



Everglades Geological Society

BULLETIN

Volume 4, Number 5

January 1998

Next Meeting: January 20, 1998
6:30 P.M. at the French Connection
(social hour starts at 5:30)

Speaker: Hugh Mitchel-Tapping

Topic: Long-Term Sampling of Selected Heavy Metal Concentrations in the Bottom Sediments of Imperial River and Spring Creek, Lee County, Southwestern Florida.

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Everglades Geological Society
P.O. Box 61684
Fort Myers, FL 33906

The Everglades Geological Society is an organization which seeks to promote interest in and understanding of Geology and the related Earth Sciences, and to provide a common organization for those individuals interested in geology and the related earth sciences.

The Bulletin is a monthly (September-June) publication of the Everglades Geological Society, Inc.

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PRESIDENT'S MESSAGE

Dan Acquaviva

One sunny day, sometime in the next six weeks, the old EGS convertible will come screeching out of a downtown parking garage to cruise the highways and byways of Southwest Florida, stopping at schuffleboard courts and bingo parlors looking for Ex-Presidents. Yes, its that time of year once again. Time for the Nominating Committee, composed of the Ex-Presidents, to gather and select candidates for EGS officers for next year.

While our Ex-Presidents don't employ the same coercive measures used by the Ex-Presidents in the movie Point Break, we're hoping that the recent assertiveness training course we sent them to will pay some dividends. In other words, if you're called and asked for the OK to place your name in nomination, "no" will not be a viable option except under the most dire circumstances. So consider it as an honor that you've been selected rather than as a responsibility to be avoided.

To paraphrase the words of the immortal Chico Esquela, "Geology bein bery bery good to you", its time for some of you to give something back. And there are some benefits as well, such as a set of keys to the old EGS convertible for each officer.

Dan

Long-Term Sampling of Selected Heavy Metal Concentrations in the Bottom Sediments of Imperial River and Spring Creek, Lee County, Southwestern Florida.

Hugh J. Mitchell-Tapping¹ and Aleta M.

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ABSTRACT

Heavy metal concentrations are important in terms of their potential toxic effects and as a signal for the presence of other types of pollution. However, heavy metals pollution has four major interpretive problems: (1) determining residual long-term geologic chemical reactions, (2) distinguishing those components attributable to natural causes from those attributable to man's activities, (3) determining whether anthropogenically-enriched sediments are likely to cause adverse effects, and (4) determining if the pollution is permanent (long-term) or is an isolated event (short-term). Among the toxic heavy metals found in stormwater, lead, copper and zinc appear to be the most abundant and frequently detected. As stormwater runoff is of major importance in southwestern Florida, this study has examined copper, lead, zinc and iron concentrations, quarterly from 1981 to 1995, from sites along Spring Creek and Imperial River. The results have given insight into the relationship of metal concentration to changes in sediment grain-size and content during both wet and dry seasons, and also to long-term pollution assessments. For example, a very high copper concentration was detected in silt and clay-sized particles at an Imperial River marina site. The same site was sampled the following year at the end of the wet season. The analysis indicated that sediment size had increased and copper concentration had returned to the lower natural background values of previous years. The high copper concentration was subsequently determined to be due to antifouling and preservatives of newly installed wooden mooring posts and that the wet season stormwater runoff had flushed many of the clay-sized particles from the marina sediments. Stormwater runoff from major developments has been recognized as a major cause of water quality degradation and is responsible for the heavy metals that enter Estero Bay surface waters. Many researchers have shown that very large quantities of heavy metals are found in urban runoff. Among the toxic heavy

metals detected in stormwater runoff, lead, zinc, and copper appear to be the most abundant and detected most frequently. Some studies have developed guidelines for distinguishing natural concentrations in sediments from contaminated sediments using iron and aluminum. As a very high iron content occurs naturally in the surface and the water-table waters of southwestern Florida, the use of the aluminum or iron methods may be questionable as a basis for distinguishing heavy metal natural background from unnatural contamination in sediments in this area. In the long-term study, 1981 to 1995, of Spring Creek and Imperial River, the data shows that there are major short-term periodic contaminations as the concentrations are so high in comparison to those of previous and post years, and that they are steadily increasing as development and boat usage increases. As site-specific data was plotted over a considerable time period to determine possible unnatural anthropogenic fractions, the natural background can be assumed, that is, prior to major development, and compared to long-term gradual increases that cause unnatural changes over time. Certain values appear to be normal natural background, others are definitely unnatural and can be related to some human activity. All concentrations appear higher at the end of the wet season due to greater rainfall, runoff, and the increase of silt and clay particles into creeks and rivers. Some short-term major increases are directly due to runoff and local construction, such as, marinas. As this study shows that heavy metal contamination is a directly related to major development, this study recommends that all construction changes in the area should be investigated, recorded, and related to specific heavy metal concentration values. The local government should enforce the ruling of no offsite discharge or leakage of septic systems into adjacent waterways, and install stormwater retention ponds in stormwater pathways.

Dr. Mitchell-Tapping has more than 25 years experience, both in the private and public sector, and national and international projects as a geologist specializing in exploration and environmental research of subsurface geology and groundwater hydrology. He has extensive knowledge of the Florida groundwater and subsurface geology together with consumptive use permitting. He has been a featured speaker, and also published many professional papers, on the subsurface geology and hydrology of Florida. Dr. Mitchell-Tapping obtained his M.S and Ph.D. from Florida State University and is presently an adjunct professor of geology at Edison Community College at Fort Myers and also a director of the Estero Baywatch Program at Estero Bay Marine Laboratory at Fort Myers Beach.

Calendar

Latin American Energy Summit Houston
Jan. 22©23

Water Reuse Conference
Lake Beuna Vista, Fl. Feb. 1©4

Third Annual Florida Water Law
Conference
Tampa, Fl. Feb. 5©6

Forty©fourth Annual Tucson
Gem and Mineral Show
Tucson Feb. 12©15

Ninth Congress of Union of
African Water Suppliers
Casablanca, Morocco Feb. 16©20

Latin American Energy Conf.
Miami March 4

International Water Technology
Conference
Alexandria, Egypt March 20©23

American Chemical Society
Annual Meeting
Dallas March 21©26

Sixth Cambridge Diagenesis
Conference
Cambridge, U.K. March 26©27

Geological Soc. of America
Southeastern Section Mtg.
Charleston, W.V. March 30©31

Third Middle East Geosciences
Conference
Bahrain April 20©22

AAPG Annual Meeting
Salt Lake May 17©20

GSA Rcky Mtn Sec. Mtg.
Flagstaff May 25©26

Soc. of Professional
Well Log Analysts
Keystone, Co. May 25©28

AWWA Annual Conference and
Exposition
Dallas June 21©25

Summit of the Americas '98:
Energy & Environment
Miami Beach July 14©17

Oil & Gas Exploration in
North America © Mid©Continent
Symposium
Wichita, Ks. August 11©13

Georgia Section AWWA
Atlanta August 16©19

Assessing and Managing
Health Risk for Drinking
Water Contamination
Santiago, Chile Sept. 7©10

Membranes in Drinking and
Industrial Water Production
Amsterdam, Neth. Sept. 21©24

Eighth International Williston
Basin Symposium
Regina, Kansas Oct. 19©21

GCAGS Annual Convention
Corpus Christi Oct. 21©23

GSA Annual Mtg.
Toronto Oct. 26©29

NGWA 50th Anniversary Annual
Convention
Las Vegas Dec. 13©16

EGS MEETING CALENDAR

1998

January 20	EGS Meeting
February 17	EGS Meeting
March 17	EGS Meeting
April 21	EGS Meeting
May 19	EGS Meeting
June 16	EGS Meeting

THIS MONTH'S CONTEST

You're a Geologist specializing in regulatory compliance and mine reclamation. You've just been transferred to the Dusty Hill Gold Mine, which, according to the Chief Mine Engineer, will be completely played out within 6 months. The Mine Owner isn't so sure and has budgeted enough for one core hole drilling program. In reviewing the files of the former Mine Geologist, who has been transferred to Tierra del Fiego to commence a surface mapping project, you come across the pre-mine development restored cross-section reproduced below.

The Mine Owner gives you a choice, you can either keep the amount budgeted for the core drilling program as your Christmas bonus or you can receive a 1% royalty on any gold deposit discovered by the core drilling program. To date, the Dusty Hill Mine has produced 350,000 ounces of gold. What do you do?

If you believe that a potential extension of the Dusty Hill Mine is possible, use the grid below to overlay the cross-section and select one block only as a drilling target. The existing mine is in grid blocks D7 and D8. Keep in mind, however, that the Chief Mine Engineer could be correct.

Have your solution to the contest ready at the next Monthly Meeting. You must be present to win. The first person to provide the correct answer, in the opinion of the judges, will win a new designer mouse pad.

(Insert Illustrations Here)

Solution to December Contest: Ten Thousand Islands
Won By: Bob Maliva

Join Everglades Geological Society

*Application forms are available:
at meetings, by mail and on our web site.*

<http://www.geocities.com/CapeCanaveral/1356>

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