

*Applying knowledge to improve water quality*



# Southern

## Regional Water Program

*A Partnership of USDA CSREES  
& Land Grant Colleges and Universities*

### Southern Region Water Quality Coordination Project

September 14, 2006 to June 1, 2007



### Progress and Impact Report

A network of Land Grant University Extension and research personnel in the Southern region responding to water quality and conservation issues with educational assistance, technology development and technology transfer programs.



# Southern Region Water Quality Coordination Project

September 15, 2006 to June 1, 2007

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# Southern Region Water Quality Coordination Project

September 15, 2006 to present

## I. Background > Project Overview > Regional Leadership Team

The Southern Region Water Quality Coordination Project sustains and expands the efforts of the Southern Region Water Quality Planning Committee (SRWQPC), which was formed by the Southern Region Extension Directors in 1988. The SRWQPC is composed of Water Quality Coordinators representing both 1862 and 1890 institutions from each of the 13 states in EPA Regions VI and IV. Through extensive coordination and collaboration internally and with external partners and stakeholders, the SRWQPC significantly enhances the development and delivery of resources and programs to address critical water resource concerns in the South and supports development and expansion of the CSREES National Integrated Water Quality Program.

The SRWQPC serves as the Regional Coordinating Committee for the project. The SRWQPC provides centralized coordination and networking both internally and with other regional water resources management programs, promotes technology development and exchange, and fosters collaborative, multi-state and multi-disciplinary efforts to more effectively and efficiently address common issues and concerns. The SRWQPC also provides leadership for the project by defining and prioritizing regional water quality issues, establishing and coordinating integrated, multi-disciplinary and multi-state research, education and extension teams targeting the 8 national themes, and by partnering with Federal, state and local agencies and organizations to address identified concerns.

The following items describe the roles and responsibilities of State Water Quality Coordinators and the organization, management and activities of the Southern Region Water Quality Planning Committee:

- Deans and Directors of the 1862 and 1890 land grant institutions in the 13 participating states appoint Water Quality Research, Education and Extension Coordinators (State Coordinators) to serve on the Southern Region Water Quality Planning Committee. Deans and Directors supported the time commitments for State Coordinators to participate in quarterly meetings and other activities of the SRWQPC.
- State Coordinators provide leadership for multi-state and regional efforts to maximize sharing of resources and minimize duplication of effort. This is accomplished through a focused assessment of state level resources and selection of components for inclusion into regional resource packages for widespread application.
- The SRWQPC facilitates integration and linkages among research, education and extension programs at the university, state, regional and national levels.

- The SRWQPC elects officers to serve as Chair and Vice-Chair for one-year terms. The Chair is responsible for conducting meetings, assigning committees, and overall program coordination.
- The SRWQPC elects one Regional Coordinator each for EPA Regions IV and VI to work directly with CSREES National Program Leaders. Regional Coordinators provide direct linkage between the SRWQPC and Federal programs and activities through coordination and program planning efforts with the Committee for Shared Leadership – Water Quality (CSL-WQ); participate in monthly conference calls; provide support for national citizenship efforts such as marketing, web site, and national conference; and represent the Southern Region at quarterly national coordination meetings in Washington, D.C., and other locations.
- The SRWQPC convenes on a quarterly basis to conduct program planning and coordination activities, and communicates routinely via a regional list-serv and through regular teleconferences.
- The SRWQPC engages and supports Extension Liaisons with the Region IV and Region VI EPA offices in Atlanta and Dallas, respectively. Liaisons provide a direct linkage with EPA and other federal partners. Liaisons also participate in multi-agency and multi-state collaborations to support the objectives of the Coordination Project.
- The SRWQPC engages a full-time Doctoral-level Project Manager to coordinate program activities, facilitate linkages within and among Program Teams, oversee the central database, manage regional planning and reporting efforts, and serve as an officer (Secretary) for the SRWQPC.

## **Background > Project Partners**

Core project partners include faculty from research, education and extension within the University system. Special efforts are made to engage personnel from all appropriate disciplines, including soils, agronomy, engineering, wildlife and fisheries, forestry, rural sociology, economics, etc., to comprehensively and effectively address identified national themes. In addition, as part of the regional effort, County Extension faculty in all related subject matter areas, and including 4-H and Family & Consumer Sciences, from across the region are engaged in the project. Many serve as team members, participate in regional training events and support local implementation of regional project initiatives.

Two other key institutional partners that were solicited and engaged to participate in the project were personnel from state Water Resources Institutes and Sea Grant programs. In several states, WRI and/or Sea Grant personnel collaborated directly on program teams. In addition, both WRI and Sea Grant personnel provided support in the development of programs and in the acquisition of leveraged funds to expand program efforts within and among project states. In addition, the Project Director serves as a WRI associate.

Regional linkages are established with EPA (Regions IV and VI) and USDA-NRCS through direct participation on program teams, most specifically the Nutrient Management and Animal

Waste Management program teams. These linkages were facilitated by the Regional Liaisons who assisted with identification of key personnel and communication of program priorities. In addition, within states, project driven linkages were established or enhanced with other state and federal agencies including USGS, USDA-FSA, USFWS, state environmental agencies, soil and water conservation districts, and health departments.

Special emphasis has been made during the project to expand and enhance linkages between 1862 and 1890 institutions in the Southern Region. Special subgrants were developed as part of the project to support capacity building and coordination within 1890 institutions and between 1890 and 1862 institutions. As the project has progressed, efforts have been expanded to engage all 1890 institutions nationally, as well as, establish linkages between the project and 1994 institutions.

## **Background > Focus Areas/Themes and Objectives for Regional Project**

The Southern Region Watershed Management Project established the framework through which identified themes address critical water quality and interrelated water quantity issues. The project supports a collaborative process through which new and existing technologies and management systems are developed and shared throughout the region. The project fosters the development and application of effective and environmentally sustainable water resource management technologies and facilitates education and implementation programs at the regional, multi-state and local levels.

The Southern Region Project endeavors to address seven of the National Program Themes defined by the Committee for Shared Leadership for Water Quality. These are:

Nutrient and Pesticide Management	Drinking Water and Human Health
Watershed Management	Water Policy and Economics
Animal Waste Management	Environmental Restoration
Water Conservation and Agricultural Water Management	

The Southern Region Project includes three primary objectives and associated tasks. Objective 1 focuses on supporting the regional coordinating committee, and facilitating regional program planning and communication; Objective 2 focuses on establishment and coordination of regional program teams; and, Objective 3 targets the maintenance and expansion of the regional website, the Southern Region Water Quality Information System (<http://srwqis.tamu.edu/>). As a part of Objective 1, the regional database is designed to serve as an assimilation point and clearinghouse for information and resources related to each of the national themes. Objective 2 facilitated that effort through the creation and support of regional program teams.

Specific project objectives are to:

**Objective 1: Support ongoing efforts of the regional coordinating committee to facilitate program planning and communication, define and prioritize research and**

**educational needs, identify expertise of contributing institutions, facilitate resource sharing and technology transfer among institutions and with other federal and state agencies, organizations and stakeholders, and support the CSREES National Integrated Water Quality Program.**

**Objective 2: Develop and apply the best available science in water quality management through establishment and facilitation of Regional Program Teams under three Focus Areas. Focus Area leaders will coordinate the work of 12 Program Teams to integrate research, education, and extension, sharing information and resources, minimizing duplication of effort, establishing partnerships, and leveraging multiple funding sources to address critical water quality issues.**

**Objective 3: Maintain and expand the Southern Region Water Quality Information System (<http://srwqis.tamu.edu/>) to serve as the repository for regional water quality information and resources, provide direct linkages to other regional and national database systems, and conduct coordinated needs and impact assessments regarding regional issues and programs.**

The Southern Region Water Quality Coordination Project expands and strengthens an existing collaborative process through which new and existing technologies and management systems are developed and shared throughout the region and nation. The project utilizes an interdisciplinary, multi-state approach to develop and deliver watershed-based water quality and quantity research and education programs by targeting three key Focus Areas: *Agricultural Pollution Prevention*, *Rural Environmental Protection* and *Watershed Management*, which arose from strategic planning in 2003-2004. Program teams established within the Focus Areas work to implement regional activities.

**FOCUS AREA 1: Agricultural Pollution Prevention:** Agriculture is identified by EPA as the leading contributor of nonpoint source pollution in the nation. All states in the Southern Region are facing major issues related to nutrients, pesticides, sediment, pathogens, and waste originating from agricultural production activities. In addition, increasing demands on limited water supplies are further affecting the quality and availability of essential water resources. The SRWQPC identified 4 key Programs to target critical issues related to agricultural production: *Nutrient Management*, *Animal Waste Management*, *Irrigation Management*, and *Water Quality Education for Agricultural Producers*. Programs under this Focus Area address the following national water quality themes: animal waste management, nutrient and pesticide management, water conservation and agricultural water management, and water policy and economics.

**FOCUS AREA 2: Rural Environmental Protection:** Rural communities throughout the South are facing many critical environmental issues related to drinking water supplies, waste management, and the challenges of land-use changes associated with urbanization. Drinking water issues range from domestic well safety and protection to source water protection for small water systems. Waste management issues range from on-site septic system maintenance to biosolids land application to solid waste collection and disposal. The encroachment of urban

areas into agricultural/forested watersheds is intensifying land use planning and management concerns in many areas of the South. The SRWQPC identified 4 key Programs targeted to address concerns of rural communities: *Drinking Water and Human Health*, *On-site Wastewater Management*, *Community Wastewater and Solid Waste Management*, and *Rural/Urban Interface Landowner Education*. Programs under this Focus Area address the following national water quality themes: drinking water and human health, and pollution assessment and prevention.

**FOCUS AREA 3: Watershed Management:** Many watersheds in the South are threatened by changes in watershed hydrology and land use, resulting in impaired water quality and loss of habitat. Impacts include unsafe water supplies, degraded fisheries, eroding streambanks, reservoir siltation, impaired habitat, and loss of floodplain functions. Causes of watershed impairment include changing land uses, stream channelization, increasing sediment loads, poor land management, and loss of riparian vegetation. State and federal resource management agencies are now promoting a watershed approach to managing water quality. This involves assessing causes and sources of impairment, developing watershed management plans, encouraging local actions to protect and restore water quality, monitoring changes, and educating citizens to become watershed stewards. The SRWQPC identified 4 key Programs to address these issues: *Watershed Assessment*, *Nonpoint Education Network for Rural Community Decision-makers*, *Watershed Restoration*, and *the Watershed Education Network*. Programs under this Focus Area address the following national water quality themes: environmental restoration, pollution assessment and prevention, and watershed management.

## **II. Project Accomplishments and Impacts**

### **National Themes (based on those addressed in the region)**

#### **Regional outputs and outcomes related to project objectives and themes**

Regional coordination through the SRWQPC promotes the development and delivery of effective management systems that can be adapted for widespread application throughout the region and the nation. Primary emphasis is placed on providing leadership for water resources research, education and outreach to help people, industry and governments prevent and solve current and emerging water quality and quantity problems.

Objectives 1 and 2 (above) of the Southern Region Water Quality Coordination Project focus on development and implementation of regionally coordinated and integrated education, extension and research efforts. **Major** outputs, outcomes, and impacts generated by the Project Teams include the following:

## Nutrient Management

- In target areas throughout the region, nitrogen and phosphorus fertilizer application on agricultural land was reduced by over 5,224,000 pounds through intensive education and training programs. In addition to the environmental benefits on water quality from reduced nutrient loading, the estimated economic impact of the program totaled over \$1,002,820 in direct fertilizer cost savings. Land area impacted by nutrient management plans was 915,000 acres, and adoption of soil testing by agricultural producers increased by 60% on 97,000 acres.

- Coordinated a regional multi-agency assessment of state nutrient management regulations, institutional capacity, and education and training resources.

<http://srwqis.tamu.edu/program-nutrientmgmt.aspx>

**Output:** Published a [Regional Nutrient Management Summary](#) which has been reported at regional and national events.

**Outcome:** The project has 1) enhanced collaboration between southern region states and partner agencies; and 2) provided the foundation for a cross-state/regional P-Index assessment.

State Nutrient Management Information: CSREES Southern Region (AL, AR, FL, GA, KY, LA, MI, NC, NM, OK, SC, TN, TX) CSRRES Nutrient Management Meeting Southern Region, Atlanta, GA, May 3-4, 2004 J. Camberato, M. Daniels, C. Mitchell, T. Obreza, L. Oldham, D. Osmond, M. McFarland, M. Risse, C. Runyan, M. Stephens, W. Thom, F. Walker, H. Zhang			
	ALABAMA	ARKANSAS	FLORIDA
<i>General Information on Nutrient Management</i>			
How many, where and what are your state nutrient TMDLs?	<ul style="list-style-type: none"> <li>• 24 out of 115 listed waterbodies are nutrient impaired. 97 of the 115 have EPA approved TMDLs.</li> <li>• They are scattered throughout the state with a particular concentration in the Coosa River watershed, Chaha River Watershed, Upper Warrior Watershed, and parts of the Tennessee River basin.</li> </ul>	<ul style="list-style-type: none"> <li>• Currently, there are no Nutrient-based TMDLs in the State associated with Nonpoint or agricultural sources.</li> </ul>	<ul style="list-style-type: none"> <li>• Yes, 1</li> <li>• Lake Okeechobee phosphorus TMDL</li> </ul>
Is there a state-managed soil-testing program? If yes, who runs it and how is it funded?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• Operated by Auburn University</li> <li>• Funded entirely by fees for service (\$8 for routine analysis)</li> </ul>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• It is run by the University of Arkansas Experiment Station.</li> <li>• Our program is free to the public. It is funded by the State through the collection of a special fee associated with fertilizer sales.</li> </ul>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• Univ. of Florida-IFAS Extension Soil Testing Lab</li> <li>• Diagnostic analysis for state and county faculty is free, all other users must pay a per-sample fee that funds the lab.</li> </ul>
Does your state have rules that regulated fertilizer and/or lime regulations?	<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• Yes, the Arkansas State Plant Board administers fertilizer and lime laws in Arkansas.</li> </ul>	<ul style="list-style-type: none"> <li>• Yes, the Florida Dept. of Agriculture and Consumer Services regulates fertilizer and lime. FDACS specifies what information must be on the fertilizer label and runs random quality tests on product samples taken at blending plants and in the field.</li> </ul>

Regional Nutrient Management Information Summary

- [Regional nutrient management website \(http://srwqis.tamu.edu/program-nutrientmgmt.aspx\)](http://srwqis.tamu.edu/program-nutrientmgmt.aspx):
  - ▶ [Regional Nutrient Management Publications Database \(http://srwqis.tamu.edu/downloads/pbc.pdf\)](#) with over 225 links to University resources.
  - ▶ [Regional Nutrient Management E-newsletters \(http://srwqis.tamu.edu/downloads/NMNewsletterJanuary2007.pdf\)](#) – semi-annual resource for internal and external program partners.
  - ▶ 32 [BMP factsheets \(http://www.sera17.ext.vt.edu/SERA\\_17\\_Publications.htm\)](http://www.sera17.ext.vt.edu/SERA_17_Publications.htm) on P source and transport management (partnership with SERA 17)
- Cross-State and Regional Issue Assessments:
  - ▶ **P-Index Comparison:** A 12-state assessment of P-index ratings based on standard scenarios was developed and used to generate a scientific paper evaluating state-to-state variations and potential implications for agricultural producers.



**Output:** Published in the *Journal of Soil and Water Conservation* and presented at conferences sponsored by the CSREES National Water Program, the Southern Plant Nutrient Conference, and the National 2006 Poultry Waste Conference.

**Outcome:** The work is now being used as the foundation for regional discussion on how to improve consistency in P indices.

**Leveraging:** \$6,000

- ▶ State-to-State Variations in Nutrient Management Recommendations – Team members led a national assessment of differences in soil test recommendations across state boundaries (in collaboration with USDA-NRCS).

**Output:** [Published online](#)

(<http://srwgis.tamu.edu/downloads/LGU.NMRecommendation.Summary.8.05.pdf>) and presented at American Society of Agronomy conference.

**Outcome:** Significant improvements in recommendations available to ag producers, land managers and state and federal land and water resource management agencies.

- ▶ Urban/Agricultural Soil Testing – Conducted a 6 state assessment of soil testing BMP adoption by different clientele groups, and a comparison of soil test ranges for P and K under different land uses.

**Output:** [Published online](#)

(<http://www.usawaterquality.org/conferences/2006/Abstracts/Mitchell.pdf>) and in the Proceedings of the Southern Plant Nutrient Conference, and presented at the CSREES National Water Program Conference

**Outcome:** Has resulted in increased adoption of soil testing by urban and agricultural clientele.

- External Partnerships

- ▶ External partners, including federal and state agency personnel and business and industry representatives, participated in team meetings and provided input in regional planning efforts.

- ▶ Co-Sponsor the joint annual Southern Plant Nutrient Conference, which has membership including LGU nutrient management research and extension personnel, industry (PPI, Mississippi Chemical, Helena, A&L Laboratories, etc.), consultants and agency personnel.

- ▶ Co-Sponsored the International P Modeling Conference

- Leveraged Funding and Associated Projects

- ▶ \$124,000 - Rio Grande Basin Initiative (nutrient management education program)

- ▶ \$6,000 - University of Florida (supports production of the regional e-newsletter).

- ▶ \$6,000 - USDA-NRCS (supported travel by NRCS to the P-Index evaluation summit)

## Animal Waste Management

- Animal waste training was delivered throughout the region. Programs offered through the Southern Region Water Program teach elements of animal waste management planning to producers, county agents, NRCS staff and private consultants to enable the development of certified CNMPs. Key examples include:
  - ▶ Project personnel coordinated environmental training reaching 2500 producers at multiple locations for the poultry and livestock producer. Training programs addressed issues such as best management practices, water quality status, proper soil testing, nutrient management principles, proper poultry house construction and maintenance, and financial incentive programs.
  - ▶ CNMPs written by Technical Service Providers in collaboration with state Departments of Agriculture and USDA NRCS will affect the fate of about 3.5 million tons of fresh manure produced each year.
  - ▶ Training programs were offered for certified operators of animal waste management systems of both AFOs and CAFOs. In Georgia alone, over 450 operators were certified accounting for nearly all swine, dairy and liquid waste managed poultry farms regulated by the Georgia Department of Environmental Protection.
  - ▶ Poultry Waste Management Educational Training Programs reached more than 1,434 people through twelve 9-hour training sessions and 35 3-hour continuing education sessions presented in 2006.
  - ▶ The Animal Waste Management program team worked closely with the National Facilitation Project titled, “A National Learning Center for Animal Agricultural Water Quality Issues” , which offered seven animal waste webcasts:
    - 1) The CNMP Development Course and Its Role in Local TSP Education
    - 2) Proposed Changes to EPA’s CAFO Regulations
    - 3) Pathogens in Animal Manure—Should We Be Concerned? (Parts 1 and 2)
    - 4) Integrated Nutrient Management and Limits of the Phosphorus Index
    - 5) Manure Application to Legumes
    - 6) Nitrogen Availability from Organic Sources
- Multi-state manure resource websites are maintained to foster the marketing of poultry litter ([OK-littermarket.org](http://OK-littermarket.org) and [www.galitter.org](http://www.galitter.org) ) and to provide fact sheets and web-based materials on litter value, and soil and litter testing.
- Team members contributed to the program webpage addressing animal waste management issues and providing access to programs and resources available across the region (<http://srwqis.tamu.edu/wastemanagement.aspx>).
- Research and demonstration programs tied to the regional project were conducted in most states regarding the environmental impacts of land application of manure and poultry litter, BMP adoption and effectiveness, and composting and potential impacts of applied compost. For example, Oklahoma offered field days such as the Spavinaw Creek Producer Tour that outlined on-farm Best Management Practices, Nutrient Management and Grazing Strategies, Water Quality Concerns, and Shoreline and Watershed Management. These outdoor events allowed participants a “hands-on” learning approach and were well received.
- E-newsletters directed to the public and Extension agents were developed to provide updates regarding research results and outreach products and are posted on the team webpage at [http://srwqis.tamu.edu/downloads/SAMWMO\\_2006-04.pdf](http://srwqis.tamu.edu/downloads/SAMWMO_2006-04.pdf).

## Drinking Water and Human Health (DWHH)

- A [DWHH FAQ](http://www.aces.edu/waterquality/faq/faq_03.htm) database at [http://www.aces.edu/waterquality/faq/faq\\_03.htm](http://www.aces.edu/waterquality/faq/faq_03.htm) has been developed under the leadership of Auburn University. The database continues to expand; it currently offers 2,252 questions and answers arranged into 12 subtopics. Using the database, citizens and Extension personnel learn how to deal with both health and nuisance issues in drinking water. The website and a companion web-based glossary of water-related terms are by far the largest of their type available on the web; the FAQ website has averaged 3,605 hits per day in 2007.
- A regional down-well camera team was formed consisting of members from AL, GA, KY, LA, OK, TN, and TX. Personnel from Georgia and the Kentucky Geological Survey assisted in equipment acquisition and conducted training for partner state LGU personnel. A web-based network (<ftp://aesl.ces.uga.edu/vendrell/>) has been established for sharing down-well camera videos, and related information and resources. Program objectives are to develop a Southern Region expert team to share experiences, wellhead-photos, case studies, and down-well videos identifying regional well construction and maintenance problems, and work together to produce Extension education curriculum. Partners include the Kentucky Geological Survey, USGS, state and local health departments, and State Departments of Environmental Quality. A \$24,800 special projects allocation from the Regional Project leveraged \$65,000 in additional state funding, and several times that in the form of matching funds from personnel dedicated to this effort. Further, the down-well cameras are used by graduate students to conduct research, thus enhancing the project's integration of research and education.
- Team members developed a [regional web-page](#) and complementary state pages addressing drinking water and human health issues and providing access to programs and resources.
- A master's thesis on the perceptions of drinking water quality was completed at TSU.
- Examples of drinking water education programs held throughout the region include:
  - i. Team members developed tools to educate private well owners of their responsibilities, including having their well water tested. New testing packages were designed for groundwater conditions in Georgia, and County Agents were trained to implement and interpret these tests. Annually, thousands of households have been encouraged to water test, many receive additional assistance through meetings, workshops, telephone consultations, or emails. Many more are impacted indirectly through county water quality programs. Through these efforts, more private well owners are taking responsibility for protecting their wells, using more and better information.
  - ii. Another training program encouraged families to conduct risk assessment self-evaluations of their home water systems and have their water supplies tested. Training meetings and educational events were conducted on water well, source water and groundwater protection. In Louisiana, a mailer on protecting drinking water systems was distributed to 65,000 rural water system users.
  - iii. An internet-based distance education class on safe drinking water, titled, "Safeguarding Private Drinking Water Supplies and Public Water Security," was delivered by team members.

## Watershed Restoration

- Regional and multi-agency collaboration by the Watershed Restoration Team have improved the state of scientific knowledge and the practice of ecosystem restoration by developing, evaluating, demonstrating, and teaching effective techniques for restoring wetlands, streams, floodplains, and watershed functions. The Team has implemented restoration projects on 24,000 acres and 120 stream miles. Riparian buffer restoration projects have been implemented on 45,000 acres.
- Stream Restoration Professional Development Education:
  - ▶ Regional Stream Restoration Conferences (biennial): <http://www.ncsu.edu/sri>. The October 2006 conference in Charlotte, NC, brought together over 500 government, consulting, and academic professionals working in stream restoration planning, design, construction, and evaluation. Impacts include enhanced understanding of restoration technologies and programs, functional networks of restoration professionals, and improved restoration projects and programs.
  - ▶ Professional Development Workshops: Training programs on watershed restoration have been designed and conducted for a wide range of audiences, ranging from state agencies to engineers to construction contractors. Over 2,400 individuals have participated in over 12,000 contact-days of training in most states in the Southern Region. Impacts include improved project planning, design, and construction.
- Student Training:
  - ▶ New courses in stream restoration have been developed and taught at NCSU and Clemson University using field demonstrations for hands-on learning. Over 100 students have participated in undergraduate and graduate courses.
  - ▶ Graduate students have been involved in over 30 projects to evaluate watershed restoration techniques.
  - ▶ Thirty undergraduate students at AU volunteer weekly to remove trash and invasive, exotic vegetation from the stream that runs through AU's campus.
- External Partnerships:
  - ▶ The 2006 Stream Restoration Conference exemplifies the large number of partnerships including many local, state, and federal government agencies, private companies, and non-profit watershed organizations interested in funding and implementing watershed restoration.



- Leveraged Funding and Associated Projects:
  - ▶ \$2,900,000 – North Carolina Department of Environment and Natural Resources: technology development, evaluation, and educational programs.
  - ▶ \$ 125,000 – South Carolina Department of Health and Environmental Control: Little Garvin Creek Restoration demonstration, research, and education
  - ▶ \$ 200,000 – Alabama Department of Environmental Management: education and demonstration programs
- Regional Watershed Restoration website: <http://www.aces.edu/waterquality/sestreams.htm>

## Water Conservation and Agricultural Water Management

This national theme is addressed through the Southern Region Water Quality Education for Agricultural Producers Program Team and the Irrigation Water Management Program Team.

### Water Quality Education for Agricultural Producers

- Four states (LA, AR, MS and TX) have collaborated regionally to implement Master Farmer or allied programs. The Water Quality Education for Agricultural Producers Program Team develops programs that help educate farmers and encourage voluntary implementation of agricultural best management practices to improve water quality. This regional program has resulted in the development of nutrient management plans for 928,500 acres and 89% of 2,047 participants indicated they received much or very much knowledge from the training, and 99% indicated they would recommend the training to others. Also, more than 75% of 2,000 ag producers indicated they had implemented BMPs as a result of the producer education programs.
- Professional Development Education
  - ▶ Several multi-state regional meetings were held in ‘train-the-trainer’ sessions to assist Master Farmer coordinators and others in curriculum development and program implementation as part of the overall implementation strategy.
- [Regional Master Farmer website:](http://www.srwqis.tamu.edu/program-waterqualityeducation.aspx)
  - ▶ [Regional Website](http://www.srwqis.tamu.edu/program-waterqualityeducation.aspx) at <http://www.srwqis.tamu.edu/program-waterqualityeducation.aspx> with links to Master Farmer and affiliated programs in four states.

**Water Quality Education for Agricultural Producers**  
**A Regional Master Farmer Program**

**Situation and Objectives**  
 Initiated in 2001 by the LSU Agricultural Center, the Master Farmer Program is an exemplary, multi-agency outreach program in Louisiana with information regarding BMPs (Best Management Practices) and the environmental and economic merits for adopting them. Since inception, more than 2,100 farmers enrolled in the LSU Master Farmer Program and these participants are continuing to work towards their 'Master Farmer' status.

**The objective of the Regional Master Farmer Program is to extend the concept and training to additional states to help educate and encourage voluntary implementation of agricultural BMPs to improve water quality.**

**The concept has already been adopted by Edenton programs in Arkansas, Mississippi and Texas. Specifically, Arkansas is currently developing curriculum for their Master Farmer Program and is slated to begin in 2007. Mississippi conducted a producer survey in conjunction with their Nutrition Producer Program in 2005 and will continue program development through 2008. Finally, Texas received funding to initiate the Professional Agriculture Producer (ProAg) through a Section 319 Grant and will initiate education programs in 2007.**

**Actions**  
 All states involved in this regional effort are committed to:

- Conduct regional planning to: (a) identify state-specific limitations to agricultural education programs on water quality, (b) develop and share education and information tools, and (c) determine needs to assess program impacts on a state and regional basis.
- Support the outreach and implementation of agricultural BMPs for water quality improvements.
- Develop and implement internet-based farm management and new producer technologies to reduce nutrient loading.
- Provide a 'tool kit' to assist the Southern Region and other states in the development of their own Master Farmer Programs.

**Calendar of Events**  
 The Agricultural Producer Education Team will meet on Monday evening at the National Water Quality Conference in San Antonio.

The LSU Master Farmer Program Team will be holding an Ag Producer Training Workshop at the National Water Quality Conference in San Antonio on Tuesday from 1:00 to 3:00 PM.

**Minutes:**  
[Minutes of the Agricultural Producer Education Team meeting](#) held in Little Rock, AR, Jan 10, 11, 2006.

**Program Information**

- Focus Areas & Program Teams
- Target Themes
- Regional/National Resources
- Success Stories
- Regional Links
- Contacts
- Partners
- Youth
- Volunteer
- Proceedings
- Other National Water Programs Projects

**Hot Topics**

- Hurricane Recovery
- Drinking Water FAQs
- TMDLs
- Environmental Pathogen Information Network
- On-site Wastewater Treatment
- Nutrient Management
- Insects

**GIS Tools**

- Regional GIS Tools
- Advanced GIS Tools
- This requires a one-time download of a Java script available from Sun Microsystems

- External Partnerships
  - ▶ Partners at the federal, state and local level, including federal and state agencies, agricultural producers, and agricultural support groups, are actively involved in helping meet program goals.
- Leveraged Funding and Associated Projects
  - ▶ \$1,100,000 – More than \$1.1 million has been directly leveraged as a result of this regional project. This includes funding from state and federal sources, including the Environmental Protection Agency 319 program, and other state and federal sources, and represents funding for technology development, research and education, and related programs.

### **Irrigation Water Management**

- The regional Irrigation Water Management team delivered trainings resulting in a 15% improvement in irrigation efficiency and the conservation of 3,250,000 ac/feet of water. Improved irrigation practices were adopted in 36% of 19,000,000 irrigated acres.
- The funds from Section 406, private contributions and USDA Rio Grande Basin Initiative were utilized to develop the Snowmelt Runoff Forecasting tool available to stakeholders through a user-friendly web interface. This tool uses real-time, hydrological models driven by NASA and NOAA remote sensing satellites. NMSU Cooperative Extension Service is teaching stakeholders in various locations in the Rio Grande Basin to operate the models through the website and to derive risk assessments from model results.
- Student Education
  - ▶ NMSU graduate course AXED 590 New Mexico Water Issues organized 5 class meetings statewide to meet with producers/managers to discuss irrigation district and agricultural water issues, technologies, and policies. 21 students enrolled and presented term papers.
- External Partnerships
  - ▶ Research and Extension faculty, along with EPA and NRCS conducted a workshop in Ft. Worth, Texas to evaluate current watershed modeling strategies.
  - ▶ Integrated program of TAMU and NMSU in research and extension irrigation efficiency studies through the Rio Grande Basin Initiative aimed at improving irrigation efficiency and water conservation in the Rio Grande basin. Extension faculty and agents conduct research and education extension studies within 8 task areas, such as 1) Irrigation District Studies, 2) Irrigation Education and Training, 3) Institutional Incentives for Efficient Water Use, 4) On-farm Irrigation System Management, 5) Urban Water Conservation, 6) Environment, Ecology, and Water Quality Protection, 7) Saline and Wastewater Management and Water Reuse, and 8) Basin-wide Hydrology, Salinity Modeling, and Technology.
- Leveraged Funding and Associated Projects
  - ▶ \$1,500,000 - Rio Grande Basin Initiative (All Task Areas)

- Regional Publications:
  - *Maintenance Guide for Microirrigation Systems in the Southern Region* – designed to assist micro-irrigation system managers/operators to utilize their systems at top efficiency.
  - *Field Devices for Monitoring Soil Water Content* – describes the currently available range of methods to measure and monitor soil water content within BMPs approach.
  - *A Simple Flow Measuring Device for Farms* – describes the construction and operation of a simple water measuring device for water flow in open channels and small streams.
  - *Water Whiz Quizzes (Agri-Aqua, Wetter Homes and Gardens, and Water Wisdom)* – short, fun quizzes that teach about water and health, water use around the house, and farm.

## Watershed Management

This national theme is addressed through the Southern Region Watershed Education Network and the Rural/Urban Interface Landowner Education Program Team. A wide variety of audiences are served through educational programs that include the following key examples:

### Rural/Urban Interface Landowner Education

- Educational programs delivered by the Rural/Urban Interface Landowner Education Team have resulted in increased requests for conservation plans (22), well water tests (500) and soil tests (300).
  - ▶ Farm and Forest Land Preservation with Conservation Easements describes conservation easements and the steps involved in creating them. It is designed for lay audiences. The use of conservation easements to preserve current uses on “working lands” is a focus of the presentation.
  - ▶ Professional Development Education multi-state regional meetings were held to, 1) advance scientific and technical research that promotes environmental protection, 2) explore current and emerging issues of importance to environmental protection, and 3) encourage collaboration among the nation's best scientists in academic, business, and nonprofit organizations.
- External Partnerships
  - ▶ Partners at the federal, state and local level, including federal and state agencies, agricultural producers, non-profit organizations, and agricultural support groups, are actively involved in helping meet program goals.



- Leveraged Funding and Associated Projects
  - ▶ \$400,500 – More than \$400,000 has been directly leveraged as a result of this regional project. This includes funding from state and federal sources, including the Environmental Protection Agency 319 program, and other state and federal sources, and represents funding for research and education, and related programs.
- Regional water quality events addressing rural/urban interface resources available at <http://srwqis.tamu.edu/program-ruralurbaninterface.aspx>.

## Watershed Education Network

- To date, students from 14 states have attended the Southern Regional Water Program **Watershed Academies**: Principles of Water Quality Monitoring, Planning, and Restoration and have learned to apply water quality and watershed management principles to understand and solve complex water resource problems. Participants gain a thorough scientific understanding of watershed processes, assessment, and techniques for protecting and conserving water resources. Instructors use case studies, field trips, and group assignments to teach water quality assessment and watershed management approaches, including conservation, protection, and restoration. Skills gained at the workshop improve students' abilities to identify problems and solutions for their local watersheds. Three academies were offered in 2006-2007 and three more are planned for 2007-2008.
- A **Regional Watershed Steward Program** coordinated by Texas A&M and the University of Georgia is being implemented. Increased understanding and adoption of appropriate BMPs and other restoration activities are being accomplished through education outreach and technology transfer via the Watershed Steward Program. Multi-disciplinary and multi-agency teams support watershed education resource materials development. Watershed Steward Partners include state natural resource agencies, the Land Grant Universities, Cooperative Extension Services, Water Resource Institutes, Sea Grant Programs and EPA. Watershed Steward Coordinators at the University of Georgia and Texas A&M University are working jointly to develop curricula, evaluation tools, and websites, and to further leverage 406 funding. The project has currently leveraged \$1,100,000 in external funding.
- Team members developed regional web-pages and complementary state pages addressing Watershed Management and the Watershed Education Network and providing access to programs and resources available across the region (<http://srwqis.tamu.edu/watershed.aspx>, and <http://srwqis.tamu.edu/program-watershededucation.aspx>).

## Water Quantity and Policy

- A multi-state Water Policy Forum titled, “The Role of Educators in the Water Planning Process” convened in Oklahoma City, March, 2007. The Forum was supported by a Coordination Special Project subaward. The purpose of the Forum was for Extension educators, water policy analysts, and decision makers to share expertise, experience, approaches, and views on research



and education needs with regard to water policy, water planning, and the role of science education in the area of public policy. Proceedings of the conference are available at <http://waterquality.okstate.edu/events/WaterForum/>.

- Team members developed a regional web-page and complementary state pages addressing Water Quantity and Policy and providing access to programs and resources available across the region (<http://srwqis.tamu.edu/waterquantity.aspx>).

### **Project Accomplishments and Impacts > National Citizenship Contributions to shared leadership on behalf of the CSREES National Water Program and the network**

The Southern Region, and specifically North Carolina State University, provided leadership in concert with the CSL-WQ for program planning and management for the annual CSREES National Water Program Conference in support of the 406 Program. The Region IV Coordinator has chaired the organizing committees for the CSREES National Water Program Conferences. About 500 water quality professionals attended the most recent conference featuring more than 240 oral and poster presentations integrating research, extension and education. Conference attendance has grown by more than 20% each year and has become a premier event for scientists and educators interested in water resource management. The 2007 Conference proceedings are posted to <http://www.usawaterquality.org/conferences/2007/default.html>. Planning is well underway for the 2008 conference to be held in Sparks, Nevada, Feb.4-8.

The Southern Region, and specifically Texas A&M University, provided leadership for marketing the CSREES National Water Program. The marketing effort utilized impact information obtained from each region. National Water Program Impact Reports were produced and distributed at the National Water Conference in February, 2007 in Savannah, Georgia. The impact reports 1) describe the goals and structure of the NWP, 2) provide key examples of how water resource professionals at universities and colleges, in cooperation with CSREES, are working with citizens, communities and partner agencies to address critical water resource problems across the United States, and 3) provide contact information for national and regional program leaders. Each region contributed a page of abbreviated project impacts or highlighted an especially successful regional effort. Reports from the National Facilitation Projects; Integrated Research, Education and Extension Projects; and Extension Education Projects also were included. A pdf version of the report is available on the national website's "National Publications" page at [http://www.usawaterquality.org/about/natl\\_pubs/national\\_impact\\_report05-06.pdf](http://www.usawaterquality.org/about/natl_pubs/national_impact_report05-06.pdf).

The Southern Region produced and developed annual, or more frequent updates of the CSREES NWP poster, a trifold brochure and a national Directory of Water Quality Coordinators. The NWP poster was presented at the CSREES National Water Conference in Savannah. In addition, the poster is available in pdf format through the 2007 National Water Conference Proceedings link on the national website.

The Directory of Water Quality Coordinators was developed and is maintained to facilitate and enhance contact among individuals and institutions and between these personnel and external

groups and organizations, create a sense of community within the university system, and provide tangible evidence of the commitment and participation of institutions and personnel in the program. It was carefully prepared to provide clear and comprehensive access to personnel from all land grant institutions including 1862, 1890 and 1994. The Directory has been widely distributed at the National Water Program Conference and through numerous requests from program administrators and water quality coordinators across the country. The directory is available on-line at [http://www.usawaterquality.org/directory/WQCdirectory\\_June07.pdf](http://www.usawaterquality.org/directory/WQCdirectory_June07.pdf).

NIWP trifold brochures were developed to serve as an additional marketing resource for the program. These have been distributed to program personnel across the county, to agency administrators, to a variety of potential external partners (e.g., NRCS, EPA, NOAA, USGS), and at a joint Extension-Experiment Station meeting in New Jersey.

## **Project Accomplishments and Impacts > Regional Coordination and Leadership**

Objective 1 (above) of the Southern Region Water Quality Coordination Project focuses on supporting the regional coordinating committee, and facilitating regional program planning and communication. The SRWQPC holds quarterly face-to-face meetings annually and convenes monthly or as needed by teleconference and/or through e-mail list-serv to conduct project business.

The SRWQPC provides leadership for the project by defining and prioritizing regional water quality issues, establishing and coordinating multi-disciplinary and multi-state teams, drawing heavily on expertise of the 1862 and 1890 land grant universities, and by partnering with federal, state and local agencies and organizations to address the national water resource themes. Through this process, 12 program teams with a total of 123 members were established to implement regional program efforts. Teams included State Water Quality Coordinators and personnel from all appropriate subject matter areas identified and solicited by coordinators to participate in the regional program. These included water resource management faculty with extension and/or research appointments, as well as personnel from partner agencies and organizations. Through the diversity, breadth and efforts of its membership, each program team integrated activities in extension, research, and education. Program Teams provided leadership for development and compilation of information and resources addressing national water resource themes and worked within their task areas to accumulate existing resources, facilitate resource sharing, identify information gaps and develop new resources.

Special regional project subgrants were used to target major areas of need and/or to address emerging issues within the region. For example, researchers and educators from southern region states participated in a forum to share expertise, ideas, and insights to aid in planning their own states' programs in the emerging area of Water Policy and Economics. Other special sub-grants funded specific Program Team efforts resulting in some of the regional accomplishments addressing national themes described in Section II above. For example, a special regional coordination sub-grant to the Drinking Water and Human Health program team allowed the team to continue training and equipping team members to enable them to identify well construction and maintenance problems, and work together to produce Extension education curriculum. This

team is helping reduce groundwater contamination by improving well construction and maintenance, revising State well construction standards, and increasing understanding of complex hydro-geological processes through the team's integrated activities involving graduate student research and extensive partnering with state natural resource and health protection agencies. Other examples of particular program team efforts included awards to the Nutrient Management Program Team to support production of a regional template for a video promoting soil testing, and to the Onsite Wastewater Management Program Team to develop a protocol that will allow the collection of information on the performance of mature, operational onsite wastewater renovation systems.

The overall goals of the Southern Region's Water Quality Conferences are to facilitate program and resource sharing among institutions and other project partners and to strengthen the capacity for Extension to develop and deliver water resource programs. This is achieved by integrating research information into successful education strategies and programs addressing current and potential water resource issues, and providing a forum for exchange of ideas and information. Substantial coordination and planning efforts are underway by the SRWQPC to organize a major regional education, training and technology transfer conferences in Fayetteville, AR in October, 2007. Over 200 water resource professionals are expected to attend the conference, which is designed to provide training and direct access to successful programs and resources employed throughout the region. Follow-up evaluations completed six months after the 2005 conference indicated that 97% agreed or strongly agreed with the statements: 1) My programs/activities have benefited from the information/materials/ideas I received, 2) I feel that cooperative working relations within Extension at all levels, program areas, and academic disciplines have been enhanced in water quality and natural resource programming, and 3) I have shared some of the information/ materials/ideas with colleagues. Similar responses were gathered following the 2001 and 2003 conferences.

## **Project Accomplishments and Impacts > Other**

Objective 3 (above) of the Southern Region Water Quality Coordination Project focuses on development of a central database management system to serve as the repository for regional water quality information and resources, and provide direct linkages to other regional and national database systems. **Major** features of the regional website are as follows:

To facilitate the accumulation, organization and delivery of resources and information, a web-based interface was developed at Texas A&M University (<http://srwqis.tamu.edu>). This interface provides a direct link to other pertinent GIS/geo-referenced information systems across the region, links and communicates with water quality programs at the watershed and regional levels, and promotes regional and national awareness and coordination in the development and delivery of water resource management programs. Website theme pages providing overviews and highlighting extension, education and research activities addressing each theme were developed by team members. Specific emphasis was placed on creating and expanding linkages within and among land grant university research, education and extension programs and external partners throughout the region.

Additional pages have been added to the Regional Database to accommodate the Project's focus area and program team structure. Program team pages (e.g., the Nutrient Management Program Team page at <http://srwqis.tamu.edu/program-nutrientmgmt.aspx>) feature teams' objectives, plans for accomplishments, products, upcoming events and working documents such as meeting or conference call minutes. Program team members may be contacted through a regional email system at <http://srwqis.tamu.edu/focusareas.aspx>. This email system is available for public use by anyone registering with the system and also is used for communication within the Southern Region. A page featuring success stories and a calendar of events also is available. In 2006, the Database hosted 36,012 unique visitors downloading 107,998 pages through 559,512 hits.

The SRWQPC has compiled Southern Region Extension hurricane preparation and recovery publications, and Extension Disaster Education Network (EDEN) links on the regional website under a Hurricane Hot Topic featured on the home page (<http://srwqis.tamu.edu/hurricane.aspx>). This regional resource brought together and made more easily accessible all of the Southern Region Extension hurricane-related information and covered a greater breadth of hurricane-related topics (with special emphasis on water) than could any particular state Extension website. This resource enables areas under hurricane warning to better prepare for the hurricane and, with the assistance of areas adjacent to affected areas, begin to print and plan distribution points for key factsheets to be delivered following the hurricane. The URL for the hurricane webpage was disseminated by Texas Cooperative Extension's administration and Ag Communications Department as part of the state's preparation effort for Hurricane Rita.

The Southern Region Water Quality Information Database also includes a specially designed and highly-effective Search University Publications feature at <http://srwqissearch.tamu.edu/search.aspx>, which provides a state-of-the-art search engine that examines thousands of science-based, water resource management publications in 65 databases maintained at universities throughout the Southern Region. All returns are highly relevant and provide objective water resource management information. This tool saves the SRWQPC many dollars and staff hours which would have been spent in assembling a region-wide publications library and is used by specialists and county agents to quickly access for use and/or to direct clientele to a variety of publications developed across the region addressing their concerns. This powerful tool, produced through collaboration of the SRWQPC, is a regional product which promotes the Coordination Project's goals of enhancing regional information sharing and resource exchange, increasing regional collaboration, facilitating delivery of land grant university resources and reducing duplication of effort.

In addition, the Southern Region Water Quality Information Database offers unique GIS mapping and analytic capabilities. Users are able to select from a menu of data layers providing information such as watersheds, impaired water bodies, soil type, land use, hydrology, roads, and population centers. Users can print maps that show the data of interest for their areas. This information is useful to County Extension Agents and watershed action groups teaching stakeholders how land use patterns may affect 303(d) designation for local water bodies.

The Southern Region is expanding its use of the GIS tools and data layers available through the Southern Region Water Quality Information Database as it implements regional Master Farmer

and Watershed Steward initiatives. Supplemental data layers such as aerial photos, ssurgo soil data, parcels, drainage patterns, subwatersheds, wetlands and elevation for the watershed of interest will be made available through the Database. In addition, detailed analyses indicating potential risk areas will be illustrated through the ArcIMS viewer on the website. These data layers and analyses are extremely helpful in explaining and illustrating watershed hydrology principles at the local level. Maps generated by the website also will be helpful in the process of Watershed Protection Plan development. In addition, the website allows data such as GPS locations, monitoring information, and impervious surface area to be uploaded for detailed analysis with ArcIMS tools.

### **III. Successes: Highlighted examples of excellence that have emerged from this project**

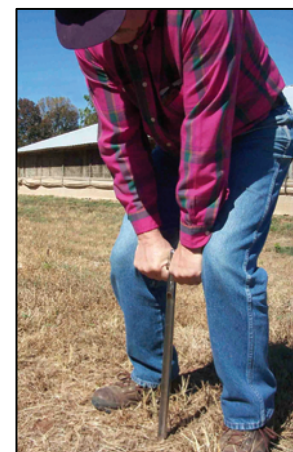
The Southern Region Water Quality Coordination Project has been critically important for enhancing, strengthening and expanding the network of water quality coordinators (the SRWQPC) established by the Southern Region Extension Directors in 1988. The Project enlarges and fortifies an existing collaborative process through which new and existing technologies and management systems are developed and shared throughout the region and nation. Program teams established by the SRWQPC continue to work to implement regional activities and address water issues identified as national themes. Numerous new contacts and collaborative partnerships have been formed through this process which otherwise likely would not have occurred. Primary emphasis is placed on providing leadership for water resources research, education and outreach to help people, industry and governments prevent and solve current and emerging water quality and quantity problems.

Several excellent program efforts have been highlighted previously in this report and many are posted to the Southern Region Water Program website through Success Stories at <http://srwqis.tamu.edu/success.aspx>. For example, the Regional Nutrient Management Summary and current team efforts to improve uniformity of Land-grant University nutrient management recommendations and increase collaboration between agencies in conservation program implementation (pp. 6-7), Comprehensive Nutrient Management Planning training delivered throughout the region (p.8), the [Drinking Water and Human Health Frequently Asked Questions \(FAQs\) database](http://www.aces.edu/waterquality/faq/faq_03.htm) ([http://www.aces.edu/waterquality/faq/faq\\_03.htm](http://www.aces.edu/waterquality/faq/faq_03.htm), p. 9), Watershed Restoration workshops provided to 1300 natural resource professionals in most of the Southern Region states (pp. 10-11), and Watershed Academies (p. 15).

Additional, excellent program efforts include the following:

#### **Watershed Impact – Nutrient Management Case Example/Success Story**

Nitrogen and phosphorus fertilizer application on agricultural land were reduced by over 4,176,000 pounds through intensive education and training programs in the Texas Rio Grande Valley. Adoption and sustained use of soil testing as a Best Management Practice by



agricultural producers was increased by over 60% on more than 80,000 acres in the nutrient impaired Arroyo Colorado Watershed. In addition to the environmental benefits, the estimated economic impact of the program totaled over \$1,002,000 in direct fertilizer cost savings. This outcome was supported by a newly developed [Regional Nutrient Management Publications Database](#) and by \$10,000 in funding from Section 406. The project also leveraged over \$124,000 from other federal, state and local sources.

### Watershed Impact – Watershed Restoration Case Example/Success Story

The Little Garvin Creek Restoration Project began with \$125,000 in grant funding from USEPA Section 319 and South Carolina Department of Health and Environmental Control. Under the direction of Clemson University and North Carolina State University, a series of workshops was conducted to train natural resource professionals in stream assessment, restoration design, construction, and monitoring. The restoration construction project addressed 1,200 linear feet of unstable stream channel on the Clemson University Simpson Farm. Three graduate student projects, 25 undergraduate student courses, and 7 professional development workshops have used the restoration site as a living laboratory for teaching and evaluating stream restoration impacts on water quality, aquatic health, and stream stability. Impacts of this project include improved water quality in Little Garvin Creek, better educated students and professionals, and establishment of a long-term research site for evaluating stream restoration.



### Watershed Impact – Master Farmer Case Example/Success Story



More than 2,000 agricultural producers have been trained through Louisiana's Master Farmer program. The inaugural group of Certified Master Farmers recently completed the third tier of the program and received certification from the Louisiana Department of Agriculture and Forestry. This represents a high benchmark in performance, which requires completion of eight hours of classroom instruction, participation in a Model Farm field tour, and development and

implementation of an NRCS Resource Management System plan to address potential or occurring pollution. With the assistance of USDA programs and other technical assistance, these producers have installed more than 40 BMPs to address environmental issues. These certified producers manage more than 15,000 acres of Louisiana farmland, all within a 50-mile radius of 303(d) listed impaired state waters. In addition, multi-state collaboration has resulted in the development of a template by the Louisiana Master Farmer Program that can be used by other

states to develop similar programs, focusing on curriculum development, implementation and lessons learned.

### Irrigation Efficiency – Case Example/Success Story



The ‘Pecanigator’, a pecan irrigation calculator, has been developed to help pecan producers schedule irrigation intervals. The tool is based on historical climate data and soil types specific to the pecan producing areas of Southern New Mexico and far West Texas. The Pecanigator is designed to improve water use efficiency while educating producers in science-based irrigation practices. Although water conservation per acre may be relatively small, pecan acreage in New Mexico and West Texas amounts to tens of thousands ( $\approx 70,000$ ) acres.

### IV. Lessons Learned/Project Challenges

The Southern Region Water Quality Coordination Project sustained and substantially expanded the collaborative framework from which a significant number of excellent regional programs have emerged. New ideas and mechanisms for operating more effectively and efficiently through regional partnerships and linkages are being continually developed. Our project continues to evolve, grow and improve. Most importantly, results of these efforts are being transmitted via state programs to the local watershed level where functional protection and improvement in water quality occurs. In the case of the Southern Region, the regional structure and the CSREES National Water Program concept are a success.

The Southern Region’s enhanced understanding of and commitment to the benefits of the regional approach can best be demonstrated by key examples of banner regional programs which are underway as a direct result of the 406 Integrated Water Quality Program:

**A Regional Watershed Steward Program** coordinated by Texas A&M and the University of Georgia, is being implemented ~ Increased understanding and adoption of appropriate BMPs and other restoration activities are being accomplished through education outreach and technology transfer via the Watershed Steward Program. Multi-disciplinary and multi-agency teams support watershed education resource materials development. Watershed Steward Partners include state natural resource agencies, the Land Grant Universities, Cooperative Extension Services, Water Resource Institutes, Sea Grant Programs and EPA. Watershed Steward Coordinators at the University of Georgia and Texas A&M University are working jointly to develop curricula, evaluation tools, and websites, and to further leverage 406 funding. The project has currently leveraged \$1,100,000 in external funding.

**The Nutrient Management Team** has fostered a partnership with the key nutrient management organization (Southern Plant Nutrient Conference), which represents industry and university personnel from across the region. This new partnership has and will enable joint and collaborative issues identification, planning and program development.

**Southern Region Down-well Camera Team** is using down-well cameras to supplement evaluation of the condition of private drinking water wells. Images obtained with a down-well camera identify problems and provide individuals with information necessary to repair their well and reduce the potential for contamination. The Team is producing a regional DVD.

The **Regional Watershed Restoration** program conducted four workshops in four states in 2006 and the **Regional Watershed Academy** team conducted three workshops in two states in 2007.

The **On-site Wastewater Management** program team is seeking external funding to establish an on-site wastewater treatment technology demonstration center to facilitate research and education material development on management of “mature” septic systems.

The **Rural/Urban Interface Landowner Education** program is seeking external funding to support development of a regional publication to provide comprehensive water resource-related information to the homeowner on the rural-urban fringe.

## **Summary**

Ultimately, the goal of the Southern Region Project is to protect and improve water resources at the local level. Regional collaboration has enhanced our ability to achieve that goal. However, regional teams and state personnel also are continuing to work to secure expanded funding to support direct delivery of programs and resources at the local level.

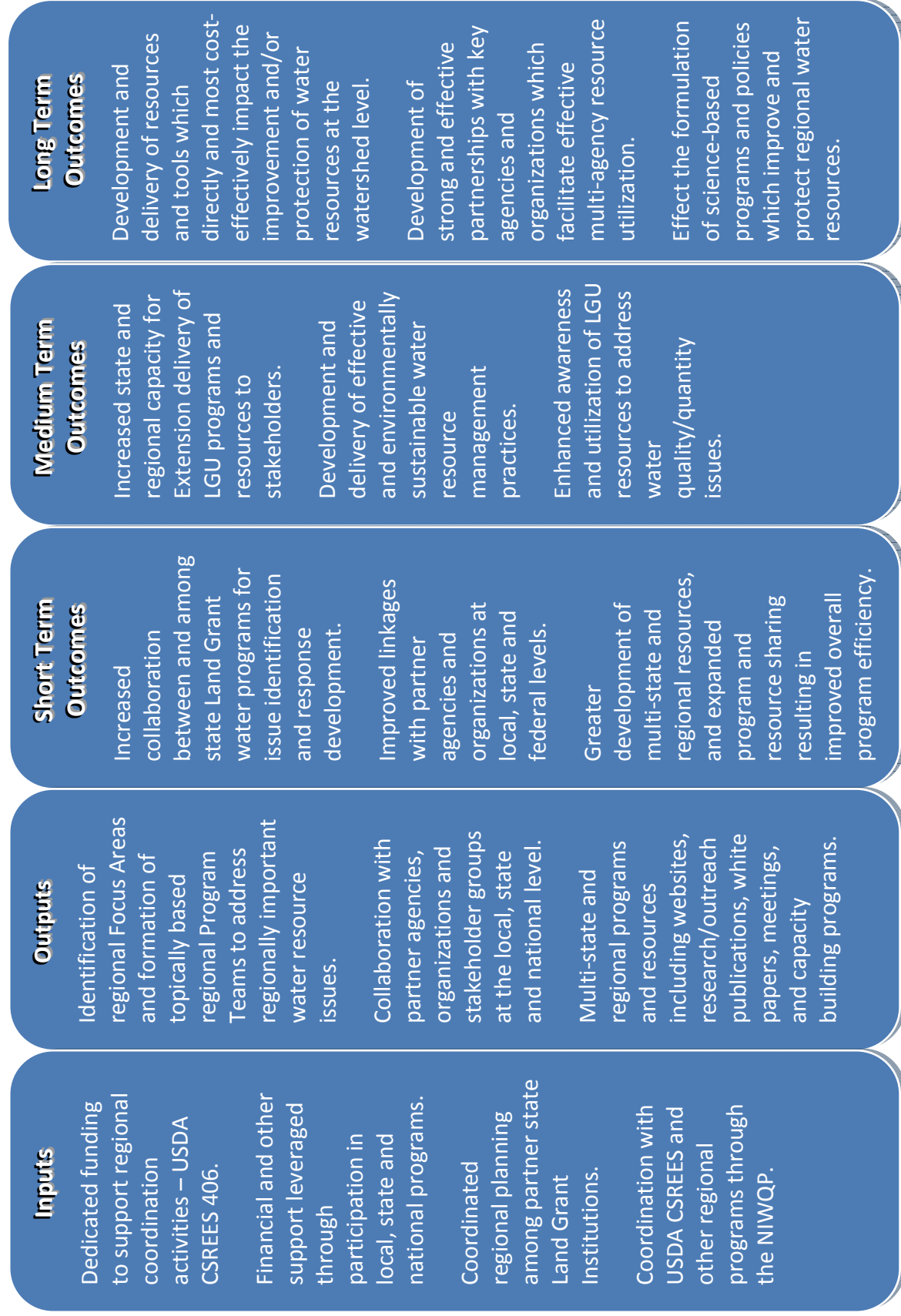
Southern Region states also face significant challenges and opportunities to meet the educational needs of “underserved audiences,” those individuals and groups not typically reached due to socioeconomic barriers. The recently funded National Facilitation Project entitled, *Facilitation of 1890 Institutions’ Water Resource Education, Extension and Research Efforts* will enhance program delivery to underserved audiences through improved collaboration of 1862 and 1890 land grant institutions. Regional team members are providing program support to the project, which ultimately, will enhance efforts to address water resource management needs affecting the lives of these clientele groups.

No major difficulties have been experienced during the project. Communications/interactions among the project partners and with USDA-CSREES have been excellent. We anticipate continued program enhancement through increased interaction of personnel via the development of regional programs, regional and program team collaborations, and through linkage with other regions through the CSREES National Water Program.



## Southern Region Water Program Logic Model

The Project promotes regional collaboration, enhances delivery of successful programs and encourages multi-state efforts to protect and restore water resources. Ultimately, the Project improves public access to the water-related research, extension and education resources available through the Land Grant University System in the Southern Region and nationwide.



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