USGS

Sound Waves

Coastal Science and Research News from Across the USGS

http://soundwaves.usgs.gov/

Fieldwork

Caribbean Coral-Reef Ecologist Studies Dust from the African Sahel

By Ginger Garrison

Beagles. Most coral-reef ecologists are not confronted with the possibility of losing weeks of work, travel funds, and hard-won field samples to a beagle. Yet there I was, in Charles DeGaulle Airport, 5 days before Christmas, trying to board a Paris-to-Miami flight, and a beagle was deciding the fate of my air samples. My official passport, official-travel papers, and sheaves of USGS analytical request forms convinced the humans responsible for airport security of my innocence but did not sway the beagle. At long last, she looked up, wagged her tail, and trotted off, with human in tow.

I traveled in December 2001 from St. Petersburg, FL, to Bamako, Mali, to set up a chemical-contaminants-sampling station to complement the microbial-sampling station I had set up there the previous year. The trip was exceptionally productive: the samplers were installed, local scientists trained, and samples successfully collected. What was a coral-reef ecologist doing sampling air in the African Sahel? I was collecting data to test our hypothesis that microbial and chemical contaminants carried in African dust may play a role in the decline of Caribbean coral reefs and may pose a risk to human health. Having lived in the Caribbean region for 18 years, I had spent the past decade documenting the continuing decline of coral reefs and was intimately aware of the influx of African dust every summer.

Every year, hundreds of millions of tons of African dust are carried from the Sahara and Sahel across the Atlantic to the Caribbean and the southeastern United States. In the Caribbean, the sky becomes hazy, visibility decreases to a few kilometers, a fine red dust settles on surfaces, and residents complain of sinus problems, coughs, and other ailments said to be caused by the dust. Although the dust has been carried to the Caribbean for thousands of years, the amount transported varies from year to year and has increased drastically since the early 1970s with the beginning of the drought in the Sahel. Composed primarily of soil particles so small (less than 2.5 µm) that our lungs cannot expel them, the dust may transport various microorganisms and chemicals that hitchhike on the small particles. **Charles Darwin**, on his 1845 voyage aboard the surveying ship H.M.S. *Beagle*, collected African dust in the Atlantic and, using a microscope, saw live microorganisms on the soil particles. Even larger organisms, African desert locusts (*Schistocerca gregaria,* as much as 3 inches long or longer), arrived alive in Antigua, Barbados, and Trinidad during a large dust event in 1988.

In 1997, **Gene Shinn**, **Garriet Smith** (University of South Carolina, Aiken), and I hypothesized that living microbes carried with the dust may be significant factors in coral-reef decline. In December

(African Dust continued on page 2)

Transport of African dust to the Americas. Upper map from Perry, K.D., Cahill, T.A., Eldred, R.A., and Dutcher, D.D., 1997, Long-range transport of North African dust to the eastern United States: Journal of Geophysical Research, v. 102, no. D10, p. 11225–11238. Lower map modified from original produced by U.S. Central Intelligence Agency.

Sound Waves

Editor
Helen Gibbons
Menlo Park, California
Telephone: (650) 329-5042
E-mail: hgibbons@usgs.gov
Fax: (650) 329-5198

Print Layout Editors
Susan Mayfield, Sara Boore
Menlo Park, California
Telephone: (650) 329-5066
E-mail: smayfiel@usgs.gov; sboore@usgs.gov
Fax: (650) 329-5051

Web Layout Editor
Trent Faust
St. Petersburg, Florida
Telephone: (727) 803-8747 Ext. 3043
E-mail: tfaust@usgs.gov
Fax: (727) 803-2030

SOUND WAVES (WITH ADDITIONAL LINKS) IS AVAILABLE ONLINE AT URL
http://soundwaves.usgs.gov/

Contents

Submission Guidelines

Deadline: The deadline for news items and publication lists for the April issue of *Sound Waves* is Friday, March 22.
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://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

Fieldwork, continued

(African Dust continued from page 1)

1997, **Garriet** isolated and identified the known seafan disease pathogen (*Aspergillis sydowii*) in its active, pathogenic form from air samples taken during a dust event in the Virgin Islands. Since that time, *A. sydowii* has been isolated only from samples taken during dust events in the Virgin Islands (but not during nondust periods), from diseased sea fans, and from air samples from Bamako, Mali. To date, **Dale Griffin** and **Christina Kellogg** (St. Petersburg, FL) have isolated more than 150 species of viable bacteria and fungi from Virgin Islands air samples taken during dust events; samples collected during nondust periods contain few microorganisms.

Sampling in a dust-source area was the next step. In December 2000, I installed a sampling station in Bamako, Mali, to collect air samples to be analyzed for microorganisms. While there, I realized that microorganisms transported with the dust might not be the only concern. In Mali, all forms of waste are burned for fuel and to fertilize the thin ribbons of arable land along the flood plain of the Niger River. Until 15 years ago, garbage was predominately animal and plant waste; now, plastic bags and various plastic products are a major component. Garbage burning today severely degrades air quality during periods of clear weather and dust storms (the Harmattan) and may release dioxin and concentrate heavy metals. Anecdotal information (including conversations with local residents and my personal experience of having to seek medical attention for respiratory problems in Mali) suggests that respiratory complaints are common.

The third largest river in Africa, the Niger, begins in the highlands of tropical Guinea and flows northward and eastward through Mali. The river is the depository

(African Dust continued on page 3)

View from St. John, U.S. Virgin Islands, during clear air conditions in September 2000.

Same view from St. John during African dust event in June 2000.

(African Dust continued from page 2)

for sewage, pesticides used on croplands, and excreted pharmaceuticals and antibiotics (used against a host of diseases, including malaria and respiratory infections). Mali receives less than 2 cm of precipitation a year and depends on the annual flooding of the Niger to deposit fertile soil on the flood plain. The fine soil particles readily adsorb many of the chemical contaminants carried by the river (pesticides, plasticizers, pharmaceuticals, and combustion products). Strong convective storms can advect these small particles, along with their chemical and microbial hitchhikers, into the atmosphere, where they can be transported thousands of kilometers to the west. Little is known about the movement of living microbes, organic chemicals, heavy metals, or radioisotopes from West Africa into the Caribbean and the southeastern United States.

Thanks to an honest beagle, the air samples from Mali made the trip to the laboratory in St. Petersburg, where they will be analyzed for chemical contaminants (a suite of pesticides, polyaromatic hydrocarbons, dioxin, plasticizers, pharmaceuticals, antibiotics, and trace metals) and viable microorganisms. That conscientious beagle must have been off duty 2 days later, when someone boarded the Paris-to-Miami flight and tried to light his running shoe.❁

Street in Djenne, Mali, showing raw sewage in gutter.

Upcoming! Documentary on Aleutians Features Two USGS Scientists

By Gloria Maender

"The Aleutians, Cradle of the Storms," a documentary jointly produced by New Zealand Natural History (Fox Television) and others, will air nationally on PBS on two consecutive Wednesdays at 10 p.m., May 8 and 15, 2002. Check your local station schedule to verify the airing schedule in your area. Two scientists at the USGS Western Ecological Research Center, research ecologist **Jim Estes** and wildlife biologist **A. Keith Miles**, appear in the two-part production, which covers the archipelago's geologic evolution, the origins and life of its traditional peoples, and its rich natural environment.❁

Radio Interview Explores African Dust, Human Health, and Mystery Novels

By Gene Shinn and Sarah Andrews

On January 15, **Ginger Garrison**, **Gene Shinn**, and geologist/novelist **Sarah Andrews** answered questions on a 1-hour talk show hosted by **Michael Krasny** of KQED radio in San Francisco, which enjoys a regular audience of 60,000 people. The subjects were African dust blown into the Caribbean, and **Sarah's** new book *Fault Line*. A former USGS geologist and now a successful novelist, **Sarah** arranged the show. Her next book, due at the printers in June for a release in early 2003, sports the working title *Killer Dust*.

Sarah conducted a workshop on writing for the public at the USGS office in St. Petersburg, FL, last year. She became interested in African dust research and how dust clouds could be used to deliver bioweapons. Never fear, we know **Em Hansen**, the lady geologist and forensic sleuth in **Sarah's** novels, will use her clever geological skills to save the world from untold horrors. If you have read any of her novels, such as *Bone Hunter* or *An Eye for Gold,* then you will know they contain abundant references to USGS research. You might even recognize "bits and pieces" of geologists you know as either murder victims or heroes.

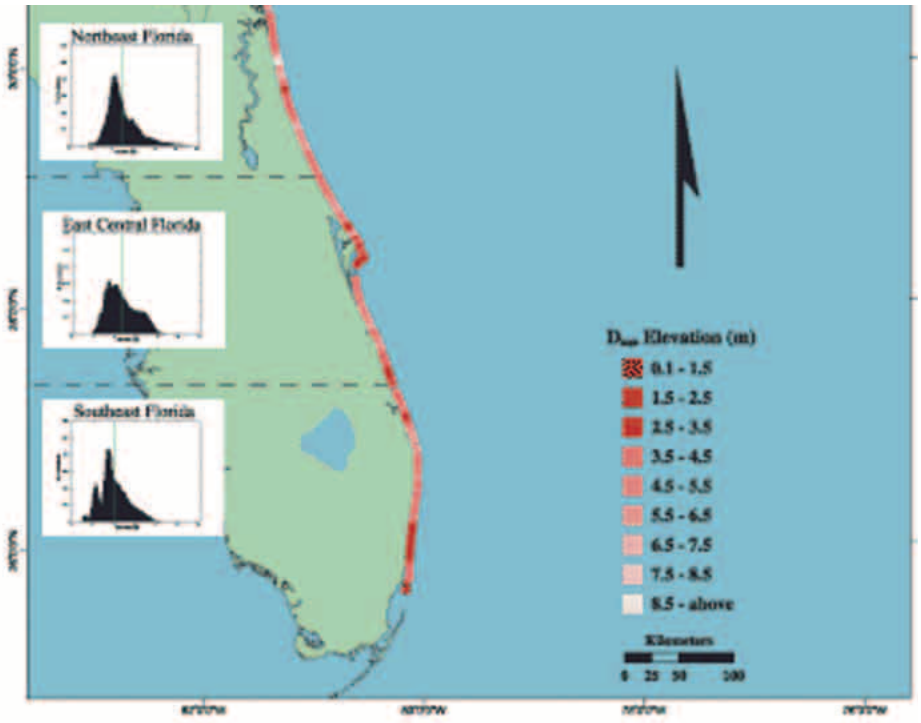
Sarah began her career in geology with investigations into windblown sediment at the USGS, where she was a close associate of the late, legendary **Edwin D. McKee**, an expert on sand dunes and delta deposits around the world. After leaving the USGS, she worked for Amoco (getting oil out of eolian sandstone) and ANGUS Petroleum, then did a "tour of duty" in environmental services. She says the only way she could get through long, boring meetings for a Superfund site was "by picking someone across the table as a murder victim and then trying to figure out who killed him." Before long, people at the table were saying, "Please kill me." (We never have meetings like that at the USGS!) All that led to publishing mystery novels, which led to her receiving journalism awards from the American Association of Petroleum Geologists (AAPG) and the Rocky Mountain Association of Geologists (RMAG), and the Shea Award for writing from the National Association of Geoscience Teachers (NAGT). Her books take geology to the public.

Now **Ginger**, **Gene**, **Dale Griffin**, and **Christina Kellogg**, who study the effects of African dust on Caribbean coral reefs and human health, are wondering, "Who gets to be killed in *Killer Dust*?"❁

"First Line of Defense" Against Storm Runup Along Florida's Atlantic Coast

By Nicole Elko

Steve Nichols of WTVT Fox Channel 13 in Tampa, FL, interviewed **Abby Sallenger** (St. Petersburg) on February 11 about a USGS map of peninsular Florida showing the Atlantic coast's "first line of defense" against overtopping or inundation by storm waves. The geomorphic features that constitute the first line of defense are the foredune ridge (the dune ridge closest to the shoreline) or, if no dune is present, the beach berm. (For areas where dunes are absent and seawalls or other shore-parallel coastal defense structures are present, the top of the structure becomes the first line of defense.) The map shows the relative vulnerability of segments of the U.S. South Atlantic coast to coastal change as a result of runup during severe storms. For example, dark-red colors indicate areas of low elevation that are highly vulnerable to overwash and inundation, whereas light-red colors indicate areas of high elevation that have low vulnerability to net coastal change. The map was created from lidar (light detecting and ranging) data collected by NASA's Airborne Topographic Mapper, an airborne system that uses laser light to make precise topographic surveys. The map is a first step toward characterizing vulnerability to storm impacts along the southeast coast of the United States. **Abby's** interview aired on the 6 p.m. broadcast the same night.

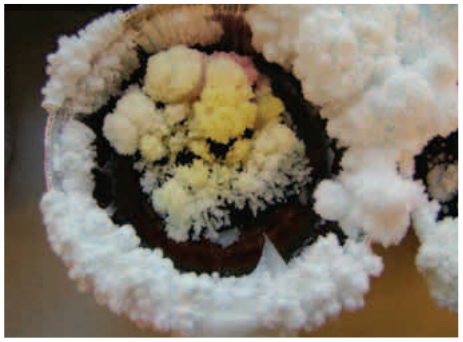


Part of map "Coastal 'First Line of Defense' Elevations." The entire map can be found online at URL http://coastal.er.usgs.gov/hurricanes/mappingchange/vulnerability.html.

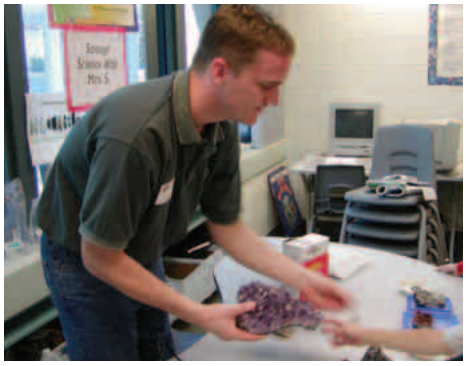
Crystal Demonstration for Second-Graders

By Dennis Krohn

On February 4, **Jason Greenwood** and **Dennis Krohn** (St. Petersburg, FL) presented a demonstration on crystals for students in the Gifted Program at McMullen-Booth Elementary School in Clearwater, FL. The second-grade class was studying how to grow crystals in space. The children examined several common minerals, such as table salt and calcite. The cubic form of halite that appeared under the microscopes fascinated them. Most of them were amazed to learn that such beautiful, well-formed crystals could grow naturally. The most popular crystal was a large optical-grade calcite rhombohedron. **Jason** showed his wonderful collection of minerals, and his training with the hard rocks in Idaho really helped with the nonstop questions the kids asked. The children were highly advanced for second grade. After class, **Jason** and **Dennis** helped the teachers identify the crystals the class had grown.



Crystals grown in a bowl by the students. The crystals formed at room temperature from various solutions of nontoxic mineral salts and dyes.



***Jason Greenwood** shows children a large rock encrusted with amethyst crystals.*

USGS Participates in Oceans Day 2002

The USGS participated in the third annual Oceans Day celebration held on February 13 at the State Capitol Rotunda in Tallahassee, FL. The Florida Institute of Oceanography (FIO) organized the event for the marine research institutions and commercial interests that focus on Florida's oceans. **Dennis Krohn** (St. Petersburg) and **Jane Eggleston** (WRD, Tallahassee District Office) staffed the USGS booth and met with the public and Congressional staff.

This year the Florida legislature met earlier than usual. The legislators must draw new district boundaries because Florida acquired two new Congressional seats in the 2000 census. The Oceans Day 2002 committee was aware of the redistricting meeting and had made a special effort to provide well-placed notices of the Oceans Day exhibit throughout the Capitol. Because of the technical nature of issues facing the legislature, people were especially interested in USGS products and asked many questions. Brochures on how to obtain aerial photographs and satellite images from the USGS were particularly popular. **Jane Eggleston** spent the entire day at the display and was invaluable in providing assistance and knowledge of water programs. ❁

Jane Eggleston *speaks to a visitor at the USGS exhibit in the Florida Capitol Rotunda.*

Home-Schooled Children Tour St. Petersburg Center

By Dennis Krohn

On February 8, 33 home-schooled children and their parents toured the USGS Center for Coastal and Regional Marine Studies (CCMRS) in St. Petersburg, FL. **Pam Goebbel** of St. Petersburg organized the tour. **Pam** is a home-schooling mom who decided she wanted to expose her children to more science, and so she began her own science curriculum for other home schoolers. Two groups of students were each given a 45-minute tour. **Gene Shinn's** toilet demonstrating the flow of water through porous limestone in the Florida Keys was a hit with these groups. So was **Bob Halley's** description of Navassa Island, a National Wildlife Refuge administered by the Department of the Interior's Fish and Wildlife Service since late 1999 (see related article in June 1999 issue of *Sound Waves*). Situated about 50 km west of Haiti, the refuge includes natural resources both on the island and in a 4.8-km-wide marine habitat surrounding the island. The students came away with new vocabulary words: conterminous, guano, and Florida Bay. We hope to see many of these children and their parents back for our open house in October. ❁

Black History Month in Woods Hole

By Glynn Williams

On February 15, in celebration of Black History Month, **Rashid Sumaila** (Fisheries Centre, University of British Columbia, Vancouver, Canada) gave a talk entitled "Impact of Marine Protected Areas on the Economic Payoffs to Different Fishing Sectors" at the Marine Biological Laboratory in Woods Hole, MA. This talk was the first of three given in February to mark Black History Month.

Several participants from the Woods Hole Field Center (WHFC) attended the talk, including **Troy Currence**, **Jamey Currence**, **Chris Polloni** and his wife **Pam**, and **Glynn Williams**. The talk was followed by a video entitled "Artist of the Harlem Renaissance." The Woods Hole Oceanographic Institution Peanut Butter Club, WHFC, and others sponsored these events.

Woods Hole Field Center members participate in a Black History Month event. From left to right: ***Gerald Ambrose*** *(Northeast Fisheries Science Center, Woods Hole, and founder of the Woods Hole Black History Month Committee),* ***Chris Polloni****, and* ***Jamey Currence****.*

Jamey Currence created a website about Black History Month in Woods Hole: **http://woodshole.er.usgs.gov/outreach/WHBHMC**. ❁

SOFIA Helps Environmental Academy Students with New Web Site

By Heather Henkel

Heather Henkel, webmaster of the USGS' South Florida Information Access (SOFIA) Web site, helped students from the Academy of Environmental Science and Technology of Forest Hill Community High School (West Palm Beach, FL) design a Web site for their entry in the Palm Beach County Envirothon. The Envirothon is an educational program in which high-school students focus on a specific environmental issue and develop skills to help resolve that issue. This year's theme was "Introduced Species and Their Effect on Biodiversity." The students from the Environmental Academy developed a program to help educate people about the responsibilities of having a pet. A video (produced during a visit to a local elementary school), brochure, and other related information can be found on the SOFIA site at URL **http://sofia.usgs.gov/forest_hill/envirothon2002/**. The students took second place in the competition, held March 1, 2002.

In addition to its work with the Envirothon, Forest Hill High School's Environmental Academy involved 13 students in the high school's science fair, held on February 15, and in the 42nd Annual Palm Beach County Science Fair, held on February 20. The aim of the science-fair projects is to introduce the students to the scientific method and to allow them to pursue their interests from a research perspective. The students select a topic, research it, create an experiment, collect results, and analyze the acceptance or dismissal of their hypothesis. This research experience is then compiled into a research paper, poster presentation, and, for some, a PowerPoint presentation used for the competition phase of the science fair. Their abstracts and additional photographs can be found at URL **http://sofia.usgs.gov/forest_hill/sciencefair/**.

Envirothon team (left to right): ***Alephio Sanchez, Lauren Connell, Drew Piersa, Brady Denger, Erin Rothenburg*** *(Captain), and* ***Leslie Rothenburg****.*

USGS Scientists Judge Projects, Present Award at Regional Science and Engineering Fair

By Jack Kindinger

Dale Griffin and **Jack Kindinger** of the USGS' Center for Coastal and Regional Marine Studies (CCRMS, St. Petersburg, FL) participated as judges for the Earth & Space and Environmental Science Categories at the 2002 Pinellas Regional Science and Engineering Fair (Pinellas County, FL) on February 8. Competing students were in the Junior Division (middle school, grades 5 through 8) and Senior Division (high school, grades 9 through 12). After the category judging, we reviewed all the projects to select one that best represented the type of science CCRMS would like to encourage. We found an obvious choice, a young man in the Junior Division Earth & Space Category. He had built two model aquifer systems (in aquariums): (1) a well-confined aquifer system, and (2) a semi-confined aquifer system. Using information researched from the World Wide Web and books, he then introduced a series of injection wells and collected empirical data on flow movement within the two aquifers. His results and conclusions were well thought out, his display was well designed, and his enthusiasm and knowledge of the topic completely won us over. We were proud to present this year's award (certificate and savings bond) to seventh-grader **Stephan Meylan** for his project "The Effect of Injection Wells on the Floridan Aquifer System." The awards ceremony was held February 13 at Osceola High School in St. Petersburg.

Upcoming! Symposium on Effects of Fishing—ABSTRACTS DUE APRIL 1, 2002

By Peter Barnes

The National Oceanic and Atmospheric Administration (NOAA) and the U.S. Geological Survey (USGS), in collaboration with the American Fisheries Society (AFS) and the Ecological Society of America (ESA), are convening a "Symposium on Effects of Fishing Activities on Benthic Habitats: Linking Geology, Biology, Socioeconomics, and Management." **Page Valentine**, **Ellen Raabe**, and **Peter Barnes** are on the organizing committees. We hope for good USGS participation. The symposium is scheduled for Tuesday, November 12, through Thursday, November 14, 2002, at the Doubletree Westshore Hotel in Tampa, FL. For detailed abstract instructions and more information regarding the symposium, see URL **http://walrus.wr.usgs.gov/bh2002**.

Congressional Briefing on California Sea Otter Research

By Karen J. Phillips

At the request of **Congressman Sam Farr** (D-17-CA), the Western Ecological Research Center (WERC) hosted a briefing in Sacramento on January 31, 2002, on the status of sea-otter research whose funding he initiated. The following were present at the briefing: **Reed Addis**, District Director for **Congressman Farr**; **Debbie Maxwell**, Center Director, USGS, WERC; **Karen Phillips**, Research Manager, USGS, WERC; **Jim Estes**, Research Scientist, USGS, WERC; **Chris Brand**, Research Manager, USGS, National Wildlife Health Center (NWHC); **Nancy Thomas**, Pathologist, USGS, NWHC; **Dave Jessup**, Veterinarian, California Department of Fish and Game (CDFG); and **Greg Sanders**, Sea Otter Coordinator, U.S. Fish and Wildlife Service.

Jim Estes briefed the Congressman's aide on research currently underway at WERC's Santa Cruz Field Station to discover reasons why the threatened California sea-otter population has experienced several periods of recent decline and an overall slower-than-expected recovery (see related article in February 2002 issue of *Sound Waves*). Research is looking at both the dead and live population for answers. As part of the sea-otter-monitoring program, beach-cast carcasses have been recovered and analyzed for trends in distribution, abundance, age and sex composition, and cause of death. In 2001, a comprehensive analysis of this information was completed for all carcasses recovered from 1968 to 1999. The analysis showed that mortality, not reproduction, is the primary driver of change in population abundance. Studies of the living population were initiated in 2001 in an effort to characterize key aspects of demography, behavior, and physiology in the California sea otter and to determine why so many animals are dying. This study is hoped to be a 5-year effort.

Nancy Thomas discussed the necropsy program of NWHC. The principal goals of this program are to identify and monitor the major causes of death in sea otters, establish the relative frequency of different causes of death, and determine the impact of diseases and other causes of death on population recovery. Necropsies have been conducted on fresh, beach-cast sea-otter carcasses since 1992, initially at NWHC. Since 1998, 25 percent of the necropsies have been conducted at NWHC, and 75 percent at the CDFG Marine Wildlife Veterinary Care and Research Center. Causes of death among necropsied animals have primarily been attributed to various infectious diseases (more than 40 percent), and this rate of disease mortality has remained relatively consistent over time and for prime-aged adults. In addition, **Nancy** reviewed other projects conducted jointly with the CDFG, including assessment of the impacts of disease and other mortality factors on the population, and future joint studies of contaminants and epizootiology.

Dave Jessup discussed various sea-otter research projects being conducted by the CDFG, including current joint projects with NWHC and the University of California, Davis (UCD), such as the necropsy collaboration and development of a joint database. The CDFG is also participating with WERC and UCD in studies of the living population. Various measurements are taken from each individual at the time of capture, including blood samples, swabs, and other biomedical samples for baseline health assessment and genetic studies and to determine immunologic function, exposure to selected infectious diseases, and selected contaminants. **Dave** also mentioned additional projects underway at CDFG and in collaboration with UCD, including investigations into pathogen pollution, contaminants in prey, and immunosuppressive factors.❁

Contracting Meeting in St. Petersburg, FL

By Marinna Martini

Marinna Martini, **Joe Newell**, **Janet Paquette**, **Ellen Mecray** from Woods Hole and **Pat Mullen** from St. Petersburg attended "Contracting Basics for Contracting Officers' Representatives (COTRs)." Although the finer points of Government purchasing are not as exciting as scientific research, purchasing within Government rules and regulations is a daily chore for many of us.

This particular course was a great introduction to Government purchasing, and I personally wished I had taken it 6 years ago. The instructor, **Gregory Hardy** (Graduate School, U.S. Department of Agriculture), was excellent, able to answer our questions with specific examples from his 15 years of contracting experience. Although the curriculum covered some dry subjects such as the mechanics and paperwork of the purchasing process, it was not all about how much paperwork we have to do. The course also provided tools for situations when the Government has not been treated fairly by a vendor or contractor, outlined the roles and responsibilities of the Contracting Officer, and introduced some basics of contract law.

Most importantly, the course outlined recent reforms in Government purchasing, many of which actually make our lives as Government purchasers easier. For example, did you know that the new buzzword is "best value" rather than "lowest cost," and that we do not have to go with the lowest bidder? Did you know that Contracting Officers are there to help us? If you make purchases greater than $2,500, make sole-source purchases, or write statements of work, I highly recommend making time for this course. It will save you time and aggravation in the long run.❁

Lake Mead Group Travels to Las Vegas, NV

By Dave Twichell

In late January, **Dave Twichell**, **VeeAnn Cross**, and **Ken Parolski** (Woods Hole Field Center) were in Las Vegas, NV, to plan this spring's work on Lake Mead and Lake Mohave. The group also gave talks on results from Lake Mead research and coordinated GIS (Geographic Information Systems) activities with other Federal and State agencies.

Dave gave two talks during the trip. The first was delivered to the Geology Department at the University of Nevada, Las Vegas (UNLV), on "Turbidities in Lake Mead." The second was given to the Las Vegas Wash Coordinating Committee (one of the principal groups overseeing water-quality issues in Lake Mead), entitled "Sedimentation in Las Vegas Bay."

Meanwhile, **VeeAnn** met with GIS specialists at UNLV, Southern Nevada Water Authority, the National Park Service (NPS), and the Nevada Bureau of Reclamation to discuss data exchange and data standards and to coordinate GIS efforts between the various agencies. **Ken** met with a cast of people regarding the coring platform that UNLV and NPS are outfitting for work on Lake Mead and Lake Mohave. **Ken's** level of expertise and commonsense approach to oceanographic equipment impressed the desert engineers.

Chris Jenkins Presents New SEABED Technology

By Jeff Williams and Jamey Currence

Christopher Jenkins, of the Institute of Arctic and Alpine Research (INSTAAR) at University of Colorado, Boulder, and **Jane Reid** (USGS, Santa Cruz) visited the Woods Hole Field Center (WHFC) on February 12 and 13 to talk with marine geologists from across the Coastal and Marine Geology Program (CMGP). The group evaluated the immediate use of usSEABED—a database of diverse types of sea-floor data—in the National Offshore Sand and Gravel Resource Assessment project, led by **Frank Manheim** (Reston) and **Jeff Williams** (Woods Hole). They also explored opportunities for using the system as a national GIS (Geographic Information Systems) database.

The Sand and Gravel project is a new, national topical assessment in partnership with the Minerals Management Service (MMS), the U.S. Army Corps of Engineers, the National Oceanic and Atmospheric Administration (NOAA), and several coastal States. The assessment is responding to increasing demand for accessible geologic information on aggregate resources for beach replenishment and coastal restoration, as well as data needs for environmental research, marine-habitat research, and other purposes. In addition to the creation of a national marine sediment database, three pilot studies are underway in New York Bight, Louisiana, and Hawaii.

Currently **Jane Reid**, **Mike Field** (Santa Cruz), **Jim Gardner** (Menlo Park), and **Chris Jenkins** are collaborating to use usSEABED to map surficial seabed sediment along the west coast for correlation with benthic habitats. This system provides a means for compiling, visualizing, and analyzing sediment data.

Chris also visited WHFC in January, while he was still affiliated with the University of Sydney, Australia. He gave a seminar to the Woods Hole science community entitled "New Information Processing Techniques Leading to Marine Substrate Maps on Local and National Scales," in which he demonstrated the GIS information-processing system that he created called dbSEABED. The U.S. version is called usSEABED.

The SEABED system provides a new kind of marine information structure, based on information processing that includes data mining and fuzzy-logic processing of text descriptions with complete temporal and geospatial discrimination of data. SEABED enables seabed data to be processed into information that assists scientific research, engineering, environmental management, fisheries, marine prospecting, search-and-rescue operations, coastal-change awareness, and defense. The system can accept a wide variety of data types, and the outputs can be used in virtually any program, such as GIS applications, spreadsheets, and relational databases.

Discussion at University of New Hampshire about Law of the Sea

By Erika Hammar-Klose

On February 5, **Debbie Hutchinson** and **Erika Hammar-Klose** (Woods Hole Field Center) visited **Larry Mayer** and **Martin Jakobsson** at the Center for Coastal and Ocean Mapping/Joint Hydrographic Center at the University of New Hampshire (UNH) in Durham, NH.

The purpose of the visit was to discuss a cooperative project between UNH, the National Oceanic and Atmospheric Administration (NOAA), and the USGS that will result in a report for the U.S. State Department that has been mandated by Congress. The report will cover data sources used to evaluate Federal offshore claims as they relate to the Law of the Sea, a United Nations convention that provides the international legal framework for exercising the rights and duties of countries related to their use of ocean space and resources. Other USGS researchers involved in the Law of the Sea project are **Terry Edgar** (St. Petersburg), **Shawn Dadisman** (St. Petersburg), and **Jon Childs** (Menlo Park).

Awards

USGS Recycling Program Honored by the City of Menlo Park, CA

By Pat Jorgenson

The Environmental Quality Commission of the City of Menlo Park, CA, recently honored the U.S. Geological Survey with its "Environmental Quality Award for 2001." The USGS program that was particularly cited by the city was the USGS "Supply Exchange," in addition to the Federal agency's overall recycling program.

The USGS Supply Exchange was opened at the 345 Middlefield Road facility in 1996, as a place for employees to drop off or pick up unwanted but still-usable office, field, and laboratory supplies, and has evolved through several onsite relocations. "This effort has proved to be a huge success," said USGS chief of operations, **Martha Burbidge**, "and each year diverts a small mountain of usable materials from local landfills and at the same time saving the Government untold dollars in procurement for new materials. One of our laboratory managers salvaged more than $5,000 in glassware that was no longer needed by another lab."

When the Supply Exchange becomes overburdened with items that no one within the organization can use, the materials are donated to local schools and charitable organizations. Maps, rock samples, and computers are donated to area schools, and in the year 2000, five pallets of surplus maps and other publications were donated to the Bridge to Asia Foundation for distribution to university students in China.

In addition to the Supply Exchange, employees at the USGS have recycled everything from aluminum cans and office paper to packing materials like "plastic peanuts" for more than a decade.

The successful recycling program at the USGS and its Supply Exchange owe their creation and continued existence to the efforts of **Sue Hunt**, an environmentally concerned employee who started and oversees both programs, in addition to her regular duties as a logistics manager with the Coastal and Marine Geology team. In 2001, **Sue** was honored with a White House "Closing the Circle" award for her recycling efforts (see articles in June 2001 and July 2001 issues of *Sound Waves*), and in 1999, she was similarly honored by the U.S. Department of the Interior (see September 1999 issue of *Sound Waves*).

Staff and Center News

Bill Dillon Retires from the Woods Hole Field Center

By Joanne Sedlock

After more than 30 years with the USGS, **Bill Dillon** retired from the Woods Hole Field Center (WHFC) on January 3, 2002. We threw a surprise party to celebrate **Bill's** retirement on January 25. **Bill's** work on Caribbean tsunamis and gas hydrates is internationally regarded as expert research. Among the well-wishers were coworkers from WHFC, the Woods Hole Oceanographic Institution (WHOI), the Monterey Bay Aquarium Research Institute (MBARI), and other USGS offices, as well as partners from private industry. Most importantly, **Bill's** wife and family, including all three children (his youngest daughter made a surprise visit from California) and his three grandchildren, were there to express their happiness for **Bill.**

The party had a nautical theme to emphasize **Bill's** love of sailing. There was also a photo display depicting **Bill's** career, starting with his teaching at the University of Rhode Island and ending with a cover story about gas hydrates in the *National Enquirer* (a career peak). The display also had many adventure-at-sea photographs. Although no formal speeches were delivered, some people did have a word or two to say about **Bill.** Among the descriptions were "great scientist," "gentleman," and "great dad." Congratulations, **Bill**! Happy sailing.

Bill Dillon's *(second from left) family joined him at his retirement party last month. The group is posing in front of a photo display depicting* ***Bill's*** *career.*

John Hughes Clarke Delivers Talk Entitled "Imaging Water Mass Variability in Coastal Environments"

By Bill Danforth

John Hughes Clarke, from the University of New Brunswick, Canada, visited the Woods Hole Field Center and gave a talk entitled "Imaging Water Mass Variability in Coastal Environments" at the Woods Hole Oceanographic Institution on January 30. **John** provided the following abstract to describe his presentation:

"As marine surveyors increasingly switch to wide-swath multibeam sonar systems, so their sensitivity to local changes in the sound-speed field is increasing. To maintain bathymetric accuracy levels at the decimeter scale (now required for precise monitoring of seabed change), they need a far greater understanding of the medium they work in. Previously water-mass sampling at time scales of hours and length scales of tens of kilometers was acceptable, but they now require minutes and hundreds of meters.

"This demand is almost equivalent to having a complete understanding of the local oceanographic variability. We will show the scale of the problem, current methods of addressing it, and our most recent results from multifrequency acoustics used to image the location and timing of rapid water-mass changes."

Seminar on Deltas by Postdoctoral Scholar at Woods Hole Science Center

By Jeff Williams

Deltas, sedimentary landforms that occur along continental margins where rivers discharge sediment to the oceans, have been studied for many decades to understand their origins and evolutionary history and as models for better understanding ancient buried delta deposits that are important for energy exploration. Research has shown that such factors as the volume of river-sediment discharge to the coast, the volume and direction of long-shore transport, tidal range, sea-level history, and wave energy and direction control the three-dimensional form and architecture of deltas.

Deltas are receiving renewed attention because they are low-relief regions, commonly densely populated and important for agriculture and extremely vulnerable to accelerated rise in relative sea level forecasted for the near future as a result of climate warming. The USGS has conducted geologic framework and process studies of the 300-km-wide Mississippi River delta plain for more than a decade to understand coastal erosion, wetland loss due to complex natural and manmade processes, habitat change, and, more recently, subsidence as a major factor in relative sea-level rise. Results from these USGS studies are being used as baseline science information for the Louisiana ecosystem-restoration program currently underway.

In a talk on February 20, 2002, entitled "Wave-Dominated Deltas," **Liviu Giosan**, a postdoctoral fellow at the Woods Hole Oceanographic Institution (WHOI), presented new ideas on the evolution and sedimentary records of wave-influenced deltas around the world. In addition to reviewing past delta studies, **Liviu** presented results of his own, ongoing research on the deltas of the Danube River (which flows into the Black Sea off Romania) and the Brazos River (which flows into the Gulf of Mexico off Texas). **Liviu** will continue his coastal research for the rest of his postdoctoral appointment and will collaborate with USGS scientists and others to organize a delta session for this fall's annual Geological Society of America meeting (Oct. 27–30, 2002, Denver, CO).

Recently Published Articles

Barton, C.C., 2001, Scaling of rock fractures [abs.]: Eos (American Geophysical Union Transactions), v. 82, no. 47, p. F569.

Barton, C.C., Manheim, F.T., DeCola, F.L., Bollinger, J., and Jenkins, J.A., 2001, Complex behavior of contaminant flux and the ecology of the Lower Mississippi River [abs.]: Eos (American Geophysical Union Transactions), v. 82, no. 47, p. F196.

Brewer, G.M., Dadisman, S.V., Flocks, J.G., Weise, D.S., and Davis, J.B., 2001, Archive of boomer seismic reflection data collected during USGS cruise 99LCA01 Crescent Beach Spring, Florida, 26 April–27 April, 1999: U.S. Geological Survey Open-File Report 01-355, CD-ROM (1 disc).

Brewer, G.M., Morton, R.A., and Weise, D.S., 2001, Archive of boomer seismic reflection data collected during USGS cruise 99SCE01 Little River Inlet to the entrance of Winyah Bay, South Carolina, 8 June–16 June, 1999: U.S. Geological Survey Open-File Report 01-326, CD-ROM set (5 discs).

Dismukes, J.S., Barton, C.C., and Morton, R.A., 2001, Nonlinear analysis of unevenly sampled shoreline position signals [abs.]: Eos (American Geophysical Union Transactions), v. 82, no. 47, p. F567.

Fisher, R.N., Suarez, A.V., and Case, T.J., 2002, Spatial patterns in the abundance of the coastal horned lizard: Conservation Biology, v. 16, no. 1, p. 205-215.

Helgerud, M.G., Waite, W.F., Kirby, S.H., and Nur, A., 2001, Laboratory measurement of compressional and shear wave speed in polycrystalline sI and sII gas hydrates and ice as functions of temperature and pressure [abs.]: Eos (American

(Recently Published continued on page 11)

(Recently Published continued from page 10)

Geophysical Union Transactions), v. 82, no. 47, supp., p. F603.

Kellogg, C.A., Griffin, D.W., Garrison, V.H., Peak, K.K., Smith, R., and Shinn, E.A., 2002, African dust microbes; an inoculum for coral reef diseases? [abs.]: Eos (American Geophysical Union Transactions), v. 83, no. 4 (Ocean Sciences Meeting supplement), abstract OS31C-35.

Kindinger, J.L., Davis, J.B., and Flocks, J.G., 2002, Seismic stratigraphy of the central Indian River region: U.S. Geological Survey Open-File Report 97-723 [URL: **http://coastal.er.usgs.gov/stjohns/indianriver**].

McGinnis, T.W., and Emslie, S.D., 2001, The foraging ecology of Royal and Sandwich Terns in North Carolina, USA: Waterbirds, v. 24, no. 3, p. 361-370.

Polloni, C., Tripp, B., and Truesdale, P., 2001, An illustrated environmental bibliography for Buzzards Bay, Massachusetts: U.S. Geological Survey Open-File Report 98-050 version 2, CD-ROM [re-released].

Poppe, L.J., Paskevich, V.F., Hastings, M.E., and Hathaway, J.C., 2001, A pictorial survey of benthic character and habitats along the U.S. east coast on CD-ROM [abs.]: Eos (American Geophysical Union Transactions), v. 82, no. 47, p. 593.

Schwab, W.C., 2002, Sand distribution on the inner shelf of Long Island, New York: U.S. Geological Survey Fact Sheet FS-136-01.

Thieler, E.R., Pilkey, O.H., Jr., Cleary, W.J., and Schwab, W.C., 2001, Modern sedimentation on the shoreface and inner continental shelf at Wrightsville Beach, N.C.: Journal of Sedimentary Research, v. 71, no. 6, p. 958-970.

Williams, R.S., Jr., 2000, A modern earth narrative—what will be the fate of the biosphere?: Technology in Society, v. 22, p. 303-339.

Publications Submitted for Director's Approval

Brock, J., Wright, W., Gesch, D., Crane, M., Hansen, M., and Sallenger, A., Development of methods for the integration of high resolution topographic and bathymetric lidar surveys of the Tampa Bay region [abs.]: Gulf Coast Association of Geological Societies meeting, Austin, TX, October 30–November 1, 2002.

Colman, S.M., and Bratton, J.F., Quantitative estimates of anthropogenically induced environmental changes in Chesapeake Bay: Science.

Edgar, N.T., Jacobson, G.L., Holmes, C.W., and Swarzenski, P.W., and McNeal, J.M., Prehistory elemental mercury concentration for the last 70,000 years; Lake Tulane, Florida [abs.]: American Society of Limnology and Oceanography meeting, Victoria, B.C., Canada, August 8, 2002.

Flocks, J.G., Kindinger, J.L., and Swarzenski, P., Sediment-hosted contaminants and distribution patterns in the Mississippi and Atchafalaya River systems [abs.]: USGS Karst Interest Group Workshop, 1st, St. Petersburg, FL, February 12–16, 2001.

Garrison, V., Foreman, W., Majewski, M., Holmes, C., Shinn, E., Smith, R., and Ranneberger, M., Timbuktu meets coral reefs; chemical contaminants in African dust [abs.]: Eastern Fish Health Workshop, 27th, Charleston, SC, March 18–22, 2002.

Gelfenbaum, Guy, Gardner, J.V., van den Ameele, E.J., Barnhardt, Walter, Lee, H.J., and Palmer, Steve, Assessing damage on the major submarine deltas of southern Puget Sound after the 2001 Nisqually earthquake using high-resolution seafloor multibeam mapping [abs]: Geological Society of America (GSA), Cordilleran Section meeting, Corvallis, OR, May 13–15, 2002.

Griffin, D.W., Detection of microbial indicators and human microbial pathogens in artificial recharge studies [abs.]: USGS Artificial Recharge Workshop, Sacramento, CA, April 2–4, 2002.

Griffin, D.W., Kellogg, C.A., Garrison, G.H., and Shinn, E.A., Long range transport of sediment in the atmosphere and its implications for global public and ecosystem health [abs.]: International Society for Ecosystem Health Conference, Washington, D.C., June 6–11, 2002.

Griffin, D.W., Kellogg, C.A., Garrison, V.H., and Shinn, E.A., Transoceanic transport of airborne sediments and global health: Review article for American Scientist.

Halley, R.B., Eleven things a geologist thinks an engineer should know about carbonate beaches: American Society of Civil Engineers.

Harris, C.K., and Butman, B., Sediment redistribution in the New York Bight; influence of wind-forced currents, energetic waves, and topography [abs.]: American Geophysical Union-American Society of Limnology and Oceanography, 2002 Ocean Sciences, Honolulu, HI, February 11–15, 2002.

Hermsen, J.M., Collie, J.S., and Valentine, P.C., Effects of fishing activity on scavenging invertebrates on Georges Bank: Journal of Estuarine Research.

Kindinger, J., Penland, S., Flocks, J., Kulp, M., and Britisch, L.D., Sand resources, regional geology, and coastal processes for shoreline restoration; case study of Barataria Shoreline, Louisiana [abs.]: Gulf Coast Association of Geological Societies meeting, Austin, TX, October 30–November 1, 2002.

Kvenvolden, K.A., Methane hydrate in the global organic carbon cycle—the biogeologic control of methane [abs.]: Geological Society of America (GSA), Cordilleran Section meeting, Corvallis, OR, May 13–15, 2002.

Normark, W.R., and Reid, J.A., Extensive turbidite deposits on the Pacific plate generated by outbursts from glacial Lake Missoula [abs.]: Geological Society of America (GSA), Cordilleran Section meeting, Corvallis, OR, May 13–15, 2002.

Raabe, E.A., Harris, M.S., Shrestha, R.L., and Carter, W.E., Morphology of a marsh-dominated coast determined from airborne laser in Eastern Gulf of Mexico [abs.]: Gulf Coast Association of Geological Societies meeting, October/November 2002, Austin, TX, October 30–November 1, 2002.

Raabe, E., and Kovach, C.W., Water-depth, seagrass, algae, and bottom type mapped with airborne multi-spectral imagery in Tampa Bay [abs.]: Gulf Coast Association of Geological Societies meeting, Austin, TX, October 30–November 1, 2002.

Shinn, E.A., Reich, C.D., and Hickey, T.D., Staghorn coral mystery of the Florida Keys: Coral Reefs.

Swarzenski, P., Sutton, P., Porcelli, D., and McKee, B., The estuarine chemistry and isotope systematics of $^{234,238}U$ in the Amazon and Fly Rivers: Continental Shelf Research.