

Fieldwork

Voyage to Recover and Redeploy Instruments in the Adriatic Sea—the Good, the Bad, and the Ugly

By Chris Sherwood

U.S. Geological Survey (USGS) scientists and technicians took part in a recent voyage (mid-February to early March) to recover data from instruments deployed last fall in the Adriatic Sea (see article “USGS Participates in Sediment-Transport Cruise in the Adriatic Sea” in the December 2002/January 2003 *Sound Waves*). The midwinter cruise was a continuation of the PASTA (Po and Apennine Sediment Transport and Accumulation) study. PASTA is a component of EuroSTRATIFORM, a research program using selected areas of the European continental margin to explore the fate of sediment particles from their sources in rivers to their deposition on shallow deltas, on the continental shelf, and in deep-sea basins. This article summarizes successes and problems encountered during the recent voyage.

The Good: USGS instruments deployed last fall have produced a spectacular record at our two sites off the Chienti River in Italy. Virtually complete records of waves, currents, temperature, salinity, and suspended-sediment concentrations between late November and mid-February were recovered from our instruments during the recent PASTA voyage on the Harbor Branch Oceanographic Institution’s research vessel *Seaward Johnson II*. These records document the persistent coastal current responsible for transporting sediment, nutrients, and contaminants southward along the Italian coast. Even two new instruments that had never been in saltwater before provided valuable records for the first part of the deployment. **Dave Rubin** and **Hank Chezar**’s sediment microphotography device (see article “The ‘Poking Eyeball’—a Prototype Underwater Camera System,” this issue) yielded



Microphotograph of bottom sediment at 9-m depth off the Chienti River. The fecal pellets contain fine sediment and were not present in some photographs after a strong Bora event (northeasterly storm). The mineral grains are coarse silt to very fine sand. Field of view is approximately 7 mm across.



Turbid plume of the Chienti River merges with the less turbid coastal current at the 9-m-depth site, about 1 km offshore of the Italian town Civitina.



Slightly bent legs of the barnacle-encrusted flow tripod from the 9-m-depth site attest to encounters with fishing gear.

intriguing photos of bottom sediment at the 9-m-depth site. The high-resolution scanning sonar, built by **Chris Sherwood** and

Marinna Martini (USGS) with help from **Jim Irish** and **Robin Singer** at the Woods

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Submission Guidelines

Deadline: The deadline for news items and publication lists for the May issue of *Sound Waves* is Wednesday, April 16.

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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Fieldwork, continued

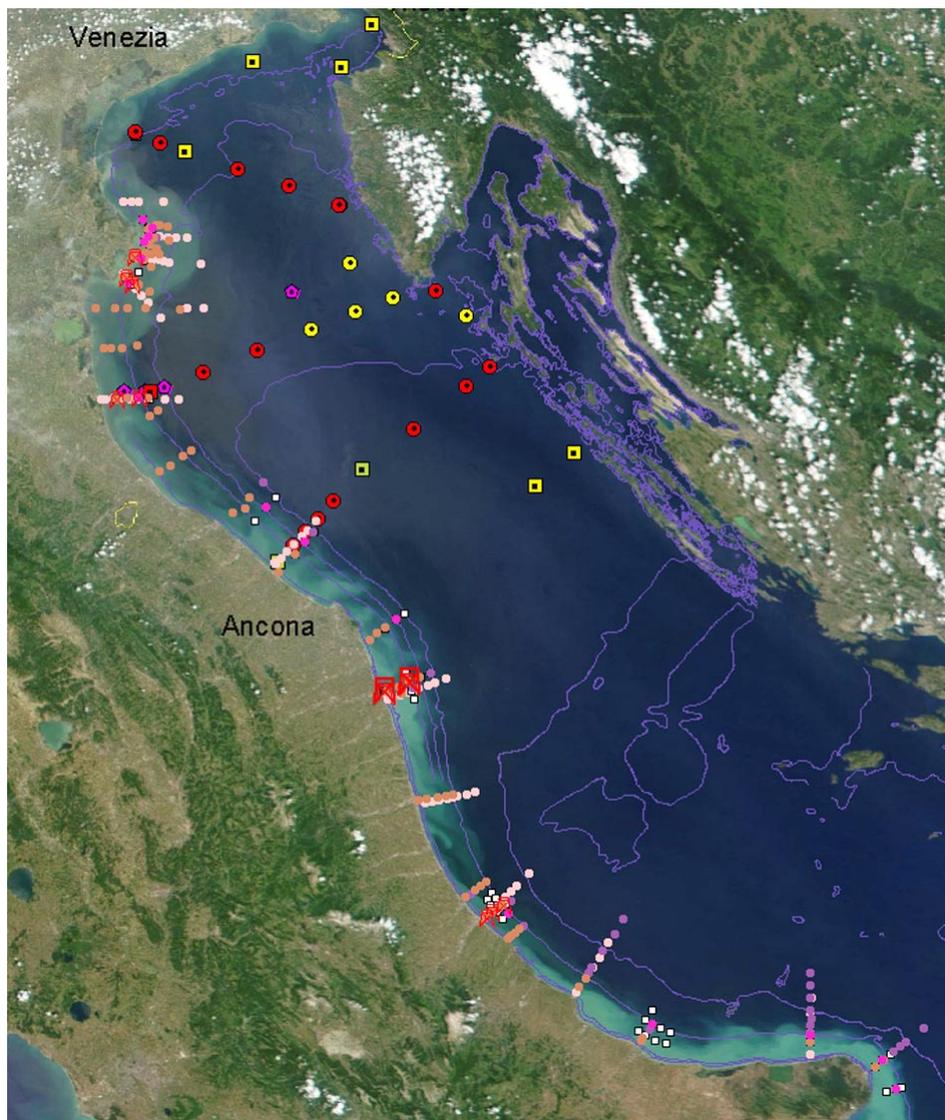
(Adriatic Sea Voyage continued from page 1)

Hole Oceanographic Institution (WHOI), revealed bottom conditions that shifted between small ripples and upper plane-bed conditions. The tripods were recovered by WHOI divers, with backup from USGS divers **Chuck Worley** and **Dann Blackwood**. **Chuck** and **Dann** dove to clear a line (not ours!) from the ship's propeller and ran sidescan-sonar surveys of the instrument sites.

The Bad: Fishing pressure from small trawlers presents a major danger to

oceanographic instruments off the Italian coast, and all three of our tripods had been hit at some point. One tripod was toppled on St. Valentine's Day (3 days before we recovered it!), the second was rotated 180 degrees early in the deployment and left slightly bent but fully operational, and the third was lifted briefly off the bottom but left in place. Despite these bumps and bangs, we got complete data sets (minus 3 days at one site). Other EuroSTRATAFORM investigators had worse luck: two

(Adriatic Sea Voyage continued on page 3)



Satellite image of the Adriatic Sea taken by a Moderate Resolution Imaging Spectroradiometer (MODIS), showing sites of measurements by the EuroSTRATAFORM program, the U.S. Naval Research Laboratory's Adriatic Circulation Experiment (ACE), and Italy's ADRIACOSM (ADRIatic sea integrated Coastal areaS and river basin Management system pilot project). A persistent and turbid coastal current runs from the Po River Delta (protruding near top left on image, just south of Venezia) to the Gargano Peninsula (bottom of map). USGS tripods are red towers just south of Ancona.

Fieldwork, continued

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other tripods were toppled earlier in the experiment, and four buoys were damaged or moved. Overall, the instrumentation array fared quite well, with nearly complete records from eight bottom-mounted sites, partial records from two more sites, and complete loss of data at only one site.

The Ugly: Biological fouling was pretty impressive, highlighting the excess-nutrient problem that plagues the Adriatic Sea. Some of our optical instruments shifted to barnacle-growth-rate sensors after the first month, but the acoustic sensors were mostly unaffected. The USGS team on board (which included **Chuck, Dann, Hank, Marinna, Chris, and Joanne Ferreira**) scraped and pressure-washed the instruments, downloaded data,

made some quick repairs, changed batteries, reapplied the antifouling paint, and redeployed everything for 4 more months. Final recovery from the same ship will occur in late May–early June.

We owe much of our success in this turnaround to folks at the Marine Operations Facility in Woods Hole, MA (**Dave [Twig] Nichols, Jonathan Borden, and Rick Rendigs**), and their counterparts at the Marine Facility in Redwood City, CA (**Dave Hogg, Dave Gonzales, Kevin O’Toole, and Hal Williams**). These guys built and shipped the instruments (and critical spare parts and batteries) on a tight schedule. The WHOI divers (**Jay Sisson and Glenn MacDonald**) were heroic, diving in cold water with strong cur-

rents and zero visibility to recover the tripods. Luckily, **Stefano Miserochi** (one of our Italian coinvestigators) navigated to the sites with even better precision than his differential global-positioning system (DGPS) is theoretically capable of. The captain and crew of the research vessel *Seward Johnson II* were outstanding, and **Chuck Nittrouer** (University of Washington) was responsible for coordinating the whole project and the difficult logistics of an overseas cruise involving 21 principal investigators from 11 institutions. The study is funded by the Office of Naval Research and the USGS Coastal and Marine Geology Program’s Community Sediment-Transport Modeling project. ❁

Research

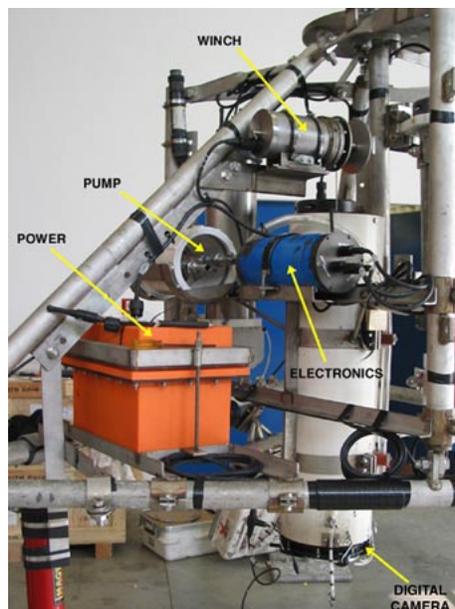
The “Poking Eyeball”—a Prototype Underwater Camera System

By Hank Chezar and David Rubin

A prototype underwater camera system has been developed by U.S. Geological Survey (USGS) scientists to take repetitive microscopic images of the seabed from a tripod on the sea floor. The images, which record changes in seabed sediment over time, are used in studies of how changes in sediment grain size influence rates of sediment movement. Understanding sediment movement is important to applied research—about sea-floor habitats, for example, or about pollutants, which move like sediment—and to basic research about the sea floor.

The camera system was developed as part of the multinational Strataform Project, a program funded by the Office of Naval Research that seeks to understand geologic processes on the continental shelf and slope that form sedimentary strata over a continuum of scales. Dubbed the “Poking Eyeball,” the system performed well in its first sea trial, begun last fall during a cruise to investigate sediment transport in the Adriatic Sea (see article “Voyage to Recover and Redeploy Instruments in the Adriatic Sea,” this issue).

The new camera system consists of five major components: power pack, water



Prototype system before deployment, showing major components.

pump, digital camera, electronic controller, and miniwinch, all designed to be mounted on a tripod that sits on the sea floor. So as not to interfere with the current flow or with other data-gathering instruments on the tripod, the camera is winched up and down



Prototype camera system covered with barnacles after 101 days on the sea floor.

1 m from a protective housing every 12 hours. The electronic controller, a modified 12V lawn-irrigation timer, determines the up-and-down movements and the bottom-pause time for the winch motor. The winch

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motor is connected to a spool with a line attached to the camera housing to raise and lower it to the seabed. The camera housing, about 10 lb negatively buoyant, contacts the seabed and remains there for about 4 minutes. During this time, the camera's internal timer triggers the camera and a synchronized ring-light flash and the camera takes one photograph. The electronic controller then raises the camera back into its protective polyvinyl chloride (PVC) housing. A mercury switch located at the top of the PVC housing triggers the electronic controller to stop the winch once the camera housing has reached its topmost position. The electronic controller also determines the start and stop times of a water pump, which circulates pressurized seawater through a series of tubes to the front window of the camera housing, keeping it



sediment free. The water pump operates four times each day for 1 minute, just before and after the camera's twice-daily contact with the seabed.

A Canon D60 digital camera with a 6.3-megapixel CMOS (complementary metal-oxide semiconductor) sensor is the heart of the imaging system. The lens, which is capable of 1X to 5X magnification and surrounded by a ring-light flash, produces well-focused images, resolving grain sizes in the silt range, shell fragments, and feces trails and pellets. After last fall's deployment in the Adriatic Sea, the system successfully operated for 8 days until strobe power and winch malfunction shut the system down. Although 8 days was not the duration of operation we had hoped for (we had hoped the camera would operate for



Images of the seabed taken by the prototype camera system at 9-m depth in the Adriatic Sea, showing silt-size sand grains, shell fragments, and fecal matter. The two photographs were taken 2 1/2 days apart. Their fields of view (approx. 7 mm across each photograph) may cover the same piece of sea floor or pieces of sea floor as much as 2 or 3 cm apart, owing to movement of the camera as it was lowered 1 m to the seabed.

the full 101 days that the tripod was on the sea floor), the design concept was proven to work. Some repair work and system reconfiguration enabled us to redeploy the Poking Eyeball on February 19. We will assess the reconfigured system's performance after it is recovered in late May.

This system and its concept build on a previous system (a.k.a. the "Flying Eyeball"; see article in June 2001 *Sound Waves*) that uses low-resolution video technology to capture underwater black-and-white microscopic images of sand on a seabed or riverbed. The added features of the new system are:

- much higher resolution and magnification,
- digital color imagery,
- geologic and biologic data collection, and
- sampling repeatability over the same seabed site.

Special thanks to the staff of the USGS Marine Facility (Marfac) in Redwood City, CA, for their engineering, mechanical, and logistical expertise in helping get this baby out the door. Considering the short, 2-month timetable to get the entire package together, and that last fall's deployment in the Adriatic Sea was its first saltwater deployment, we think all involved in the new system's production can be proud of its initial results. ❁

Outreach

Pelican Pete Travels the World—USGS Center in St. Petersburg, FL, Assists in the Celebration of the City's 100th Anniversary

By Dennis Krohn

The City of St. Petersburg, FL, location of the U.S. Geological Survey (USGS)'s Center for Coastal and Watershed Studies



(CCWS), is celebrating its 100th anniversary of incorporation as a city, in cooperation with its sister city, St. Petersburg, Russia, which is celebrating its 300th anniversary. As part of the festivities, the Florida city is sponsoring a

*Poster of Pelican Pete at the Parque Nacional Isla del Coco in Costa Rica, where USGS scientist **Ginger Garrison** conducts research. **Ginger** presented her colleagues in Costa Rica with the poster in honor of the 100th anniversary of the city of St. Petersburg, FL, which has the pelican as its mascot and is the location of the USGS' Center for Coastal and Watershed Studies.*

contest to send a poster of its mascot, Pelican Pete, to localities around the world. CCWS scientists and their children and colleagues are contributing to the effort. Here is a poster of Pelican Pete at the Costa Rican National Park, Parque Nacional Isla del Coco, on the Pacific side of the island (lat. 5°N., long. 87°W.), 350 mi southeast of Puntarenas, Costa Rica. **Ginger Garrison** of the CCWS presented the poster, colored by **Hannah Krohn**, to her colleagues in Costa Rica. **Ginger** is working on a revised compilation of all the fish found in reefs of the national park. ❁

Woods Hole Field Center Staff Participate in Massachusetts Maritime Academy High School Environmental Symposium

By Erika Hammar-Klose and Seth Ackerman

The U.S. Geological Survey (USGS)'s Woods Hole Field Center (WHFC) contributed to the Ninth Annual High School Environmental Symposium, sponsored by the Massachusetts Maritime Academy (MMA). The event was held at MMA's Cape Cod Canal campus (Buzzards Bay, MA) on February 28 under the direction of **Christopher Ryan**, **Jim Watkins**, and **Fuji Fulgueras**, the MMA symposium coordinators. Approximately 200 students and teachers departed for behind-the-scenes tours of the Woods Hole scientific community as part of the symposium. **Seth Ackerman** (WHFC), who organized the field trip in Woods Hole, led students and teachers to the first stop on the field trip, Megansett Beach in West Falmouth, MA.

At Megansett Beach, **Tony Williams** of the Coalition for Buzzards Bay discussed water quality on Cape Cod (for more information, see URL <http://www.savebuzzardsbay.org>). The coalition's objective is to pursue the restoration and protection of the bay ecosystem through direct citizen advocacy and through the regulatory and legal process at local, State, and Federal levels.

Stops in the Woods Hole Village included:

- the National Oceanic and Atmospheric Administration (NOAA)'s National Marine Fisheries Service (NMFS) Woods Hole Science Aquarium,
- the Marine Biological Laboratory (MBL)'s Marine Resources Center,
- the Woods Hole Oceanographic Institution (WHOI)'s research vessel *Oceanus* and Applied Ocean Physics and Engineering department, and
- a talk about the types of research done at the USGS WHFC, given by **Ellen Mecray** and **Elizabeth Pendleton**.

George Liles of NOAA/NMFS made the Woods Hole Science Aquarium (see URL <http://www.nefsc.noaa.gov/nefsc/aquarium/>) available for a tour. The animals in the aquarium are representative of local marine populations and those on Stellwagen Bank. The students toured



Tony Williams discusses water quality with a group of chilly students on snow-covered Megansett Beach.



Hank Maude shows off some of MBL's critters.

the work areas behind the display tanks, where they were able to handle some of the critters. The Marine Resources Center at the MBL in Woods Hole is a state-of-the-art facility where scientists can conduct research on aquatic organisms, supply field-collected aquatic organisms for use in research and education, provide veterinary medical care to aquatic organisms, and conduct basic research into the causes, treatment, and prevention of diseases affecting aquatic animals (see URL <http://www.mbl.edu/services/MRC/>). **Bill Mebane**, **Catherine Hemmerdinger**, and **Steven Roberts** gave a video presentation on MBL's research, and **Hank Maude** and **Ed Enos** gave students a tour of the Tank Room, where MBL stores various aquatic organisms in saltwater tanks.

Hovey Clifford and **John Dyke** gave a tour of one of WHOI's main research vessels, the research vessel *Oceanus* (see URL http://www.whoi.edu/marops/research_vessels/index.html). **Hovey** described the equipment configuration on the ship and then showed students the main labs and the bridge. **John Kemp** gave an overview of WHOI's engineering projects in the Applied Ocean Physics and Engineering department, where engineers design a wide array of instruments, vehicles, and observing systems that extend the reach of

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Hovey Clifford shows MMA symposium participants the labs and the bridge on WHOI's research vessel *Oceanus*.

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WHOI scientists and the entire oceanographic community (see URL <http://www.whoi.edu/science/AOPE/dept/>).

Ellen Mecray and **Elizabeth Pendleton** of the USGS WHFC gave talks about the many projects that USGS scientists work on in Woods Hole (see URL <http://woodhole.er.usgs.gov/>). They described the diverse science we do here in Woods Hole and the various places we work, including many of the underwater areas between shorelines and deep water off the U.S. east coast and the Gulf of Mexico and in parts of the Caribbean and Great Lakes. **Elizabeth** and **Ellen** highlighted sea-floor mapping, the SWASH (Surveying

Wide-Area Shorelines) system, geochemistry, and National Assessments; they educated the students on the USGS' role within the Federal Government; and they discussed their personal career paths.

Feedback from the students, their teachers, and parents has been very positive. The students had an exciting time exploring Woods Hole, its labs, and its ships. Thanks to everyone who helped out! ❁



Ellen Mecray (left) and Elizabeth Pendleton present USGS WHFC research to the MMA symposium participants.



Meetings

The National Special Emphasis Program Advisory Committee (SEPAC) Annual Meeting

By **Jamey M. Reid** and **Quenton Smith-Costello**

The Special Emphasis Program Advisory Committee (SEPAC) of the U.S. Geological Survey (USGS) held its annual meeting on February 26, 2003, using USGS cyberseminar technology. The SEPAC was established in 2001 to enhance the USGS mission, vision, strategic direction, and diversity goals and objectives, fostering a positive cultural change; and to ensure an open and communicative environment for the cross-cultural exchange of information and ideas. The committee's cybermeeting was held in place of a face-to-face meeting that was scheduled for the week of February 24-28, 2003, but was postponed until next summer because of uncertainties about the Fiscal Year 2003 budget.

Participants at February's cybermeeting were able to attend by using a computer, with the appropriate software, to log onto the USGS cyberseminar Web site to view slide presentations, and dialing into a telephone conference bridge to hear presentations and take part in discussions. The technology worked smoothly, helping the participants to have a highly successful meeting.

February's meeting served primarily as a collective progress report, enabling SEPAC members to stay abreast of national and regional issues and tasks. It was attended by approximately 40 USGS employees, including the three Deputy Regional Directors, the Chief of Administrative Policy and Services, staff members from the Office of Equal Opportunity (OEO), managers, contractors, and others. Participants logged in from throughout the country, in places that ranged from Hawaii to New Hampshire.

Joan Fitzpatrick, Deputy Regional Director for the Central Region and the management representative for the Central Region SEPAC, moderated the meeting. **Kaye Cook**, Personnel Officer, gave welcoming remarks and an update about the reorganization of the Department of Interior (DOI)'s Equal Employment Office (EEO), describing its function, purpose, and proposed structure. She also informed the group that **Robert E. Doyle** has been appointed the new Deputy Director, and mentioned some action items relating to SEPAC in the Human Resource Action Plan.

The regional SEPACs presented findings on the four topics each had been tasked to study: advancement, development, recruitment, and retention.

The Headquarters SEPAC, tasked with advancement, stated a primary objective of benchmarking (identifying, understanding, and adapting outstanding practices of) other Federal agencies and the private sector in regard to barriers, best practices, and lessons learned. The Headquarters SEPAC also requested and analyzed relevant statistical data from the OEO and will formulate a summary with recommendations, as well as develop a final report.

The Eastern Region SEPAC, tasked with development, stated that its purpose and scope is to examine USGS career-development programs, policies, and procedures and how they have affected women, minorities, and people with disabilities since their implementation. The Eastern Region SEPAC's approach has been to evaluate data sets over a 10-year period (1992-2002) with respect to leadership development and opportunities for career-building training and develop-

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mental assignments, and to collect input from employees who have separated from the USGS.

The Western Region SEPAC, tasked with recruitment, stated that its objective is to analyze policies, practices, and procedures which may present barriers to the recruitment and hiring of employees belonging to a Special Emphasis Program (SEP) focus group. The eight SEP focus groups are the Federal Women's Program, the Hispanic Employment Program, the Disability Employment Program, the African American Employment Program, the American Indian/Alaskan Native Employment Program, the Asian American/Pacific Islander Employment Program, the Gay/Lesbian/Bi-Sexual Employment Program, and the Multi-Cultural, Multi-Racial, and Other Ethnic Group Employment Program. The Western Region SEPAC also gave an update on a possible partnership with San Francisco State University on evaluating governmental diversity programs.

The Central Region SEPAC, tasked with retention, stated that its scope is to study, evaluate, and recommend strategies for changing programs, policies, and

procedures that hinder the retention of diverse and underrepresented categories of employees within the USGS. The Central Region SEPAC identified methods to assist with their task, including training, collection of exit-interview data, and establishment of partnerships.

The SEPAC subcommittees related to communication and networking also gave presentations. The Networking team recommended a successful network for communication to and from regional management, the OEO, SEPAC, focus groups, and USGS employees. The Communications team recommended several types of communication tools and programs consisting of seminars, Web sites, printed media, SEP messages, and diversity programs and activities.

The final presentation of the meeting was the recently completed SEPAC Strategic Plan. For a copy, please contact any of the chairs listed below. To read the chapter on SEPAC in the online U.S. Geological Survey Manual, visit URL <http://www.usgs.gov/usgs-manual/300/308-59.html>.

The overarching duty of the SEPAC is to advise and link with management to develop, articulate, and communicate the business case for embracing workforce

diversity within the USGS. SEPAC strives to accomplish this by:

- analyzing policies, practices, and procedures that may present barriers to the recruitment, retention, development, and advancement of target groups;
- developing and maintaining internal and external networks to gather information;
- increasing awareness and enhancing expertise; and
- educating and informing others about SEP activities.

For more information about the SEPAC, see additional articles in the September 2001 and May 2002 issues of *Sound Waves*, contact the National SEP Manager, **John Szemraj**, at 703-648-7011, or contact the following chairpersons for specific regions:

Headquarters:

Celso Puente, 703-648-5601

Eastern Region:

Jamey Reid, 508-457-2204

Central Region:

Richard Shields, 303-202-4382

Western Region:

Paul Okubo, 808-967-8802 ☘

Awards

USGS Scientist Receives Ed Ricketts Marine Science Award



Chris Harrold (right), Director of Research and Conservation at the Monterey Bay Aquarium, gives **Jim Estes** the Ed Ricketts Award, presented yearly to individuals who have exhibited exemplary work throughout their career and advanced the status of knowledge in the field of marine science.

U.S. Geological Survey (USGS) scientist **James A. Estes** received this year's Ed Ricketts Award during the Monterey Bay National Marine Sanctuary Symposium at California State University, Monterey Bay, on March 15, 2003. **Estes** is an internationally recognized expert on sea otters and a specialist in the critical role of apex, or top-level, predators in the marine environment.

Since 1986, the Ed Ricketts Memorial Lecture has honored individuals who have exhibited exemplary work throughout their career and advanced the status of knowledge in the field of marine science. Recipients are selected by the Monterey Bay National Marine Sanctuary Research Activities Panel.

"I am delighted to be a recipient of this award," said **Estes**, who is a USGS

research wildlife biologist at the Western Ecological Research Center's field station in Santa Cruz, CA. **Estes** also holds academic posts as research associate and adjunct professor with the Biology Department, Environmental Studies Department, and Institute of Marine Sciences at the University of California, Santa Cruz.

Estes gave the Ricketts Memorial Lecture titled "Defaunated Food Webs: Vertebrate Consumers and Nature's Balance." Research Activities Panel chair **Chris Harrold** of the Monterey Bay Aquarium introduced **Estes** and presented the award to him immediately after the lecture.

"**Jim** has conducted ground-breaking research on sea otters and other marine

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mammals for over 30 years,” said **Harrold** in praise of **Estes**. “Much of what we know today about sea otters and their interactions with nearshore marine ecosystems comes from his pioneering work in the Aleutian Islands and the subsequent work done by him and his students. His knowledge about marine mammals and ecosystems is broad and deep, and his research interests range from the ecology and evolution of kelps to reasons for the rise and fall of the great whales. He worked recently with several collaborators in reconstructing long-term effects of human exploitation on marine ecosystems.”

Estes’ interest in predation as an ecosystem-level process began in the early 1970s, shortly after he began working with sea otters. Using the otters’ fragmented distribution across the Aleutian Archipelago, which resulted from a history of near-extinction and recovery, he discovered the species’ keystone role in kelp forests by contrasting islands where the otter was abundant or rare. This work provides one of the better-known examples of how apex predators influence ecosystem function.

These early findings led **Estes** to explore the spatial, temporal, and functional dimensions of sea-otter/kelp-forest interactions over the next 30 years. **Estes’** most recent research addresses the unanticipated collapse of sea otters and kelp forests in western Alaska. He is currently involved with studies designed to better understand the vexing problem of decline in the threatened California sea otter.

Estes has published his research in more than 100 journal articles and book chapters. He earned the following degrees: a B.A. in zoology at the University of Minnesota in 1967, an M.S. in zoology at Washington State University in 1969, and a Ph.D. in biological sciences and statistics from the University of Arizona in 1974.

Two of his landmark journal articles are:

- **Estes, J.A., Tinker, M.T., Williams, T.M., and Doak, D.F., 1998, Killer whale predation on sea otters linking coastal with oceanic ecosystems: Science, v. 282, p. 473-476** (see a summary in the USGS press release at URL <http://www.werc.usgs.gov/news/1998-10-15.html>).

- **Jackson, J.B.C., Kirby, M.X., Berger, W.H., Bjorndal, K.A., Botsford, L.W., Bourque, B.J., Bradbury, R., Cooke, R., Erlandson, J., Estes, J.A., Hughes, T.P., Kidwell, S., Lange, C.B., Lenihan, H.S., Pandolfi, J.M., Peterson, C.H., Steneck, R.S., Tegner, M.J., and Warner, R., 2001, Historical overfishing and the recent collapse of coastal ecosystems: Science, v. 293, p. 629-638** (see a summary in the USGS press release at URL <http://www.werc.usgs.gov/news/2001-07-26.html>).

Additional information about **Estes** and his research can be found at URL <http://www.werc.usgs.gov/santacruz/estes.asp>.

Ed Ricketts died more than 50 years ago, yet this marine biologist who never earned a college degree still inspires followers with his book *Between Pacific Tides*. **Ricketts** pursued his research from a laboratory in Monterey, CA, where fishermen, biologists, and writers alike visited him. He was the inspiration for the character “Doc” in **John Steinbeck’s** novel *Cannery Row*. ❁

Staff and Center News

Geochemist Frank T. Manheim Retires from the USGS

By Jeff Williams, with inputs from Frank’s friends and colleagues

After a distinguished career as a senior research geochemist with the U.S. Geological Survey (USGS) spanning nearly 4 decades, **Frank Manheim** has decided to “officially” retire, but expects to remain active and writing about science-related activities and national and international policy. **Frank** started his career on January 1, 1964, in Woods Hole, MA, when plate tectonics was a fresh and highly debated theory and marine geochemistry was in its infancy. During his career, **Frank** has been a leader in marine geochemistry and in understanding environmental sedimentary systems. He has also led in research on hard minerals in the marine realm, in studies of the role of hydrology in coastal-plain regions, and, more recently, in

the design of sediment data bases incorporating legacy data sets into relational data-base-management systems for mapping and interpreting sea-floor regions.

Frank has long been known for having boundless enthusiasm and “thinking big”; he is especially skilled at coupling new scientific hypotheses and ideas with cutting-edge technology. **Frank** wrote classic papers on Baltic Sea geochemistry, shallow-water ferromanganese deposits, world-ocean ferromanganese crusts, and Blake Plateau phosphorites and manganese deposits, all of which are still widely cited.

In addition to publishing more than 190 papers and reports, **Frank** has developed innovative equipment and techniques during his research. Pore-water squeezers developed for the world-ocean Deep Sea

Drilling Project in 1968 are still standard equipment for the current International Phase of Ocean Drilling (IPOD) program and are used by USGS water-resources scientists for ground-water studies. In the early 1990s, **Frank**, working with **Jack Hathaway** and later **Marilyn ten Brink**, developed novel techniques for compiling chemical data bases for coastal contaminated sediment, using heterogeneous sources. Aspects of the approach have been adopted nationally by the U.S. Environmental Protection Agency.

Frank was a leader in student and minority recruitment at the USGS Woods Hole Field Center, an interest he has continued at USGS headquarters in Reston, VA. He was a professor and chairman of

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(Frank T. Manheim Retires continued from page 8)

the College of Marine Science, University of South Florida, and an adjunct professor at State University of New York (SUNY), Stony Brook. **Frank**, one of the pioneers

in marine geochemistry, has a career to be proud of. For the next stage in his life, **Frank** will be an emeritus scientist with the USGS in Reston, VA, and an affiliate

professor in the School of Public Policy of George Mason University in Fairfax, VA. ❁

Science and Fiction—Sarah Andrews, Author of *Killer Dust*, Discusses Her Latest Mystery Novel

By Dennis Krohn

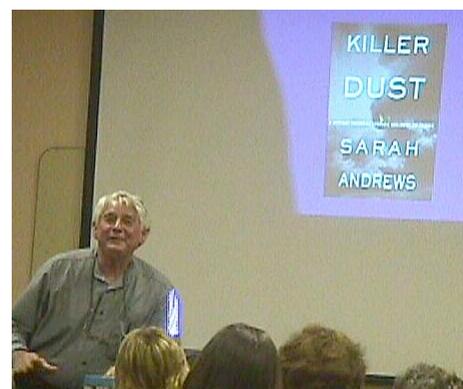
Sarah Andrews, mystery writer, college teacher, and former U.S. Geological Survey (USGS) employee, gave a talk about her



Sarah Andrews speaks to members of the Association of Women Geoscientists on her career as a mystery novelist. Pictured is the cover from *Tensleep*, her first mystery.

latest novel, *Killer Dust*, to the Association of Women Geoscientists (AWG) at the USGS Center for Coastal and Watershed Studies in St. Petersburg, FL, on February 28. **Sarah's** novel is based on the research of USGS scientist **Gene Shinn** and his interest in the effects of African dust on marine and human ecosystems. (See related article, "Radio Interview Explores African Dust, Human Health, and Mystery Novels," in March 2002 *Sound Waves*.)

Although many characters and localities may be recognizable to some readers, the book is a work of fiction—but not science fiction, as **Sarah** points out—and is only a reflection of the real world. *Killer Dust* is **Sarah's** eighth novel featuring series heroine and forensic geologist Em Hansen as she solves murders that highlight Earth-science issues. **Sarah** gave a wide-ranging talk on her career, how Earth scientists



Gene Shinn, playing his character Miles Guffey (resemblance to persons living or dead is purely coincidental), discusses colleagues in the book and his "helping" **Sarah** write *Killer Dust*.

think, and how she chooses a plot topic. The AWG audience was thrilled and stayed around for a spirited question-and-answer session and book signing. ❁

Publications

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Baldwin, W.E., Morton, R.A., Denny, J.F., Schwab, W.C., Gayes, P.T., and Driscoll, N.W., 2003, Surface and subsurface geologic mapping within South Carolina's Long Bay, between Little River and Winyah Bay: Southeast Coastal Ocean Science Conference and Workshop, Charleston, S.C., January 27-31, 2003, Program with Abstracts, p. 90.

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