

UF Water Institute Symposium

February 27–28, 2008, Gainesville, Florida

Sustainable Water Resources



FLORIDA CHALLENGES

GLOBAL SOLUTIONS



UF UNIVERSITY of
FLORIDA
Water Institute



www.waterinstitute.ufl.edu

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Acknowledgements

We gratefully acknowledge the contribution of the following people who helped make this Symposium a success.

Symposium Program Committee

- Tom Ankersen, *College of Law, Conservation Clinic, Center for Governmental Responsibility, University of Florida*
- Mark Brenner, *Department of Geological Sciences, University of Florida*
- Caroline Choi, *Progress Energy*
- Joseph Delfino, *Department of Environmental Engineering Sciences, University of Florida*
- Ruth Francis-Floyd, *Department of Fisheries and Aquatic Sciences, University of Florida*
- Peter Frederick, *Department of Wildlife Ecology and Conservation, University of Florida*
- Natalie Freeman, *Environmental Health, College of Veterinary Medicine and College of Public Health and Health Professions, University of Florida*
- Richard Hamann, *College of Law, Center for Governmental Responsibility, University of Florida*
- James Jones, *Department of Agricultural and Biological Engineering, University of Florida*
- Martha Monroe, *School of Forest Resources and Conservation, University of Florida*
- Ramesh Reddy, *Department of Soil and Water Science, University of Florida*
- Leslie Paul Thiele, *Department of Political Science, University of Florida*
- Peter Waylen, *Department of Geography, University of Florida*

Water Institute Staff

- Mary Garvin, *Administrative Assistant, Water Institute, University of Florida*
- Kathleen McKee, *Research Coordinator, Water Institute, University of Florida*
- Mark Newman, *Research Coordinator, Water Institute, University of Florida*
- Lisette Staal, *Research Coordinator, Water Institute, University of Florida*

Student Volunteers

- Graduate Students from the Adaptive Management : Water, Wetlands and Watersheds IGERT Program, and the Agricultural and Biological Engineering, Environmental Engineering Sciences, Food and Resource Economics, and Soil and Water Science Departments.
- Undergraduate students from the J. Wayne Reitz Scholars Program

Symposium Support was provided by the UF Center for Training, Research and Education for Environmental Occupations (UF/TREEO), the UF Office of Academic Technology, and the UF Department of Agricultural and Biological Engineering

Welcome

from University of Florida
President **Bernie Machen**



Faculty, students and special guests:

I am delighted to welcome you to the University of Florida Water Institute Symposium.

This is the Water Institute's first major conference, and it couldn't be more timely. Statewide and across the country, maintaining adequate supplies of freshwater now ranks as one of the nation's foremost public policy concerns. From west to east, the urgency is obvious in the dwindling reserves of Lake Powell, the shrinking Lake Lanier and the record low levels in Lake Okeechobee — not to mention the abnormally dry or drought conditions confronting much of the rest of the U.S.

Only the cooperative efforts of the broadest range of scientists and scholars will allow us to address these challenges. UF faculty conceived the Water Institute to nurture and support this interdisciplinary approach, and organizers have carried that mission forward in this symposium, which includes faculty from throughout the academy. Recognizing that the problems confronting water resources cross all political, disciplinary and professional lines, we are also pleased to have so many participants from business, nonprofits and the public sector.

Thank you for joining us for what promises to be a rich and fruitful symposium.

Sincerely,
Bernie Machen
President, University of Florida

Welcome

from UF Water Institute
Director **Wendy Graham**



Dear Colleagues,

Thank you for joining us for the inaugural UF Water Institute Symposium. We are pleased by the enthusiastic response to this event.

It is the goal of this symposium to bring together professionals, students and the public to examine the challenges of water resources sustainability. During the next two days we will explore the latest developments in science, technology, policy and education that may provide solutions to these challenges. We value your contributions to the discussions and encourage your active participation. Using ideas generated at the symposium, we will develop broad-based recommendations for interdisciplinary research and education programs needed to ensure water resources sustainability for Florida and beyond.

We at the UF Water Institute believe that the best solutions to Florida's water resource issues will be found at the cutting edge intersection of hard science, social science and public policy. Solutions developed in Florida will provide a model for others managing similar water issues throughout the United States and around the world. The UF Water Institute faculty looks forward to partnering with water professionals statewide to make this happen.

Thanks again for participating in the UF Water Institute's first Symposium.

Sincerely,
Wendy Graham
Director, University of Florida Water Institute



Hotel Floorplan



Agenda

Tuesday, February 26, 2008

4:00pm-8:00pm

Symposium Check-in

PRE-FUNCTION AREA

Wednesday, February 27, 2008

7:30 a.m. - 7:30 p.m.

Symposium Check-in

PRE-FUNCTION AREA

8:30 a.m.-10:00 a.m.

Plenary Session: Welcome and Keynote Address

BALLROOM A

(moderator: Wendy Graham, Director, University of Florida Water Institute)

- Wendy Graham, Director, University of Florida Water Institute
- J. Bernard Machen, President, University of Florida
- Jeffrey Lyash, President and Chief Executive Officer, Progress Energy Florida
- Keynote Speaker: Peter Gleick, President and Co-founder, Pacific Institute
Water in the 21st Century: Real Problems; Real Solutions

Sponsored by: Progress Energy

10:00 a.m. -10:30 a.m.

Break

Sponsored by: Carollo Engineers

10:30 a.m. -12:30 p.m.

Plenary Session: Complex Challenges to Sustainable Water Resources

BALLROOM A

(moderator: Wendy Graham, Director, University of Florida Water Institute)

- Matthew Larsen, Chief Scientist for Hydrology, US Geological Survey
Water Resources, Population Growth, and Land Use Change
- Neil Ward, Director, Decision Systems Research, International Research Institute for Climate and Society, The Earth Institute at Columbia University
Climate Variability and Climate: Seeking the Meaning for Water Resources Management
- Lora Fleming, Co-Director of the NSF NIEHS Oceans and Human Health Center, University of Miami
Water and Public Health in Florida
- Bron Taylor, Associate Professor, Department of Religion, University of Florida
Thinking like a Watershed: Spirituality, Ethics & Watershed Organizing

Speakers Sponsored by: Tampa Bay Water

South East Climate Consortium

The Frances C. and William P. Smallwood Foundation

12:30 p.m.-1:30 p.m.

Lunch at Albert's Restaurant (included)

1:30 p.m.-3:00 p.m.

Concurrent Oral Presentations: Challenge - Population Growth and Land Use Impacts to Water Resource Sustainability

BALLROOM B

(moderator: Ramesh Reddy, Graduate Research Professor, University of Florida)

- Margaret (Peggy) Carr, Professor, Associate Dean for Students and Academic Affairs, University of Florida College of Design, Construction and Planning
Florida's Other Limited Resource: Land
- Roger Sims, Holland & Knight LLP
The Interface of Water Use and Growth Management
- David York, York Water Circle, Tallahassee, Florida
Water Reuse: The Florida Model



Agenda

1:30 p.m.-3:00 p.m.

Concurrent Oral Presentations: Challenge - Climate Variability and Climate Change Factors Impacting Water Resource Sustainability
(moderator: James Jones, Distinguished Professor, University of Florida)

DOGWOOD

- **David Zierden**, State Climatologist, Center for Ocean – Atmospheric Prediction Studies, Florida State University
Florida's Climate: From El Nino to Climate Change
- **Alison Adams**, Sr. Manager, Source Rotation & Evaluation Protection, Tampa Bay Water
Dealing with Climate Uncertainty in Operating a Reliable Water Supply System
- **Jayantha Obeysekera**, Director, Hydrologic & Environmental Systems Modeling, South Florida Water Management District
Incorporation of Climatic Variability for Management of Water Resources in South Florida

1:30 p.m.-3:00 p.m.

Concurrent Oral Presentations: Challenge - Public, Wildlife and Ecosystem Health and Water Resource Sustainability
(moderator: Natalie Freeman, Associate Professor, University of Florida)

BALLROOM C

- **Glenn Morris**, Director, Emerging Pathogens Institute, University of Florida
...And is the Water Safe?
- **Marilyn Spalding**, Research Associate Professor, Department of Infectious Diseases and Pathology, College of Veterinary Medicine, University of Florida
Florida's Wetlands and Wildlife Health
- **Louis Guillette**, Professor, Department of Zoology, University of Florida
Aquatic Contaminants and Reproductive Health: Lessons Learned from Wildlife

3:00 p.m.-3:15 p.m.

Break

Sponsored by: PBS&J

3:15 p.m.-5:00 p.m.

Concurrent Oral Presentations: Population Growth and Land Use Impacts to Water Resource Sustainability
(moderator: Ramesh Reddy, Graduate Research Professor, University of Florida)

BALLROOM B

- **Mark Clark**, Associate Professor, Soil Water Science Department, University of Florida
Identifying and Overcoming Barriers to Implementation of Low Impact Development Practices in Florida
- **Thomas Ruppert**, Assistant in Environmental Law, UF IFAS and Levin College of Law
From Rooftop to River: The Legal and Administrative Basis for Managing Stormwater through Low-Impact Development
- **Charles Fletcher**, Attorney, de la Parte & Gilbert, P.A.
Water Rights in Florida: Public Perception v. Legal Reality
- **Matthew Cohen**, Assistant Professor, School of Forest Resources and Conservation, University of Florida
The Hydrologic Implications of Large Scale Biofuel Production
- **James Jawitz**, Associate Professor, Soil and Water Science Department, University of Florida
The Hydraulic Cycle in Florida's Metropolitan Areas
- **Larry Parsons**, Professor, Soil and Water Science Department, University of Florida
Reclaimed Water – A Sustainable Source for Florida's Growing Water Demands

3:15 p.m.-5:00 p.m.

Concurrent Oral Presentations: Climate Variability and Climate Change
(moderator: James Jones, Distinguished Professor, University of Florida)

DOGWOOD

- **Guillermo Baigorria**, Post-Doctoral Research Associate, Agricultural and Biological Engineering, University of Florida
Changes in rainfall patterns in the Southeast USA

- **Jessica Bolson**, Research Assistant, Rosenstiel School of Marine and Atmospheric Science, University of Miami
Integrated Water Resources Planning for South Florida
- **Jack Kiefer**, Senior Associate, Hazen and Sawyer, P.C.
A Risk Management Framework for Evaluating Climate Change Impacts on Water Supply Reliability
- **Kathleen O'Neil**, Senior Project Manager, PBS&J, Inc.
Dynamic Decision Support System (D2S2) for Regional Water Resource Management
- **Kelly Stevens**, Meteorologist, Division of Air Resource Management, Florida Department of Environmental Protection
Drought and its Relationship to Long-term Climatological Indicators in the Apalachicola-Chattahoochee-Flint River Basin
- **Jennifer Jacobs**, Associate Professor, Department of Civil Engineering, University of New Hampshire
Evapotranspiration and Florida Water Sustainability: Insights from a Decade of Research

3:15 p.m.-5:00 p.m.

Concurrent Oral Presentations: Public, Wildlife & Ecosystem Health and Water Resource Sustainability
(moderator: Natalie Freeman, Associate Professor, University of Florida)

BALLROOM C

- **Elizabeth Anderson**, Deputy Director, Global Water for Sustainability Program
Addressing the Intertwined Issues that Affect Water Resource Sustainability Worldwide: Lessons from South America and East Africa
- **Sarah Lynch**, Director Agriculture Markets, World Wildlife Fund
Valuing Ecosystem Services on Florida Ranchlands: Lessons Learned
- **Susan Gray**, Deputy Director, Watershed Management Department, South Florida Water Management District
Can One Lake Be Everything to Everyone? The Challenge of Managing Lake Okeechobee for Multiple Users.
- **Vimala Nair**, Research Associate Professor, Soil and Water Science Department, University of Florida
Phosphorus Issues and Protocol Development for Risk Assessment in Florida Watersheds
- **Tom Frazer**, Associate Professor, Department of Fisheries and Aquatic Sciences, University of Florida
Is Increased Nutrient Delivery Compromising the Ecological Integrity of Florida's Spring-fed Coastal Rivers?
- **Ann Shortelle**, Chief Scientist, MACTEC Engineering and Consulting, Inc.
Scorecard for Chemical Treatments to Control Nutrients in Surface Water Restorations in Florida

3:15 p.m.-5:00 p.m.

Concurrent Oral Presentations: Water Quality Impacts and Implications
(moderator: Joseph Delfino, Professor, University of Florida)

LIVEOAK

- **Rick Copeland**, Geologist, Florida Geological Survey
Potential for Statewide Saline Encroachment of Florida Spring Water
- **Jim Heffernan**, Post-Doctoral Research Associate, School of Forest Resources and Conservation, University of Florida
Re-evaluating the Relationship between Nitrogen and Algae Blooms in Florida Springs
- **Chance Lauderdale**, Professional Engineer, Carollo Engineers
Monitoring for Microcontaminants in an Advanced Wastewater Treatment Facility
- **Dale Griffin**, Environmental and Public Health Microbiologist, US Geological Survey
Microbiological perspectives – The impact of wastewater disposal systems on Florida's coastal waters
- **Erich Marzolf**, Technical Program Manager, St. Johns River Water Management District
Will Increased Reliance On Reuse Further Impair Our Waterways?



Agenda

5:00 p.m. -7:30 p.m.

- **Peter Sheng**, Professor, Coastal and Civil Engineering, University of Florida
Hypoxia In Estuarine & Coastal Waters

Poster Presentations and Reception (included)

BALLROOM A and HAWTHORNE

- Session 1 - 5:30 to 6:30 (includes Best Graduate Student Poster Competition)
- Session 2 - 6:30 to 7:30

(moderator: Kathleen McKee, Research Coordinator, UF Water Institute)

Six Poster Sections

- Population Growth and Land Use Change
- Climate Variability and Climate Change Factors
- Public Health, Wildlife Health and Ecosystem Health
- Nutrient Enrichment and Emerging Contaminants
- Public Perceptions, Values, Attitudes and Socioeconomic Factors
- Water Availability and Allocation

For Complete List of Poster Presentations by Session see page 12.

For Alphabetic Listing of Posters by Author see page 19.

For Map of Poster Layout see page 18.

Sponsored by: Progress Energy

Thursday, February 28, 2008

7:30am-3:00pm

Symposium Check-in

PRE-FUNCTION AREA

8:30 a.m. -10:00 a.m.

Concurrent Panel: Florida Water Availability And Water Needs In 2020, 2060

BALLROOM B

(moderator: Steve Seibert, Executive Director, The Century Commission for a Sustainable Florida)

Summary description of panel: Florida's economic and social development over the past several decades has been fueled by its climate and abundant water resources. Increased population, rapid urban development, large agricultural water demands and the need to protect natural resources, however, have led to water availability problems in many parts of the State. Each panelist will be asked to discuss barriers and bridges to understanding statewide water availability in both 2020 and 2060; the water needs of various users (agriculture, urban, industrial, ecosystems) in those years; and the successes/failures of programs and policies that promote water resource sustainability (MFLs, water conservation, demand management, alternative water supplies, reuse, etc). Targeted questions and discussion will follow.

Panelists:

- **Janet Llewellyn**, Director, Division of Water Resource Management, Florida Department of Environmental Protection
- **Chuck Aller**, Director, Office of Water Policy, Florida Department of Agriculture and Consumer Services
- **Don Polmann**, Director, Science & Engineering, Tampa Bay Water
- **Bill Pine**, Assistant Professor, Department of Fisheries and Aquatic Sciences, University of Florida
- **Steve Kurcan**, Grady Pridgen, Inc.

Sponsored by: Tampa Bay Water

8:30 a.m. -10:00 a.m.

Concurrent Panel: Sources and Impacts of Emerging Contaminants

DOGWOOD

(moderator: Joseph Delfino, Professor, University of Florida)

Summary description of panel: Emerging contaminants are impacting human and ecological health. Wastewater and drinking water treatment is becoming increasingly challenged. What is truly meant by emerging contaminants and how seriously are they taken? What makes contaminants "emerging"? Are "emerging" contaminants new or just newly recognized? Are "emerging" contaminants always emerging?

How should we be positioning ourselves through science, policy and public awareness to understand and address emerging contaminants? How can we ensure that the best available scientific information is used to establish priorities and make management decisions regarding water resources? What role do experiments, observations, lab work, etc. play in this? Key Question for panelists - "What are the major threats and current responses to emerging contaminants in water and how much does it matter?"

Panelists:

- **Andy Kane**, Associate Director, Emerging Pathogens Institute, University of Florida
- **Nancy Denslow**, Scientist, Department of Biochemistry and Molecular Biology, University of Florida
- **Brian Katz: Hydrologist**, US Geological Survey
- **Timothy Fitzpatrick**, Administrator, Chemistry Section, Florida Department of Environmental Protection

Sponsored by: Soil and Water Engineering Technology, Inc.

8:30 a.m. -10:00 a.m.

Concurrent Panel: Water Transfers: Who Decides? People, Policy And Politics

BALLROOM C

(moderator: Katrina Schwartz, Assistant Professor, University of Florida)

Summary description of panel: "Water wars" have long been a fact of life in the American Southwest, and now they may be in the offing for Florida. With population and water consumption continuing to grow rapidly, officials across the state are looking at the costs and benefits of water transfers in Florida. How and by whom are such critical decisions about water transfers made in Florida? This panel discussion will examine the role of various stakeholders in the decision-making process, and assess the possible social and economic impacts of water transfers on different communities and demographic groups.

Panelists:

- **Christine Klein**, Professor of Law, University of Florida Levin College of Law
- **Melissa Meeker**, South Florida Water Management District Governing Board Member
- **Tom Swihart**, Administrator, Office of Water Policy, Florida Department of Environmental Protection
- **Hal Wilkening**, Director, Department of Resource Management, St. Johns River Water Management District
- **Woody Wodraska**, National Director of Water Resources, PBS&J, Inc.

Sponsored by: Ardaman and Associates

10:00 a.m. -10:30 a.m.

Break

Sponsored by: CH2M Hill

10:30 a.m. -12:00 p.m.

Concurrent Panel: Water Conservation as an Alternative Water Supply

BALLROOM B

(moderator: David Bracciano, Demand Management Coordinator, Tampa Bay Water)

Summary description of panel: Competition and cost to develop limited conventional and other alternative supplies continues to rise. The use and implementation of cost effective quantifiable conservation methods, programs and measures can significantly reduce the need for these conventional supplies and increase available resources for its best use. What role should water conservation and increased efficiency play in the development and use of water supplies? What strategies and evaluations are necessary to identify the availability and cost of conserved water and in what major sectors of demand? How does future water use efficiency potential fit in supply scenarios? What role does the private sector play in increasing efficiency of use? This panel will identify the methodologies that can and have been used to successfully lower existing and future average and peak demands, what potential exists in various sectors, applicable research that can quantifiably affect future and existing demands and how both public and private entities can play a significant role in increased efficiency and conservation of water resources.



Agenda

Panelists:

- **Bruce Adams**, Director of Water Management, EMC Engineers, Inc.
- **Jane Bucca**, Program Manager-Alternative Water Supply and Conservation, South Florida Water Management District
- **Michael Dukes**, Associate Professor, Department of Agricultural and Biological Engineering, University of Florida
- **Pierce Jones**, Professor, Department of Agricultural and Biological Engineering, University of Florida, Program for Resource Efficient Communities
- **Jack Kiefer**, Senior Associate, Hazen and Sawyer, P.C.

Sponsored by: Conserve Florida Water Conservation Clearinghouse

10:30 a.m. -12:00 p.m.

Concurrent Panel: Nutrient Enrichment of Surface, Ground and Coastal Waters

DOGWOOD

(moderator: Peter Frederick, Research Professor, University of Florida)

Summary description of panel: Nutrient enrichment of Florida's waters has enormous potential to affect ecosystems and humans by altering water quality characteristics, radically simplifying plant and animal community composition, and fomenting a number of important wildlife and human disease agents. In addition, there is significant potential for nutrient enrichment to affect the state's economy through its effects on agriculture, human health, commercial fish and shellfish harvest, outdoor recreation and tourism, to name a few. This panel is composed of experts who have grappled directly with effects of nutrients in surface, ground and nearshore waters, often at large spatial scales. They will address the current certainties and uncertainties in predicting effects of nutrient enrichment in Florida, and discuss alternative methods to significantly reduce nutrient enrichment, with a goal of envisioning likely nutrient effects in 2030. The panel will also take questions directly from the audience as time allows.

Panelists:

- **Jerry Brooks**, Deputy Director, Div. of Water Resource Management, Florida Dept of Environmental Protection
- **Peter Doering**, Chief Environmental Scientist, Coastal Systems Division, South Florida Water Management District
- **Karl Havens**, Professor and Chair, University of Florida Dept of Fisheries and Aquatic Sciences
- **Fred Sklar**, Chief Environmental Scientist, Everglades Division, South Florida Water Management District

Sponsored by: Taylor Engineering

10:30 a.m. -12:00 p.m.

Concurrent Panel: Public Perceptions and Practice: A Key to Sustaining Water Resources

BALLROOM C

(moderator: Martha Monroe, Associate Professor, University of Florida)

Summary description of panel: Managing water quality and water quantity is a process that involves research, policy and the public. Public support can enable the effective implementation of policies and regulations. In addition, the solutions to water challenges often depend upon the decisions and actions by individuals who use, conserve, and manage local water resources. Designing programs that effectively inform, educate, motivate and empower the public is a critical complement to research and policy. Panelists will provide case studies that describe effective strategies for reaching and engaging the public, discuss the theories that drive their practices and provide recommendations for others who wish to develop programs for the public.

Panelists:

- **Elaine Andrews**, Director, University of Wisconsin Environmental Resources Center
- **Linda Burnette**, Director, Office of Communications & Governmental Affairs, St. Johns River Water Management District
- **Darrell Smith**, Coordinator, Suwannee River Partnership, Florida Dept of Agriculture and Consumer Services
- **Martha Strawn**, Author/Artist, University of North Carolina, Charlotte

Agenda

12:00 p.m. -1:00 p.m.	Lunch at Albert's Restaurant (included)	
1:00 p.m.-1:15 p.m.	Plenary Presentation: Best Graduate Student Poster Awards Poster awards sponsored by: The Frances C. and William P. Smallwood Foundation	BALLROOM A
1:15 p.m.-1:45 p.m.	Plenary Session: Symposium Synthesis, A Bird's Eye View (moderator: T. Ankersen, Legal Skills Professor, University of Florida)	BALLROOM A
	<ul style="list-style-type: none"> • Mark Brown, Associate Professor, University of Florida Department of Environmental Engineering Sciences • Richard Hamann, Associate in Law, University of Florida Levin College of Law • Sanford Berg, Director of Water Studies, Public Utility Research Center, Warrington College of Business, UF 	
1:45 p.m.-3:15 p.m.	Plenary Session: Florida Policies and Programs: Challenges and Opportunities (moderator: Les Thiele, Professor, University of Florida)	BALLROOM A
	<p>Summary Description: This panel consists of three executive directors and one deputy executive director of four Florida Water Management Districts, as well as the Deputy Secretary of the Florida Department of Environmental Protection (FDEP). Panel members will be addressing the most significant challenges to managing Florida's water resources today and in the foreseeable future. They will also identify those policies and programs that are currently working well, and those policies and programs that need to be developed to ensure successful water management for the coming decades.</p> <ul style="list-style-type: none"> • Mimi Drew, Deputy Secretary for Regulatory Programs and Energy, Florida Department of Environmental Protection • Kirby Green, Executive Director, St. Johns River Water Management District • Chip Merriam, Deputy Executive Director for Water Resources, South Florida Water Management District • David Moore, Executive Director, South West Florida Water Management District • David Still, Executive Director, Suwannee River Water Management District 	
3:15 p.m.-3:45 p.m.	Break	
3:45 p.m.-4:45 p.m.	Plenary Session: Town Hall Implications for Florida's Research and Education Agenda - Information, Technology and Policy Needs for Sustainable Water Resources (moderator: Wendy Graham, Director, University of Florida Water Institute)	BALLROOM A
	<ul style="list-style-type: none"> – Open questions/dialogue with the audience – Symposium Synthesis team and the Policies and Programs panelists. 	
4:45 p.m.-5:00 p.m.	Wrap-up and Future Action (moderator: Wendy Graham, Director, University of Florida Water Institute)	
6:00 p.m. - 9:00 p.m.	Opening Reception of the 14th Annual University of Florida Levin College of Law Public Interest Environmental Conference (Separate Registration Required)	University of Florida President's House



List of Poster Presentations By Session

Poster Session 1 5:30 p.m. – 6:30 p.m.

Ballroom A

Climate Variability and Climate Change Factors

Brown, Mark
University of Florida
Assessing the values of water and its allocation under climate change scenarios using a biophysical approach
Poster No. 103

Clarke, Alice
Everglades National Park
Climate Change and South Florida's National Park
Poster No. 105

Dix, Nicole
University of Florida
Water Quality Changes within the Guana Tolomato Matanzas National Estuarine Research Reserve, FL Associated with Four Tropical Storms
Poster No. 106

Keener, Victoria
University of Florida
ENSO based low-frequency precipitation and nutrient load oscillations in the Little River Watershe
Poster No. 108

Kiker, Gregory
University of Florida
Development of a management-focused, spatial decision support tool to simulate water resource effects of climate forecasting within southern Florida beef cattle agroecosystems
Poster No. 112

Woli, Prem
University of Florida
Water Deficit Index (WDI) For Quantifying Crop Water Stresses 1
Poster No. 111

Sheng, Peter
University of Florida
Effects of hurricanes on estuarine and coastal ecosystems
Poster No. 110

Public Perceptions, Values, Attitudes and Socioeconomic Factors

Alvarez Strauser, Diane
Beautyberry Books
Green-up Our Attitudes, Not Our Yards
Poster No. 203

Baum Haley, Melissa
University of Florida
Residential irrigation water application influenced by socio-economic parameters
Poster No. 208

Finnegan, Eleanor
University of Florida
The Role of the Islamic Tradition in Water Issues: Focus on America and Beyond
Poster No. 204

Pawlitz, Rachel
University of Florida
Praying for Rain: Media Framing of Water Allocation in the Apalachicola-Flint-Chattahoochee Basin
Poster No. 210

Snyder, Samuel
University of Florida
Dammed Debate: The Role Values and Perceptions of Water in the Rodman Dam/Ocklawaha River Debate
Poster No.212

Sobczak, Robert
Big Cypress National Preserve
South Florida's Watershed Journal
Poster No. 206

Wilson, James
University of Florida
River of God(s): Religious Perspectives and Conservation of Pakistan's Sindh River
Poster No. 211

Population Growth and Land Use Change

Arias, Mauricio
University of Florida
Characterization of Suspended-Sediment Concentration during runoff-events into a closed-basin stormwater system
Poster No. 309

Bhadha, Jehangir
University of Florida
An Attempt to Sustain the Choctawhatchee Coastal Dune Lakes of Florida from Natural and Anthropogenic Perils: A Collaborative Approach
Poster No. 306

Carey, Richard
University of Florida
Nutrient Loads in the Biscayne Bay Watershed, South Florida (1994-2006): A Trend Analysis
Poster No. 310

Kim, Haryun
University of Florida
The inorganic nitrogen transformations in tributaries impacted by fertilizer and ranch activity, the Santa Fe River
Poster No. 305

Olmsted, Tom
University of Florida
Understanding Urban Outdoor Water Use
Poster No. 312

Phillips, Brian
North Carolina State University
Methods to Predict the Lateral Effect of a Drainage Ditch on Adjacent Wetland Hydrology
Poster No. 302

Stocks, Gabriela
University of Florida
Revering Rivers: Perceptions vs. Reality in an Amazonian Watershed
Poster No. 304

Taft, Jessica
BCI Engineers and Scientists
Poster No. 307
*A Description Of The Landscape Development Intensity Index
And Its Effect On The Stream Condition Indexes Of Florida's
Streams And Rivers*

Water Availability and Allocation

Acar, Ozlem
University of Florida
Poster No. 412
*Analytical Groundwater Models to Analyze Drawdowns in Leaky
Three-Layer Aquifer Systems*

Davis, Stacia
University of Florida
Poster No. 413
Water Conservation in Landscape Irrigation Using ET Controllers

Gowdich, Leslie
University of Florida
Poster No. 413
*Green-Ampt Infiltration and Redistribution Calculations for 1-D
and Quasi 3-D (Point Source) Flow Domains*

Greene, Gretchen
Entrix Inc.
Poster No. 405
*Balancing Long Term Water Demand and Supply: The Arizona
Case Study*

Krekeler, Carolyn
University of Florida
Poster No. 402
*Fusing Spatio-Temporal Data to Estimate Streamflow via a
Bayesian Network*

McLarty, Rebecca
University of Florida
Poster No. 414
*Toilet End Use Evaluation Methodology for Single-Family
Residences in Tampa, Florida*

Padowski, Julie
University of Florida
Poster No. 407
*Inverse Modelling of a Dynamic Decision Support System for
Water Resources Planning and Management*

Scholl, James
Malcolm Pirnie
Poster No. 406
Water Supply Planning Issues in Charlotte County, Florida

Shedd, Mary
University of Florida
Poster No. 411
Soil Moisture-based Irrigation Control on St. Augustinegrass

Zajac, Zuzanna
University of Florida
Poster No. 401
*Global Sensitivity Analysis of the South Florida Regional
Simulation Model (RSM) using the Method of Morris*

Ziembra, Lukasz
University of Florida
Poster No. 410
A Digital Library for Water Conservation

Nutrient Enrichment and Emerging Contaminants

Brown, Gordon
University of Florida
Poster No. 510
Development of Device for Measuring EDC Flux in Groundwater

Cathey, Anna
University of Florida
Poster No. 502
*Incorporating Uncertainty into Adaptive, Transboundary Water
Challenges: a Conceptual Design for the Okavango River Basin*

Corbett, Liz
Florida State University
Poster No. 516
*Radon and CH₄ Tracing of Groundwater Flow and Surface
Water Interactions at Wakulla Springs*

Dimova, Natasha
Florida State University
Poster No. 519
*Groundwater-Surface Water Interaction Study for Six Florida
Lakes – Newnans Lake, Lake Butler, Clear Lake, Lake Haines,
Lake Shipp and Lake Josephine*

Djidonou, Desire
University of Florida
Poster No. 508
*Using the CROPGRO Model to Simulate Fresh Market
Production, N Uptake, and N Leaching of Snap Bean as Affected
by N fertilization and Irrigation*

Goswami, Debashish
University of Florida
Poster No. 537
*Evaluation of ranchland best management practices for
phosphorus discharge in the Lake Okeechobee*

Green, Alex
University of Florida
Poster No. 536
*On a Possible Path to Remediating Florida's Eutrophied Fishing
Lakes*

He, Jianqiang
University of Florida
Poster No. 512
*Parameter Estimation for CERES-Maize Model with the GLUE
Method*

Hu, Bill
Florida State University
Poster No. 501
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Snyder, Elizabeth Hodges
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Waterhouse, Amy
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Spatial structure of tidal and residual flows at a tidal inlet

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Aycock, Robert
Weston Solutions, Inc.
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FVP Consultants, Inc.
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Linkage of Ecological Algorithms with a Transport and Reaction Simulation Engine (TaRSE:ECO) for implementation with the regional-scale water simulation model, RSM

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Fate and Effects of Anthropogenic Chemicals in Seagrass Ecosystems

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Green, Deborah
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Esry, Don
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Wanakule, Nisai
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Poster No. 403
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Bhat, Shirish
Environmental Consulting and Technology Inc.
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Bonilla, J. Alfredo
University of Florida
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Pathogens, Public Health and Coastal Ocean Water

Cheng, Peng
University of Florida
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Flow dynamics over hollows in estuaries

Clark, Mark
University of Florida
Poster No. 517
Reducing Tributary Nitrate Load from a Container Nursery within the Santa Fe River Watershed

Erickson, John
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Young, Linda
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Walsh, Stephen
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The diagram illustrates a sorting process with two parallel paths. The left path consists of four rows of numbers, and the right path consists of five rows. The numbers are color-coded: green for the top row, blue for the second row, grey for the third row, orange for the fourth row, and purple for the bottom row. The paths are connected by a central vertical line with four circles, representing a merging or comparison step.

Left Path:

- Row 1 (Green): 534, 533, 532, 531
- Row 2 (Blue): 517, 518, 519, 520
- Row 3 (Grey): 516, 515, 514, 513, 512
- Row 4 (Blue): 417, 418, 501, 502, 503
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- Row 1 (Green): 535, 536, 537
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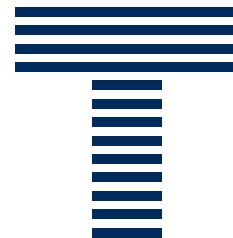
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UF UNIVERSITY of
FLORIDA
Water Institute
570 Weil Hall
PO Box 116601
Gainesville FL 32611-6601
Phone: 352.392.5893
Fax: 352.392.6855

www.waterinstitute.ufl.edu