

Fieldwork

Mapping Sediment Distribution and Thickness in Lake Mohave

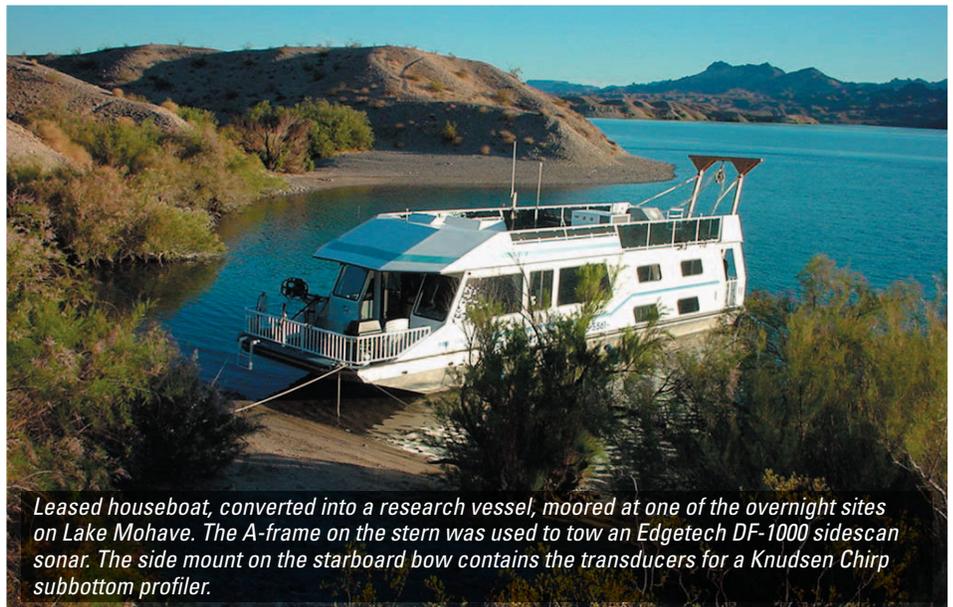
By Dave Foster

From April 13 to 29, **Ken Parolski**, **Dave Foster**, and **Mark Capone** of the Woods Hole Field Center (WHFC) completed a high-resolution geophysical survey in Lake Mohave, on the Arizona and Nevada State line along the Colorado River. The fieldwork is part of an ongoing project led by **Dave Twichell** (WHFC) and **Mark Rudin** of the Health Physics Department at the University of Nevada, Las Vegas (UNLV), to address such issues as water quality and reservoir capacity in Lakes Mead and Mohave.

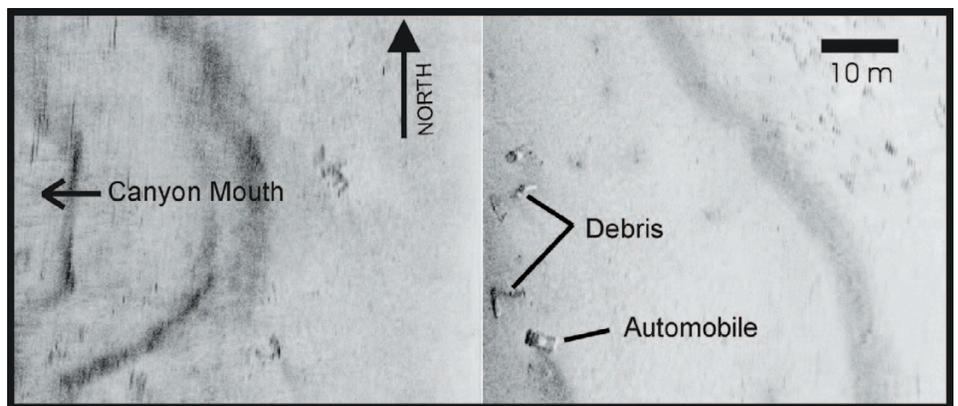
The project scientists focused first on Lake Mead, behind Hoover Dam on the Colorado River, about 25 mi east of Las Vegas, NV (see article in June 2001 issue of *Sound Waves*). Recently, they have turned their attention to Lake Mohave, about 50 mi south of Lake Mead. The north and south sections of Lake Mohave are narrow, about 1 mi wide, and are bounded by the canyon walls of the Colorado River. The main basin of the lake is the middle section, about 8 mi long and 5 mi wide.

Bathymetry, sidescan-sonar, and Chirp subbottom data were collected to map the thickness and distribution of sediment that has accumulated since the construction of Davis Dam and the impoundment of Lake Mohave in 1953. The resulting maps will guide selection of sites for sediment sampling and analysis, which, in turn, will help scientists understand how pollutants from urban and agricultural runoff might be distributed throughout the lake.

The sidescan-sonar data yield images of the surface of the lake floor, revealing rock, sediment, geomorphic features, and manmade debris. The Chirp subbottom data yield high-resolution seismic-reflection profiles that show sediment layers



Leased houseboat, converted into a research vessel, moored at one of the overnight sites on Lake Mohave. The A-frame on the stern was used to tow an Edgetech DF-1000 sidescan sonar. The side mount on the starboard bow contains the transducers for a Knudsen Chirp subbottom profiler.



Sidescan-sonar image showing debris deposited in Lake Mohave from a 1974 flash flood. Vertical line in center shows where two swaths of sidescan-sonar data have been joined.

and bedrock features down to about 10 to 20 m below the lake floor. The data collected in Lake Mohave will be used to construct a sidescan-sonar mosaic (swaths of sidescan-sonar data joined to produce a continuous image) of the lakebed and a sediment-thickness map of post-impound-

ment deposits (sediment deposited after the lake was created). The information will be shared with USGS hydrologists and made available to several other government agencies and universities involved in studies of the lake (UNLV, the Southern Nevada Wa-

(Sidescan-Sonar continued on page 2)

Sound Waves

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Submission Guidelines

Deadline: The deadline for news items and publication lists for the July issue of *Sound Waves* is Tuesday, June 18.

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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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

Fieldwork, continued

(Sidescan-Sonar continued from page 1)

ter Authority, the Bureau of Reclamation, and the National Park Service).

A leased houseboat was rigged with side-mount transducers for the Chirp sub-bottom system and an A-frame to tow the sidescan sonar (see photo, page 1). Dust storms with winds gusting from 50 to 60 mph delayed our start by a few days. The crew quickly made up for lost time by working and staying overnight on the houseboat. This strategy also enabled us to reach some of the more remote areas of the lake.

Preliminary interpretation of the data shows that pre-impoundment features dominate the lakebed and that post-impoundment deposits are not as extensive as they are to the north, in Lake Mead. The shallow areas of Lake Mohave are predominantly alluvial-fan deposits and bedrock ledges; both are clearly observable in the sidescan-sonar data. The sidescan-sonar and Chirp subbottom records also clearly define the pre-impoundment banks of the Colorado River. Sand waves are still vis-

ible on the riverbed where post-impoundment sediment is absent. Sand dunes are still preserved along the banks of the river channel. Post-impoundment deposits do not exceed a few meters in thickness. Lake Mead, in contrast, has deposits as much as 30 m thick.

Major sources of sediment are not obvious in Lake Mohave; however, there are localized deposits from flash floods in the many tributaries that enter the lake. Although the lake has a short history, there was a significant flash flood in Eldorado Canyon in 1974 that caused nine fatalities and considerable property damage. Witnesses observed a large flood surge at the canyon mouth, carrying debris, cars, and trailer homes. Our sidescan-sonar records clearly show some of the debris from this flood (see image, page 1). The Chirp sub-bottom profiles show a localized deposit near the canyon mouth. We will be mapping the deposits in this area to estimate how much sediment entered the lake during this event. ☼

Research

Progress in Delineating Submarine Ground-Water Discharge in Delmarva Coastal Bays

By Frank Manheim

Over the past 2 years, several complementary techniques have led to new insights into ground-water conditions in the Delmarva coastal bays, which dissect the coasts of Delaware, Maryland, and Virginia (see map, page 3). Owing to human activities, the bays receive excess nutrients, such as nitrogen, a substantial proportion of which are presumed to enter via submarine ground-water discharge. This discharge triggers excess macroalgae and phytoplankton blooms, creating widespread fouling and altering bottom environments in the bays.

To track submarine ground-water discharge in selected Delmarva coastal bays, USGS scientists and cooperators recently measured the electrical resistivity of the bay sediment. Their measurements revealed that submarine discharge of fresh

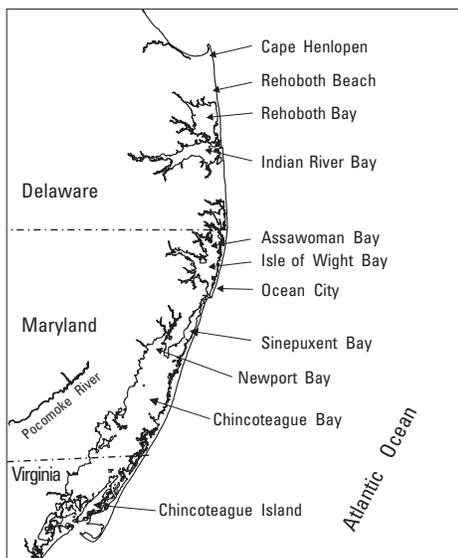
ground water is occurring at distances from a few hundred meters to 1 km into coastal bay waters, much farther offshore than predicted by standard coastal hydrologic models. The new data will define pathways for freshwater inflow and help resource managers plan remediation efforts to reduce nutrients entering the coastal bays. Accurate information may minimize remediation impacts on local farming, recreation, and other activities in the coastal areas.

A new "streamer resistivity survey" technique was used to measure the electrical resistance of the bay sediment. Normal saltwater sediment is a good conductor of electricity; however, bottom sediment permeated by fresh water is a

(Ground-Water Discharge continued on page 3)

Research, continued

(Ground-Water Discharge continued from page 2)

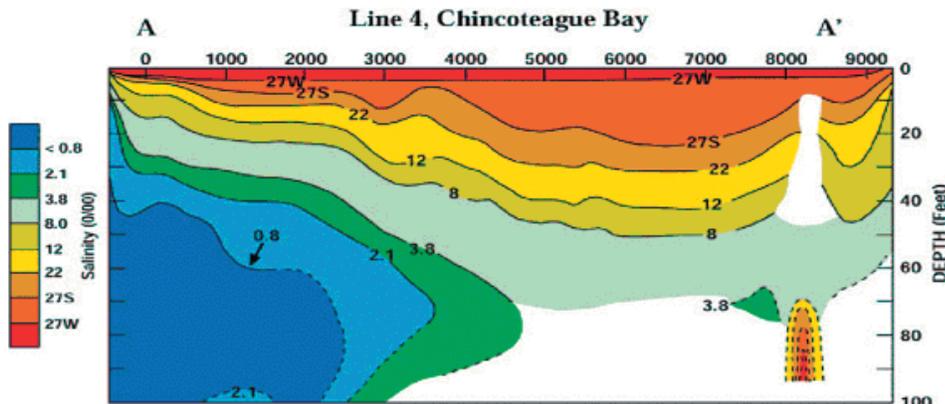
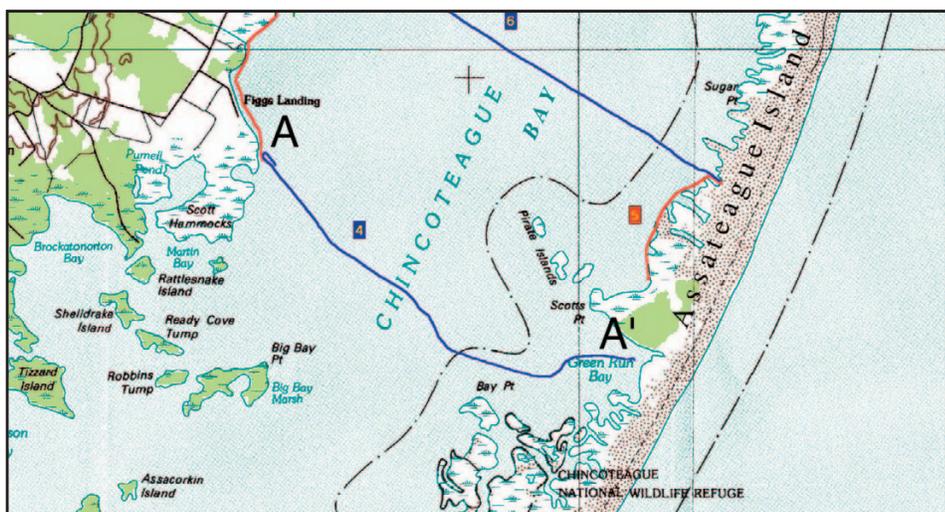


Atlantic coast of Delmarva Peninsula showing coastal bays.

poor conductor of electricity and acts like a semi-insulator. To conduct the streamer resistivity surveys, scientists towed 360-ft electrical cables called streamers behind small boats. Continuous measurements of electrical potential at variable spacings allowed the scientists to map fresh, salt, and mixed water layers to more than 100 ft below the bay floors.

Streamer resistivity investigations of sub-sea-floor ground water collect data at a rate 30 to 70 times that for comparable measurements on land. In fact, the nearly 300 km of trackline collected in Rehoboth and Indian River bays (Delaware); Assawoman, Isle of Wight, and Sinepuxent bays (Maryland); and Chincoteague Bay (Maryland and Virginia) may exceed the total length of all horizontal resistivity surveys ever collected on land in the United States.

Scientists used a vibradrilling unit from a barge supplied by the Delaware Department of Natural Resources to verify resistivity data collected in October 2001 from Indian River Bay. **David Krantz** (formerly of USGS, now at University of Toledo, OH) and **Dan Phelan** (USGS, Baltimore, MD) obtained gamma and electrical-induction logs as much as 90 ft long through steel and plastic casing. These logs confirmed the presence of



Cross section (bottom) showing salinity of ground water in sediment beneath Chincoteague Bay, MD. Section runs from A to A' on map (top). Numbers across top of cross section show horizontal distance in feet. Salinities are in parts per thousand (o/oo) and were derived from resistivity data. Note that a freshwater wedge extends only from the west shore of the bay; the water adjacent to Assateague Island is brackish.

freshwater layers beneath salty surficial ground water in sediment underlying parts of the bay.

The new vibradrilling logging approach does not require drilling fluid, which can complicate log interpretation. Fluid-conductivity changes delineated by the logs were complemented by interstitial-water and resistivity-probe study of the cores performed by **Frank Manheim** (USGS, Reston, VA) and **John Bratton** (USGS, Woods Hole, MA). Advanced chemical and isotopic measurements were performed by **J.K. Bohlke** (USGS, Reston, VA). Age-dating of water samples by chlorofluorocarbon and sulfur hexafluoride techniques demonstrated ages for submarine ground waters commensurate

with ages of ground waters at comparable depths on land.

The current activities represent wide-ranging cooperation among scientists from the USGS, the Delaware and Maryland Departments of Natural Resources, the University of Delaware, and other organizations. Results from these investigations have been presented over the past several months at the Society for Applied Environmental and Engineering Geophysics (SAGEEP) Symposium in Las Vegas, NV, the Geological Society of America meeting in Boston, the USGS Delaware Ground-Water Hydrology Seminar, a Regional Groundwater Planning Conference in Raleigh, NC, and a Regional Ground-water Workshop in Annapolis, MD. ❁

USGS Work Is Leading to New Operations for Glen Canyon Dam

By David Rubin

Since its completion in 1963, Glen Canyon Dam has controlled the flow of Colorado River water through Grand Canyon. By changing the flow of water and sediment down the Colorado River, the dam has caused numerous changes downstream, including a decline in the number and size of sand bars along the river in Grand Canyon National Park. Sand bars and banks are essential components of the Colorado River ecosystem and were distinctive features of the pre-dam landscape. They create terrestrial habitat for riparian vegetation and associated fauna, and backwater channels used as habitat by native fish. Bars are used by boaters and other park visitors, and some of them help preserve archeological resources. Because of the sand bars' importance, their restoration and maintenance have been a high priority for programs established by the Department of Interior (DOI)'s Bureau of Reclamation to assess Glen Canyon Dam's effect on downstream resources and to make recommendations for dam operations that will better protect those resources. The most recent such program is the Glen Canyon Adaptive Management Program, established in 1996.

USGS scientists from the Coastal and Marine Geology Program (CMGP) have been contributing to the assessment of sand resources in Grand Canyon for more than a decade, through sedimentologic studies (**Dave Rubin**, Menlo Park, CA) and the use of sidescan sonar (**Roberto Anima**, Menlo Park, CA), underwater video (**Hank Chazar**, Menlo Park, CA), and other marine-research technologies. Their findings contributed to a decision by DOI to release an unusually large volume of water from Glen Canyon Dam in spring 1996 to determine, in part, whether this artificial "flood" could move sand from the river's main channel into sand bars along its banks.

CMGP contributions to sand-bar restoration efforts in Grand Canyon are continuing to affect DOI management decisions. In August 2000, **Dave Rubin** and colleagues from the USGS (**David Topping**), Utah State University (**Jack Schmidt**), and Northern Arizona University (**Joe Hazel** and **Matt Kaplinski**) were requested to



Sand bar (foreground) along the Colorado River in Grand Canyon.

summarize their recent published findings for the office of the Secretary. To respond to this request, the group worked with their program manager at the USGS Grand Canyon Monitoring and Research Center (**Ted Melis**) and prepared a memo reporting that restoration efforts—including the 1996 Grand Canyon flood experiment—were failing to meet the sediment goals established by the Glen Canyon Adaptive Management Program. The memo explained why the restoration efforts were failing and how operations in Glen Canyon Dam might be altered to optimize sand-bar restoration.

The memo written by **Rubin** and his colleagues summarized five technical articles that had been published in the journals *Water Resources Research* and *Geology* and in a special volume on the 1996 flood experiment published by the American Geophysical Union. In addition to the normal scientific review of these five articles, the memo itself was carefully reviewed by the Technical Work Group and its sediment subcommittee of the Adaptive Management Work Group (groups established as part of the Glen Canyon Adaptive Management Program). These groups endorsed the findings in the memo, and the Grand Canyon Monitoring and Research Center (also part of the Glen Canyon Adaptive Management

Program) made a formal proposal to adopt the recommendations. In April, a vote was conducted by the full Adaptive Management Work Group, and the proposed flow recommendations were approved by a vote of 17 to 1 (with 1 abstention). These recommended changes to dam operations have been forwarded to Secretary of the Interior **Gale Norton**.

The media have reported these recent events in *USA Today* (April 11, available on the Web at URL

<http://www.usatoday.com/news/healthscience/science/enviro/2002-04-11-grand-canyon-flood.htm>), *The Arizona Republic* (April 26), the *Arizona Daily Sun* (April 26), and the *New York Times* (April 26, URL

<http://www.nytimes.com/2002/04/26/national/26RIVE.html>, and June 11, URL <http://www.nytimes.com/2002/06/11/science/earth/11RIVE.html>).

The scientific findings summarized in the memo evolved into an article for *Eos* (in press, expected to be published in June 2002). New technology and a better understanding of sediment transport gained from the Grand Canyon work are now being incorporated into marine sediment-transport studies. ❁

Career Options Presented to Junior High School Girls

By Flavia Wood

Flavia Wood (Woods Hole Field Center) presented a talk entitled “What Does a Geologist Have to Do with Pollution?” at the UCONN Multiply Your Options 2002 workshop on May 8. Multiply Your Options is a program sponsored by the University of Connecticut that targets girls in junior high school (grades 6 through 8) to promote women in careers that use math, science, and engineering. About 280 girls from several Connecticut schools attended the workshop. This is the second year that **Flavia** has been invited to speak by the UCONN School of Engineering. **Flavia** spoke to two groups of female students during a morning session of the workshop. Topics of discussion included coastal erosion, water transport of sediment, and a

demonstration of varying infiltration rates.

Flavia was pleasantly surprised to find many correct answers during a question-and-answer *mêlée*. Most students have had no formal studies in geology or Earth science. Questions covered general geology topics, such as plate tectonics, earthquakes, and glaciers. Other presenters promoted various career options, from engineering to chemistry to police-detective work. ☼



During her presentation at Multiply Your Options 2002, **Flavia Wood** (Woods Hole Field Center) holds a poster depicting changes in land usage on Cape Cod between 1951 and 1990.

Lecture on Coastal Hazards at Massachusetts Coastal Workshop

By Becky Deusser

Jeff Williams (Woods Hole Field Center) was the principal speaker at the Shoreline Processes Workshop held in Plymouth, MA, on April 16. It was the first of four workshops in the Coastal Hazards Workshop Series cosponsored by the Massachusetts Office of Coastal Zone Management, the Federal Emergency Management Agency (FEMA), the Massachusetts

Association of Land Surveyors and Civil Engineers (MALSCE), and the Boston Society of Civil Engineers Section/ASCE (BSCES). The purpose of the series is to educate local coastal managers and the public about the latest scientific findings about coastal processes, management, and planning tools relating to coastal-hazard issues. **Jeff** discussed the geologic factors

and processes driving erosion and marine transgression, as well as options for dealing with coastal erosion. He also presented the latest scientific thinking on climate change, and the scientific consensus on relative sea-level rise and its potential effects on accelerating erosion and wetland loss around the world. ☼

Earth Day Celebration at Lowry Park Zoo

By Nancy DeWitt

The Earth Day celebration at Lowry Park Zoo in Tampa, FL, was much smaller this year than in the past 2 years. Nevertheless, all the usual displays were present. **Nancy DeWitt**, **Stacy Merriweather**, **Katie Merriweather** (age 14), **John Gilbert** (USGS volunteer), **Dale Griffin**, and **Morgan Griffin** (age 9) represented the USGS' St. Petersburg Center for Coastal and Regional Marine Studies (CCRMS). Our table was a big success. Special thanks to **Stacy** who put together great

kids' packets that included puzzles (which she made), games, and information about dolphins, Earth science, volcanoes, sea turtles, manatees, and alligators. Demonstrations of the kids' SOFIA Web site (URL http://sofia.usgs.gov/virtual_tour/kids/) went well, and teachers were especially interested in the educational materials offered on the Web site. **Katie Merriweather** did a fantastic job supervising the kids' table and making hydrologic-cycle bracelets! Her patience with younger

kids is well beyond that of the average 14-year-old. **Morgan Griffin** entertained our volunteer staff and kept morale high by reporting different activities occurring around us and down at the local pond.

Hands-on displays included the portable vibracore tripod, aluminum core barrel, scuba rig and dive flag, a split vibracore, and **Jim Flock's** poster “What is a vibracore?” It was a good day overall, thanks to everyone's hard work. ☼

Woods Hole Specialists Present Practical Applications of GIS

By Becky Deusser

VeeAnn Cross and **Tammie Middleton** of the Woods Hole Field Center (WHFC) presented a lecture to undergraduate students at Cape Cod Community College on how the USGS uses GIS (Geographic Information Systems) for research in coastal and marine environments. Course instructor **Chris Crawford** had invited WHFC to present information for his course entitled "Introduction to GIS." **VeeAnn** gave an overview of GIS technology and

presented its applications in her work on the Southwest Washington Coastal Erosion project led by **Guy Gelfenbaum** (Menlo Park, CA). Her talk emphasized the use of real-time GIS in data collection and its integration with sidescan-sonar and seismic-reflection data to help guide selection of sediment-sample locations.

Tammie discussed her work with the Historic Area Remediation Site project, or HARS, which is headed by **Brad**

Butman (WHFC). **Tammie** showed how GIS was used in the collection and integration of the various data used in the HARS study. Some of the data types mentioned were multibeam, navigation, and sediment data. **Tammie** also gave a short summary of other areas where the WHFC has worked with GIS. ❁

GIS Workshop on Gulf of Maine for Teachers

By Chris Polloni

Staff from the USGS' Woods Hole Field Center (WHFC) led a workshop entitled "Data Integration of the Gulf of Maine: A GIS study of Land and Sea" as part of the Massachusetts Marine Educators annual weekend meeting at the Woods Hole Oceanographic Institution on April 27.

GIS (Geographic Information Systems) is a relatively new topic for public-school teachers. While many have heard of marine GIS, most teachers have not used it in the classroom. Because of its location, Massachusetts provides an ideal landscape for using marine GIS in environmental studies.

The USGS workshop explained how GIS has been used in public schools to study terrestrial and marine topics, with emphasis on the Gulf of Maine watershed. The Massachusetts Curriculum Frameworks (Massachusetts Department of Education guidelines for developing curricula) have recently included GIS as a skill to be taught in schools across the State. This workshop acquainted teachers with ESRI (Environmental Systems Research Institute) ArcView software. WHFC also provided USGS data disks and take-home, hands-on activities that have already been used in local classrooms.

Each participant worked with a copy of the USGS quadrangle map of Woods Hole and a detailed contour map of WHOI's Quissett Campus. **Charles Saulnier**, an environmental-science teacher at the Essex Agricultural School, led the first session



Chris Polloni holds a starfish presented as a gift by participants in the Massachusetts Marine Educators' workshop at the USGS Woods Hole Field Center. From left to right, **Erin Gordon**, **Barbara Belanger**, **Chris Polloni**, **Howard Dimmick**, **Amy Holt Cline**, **Charles Saulnier**, and **Brandy Moran**.

of the workshop by providing an extensive overview on how to work with a topographic map. He introduced the group to roamers (measuring devices that combine features of a protractor and a ruler to assist more accurate map reading and plotting) and the use of meter sticks with mapping.

Chris Polloni led the second session with an overview of the Massachusetts Bay GIS CD-ROM (USGS Open-File Report 99-439) and the USGS East Coast Sediment Analysis (USGS Open-File Re-

port 00-358), both of which were provided as part of the teachers' handouts. **Amy Holt Cline**, an environmental-science teacher and GIS specialist at the Essex Agricultural School, led the third session. **Amy** gave examples of the successful use of GIS in the classroom using maps that her students had created as part of her mapping curriculum based on the Massachusetts Bay CD-ROM. **Erika Hammar-Klose** and **Glynn Williams** (WHFC) assisted with the workshop. ❁

USGS Participates in MarineQuest 2002

By Marci Marot

On April 20, the USGS participated in MarineQuest 2002, the annual open house for the Florida Fish and Wildlife Conservation Commission's Florida Marine Research Institute (FMRI). FMRI is one of several research partners located along with the USGS on the St. Petersburg campus of the University of South Florida. MarineQuest features outdoor displays, laboratory tours, and hands-on demonstrations focusing on FMRI's ongoing research. Activities

for the kids included touch tanks of various sea creatures, face paintings, make-your-own-manatee, sand paintings, and water safety and rescue demonstrations. **Chandra Dreher** and **Marci Marot** coordinated the USGS involvement this year.

The USGS provided an information table and displays highlighting current research projects, such as the Tampa Bay Pilot Study and African dust research. For the future scientists, there were coloring sheets, puzzles, vibracores from the West Florida shelf to sample, and the always-popular Sands of the World display. In addition to **Chandra** and **Marci**, **Jason Greenwood**, **Gina Peery**, **Chris Kellogg**, and **Amanda**

Frick volunteered time out of their weekend to answer questions, explain sampling techniques, and discuss how our research studies are benefiting the local community. MarineQuest is one of the campus' most popular annual outreach events, enjoyed by both scientists and visitors alike; it provides scientists with an exciting opportunity to showcase their coastal and marine research efforts and to interact with the public. Approximately 1,700 people braved unseasonably warm weather to attend, and many of them expressed an eagerness to attend the USGS open house at the Center for Coastal and Regional Marine Studies (CCRMS) during Earth Science Week this fall. ☼



Marci Marot shows a group of children a collection of beach sands from around the world through a reflected-light microscope at MarineQuest 2002, Florida Marine Research Institute, St. Petersburg, FL.



Chandra Dreher (left) and **Amanda Frick** at the St. Petersburg Center for Coastal and Regional Marine Studies display table.

Florida Caribbean Science Center's First Open House

By Dennis Krohn

The Florida Caribbean Science Center (FCSC) in Gainesville, FL, held its first open house on April 22 and 23. The event was tied in with Earth Day and was modeled after the open house held last fall at the St. Petersburg Center for Coastal and Regional Marine Studies (CCRMS). The first day (8 a.m. to 1 p.m.) was geared toward 4th-grade students, more than 500 of whom attended from local elementary schools. The second day (3 p.m. to 7 p.m.) was open to the general public, and nearly

300 people attended. **Bonnie McGregor** (Associate Director, USGS, Reston, VA) was present, along with **Suzette Kimball** (Eastern Regional Executive for Biology) and **Dave Bornholdt** (Eastern Regional Associate Executive for Biology). **Lisa Robbins** (Chief, CCRMS) and **Carl Goodwin** (District Chief, Water Resources, Tallahassee, FL) joined **Russ Hall** (Director, FCSC) to represent the major USGS research centers in Florida. **Gayle Sisler** and **Michelle Barrett** (both from the Eastern Region Office, Reston,

VA) combined their visit to the open house with a tour of different offices.

Last year, **Hannah Hamilton**, the FCSC's public-affairs specialist, arranged for three highly popular exhibits to be brought to St. Petersburg. We were happy to respond in kind. **Jim Flocks**, **Dennis Krohn**, **Russ Peterson**, and **Chris Reich** (CCRMS) spent 3 days in Gainesville setting up and displaying exhibits on different coastal projects and themes. **Dennis** and **Russ** showed the effects of hurricanes on

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Outreach, continued

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the coast and the different techniques used by USGS scientists to measure the changes. **Chris'** display on corals and viewing sediment through a microscope was a popular hands-on demonstration. A huge hit was **Jim's** operation of the vibracorer. In addition, eight staffers from the USGS Water Resources District Office in Tallahassee and

Subdistrict office in Altamonte Springs/Orlando took part in the open house. They exhibited a ground-water model and presented displays on water quality, karst and sinkholes, and major programs, publications, and Web sites, including the SOFIA Web site (URL <http://sofia.usgs.gov/>), developed largely at CCRMS.

Several biologists located at CCRMS also had displays, among them sediment-elevation tables (SETs). They posed the questions: Who cares about dirt? Especially if it's dirt in a wetland? Then they offered some answers: Wetlands support a great variety of wildlife. Wetlands also support plant life and cleanse the water that flows through them. The "dirt" or sediment in wetlands is key to providing habitat for the plants that in turn support the animals, so understanding the processes that affect the sediment is important. The biologists showed visitors how SETs help scientists measure the rate at which soil and sediment either build up or are lost from wetlands. This information is used by environmental managers concerned with wetlands conservation. ☼



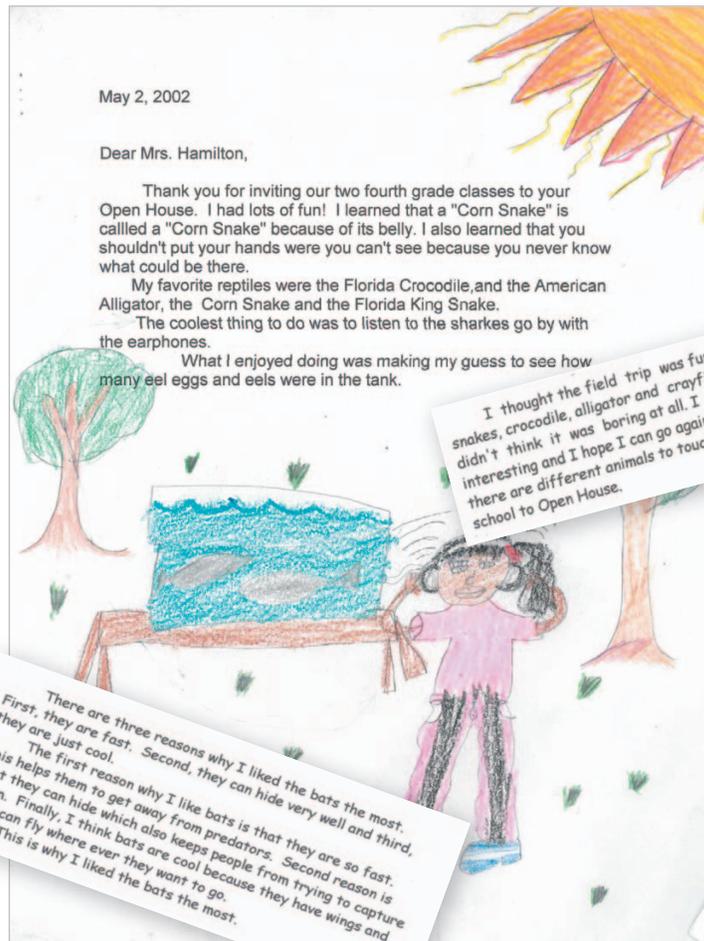
Ken Dodd, Jennifer Staiger, and Kristina Sorensen (FCSC) seated at the herpetology table. On display are a variety of turtle shells and a toy alligator. The turtle shells are, from right to left, two box turtle (*Terrapene carolina*) carapaces, a yellow-bellied slider (*Trachemys scripta scripta*) shell, and a cooter (*Pseudemys sp.*) shell. The tanks contain, from right to left, greater siren (*Siren lacertina*, an eel-shaped tailed amphibian), gopher frog tadpoles (*Rana capito*), and leopard frog tadpoles (*Rana sphenoccephala*).



Dennis Krohn explains a display about helicopters, hurricanes, and ATVs (all-terrain vehicles) at the Florida Caribbean Science Center's open house.



Jane Eggleston (left, Water Resources, Tallahassee) and **Kathy Beck** (Florida Caribbean Science Center, Gainesville) demonstrate the ground-water-contamination model often used for open houses at the St. Petersburg Center for Coastal and Regional Marine Studies.



Thank you notes from 4th-graders at Shell Elementary School.

May 2, 2002

Dear Mrs. Hamilton,

Thank you for inviting our two fourth grade classes to your Open House. I had lots of fun! I learned that a "Corn Snake" is called a "Corn Snake" because of its belly. I also learned that you shouldn't put your hands where you can't see because you never know what could be there.

My favorite reptiles were the Florida Crocodile, and the American Alligator, the Corn Snake and the Florida King Snake.

The coolest thing to do was to listen to the sharks go by with the earphones.

What I enjoyed doing was making my guess to see how many eel eggs and eels were in the tank.

I thought the field trip was fun. I got to touch the snakes, crocodile, alligator and crayfish. I had so much fun. I didn't think it was boring at all. I thought it was very interesting and I hope I can go again next year. If I do I hope I there are different animals to touch. Thank you for inviting our school to Open House.

There are three reasons why I liked the bats the most. First, they are fast. Second, they can hide very well and third, they are just cool. The first reason why I like the bats the most, this helps them to get away from predators. Second reason is that they can hide which also keeps people from trying to capture them. Finally, I think bats are cool because they have wings and they can fly where ever they want to go. This is why I liked the bats the most.

CMGP National Knowledge Bank's 2nd Annual Workshop

By **Becky Deusser**

The USGS Coastal and Marine Geology Program (CMGP)'s National Knowledge Bank group, led by **Debbie Hutchinson** (Woods Hole, MA) and **Rex Sanders** (Menlo Park, CA), held its second annual workshop at the USGS' Center for Coastal and Regional Marine Studies in St. Petersburg, FL, from April 23 to 25. The purpose of the workshop, entitled "Building a Knowledge Bank for CMGP," was to gather information necessary to create a preliminary action plan

for the CMGP National Knowledge Bank. With the aid of presentations from outside information managers, the workshop participants discussed the immediate and future needs for three key aspects of the knowledge bank: information architecture, information content, and utility of information.

The first part of the meeting provided an overview of work being done outside of USGS in the area of knowledge management. Participating agencies included several

centers within the National Oceanic and Atmospheric Administration (NOAA), the Geological Survey of Canada, the Lamont-Doherty Earth Observatory at Columbia University, and the Woods Hole Oceanographic Institution. The rest of the workshop was spent on organized group discussions. Following the workshop was a discussion led by **Steve Eittreim** (Menlo Park, CA) about the linkages between the Knowledge Bank and the Synthesis and Assessment projects. ☼

USGS Conference on Communicating Science in a Virtual World

By **Chris Polloni**

Chris Polloni (Woods Hole, MA) attended the USGS Office of Communications 2002 annual conference on "Communicating Science in a Virtual World," held in part at the USGS eastern-region headquarters in Reston, VA. The meeting was also held simultaneously, via teleconference, at the central- and western-region headquarters in Denver, CO, and Menlo Park, CA.

The meeting was an intense experience, with 14 sessions that included cyberseminars, satellite-TV broadcasts, video, and a variety of collaborative communication and streaming media over the World Wide Web. The conference also addressed regional issues, with highlights

on the Chesapeake Bay impact crater, led by **Greg Gohn** (Reston, VA), and on the Florida Everglades, led by **Lynn Wingard** (Reston, VA).

The USGS Office of Communications introduced its new structure and held discussions with eastern-region staff, headed by **Michelle Barrett** (Reston, VA). Participants had a tour of the fourth-floor offices of the eastern-region leadership team, with an introduction by **Bonnie McGregor** (USGS Eastern Regional Director). **Tom Armstrong** (Reston, VA) gave a thought-provoking overview of future directions in integrated science and how they might affect the USGS' communications role in

the science-planning process. The meeting was interesting, challenging, and packed with good information. ☼



Chris Polloni (Woods Hole, MA) with **Judy Salvo** (USGS Office of Communications, Reston, VA) at the USGS conference "Communicating Science in a Virtual World."

Workshop on Securing Nation's Rights to Continental-Shelf Territory

By **Jon Childs**

Debbie Hutchinson (Woods Hole, MA) and **Jon Childs** (Menlo Park, CA) attended a workshop on "Securing Your Nation's Rights to Continental Shelf Maritime Territory," organized by the Southampton Oceanography Centre and the United Kingdom Hydrographic Office and held May 13-17 in Southampton, England. The workshop focussed on the 1982 United Nations Convention on the Law of the Sea (UNCLOS), in particular on Article 76 of that convention. Article 76 specifies the circum-



Participants of the workshop "Securing Your Nation's Rights to Continental Shelf Maritime Territory," organized by the Southampton Oceanography Centre and the United Kingdom Hydrographic Office, held May 13-17 in Southampton, England.

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Meetings, continued

(Nation's Rights Workshop continued from page 9)

stances under which coastal countries may claim an extended continental shelf beyond the 200-mi Exclusive Economic Zone (EEZ) and the process by which that claim must be documented and submitted. The United States has signed, but not ratified, the UNCLOS. The Senate is expected to take up consideration

of the treaty in the near future. The workshop featured a highly experienced panel of lecturers from the United Kingdom, Canada, and Norway and was organized by **Lindsey Parsons** (front row, far left in photograph). Many in the USGS' Coastal and Marine Geology Program will remember **Lindsey** from

his participation in GLORIA cruises in the Gulf of Mexico and the Aleutian Islands. Other participants in the workshop hailed from Australia, Denmark, Morocco, Tonga, Fiji, Papua New Guinea, Solomon Islands, Mozambique, Mauritius, Seychelles, and the Democratic Republic of the Congo. ❁

Awards

Colorado School of Mines Honors Keith Kvenvolden

By **Keith Kvenvolden**

On May 1-4, 2002, **Keith Kvenvolden** (Menlo Park, CA) attended his 50th college reunion at the Colorado School of Mines, Golden, CO. During the festivities, he presented a lecture entitled "The Geobiology of Natural Gas Hydrate," and during the commencement ceremony he received the school's Distinguished Achievement Medal. The citation reads as follows:

Dr. Keith A. Kvenvolden graduated from Mines at the top of his class in 1952 as a geophysical engineer. He currently holds the position of senior scientist for the United States Geological Survey's Coastal and Marine Geology Team. During his career he has pub-

lished more than 500 papers and abstracts dealing with a variety of subjects in organic geochemistry, often related to fossil-fuel energy and the environment.

Following his service in the U.S. Army, he earned M.S. and Ph.D. degrees in geology from Stanford University. He then returned to work at Mobil Oil Corporation. After five years at Mobil, **Dr. Kvenvolden** went to work for NASA and participated in the Apollo Program analyzing returned lunar samples, and he led a group that studied lunar dust, meteorites, and ancient rocks for signs of the origin of life. Following this, he moved to the U.S. Geological Survey,

where he has become a leading authority regarding the existence and character of naturally occurring methane hydrates.

The recipient of numerous awards and honors for his work, **Dr. Kvenvolden** was elected to Fellowship in the Geological Society of America, the American Association for the Advancement of Science, The Explorers Club, the American Geophysical Union, and The Geochemical Society and the European Association for Geochemistry. He was the Geological Society of America Michel T. Halbouty Distinguished Lecturer for 2000. ❁

Staff and Center News

Congratulations to USGS Student Employees

By **Lisa Robbins**

Congratulations go to student employees at the USGS' St. Petersburg Center for Coastal and Regional Marine Studies (CCRMS) for successfully defending their Master's theses. **Wayne Baldwin** (advisor **George Voulgaris**, University

of Southern California), **Marci Marot** (advisor **Bob Byrne**, University of South Florida, St. Petersburg), and **Andy Van Cleave** (advisor **Lisa Robbins**, center chief, CCRMS) graduated this spring. **Wayne** and **Marci** are still on board at

the USGS; **Andy** was swept away by a local consulting firm in Tampa named GLE, which hired him for their asbestos lab and have asked him to help set up their biological air-monitoring lab. ❁

Bill Schwab is New Team Chief Scientist at Woods Hole Field Center

By **Becky Deusser**

Dave Russ (USGS Eastern Regional Geologist) announced in May that **Bill Schwab** has been selected as the new team chief scientist for the Coastal and

Marine Geology Program's Woods Hole Field Center (WHFC). **Bill** will be replacing **Debbie Hutchinson**, who has rotated out of the position after nearly 6 years

of service. In the interim, there will be several acting team chief scientists. **Jeff Williams** handled this responsibility for

(*New Team Chief Scientist continued on page 11*)

(New Team Chief Scientist continued from page 10)

the month of April. **Uri ten Brink** served during May, and **Mike Bothner** will serve during June. **Marinna Martini** will then take on the position until **Bill** formally takes over by July 15.

In his announcement, **Dave Russ** emphasized **Bill's** background as a geophysicist with a research focus on understanding sedimentary processes in coastal and marine environments, ultimately leading to a predictive capability for sediment

transport, deposition, shoreline change, and sea-floor stability. He noted **Bill's** service on various committees, as well as his leadership role in several important USGS research projects. Since 1988, **Bill** has led the WHFC Sea-Floor Mapping Group, described by **Dave** as being "at the forefront nationally of high-resolution marine-mapping technology and applications."

Dave also thanked **Debbie** for her service. "**Debbie's** vision and leadership, not

just for the scientific program at Woods Hole, but for the larger Coastal and Marine Geology Program, are primary reasons for the productivity and outstanding national reputation that the program currently enjoys," he wrote. **Debbie** welcomes the transfer back into science. She will be heading several projects, including Gas Hydrates, the National Knowledge Bank, and the Law of the Sea. ☼

Woods Hole Field Center Welcomes Two New Employees

The Woods Hole Field Center (WHFC) welcomed two new employees in May: **Guthrie Linck** has joined the Coastal and Marine Geology Program (CMGP), and **Matt Wander** works in the Water Resources Discipline (WRD).

Guthrie is a computer programmer, hired to help design and program the Marine Realms Information Bank (MRIB) interface under the CMGP National Knowledge Bank project (MRIB is headed by **Fran Lightsom**

and **Fausto Marincioni**). **Guthrie** graduated from Brown University with a degree in computer science in 1999. Since then, **Guthrie** has worked in computer programming in several locations, including HotJobs.com, Ltd. (New York, NY), the Marine Biological Laboratories (Woods Hole, MA), and the Woods Hole Oceanographic Institution (Woods Hole, MA).

Matt has joined **Eric Sundquist's** (WRD) project as a physical scientist to

supervise lab, field, and data-management activities for research on carbon geochemistry. **Matt** will also help with various outreach activities related to carbon and climate research. He is a graduate of Harvey Mudd College and holds Master's degrees in chemistry and geology from the University of Illinois at Urbana-Champaign. **Matt** says he's happy to return to a research environment after a brief foray into the consulting world. ☼

Woods Hole Field Center Visitor from University of Minnesota

Gary Parker, from the University of Minnesota's St. Anthony Falls Laboratory, visited with **Chris Sherwood** and **Dave Twichell** of the USGS' Woods Hole Field Center (WHFC) after presenting

a lecture at WHFC on "Co-Evolution of Topset, Foreset, and Bottomset Deposits of Deltas with Plunging Turbidity Currents." **Gary** discussed sediment-transport modeling with **Chris**, and sedimen-

tation in Lake Mead and its relation to the evolution of intraslope basins in the Gulf of Mexico with **Dave**. ☼

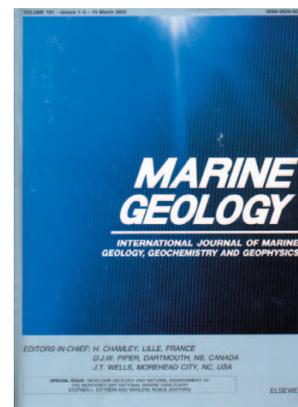
Publications

Special Issue of *Marine Geology* on USGS Research in Monterey Bay National Marine Sanctuary

The results of 6 years of research by the Coastal and Marine Geology Program (CMGP)'s Monterey Bay National Marine Sanctuary project have recently been published in a special issue of the journal *Marine Geology* (v. 181, no. 1-3, 321 p., dated March 15, 2002). Edited by **Steve Eittreim** and **Marlene Noble** (Menlo Park, CA) and entitled "Seafloor Geology and Natural Environment of the Monterey Bay National Marine Sanctuary," the vol-

ume contains 16 articles by 39 authors. The articles cover a wide range of topics, including sea-floor geology and morphology, sedimentation processes, hydrocarbons and sea-floor seeps, foraminiferal environments, circulation, and histories of shoreline erosion and accretion. A CD-ROM at the back of the volume contains most

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Cover of special issue of *Marine Geology* (v. 181, no. 1-3) summarizing 6 years of research by the Coastal and Marine Geology Program's Monterey Bay National Marine Sanctuary project.

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of the data and interpretations from the project. The table of contents with links to abstracts can be found at URL <http://www.elsevier.com/locate/issn/00253227/>.

Steve Eittreim led the Monterey Bay National Marine Sanctuary proj-

ect from 1994 until its conclusion. His efforts were honored in March 2002 when he received the Monterey Bay National Marine Sanctuary Award for Science/Research from the Monterey Bay National Marine Sanctuary and the

Association of Monterey Bay Area Governments (see article in April 2002 issue of *Sound Waves*). ❁

New Environmental-Research Publication Has Timely Release for Mercury Concerns in the Gulf of Mexico

By Frank Manheim

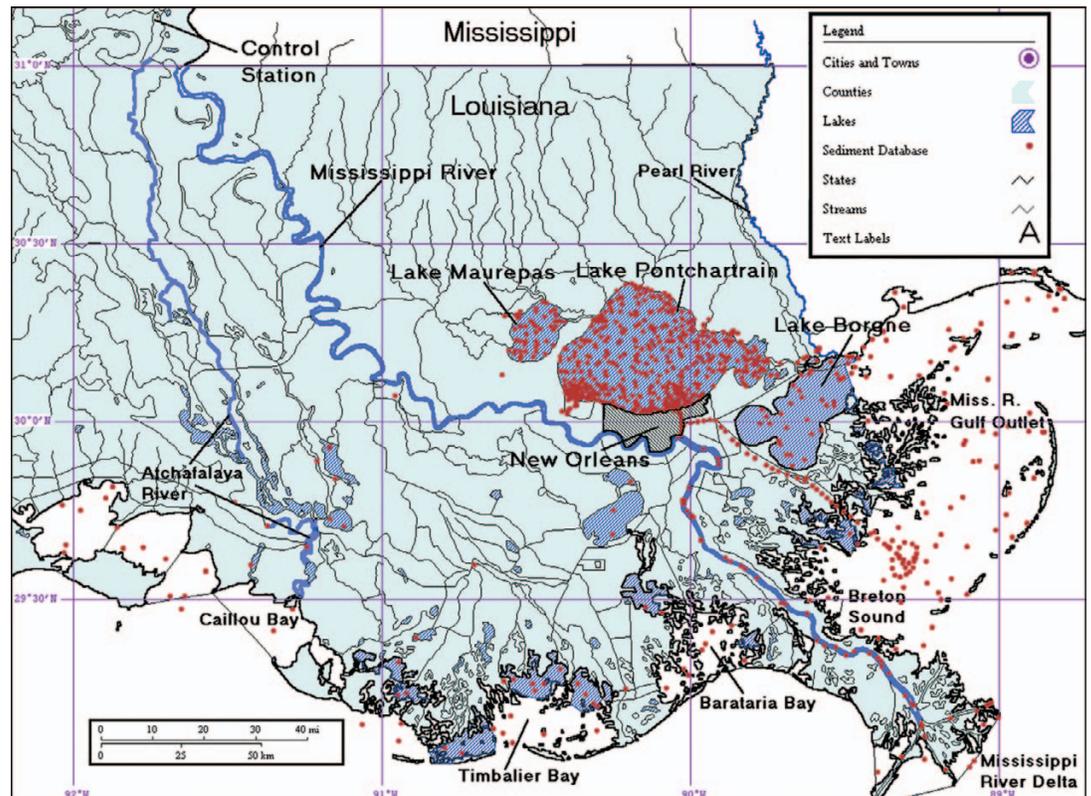
A USGS Professional Paper entitled "Lake Pontchartrain Basin: Bottom Sediments and Related Environmental Resources" (USGS Professional Paper 1634) was presented at the biennial "Basics of the Basin" symposium on Lake Pontchartrain research, held in New Orleans, LA, on May 16-17. Edited by **Frank Manheim** (Reston, VA) and **Laura Hayes** (Pembroke, NH), with LandView (4th release) implementation by **Jerry McFaul** (Reston, VA), the professional paper was published as a CD-ROM. It summarizes several years of collaborative work, with

contributions from **Jeff Williams, Chris Polloni, Rich Signell, and Jeff List** (Woods Hole, MA), **Jack Kindinger** and **Jim Flocks** (St. Petersburg, FL), and others from the USGS' Coastal and Marine Geology Program. The product contains a wealth of information, including data, scientific reports, instructional and outreach information, and a comprehensive sediment-chemistry data base integrated with a specially edited and augmented version of LandView, a software package for creating information-rich maps that runs on both Windows and Macintosh platforms.

The Professional Paper's release was timely, following reports in the media about mercury contamination around Gulf of Mexico drill rigs and concerns that similar contamination might be found in Lake Pontchartrain. The Gulf of Mexico drill rigs discharge 1 million pounds of drilling mud per hole. Barite, used to create a heavy drilling mud to overcome high pressures in oil-bearing formations, is believed to be the source of enhanced mercury in sediment samples and fish specimens collected in the gulf. Concern about

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Map illustrating the study area (Lower Mississippi River, Atchafalaya River, Gulf of Mexico) and sampling points (red dots) for chemical and other data in the regional data base in Professional Paper 1634, recently published as a CD-ROM. This map was created with LandView software included in the CD-ROM. LandView incorporates geographic and demographic base data and permits importing of user data, which can be plotted and labeled with a built-in mapping system (MARPLOT). A student assistant with no previous experience completed this illustration on his second day working with the software. The LandView package is in the public domain and is configured on the Professional Paper CD-ROM for both Windows and Macintosh platforms.



(Timely Release continued from page 12)

mercury contamination has extended to Lake Pontchartrain because earlier drilling discharged drilling mud in the lake, and USGS Professional Paper 1634 reveals high concentrations of barium, a component of barite, in and around New Orleans waterways. The sediment-chemistry data base published in the Professional Paper, however, shows only a few samples with enhanced mercury in the area.

Two more highlights from Professional Paper 1634:

During presentation of the Professional Paper at the "Basics of the Basin" symposium in New Orleans, **Frank Manheim**, **Laura Hayes**, **Jerry McFaul**, and **Arthur Horowitz** (USGS Water Resources, Atlanta, GA) compared data from Lake Pontchartrain with chemical data on suspended matter in the Mississippi River (from the USGS National Stream Water Quality Accounting Network, or NASQAN). Their findings revealed that Lake Pontchartrain

sediment is cleaner than current Mississippi River suspended matter, even though the Mississippi River is the source of most of Lake Pontchartrain's sediment. The Professional Paper shows that shell dredging in Lake Pontchartrain (stopped in the 1990s) has mixed clean sediment of Pleis-



Photograph "Old Friends" by **Julia Sims** (Ponchatoula, LA) appears in *USGS Professional Paper 1634*. Photograph was taken at Keifer Point, Lake Maurepas, near the mouth of Pass Manchac.

tocene age with the contaminated modern suspended matter.

Jerry McFaul developed a tutorial to demonstrate the LandView software at the symposium, using the newly released CD-ROM. The product's potential value to a wide variety of users continues to gain attention. LandView incorporates detailed Federal data from the U.S. Census Bureau, the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), and the USGS with a public-domain mapping package. Selected data can be plotted and labeled on base maps incorporating such data as roads, political boundaries, coastlines, and streams, as the map accompanying this article shows. User-supplied data sets may also be integrated with the embedded information. The LandView package offered on the Professional Paper CD-ROM is configured for both Windows and Macintosh platforms. ❁

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