WELCOME & INTRODUCTION
to the
WORKSHOP ON THE SIGNIFICANCE OF CAVES IN WATERSHED MANAGEMENT AND PROTECTION IN FLORIDA
April 16 & 17, 2003

Dr. Walt Schmidt

On behalf of the Department of Environmental Protection (DEP) / Florida Geological Survey, and the Hydrogeology Consortium, I welcome you to the ***Workshop on the Significance of Caves in Watershed Management and Protection in Florida.*** Just as one of our prior workshops was appropriately held here last May (titled: *Workshop to develop blue prints for the management and protection of Florida springs)* this location again is a natural and logical place to discuss caves, and their significance to our understanding the dynamics of groundwater movement. The Ocala, Marion County area is high on the Florida Platform and upper Eocene limestones that comprise the top of the Florida aquifer system in the area are located close to the land surface. As a result we have many landforms associated with karst geology readily observable in the vicinity. Sinkholes, caves, and springs are abundant and common, and contribute to make the area beautiful and famous. We all know of the world famous Silver Springs just east of here, and the equally well known rolling karst hills covered in rich grasses famous for their horse farms.

Anyone that has looked at a satellite photo or high altitude photograph of the State of Florida immediately notes the many circular lakes we have. And the fact that many of these lakes are not interconnected to each other. Many of these surface water features are the manifestation of surface erosion mechanics in conjunction with mechanical and chemical subsurface weathering of limestone's and dolostones. This "internal" drainage into the underlying rock layers has been occurring for millions of years and continues today. Where does the water go, if not drained off via surface streams? Well, our vast underground aquifers are as plentiful as they are because of this long standing dissolution of the carbonates. The prolific nature of the Floridian aquifer system is the result of millions of years of slightly acidic surface water entering the ground and dissolving away rock leaving behind voids and increased porosity. And these voids are interconnected thereby allowing groundwater replacement and movement in the subsurface. It's hard for the layman to comprehend how riddled with pore spaces some of our limestones and rock layers can be. Think for a moment of some photos you have seen, or locations you have visited on various fieldtrips. Visualize the volume of material that has entered subsurface horizons and rock layers from above. The volume of rock, sediment, soil, and water that was consumed at the Winter Park Sinkhole in 1981 (it took one house and a shed, a swimming pool, most of a four lane highway, part of a auto-repair facility, 2 Porsche sport cars – three others and a camper that were retrieved, many trees, and millions of cubic feet of soil / sediment). Think of the Devils Millhopper, Big Dismal, Lake Jackson, or Paines Prairie. There are thousands of examples. When we as geologists have an opportunity to view, this weathered and solution riddled rock when overburden or soil is scrapped off, we are amazed at what we see. Recall the, now famous photo taken by Bill Wisner in 1972, of the Buda limerock mine between Newberry and High Springs, that

showed the honeycomb of round solution pipes. In other instances, we plot depth to "top of rock" from cores and wells in one place, then find that within 100 feet away the same top of rock may be a couple of hundred feet deeper in elevation. Sea level changes, surface erosion, and subsurface solution has greatly modified our landscape and left behind what we see today.

Our departed colleague Bill Wilson reported in 1995 that based on his data and calculations he has estimated between 145-650 buried sinkholes per square mile in upland sites and between 1,200 and 8,700 per square mile in lowland sites. He further reported dissolution openings in the top of the Floridan aquifer ranging from 32,000-1,900,000 per square mile. While these numbers seem daunting themselves, consider he also estimated the cave density in parts of the unconfined Floridan aquifer system. He suggested the open cave density per unit area is typically 670-5,100 miles/mile^2. This is an enormous amount of cave passages, no wander we have such large transmissivities. He suggested that such data would call for an average distance between cave passages of between 370 and 500 feet. Meaning no point in the aquifer would be more than maybe 200 feet from the nearest open cave! So,….. IS UNDERSTANDING CAVES AND ASSOCIATED CONDUITS IMPORTANT TO REALLY BEING ABLE TO CONSERVE AND PROTECT OUR AQUIFERS? IS CAVE AND GROUNDWATER DYNAMICS A CRITICAL COMPONENT TO GROUNDWATER PROTECTION, MOVEMENT, CLEAN-UP, AND GENERAL WATER MODELING EFFORTS? We are past the point that the answers to these questions are up for debate! It's clear to the professional hydrogeologic community, understanding cave systems is fundamental to understanding groundwater dynamics.

Caves and their relationships to our aquifers have been known and reported on for some time in Florida. As early as 1674, a Friar with the Spaniards exploring North Florida reported their group spent the night in a cave where more than 200 men could be lodged comfortably, and he went on to say "there was a brook which gushes from the living rock." He was talking about the caves north of Marianna, we call Florida Caverns. We also have evidence in the form of artifacts of post-Columbian (prior to about 1500 AD) use of various caves by the earliest of human occupation of the area. Other records and various stories document Indian use of caves and use made during the Civil War. I know student chapters of the National Speleological Society (NPS) at FSU and other Universities have for decades gone out on caving trips and provided many surveyed and mapped reports of their fieldwork.

During the past two to three decades many professional cave diving groups such as the Cave Diving Section of the NPS, the National Association for Cave Diving, the U. S. Deep Caving Team, the International Association of Nitrox and Technical Divers, and the continuous local efforts of the Wakulla Karst Plain Projects team, have gathered an enormous amount of submerged cave data and mapped passage information. Some of the most highly respected members of the international professional cave diving community, reside and work in Florida and have shared their expertise and results of their work with other professionals so that we may understand our aquifer dynamics a little better, with the benefit of an "eye-witness." The continuing contributions and cooperative efforts

between the professional cave diving community and our hydrogeology professionals is a natural and critical marriage to better understand and conserve our groundwater resources and these unique subterranean environments.

The Springs Task Force made numerous recommendations to further our knowledge and ability to protect and conserve our spring's resources. Knowing that springs are but one component of our karst landforms, and all the surface / subsurface features are interrelated, the Task Force recommended a comprehensive database be compiled to include these features and their surveyed maps. The Florida Geological Survey has coordinated with many professionals to instigate such an endeavor. One glitch in the effort, however, is the obvious concern for locational information to be made public for the many pristine springs and cave entrances. The FGS has proposed legislation to allow such data to be filed and maintained in a confidential manner in accordance with the instructions of the source of the information and or owner of the property. This however, is not being pursued this year due to other priorities within the DEP.

General and detailed understanding of karst features and subsurface hydrogeology is fundamental to the protection and hoped for cleanup of contaminated aquifers within our state. We at the FGS are involved in surface geologic mapping, subsurface detailed lithologic descriptions, and the spring's initiative with numerous in-house and contracted studies, and upgrading the DRASTIC maps with the Florida Aquifer Vulnerability Assessment (FAVA) project adding karst features. The subsurface caves and conduits clearly are a critical and important part of our overall understanding or our aquifer dynamics, groundwater transport, and surface water / groundwater interactions. So, you are the "choir" and we all know that. But coming together in a workshop such as this, helps us focus our efforts, and helps us speak with one voice when elected and appointed government officials ask us for input or for our professional opinion on recommendations to conserve and protect our groundwater resources. As individual scientists, geotechnical engineers, professional cave divers, etc, we appropriately disagree on things, maybe that's an understatement. But, workshops such as this help us form common ground for the big picture, and having a consistent message from the geoscience and hydrogeologic community to decision makers is important for our credibility.

This workshop is divided up into three general focus topics to initiate discussions. First is: *Bridging the Gap between Cavers & Scientists*, second is: *Utilization of Cave Data in Hydrogeological Investigations*, and last; *Cave Resource Management; Politics, Public Relations, and Funding*. Choose the group which interests you the most, or amble back and forth between groups. Thank for your interest and participation. We look forward to an interesting and useful couple of days.

c/Geo Invest/Hydrogeology