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florida Geology *forum*



A Newsletter from the Florida Geological Survey

florida STATEMAP program

(Cooperative Effort: FGS, U.S. Geological Survey, Okaloosa-Walton Community College, and Florida Museum of Natural History)

The STATEMAP Program is a cooperative program funded jointly by the FGS and the National Cooperative Geologic Mapping Program (NC-GMP) under the State Geologic Mapping Component (STATEMAP). This program is designed to produce new geologic maps for selected regions throughout the country. For each of the last ten years, staff members from the FGS have performed detailed geologic mapping of 1:100,000 scale USGS quadrangles throughout Florida and published the results as part of the Open-File Map Series. The primary product, created annually by this project, is a surficial bedrock geologic map of a given area, along with stratigraphic cross sections and a secondary geologic map such as a surficial sediments map or detailed stratigraphic column representative of the study area.

Study areas are considered for mapping based upon recommendations from the State Geologic Mapping Advisory Committee (SMAC). This committee, which is comprised of representatives from various governmental agencies, universities, and the private sector, meets annually. The committee weighs factors such as urban growth, potential water use, aquifer vulnerability, environmental sensitivity, and geologic complexity to choose a map area. The western portion of the Gainesville USGS 1:100,000 scale quadrangle was selected and subsequently approved by the NCGMP, as the current STATEMAP 2003-2004 study area. Based on the 2003 recommendations of the SMAC, the NCGMP recently awarded the FGS funding to map the eastern portion of the Gainesville USGS 1:100,000 scale quadrangle for 2004-2005.

In 2002-2003, FGS staff geologists **Richard Green, William L. Evans III, David Paul**, together with **Dr. Jonathan Bryan**, a staff geologist and Chairman of the Science Department of the Oka-



Will Evans carefully holding the rescued Barred Owl after crew members untangled it from the abandoned catfish line on the bank of the lower Suwannee River (photo by Rick Green)

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Lower Suwannee River Expedition Crew: front row (left to right), Jon Bryan, Rick Green, Dave Paul, Jim Balsilie and Tom Greenhalgh. Back row (left to right), Roger Portell, Jim Ladner, and Will Evans (photo by Rick Green)

loosa-Walton Community College, produced a geologic map, surficial sediments map, and several cross sections of the eastern portion of the 1:100,000 scale Marianna Quadrangle. This completed the geologic mapping of the entire 1:100,000 scale Marianna Quadrangle which began in 2001. These maps and cross sections are available through the FGS Open-File Map Series (OFMS 91 and 92).

In September of 2003, the FGS began working on the bed-rock geologic map, cross sections and a detailed stratigraphic column of the western portion of the Gainesville USGS 1:100,000 scale quadrangle. Field mapping began in October, with a planned completion date of August 2004. The geologic map, cross sections, and stratigraphic column for this area will be available through the FGS Open-File Map Series beginning in October of 2004.

As part of the field mapping for this project, staff from the FGS STATEMAP, Coastal Research, and Hydrogeology Programs, together with **Dr. Bryan**, and **Dr. Roger Portell** of the Florida Museum of Natural History, recently completed an extensive geologic mapping expedition of the lower Suwannee River system located within the study area. Utilizing two scout/support boats and a live-aboard vessel used

as a base of operations, expedition geologist mapped over 100 miles of the lower Suwannee River and approximately 10 miles of the western portion of the Santa Fe River. This included the collection of numerous geologic samples and rescue of a young Barred Owl that had been hopelessly snared in an abandoned catfish line along the banks of the Suwannee River.

National Cooperative Geologic Mapping Program - AASG Mentoring Program



Jake Halfhill, 2003 AASG mentored student, examining a cavity in the Hi-Cal Limestone Quarry located in Marianna, Florida (photo by Rick Green)

Beginning in 1999, the FGS entered into a cooperative agreement with the Association of American State Geologists (AASG) designed to provide mentored field training for students interested in learning geologic mapping techniques. This student mentorship program provides funding for the students in the form of a \$3,700 award. The bulk of this award is paid to the student as a stipend, with \$500 used for expenses while in the field.

Once a student is selected for the program, personnel from the FGS STATEMAP Program begin training the student in a variety of mapping techniques. This training typically includes several days of "hands on" field work, the use of various computer programs and laboratory description of cores and well cuttings throughout the study area. Upon completion of the program, the student is required to provide a written report on the mentored experience and an oral presentation on the geology of the STATEMAP study area to the FGS staff and other interested earth science professionals.

Jake Halfhill, an undergraduate at Florida State University majoring in geology and a Sergeant in the United States Marine Corps Reserves, was the recipient of the AASG 2002-2003 mentored student award. Jake was a credit to the mentored student program and performed all of his assignments in an outstanding manner. Information on Jake's mentored experiences, as well as student reports from around the country, may be seen on the AASG web site at http://kgsweb.uky.edu/AASG/student_list.htm

Coastal Research Program

The Coastal Research Program is nearing the end of the second year of a five year program designed to assess available potential sand resources off Florida's northeast coast beaches. Work accomplished this quarter includes the collection of over 190 miles of subsurface acoustic profile data. This consists of a reconnaissance survey offshore of the northern half of St. Johns County and infill and tie line data collected off Nassau and Duval Counties. The computer then processes all subsurface acoustic profile data collected in years 1 and 2, and additional beach sampling to establish a baseline characterization of "native" beach sands in the study area. A total of 63 beach sampling locations were identified and 127 points sampled. Beach sample locations were spaced at an approximate one mile interval, every fifth beach monument survey point where practicable, along the beaches of St. Johns and Flagler Counties.

Jim Ladner collecting a beach sample from a back beach. (photo by Dan Phelps)



Geological Assessment of the Florida Big Bend Coastal Wetlands

This on-going project, initiated in July 1991, collects geologic data for use by federal, state and local agencies in developing effective wetland preservation programs. It focuses on characterizing the wetland processes of the estuaries of the Aucilla, Apalachicola, Steinhatchee, St. Marks, Waccasassa and Ochlockonee Rivers utilizing Sediment Elevation Table (SET) measurements of marsh elevation and accretion changes over time. An analog to these estuaries is provided by monitored sites in the Ace Basin, South Carolina and Cumberland Island, Georgia.

The Big Bend marshes are experiencing a local mean sea level rise of 1.5 to 2.5 millimeters (mm) per year. The effect this has on the marsh surface is dependant on a number of variables including sediment supply, storm events and marsh subsidence. Current measurements indicate that the marsh surface is not keeping up with this rate of sea level rise. The on-going comparison of these estuaries enables better prediction of natural systems' response to changes that are both natural (sea level change) and human-induced (increasing upland development).

Jim Ladner, FGS geologist freeze coring to measure sediment accumulation. (photo by Dan Phelps)



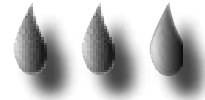
Educational Outreach

Community Classroom after School Program

On October 29 **Paulette Bond**, a Professional Geologist with the FGS, and **Greg Ira**, Director of DEP's Office of Environmental Education, hosted an after school field trip to the Oakland Cemetery for students participating in the Community Classroom after school program. Students from elementary through middle school heard a short talk on various historical aspects of the cemetery before separating into teams. Teams visited a freshly cut tree and counted its growth rings in order to determine its age. They also visited various grave markers and calculated ages from dates of birth and death. They also examined symbols carved into grave markers. Students who did not participate in the fieldtrip worked on coloring sheets designed to illustrate vocabulary terms associated with sinkholes and volcanoes. The afternoon ended with trick-or-treating in celebration of Halloween.

For more on Educational Outreach see page 10

FGS Hydrogeology Program



This winter, the FGS Hydrogeology Program continued to make progress on a variety of in-house projects as well as out-sourced research. Much of the focus is in the area of springs, hydrogeologic modeling and aquifer storage and recovery (ASR).

Dr. Rick Copeland and **Tom Greenhalgh** are assessing the effects of land-use on the water quality of Fanning Springs through use of a monitoring network in cooperation with the Suwannee River Water Management District (SRWMD). Outsourced cooperators for the project include Soil and Water Engineering Technology, Inc., which will provide land-use nutrient loading data to the project, and **Dr. Brian Katz** of the US Geological Survey, who is conducting a hydrochemical evaluation of the Fanning Springs springshed. **Tom Greenhalgh** and **James McLean** are also working with the SRWMD to locate and characterize offshore springs.

Research conducted by **Drs. Jon Arthur, Adel Dabous** and **Jim Cowart** (FSU) on water-rock interaction during ASR was presented by **Dr. Arthur** at the Underground Injection Science and Technology Conference at Lawrence Berkeley National Laboratory in October. Their paper "*Water-rock geochemical considerations for aquifer storage and recovery: Florida case studies*" will be published in a special peer-reviewed volume later this year. The FGS is looking forward to cooperating with the South Florida Water Management District, Camp Dresser and McKee, Inc. and the University of South Florida on ASR projects in the coming months. Outsourced projects involving microbiology of ASR storage zones (see USGS collaboration below) and ASR modeling (with **Dr. Eberhard Roeder**) in dual porosity carbonate settings are underway.

Two major mapping projects applying GIS modeling are near completion: the cooperative hydrogeologic framework study with the Southwest Florida Water Management District and the DEP-funded Florida Aquifer Vulnerability Assessment (FAVA) project. Moreover, an extension of the FAVA project, applying Neural Networks, is being conducted by **Dr. Barnalli Dixon**, University of South Florida. For more information on these projects or on activities of the FGS Hydrogeology Program, contact **Dr. Jon Arthur** at the FGS. Additional hydrogeology outsourcing activities are summarized below.

Research in collaboration with Florida State University:

Understanding the dynamics of water flow and surface water contribution to the Wakulla Springs system

This project is a continuation of the ongoing study initiated in 2002. It investigates variations in discharge measured at the springs system and cross-correlates these variations with events that affect the system flow such as storms, draw down of Lake Jackson etc.

The proposed research project consists of two phases, each with five tasks. The first phase (roughly coinciding with the first year of the project) focuses on the data which has been previously collected by the Northwest Florida Water Management District. The second phase (to be completed in subsequent years) will focus on the data to be collected by a set of newly purchased meters currently being installed. Several flow meters have been purchased from Falmouth Inc. which are being placed in predetermined locations in the spring conduits by divers. The meters will measure flow rates and direction, temperature and pressure and report results at frequencies measured in seconds. We hope that statistical analysis of the long term data will enable us to determine the sources and quality of water reaching the spring system. This information may eventually establish a cause and effect relationship between land use activities, natural events and water quality changes in the spring system.

Ground water tracing experiments in the Woodville Karst Plain

This project is also a continuation of previous studies funded by the Hydrogeology Program in the Woodville Karst Plain in an effort to increase scientific understanding of surface water – ground water interactions. It is hoped that this study will lead to the development of conceptual, analytical and numerical models for ground water flow and contaminant transport in karstic settings. Specifically, Hazlett-Kincaid Inc., (HKI; subcontractors to FSU) will use EPA-approved fluorescent dyes in an attempt

to systematically evaluate the connection between Wakulla Spring and selected sinkholes north of Ames Sink, as well as Indian and Sally Ward Springs. The tracer tests are being performed such that progressively longer probable flow paths are confirmed until the final connection can be evaluated.

This contractor will be responsible for constructing a new database, or modifying the existing cave database, to accommodate dye tracing data from this project as well as other dye tracing data from around the state. The FGS will be responsible for populating and administering the database once it is established.

Quantification of ground water discharge to coastal and riverine systems using radon and radium isotopes

Remote sensing surveys conducted by FGS subcontractor SenSyTech, Inc., in 2002/2003 identified "hot spots" of groundwater discharge to both fresh and saline surface waters in Florida. The objective is to provide tracer based estimates of the volume of ground water being discharged in these locations, under conditions of non-point source diffusive flow. This study will also evaluate the tracer approach for determination of point source or spring discharge.

To carry out this task, **Drs. Burnett** and **Chanton** of FSU's Department of Oceanography will use distributions and inventories of Rn and Ra isotopes to estimate ground water discharge rates in a marine system with diffuse flow and a freshwater riverine system with diffuse flow. They will also evaluate the effectiveness of this approach for measuring discharge in a spring system with point source flow. Ground-truthing will be performed in the diffuse systems with automated seepage meters already assembled by the research team.

Development of ground water flow model and non-point source contaminant transport model in Karst: Initial Phase

The need to develop a model for ground water movement and contaminant transport in karst has been a priority for researchers in the field of ground water hydrogeology. HKI has cooperated with the principal investigator, **Dr. David Loper** (FSU), to develop a model and has achieved promising results with the probabilistic method and the use of FEFLOW (Finite Element Flow, a groundwater flow model) in the Woodville Karst Plain. This project, led by HKI, will build upon the progress made to date by using a hydro-geo-chemical approach that evaluates both the impacts of the spring-cave systems on the groundwater flow and nitrate transport, which are both major issues in the area. The project will address an initial phase of work to be completed by end of 2004. Pending continuation of federal funding, the second phase will be completed in FY 2005.

The project will be piloted in the Fanning and Manatee springsheds, where water quality and water flow data are being collected by the Suwannee River Water Management District.

Research in collaboration with the University of West Florida

The overall hypothesis behind this study is that microbial communities of the cave/aquifer systems will reflect contamination from surface sources in both abundance of biomass and community structure. Using biofilms grown on glass slides for this analysis instead of single grab water samples integrate water quality conditions over the growth period, and better reflect the type of habitat most important to microorganisms in pristine systems. We also expect that new species of both prokaryotes and eukaryotes will be discovered, which may be useful in tracking water quality history of the systems. These analyses will employ a mixture of culture and molecular techniques aimed at both species and community level characterizations. The study will also assess the presence and source of allochthonous bacteria indicative of fecal contamination by humans or other warm-blooded animals.

The initial study sites will coincide with three wells accessing the Manatee Springs system and three wells accessing the Wakulla Springs system. These wells were drilled by the FGS, which also installed tubing and power sources to allow for sample collection and analysis on the surface as well as for continuous data recording in situ. In situ data gathering is achieved by flow meters, installed directly in the spring conduits by divers retained by the FGS. The meters are designed to measure water flow, temperature and specific conductance. Divers have attached slides to the meters to allow for long term biofilm growth. Divers will also collect scrapings of potential bacterial growth on the walls of the conduits for speciation and genetic typing. Other water samples will be collected at the wellheads to analyze for additional water quality parameters.

Research in collaboration with the US Geological Survey, St. Petersburg

Characterization of the microbial ecology in ASR systems

The focus of ongoing research in aquifer storage and recovery (ASR) microbiology in Florida is currently on perspective of public health. These efforts are designed to address regulatory issues, such as survival of indicator microorganism and pathogen survival, but do not address how the indigenous microbial populations in the native aquifer waters are affected. An understanding of how the native microbial populations are impacted by the injection of treated water from facilities providing public drinking water or recycled wastewater is important. The native microbial population is responsible for alterations in the geochemistry of the aquifer system, not those microorganisms of public health concern. For example; the concentrations of organic carbon, nutrients and oxygen that are being injected into the native aquifer are relatively high and these changes in the nutrient and dissolved gases availability will shift the microbial community structure to one that favors those bacteria that can more rapidly utilize the new nutrient and oxygen sources. Such shifts in the community and chemical equilibria in the native and stored waters may enhance geochemical processes, such as trace metal mobilization, and contribute to the deterioration of the quality of the stored water and reduction in ASR well productivity.

This project, conducted by **Dr. John Lisle**, US Geological Survey, will provide baseline genetic and physiological characterizations of the native microbial populations in the selected aquifer waters. These data will be of critical importance during the monitoring of ASR systems if issues other than those of regulatory interest (e.g., arsenic mobilization, decreased well production, pathogen survival) are to be addressed. Collectively, these baseline data will provide a standard to which future samples collected from the ASR systems can be compared.

Questions or comments on any of the outsourced projects described above maybe directed to the outsourcing project manager at the FGS Hydrogeology Program, **Dr. Rodney S. DeHan**.



FGS 2003 Award Luncheon

The 2003 FGS Annual Awards Luncheon was held on February 24, 2004, at Tia's Tex Mex Restaurant. **Tom Greenhalgh** was the Master of Ceremonies and announced the following awards:

Team Extra Effort Awards:

The LCS/FGS Cooperative Program Team – **Steve Spencer, Paula Polson, Cris Poarch, and Jeremy Poarch;**

The FGS Springs Team – **Ryan Means, Rebecca Meegan, Robby Jones, and Alan Willett;**

The Manatee Springs Conduit Team – **Harley Means, Tom Greenhalgh, Ken Campbell, Eric Harrington, Robby Jones, Bridget Coane, Clint Kromhout, Lee Booth, David Paul, and Alan Willett;**

The STATEMAP Suwannee Team – **Jim Ladner, Jim Balsillie, Rick Green, Will Evans, Tom Greenhalgh, and David Paul.**

Individual Extra Effort Awards: **Jim Balsillie, Erin Dorn, Rick Green, Jim Ladner, Harley Means, Rebecca Meegan, Frank Rupert, Carolyn Stringer, and Wade Stringer.**

FGS Employee of the Year Award: **Cris Poarch**.

Congratulations to all the 2003 Award winners!

The Chief's Corner

by **Walt Schmidt**

Professional Geology – Not Just for Scientists Anymore! Think... "Marketing"

The professional geology community is classically comprised of individuals who tend to keep to themselves and don't socialize and attend large meetings often. They like solitary field work and enjoy the outdoors where they can do "hands-on geology" and maybe take samples back to the lab or office to contemplate or write-up field notes. Too often when we do gather together, we solicit validation from our peers and we "preach to the choir" on earth science and environmental conservation issues when we are already in the same corner.

The Board of Professional Geologists just added three new members, and they immediately had to get up to speed on proposed legislation that will impact licensed professional geologists. While this is not their job as board members, they were able to contribute to the discussion that will impact all Florida PG's. Some of our university geoscience departments are suffering a drop in student enrollment. In fact, as I write this the University of Connecticut is proposing to drop the Department of Geology and Geophysics (the premiere department in the state) due to funding priorities. FSU is reviewing their Geosciences Department to determine if it should remain a stand alone program. The mining and oil & gas industries are clearly in a down turn nationally and in Florida. At one time this was the major employment market for geologists. In recent decades the environmental consultant arena and contaminant/waste clean-up industry has dominated hiring in the Florida geosciences community. In fact, that wave of activity 20 years ago was the reason licensing of Florida PG's passed the Legislature – to insure qualified professionals contribute to the protection of our water resources.

My point is, so much of this apparently unrelated outside activity, not linked to everyday geology, is in reality critical to the livelihood of our geosciences profession. Geologists must reallocate their weekly work load to incorporate a small percent of their time to geoscience outreach and education. Our elected and appointed officials, our colleagues from other professions, and the public need our input to assist with understanding earth systems as they struggle to understand environmental and natural resources issues. Geoscience issues often serve as a critical foundation to environmental regulatory decisions, land-use decisions and planning, geologic hazards mitigation, contamination and waste clean-up, water resources protection, minerals exploration and production, sustainable development or environmental conservation. Geologists have much to offer and they must become proactive to share their knowledge and offer their insight. Not only can it be financially rewarding, it will increase the odds of various environmental engineering projects being successful if they are based on competent geoscience. Involvement increases the professional respectability and personal self-worth of those offering such assistance. We live in a state where the environment and our pristine natural resources are extremely visible in public policy and significant to our economic well-being. The geoscience community must step up and offer what we can, timely and on task when appropriate. Our apathy as a profession must change!



The FGS Website

New look

The DEP's Office of Communications and Bureau of Information Systems has implemented a new design for the DEP website. The new design updates the current look and gives all the websites within the DEP system expect to see changes in the look and navigation this April. For questions on the FGS website please contact **Paula Polson** at

paula.polson@dep.state.fl.us

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FGS - Geochemistry Project Update



In 1998 the Florida Geological Survey (FGS) collaborated with the U.S. Geological Survey (USGS) to undertake a statewide systematic survey and elemental analyses of stream-sediment and upland-sediment samples. FGS staff completed the bulk of the statewide sediment sampling in the first phase of the program. This initial phase collected 1557 samples and used the UTM coordinate system and a ten square kilometer cell grid to locate sampling sites. A second phase of the project was smaller in scope but collected approximately 732 samples in the St. Marks watershed region. This phase of sampling utilized cells that were one square mile in size. In all, over 2,100 samples were collected and analyzed by various means for 40 minor and trace elements.

The Florida data were combined with similar data from all 50 States to form a first time comprehensive database available at <http://tin.er.usgs.gov/geochem/doc/home.htm>. The information can be used to determine naturally occurring levels of chemical elements in stream sediments (which serve as representative samples from the respective watershed) and to detect regional chemical anomalies that may affect human health. The new site also includes analyses of samples archived from previous USGS studies and samples collected by USGS scientists in collaboration with state and federal agencies, academia, and industry.

This version of the online report provides complete access to National Geochemical Survey (NGS) data, describes the history of the project, the methodology used, and presents preliminary geochemical maps for all analyzed elements. Future editions of this, and other related reports, will include the analytical results of variance studies, as well as interpretive products related to the NGS data.

News from the Florida Association of Professional Geologists



The FAPG is very pleased to announce increasing membership and significant activity regarding legislation in support of Florida's licensed Professional Geologists. Please see the FAPG web site at <http://www.fapg.org> for current information regarding FAPG-initiated bills in the House and Senate for Session 2004! In support of its legislative efforts, the FAPG is sponsoring a Legislative Day at the Capitol on April 12 and 13, 2004. For more information, contact FAPG President, **Dr. Jon Arthur** at jarthur45@comcast.net.



ASR IV Forum, April 15 and 16, 2004, Tampa, Florida

The FGS, the American Ground Water Trust (AGWT) and the Hydrogeology Consortium are co-convening the fourth in a series of technical forums focusing on aquifer storage and recovery. The event, co-sponsored by the International Association of Hydrogeologists, will be held in Tampa, Florida on April 15 and 16, 2004. This two day forum will focus on ASR science, technology, management and policy issues and will feature more than 25 speakers. Each day of the meeting will end with an open forum discussion to allow all participants to share ideas and make recommendations regarding this important water-resource alternative. Watch your inbox and the FGS web site for more information. Details will also be available at the AGWT website: <http://www.agwt.org>.

National Ground Water Association Field Trip

On December 12, 2003, **Dr. Tom Scott**, Assistant State Geologist for Geological Investigations, co-led a field trip for the National Groundwater Association at its annual convention in Orlando, December 9-12, 2003. **Mr. Irvin Kety** from the Dunedin Water Treatment Plant was the other co-leader. Dr. Scott provided a geologic travelogue as the bus journeyed from Orlando to Homosassa Springs, Dunedin, Tampa and back to Orlando. Mr. Kety presented information and answered questions on the reverse osmosis process used for water treatment in Dunedin, Florida. The field trip visited Homosassa Springs, the Dunedin low pressure reverse osmosis water treatment facility and the Tampa Bay desalination facility. Forty participants attended the field trip.



Rainbow Springs

FGS Participates in Marion County Spring Festival

On September 27, **Harley Means**, FGS Geologist, represented the Florida Geological Survey by staffing a booth at the second annual Marion County Springs Festival. The Festival was held from 10am to 4pm at Rainbow Springs State Park near Dunnellon, Florida. His presentation "*Where Does Our Springs Water Come From?*" gave an overview of the geology of the springs that flow into the Rainbow Springs basin. Rainbow Springs is a magnitude-one spring that produces approximately 500 million gallons of clear water each day.

Harley also spoke on the Florida Springs Initiative, a DEP program to investigate springs-related issues.

Dr. Tom Scott and **Mr. Harley Means** provided a lecture to the participants of the Department of Health's Onsite Disposal Workshop in Tallahassee, November 19 and 20, 2003. The lecture "*An overview of Florida's Geology and Hydrology*" focused in particular on the karstic areas of the state. Workshop participants were treated to a field trip to Lake Jackson, the City of Tallahassee Southeast Spray Field and Ames Sink where a stream disappears underground.

Ames sink (photo by Tom Scott)



Events, Presentations and Conferences

The Florida Springs Task Force will hold a three day meeting at Wakulla Springs on May 11-13. This event will consist of a field trip on the 11th, led by **Tom Pratt** (NFWFMD) and **Jim Stevenson** (former Task Force Chairman); Task Force Meeting on the 12th; and a symposium discussing ongoing research within the Woodville Karst Plain on the 13th. The meeting will take place at the Wakulla Spring Lodge within the Wakulla Spring State Park. Registration is required for the field trip and the symposium. Contact either **Mike Bascom** (michael.bascom@dep.state.fl.us) or **Gary Maddox** (gary.maddox@dep.state.fl.us) for registration information.

Richard Green and **William L. Evans**, the co-principal Investigators for the STATEMAP Program, will present a poster session entitled: Surficial and Bedrock Geology of the Eastern Portion of the U.S.G.S. 1:100,000 Scale Marianna Quadrangle, Northwestern Florida, at the Florida Academy of Sciences Meeting in Orlando, in mid-March.

On May 28-31, the Cave Diving Section of the National Speleological Society (NSS-CDS) will sponsor a workshop at the Paramount Resort Hotel in Gainesville, entitled "*The Science of Cave Diving*". The FGS will assist the NSS-CDS by giving presentations, participating on panels and assist with the compilation and distribution of panel notes. The four-day workshop will bring together cave divers, scientists, regulators, private landowners, and researchers to explore cooperative opportunities for the cave diving and scientific communities in the management and protection of our karst environment. For detailed information on this workshop see the FGS website at http://www.dep.state.fl.us/geology/newsevents/science_cave_div.pdf

ASR IV Forum, April 15 and 16, 2004, Tampa. See page 9 for details.

Educational Outreach

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Holy Comforter Day School

On January 6 FGS geologists, **Tom Greenhalgh** and **Paulette Bond** assisted **Greg Ira**, Director of the DEP Office of Environmental Education, in presenting the concepts of the water cycle, watersheds and springsheds to middle school students at Holy Comforter Day School. The students were participating in a special week-long enrichment project led by Greg Ira and entitled "*Water Week*" before beginning their spring semester. Field trips, hands-on laboratory activities, journal exercises aimed at developing writing skills, and guest speakers gave students fresh insight into environmental science.

Talk at Wakulla Springs

On January 26 FGS geologist **Paulette Bond** presented a talk on Wakulla Springs and its geology to about 50 high school students and their teachers. The talk was held at Wakulla Springs State Park and provided students with an environmental context for their field exercise. While at the park students collected soil samples from various settings and made notes to document them. Upon returning to the classroom, the soils were tested for a number of chemical parameters.

FGS Educational Outreach in Incirlik Air Base, Turkey

On January 5, we received a request for educational information in support of 8 and 9 grade science classes. That in itself was not unusual. What was unusual was that the students are the sons and daughters of U.S. Air Force personnel stationed at Incirlik Air Base, Turkey. The teacher told us that, "Due to the large number of air bases in Florida, most of the students had lived in Florida for a few years and about a quarter of them consider it "home"."

Following, are e-mail messages from **Jack Graham**, Earth Science Teacher at Incirlik American High School, regarding our support of their efforts:

"This is AWESOME! I asked for a few e-mails now and then about your work and you are sending me a gold mine of things for which I have no other source. I cannot thank you enough. The kids thank you. DoDDS thanks you. This real world connection has given me a better way to answer the common question What's this good for? that students always ask as I start a new unit. I know I sound a bit effusive, but I really mean it and just don't know how better to say it than Thank You!"

"We have received the *Florida's Geology Unearthed* video tape which I have started using in my Earth Science classes. We are finishing a unit on industrial minerals and sources of chemical elements. The videotape and supporting materials book is a great help in presenting the mineral mining concepts we have been talking about. I was very pleased to find the Florida's Industrial Minerals chart in what you sent me and immediately posted it. My students discovered that several of the mineral samples we investigated last week are listed and pictured on the chart with some additional information about them that we had not discussed. This led to a very lively discussion of phosphates versus elemental phosphorus and fertilizers versus explosives."

"We are starting a unit on Geologic History so I posted the three posters you sent us that describe the geologic history of Florida in eye catching color. The one showing the eras, epochs, and periods matches the one in our Earth Science book and further reinforces the concepts of the fossil record."

"The Karst land form maps and wall charts will help with explaining Karst landforms which will be presented as we discuss the fossil record, mineral leaching, deposition, sedimentation, and why our local Turkish water is so hard. The video also helps show how these geological ideas all interrelate."

"On behalf of my students here at Incirlik Air Base, Adana, Turkey, THANK YOU!"

New Publications at the FGS

- Poster 11 – Florida's Sinkholes, 2004, compiled by Frank Rupert and Steve Spencer, illustrates the locations of reported sinkholes in Florida, the primary sinkhole zones statewide, types of sinkholes, and the processes that form them.
- Special Publication 51 – Workshop to Develop Blue Prints for the Management and Protection of Florida's Springs, 2004, Workshop Proceedings, May 8-9, 2002, Ocala. Available as a CD.
- Special Publication 53 – Significance of Caves in Watershed Management and Protection in Florida, 2004, Workshop Proceedings, April 16-17, 2003, Ocala. Available as a CD.
- Video Series 2 - Florida's Aquifer Adventure- available in DVD and video. A 20 minute film which describes Florida's aquifer systems, springs, caves and environmental issues.

For ordering instructions and forms: visit the FGS website at <http://www.dep.state.fl.us/geology> click on *publications* on the left then click on the *list of publications, order form and ordering instructions* link.

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FGS Web Statistics

The FGS web site continues to have a large amount of traffic. During the third week of January 2004 (which is a typical week) we had 3,752 visitors to our site with 6,747 pages viewed. The most frequently visited page is the home page followed by the Data and Maps page, and the new Florida Rocks pages.

What's new!

Florida Rocks is a new addition to the web site and can be found at http://www.dep.state.fl.us/geology/geologictopics/rocks/florida_rocks.htm. Within these pages you will find the most common rocks and minerals in Florida. Each rock or mineral has a great picture along with a description. Another recent addition is the *Florida Spring Classification System and Spring Glossary* this is a pdf file and can be opened at this address <http://www.dep.state.fl.us/geology/geologictopics/springs.htm>.

STATE OF FLORIDA
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FLORIDA GEOLOGY FORUM
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The *Florida Geology Forum* is designed to reach a wide range of readers interested in the geology and natural resources of Florida. Reproduction is encouraged with proper recognition.

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