



NSF Awards \$3 Million Grant to Monitor Savannah River

The National Science Foundation (NSF) has awarded \$3 million to Clemson University to design, develop and deploy a basin-wide network of computerized sensors to monitor water quality the entire length of the Savannah River. The major research instrumentation award, funded through NSF's Division of Computer and Network Systems is titled "Development of the Intelligent River®, a Basin-Scale Monitoring Instrument".

A battery-operated computer smaller than a Rubik's Cube is at the heart of the endeavor to deploy a network of environmental sensors along the 312-mile Savannah River. This network will provide real-time data on water quality and flow rate at a scale that until now was cost-prohibitive. The data is critically needed to improve water resources management as demand increases for drinking water, hydroelectric power, recreation and industrial production. Called a "MoteStack," the patent-pending technology allows an unprecedented number of sensors to be deployed across a large area and operate as a highly efficient network.

The MoteStack is inserted into a patent-pending buoy system anchored to the river floor. External sensors collect data on water temperature, flow rate, turbidity, oxygen levels and the presence of pollutants. The MoteStack processes the data and transmits it to Clemson's high-performance computing system. Information is then displayed on an interactive website where water resource managers can view multiple data sources and locations at the click of a mouse.

The Intelligent River® is a campus-wide interdisciplinary research initiative, administered through the Institute of Applied Ecology, that joins the forces of computer and environmental scientists to develop new technologies for linking land use, energy production, climate change and water resources. It also is a key component of Clemson University's *Center of Economic Excellence in Sustainable Development* that focuses on green job creation around these technologies.

Expertise on the project team includes hardware developers, software engineers, river ecologists, visual effects scientists, forestry and natural resource scientists, information technologists and applied economists.

Jason Hallstrom, an associate professor in the School of Computing and a Clemson IDEaS Professor, is the principal investigator. Team members include Gene Eidson, director of Clemson's Institute of Applied Ecology and ecology program director for Clemson's Restoration Institute (*Dr. Eidson initiated the Intelligent River® program in 2007 with seed funding of \$1.75 million from Clemson Public Service Activities*); Robert Geist, School of Computing; Sebastien Goasguen, School of Computing; Anand Jayakaran, School of Agricultural, Forest & Environmental Sciences; Christopher Post, Department of Forestry & Natural Resources; Julia Sharp, Department of Mathematical Sciences; Jerry Tessorf, School of Computing; K.C. Wang, Department of Electrical & Computer Engineering; David White, Clemson Computing & Information Technology and Oscar Flite with the Southeastern Natural Sciences Academy.

For more information, visit the project web site at www.clemson.edu/appliedecology/savannah.



A researcher places a MoteStack monitoring device into a buoy.

Image by: Clemson University

Charleston Vertical Farm Design Feasibility Study

The Institute of Applied Ecology recently completed a design feasibility study to repurpose an existing building in downtown Charleston to house a vertical farm that would support sustainability initiatives. The study was done in collaboration with Clemson's *Centers of Economic Excellence in Urban Ecology & Restoration and Sustainable Development* and the *City of Charleston* and was funded by a grant from the EPA 2010 Innovations Pilots Project.

An interdisciplinary faculty team was formed to conduct the analysis, which focused on agriculture, horticulture, green building and the architectural potential of property candidates recommended by the City of Charleston.

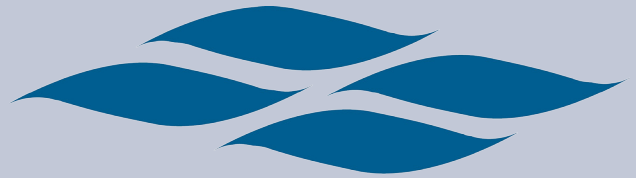
A series of design charrettes was held in Charleston with project faculty and students from the Clemson University Graduate School of Architecture. Through a design studio during the fall semester, the students developed seven design models for repurposing the Port City Paper building located on King Street. For more information, visit the project web site at www.clemson.edu/appliedecology/vf_project.

Aiken Green Infrastructure Project Wins Award

The City of Aiken received a Municipal Association of South Carolina achievement award for the Sand River Headwaters Green Infrastructure project. Dr. Gene Eidson, director of the Institute of Applied Ecology, is the principal investigator for the project.

The Clemson University *Center for Watershed Excellence* worked in partnership with the City of Aiken and engineering firm, Woolpert, Inc., to design and implement natural treatment systems to enhance stormwater infiltration in downtown watersheds. The project objective is to reduce the impact of stormwater on nearby Sand River and Hitchcock Woods by returning to the principles of how stormwater was treated decades ago, prior to the introduction of pavement, driveways and other impervious structures.

Over the past several months the research and monitoring program that taps into Clemson's Intelligent River® research program has been providing online data from five monitoring stations throughout the project site. The project web site is www.clemson.edu/watershedcenter/aiken_green.



S.C. Water Resources Conference www.scwaterconference.org

The 3rd biennial **S.C. Water Resources Conference** will be held October 10-11, 2012 at the Columbia Metropolitan Convention Center. The goals of the conference are to communicate new research methods and scientific knowledge; educate scientists, engineers and water professionals; and disseminate useful information to policy makers, water managers, industry stakeholders, citizen groups and the general public. The conference provides an open forum to discuss current water policies, research projects and water management in the state. Major Contributors for 2012 include *Santee Cooper* as the Title Contributor and *Charleston Water System* and *YSI* as Benefactor Contributors.

The 2010 event featured over 100 oral presenters, 37 poster presenters and 13 exhibitors. Interviews held during the event have been archived on the *Your Day* radio program web site, and links are listed on the "News Coverage" page at www.scwaterconference.org. Proceedings and program information from the past two conferences are available through the "Archives" page at www.scwaterconference.org.

Abstracts are now being accepted for oral and poster presentations, and the deadline for abstract submittal is March 30th. There will also be a student poster competition open to graduate and undergraduate students. Conference registration will open in May. Visit www.scwaterconference.org for more information or contact Dawn Anticole White, conference coordinator, at dawnw@clemson.edu or (864) 656-2618.

Become a 2012 SCWRC Contributor

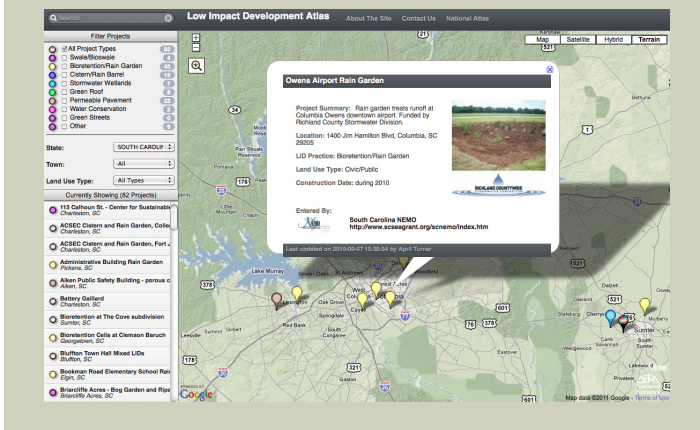
For information on becoming a contributor, please contact Dr. Gene Eidson, SCWRC co-chair, at geidson@clemson.edu, (864) 710-0882 or Elizabeth Colbert-Busch, Restoration Institute business development director, at ebusch@clemson.edu, (864) 554-7226 x117.

empowering change Online Watershed Management

Community officials and other professional decision-makers need readily-accessible and easily-interpreted information about hydrological, ecological, historical, and cultural parameters for effective short- and long-term sustainable development, including considerations for climate change and community resilience. Those who decide on the quality of that waterway are not only the decision-makers and municipal, county and state staff, but those who live in and use the watershed as well.

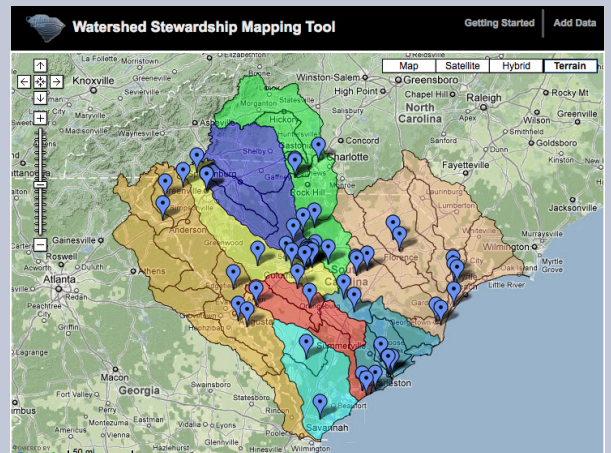
The **SC Low Impact Development Atlas (LID)** exhibits LID practices installed across South Carolina to promote familiarity with runoff management and infiltration options for decision-makers, engineers, stormwater managers, agencies and the public.

www.clemson.edu/carolinaclear/lidmap



The **Watershed Stewardship Map** identifies local organizations offering opportunities to restore and protect watersheds and encourages increased watershed stewardship amongst the state's residents.

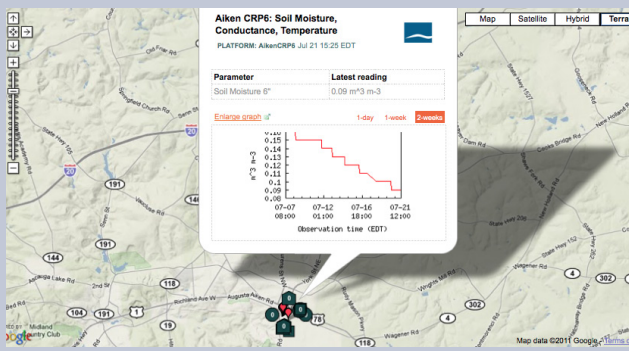
www.clemson.edu/watershedcenter/stewardship



Intelligent River® from observational to operational

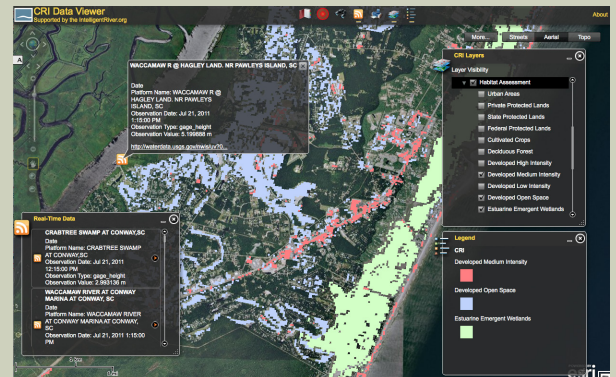
Intelligent River® is a hydrological observation system to support research and provide real-time monitoring, analysis and management of water resources in South Carolina. It was developed by an interdisciplinary team with funding from Clemson University Public Service Activities.

www.intelligentriver.org



The **Community Resource Inventory (CRI-SC)** is an interactive, web-based mapping tool for non-GIS users interested or involved in watershed management. It has been piloted in Georgetown County, South Carolina.

www.clemson.edu/baruch/cri



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Linking land use, water, energy and climate change

The **Institute of Applied Ecology (IAE)** is applications-driven, bringing together an entrepreneurial and interdisciplinary faculty with an applied focus to develop, pilot and package innovative solutions for sustainable natural resources. The Institute was officially established in October of 2010. Major programs of IAE include the EPA-Designated *Center for Watershed Excellence* (www.clemson.edu/watershedcenter) and the *Intelligent River® Research Enterprise* (www.intelligentriver.org).

IAE will support the Sustainable Environment Focus Area by expanding opportunities for Clemson University faculty and students to participate in

statewide watershed management programs. IAE focuses on the application of novel and emerging technologies, innovative management strategies, and multi-scale outreach programs to solve major natural resources problems. The institute designation formalizes the efforts of the entrepreneurial faculty who are driving transformative science and technology in the areas of watershed ecology, green infrastructure, cyberinfrastructure, ecological restoration and sustainable natural resources.

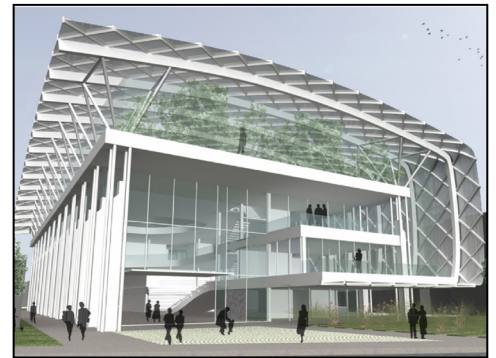
The IAE offices were relocated in August of 2011 to Kappa Street (off Silas Pearman Blvd), in the Strom Thurmond Institute building on campus.



INSTITUTE of
APPLIED ECOLOGY



CLEMSON UNIVERSITY



S.C. Water Resources Conference

Save the Date

2012 S.C. Water Resources Conference
October 10th - 11th

Columbia Metropolitan Convention Center
Abstract Submittal Deadline: March 30th

www.scwaterconference.org

STORMWATER
pond
MANAGEMENT  **2012**
conference

www.pondconference-grandstrand.org
March 3rd, 8:00am - 4:30pm, Myrtle Beach
Springmaid Resort Conference Center

www.pondconference-charlestonarea.org
March 22nd, 8:00am - 4:30pm, N. Charleston
Trident Technical College

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