



Myakka

A Soil and Water Science Department Publication



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Summer 2003

The Everglades



Editors:
Pam Marlin
Dr. Vimala Nair

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<http://soils.ifas.ufl.edu>



FROM THE CHAIR

In a series of newsletters starting with this issue, we will present select examples of the Soil and Water Science Department's (SWSD) research and outreach activities in various regions of the state. In each of these regions our faculty conduct research in a wide range of ecosystems with emphasis on water quality. This issue of **Myakka** presents a brief summary of our research and outreach activities in the Everglades.

Historic Everglades included a river of sawgrass and sloughs approximately 80 km wide with shallow water depth. Water flowed unimpeded from Kissimmee River to Lake Okeechobee through Everglades to Florida Bay. Modern-day Everglades is more complex with canals, dikes, high density of urban development, and intense agricultural practices. The natural Everglades contributes to South Florida's water supply, flood control, and recreation, while supporting diverse species of wildlife and vegetation. The Everglades Forever Act (Florida Statute No. 373.4922) states that "the Everglades ecosystem must be restored in terms of water quality and water quantity and must be protected in a manner that is long term and comprehensive". Everglades restoration can be framed into interrelated factors: water quantity, water quality, timing of water flows, and distribution of water. Our research focus is on water quality in agricultural and natural areas of the Everglades.

The SWSD has been very active in addressing soil and water quality issues in the Everglades. Our faculty at the

Tropical REC has been active in developing management practices to improve nutrient use efficiency and water quality in calcareous soils used to grow various tropical crops. Our faculty at the Everglades REC have long been interested in subsidence of organic soils. Currently this group is involved in developing best management practices for sugarcane and other crops grown on organic soils, with the goal of reducing nutrient loads and improving water quality.

In natural areas of the Everglades, our research included the measurement of spatial and temporal distribution of nutrients, historical nutrient accumulation rates, and biogeochemical indicators to evaluate nutrient impacts in the Everglades. State and federal agencies formulating policy and regulation and developing management strategies to protect these natural resources now use the results obtained from these studies.

We recognize the complexity of the Everglades issues and the importance of interdisciplinary approaches in addressing soil, water, and environmental issues in this region. We see great potential for UF to be a major player in research and education in the Everglades restoration. This requires programmatic team building on UF campus to effectively compete for grant and contract funds in this region. We have developed effective collaborations with faculty in other UF departments and with the state and federal agencies working in the region. Through our research and extension programs, we will make efforts to have a strong presence in this region in addressing soil and water quality issues related to the Everglades restoration.

Summer 2003

NEW GRADUATE STUDENTS

Puja Jasrotia, MS, *Advisor*, A. Ogram

GRADUATES

Kevin Grace, MS, *Advisor*, J. White
Ravindra Ramnarine, MS, *Advisor*, W. Harris

Christine Bliss, PhD, *Advisor*, N. Comerford

Eric Brown, PhD, *Advisor*, J. Sartain
Hector Castro, PhD, *Advisor*, A. Ogram
Raymond Snyder, PhD, *Advisor*, J. Sartain

Florida's Wetland WebGIS and Geo-Database

Thousands of soil samples have been collected in Florida's wetlands by staff and scientists of the Wetland Biogeochemistry Laboratory (WBL), UF. To preserve, standardize and centralize these datasets of soil physical, chemical, and biological properties a seed project funded by the Center for Natural Resources facilitated to develop a web-based, interactive information and visualization system, by Sabine Grunwald, SWS-GIS Research Laboratory. Soils data collected in various hydrologic units of the Everglades can viewed at <http://GISWetlands.ifas.ufl.edu>. For additional information, contact **Sabine Grunwald**, Sgrunwald@ifas.ufl.edu.

TEACHING

Fourth Annual

Soil and Water Science Department Research Forum

The Fourth Annual Soil and Water Science Research Forum was held on September 4, 2003, in Gainesville, Florida. The forum was attended by all faculty and graduate students of the department, and representatives from state and federal agencies, and private industry. **Dr. Jimmy Cheek**, Dean for the Academic Programs, addressed the group on the role of SWSD in overall educational programs of College of Agricultural and Life Sciences. **Dr. James Davidson**, Emeritus Vice President for Agriculture and Natural Resources, gave a key note lecture on his vision for soil and water science and role of young scientists. The complete lecture can be viewed at: <http://soils.ifas.ufl.edu/forum>. Graduate students and post-doctoral fellows presented 8 oral and 40 poster presentations. Two best oral and 5 best poster presentation awards were presented. Winners of oral presentations were: **K. Makris**, W. Harris and T. Obreza advisors, and **C. Penton**, S. Newman and K. Reddy advisors. Winners of best poster presentations were: **E. Dunne**, K. Reddy advisor, **D. Herrera**, R. Mylavarapu advisor, **G. Kertulis**, L. Ma advisor, **S. Simon**, J. White advisor, and **I. Uz**, A. Ogram advisor.

Short Courses in Soil and Water Science

The Soil and Water Science Department offered three short courses:

Hydric Soils: W. Hurt and W. Harris. This exclusive training program focused on the interrelations of hydrology and hydric soils and how to distinguish hydric soils from nonhydric soils. Wade Hurt, wade_hurt@ifas.ufl.edu.

GIS Applications in Soil and Water Science: S. Grunwald. This exclusive training program focused on how to make use of readily available geo-data layers of soils, geology, land use, and topography. Sabine Grunwald, sgrunwald@ifas.ufl.edu.

Biogeochemistry of Wetlands: Science and Applications: M. Clark, J. Delfino, R. Gambrell, W. Hurt, P. Inglett, R. Reddy, and J. White. This short course provided training to professionals on basic concepts involved in biogeochemical cycling of nutrients and other contaminants in wetlands, as related to soil, water, and air quality. Ramesh Reddy, krr@ufl.edu.

A total of 100 professionals attended these 3 courses. The Hydric Soils and GIS courses are scheduled to be offered during summer 2004. In addition, a new course entitled, Basic Soils – An introduction, is scheduled for offering during March 9-10, 2004. Details of these courses can be seen at <http://conference.ifas.ufl.edu/soils/index2.html>



The E.T. York Lecturer - Dr. Pedro A. Sanchez

The SWSD will host **Dr. Pedro A. Sanchez** during his visit to UF/IFAS as the 2003 E.T. York Lecturer. Dr. Sanchez, the 2002 World Food Prize laureate, and a 2003 MacArthur Fellow, is Director of Tropical Agriculture and Senior Research Scholar at the Earth Institute of Columbia University in New York City. He also serves as coordinator of the Hunger Task Force of the United Nations' Millennium Development Project. Sanchez served as Director General of the World Agroforestry Center (ICRAF) headquartered in Nairobi, Kenya from 1991-2001.

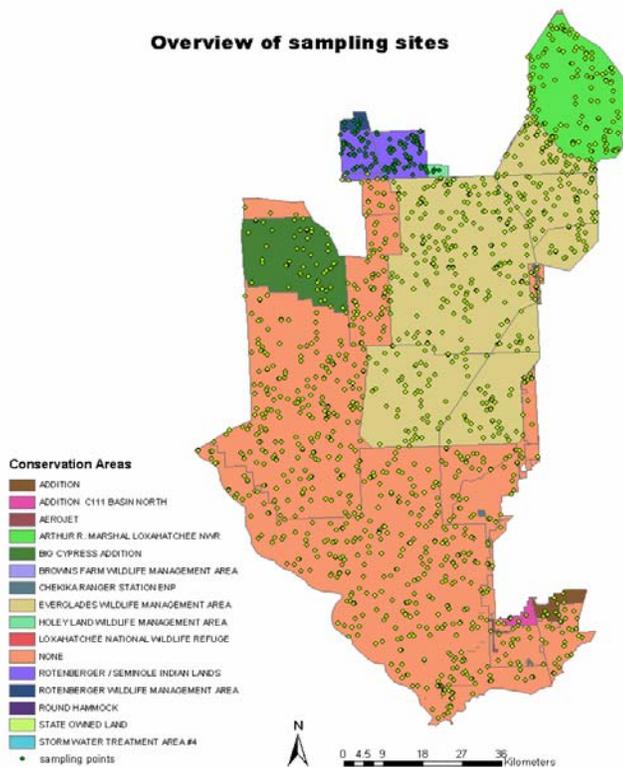
Dr. Sanchez's visit is scheduled during the week of November 11-14, 2003. Dr. Sanchez will present the E.T. York lecture at 10.30 am on Thursday, November 13, 2003 in Rion Ballroom, Reitz Union, at the University of Florida. The topic of his presentation is entitled "**Ending hunger in Africa: What needs to be done**". For additional information on the Dr. Sanchez visit, contact Ramesh Reddy at krr@ufl.edu.

RESEARCH

At present there are several on-going projects in the Everglades including developing nutrient management practices for crops grown on calcareous soils and in the Everglades Agricultural Area (EAA). Projects in natural areas include: Water Conservation Areas, Storm Water Treatment Areas, and the Everglades National Park (ENP). Here are few examples of the SWSD research programs in the Everglades region.

Soil Phosphorus Monitoring in the Everglades

The purpose of this study is to determine: (i) spatial distribution of soil P in selected hydrologic units of the Everglades including: Water Conservation Areas (WCA-1, WCA-2a, and WCA-3), and ENP, (ii) calculate long-term changes in soil P storage, and (iii) develop spatial maps using geostatistical techniques. This massive sampling includes approximately 1700 stations distributed in various hydrologic units including: water conservation areas, Holyland and Rotterberger conservation areas, ENP, and Big Cypress. This project is funded by the South Florida Water Management District and Comprehensive Everglades Restoration Program (CERP). Investigators in this project are: Mark Clark, Sabine Grunwald, Sue Newman, Todd Osborne, and Ramesh Reddy. For additional details contact **Ramesh Reddy** at krr@ufl.edu.



On-Farm Research in the Everglades Agricultural Area

The research conducted by UF/IFAS at Everglades EREC represents the most comprehensive ongoing research program regarding Best Management Practices (BMP) effectiveness in the Everglades Agricultural Area (EAA) Basin south of Lake Okeechobee. Ten farms ranging in size from approximately 130 ha to 1,860 ha have been studied in an attempt to develop and verify the effectiveness of BMPs for reducing total phosphorus (TP) loading in the EAA Basin. Land use on the selected farms varies from monocultures of sugarcane and vegetables to multi-cultures of vegetables, rice, sod and sugarcane. Organic soils prevail in the EAA. Water management practices that proved most effective included making internal drainage improvements to the farm to allow more uniform drainage. Particulate P accounts for 20 to 70% of TP exported from EAA farms and is frequently the cause of spikes in TP loads. A significant fraction of particulate P in the EAA originates from in-stream biological growth, rather than from soil erosion.

Management practices that are recommended by the study to control particulate P in discharges include practices that reduce or minimize the occurrence of continued high velocities in the canals while pumping water to drain fields. Aggressive weed control programs in the main canals are the most productive in reducing the supply of transportable high P content biomass. Relocating sediments upstream from the pump house is also recommended in conjunction with irrigation events. The research projects at EREC confirm the effectiveness of existing BMPs as well as provide direction on areas of future research. Future focus includes evaluation of the active biological and chemical interactions that flourish in the ecosystems south of the EAA so that relationships between P leaving the EAA and its eventual downstream points can be developed. For additional information contact **Samira Daroub** at SDaroub@ifas.ufl.edu.

Microbial and Biogeochemical Indicators of Restoration in the Hole-in-the-Donut



The Soil Molecular Ecology Lab and the Wetland Biogeochemistry Lab recently initiated a new project with SWSD courtesy professor and Department of Interior soil scientist Mike Norland to study development of microbial communities and attendant biogeochemical cycles in the Hole-in-the-Donut area of the Everglades National Park. The Hole-in-the-Donut was farmed until the 1970s, and the exotic plant *Schinus terebinthifolius*, commonly known as Brazilian pepper or Florida holly, invaded the area when the farms were abandoned. Removal of Brazilian pepper requires complete removal of soil, leaving only the white calcium carbonate substratum remaining. Restoration is left to natural processes, which provides an outstanding opportunity to study the development of microbial communities and biogeochemical processes in this area, and to develop and test microbial and biogeochemical indicators of successful restoration. The PIs on this project are Andy Ogram and Ramesh Reddy. For additional information contact Andy Ogram at avo@ifas.ufl.edu.

Soil Accretion and Development of the Everglades Landscape



A three-year study is underway in the Florida Everglades to investigate soil accretion processes and their influence on the spatial vegetative mosaic of Shark River Slough. Historically this landscape pattern had a prominent orientation parallel to the direction of flow. This pattern is still prevalent in many areas; however, the "Ridge and Slough" landscape has shown signs of decline in linearity, senescence of

ridge vegetation and encroachment of ridge and wet prairies species into the deeper water sloughs. As part of the monumental effort to restore the Everglades, maintaining the Ridge Slough landscape is critical not only to the representation of pre-disturbance conditions, but also to many species including fish, water fowl, and alligators that utilize the deeper water slough community and benefit from the tremendous edge effect provided by the interface between ridge and slough areas. Because the vegetative community of the Everglades is intimately linked to soil elevation and hydrology, understanding processes related to soil accretion are critical to short and long term restoration efforts. For more information contact **Mark Clark** at clarkmw@ifas.ufl.edu.

International Symposium on Nutrient Management in Agricultural Watersheds: A Wetlands Solution



The University of Florida-IFAS and Teagasc Research Center, Johnstown Castle, Co. Wexford, Rep. of Ireland are jointly hosting an international symposium on Nutrient Management in Agricultural Watersheds: A Wetlands Solution, scheduled for May 24-26, 2004, Wexford, Ireland. The Symposium will provide a forum for synthesis and interpretation of current status on the role of wetlands to improve water quality in agricultural catchments. For additional information contact **Ramesh Reddy** at krr@ufl.edu.

Nutrient Management for Tropical Fruits and Vegetables

Soil and Water Science program at Tropical REC focuses on developing management practices to improve nutrient use efficiency, plant nutrition and water quality; nutrient cycling in calcareous soils; and determining impacts of agriculture on south Florida's natural ecosystems. Details of this program can be viewed at <http://yuncong.ifas.ufl.edu>. One example of research program is on Lychee (*Litchi chinensis* Sonn.) fruit is gaining popularity, and has become a high value crop in south Florida with sales of over \$20 million per year. Unreliable flowering and fruit set seriously impact lychee production in Florida and throughout world. We found that the lack of maturity of late vegetative flushes in the late fall or early winter prevents flowering, and that low nitrogen concentrations in the leaves reduced vegetative flushing and increased flowering and yield. These discoveries enabled us to recommend effective corrective measures. For additional information contact **Yuncong Li** at yunli@ifas.ufl.edu.

FACULTY, STAFF and STUDENTS

James Bonczek is appointed as Lecturer in Soil and Water Science. In this new role, James will teach laboratory sections of introductory soils course offered both at undergraduate and graduate levels and teach a new undergraduate general education course (submitted for approval) entitled "The World of Water".

Jerry Sartain was awarded the 'Wreath of Grass' by the Florida Turfgrass Association (FTGA) at their annual meeting in September, 2003. This is the highest award that the FTGA awards and it has not been given to scientists working at universities for the past two decades.

Ann Wilkie was appointed to the National Pork Board's newly formed Public Health and Worker Safety Advisory Group in June 2003. The Advisory Group will deal with issues such as the health effects of odor, water and air microbial contamination, and worker safety in livestock production.

SWS Alumni

We are in the process of updating contact information. Please visit our website and update your contact information. If you do not have access to the website, you can send us the updated information. In our future newsletters, we would like to include alumni news. So please send us information that you would like to share with your friends and colleagues.