

UF WATER INSTITUTE ACCOMPLISHMENT REPORT

June 2006-June 2008

1. INTRODUCTION

Florida's burgeoning human population and vulnerability to both climatological and anthropogenic changes in the water cycle make the State a unique living laboratory to develop new knowledge and test solutions to global water problems. In recognition of the importance of water issues, and the need to address them in a new interdisciplinary manner, the University of Florida (UF) established a campus-wide interdisciplinary Water Institute in May 2006.

1.1 Mission

The UF Water Institute brings together talent from throughout the University to address complex water issues through innovative interdisciplinary research, education, and public outreach programs.

1.2 Vision

Interdisciplinary UF Water Institute Teams, comprised of leading water researchers, educators and students, develop new scientific breakthroughs; creative engineering; policy and legal solutions; and pioneering educational programs that are renowned for addressing state, national, and global water problems.

1.3 Values

Partnerships: The Water Institute recognizes the importance of developing strong inclusive partnerships among Water Institute Affiliate Faculty, and with external stakeholders, to identify and prioritize critical water issues requiring interdisciplinary expertise.

Expertise: The Water Institute is committed to developing the basic knowledge, practical experience, and infrastructure required to respond to stakeholders' emerging water issues.

Excellence: The Water Institute is committed to provide excellent interdisciplinary water-related research, education and outreach programs that are recognized within the state of Florida, the nation and the world.

Respect: The Water Institute provides services that acknowledge and respect the expertise of all Water Institute Affiliate Faculty; it also recognizes the personal values, cultures, and socioeconomic context of its diverse external stakeholders.

1.4 Goals

The overarching goals of Water Institute research, education/outreach programs are to:

- Improve basic knowledge of the physical, chemical, and biological processes in aquatic systems (rivers, lakes, oceans, estuaries, wetlands, soil and ground waters).
- Enhance understanding of the interactions and interrelationships between human attitudes and activities, and aquatic systems.
- Develop and promote the adoption of improved methodologies for water management and policy (including quantity, quality and ecosystem services) based on a foundation of science, engineering, management and law.

2. INTERDISCIPLINARY EDUCATION/OUTREACH PROGRAMS

The following interdisciplinary education/outreach programs have been developed by the UF Water Institute. These programs provide interdisciplinary venues to develop and share new knowledge, and to develop and encourage the implementation of new technology and policy solutions for water issues. These programs also develop partnerships with external stakeholders that help to identify and prioritize critical water issues requiring interdisciplinary expertise; as well as to provide expertise and support for addressing these issues.

2.1 Biennial UF Water Institute Symposium: sponsored by Progress Energy.

The inaugural Water Institute Symposium held in Gainesville Feb 27-28, 2008 brought together 450 scientists, engineers, academics, policy makers, water managers, industry representatives, lawyers, students and members of the public to consider the relationships among challenges to water resources sustainability, explore solutions for pressing issues and provide broad based recommendations for research, education, technology and policies to ensure water resources sustainability for Florida and beyond.

Over 180 contributed oral and poster presentations were presented by faculty graduate students, consultants and state and federal agency scientists in Florida. A group of nationally and internationally recognized invited speakers from academia, federal agencies, and policy “think-tanks” participated in the opening plenary session of the symposium. The symposium concluded with a panel, comprised of the Executive Directors of each of the Water Management Districts and the Secretary of the Florida Department of Environmental Protection that focused on current Florida policies and programs and future research and education needs. A graduate student poster competition was held and 4 awards totaling \$3000 were made to support graduate student travel to a national/international meeting to present their work. For Symposium agenda see <http://www.waterinstitute.ufl.edu/symposium/agenda.html>)

An on-line evaluation of the Symposium showed that :

- 99% of participants agreed (34%) or strongly agreed (64%) that the theme of the Symposium and the content of the sessions were timely, appropriate and informative.
- 88% of participants rated the symposium as very good (64%) or among the best (24%) they have attended
- 98% of participants plan to attend a UF Water Institute Symposium again
- 55% of participants would like to see the UF Water Institute host a Symposium similar to this one once per year
- 43% of participants would like to see the UF Water Institute host a Symposium similar to this one once every two years.

The decision has been made to host a large, widely encompassing Water Institute Symposium every two years, with smaller more focused meetings hosted in between.

2.2 UF Water Institute Distinguished Scholar Seminar Series: Sponsored by the Smallwood Foundation

This annual seminar series, initiated in Fall 2007, invites high profile scholars to UF on a monthly basis to: conduct a general Water Institute seminar that will be of interest to a broad audience; meet with the Water Institute Faculty Advisory Committee to discuss strategic planning and partnering opportunities; and meet with interested Water Institute faculty to discuss specific research/education issues. Each scholar is also asked to serve on the External Council of Advisors for the Water Institute for a 12 month period following his/her visit. For a list of the 2007-08 Seminar Series Scholars, seven of whom hold Eminent Scholar Chairs at their institutions and five of whom are National Academy members, see <http://waterinstitute.ufl.edu/events/seminars.html>).

2.3 Interdisciplinary Workshops and Expert Panels

Periodic interdisciplinary workshops and expert panels are hosted to develop partnerships between and among UF Water Institute Faculty, external academics and external stakeholders to identify and prioritize critical water issues requiring interdisciplinary expertise; as well as to provide expertise and support for addressing these issues.

July 16-20 2007: The Water Institute hosted a week-long Agricultural Knowledge Initiative Research Planning Workshop to kick off the USDA/ICAR Sustainable Water Resource Management: U.S. Collaborative Research and Education Project. The workshop included facilitated discussions and field trips and provided an opportunity for the detailed planning of the funded research projects which will be conducted in India. Six participants from three Indian Partner institutions, one participant from North Carolina A&T, and eleven participants from UF attended the workshop. Sponsored by USDA.

August 21, 2007: The Water Institute hosted a one-day Springs Nutrient Workshop with about 70 faculty members, state and local scientists, organizers, managers, regulators and policy experts. The workshop included synthesis presentations on the state of knowledge regarding sources, transformations, sinks and ecological impacts of nutrients in springs, as well as facilitated break out sessions to discuss information gaps and research needed to address these gaps. Sponsored by FDEP.

September 12 2007: The Water Institute hosted a one day Hydrologic Information Systems Workshop to assist the government of Australia in exploring how hydrologic databases and integrated modeling tools can be used to manage water movement and accounting on a large regional scale. Representatives from the three largest Florida Water Management Districts, USGS, the Australian Meteorologic Bureau, the Australia Commonwealth Scientific and Industrial Research Organisation (CSIRO) Land and Water Division, University of Florida, and University of Texas Austin participated in the meeting. Sponsored by the UF Water Institute.

November 15-16 2007: The Water Institute hosted a free half-day instructional seminar on the use of ArcHydro for water resource management applications. This seminar is open to UF faculty, students, consulting firms, and Water Management District employees. A one-day symposium to present the state of practice for the use of ArcHydro in Florida followed. The

purpose of these meetings was to share information about hydrologic data management and tool development for water research, education, decision-making, visualization and modeling efforts in Florida. Sponsored by the UF Water Institute.

November 29, 2007: The Water Institute hosted a one-day Open Modeling Interface (OpenMI) working group meeting between UF Faculty and OPEN-MI Developer and Principal Investigator Dr. Roger Moore from the Centre for Ecology and Hydrology, Wallingford, UK. The purpose of these meetings was to inform UF Faculty of the OpenMI standard for linking hydrologic and ecologic models, and encourage participation in this international effort. The Open-MI standard is a software component interface definition for the computational core (the engine) of the computational models in the water domain. Sponsored by the UF Water Institute.

November 30, 2007: The Water Institute hosted a one-day Water Conservation Research Planning Workshop to review the status of Florida water conservation research programs and develop a prioritized Water Conservation Research Agenda to support public water supply utilities and water managers in developing effective and efficient water conservation programs. The workshop was developed in collaboration with the Conserve Florida Group (a consortium of representatives from FDEP, all 5 Water Management Districts, Florida Water Utilities, and UF) and other interested UF Faculty. Sponsored by Conserve Florida Water.

September 4, 2008: Coordinate panel discussion on Water and Social Equity at the Harn Museum in conjunction with Harn "Water as Metaphor for Identity" exhibition and the UF Common Reading Program "When Rivers Run Dry". Sponsored by the Water Institute

September 17-18, 2008: Coordinate and host 2 - day workshop of national experts on the Environmental Effects of Withdrawals from the St. Johns River.

June –September 2008: Coordinate state-wide peer review of American Water Works Associate Florida 2030 Water Supply Infrastructure Vision Documents. Sponsored by the Century Commission in preparation for the Governor's Water Summit

June –December 2009: Coordinate national peer review of the Watershed Assessment Model. Sponsored by the Florida Department of Agriculture and Consumer Services and the Florida Department of Environmental Regulation.

2.4 Administration of the Hydrologic Sciences Academic Cluster

The UF academic cluster for graduate studies in Hydrologic Sciences (HSAC) was established in 1993 as a unique interdisciplinary program designed to broaden the skills of science and engineering students who are interested in all aspects of water; i.e., occurrence and quantity, distribution, circulation, quality, and management/policy. Currently 45 faculty members and 30 graduate students from 10 departments and 3 colleges participate in the HSAC. Since 1993 120 M.S. and Ph. D. students have graduated from the program.

As recommended by the UF Faculty Water Institute Launch Team, the Water Institute provides administrative services to the HSAC including maintaining the HSAC website and housing the

HSAC student, faculty and meeting records. In addition The UF Water Institute Director serves as a permanent voting member on the Hydrologic Sciences Academic Cluster Faculty Coordinating Committee.

3.0 RESEARCH PROGRAMS DEVELOPED

The following interdisciplinary research programs have been developed by the UF Water Institute faculty and staff. These programs bring together interdisciplinary teams of faculty and students to provide the knowledge base for, and to develop new technology and policy solutions for state, national and global water issues.

3.1 Externally Funded Water Institute Projects

3.1.1 Water Institute Directed Projects (\$3.4 Million)

- Cooperative Graduate Research Assistantships in Critical Water Resources Areas for South Florida, South Florida Water Management District/Florida Water Resources Research Center, \$210K, Mar 2006- Mar 2009.
- Demonstration of Water Quality Best Management Practices for Beef Cattle Ranching in the Lake Okeechobee Basin , Florida Department of Environmental Protection, \$1.568 Million, Sep 2002-Oct 2008.
- India Agricultural Knowledge Initiative, U.S. Department of Agriculture, \$150K, Aug 2006- Jul 2009.
- Peer Review of the Watershed Assessment Model, Florida Department of Agriculture and Consumer Services, \$100K, July 2008-December 2008.
- Suwannee River Hydrologic Observatory, National Science Foundation and the Swisher Foundation, \$500K, Dec 2006- Nov 2008.
- Use of Seasonal Climate Forecasts to Reduce Risk in Regional Public Water Supply Management in the Tampa Metropolitan Region, Tampa Bay Water and the Swisher Foundation, \$250K, Apr 2007 – Mar 2009.
- Use of Intra-seasonal and Seasonal Forecasts to Reduce Risk in Regional Public Water Supply Management, NOAA Sectoral Applications Research Program (SARP), \$300K, October 2008-October 2010
- Water Institute Distinguished Scholar Seminar Series, Smallwood Foundation, \$51K, April 2007-April 2009.
- Water Institute Water Systems Collaboratory, Florida Legislative Budget Request, \$500K, July 2007-June 2008.

3.1.2 Water Institute Assisted Projects (\$1.25 Million)

- Conserve Florida Clearinghouse. J. Heaney - P.I. (Environmental Engineering Sciences), Florida Department of Environmental Protection, \$620K, Apr 2006- Apr 2008.
- Development of a Dynamic Decision Support System (D2S2) for Water Supply Planning. J. Jawitz - P.I. (Soil and Water Science), American Water Works Association Research Foundation/Palm Beach County Water Utilities Department, \$100K, Jan 2007 to Jan 2010.
- Reducing nonpoint source loss of nitrate with in the Santa Fe Basin. M. Clark - P.I. (Soil and Water Science). Florida Department of Environmental Protection, \$304K, Apr 2007-Oct 2009.

- Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems. M. Brown - P.I. (Environmental Engineering), Florida Department of Environmental Protection, \$227K, Apr 2007 – Apr 2008.

3.1.3 Water Institute Faculty Projects

Faculty affiliated with the Water Institute currently manage over **\$90,000,000** in active externally funded projects. These projects are compiled in a web-accessible database that can be searched by investigator, department, keyword, title, date and/or funding agency (see <http://ees-his06.ad.ufl.edu/SearchFundedProjects/>)

3.2 2007 Water Institute Program Initiation Fund Awards (Total Awards = \$195K)

The following awards were made under the first Program Initiation Fund (PIF) Competition in March 2007:

- Protecting Florida's Water Quality: Identifying and Overcoming Barriers to Implementation of Low Impact Development (LID) Practices. Mark W. Clark - PI (Soil and Water Science), Tom R. Ankersen (Conservation Clinic, Levin College of Law), Pierce H. Jones (Agricultural and Biological Engineering), Barbra C. Larson (Environmental Horticulture).
- A Framework for Assessing The Hydrologic Footprint of Large-scale Biofuel Production . Matt Cohen - PI (School of Forest Resources and Conservation), Mark T. Brown (Center for Wetlands, Environmental Engineering Sciences), Angela Lindner (Environmental Engineering Sciences).
- Environmental Consequences of Nutrients and Organic Matter Injection into Carbonate Aquifers; Implications for Water Quality in Aquifer Storage and Recovery (ASR) Technology. Andrew R. Zimmerman - PI (Geological Sciences), Jean-Claude Bonzongo (Department of Environmental Engineering Sciences), Willie Harris (Soil and Water Science).
- Sediment Transport through Tidal Inlets During Extreme Forcing: Erosion or Accretion? Arnaldo Valle-Levinson - PI (Civil and Coastal Engineering), John M. Yeager (Geological Sciences), Tian-Jian Hsu (Civil and Coastal Engineering), Alexandru Sheremet (Civil and Coastal Engineering).
- Coupling of Advanced Oxidation and Adsorption Processes onto Silica-Titania Composites for Low Level Capture of Metals from Water Effluents. David W. Mazyck - PI (Environmental Engineering Sciences), Jean-Claude Bonzongo (Environmental Engineering Sciences), Lena Q. Ma (Soil and Water Science).
- Water, Gender and Equity in India. Whitney Sanford - PI (Religion), Anita Anantharam (Women's Studies), Vasudha Narayanan (Center for the Study of Hindu Traditions, Religion).

Reports on the PIF projects are due June 30, 2008. Deliverables from projects include peer reviewed journal articles and proposals (submitted through the Water Institute) for externally funded research projects. During academic year 2008-09 the Water Institute

will host a series of brown-bag faculty-student seminar/discussion groups lead by the 2007-08 PIF project teams.

3.3 2008 Water Institute Program Initiation Fund Awards

The 2008 Program Initiation Fund was revamped to experiment with alternative, more “hands-on” strategies of stimulating productive, externally funded, interdisciplinary research programs. The new program will support interdisciplinary working groups consisting of UF faculty, graduate students, and key external experts to address complex issues of water resource sustainability that have state, national and global importance. Working group topics selected for 2008 include:

- Integrated analyses of climate, land use, hydrologic, biogeochemical, ecologic, and socioeconomic systems to inform water management decisions
- The nexus between sustainable energy and sustainable water supplies
- Water-borne contaminants, pathogens and health

Each working groups will produce:

- A research and education agenda that summarizes the state of the art in the area, and defines important gaps in knowledge that should be pursued by the working group.
- A strategic plan to fund and execute the research and education agenda.
- At least one Water Institute position paper to the Florida Legislature and/or other Florida stakeholders that summarizes the need for the working group effort and its potential to produce important knowledge of significance to the management of Florida’s water resources
- At least one peer-reviewed journal article that analyzes and synthesizes existing data and information, results of new modeling studies, new surveys, etc. in support of the working group’s agenda.
- At least two interdisciplinary proposals to fund and execute specific aspects of the research and education agenda.

4. OTHER LEADERSHIP/OUTREACH ACTIVITIES

- Invited Presentation to the National Research Council Water Science and Technology Board on the Water Implications of Biofuels, July 12, 2007.
- Invited Speaker at the National meeting of the Soil and Water Conservation Society, July 22, 2007.
- Invited seminar at the SouthWest Florida Water Management District, July 25, 2007.
- Invited speaker at the Jacksonville Rotary Club, September 10, 2007.
- Invited speaker for the University of Florida “Florida Tomorrow” Campaign Kick-Off, September 28, 2007.
- Invited Panelist on Water Management Implications of Climate Change for Florida Legislature Energy and Environment & Natural Resource Committees, November 6th, 2007.
- Invited seminar Oak Hammock Institute for Learning in Retirement, April 1, 2008

- Member of Board of Directors, Consortium of Universities for the Advancement of Hydrologic Sciences, 2003-2008; Chair 2005-2006, Past-Chair 2007.
- Member of Advisory Committee, Collaborative Large-Scale Engineering Analysis Network for Environmental Research, 2005-2007.
- Member of WATer and Environmental Research Systems Network (WATERS Network) Design Team, 2006-2008.
- College of Engineering Dean Search Committee, 2008.

