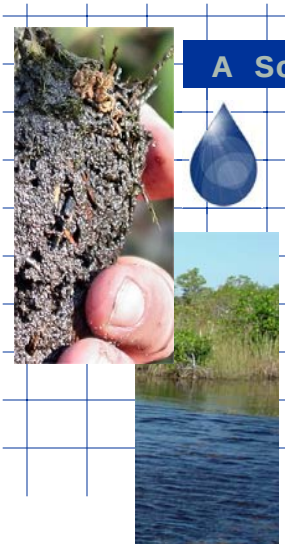


A Soil and Water Science Department Publication

# Myakka

Volume 5 Number 3 | Institute of Food and Agricultural Sciences | Fall 2005

## URBAN LAND USE AND MANAGEMENT

**U**rban land use is an important component of global land transformation, as prime agricultural and forested lands are now converted into cities and towns. Less than half of the world's population now reside in urban environments. Urban land use is a dominant demographic trend in Florida and the U.S. with approximately 80% of the US population now living in urban areas. In Florida, almost 90% of it's population of nearly 17 million, occupy urban land areas. The intense use of these lands brings unique challenges of soil and water quality including: soil contamination and remediation, stormwater management, land application of wastes and waste waters, septic tanks, water borne pathogens, and flooding of these land areas during extreme events such as hurricanes. Given these challenges, the Soil and Water Science Department (SWSD) is making efforts to increase its role in addressing current and future needs in this area.

Here are few highlights since the last newsletter:

Alan Wright joined as Assistant Professor in Soil and Water Science at the Everglades REC, Bell Glade, Florida. Alan's research and extension activities will revolve around nutrient management and water quality issues in agricultural and urban land areas in south Florida.

The Sixth Annual SWSD Research Forum was a success, thanks to active participation from students, faculty, and clientele. Dr. Henry Gholz, from the National Science Foundation, and Dr. Kirby Barrick, Dean for Academic Programs, CALS, were the key speakers at the Forum. Several graduate students and post-doctoral fellows made oral and poster presentations. Best oral and poster presentation awards were given to: Gabriel Kasozi, Sanjay Lamsal, Rosanna Rivero, and Ondine Wells.

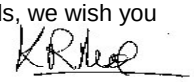
## FROM THE CHAIR

Once a year the SWSD awards scholarships to graduate and undergraduate students. This year, the F. B. Smith award was given to undergraduate students: Aja Stoppe and Julie Driscoll. The following graduate students were awarded scholarships: Carlisle award - Gabriel Kasozi; Polston award - Myrlene Chrysostome, Daniel Herrera and Carolina Medina; Robertson award - Elizabeth Hodges. The SWSD Outstanding Undergraduate award was given to Lauren Dillard. The SWSD award for excellence in graduate studies was given to Patrick Inglett in the Ph.D category and to Julie Padowski in the M.S category. Manohardeep Josan received the "Graduate Student of the Year Alpha Zeta 2005 Homecoming Award" and the CALS "Outstanding International Student Award" . The SWSD Superior Accomplishment Award was given to USPS staff members: John Thomas and Yu Wang. The SWSD Teacher and Advisor of the Year award was given to two faculty members: James Jawitz and Vimala Nair.

At the national level, recognitions to faculty include: Mary Collins, President of Soil Science Society of America; George O'Connor recipient of the Environmental Quality Research Award; and Willie Harris elected as a Fellow of the Soil Science Society of America.

Congratulations to all award and scholarship winners for their outstanding contributions to SWSD.

Overall, accomplishments of faculty, staff, and students in the past five years have continued to elevate the department's stature at national and international levels. The Department continues its commitment to excellence in teaching, research, and extension/outreach programs. The following goals for the next 5 years were developed during the departmental statewide faculty meeting (conducted in MFREC-Apopka): (1) recognize advances and changes in soil and water science discipline and adjust programs accordingly to stay current; (2) continue to build on SWSD strengths and develop nationally prominent programs in teaching, research, and extension; (3) develop stronger programmatic linkages between Gainesville campus and RECs; (4) develop stronger linkages with the clientele; and (5) overall, bring SWSD programs to the next level of excellence. To our alumni and friends, we wish you a happy and prosperous new year.





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## New Graduate Students Fall 2005

**PhD**

Andrea Albertin, Advisor, J. Sickman
Das Jaya, Advisor, S. Daroub
Ha Ryan Kim, Advisor, K. Reddy
Jessica Miles, Advisor, S. Grunwald
Michael Miyittah, Advisor, J. Rechcigl
Casey Schmidt, Advisor, M. Clark
Lauren Serra, Advisor, N. Comerford
Ramona Smith, Advisor, J. Sickman

**MS**

Erin Atkinson, Advisor, J. Jawitz
Cheryl Baptist, Advisor, M. Teplitski
Charles Bohall, Advisor, K. Reddy
Christine Coffin, Advisor, Y. Li
Caitlin Hicks, Advisor, K. Reddy
Lalitha Janardhanan, Advisor, S. Daroub
Kathleen Lockhart, Advisor, S. Grunwald
Mary Maddox, Advisor, C. Mackowiak
Augustine Muwamba, Advisor, P. Nkedi-Kizza
Marcela Quintero, Advisor, N. Comerford
Catherine Rolen, Advisor, C. Wilson
Joe Sewards, Advisor, M. Clark
Lisa Shaw, Advisor, M. Clark
Stephen Sirotko, Advisor, L. Ma
Shannon Smith, Advisor, J. Jawitz
Sam Vacca, Advisor, K. Reddy
Gustavo Vasques, Advisor, S. Grunwald
Jiang Yang, Advisor, L. Ma

## Graduated Fall 2005

**PhD**

Noel Cawley, Advisor, W. Harris
Myrlene Chrysostome, Advisor, V. Nair

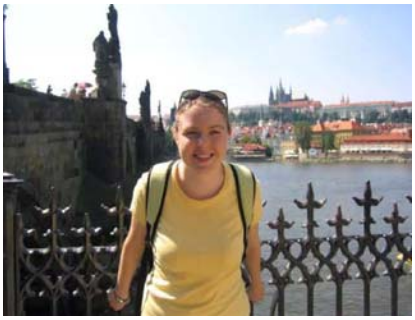
**MS**

Julie Padowski, Advisor, J. Jawitz
Warren Zwanka, Advisor, D. Graetz

**Congratulations…**

Wade Hurt and Vic Carlisle presented a poster at the 2005 Coastal Zone Conference, New Orleans, LA, July 17-21, 2005. The poster, 'Using Soil Morphology for Identification, Delineation, and Mitigation of Wetlands in Coastal Zone Landscapes', was awarded a blue ribbon.

## The Czech Republic Experience



*Victoria Gardner, SWSD undergraduate student, in Prague*

A group of nine undergraduate students from the University of Florida participated in a month long course, which integrated aspects of forestry, wildlife, hydrology, soils, and policy. Based in Prague, the capital of the Czech Republic, the group was exposed to a rich culture, brilliant architecture, and a peaceful countryside. I was fortunate enough to have been selected for the program and gained the awesome opportunity to study Czech soils and watersheds, said Leanna Woods. The soils that we may call Spodosols in the United States are referred to as Podzols in Czech and they are not formed through the effects of a fluctuating water table. The great permeability of the Podzols allows water to rush through the system, carrying nutrients to lower soils depths. The Podzols are an excellent environment for the Forests of the Czech Republic, which currently are dominated by the Norway Spruce, *Picea abies*. Growing quickly and with a high timber yield, foresters have purposefully planted the Norway Spruce, allowing other species to dwindle. Recently, the forests have been under attack by a bark beetle, which enjoys the monoculture the Czechs have created. Efforts are being made to stop the spread of the bark beetle and promote the growth of other tree species. The preservation of forests is of utmost concern to many a Czech, for the lands are not only used for timber production, but are also very popular recreational sites. Many Czechs enjoy picking mushrooms and berries, hiking, and feeling close to nature. Therefore, when trees are cut for timber or for the health of the stand, the public becomes quite agitated. Foresters must attempt to balance economics, the health of the stand, and public opinion, which is a hard enough task without the overhaul of one's government having taken place over the last decade. The fall of communism in 1989 has allowed the people of the Czech Republic to make their own decisions without foreign influence. With admittance into the European Union, there is likely to be even greater changes occurring in this fascinating land. We hope one day to return to the Czech Republic to enjoy the forests and the culture. *This article was written by Leanna Woods, SWSD undergraduate student, who participated in the program.*

# FACULTY

## 2005 Environmental Quality Research Award

George A. O'Connor received the 2005 Environmental Quality Research Award. This award is given annually by the American Society of Agronomy to an individual known for original and significant research in environmental issues related to agriculture and natural resources. George O'Connor is a Professor of Environmental Soil Chemistry in the Soil and Water Science Department at the University of Florida. O'Connor's program focuses on the application of basic soil chemistry to issues associated with the land application of non-hazardous wastes (primarily biosolids) and the determination and control of the fate and transport of waste constituents. Recent efforts have focused on the interpretation of data in light of risk assessment, sustainability issues, state and national rule development, and the use of various soil amendments to control pollutant behavior. O'Connor was Chair of the Soil and Water Science Department (UF) from 1990-1994 and is a Fellow of both the American Society of Agronomy and the Soil Science Society of America.

## Willie Harris — SSSA Fellow

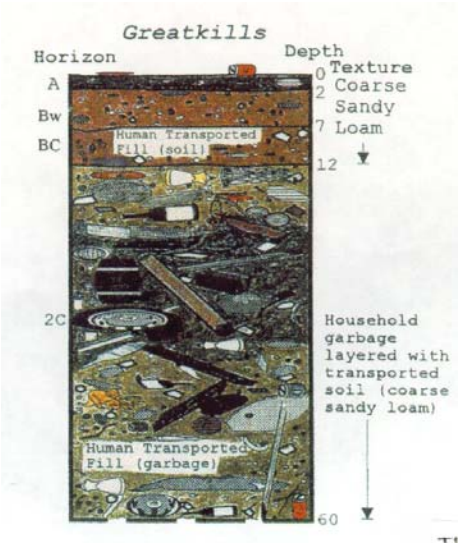
Willie Harris was elected as a Fellow of the Soil Science Society of America (SSSA). This is the highest recognition given to SSSA members for their professional achievements and service. Up to 0.3% of the active members are elected as Fellows each year. His general research activities relate to mineral stability and transformations in soils and sediments; properties of soil minerals; mineral distributions as related to stability and genetic processes; and soil properties as related to mineralogy.

Harris was elected as a Fellow of SSSA for his outstanding research and teaching accomplishments. He has also been selected to receive the 2005 College of Agricultural and Life Sciences (CALS) graduate Teaching/Advising Award. This award is given annually to an outstanding graduate advisor/teacher in the CALS.

# URBAN LAND USE AND MANAGEMENT

*Soil scientists investigate soils in subdivisions to determine depth to high water table and the presence of shrink-swell clays.*

The continued urban growth in Florida poses unique challenges for the use and management of soil and water. Urban uses of soil are replacing rural uses in many Florida counties. Soil is a very important natural resource even in urban and urbanizing areas because it serves as a foundation for buildings and structures, and as an absorbent for pollutants. Citizens do not realize the amount and importance of non-concrete, non-asphalt "open-space" in urban environments. For example, City Parks provide open-space but are often constructed on abandoned land or even landfills with vastly different soil properties. Children play on ball fields that may have high contents of heavy metals and other pollutions. In urbanizing areas soil properties may be the limiting factor for development. Soils with high shrink-swell mineralogy must be identified before construction. Homeowners may need to spend thousands of dollars if cracking occurs in foundations built on shrink-swell clays. Urban wetlands and constructed storm water retention basins must be monitored to ensure that hydrocarbons or heavy metals do not build up and contaminate the basin. Thus, there are many questions and concerns related to soil for urban land use and management in Florida. For further information, contact Mary Collins at mec@ifas.ufl.edu.




*This soil is located in a landfill that is now a park in New York City.*

## Recycling Biosolids in the Urban Setting

*Biosolid application on turf*

Biosolids are nutrient-rich organic materials that result from the treatment of sewage sludge. When treated and processed to exacting standards, sewage sludge becomes biosolids which can be safely recycled and applied as fertilizer to sustainable improve and maintain productive land and to stimulate plant growth. In Florida, biosolids identified as Class AA have essentially no pathogen hazard and minimal heavy metal concerns. Class AA biosolids, especially pelletized products (e.g., Milorganite, GreenEdge), lend themselves to easy application on urban lawns, and are favored products for golf course greens. *See Biosolids Page 4*

*FDEP Environmental Plots—Towers represent collection points for buried lysimeters*

## New Turfgrass Research Facility at the University of Florida

An exciting new era for the University of Florida turfgrass research program began in February at the Plant Science Research and Education Unit near Citra. Heavy equipment began transforming a 28.6 acre parcel into a state-of-the-art turfgrass research facility that will harbor three complete golf holes, a football field, a baseball infield, a 20K sq foot variable depth USGA green, a 20 K sq ft push up green, a 32 K sq ft variable rate irrigation area, a 1.2 acre putting green and thirty 10 K sq ft research plots. *See Facility Page 4*

## New Florida Homeowners Often Encounter Problem Soils

Many new residents of Florida's rapidly-growing urban areas learned how to garden and grow ornamental plants in Midwestern states. They quickly find that the soils in their new yards are vastly different than what they remember from "back home." Soils high in clay and organic matter are nowhere to be found, but there is no shortage of poor-fertility coarse sand, especially to the south and close to the coast. Do-it-yourself gardeners and landscapers discover their old ways of doing things do not work well, so many of them give up and hire a professional landscape service. The brave ones take time and effort to learn Florida gardening techniques, often taking advantage of the UF-IFAS Extension Service Master Gardener program.

A major factor leading to gardening and landscaping woes is the burial of native surface soil around the home and yard with fill material. In low-lying areas near the coast, building codes often require the elevation of home sites to be raised 3 feet or more above the natural ground surface, so fill from sand mines is brought in. This "soil" is essentially all sand, contains almost no organic matter, and usually contains free calcium carbonate (not surprising considering the Florida peninsula's lime rock base). The resulting alkalinity leads to immediate problems when the unknowing homeowner plants an acid-loving species like Ixora and iron deficiency appears. Micronutrient deficiencies in plants on high pH soils are extremely difficult to overcome. One solution is to consult a local Master Gardener or Extension Agent to learn which ornamental species can thrive at high pH, then use them in the landscape.

*See Homeowners Page 4*

*Con't Facility Page 3*

Eight of these research plots (80 K sq ft) have been dedicated to the turfgrass breeding program. Six vegetative and seeded bermuda cultivars were planted on the football field. One hundred lysimeters (3 ft diameter by 3 ft depth) were buried in the plots for leachate collection. Results from this three-year study sponsored in part by the FDEP will serve as a basis for BMP fertilization recommendations for home lawns.

A 6 K sq ft maintenance facility has been approved for construction and is slated for completion in February 2006. The Toro corporation has been one of the major contributors to the facility. Toro donated state of the art irrigation equipment and turfgrass maintenance equipment each valued at approximately $250 K. The Seven Rivers Golf Course Superintendents Association using funding from the Envirotron Classic, pledged $30 K annually for a five-year period to support a field research maintenance position. The Florida Sod Growers Cooperative and Environmental Turf donated turfgrasses in the form of sprigs and sod. The Florida Gulf Coast Golf Course Superintendents Association donated funding for a part time OPS position. Harrell's, Green Edge Technologies, Pursell's and Liquid Ag Systems donated fertilizer materials for grow-in and maintenance of the turfgrasses. Pennington Seeds donated the seeded bermudas for the football field.

This turfgrass research facility is unequaled in complexity and research opportunities. Due to the number of turfgrass species, cultivars and the growing media diversity this facility represents research opportunities that are not found at any other turfgrass research facility in the US. Take the short drive down to Citra and Jerry Sartain will gladly give you a tour of this fantastic facility! For further information, contact Jerry Sartain at jbs@ifas.ufl.edu.

*Con't Homeowners Page 3*

*Burial of surface soil under fill material*

Determined gardeners can battle alkaline soils using elemental sulfur and organic soil amendments, but they should prepare themselves for a long and costly effort. For further information, contact Tom Obreza at taob@ifas.ufl.edu

***Con't Biosolids Page 3***

Applying biosolids can improve the soil by adding plant essential nutrients, including nitrogen and phosphorus, sulfur, and micronutrients. The nutrients in biosolids are also usually more slowly released than from traditional fertilizer sources, so nutrients are plant available over a longer time span and less of the nutrients are susceptible to leaching losses during heavy rains. Biosolids can also have a favorable impact on the soil, by increasing water-holding capacity and helping to reduce erosion. In Florida, biosolids can be especially beneficial because the sandy soils have low nutrient and water holding capacities. Additionally, biosolids may contain micronutrients not present in typical chemical fertilizer mixes of nitrogen, phosphorus, and potassium. For further information contact George O'Connor at gao@ufl.edu.

# EXTENSION

## Enhanced Stormwater Basin Design

Urban areas cover approximately 11% of the state of Florida, and an estimated 130,000 acres of natural and agricultural lands are developed every year. With this intensification of land use often comes an increased quantity of stormwater runoff, as well as higher concentrations of sediments, nutrients, heavy metals and other contaminants. Impacts to Florida's water resources, as well as those across the nation, have lead to new permitting requirements for stormwater discharge to state waters and to watershed wide efforts to reduce existing contaminant loads. There is also a growing interest in Low Impact Development strategies that reduce the likelihood of water quality degradation before it occurs.

Many opportunities exist to minimize the quantity and quality changes in stormwater resulting from development through use of source controls and innovative structural and non structural management practices within the watershed. One such practice is the integration of wetlands into stormwater basins to improve water quality. Stormwater basins are designed to mitigate for the difference in volume between pre-development and post-development runoff as well as provide some improvement in water quality. However, with the increased need to address water quality impacts, traditional designs may not be sufficient to meet necessary discharge concentrations or loads. In addition, although stormwater basins have typically been thought of as infrastructure and often been isolated within a development, enhanced basin designs could provide multifunctional benefits that make these areas an amenity to the community and not just a regulatory requirement.

On the University of Florida Campus an existing three acre stormwater retention basins was retrofitted in 1998 in an attempt to improve water quality, promote vegetative diversity, enhance aesthetics, provide wildlife habitat and facilitate the Natural Area Teaching Laboratories (NATL) outdoor classroom research and education resources. Named the Stormwater Ecological Enhancement Project or SEEP, this three acre area has gone from a low diversity (thirty two vegetative species), low complexity (uniform topographic and hydrologic regime) and minimal use education resource to now hosting over 120 vegetative species, five hydrologic regimes, forty two avian species, thirteen herptifauna, four mammals, and two fish species. Water quality improvements have been facilitated by increased sediment accretion rates within target forebay areas allowing for greater removal of contaminants and sorption by organic matter. Over seventy six university courses, numerous Natural History Museum student programs and other educational tours now utilize NATL and SEEP annually. To learn more about SEEP contact Mark Clark at clarkmw@ifas.ufl.edu.