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florida Geology forum



A Newsletter from the Florida Geological Survey

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Nitrate Trends in Selected Second Magnitude Springs of Florida

*This article is the abstract of a paper being presented by **Harley Means** at the SEGSA in Memphis co-authored by **Rick Copeland & Tom Scott***

Florida's more than 700 springs are natural treasures which provide recreation and enjoyment to millions of people each year. Over the past 55 years, the Florida Geological Survey (FGS) has periodically sampled and analyzed water from selected springs across the state. As part of the Florida Springs Initiative, the FGS has recently sampled spring water from Florida's 33 first magnitude springs and published the newly acquired data in comparison to historic data in order to document changes in water quality over time. The FGS documented increasing trends in nitrate levels in the first magnitude springs when compared to historic nitrate levels.

Following the sampling effort of the first magnitude springs, the FGS sampled selected second magnitude springs. Data from second magnitude springs were analyzed using the Mann-Kendall and the Wilcoxon Signed-Ranks tests. Both tests are nonparametric. The Mann-Kendall test was used to check for a monotonic trend over time for nitrate from an individual spring. The Wilcoxon Signed-Ranks test was used to compare nitrate data from all sampled second magnitude springs during any time step (e.g. 2002) to a previous step (e.g. 1985). Nitrate trends similar to those seen in the first magnitude springs were observed.

The documenting of increasing nitrate levels in Florida's springs by the FGS, and other state and federal agencies has prompted research efforts aimed at pinpointing nitrate sources. The Florida Primary Drinking Water standard for nitrate is currently 10 mg/L. However, concentrations of as little as 1 mg/L of nitrate have caused significant alteration in the ecology of some springs and spring runs. Currently, the Florida Springs Initiative is funding further research into nitrate trends and sources and is working to develop best management practices for springsheds that have been impacted by elevated nitrates.



Second Magnitude Spring
Fern Hammock Spring

Nitrate found in spring water originates from fertilizers, septic tanks and animal waste that enters the aquifer in the spring recharge area. Nitrate, being a nutrient, encourages algal and aquatic plant growth in spring water, which may lead to eutrophication of the spring and associated water body. When nitrate levels exceed 10 mg/L in drinking water, it is potentially hazardous to infants, causing methemoglobinemia or "blue baby syndrome".

Florida Springs Conference

“Natural Gems - Troubled Waters”

The second Florida Springs Conference, entitled “Natural Gems – Troubled Waters” was held at the Sheraton Hotel in Gainesville on February 5th thru the 7th, 2003. This conference was sponsored by the Florida Department of Environmental Protection and attended by almost 400 professionals and private citizens. The conference agenda included field trips to the Ichetucknee Springs State Park and the Santa Fe River recharge basin, concurrent speaker sessions, invited guest speakers and the premier of film maker **Wes Skiles**’ new documentary video: *Waters Journey*. A diverse range of topics were discussed by speakers with springs and spring protection being the common theme. A summary of some of the FGS contributions are presented in this newsletter below.

Governor **Jeb Bush** established the Florida Springs Initiative, the first comprehensive, coordinated approach for springs protection.

The Initiative encourages public-private partnerships and landowner assistance, expanding participation in springs protection.

Reprinted from a letter written by David B. Struhs published in the Florida Springs Conference Program

Water Quality and Residence times of Ground Water in Springs of the Middle Suwannee River Basin: by **T. H. Greenhalgh**

Excess nutrients primarily from agricultural activities are causing algal mats and periphyton blooms in the Suwannee River and its estuary. Forty-five percent of the Suwannee River’s present nitrate load enters the river in an area designated as the Middle Suwannee River Basin (MSRB). The management strategy in place to address agriculture’s ground water nitrate loadings in this area is through the use of “best management practices” (BMPs). Based on spring water age dates obtained from chemical and isotopic techniques, it has been stated that it will be a decade or longer before the effects of the “best management practices” will be discernible.

Discharge measurements and water quality samples were obtained from two third magnitude springs in the MSRB between March 2000 and August 2001. Variation in ground water discharge and loads of nitrate-nitrogen, potassium, sulfate and the detection of parent herbicides (atrazine and metolochlor) indicate a component of the springs’ discharge is recent aquifer recharge and has a residence time of weeks to several months. Thus, if the employed BMPs are effective in reducing nutrient loads, it should be discernible in a much shorter time frame than the apparent age of the spring discharge as determined by chemical and isotopic dating techniques.

Preliminary Springshed Maps for Florida’s First Magnitude Springs: by **T. H. Greenhalgh**

The Florida Geological Survey’s Hydrogeology Program is working in conjunction with hydrogeologists from the Northwest Florida, Suwannee River, St. Johns River and Southwest Florida Water Management Districts and the U.S. Geological Survey to produce preliminary springshed maps for Florida’s first magnitude springs. A “*springshed*” is defined as “those areas within groundwater and surface-water basins that contribute to the discharge of the spring.” The purpose of these maps will be to inform and assist citizens and government in making proper decisions on their activities and land uses within these springsheds. These maps are being developed with currently available information and should be considered *baseline* maps. Further refinement of the maps will occur as on-going and future research advance our understanding of the hydrology of these spring systems.

This effort involved the establishment of a Florida karst data base to store and manage data related to springs, caves and sinkholes. It also involved the construction of educational models and exhibits and conducting a workshop entitled “Blueprints for the management and protection of Florida’s springs”. The latter was held in Ocala in November of 2002 and generated findings and recommendations that were published as workshop’s proceedings in a CD ROM format currently available at the FGS. Additional activities under this topic included the design of two posters pertaining to springsheds; those are currently progressing toward finalization. Finally, the FGS is cooperating with the FREAC of the Florida State University to conduct the “Florida Maps” project. This is a curriculum development activity aimed at middle and high school students and their teachers with the objective of helping them visualize natural processes and relate them to other fields of study; such as mathematics and history. Material produced by the project will include satellite and airborne imagery, topographic maps and other cartographic products.

Education and Outreach Efforts Toward Better Management and Protection of Florida Springs: by **J. D. Arthur, R. D. Dehan, T. R. Kincaid**, (Hazlett-Kincaid Inc.) and **P. Bond**

This paper by McClean and DeHan and Donoghue was presented by McClean at the Springs Conference in Gainesville. It reported on the FGS’s experience in using remote-sensing techniques to locate areas of ground water discharge into surface waters. Two major surveys were conducted in May of 2002 covering more than ten bodies of water across the State. One survey used aerial thermography, while the other was a boat-towed resistivity survey coupled with sidescan imaging. Data generated by the two surveys confirmed the feasibility of using remote sensing techniques to study large areas of ground water/surface water interaction on a regional basis and at relatively low cost.

The Utility of Remote-Sensing Techniques in Investigating Interaction Between Ground Water and Surface Water: by **J. A. R. McClean, R. S. Dehan and J. F. Donoghue** (Department of Geological Sciences -FSU)

The Florida Geological Survey is developing a GIS Model (FAVA; see page 9) to use in the prediction of the vulnerability of Florida’s major aquifers to contamination. FAVA differs from the Environmental Protection Agency’s DRASTIC model in that the newer technique is GIS-based and accounts for Florida’s karstic terrain. The Weights of Evidence analytical method is utilized as a method for quantifying relationships between layers with actual contaminant occurrences in order to assess a hypothesis. These calculated relationships, are analyzed to yield a data-driven predictive model, which currently utilizes the following spatial layers (evidential themes): thickness of confining unit, soil drainage, and the percentage of an area covered by karst features.

Application of the Weights of Evidence Method to Assess Aquifer Vulnerability in Florida: by **A. E. Baker, J. T. Cichon, J. D. Arthur and H.A.R. Wood**,



The Springs Conference was the perfect forum for honoring **Jim Stevenson**, Chairman of the Florida Springs Task Force and head of the DEP Florida Springs Initiative. During the Conference, Jim was honored by Secretary Struhs for his dedication and long service to the State of Florida. The distinguished DEP Resource Manager of the Year Award, DEP’s top honor, will now be awarded as the Jim Stevenson Resource Manager of the Year Award. The Governor and Cabinet passed this resolution honoring Jim on February 25th in a ceremony at the Capitol. We congratulate you, Jim!

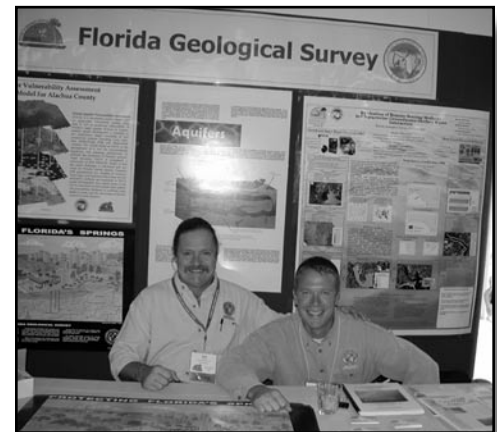
Florida Springs Conference

“Natural Gems - Troubled Waters”

Status of the
Florida Geological
Survey Springs
Bulletin update: by
**G.H. Means, and
T.M. Scott**

The Florida Geological Survey (FGS) published Bulletin 31, The Springs of Florida in 1947, which was the first comprehensive report ever produced on Florida's springs. This volume contains water chemistry data, flow measurements, map locations, and other pertinent information on 76 major springs along with some information on other springs. The Bulletin was updated in 1977, and many newly discovered springs were added to it. In 2001, the Florida Legislature passed the Florida Springs Initiative in response to recommendations made by the Florida Springs Task Force. This initiative authorized funding to the Department of Environmental Protection for springs related projects.

The Florida Geological Survey received funding in 2001 from the Florida Springs Initiative to make a second revision to Bulletin 31. Within four months of funding, the FGS had sampled and compiled data on the 33 first magnitude springs of Florida. These data were published in FGS Open File Report 85, First Magnitude Springs of Florida, in January, 2002. Currently, survey staff are sampling water quality and gathering data on second magnitude springs. A similar Open File Report will be published on selected second magnitude springs, and by July of 2004, a complete revision to Bulletin 31 will be published.



Tom Scott (left) and Harley Means
at the FGS Booth , Florida Springs
Conference

Assessment
of Long Term
Trends (Decades)
in Florida Spring
Water Quality: by
R. E. Copeland

Florida has over 700 recognized springs. Unfortunately, chemicals produced by man's land use activities that enter aquifers through natural recharge processes can negatively impact the quality of spring water. In addition, because of the high demand of groundwater, heavy pumping can potentially lower aquifer water levels. This can result in a negative impact on both the flow rate and the water chemistry of springs. Thirteen first-magnitude springs were sampled for 17 common chemicals by governmental agencies in 1948, the early 1970s, 1985, and 2001. These four sets of consistent data were used for long term trend detection. Results indicate that between the early 1970s and 2001, nitrate concentrations have increased in the 13 first-magnitude springs almost 20-fold. The increase is tied to land use activities in the vicinity of the springs and is adversely affecting aquatic life in several of the associated spring runs. Between the 1985 and 2001, total dissolved solids (TDS) have significantly increased. This could be related to the recent decrease in Florida's rainfall since the late 1990s which has lowered the ground-water near, and the discharge from springs. Evidence suggests that mineralized groundwater from the deeper portion of Florida's aquifers could be the reason for the increase in TDS. Currently, this theory is being checked by analyzing spring data collected either quarterly or bimonthly from the states water management districts since the 1980s.

In the spring of 2002, a number of Florida's hydrogeologists met and discussed the significance and importance of protecting Florida's springs from contamination related to man's land use activities. Many of the participants argued that in order to efficiently protect Florida's springs, a fundamental understanding of spring terms as used in Florida is critical. It was decided that a glossary of spring terms should be developed. The FGS assumed the lead role in its development and it organized a Spring Nomenclature Committee to address this issue. The committee is made up of representatives of governmental agencies, the state university system, hydrogeologists from around the state and private citizens. The glossary consists of the most commonly used spring terms, along with their synonyms. Whenever possible, existing terminology was used and was taken from professional dictionaries and glossaries. When completed, it is anticipated that the glossary will enable both the scientific community and the public to use a set of standardized terms. During the development stage of the glossary, it became apparent that a spring classification system should also be developed. This newly developed classification system is a model that enables one to envision the relationship of one spring to the others within the state. As it turns out, all of Florida's springs can be grouped into only a handful of different classes. This was fortunate in that it greatly reduces the complexity in the way we think of our springs. The publication is scheduled for completion within the next several months.

Development of a
Springs Glossary
and Classification
for Use in Florida:
by **R.E. Copeland**

The Florida Geological Survey Coastal Research Program (CRP), working under a multi-year Cooperative Agreement with the U.S Department of Interior Minerals Management Service (MMS), conducted a comprehensive program of offshore seismic profiling and bottom sediment grab sampling designed to locate sand deposits suitable for beach restoration in federal waters off Nassau and Duval Counties. Ongoing analyses of this data will assist in locating sites for offshore vibracoring to be conducted next summer. The study area for this program will ultimately include the area offshore of Nassau, Duval, St. Johns, Flagler and Volusia Counties. Projected duration of this project is 5-6 years. The scope of this study includes the publication of an annotated bibliography describing previously conducted work in the area, a baseline survey characterizing beach sand in the study area, the collection of subsurface acoustic profile data in federal waters, and the acquisition and analysis of numerous bottom grab samples and vibracores.

Results of this study, which will be published as an FGS publication, will identify sand deposits as well as estimated sand volumes. The publication will be in an ArcView interactive CD format designed to provide user friendly offshore data/information to state/county officials and planners to assist them in the development of effective plans to restore the area's eroded beaches.

The CRP worked with the community of Lynn Haven, Florida, the Navy, and DEP in Bay County in characterizing bottom sediments in a portion of North Bay. This study also produced a bathymetric map of the study area. Data derived from this study has been incorporated into a growing statewide coastal data base maintained by the FGS.

Coastal Research Program



The DEP Ombudsman, Dr. Benji Brumberg, and 3 interns from the FSU School of Government recently accompanied **Jim Ladner** and **Ron Hoenstine**, CRP geologists, into the marshes of the Aucilla Rivers Estuary. The group wanted to get a glimpse of scientists in action studying the environment of Florida. Pictured left to right Dr. Benji Brumberg, **Michele de Verteuil**, **Keely Brown**, **Jeri Joiner** and **Jim Ladner**.



The Chief's Corner

by
Walt Schmidt

APRIL 22nd – “MINING DAY AT THE STATE CAPITOL”

On April 22, 2003, “Mining Day at the State Capital” will be celebrated in Tallahassee. Representatives from state government as well as the mining industry will exhibit educational displays and be on hand to answer questions about Florida’s minerals and mining.

Land and its component constituent rocks and minerals, the soil, and the water resources, together comprise the natural infrastructure upon which all life on earth depends. These components are a result of a long-term balance of several earth-system cycles (including geological, hydrological, geochemical, nutritional, and biological). Humans often intervene upon these systems to impact and disturb these phenomena and alter these dynamics. The magnitude of human-induced changes on earth now approaches that level of impact that natural forces have had throughout geologic time. And as our population and society continues to grow, we strive for “environmental preservation,” “natural resource conservation,” and “sustainable growth.” We have begun to realize our earth systems and earth resources are finite, as we strive to provide short-term nourishment for the present generation and to preserve natural infrastructure for future generations. With this in mind, we must view mineral resources utilized for societal infrastructure, not as local – site specific commodities, but as valuable natural resources needed regionally state-wide, nationally or internationally. What is naturally occurring as a mineral commodity in one area may be critically needed in another location based on our society’s location demands.

The 21st Century is being referred to as the “Urban Millennium” by some experts. In the United States we now see 75% of our population living in urban places, and our population is expected to grow by 50% within fifty years. Our consumption of construction aggregates has gone up by 600% over the last half century, and the amount of aggregates anticipated to be needed in the next 25 years will match that consumed by this country in the past 100 years. Mining activities provide the raw building blocks for our homes, office buildings, malls, highways, and bridges. The mining industry and those knowledgeable of these activities must strive to communicate this information and educate the public on these issues. Outreach efforts can raise awareness of aggregates and other mined materials which are routinely used for soil-erosion control, water purification, reducing sulfur dioxide emissions from power plants, flood and erosion control, and many other needs.

The wise use of our natural resources promotes sustainable growth and ensures we can meet the future demands of our state. Geoscientists and mining engineers must incorporate outreach into their programs to better share their knowledge of the earth’s resources. State and local decision makers and the public must be provided with information and data on various tools to evaluate alternative methods of sustaining both our physical infrastructure and natural resources. “Mining Day at the State Capital” is a great opportunity to provide this educational outreach. I hope to see you there.

The Florida Academy of Sciences will be holding their 67th Annual Meeting on March 21-22, 2003. Many of the papers presented at the Springs Conference by FGS employees (see page 2 and 3) will also be presented at the upcoming meeting. From the FGS Hydrogeology Program **Alan Baker, Jim Cichon, Andrew Rudin** and **Alex Wood** will be attending and presenting papers or posters. Alan will present a paper on FAVA while Alex will present a paper on mapping the intermediate aquifer system/intermediate confining unit in Florida (see below). Jim and Andrew will present posters on different aspects of FAVA. Andrew's poster will describe our efforts in creating a digital elevation model for the state and Jim's poster is a description of the FAVA project using the weights of evidence methodology. Additionally, the poster entitled "Preliminary Springshed Maps for Florida's First Magnitude Springs" (see pg.2) will be on display.

Florida Academy of Sciences

The intermediate confining unit/intermediate aquifer system (ICU/IAS), which consists of highly variable fine-grained siliciclastic deposits and low-permeability limestone and dolostone, retards the flow of ground water between the overlying surficial aquifer system and the underlying Floridan aquifer system. Most previous efforts to characterize the ICU/IAS have typically been limited to regional studies. There exists a need for a statewide geographic information system coverage of the ICU/IAS for use in the Florida Aquifer Vulnerability Assessment model currently under development at the FGS. Methods for statewide characterization of ICU/IAS involve evaluation of detailed well data to accomplish advanced three-dimensional surface modeling using geostatistical analysis methods.

Mapping the
Intermediate
Confining Unit/
Intermediate Aquifer
System in Florida
(ICU/IAS): by
H. A. R. Wood

In the November 2002 issue of the Journal of Sedimentary Research (JSR) **J. H. Balsillie, J. F. Donoghue, K. M. Butler,** and **J. L. Koch** published the article entitled "Plotting Equations for Gaussian Percentiles and a Spreadsheet Program for Generating Probability Plots". The impetus for the work was to find a method for generating arithmetic probability paper using a programming language(s). At about the same time an EXCEL application entitled "Analytic Granulometry Tools" was installed on the FGS web site (http://www.dep.state.fl.us/geology/geologictopics/analytic_gran_tools/analytic_gran.htm) which incorporated our research results.

In February, 2003 **Neil A. Wells** from the Geology Department of Kent State University wrote a discussion about the Balsillie et al. JSR paper noting it to be an "impressive achievement" and "clearly valuable". Balsillie et al. have formulated a reply, and it and Wells' papers are planned for publication in JSR this coming November.

Since installation of the Analytic Granulmetry Tools application on the FGS web site, it has had over 300 hits. In addition, various communiqués have been received by the authors. B. A. Cheadle, President of Dark Matter Energy Consulting Corporation, Calgary, Alberta, Canada replied "... with some interest as I have often struggled with devising an appropriate manner to trick EXCEL into faking a probit scale for probability plots". M. J. Johnsson, a coastal geologist with California Coastal Commission, congratulated the effort by stating "... I am impressed with the wonderful job you have done ... granplot certainly far exceeds my humble spreadsheets in utility and design". Professor Jorge Ledesma-Vaczques, Chairman of the Geology Department, Facultad de Ciencias Marinas, Ensenada, Mexico teaches under grad and graduate sedimentology and was "... very much interested in getting a copy of GRANPLOT ... and most likely will present them to my students ... we will start class on Monday" (Feb. 3, 2003).

FGS on Forefront in Sedimentary Research

Troy Springs State Park

FGS Geologist **Tom Scott** and Spring's Team Geologist **Tina Roberts** were interviewed by **Buz Conover** from WFSU-TV at Troy Spring State Park. Troy Springs State Park is located in Lafayette County, six miles northwest of Branford. The Interview was aired Friday February, 28 at 5:30 pm on the Florida Channel and Sunday March, 2 at 10:30 am on WFSU. In this photograph Tina is explaining the ground-water chemistry associated with the springs.



Florida's Minerals

The United States Geological Survey (USGS) reported that in 2001 Florida ranked fifth in the nation with an estimated industrial mineral production value of \$1.75 billion. Florida's minerals are strip mined from shallow deposits around the state. The beneficial resources are then used both here in the state as well as exported to other states and even worldwide.

Florida supplies approximately one-quarter of the world's phosphate needs and three-quarters of US domestic needs. Nearly all of the rock that was mined in Florida, 22.8 million metric tons in 2001, was used to manufacture fertilizer which was used in the agriculture industry. The remaining ten percent was used to manufacture products such as vitamins, soft drinks and toothpaste. Phosphate continues to be mined in central Florida in Polk County, and in eastern Hamilton County in north Florida. In 2001, \$1.12 billion dollars worth of fertilizer was exported from Florida making it one of Florida's leading export commodities.

Florida ranked second nationally in production and fourth in consumption of crushed stone (limestone and dolostone) in 2000. Most of the rock that was mined in Florida was used for road construction. The cement industry uses limestone of high purity to manufacture Portland and masonry cement. Florida ranks in the top five states in the production of Portland cement and is first in the production of masonry cement. It is mined throughout most of the state.

Florida ranks approximately 15th in the country in sand and gravel used or produced. This particular commodity is subdivided into construction and industrial sand. The bulk of the sand that is mined throughout the state is of construction grade.

Economic heavy minerals deposits are located in the Clay County region of northeast Florida. The minerals, which include ilmenite, rutile, zircon, and leucosene have specific gravities of approximately 2.9 and greater. Ilmenite and rutile are primary mineral ingredients to produce titanium dioxide which is used as a paint whitener. Heavy minerals are also used in the manufacture of varnish and lacquers, plastics, and paper.

Peat is an organic-rich accumulation of decaying plant material. Although peat departs from the inorganic definition of a mineral, it is generally considered an economic mineral. Florida ranks in the top five states nationally in the production of horticultural peat.

Fuller's Earth, common clay and kaolin are mined in a few locations in Florida. Fuller's Earth is typically used as an absorbent material that is mined in Gadsden and Marion Counties. Kaolin is used in the manufacture of paper and refractories and is mined in Putnam County. Common clay is mined in small quantities throughout the state and is used in the manufacture of brick, cement and lightweight aggregate.

New Publications at the FGS

The FGS has updated and reprinted the List of Publications. The List of Publications is a 55 page booklet listing all publications available through the FGS. The List of Publications is also available on the web at <http://www.dep.state.fl.us/geology/publications/listofpubs.html>. This online version of the List of Publications has links to electronic versions of many of our publications that have been scanned and made available by the State University System of Florida PALMM project.

Hydrogeology Program staff are working on a wide variety of projects, some of which are highlighted in this issue of the FORUM, such as presentations at the Florida Springs Conference and the upcoming Florida Academy of Science meeting. Moreover, last October Alan Baker and Jon Arthur presented research on the Florida Aquifer Vulnerability Assessment (FAVA) project and 3D hydrostratigraphic mapping in Southwest Florida at the 2002 Annual Meeting of the Geological Society of America. In addition to in-house projects involving aquifer storage and recovery geochemistry, springs nomenclature, water quality trends and locations, identifying sources of contamination within the Fanning springshed, surface water-groundwater field studies, the Hydrogeology Program is facilitating several outsourced projects:

- Development of “Florida MAPS” curriculum material as a hydrogeology resource for Florida’s educators;
- Dye tracing and water quality studies in the Wakulla karst plain to improve characterization of flow dynamics in the region (among the dye tracing studies, one test will evaluate interaction between aquifer matrix and a conduit by introducing dye to wells proximal to the conduit);
- Surface water-groundwater interaction studies utilizing thermography, infrared imaging and field studies to identify and characterize previously unknown springs and seeps in Florida’s uplands and coastal zones;
- Development and population of a statewide karst database that includes springs, sinkholes and cave system maps;
- Use of geophysical applications to characterize the shape and dynamics of injected water during aquifer storage and recovery cycle testing;
- A workshop cosponsored with the Hydrogeology Consortium: “Significance of Caves in Watershed Management and Protection in Florida,” Ocala, April 16-17, 2003.
- Publication of education/outreach posters describing Florida’s springsheds and the effect of land-use activities on springsheds.

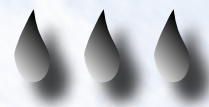
FLORIDA AQUIFER VULNERABILITY ASSESSMENT (FAVA) MODEL UPDATE

The FAVA team is currently working on improving and completing the data layers for the FAVA model. In addition to a new and improved statewide Digital Elevation Model, the team is developing an improved intermediate aquifer system/intermediate confining unit (IAS/ICU) map, creating the first statewide surficial aquifer system (SAS) water-table surface and developing a karst (e.g., sinkhole) data layer. Methods for statewide characterization of the IAS/ICU and the SAS water-table surface involve evaluation of detailed well data to accomplish advanced three-dimensional surface modeling using geostatistical analysis methods. The FAVA team is developing an approach to incorporate a karst data layer into the FAVA model based on the topographic depression coverage.

The FAVA team is also focusing on the collection and evaluation of training points used in the weights of evidence methodology. Statewide, the FAVA model incorporates 576 training points distributed among five aquifer systems. These training points are wells selected from the DEP background water quality network which contain elevated nitrate levels. In order to incorporate more training points, the FAVA team is reassessing the nitrogen cycle and how it operates in different areas of the state. For instance, nitrogen in the form of ammonia may exist in reducing environments in the southern part of the state.

Other news: Recently, four members of the FAVA team (**Jon Arthur, Alan Baker, Jim Cichon** and **Alex Wood**) attended the Florida Springs Conference held in Gainesville from February 5–7. Jim presented a paper on how to utilize the FAVA model in springshed protection while Alan presented a poster titled “Florida Aquifer Vulnerability Assessment Model – Applying Weights of Evidence to Assess Springshed Vulnerability”.

FGS Hydrogeology Program



For more information about the FGS Hydrogeology Program, contact **Jon Arthur** (voice: 850/488-9380, email: jonathan.arthur@dep.state.fl.us).

At the Seven Hill Regional User Group, GIS Workshop 2002, five members of the FGS Hydrogeology Program **Alan Baker, Jim Cichon, Alex Wood, Andrew Rudin,** and **Brandon Ashby** won first place in the project presentation category for the poster titled “Florida Aquifer Vulnerability Assessment (FAVA). The workshop was titled “Integrating GIS into Our Communities” and took place November 14-15, 2002. To see this poster visit the FGS website at http://www.dep.state.fl.us/geology/programssections/hydrogeology/fava_poster.pdf

Continued next page

Upcoming Events:

Alan Baker, Jim Cichon, Andrew Rudin and **Alex Wood** will be attending the Florida Academy of Sciences 67th Annual Meeting. Please see Florida Academy of Sciences (page 7) for further details.

This spring, **Jon Arthur**, (FAVA Project Manager) will coordinate with the Department of Community Affairs to give presentations at regional planning workshops on the importance of FAVA to land-use planning.

St. Johns River Water Management District



sjrwmd.com



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The Division of Ground Water Programs has published a web version of Technical Report SJ2002-5, "Springs of the St. Johns River Water Management District". The publication lists 24 springs that were not inventoried in FGS Bulletin 31 (Revised) and updates the information of the springs published in the bulletin. Where possible the site has updated pictures, discharge tables and graphs, water quality table, a summation of water quality trends, a discussion of the age of the water and the data files.

The site can be reached at http://sjrwmd.com/programs/plan_monitor/gw_assess/springs/



FAPG ELECTS NEW OFFICERS

Members of the Florida Association of Professional Geologists have elected new officers to serve on the Executive Committee of the association:

- | | |
|-------------------------|----------------|
| • Jon Arthur | President |
| • Cliff Harrison | Vice President |
| • Carlos Lemos | Treasurer |
| • Mervin Dale | Secretary |

President **Jon Arthur** is a Florida native and received his B.S. and Ph.D. degrees from Florida State University. He supervises the FGS Hydrogeology Program. Vice President **Cliff Harrison**, also a Florida native, graduated from the University of South Florida and is senior hydrogeologist and production manager at Schreuder Inc. Born in Brazil, Treasurer **Carlos Lemos** came to the United States to attend North Carolina State where he earned a B.A. in geology. When he retired in 1992, he was a principle geologist and manager of Law Engineering in Tampa. Secretary **Mervin Dale** was born in Morocco, Africa, and attended the University of Oklahoma where he received a B.S. in chemistry. He also earned a B.S. and an M.S. in geology from the University of Florida. Mr. Mervin is employed by the Tetra Tech NUS Inc. in Jacksonville, where he works on the U.S. Navy's Clean III contract.

The FAPG is the professional association in Florida whose sole purpose is to advocate for professional geologists. Through the FAPG, geologists have full-time staff in Tallahassee working to ensure the future of professional geology in Florida. The FAPG is committed to maintaining the integrity of the PG license and making sure that professional geologists are given parity with other regulated professionals.

For more information about the FAPG, call **Robert Skrob**, 850/222-6000, or e-mail, robert@fapg.org.

If you have feedback or ideas about the direction of the FAPG, please contact FAPG's new President **Jon Arthur** by e-mail, Jonath.an.Arthur@dep.state.fl.us.

FGS WELCOMES NEW COMPUTER SYSTEM MANAGER

Christopher J. Poarch joined the FGS in December 2002, filling the position of the recently resigned FGS Computer System Manager, **Jesse “Ace” Fairley**. Ace resigned his position to pursue other career opportunities in October, 2002. Cris received his B.S. degree in Information Studies from Florida State University in December and an A.A. degree, with honors, from Tallahassee Community College, where he concentrated on Web Development. Cris had worked at the FGS as an OPS IT Assistant since October 2001; his experience meant that he was able to “hit the ground running” in this position. Cris has already proven to be extremely competent, motivated, and customer oriented; we are delighted to welcome him as a valued member of the FGS team.

NEW GIS ANALYST JOINS THE FGS

FGS GIS Analyst **John M. Marquez** left the FGS in January 2003 to pursue career opportunities with the City of Tallahassee. **Andrew C. Rudin** is scheduled to fill this position on March 10, 2003, having decided to enjoy one last fling with freedom by traveling to Europe before he begins his new job. Andrew earned his B.S. degree in Geography and International Affairs from Florida State University in May 2001. Andrew has been providing GIS support for the Florida Aquifer Vulnerability Assessment (FAVA) Project as an OPS employee since August 2001. He was one of the FAVA team members to win an award from the Seven Hill Regional User Group, 2002 GIS Workshop (details elsewhere in this newsletter). He has extensive experience with ArcInfo, ArcView, and ArcMacro programming. Andrew’s education, experience, and proven excellence make him a great addition to the FGS full-time staff.

FGS Employee News

FGS Librarian, **Carol Armstrong**, has been elected to the Board of Directors of the Panhandle Library Access Network (PLAN.) PLAN provides training workshops, consortium agreements, and many other support activities for libraries throughout the panhandle of Florida. Carol recently attended workshops on the new Connexion interface for OCLC, and Florida library technology issues.

2003 SE-GSA Annul Meeting

Memphis, Tennessee on March 13-14, 2003

For information visit the website

<http://cas.memphis.edu/geology/2003gsa/2003SCSEGSA.htm>

Florida Academy of Sciences

67th Annual Meeting

University of Central Florida, Orlando on March 21-22 , 2003

For further information please log on to this website

<http://www.floridaacademyofsciences.org/meetings.htm>

2003 GSA Annual Meeting & Exposition

Seattle, Washington on November 2-5, 2003

Washington State Convention & Trade Center

For further information please log on to this website

<http://www.geosociety.org/meetings/2003/>

Significance of Caves in Watershed Management and Protection in Florida

Ocala Florida (Ocala Hilton) on April 16-17, 2003

Please log on to this web page for more detailing and registration

http://www.dep.state.fl.us/geology/newsevents/workshop_announcement.htm

Upcoming Meetings, Conferences and Workshops

In late October the Oil and Gas section moved out of the Gunter building to its new offices at the DEP warehouse. The new phone number is 1-850-245-3194 and the Fax number is 1-850-245-3136. The move was due to the need for more space and was started in motion by **Al Keaton** asking “can’t we move to those empty offices at the warehouse?” Much to our surprise and delight the request was OK’ed and the move was on. We increased our office space and now we don’t have to double-up in offices.

Oil and Gas Section

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
JEB BUSH, GOVERNOR DAVID B. STRUHS, SECRETARY
FLORIDA GEOLOGICAL SURVEY WALTER SCHMIDT, STATE GEOLOGIST
FLORIDA GEOLOGY FORUM DESIGNER/EDITOR, PAULA POLSON
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