, this multidisciplinary conference built upon the success of the first conference, held in 2005 at the Olympic Park Institute in Port Angeles, Washington (see URL <http://pubs.usgs.gov/sir/2006/5308/>). Whereas the first conference focused on understanding the current status of modeling within the USGS, the second conference focused on interagency collaboration and brought together scientists and managers from both within and beyond the USGS. The intent was to foster collaboration and encourage participants to share information in the hope that this cooperation would result in both short- and long-term enhancements of USGS modeling capabilities and science. The conference also provided a showcase for participants to display their modeling capabilities.

This year's meeting was built around four themes: Integrated Landscape Monitoring/Modeling, Global Change, Ecosystem Modeling, and Hazards and Risks. More than 160 attendees participated in this year's event, which began on a Monday with free workshops: "An Introduction to Structural Equation Modeling," "MapWindow GIS—Integrating Modeling into a Customizable, Open-Source GIS," and "An Introduction to Using PEST—a Model Independent Parameter Estimation and Uncertainty Analysis Code."

**Chris Polloni** of the USGS Woods Hole Science Center (Woods Hole, Massachusetts) attended the training session on MapWindow GIS, an open-source, programmable geographic-information system (GIS) that supports manipulation, analysis, and viewing of geospatial data and associated attribute data in several standard GIS formats. The 4-hour introduction and overview showed participants how to build a customized GIS tailored to a user's data and intended use. Each attendee received a demo CD, a newly released guide, and a T-shirt! **Polloni** had



*EarthVision model by Mike Pantea shown on the GeoWall system. Photograph by Chris Polloni.*

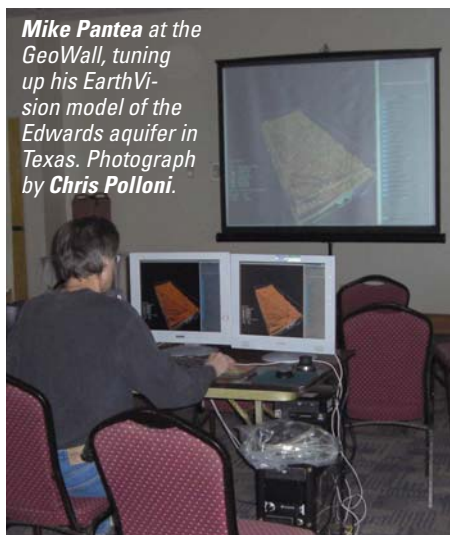
seen MapWindow GIS used at Woods Hole Oceanographic Institution. The software is useful but does require some knowledge of the C or C# programming languages.

The second day of the conference started off with USGS Chief Scientist for Geology **Linda Gunderson** (Reston, Virginia) and USGS Central Regional Director **Thomas Casadevall** (Denver, Colorado) welcoming the attendees to the conference. During her opening remarks, **Gunderson** discussed the need for more powerful computers ("big iron") to support the robustness of our modeling com-

munity. She also urged us to use the new USGS Science Strategy, as set forth in "Facing Tomorrow's Challenges—U.S. Geological Survey Science in the Decade 2007–2017" (USGS Circular 1309, URL <http://pubs.usgs.gov/circ/2007/1309/>), to guide our efforts in interdisciplinary science, data integration, creating decision-support tools, and modeling scenarios. **Gunderson's** address was followed by a day full of oral presentations and panel sessions on the first two conference themes: Integrated Landscape Monitoring/Modeling and Global Change. The afternoon saw the audience participating in a town-hall-style meeting titled "Global Climate Change: Modeler's Input." The day ended with a poster session on the topics presented during the earlier oral presentations.

One of the poster sessions featured the USGS Coastal and Marine Geology Program's GeoWall—a stereo projection system for visualizing the Earth's surface and subsurface and the processes that affect them. The GeoWall was used to present an array of 3D and 4D model products, which were viewed by using 3D polarized glasses. USGS geologist **Mike Pantea** (Denver, Colorado) had used EarthVision software to model the geologic framework of part of the Edwards aquifer in Texas;

*(Modeling Conference continued on page 12)*



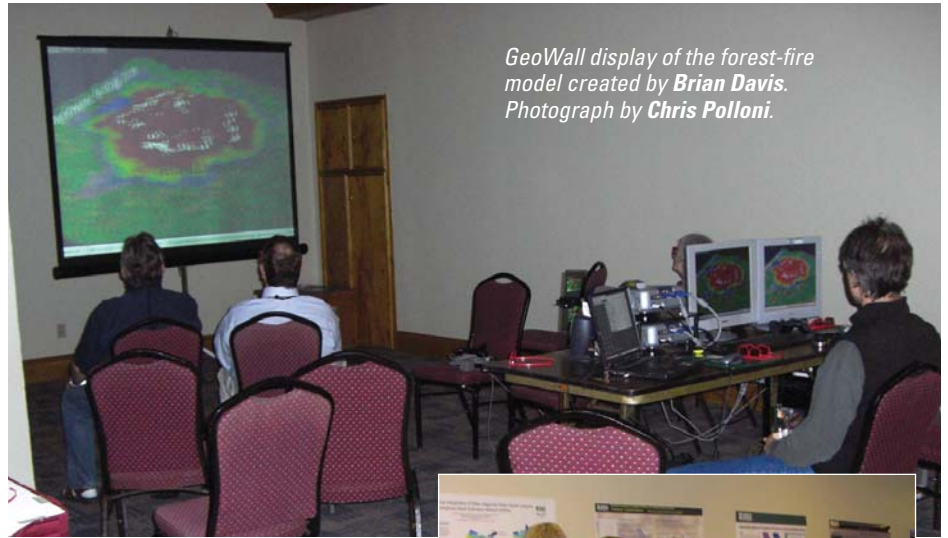
*Mike Pantea at the GeoWall, tuning up his EarthVision model of the Edwards aquifer in Texas. Photograph by Chris Polloni.*

## Meetings, continued

(Modeling Conference continued from page 11)

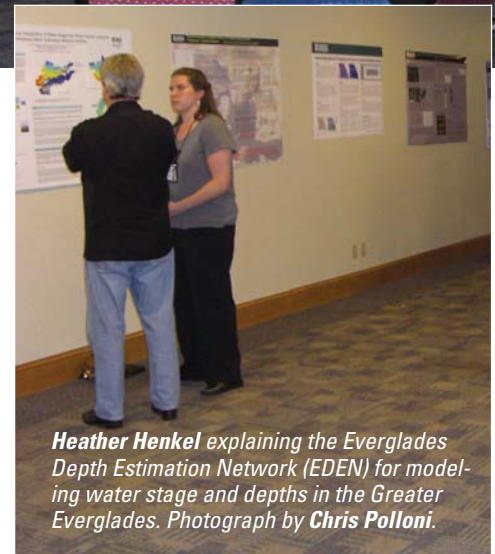
he demonstrated additional usefulness of the modeling tool by showing water-level change over time. Several USGS DVD information products were provided as examples of how to publish interactive models. A “virtual” **Brian Davis** (USGS Earth Resources Observation and Science (EROS) Data Center) was present by recorded voice synced with an animated ArcScene model of a forest fire spreading through various habitats and terrain. Consultant **Mike Kelly’s** educational model of Sunset Crater near Flagstaff, Arizona, was shown by **Polloni**, who provided instruction on using remote-control devices (such as the Rumblepad and ROMA) to navigate the scene. A submarine flythrough of the Puerto Rico Trench included views of sub-sea-floor earthquake hypocenters to indicate the orientation of the subduction-zone fault. Two computers were used to run the GeoWall system: a Linux system configured by **Dave Foster** of the Woods Hole Science Center for use with EarthVision, and a Windows XP Shuttle to support everything else. Dynamic Graphics, Inc., provided an EarthVision temporary license for use at the conference.

**Heather Henkel** of the USGS Florida Integrated Science Center office in St. Petersburg and **Leonard Pearlstine** of Everglades National Park presented a poster titled “Spatially Continuous Interpolation of Water Stage and Water Depths



GeoWall display of the forest-fire model created by **Brian Davis**. Photograph by **Chris Polloni**.

Using the Everglades Depth Estimation Network (EDEN).” EDEN is an integrated network of real-time water-level monitoring, ground-elevation modeling, and water-surface modeling that provides scientists and managers with current (1999 to present), online water-depth information for the entire freshwater portion of the Greater Everglades. Data and tools available at the EDEN Web site (URL <http://sofia.usgs.gov/eden/>) enable investigators to calculate water depth and infer other hydrologic characteristics—such as recession rates, time since last dry period, and water-surface slope—virtually anywhere in the Everglades,



**Heather Henkel** explaining the Everglades Depth Estimation Network (EDEN) for modeling water stage and depths in the Greater Everglades. Photograph by **Chris Polloni**.



The field-trip group hiking in Mississippi Sandhill Crane National Wildlife Refuge. Photograph by **Chris Polloni**.

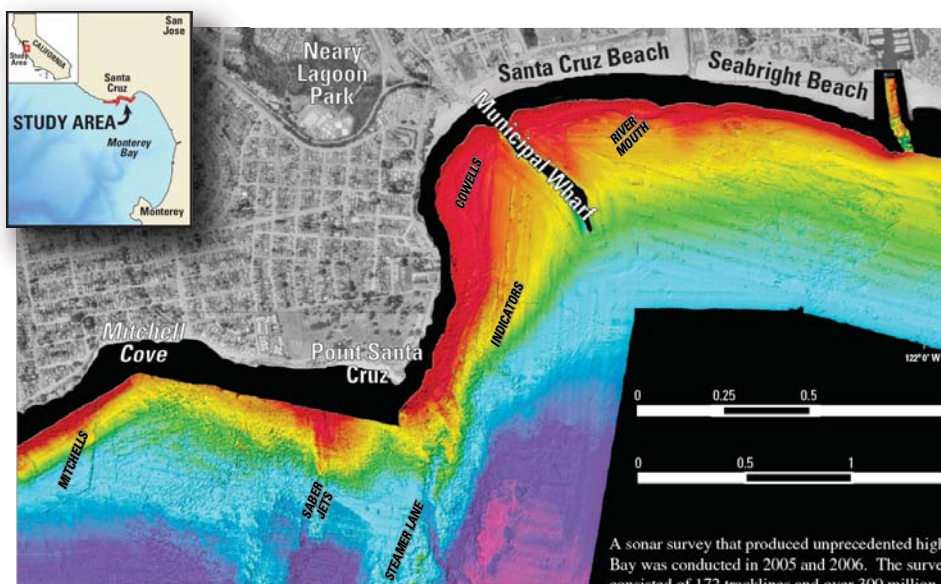
including sites difficult to visit in the field. EDEN is funded by the Comprehensive Everglades Restoration Plan (CERP) and the USGS Priority Ecosystem Sciences (PES), with collaborative support from Federal and State Government agencies, scientists in South Florida, and the University of Florida.

On Wednesday, many attendees enjoyed a vigorous field trip to Mississippi Sandhill Crane National Wildlife Refuge, Grand Bay, 5 Rivers (Alabama’s Delta Resource Center), and Bon Secour National Wildlife Refuge. Some participants remained behind to participate in ad hoc working groups. That evening, a second poster session was devoted to the last two themes: Ecosystem Modeling, and Hazards and Risks. The final day featured oral presentations and panel discussions on these two themes and closed with remarks by **Linda Gunderson**. ❁

## Poster of Sea Floor in Northern Monterey Bay, California, Depicts Complex Bathymetry, Including Bedrock Ridges that Cause Surf Breaks

The U.S. Geological Survey (USGS), along with the California Department of Boating and Waterways, the Santa Cruz County Redevelopment Agency, and the Santa Cruz Department of Public Works, has produced a poster displaying color-coded bathymetry, underwater photographs, and oblique views of the sea floor in northern Monterey Bay off the coast of Santa Cruz, California.

“Views of the Sea Floor in Northern Monterey Bay, California” (USGS Scientific Investigations Map 3007) is an outgrowth of a sonar survey by the USGS in 2005 and 2006 that produced unprecedented high-resolution images of the sea floor off Santa Cruz. Performed over 14 days, the survey consisted of 172 tracklines and more than 300 million soundings and covered an area of 12.2 km<sup>2</sup> (4.7 mi<sup>2</sup>). The goals of the survey were to collect high-resolution bathymetry (depth to the sea floor) and acoustic-backscatter data (amount of sound energy bounced back from the sea floor, which provides information on sea-floor hardness and texture) from the inner continental shelf. These data will provide a baseline for future change analyses, geologic mapping, sediment- and contaminant-transport studies, benthic-habitat delineation, and numerical-modeling efforts. The survey shows that the inner shelf in this area is extremely varied, encompassing flat sandy areas,



Excerpt from “Views of the Sea Floor in Northern Monterey Bay, California” (USGS Scientific Investigations Map 3007), with index map superimposed. Labels of sea-floor features that cause surf breaks (for example, “Steamer Lane”) have been darkened for greater visibility at reduced scale.

fault traces, boulder fields, and complex bedrock ridges that support rich marine ecosystems. Furthermore, many of these complex bedrock ridges form the “reefs” that result in a number of California’s classic surf breaks.

The new poster, which measures 46 by 36 inches, features map and oblique views of the bathymetric data collected during the survey, plus underwater photographs from selected sites. The full reference for the poster is: Storlazzi, C.D., Golden,

N.E. and Finlayson, D.P., 2008, Views of the sea floor in northern Monterey Bay, California: USGS Scientific Investigations Map 3007 [URL <http://pubs.usgs.gov/sim/3007/>]. Paper copies can be obtained from the USGS Science Information and Library Services (SILS) at 1-888-ASK-USGS, or the USGS online store at URL <http://store.usgs.gov/> (product number 208389). The poster can be downloaded as a Portable Document Format (PDF) file at URL <http://pubs.usgs.gov/sim/3007/>.

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