



*Applying knowledge to improve water quality*

# Southern

## Regional Water Program

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

### Southern Region Watershed Management Project

September 15, 2000 to September 14, 2005



### Terminal 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 Watershed Management Project

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# Southern Region Watershed Resources Management Project

## Final Report

Sept. 15, 2000 to Sept. 14, 2005

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

The Southern Region Watershed Resources Management Project sustained and expanded 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 enhanced the development and delivery of resources and programs to address critical water resource concerns in the South and supported development and expansion of the CSREES National Water Quality Program.

The SRWQPC served as the Regional Coordinating Committee for the project. The SRWQPC provided centralized coordination and networking both internally and with other regional water resources management programs, promoted technology development and exchange, and fostered collaborative, multi-state and multi-disciplinary efforts to more effectively and efficiently address common issues and concerns. The SRWQPC also provided 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 appointed 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 provided leadership for multi-state and regional efforts to maximize sharing of resources and minimize duplication of effort. This was accomplished through a focused assessment of state level resources and selection of components for inclusion into regional resource packages for widespread application.
- The SRWQPC facilitated integration and linkages among research, education and extension programs at the county, university, state, regional and national levels.
- The SRWQPC elected officers to serve as Chair and Vice-Chair for one-year terms. The Chair was responsible for conducting meetings, assigning committees, and overall program coordination.

- The SRWQPC elected one Regional Coordinator each for EPA Regions IV and VI to work directly with CSREES National Program Leaders. Regional Coordinators provided 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); participated in monthly conference calls; provided support for national citizenship efforts such as marketing, web site, and national conference; and represented the Southern Region at quarterly national coordination meetings in Washington, D.C., and other locations.
- The SRWQPC convened on a quarterly basis to conduct program planning and coordination activities, and communicated routinely via a regional list-serv and through regular teleconferences.
- The SRWQPC engaged and supported Extension Liaisons with the Region IV and Region VI EPA offices in Atlanta and Dallas, respectively. Liaisons provided a direct linkage with EPA and other federal partners. Liaisons also participated in multi-agency and multi-state collaborations to support the objectives of the Coordination Project.
- The SRWQPC engaged 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 included faculty from research, education and extension within the University system. Special efforts were 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 and Consumer Sciences, from across the region were engaged in the project. Many served as team members, participated in regional training events and supported 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. Two Sea Grant administrators served as State Coordinators and one served as a Regional Coordinator. In several states, WRI and/or Sea Grant personnel collaborated directly on theme 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.

Regional linkages were established with EPA (Regions IV and VI) and USDA-NRCS through direct participation on theme teams, most specifically Nutrient and Pesticide Management and Watershed Management. 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 was 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 progressed, efforts were 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 were addressed by channeling and leveraging technical and financial resources to comprehensively address critical water quality and interrelated water quantity issues. The project supported a collaborative process through which new and existing technologies and management systems were developed and shared throughout the region. The project fostered the development and application of effective and environmentally sustainable water resource management technologies and facilitated education and implementation programs at the regional, multi-state and local levels.

The Southern Region Project endeavored to address each of the initial 7 National Program Themes defined by the Committee for Shared Leadership for Water Quality. These included:

Nutrient and Pesticide Management	Watershed Management
Animal Waste Management	Pollution Assessment and Prevention
Drinking Water and Human Health	Water Quantity and Policy
Watershed Restoration	

The Southern Region Project included three primary goals and associated objectives. Goal 1 focused on creation and management of the project organizational structure; Goal 2 focused on development of a regional geo-referenced database as required by the grant; and, Goal 3 targeted the development and implementation of integrated programs. As a part of Goal 2, the regional database was designed to serve as an assimilation point and clearinghouse for information and resources related to each of the national themes. Goal 3 facilitated that effort through the creation and support of regional theme teams.

Specific project goals and objectives were to:

**Goal 1:        Establish a Coordinating Committee with technical support to optimize regional program planning and communication, identify, prioritize and address research and educational needs across the region, identify the expertise of contributing institutions, and facilitate resource sharing and technology transfer between and among institutions to meet identified needs.**

- Objective 1: Establish a Southern Region Water Quality Planning Committee representing the 13 states in EPA Regions IV and VI as the Regional Coordinating Committee for the proposed Southern Region Watershed Resources Management Project.
- Objective 2: Obtain the involvement of a State Water Quality Research, Education and Extension Coordinator in each of the 13 participating states, and establish linkages to water quality programs at 1890 and 1994 institutions.
- Objective 3: Coordinate with existing Federal, State and local water quality programs, identify opportunities for internal and external linkages, partnerships, and liaisons to optimize collaborative efforts to promote water quality education throughout the Region.

**Goal 2: Create a watershed-based, geo-referenced, central database management system to serve as the repository for regional water quality information and resources, provide direct linkages to other regional and national database systems, conduct coordinated needs and impact assessments regarding regional issues and programs, and display the resulting water quality improvements in GIS.**

- Objective 4: Establish a web-based, geo-referenced information and reporting center at Texas A&M University to manage information provided by states in the Region and report on progress of the Southern Region Watershed Resources Management Project.
- Objective 5: Facilitate collaborative linkages with existing water resources database systems at the Federal (EPA, NAWQA, USDA-NRCE, etc.) and state (State Water Resource Agencies) levels.
- Objective 6: Utilize water resource assessment tools, including geographic information systems and watershed/water quality models to conduct periodic state and regional needs assessments to guide overall program direction and assess program impacts.
- Objective 7: Utilize the geo-referencing system as the central reporting system for all collaborative regional program efforts facilitated through the Southern Region Watershed Resources Management Project and related programs.

**Goal 3: Develop and implement regionally coordinated, integrated education, extension and research efforts that share information and approaches to minimize duplication of effort and leverage multiple funding sources, and address water quality issues common to the region.**

- Objective 8: Compile summaries of existing state research, education and extension information and data resources that can be incorporated into the central database management system.
- Objective 9: Develop education outreach modules, including distance learning technologies, addressing critical water quality and water resource management issues that are designed for widespread application in watersheds with similar water resource concerns.

Objective 10: Conduct individual and multi-state, and regional technology transfer programs to promote the use of appropriate water resource management tools by professionals, agricultural producers and communities in agriculturally-impacted watersheds.

## II. Project Accomplishments and Impacts

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

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

Goal 3 (above) of the Southern Region Watershed Management Project 2000-2004 focused on development and implementation of regionally coordinated, integrated education, extension and research efforts. **Major** outputs, outcomes, and impacts associated with the national themes addressed by the Project Team were as follows:

### Nutrient and Pesticide Management

- The Southern Region Nutrient Management Theme Team coordinated a regional, multi-agency (NRCS, EPA, state regulatory agencies, 1890s, 1862s) planning conference to increase understanding of regional variations and enhance collaboration among agencies and groups in nutrient management program implementation. As part of the effort, a comprehensive summary of southern region states' nutrient management regulations, education and training resources, and P-indices was compiled and is posted to <http://srwqis.tamu.edu/downloads/NutMgtCSREES.pdf>. To continue these efforts, the team currently is leading a national initiative between CSREES and NRCS Headquarters to enhance uniformity of Land-grant University nutrient management recommendations, and increase collaboration between agencies in conservation program implementation.
- Team members developed a regional web-page and complementary state pages addressing nutrient and pesticide management issues and providing access to programs and resources available across the region (<http://srwqis.tamu.edu/nutrient-pesticide.aspx>).
- Nutrient Management Training Workshops were conducted across the region and educational resource materials were developed and shared to improve program efficiency and enhance technology transfer. Target audiences included agricultural producers, homeowners, coastal residents, golf course operators, nursery managers, and Spanish-speaking workers in the Green Industry.
- Adoption and Sustained Use of Soil Testing as a Best Management Practice for Water Resource Protection ~ Nitrogen and phosphorus fertilizer application on agricultural land was reduced by over 4,176,049 pounds through intensive education and training programs in one targeted program. 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 which was enabled by \$20,000 in 406 funding. To further these efforts, the Southern Region is beginning development of two training videos on the environmental benefits of nutrient management and the critical role of soil testing in recommending environmentally responsible application rates of fertilizer and lime.
- Waste Pesticide Disposal Programs ~ To address waste pesticide disposal problems and associated environmental issues, waste pesticide disposal events were conducted in collaboration with farm support groups, educational institutions, environmental agencies and

farmers. Over one million pounds of waste agricultural pesticides were collected and disposed of properly.

- P-Index Comparison – A regional comparison of state P-Indices was initiated to evaluate variations in design, application and impact of phosphorus management tools and potential differential impacts on agricultural producers and land managers across state boundaries. Results have been presented at regional and national meetings and a refereed journal publication is under development.
- Nutrient Management Certification Programs were developed and delivered in concert with USDA-NRCS in all states. Program templates and training resources were shared among states, significantly reducing redundancy in effort and enhancing consistency among state programs. In Texas alone, over 200 nutrient management planners were certified through the program.
- Research and demonstration efforts were conducted in all states to address nutrient management recommendations, BMP adoption and effectiveness, and pesticide selection and application techniques. Multi-state efforts targeting soil testing methods and adoption of standard recommendations have been initiated and are on-going.

### **Animal Waste Management**

- Comprehensive Nutrient Management Planning training was delivered throughout the region. Programs offered through the Southern Region Water Program taught elements of animal waste management planning to producers, NRCS staff and members of approved third party organizations to enable their development of certified CNMPs. Key examples include:
  - i. The University of Arkansas Cooperative Extension Service coordinated an environmental training for the Poultry and Livestock industry. The training 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. The training was delivered to over 2500 producers at several locations.
  - ii. CNMPs written by Technical Service Providers trained by University of Florida Extension in collaboration with the Florida Dept. of Agriculture and Consumer Services and NRCS will affect the fate of about 3.5 million tons of fresh manure produced each year.
  - iii. University of Georgia Extension developed a training program for operators of animal waste management systems on both AFO's and CAFO's. As a result, Georgia has certified about 400 operators, accounting for nearly all swine, dairy and liquid waste managed poultry farms regulated by the Georgia Department of Environmental Protection.
  - iv. Training in CNMP was provided to county faculty from across the region at the biennial regional conference held in Ruidoso, NM, November 2003.
- A multi-state manure resource website was developed to foster the marketing of poultry litter (<http://OK-littermarket.org>) and to provide fact sheets and web-based materials on litter value, and soil and litter sampling.
- Team members developed a regional web-page and complementary state pages 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 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.

### Drinking Water and Human Health

- Under the leadership of Auburn University, the Drinking Water and Human Health Program Team developed and continues to expand a [Drinking Water and Human Health Frequently Asked Questions \(FAQs\) database](#) currently offering 1,996 questions and answers arranged into 12 subtopics. Using this FAQ database, citizens and Extension county agents learn how to deal with both health and nuisance issues in drinking water. This website and a web-based glossary of water-related terms also compiled by the Auburn University State Water Program have logged hundreds of thousands of hits and are by far the largest of their type available on the web.
- The Team used down-well cameras to supplement evaluation of the condition of private drinking water wells. Images obtained with the down-well cameras identified problems and provided individuals with information necessary to repair their well and reduce the potential for contamination. The Team currently is producing a regional DVD of common well problems illustrated with footage from the cameras.
- 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 available across the region (<http://srwqis.tamu.edu/drinkingwater.aspx>).
- Safe drinking water education programs and testing campaigns were held throughout the region. A few examples include:
  - i. Health departments in many counties offer bacteria testing to private well owners; however, this service was not available throughout Georgia. Water chemistry is only available to private well owners through the Cooperative Extension Service's laboratory or a private water-testing laboratory. The Georgia Drinking Water theme team, funded by Sec. 406, worked to expand the Georgia Cooperative Extension Service water testing program statewide. Training was given to County Agents for implementing both new services along with county-led programs to inform their clients. Yearly, over 4000 clients are impacted directly through meetings, workshops, telephone calls, emails, and analytical services. Many more are impacted indirectly through county water quality programs.
  - ii. As a result of training by the Louisiana Cooperative Extension Service, participants conducted risk assessment self-evaluations of their home water systems and had their water supplies tested. Training meetings and educational presentations were held on water well, source water and groundwater protection. In addition, a mailer on protecting drinking water systems was distributed to 65,000 rural water system users.
  - iii. New Mexico State University Cooperative Extension conducted internet-based distance education classes on safe drinking water. The classes were entitled, Safeguarding Private Drinking Water Supplies and Public Water Security.

## **Watershed (Environmental) Restoration**

- Watershed Restoration Team members developed a regional web-page and complementary state pages addressing Watershed Management issues and providing access to programs and resources available across the region (<http://srwqis.tamu.edu/environment.aspx>).
- Team members coordinated the training of over 1300 natural resource professionals through delivery of 32 workshops at 18 locations in 8 southern region states (NC, AL, SC, GA, FL, MS, TN, KY). Over 32 demonstration projects are complete, with funding provided by USDA, USEPA, state agencies, and local watershed organizations. These educational programs have resulted in changes in state and federal policy regarding stream mitigation to emphasize a more effective natural channel design approach. Mitigation projects are being designed and permitted to result in stable functioning streams based on the increased professional understanding of stream restoration techniques. Over \$3 million, including funding provided by USEPA, state agencies, and local watershed organizations to design and construct demonstration projects has been leveraged by \$100,000 in Section 406 funding from 2000-2004.
- A total of over 50 research/demonstration projects were implemented/maintained by team members during 2000-2004, including stream, buffer, and wetland restoration projects.

## **Watershed Management Pollution Assessment and Prevention Water Quantity and Policy**

These national themes were addressed through the Southern Region Watershed Education Network. A wide variety of audiences were served through educational programs that included the following key examples:

- 546 students from seven 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.
- Numerous educational programs have been provided to stakeholders in impaired watersheds directly as a result of project efforts. For example, the University of Tennessee Agricultural Extension Service worked with stakeholders in the Pond Creek Watershed to install best management practices that will improve water quality. Pond Creek was placed on the state 303(d) list of impaired waters because of pathogens and nutrients. Results of intensive water quality monitoring were incorporated into a detailed Pollution Source Inventory and model for the watershed. The Inventory was used to inform stakeholders about water quality issues as well as to target efforts.

- New product development: Beginning in 2003 and continuing through 2005, Section 406 funding supported development of a web-based tool that uses real-time, hydrological models driven by NASA and NOAA remote sensing satellites to more accurately forecast snowmelt runoff. This information is improving water managers' decision-making capabilities. \$10,000 in Section 406 funding has leveraged \$50,000 in private contributions and \$15,000 in USDA Rio Grande Basin Special Initiative funding. These funds were used to develop the Snowmelt Runoff Forecasting tool available to stakeholders through a user-friendly web interface. 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.
- Team members developed regional web-pages and complementary state pages addressing Watershed Management, Pollution Assessment and Prevention, and Water Quantity and Policy and providing access to programs and resources available across the region (<http://srwqis.tamu.edu/watershed.aspx>, <http://srwqis.tamu.edu/pollution.aspx>, and <http://srwqis.tamu.edu/waterquantity.aspx>).

**Project Accomplishments and Impacts > National Citizenship  
Responsibilities and leadership on national initiatives and multi-region  
activities addressing national themes or emerging issues**

The Regional Coordinator and Project Director for the Southern Region served as the inaugural Co-Chair of the Committee for Shared Leadership (CSL). In that role, he worked closely with the CSREES National Program Leader, other CSREES personnel, and the other Regional Coordinators to conceptualize, build and implement the CSREES National Water Quality Program. In addition, he developed and presented educational programs encouraging participation in the program at the NIWQP National Conference in Boise, Idaho, the American Society of Agronomy national conference in Seattle, Washington, the initial regional organization and planning meeting of Region 1, and for the USDA CSREES Forestry initiative to promote adoption of a similar model.

The Southern Region also contributed to implementation of the CEAP Initiative. The Regional Coordinator served as the first CEAP Panel Manager. In addition, the NCSU Co-Project Leader coordinated the development of a CEAP Symposium at the NIWQP Annual Conference.

**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 350 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 2004 Conference proceedings are posted to [2004 USDA-CSREES National Water Quality Conference](#). Planning is well underway for the 2006 conference to be held in San Antonio, TX, February 6-8.

The Southern Region, and specifically Texas A&M University, provided leadership for marketing the CSREES National Integrated Water Quality Program. The marketing effort utilized evaluation and impact information obtained through the national reporting database developed at the University of Wisconsin, and information solicited from each region. A National Integrated Water Quality Program Impact Report was produced and distributed at the NIWQP National Conference in February, 2005 in La Jolla, California. The Impact Report 1) describes the goals and structure of the NIWQP, 2) provides key examples of how water quality professionals at universities and colleges, in cooperation with CSREES, are working with citizens, communities and partner agencies to address critical water quality problems across the United States, and 3) provides contact information for national, regional, and state program leaders. Each region contributed a section which describes their program framework, provides an abbreviated list of project impacts, and highlights 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 posted to <http://srwqis.tamu.edu/downloads/National.Impact.Report.3MB.pdf>. A second edition of the USDA-CSREES National Water Program Impact Report is currently under development by the Southern Region.

The Southern Region produced and developed annual, or more frequent updates of the CSREES NIWP poster, a trifold brochure and a national Directory of Water Quality Coordinators. The NIWP poster was presented at the CSREES National Water Quality Conference in La Jolla, CA; the 1890, 1994 and 1862 Water Quality Collaborative Conference in Atlanta; the 4<sup>th</sup> National Conference on Science, Policy and the Environment: Water for a Sustainable and Secure Future, an EPA Region VI In-House Water Quality Fair, a Volunteer Monitoring Conference and the Colorado Water Resources Conference. In addition, the poster was made available in pdf format through the 2005 National WQ Conference Proceedings link on the national website. A pdf file for the NIWQP poster also is available on the national website's "About Us" page and on the Southern Region website at <http://srwqis.tamu.edu/posters.asp>.

The Directory of Water Quality Coordinators was developed 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\\_Aug05.pdf](http://www.usawaterquality.org/directory/WQCdirectory_Aug05.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), at a joint Extension-Experiment Station meeting in New Jersey, and at an EPA Region VI Water Quality forum.

The Southern Region has transitioned to the national reporting system at <http://www.uwex.edu/ces/regionalwaterquality/reporting.htm> by filing state and program team reports, in addition to regional reports to that database.

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

Goal 1 (above) of the Southern Region Watershed Management Project 2000-2004 focused on establishment of a Coordinating Committee (Southern Region Water Quality Planning Committee) with technical support to optimize regional program planning and communication, identify, prioritize and address research and educational needs across the region, identify the expertise of contributing institutions, and facilitate resource sharing and technology transfer between and among institutions to meet identified needs. The SRWQPC held quarterly face-to-face meetings annually and convened monthly or as needed by teleconference and/or through e-mail list-serv to conduct project business.

The SRWQPC provided 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 quality themes. Through this process, 7 theme teams with a total of 114 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 theme team integrated activities in extension, research, and education. Theme Teams provided leadership for development and compilation of information and resources addressing national water quality themes and worked within their task areas to accumulate existing resources, facilitate resource sharing, identify information gaps and develop new resources.

Special subgrants were utilized to targeted major areas of need and/or to address emerging issues within the region. For example, to further strengthen ties with 1890 institutions a special sub-grant was awarded through 406 regional coordination funds to enhance participation of 1890 personnel in regional strategic planning and program implementation. Other special sub-grants funded particular theme 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 Nutrient Management Theme Team enabled the team to coordinate a regional, multi-agency (NRCS, EPA, state regulatory agencies, 1890, 1862) planning conference, which produced a comprehensive summary of southern region states' nutrient management regulations and education and training resources, and which has significantly

enhanced the integration of research, education and outreach in this key area through direct comparison and analysis of differences in state approaches to nutrient management planning and implementation (such as the P-index). Other special sub-grants funding integrated activities of particular theme team efforts included awards to the Watershed (Environmental) Restoration Theme Team to support dissemination of science-based information on stream restoration techniques and to the Animal Waste Management Theme Team for regional Certified Nutrient Management Trainings.

Substantial coordination and planning efforts were conducted by the SRWQPC to organize major regional education, training and technology transfer conferences in Gulf Shores, AL in 2001 and in Ruidoso, NM in 2003. Over 400 water resource professionals attended the conferences, which were designed to provide training and direct access to successful programs and resources employed throughout the region. Follow-up evaluations completed six months following the 2003 conference to determine how attendees used information and materials from the conference indicated that 93% agreed or strongly agreed that their capacity to produce successful water quality and natural resource programs has been strengthened, and the same percentage agreed or strongly agreed that their program/activities had benefited from the information and ideas received. Similar responses were gathered following the 2001 conference.

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

Goal 2 (above) of the Southern Region Watershed Management Project 2000-2004 focused 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 theme 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.

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 Southern Region Water Quality Planning Committee, 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. Two levels of access to data layers are provided. HTML-access 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. Full-access users are able to download, supplement and manipulate the data layers provided.

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

The Southern Region Watershed Resources Management Project was 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 enlarged and fortified an existing collaborative process through which new and existing technologies and management systems were developed and shared throughout the region and nation. Theme teams established by the SRWQPC worked to implement regional activities and address water issues identified as national themes. Numerous new contacts and collaborative partnerships were formed through this process which otherwise likely would never have occurred. Primary emphasis was 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. 4-5), Comprehensive Nutrient Management Planning training delivered throughout the region (p.5), the [Drinking Water and Human Health Frequently Asked Questions \(FAQs\) database](#) (pp.5-6), Watershed Restoration workshops provided to 1300 natural resource professionals in most of the Southern Region states (pp. 6-7), Watershed Academies (p. 7), and Regional Training for Water Resource Professionals (Biennial Regional Conference, p. 10).

Additional, excellent program efforts include the following:

**Regional Coordination:** As a direct result of the Southern Region Watershed Resources Management Project, collaboration between 1890 and 1862 institutions was substantially enhanced and expanded through joint program planning, resource sharing and participation on regional theme teams. An outstanding example of regional commitment to increasing capacity

and coordination is the 1890-1862-1994 Water Quality Collaborative Conference which was conducted by the Southern Region in 2004 in Atlanta, GA. The purpose of the Conference was to facilitate sharing of water quality resources and expertise; establish multi-institutional water quality work teams; improve collaboration and linkages among the 1890, 1994 and 1862 institutions; increase awareness of water quality work at 1890 and 1994 institutions; and strengthen linkages between USDA-CSREES, minority institutions and other agencies. Work groups are now implementing five action plans developed at the Conference. A sharp increase in attendance and participation at regional quarterly meetings in Tunica, MS and Baton Rouge, LA and at the National Water Quality Conference in La Jolla by water quality coordinators from 1890 institutions has resulted. Proceedings for the conference are posted to <http://biosystems.okstate.edu/waterquality/events/Atlanta2004/>.

The regional project also supported planning and organizational efforts leading to the development of a National Facilitation Project proposal funded by CSREES and entitled, *Facilitation of 1890 Institutions' Water Resource Education, Extension and Research Efforts*. A Southern Region representative of the 1890 institutions served as the primary author. In addition, through the regional project a commitment among 1890 institutions to assist and support development of an 1890 water resource expertise database has been generated and several have offered to host the database on servers at their campuses.

**Watershed Management:** The watershed management theme team began developing a regional curriculum template patterned after the *Master Farmer Program* introduced in Louisiana and supported by regional 406 funds. The Master Farmer program is an effort to demonstrate that agricultural producers can voluntarily reduce the impact that agricultural production has on the environment while remaining economically viable through the adoption of research-based conservation practices. The Southern Region Master Farmer Program is a regional collaboration that has produced companion programs currently in progress or under development in Arkansas, Mississippi and Texas.

**Water Quality Education for Youth:** The SRWQPC identified a need for focused, hands-on water quality education for 4-H and other youth. Objectives of the program were to: (1) Create a multi-state program in which youth learn the importance and value of water resources, (2) Enhance partnerships and collaboration between states and various agencies and organizations, (3) Develop and share educational resources, and (4) Promote development of similar programs in other states and regions. Three examples of program implementation under this effort include: a) A three-day, two night pilot resident camp was conducted at Land Between The Lakes, TN. 5<sup>th</sup> and 6<sup>th</sup> graders from Kentucky and Tennessee engaged in various activities related to key water concepts. Results of pre-and post tests and activity reports were significant at  $p < 0.10$ . Partnerships included EPA Region IV's Watershed Education Network, Kentucky Water Resource Research Institute, U.S. Forest Service, University of Kentucky Cooperative Extension Service, Tracy Farmer Center for the Environment, and University of Tennessee Extension. b) From 2000-2002, over 14,000 youth received classroom and hands-on education on water quality and basic water testing through a Louisiana Cooperative Extension Service statewide, broad-based program that provides youth with basic science information on water and water quality, and c) Clemson University supports 15 (annually), week-long youth water quality education programs entitled, "4H20 – Pontoon Classroom."

#### IV. Lessons Learned/Project Challenges

The Southern Region Watershed Resources Management Project sustained and substantially expanded the collaborative framework from which an increasing number of excellent regional programs continue to emerge. New ideas and mechanisms for operating more effectively and efficiently through regional partnerships and linkages are constantly emerging. Our project continues to develop, grow and improve. 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 Master 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 will be accomplished through education outreach and technology transfer via the Master Watershed Steward Program. Multi-disciplinary and multi-agency teams are being assembled to support watershed education resource materials development. Master 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 \$758,000 in external funding.

**Regional Master Farmer Program** ~ The Water Quality Education for Agricultural Producers Program Team has developed a regional curriculum template patterned after the *Master Farmer Program* introduced in Louisiana and will offer a training seminar for the materials in January, 2006. *Master Farmer* training involves classroom instruction on environmental stewardship related to water regulations, conservation practices, and USDA conservation funding; attendance at Model Farm Field Days; and development of farm-specific conservation plans. The objective of the regional program is to extend the concept and training to additional states to help educate and encourage implementation of agricultural BMPs to improve water resources.

**CSREES/LGU/NRCS Nutrient Management Partnership** ~ The nutrient management team currently is leading a national project partnership between CSREES and NRCS Headquarters to enhance uniformity of Land-grant University nutrient management recommendations, and increase collaboration between agencies in conservation program implementation.

**Poultry Waste Management Publications/Learning Modules** ~ The Animal Waste Management team is creating a web-based series of regional poultry waste management publications/learning modules. A joint proposal has been submitted to EPA for an Environmental Education award to support this effort.

**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** ~ The 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 of common well problems illustrated with footage from the cameras.

The **Regional Watershed Restoration** program team is planning four workshops in four states for 2006 and the **Regional Watershed Academy** program team is planning three workshops in two states for 2006.

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

The **Rural/Urban Interface Landowner Education** program team will hold a Conservation Easement workshop in 2006 and 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.

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. The result will be progress toward unified and coordinated efforts to address water resource management needs affecting the lives of these clientele groups.

No major difficulties were experienced during the project. Communications/interactions among the project partners and with USDA-CSREES were 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.

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