

SWAMP REPORT

A periodical about wetland research and activities at the University of Florida

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Summer 2006

New PhD IGERT Program Heads to Botswana

This summer, ten students were admitted to the inaugural year of the University of Florida IGERT PhD program on Adaptive Management: Water, Wetlands and Watersheds. Funded by the National Science Foundation, the IGERT program (Integrative Graduate Education and Research Traineeship) supports PhD scientists and engineers who participate in interdisciplinary study that addresses key global issues. Under the direction of Dr. Mark Brown, UF Department of Environmental Engineering Sciences, the Adaptive Management program links four Colleges, fifteen Departments, and three research Centers at the University of Florida with international wetlands research centers in Africa, Mexico, South America, Australia, and south Florida.

The program stresses basic science in each student's discipline, coupled with training in systems, law, policy, ethics, and communication. The goal of the Adaptive Management program is to develop an interdisciplinary doctoral program that stresses integration of engineering, biophysical, and social sciences and addresses important issues related to wise use of water and wetlands through cutting edge, field-based teaching and research. Students in the program spend summers exploring adaptive management issues locally in the Florida Everglades and internationally in the Okavango Delta in Botswana, the Pantanal in Brazil,



Kakadu in Australia and the northern Yucatan Peninsula in Mexico.

This summer, students studied in the Okavango Delta in Botswana, one of the world's largest inland wetland/aquifer systems. The headwaters of the delta start in Angola's western highlands, then flow through Namibia, and finally enter Botswana, where it terminates in the Kalahari with over 95 percent of the water eventually evaporating. The rivers flowing into the Okavango Delta originate outside Botswana where they are subject to withdrawals and damming. Students learned about issues such as the transnational commission set up to develop

water use policies as well as the pressures from local populations, tourist development, dams and other water extraction projects in the management of the Delta.

The program is managed through the Center for Environmental Policy (CEP), the Howard T. Odum Center for Wetlands (CFW), and the Land Use and Environmental Change Institute (LUECI). Two laboratory facilities associated with LUECI, the Florida Institute of Paleoenvironmental Research (FLIPER) and a GIS Remote Sensing lab, are also available to all IGERT participants. For information, go to <http://amw3igert.ufl.edu/>

Inside this issue:

Faculty Update: Dr. Carrie Reinhardt Adams joins Environmental Horticulture	2
Alumni Update: Jeff Smith leads Merritt Island Wetland Restoration	2
Faculty Update: Dr. Matthew Cohen joins School of Forest Resources and Conservation	3
Student update: Weir installed at the UF Stormwater Ecological Enhancement Project	4
Recent Publications	4
Conferences and Events	4

Wetlands Portal Website

The new site serves as a portal of internal and external links to all research and educational activities related to wetlands at the University of Florida. Included on the website are lists of faculty and courses focused on wetlands, links to relevant departments and research centers, and information about wetlands on and near the UF campus.

<http://wetlands.ufl.edu>

Dr. Carrie Reinhardt Adams joins Environmental Horticulture

Dr. Carrie Reinhardt Adams joined the University of Florida in August 2005, as assistant professor in the Environmental Horticulture Department with a 40/40/20 teaching/research/extension appointment in Restoration Ecology. She is developing a research program that uses environmental horticulture to address problems in restoration ecology, such as establishment of native species in disturbed and restored landscapes and invasive species management.

Dr. Adams is currently involved with habitat restoration of semi-permanent freshwater wetlands at the Florida Panther National Wildlife Refuge in the Big Cypress Basin, and will likely be working in roadside plant conservation research, restoration follow-

ing trail/road closures, and coastal revegetation. She teaches Introduction to Ecosystem Restoration (ORH 492), in the spring which has a major unit on wetland restoration. She is developing a graduate-level restoration course that will draw heavily on wetland-based examples.

As part of her extension efforts, Dr. Adams is developing a program that links native plant industries, restoration practitioners, and ecologists, resulting in a mutually beneficial information exchange through annual meetings and a website.

She has a BS in Environmental Resources Management and a M.S. in Ecology from Pennsylvania State Uni-



versity and a Ph.D. in Water Resources Science/Horticultural Science from the University of Minnesota. For more information: <http://hort.ifas.ufl.edu/people/reinhardt.htm>

Research Highlight

Historic Pond Restoration in the Florida Panther National Wildlife Refuge

Carrie Reinhardt Adams and Michael Kane, UF Environmental Horticulture Department

This research, funded in May 2006 by the US Fish and Wildlife Service and the Florida Cooperative Fish and Wildlife Unit, is designed to develop best management practices for efficient pond ecosystem restoration to reestablish habitats critical to threatened and endangered flora and fauna. We propose to:

- Restore pond topography at multiple sites;
- Develop a floristic list of historic aquatic/wetland species;
- Collect propagules (seed, stem and rhizome cuttings) from numerous genotypes for propagation and micro-propagation and evaluate effects of genotype, planting density and elevation on establishment of propagated aquatic and wetland species; and
- Evaluate revegetation and post-restoration maintenance practices which promote long-term sustainability of the plant community in the restored ponds.

Alumnus Leads Wetland Restoration at Merritt Island

Jeff Smith recently completed a M.S. degree in the Soil and Water Science Department and accepted a job as a wetland restoration ecologist at the 140,000-acre Merritt Island National Wildlife Refuge at John F. Kennedy Space Center. Jeff's primary objective is to coordinate the restoration of mosquito impoundments that were constructed to biologically control mosquito populations. The original intent was to flood the impoundments before mosquitoes could lay their eggs, thereby, decreasing breeding areas and populations. However, the impound-

ments disrupted the natural water flow between the impounded areas and the estuaries including Indian River, Banana River and Mosquito Lagoon. This hydrologic shift altered fish and wildlife habitats and allowed many invasive exotic plant species to establish. The impoundments enclose a wide range of ecosystems from brackish-estuarine and freshwater wetlands to scrub communities and orange groves.

The refuge is an important habitat for migratory birds and some impoundments are managed for specific birds. However in other impoundments the

goal is to restore natural hydrologic connections by removing dikes and allowing these ecosystems to reorganize. Jeff completed the Wetlands Concentration at UF and received a B.S. in horticulture/landscape design from Michigan State University.



Dr. Matthew J. Cohen joins School of Forest Resources and Conservation to focus on Forest Watershed Systems

In March of 2006, Dr. Matthew J. Cohen joined the School of Forest Resources and Conservation as an Assistant Professor of Forest Water Resources. Dr. Cohen is a watershed systems scientist with broad interests in wetland ecosystems ecology, hydrologic dynamics, ecosystem monitoring and assessment, and environmental valuation.

Through his new position, Dr. Cohen hopes to improve our understanding of the services that forests and wetlands provide for healthy watersheds. He is developing a new

course titled Forest Water Resources (spring 2007) that will focus on hydrologic processes in forested watersheds, and co-developing a graduate course on adaptive management of water and watersheds for the new IGERT program.

Dr. Cohen received a B.S. in Environmental Engineering from Swarthmore College, and an M.E. in Ecological Engineering and Ph.D. in Systems Ecology from the University of Florida.

For more information go to <http://mjcohen.ifas.ufl.edu/>



Research Highlights

Predicting the Properties of Everglades Soils Using New Sensor Technologies

Matthew Cohen, School of Forest Resources and Conservation, and Mark Clark, Sabine Grunwald, and Ramesh Reddy, Soil and Water Science Department

Soil represents a repository of ecosystem information that will be invaluable as a measure of restoration progress as the Comprehensive Everglades Restoration Program proceeds. By virtue of integrating ecological processes over time, certain soil properties (soil phosphorus, soil carbon quality, soil nitrogen) are candidates for ecosystem performance metrics. This research explores the efficacy of new optical sensors in the visible and near infrared spectrum for predicting the properties of soils; the technique, known as diffuse reflectance spectroscopy, is rapid (>200 samples/day), inexpensive (<\$1/sample), precise (~2% replicate error), accurate and requires no reagents. The research is developing calibrations between detailed reflectance spectra and soil properties measured in the laboratory, and using those calibrations to understand various edaphic processes occurring across scales (from the whole ecosystem, to patterns at the community mosaic scale). Results to date demonstrate methodological efficacy and reinforce the need to examine the soil when evaluating ecological system responses to restoration. Funded by the US Dept. of Interior, Critical Ecosystems Studies Initiative.

Nutrient Loading to Newnans Lake

Matthew Cohen and Larry Kohrnak, School of Forest Resources and Conservation

Newnans Lake is a shallow, hyper-eutrophic lake near Gainesville. While nutrient levels in the lake are elevated with respect to historic conditions, the watershed is among the least developed in the state, with only a small fraction of lands in what are traditionally considered high nutrient load land uses. The objective of the project is a comprehensive survey of water quality in space and time in an effort to understand the loading dynamics to the lake, and develop hypotheses for how loads might be attenuated at the landscape scale. Funded by the St. Johns River Water Management District.



Students Install Weir at SEEP

The UF Stormwater Ecological Enhancement Project (SEEP) began in 1995 as a take-home final exam for the course Ecosystems of Florida. The objective was to develop a management plan to enhance a conventional stormwater retention basin located within the University of Florida Natural Area and Teaching Lab (NATL) for species diversity while optimizing the basin's use for research and education. In 1998, the UF Wetlands Club took this project to the next step and initiated the recontouring and planting of the basin. Since then, SEEP has become a popular place for educating visitors about integrating wetland function in stormwater basins and has also served as the site for numerous research projects.

This spring, a new weir was in-

stalled between the forebay and the rest of the basin. The weir was designed by Dr. Mark Clark, and students Chris Martinez and Kevin Ratkus to allow for adjustable openings to control the water flow. It is hoped that the weir will assist with future research at the SEEP.

Marty Werts, Darrell Pons, John Black, Jimmie Ross, Michael Franklin, and Les Bloomfield of the UF Physical Plant Division were instrumental in the construction process. Twelve members of the UF Wetlands Club carried and



poured the cement and 8 sorority & fraternity volunteers assisted with the clean-up and finishing touches as part of "Greek Day".

Recent Publications (sample representation)

We invite faculty to submit publications to be referenced in future newsletters.

- Brenner, M. D.A. Hodell, J. H. Curtis, W.F. Kenney, B. Gu, J.M. Newman, and B.W. Leyden. 2006. Mechanisms for organic matter and phosphorus burial in sediments of a shallow, subtropical, macrophyte-dominated lake. *Journal of Paleolimnology* 35:129-148.
- Cohen, M.J., J.P. Prenger and W.F. DeBusk. 2005. Visible-Near Infrared Spectroscopy for Rapid, Non-Destructive Assessment of Wetland Soil Quality. *Journal of Environmental Quality* 34:1422-1434
- Grunwald S., R. Corstanje, B.E. Weinrich and K. R. Reddy. 2005. Spatial patterns of labile forms of phosphorus in a subtropical wetland 10 years after a sustained nutrient impact. *Journal of Environmental Quality* 35: 378-389.
- Martin J., J.D. Nichols, W.M. Kitchens, and J.E. Hines. 2006. Multiscale patterns of movement in fragmented landscapes and consequences on demography of the snail kite in Florida. *Journal of Animal Ecology*. 75 (2):527-540.
- Reinhardt, C. H. and S. M. Galatowitsch. 2005. *Phalaris arundinacea* (reed canary grass): rapid growth and growth pattern in conditions approximating newly restored wetlands. *Ecoscience* 12 (4): 569-573.
- Rice, K.G., J. H. Waddle, M.E. Crockett, R.R. Carthy, and H. F. Percival. 2005. Herpetofaunal inventories of the National Parks of South Florida and the Caribbean: Volume III. Big Cypress National Preserve. US Geological Survey, Open File Report 2005-1300, Fort Lauderdale, Florida.
- White, C.L., and M.B. Main. 2005. Waterbird use of created wetlands in golf course landscapes. *Wildlife Society Bulletin* 33:411-421.

Upcoming Conferences and Events

- Soil and Water Science Department Research Forum, September 15, 2006. <http://soils.ifas.ufl.edu/forum/>
- Hydric Soils (Specialized Training for Wetland Specialists), October 3-5 OR October 31-November 2 OR November 28-30, 2006. <http://conference.ifas.ufl.edu/soils/hydricsoils/>

*To submit comments or content for future newsletters (research, publications or alumni) please contact **Mark Clark, clarkmw@ufl.edu** .*