

SPECIAL PROJECT DESCRIPTIONS 2004 – 2011

2004-2005 Special Projects

Castille: Multi-State Master Farmer Initiative

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 *Master Farmer Program* is implemented by the LSU AgCenter and partners with the Louisiana Farm Bureau Federation, the Natural Resources Conservation Service, the Louisiana Department of Environmental Quality, the Louisiana Department of Natural Resources, the National Oceanic and Atmospheric Administration, the Louisiana Cattlemen's Association, and the Louisiana Department of Agriculture and Forestry.

The watershed specific program is divided into three phases, and a participating farmer must complete all three to become a certified master farmer. Phase one consists of environmental and BMP education, including an eight-hour session of classroom lectures. Phase two consists of "model farm" visits, where enrolled farmers visit sites in their watershed where BMPs have been implemented and the farm managers have completed the training. The third phase is the development and implementation of site-specific conservation plans including the implementation of BMPs at a cost-effective level. To date, there are over 1150 producers enrolled in the program.

Hairston & Brantley: Southern Watershed Education Network: Watershed Professionals Sub-Committee

Extension water quality programs for watershed professionals are currently being conducted by many states in the southern region. Identification of expertise in trainings and program coordination need to be improved. A template needs to be created so that workshops may be more easily reproduced in states where there is interest. The Watershed Education Network will be the premier program for watershed materials, outreach and education and training programs for watershed professionals.

The Watershed Professionals Sub-Committee will provide a framework for workshop coordination and easily reproducible templates for watershed education programs targeted to watershed professionals. The target audience referred to as watershed professionals includes-Extension Agents, Watershed Action Groups, Industry Representatives, and State, Local, and Federal Agency Representative

The goal is to coordinate watershed education activities that target natural resource professionals in the southern region. Improve transfer of lessons learned between states to improve watershed education programs and activities.

2005-2006 Special Projects

Kissel: Video Education and Marketing for Soil Testing as a Best Management Practice in the Southern Region

Adoption of soil testing is low among farmers and homeowners in many states. Many homeowners routinely apply fertilizer (sometimes in excessive amounts) to their lawn and garden without a soil test. As a result of excess fertilization, soil nutrient levels increase rapidly. Excess nitrogen and phosphorus fertilizer can move off land and contaminate lakes and streams. This project will create two videos, a short 5-minute trailer and a second longer 15-minute training video covering the environmental benefits of nutrient management and the critical role of fertility testing in recommending environmentally responsible application rates of fertilizer and lime. The video will also cover proper steps for collecting a soil sample, interpreting/understanding soil test results, and marketing soil labs (public and private). The intended audiences are shoppers at lawn and garden centers, homeowners, forestland owners, those establishing wildlife food-plots, as well as traditional farmers. A host will present generic information; although to better capture the trust of the viewer, sections requiring unique state information will be produced separately and inserted into the generic template.

The video will inform the viewer of the great value of soil testing for amending soils properly, which in turn will increase the number of samples submitted to labs. Scientifically, increased soil testing by non-agricultural audiences will improve University databases on the nutrient status of urban soils. From this information a need may be found for special soil test calibrations. More data would also improve our understanding of the buildup or depletion of certain nutrients (phosphorus is one example), which could be compared between urban and agricultural soils.

Smith & Babbit: Water Quality Issues at the Rural-Urban Fringe. Multi-State Workshop for Master Gardeners, Extension Faculty, Landscape Professionals, Landowners, and Community Leaders

The workshop is designed especially for individuals working with water quality issues associated with landscapes and gardens at the rural-urban fringe. This emerging issue is the result of rural to urban land use change, resulting from population growth, economic development, and community sprawl. It is increasingly important in rural communities across the South; these communities typically do not have trained professional staff to deal with the issue.

Participants will learn about water quality best management practices (BMPs) that they can integrate into their work through presentations, demonstrations, and field activities. The program will be a multi-state workshop targeting master gardeners, Extension faculty, landscape professionals, rural landowners, public property managers, and community leaders.

Smith & Clark: Conservation Easement Education

In response to local interest, Tennessee has developed a conservation easement fact sheet. It includes links to Tennessee enabling legislation, state greenbelt regulations, and relevant tax regulations. We propose to:

1. Produce a "generic" conservation easement fact sheet by removing the Tennessee specific information from the existing fact sheet and rewriting as needed. The fact sheet would be a web-based regional publication.
2. Seek out internet-based sources of state legislation and regulations for the 13 states in the southern region. Links to these resources and other relevant state-specific information identified in the search, such as lists of organizations able to accept easements, will be added to the regional site.

3. Create a regional PowerPoint presentation on conservation easements that will also be posted on the site for downloading and use throughout the region.

These resources will contribute to landowner education programs in the region. Benefits expected include more informed land use decisions along the rural-urban interface, contributing to water quality protection and improvement.

Vendrell: Southern Region Down-Well Camera Team

With a down-well camera, Georgia's wellhead protection program goes beyond traditional aboveground inspections opening a new realm of information explaining water quality problems due to well construction. Additionally, this video footage serves as powerful visual information inspiring the development of new education materials taking well owners to an understanding that in the past have been too complex to describe in words and diagrams to a lay person, visually conveying complex hydro-geological processes. An education video and new Farm*A*Syst self-assessment tool is available to educate well owners in Georgia. The down-well camera has been so popular among County Agents in Georgia that soon there will be a camera available to them in each of the four Districts. Also, South Carolina health officials use a down-well camera as part of their well inspection program.

Scientifically, this approach replaces conjecture with visual facts and recognizes regional problems that Extension should be addressing. Environmentally, groundwater can be protected; eliminating direct avenues for contaminants to enter groundwater, by identification of improperly constructed or maintained wells. Economically, prevention of groundwater contamination is essential because once contaminated, cleanup is most often economically impractical if not impossible.

Risse & Pagan: Master Watershed Stewardship Program—A Regional Project to Build the Capacity of Extension

The goal is to develop a regional Master Watershed Stewardship Program that provides states with tools and framework to build the capacity of Extension by incorporating agent training and a public outreach and education course on critical watershed issues. As Extension, local agents are being called on and required to address local watershed concerns, such as TMDLs and stormwater, within their communities. By establishing a regional Master Watershed Stewardship Program, agents have opportunities for expanding their knowledge and a method to share and address concerns with their clientele.

The Master Watershed Stewardship Program is modeled after Extension's master program concept, such as Master Gardener. First, the Program educates agents on watershed issues and methods to address concerns on a local level. Then, it invites citizens to participate in several workshops that cover watershed concepts in modules. To apply their knowledge, Master Watershed Stewards volunteer 40-hours of service in a community watershed project.

2006-2007 Special Projects

Kissel: Video Education and Marketing for Soil Testing as a Best Management Practice in the Southern Region 2nd year Funding

This project will create two videos, a short 5-minute trailer and a second longer 15-minute training video covering the environmental benefits of nutrient management and the critical role of fertility testing in recommending environmentally responsible application rates of fertilizer and lime. The video will also cover proper steps for collecting a soil sample, interpreting/understanding soil test results, and marketing soil labs (public and private). The intended audiences are shoppers at lawn and garden centers, homeowners, forestland owners, those establishing wildlife food-plots, as well as traditional farmers. A host will present generic information; although to better capture the trust of the viewer, sections requiring unique state information will be produced separately and inserted into the generic template.

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Osmond: Extending Information Developed by the Nutrient Management Team: P Index

The Southern CSREES Nutrient Management Project Team has, for the past two years, been working on a comparison between 12 southern Phosphorus (P) Indices. The paper has just been accepted for publication in the Journal of Soil and Water Conservation. This is the first comparison between state P-Indices. The paper will, undoubtedly, have national impact on the P-Index debate; results show significantly different P-Index ratings between the states for the same set of conditions. In addition, the paper also highlights differences between state USDA-NRCS 590 standards. The paper is very long and it is anticipated that it will cost approximately \$2,000 for publication of this article. We are asking for funds to cover the cost of publication.

The comparison described above has shown that divergent ratings exist between the P-Indices for the same conditions. Since several states share cross-boundary watersheds, divergence of ratings will cause problems for the implementation of USDA-NRCS Conservation Security Program (CSP). It also calls into question the utility of the P-Index. A recommendation from the authors of the paper was for the 12 southern states to work together in order to modify or revise their respective P-Indices to enhance uniformity. This project will provide resources for this activity.

Buchanan: Development of a Field-Scale Protocol to Measure the Long Term Hydraulic Acceptance Rate of Mature Wastewater Drainfield Systems with Varying Interface Architecture

On June 27-28, 2006 the above listed Southern Region scientists met in Atlanta, Georgia to discuss the potential for measuring the actual absorption rate of mature drainfields with various styles of trench architecture. From this meeting, two hypotheses were determined: 1) hydraulic performance of a mature drainfield is not affected by trench architecture and 2) reduced length trenches do not renovate effluent as well as full length trenches.

In the past few years, these issues have become more significant because new technologies are being introduced that can potentially reduce the size of drainfields and therefore open more land up for development. For example, in-trench vaults are available that eliminate the need for gravel in the trench. Without the gravel, there is more effluent storage capacity and no masking of the soil-effluent interface.

Conceptually, less trench surface area is needed to absorb the effluent. Thus, many locations have allowed the vaulted-trench architecture to be installed with 20 to 50% trench size reductions as compared to conventional gravel systems. There is anecdotal evidence of increased system failures due to this reduction. However, it has not been quantified as to whether this reduction was within a presumed trench-design safety factor or if the vaulted system is a more efficient means of infiltrating effluent into the soil. The second hypothesis relates to the renovation potential of onsite wastewater systems. Can a reduced trench length have the same renovation potential as a full length trench? There is scientific evidence to suggest that the effluent-soil interface area needs to be maximized to obtain the full physical, chemical and biological renovation potential of soils. By reducing the trench area (based on hydraulics), is the renovation potential being compromised?

McCowan: Southern Region Rural-Urban Interface Issues

Scientific, environmental and economic benefit for this project is for researchers and educators to identify knowledge gaps regarding the interaction between rural and urban interface. Information from several geographical locations is a valuable tool to determine knowledge and research gaps. Assembling information into one location will enhance development of resource needs. Several examples of rural/urban resources in Southern Region were identified at a rural/urban committee meeting. Some of the resources and locations are listed below:

- ❖ The forestry department at Auburn University held a conference, March 13-16, 2005 titled “Emerging Issues along Urban/Rural Interfaces: Linking Science and Society.”
- ❖ Alabama Cooperative Extension Service held “The Urban-Rural Interface Conference” to educate participants on how to collaborate and build partnerships.
- ❖ The University of Tennessee held a workshop in 2005 that covered a variety of topics dealing with land-use changes from rural to urban spaces.
- ❖ A paper was written by Lawrence Libby, Ohio State University and Michael Dicks, Oklahoma State University titled “Rural-Urban Interface Issues.”

The relevance of this project is promoting and assembling papers, fact sheets, and promoting conferences addressing rural/urban issues.

Vendrell: Southern Region Down-Well Camera Team 2nd year Funding

This is to request a second year of funding to enhance the development of a Southern Region team for inspecting groundwater well bores using a down-well camera. Funds are need to cover travel expenses for training, equipment for a new team member (Tuskegee University), and travel expenses to bring the team together to discuss goals and development of a Southern Region Groundwater Symposium, and travel expenses for participation in the New England Region Water Well Symposium.

Last year’s funding was used entirely to pay a portion of the cost for equipment. Currently, seven institutions are participating on this team, Tuskegee University, University of Kentucky, Louisiana State University, Oklahoma State University, Tennessee State University, Texas A&M University, and University of Georgia.

Smolen: Water Policy Forum

Currently several states in our region have recognized the need for public education and policy deliberation in this area. New Mexico State University State University has established a team of technical and educational specialists to address issues of utilization of water resources and water

allocation among competing users. Oklahoma State University, Texas A&M University, and University of Arkansas are also planning programs to address their water issues.

In the proposed project, researchers and educators from the four states will come together in a forum to share expertise, ideas, and insights to help in planning their own states' programs. Prior to the forum, each state will lay out what it has to offer and what it hopes to gain from the meeting. Facilitated sessions with note takers will help capture information and recommendations concerning research needs, public policy education, and the public deliberation process.

Fletcher & Larson: Yards and Neighborhoods Program Training and Publication Development

The proposed project will help establish a new program in Louisiana (Louisiana Yards and Neighborhoods, LY&N) targeting specific watersheds using the educational outreach and research currently being conducted in Florida with the Florida Yards and Neighborhoods program. In addition, the programs currently in place in Alabama, North and South Carolina will also be reviewed and modeled for the Louisiana program.

Implementation of the LY & N program will provide residents with the opportunity to take steps to reduce the impacts of population growth and urban development by adopting home landscape practices that minimize harmful effects on the environment. Work in recent years has shown that adoption of environmentally friendly landscaping practices can slow down the effects of environmental degradation caused by nonpoint source (NPS) pollution. Success can only be measured over time as more and more participants are educated through the LY & N program and begin to utilize those practices in their own landscapes. The collaborative efforts of using the research-based information from the Florida faculty members will enhance regional collaboration as well as an expansion of results.

2007-2008 Special Projects

Turner: Water Ripples Interactive Youth Games

The **Water Ripples** project proposes to develop youth water education materials designed for interactive 'fun-time' learning. These materials will include interactive educational games for age groups ranging 4th to 6th grade. Materials will be designed for stand alone instruction as a packaged presentation for young audiences.

Popular game formats such as Jeopardy, Trivial Pursuit, etc, will be used to facilitate learning about water. Games will introduce students to various concepts that can be adopted for a particular setting, e.g. rural or urban. Playing the games will help students understand relationships of cause and effect in protecting water resources. Each response, correct or incorrect, will provide additional information to enhance knowledge gained. The ultimate benefits of these program materials will be increased understanding of water quality protection and conservation.

Smolen: Water Policy Primer, Water Rights in Arkansas through New Mexico

In follow up to the 4-State Water Forum held March 29-30, 2007, a layman's report will be developed to review the differences in water law and water rights in the western part of the southern region. The variation from Arkansas through Texas and Oklahoma to New Mexico covers the gamut of doctrines used in the U.S. for administration of water rights. Arkansas has a completely riparian doctrine whereas New Mexico is completely administered by the doctrine of prior appropriation. Oklahoma and Texas have variations that are a mix of the two doctrines. There are clearly advantages and disadvantages to each system considering the future challenges of increasing demand from urban development. The Primer will be useful throughout the region in public education programs on water conservation, water allocation, and drought management.

Bauske: Advanced Master Gardener Training in Water Resource Issues

The Urban Water Issue Team, a team of county agents in Georgia has been developing an advanced training for Master Gardeners in water issues. The course currently requires three days of training to complete. We envision morning lecture, followed by hands-on sessions in the afternoon. It includes information on the watershed concept, landscaping for water quality, assessing water quality, the impact of land use on water quality, and technology and strategies for minimizing the use of water.

We propose completing the development of the advanced training in water issues for Master Gardeners curriculum and team teaching it to agents and Master Gardeners in Georgia, Alabama, and South Carolina. We will use distance teaching technology (Horizon Wimba or Breeze) available through Cooperative Extension in all three states to implement the training.

Jennings: Agent Training: Extension's Role in Developing Watersheds

We propose to host a training and tour for Extension agents that introduces land use change impacts on water quality, watershed planning, watershed restoration, and roles they may take in working with their communities.

Project investigators will describe successful watershed programs, demonstration projects, and funding mechanisms. The proposed training will encourage Agents to share their lessons learned and offer an opportunity to network with peers at a regional level. Equipping Agents with the latest information and

examples of Extension's role in developing watersheds will improve their ability to understand and help propose solutions to urbanization issues.

Peterson & McFarland: Development of a Web-based Training for the Regional Watershed Steward Program

The purpose of this project is to support the design and development of a web-based training tool for the regional Watershed Steward Program funded under the proposal titled, "Master Watershed Stewardship Program – A Regional Project to Build the Capacity of Extension." Specific goals of the project are to:

- Enhance interactive learning opportunities for watershed education across the region and establish a larger, more well-informed citizen base.
- Promote healthy watersheds by increasing citizen awareness, understanding, and knowledge about the nature and function of watersheds, potential impairments, and watershed protection strategies to improve water quality and minimize nonpoint source pollution in the region's watersheds.
- Facilitate greater involvement of citizens in local water resource management and protection activities.

Silitonga: Dissemination of Water Quality Educational Materials to Under-served Communities

Educational materials in this project will address both surface- and ground- water issues. Alcorn State University will assemble available materials, conceptualize, and modify them to accommodate the needs of under-served population. The modified resources will be adopted and customized by four (4) other collaborating 1890 Land Grant Universities; Alabama A&M, University of Arkansas-Pine Bluff, Tennessee State University, and Florida A&M. These materials will then be available and accessible through each institution's web page or they may be obtained directly from the institutions. The purpose of extending available information to the under-served communities is aimed to increase community awareness and to have a better understanding about their role in impacting water quality. With better knowledge, it is anticipated that the community will be encouraged to participate in conserving, preserving, and improving water quality in their areas. Consequently, their participation will have a positive impact in improving water quality and indirect economic impact. A community effort can be conducted at a local stage, which will have an effect on a watershed level. Furthermore, collaborating activities will have a broader influence on a regional scale that could be implemented at a national level.

Risse: Poultry Litter Marketing Workshop

The Southern Region leads the United States in poultry production and the regional animal waste management team has identified poultry litter utilization as a primary educational opportunity. In addition, increased commercial fertilizer prices, regional water quality issues associated with the concentration of poultry production, and new opportunities for market based conservation have led to greater interest in programs that facilitate the development of poultry litter markets. In addition, some Southern states, for example, Georgia, Oklahoma, Alabama, and Arkansas have pioneered programs and policies to encourage the development of poultry litter markets. The purpose of this project is to build on a Conservation Partnership Initiative in Georgia to expand a watershed based project to one that will have regional and national implications. We intend to do this by hosting a regional conference in Georgia and inviting speakers and participants from across the region. The primary focus of the conference will be on development of poultry litter markets but it will include sessions on poultry litter transport programs, value added processing of litter, nutrient trading and other market based conservation opportunities, and BMP's for minimizing the impact of poultry litter utilization. In addition to knowledge gained through

the conference, the planning committee will work with stakeholders to develop and submit a report on regional opportunities for poultry litter marketing programs.

2008-2009 Special Projects

McFarland: Enhancing Nutrient Management Education and BMP Adoption

The frequency and degree of nutrient impairment of surface water bodies in the Southern Region is increasing. Both agricultural and urban applications of organic and inorganic products containing fertilizer nutrients are contributing to the problem. Education and voluntary adoption of best management practices such as soil testing, product selection, and application equipment calibration are the least costly and most viable approach to limiting nutrient enrichment of water resources.

Extension personnel across the Southern Region develop and deliver outreach education programs designed to achieve increased levels of adoption of nutrient management practices. Collaboration among these individuals to share the most effective and successful educational tools and resources will enhance overall success of these programs. In addition, comparative assessments of program effectiveness relative to similar efforts in other states will enable participants to better determine and address program needs.

Osmond: Continuation of Southern P Indices Comparison

During the last regional Southern Water Program project (2004-2009), the Nutrient Management working group compared the phosphorus indices (P-Index) from the 12 southern states (AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX). This assessment of P-index ratings was based on standard scenarios. There were significant differences in the ratings from state-to-state when the standard conditions were used. This information was used to generate a scientific paper in the *Journal of Soil and Water Conservation* evaluating state-to-state variations and potential implications for agricultural producers. The comparison of southern P-indices was also presented at a conferences sponsored by the CSREES National Water Program, the Southern Plant Nutrient Conference, and the National 2006 Poultry Waste Conference. Due to the significant and real differences in P-indices between states, the work on the P-indices was beginning to be used as the foundation for regional discussions on how to improve consistency in P indices across states. Recently the SERA-17 group used the southern P-index comparison paper to begin a discussion on a national P index tool.

Clearly this work on southern P-indices has had a significant national impact. It is important that the Nutrient Management subgroup of the Southern CSREES Water Program continue to collaborate on P-indices to make them more similar; otherwise a national standard that does not account for local conditions may be developed. Thus, we propose to continue evaluating the differences between the Southern P-indices and try to minimize these differences.

Sharpley: Regionalized Approach for Best Management Practice Development and Monitoring

Several states in the Southern Region have developed, implemented and have been monitoring the impacts of BMPs for successful agricultural production. There is need to establish a framework/protocol for collecting and compiling information on the different BMPs and their specifications, contaminant reduction efficiencies, time after implementation (i.e., age), maintenance required, for example, and to expand the informational database to cover all states in a coordinated manner across the Southern Region. These states are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, New Mexico, Oklahoma, South Carolina, Tennessee, and Texas. This assessment will also consider which contaminant is of concern and which BMP may be best suited to decreasing the potential for that contaminant to impair surface and ground water quality. Consideration will also be given to state specific conditions and issues, which may influence contaminant or BMP prioritization. Contaminants of concern are increasing, but this project will consider nutrients (nitrogen – N and phosphorus – P) and sediment.

A database showing the details of BMPs adopted, implemented and monitored on watershed scales will provide insight into how the land is being managed as the over-arching goal is still minimizing contaminant impacts on water quality. At this time such a database is not available and can be easily developed through collaboration among member states.

Farahani: Irrigation and Agro-Meteorology Information and Educational Resources to

Improve Irrigation Efficiency and Minimize Environmental Impacts in the Southern Region

There are many challenges facing today's farmers, particularly those with high-input irrigated production systems. In order to efficiently utilize irrigation to remain competitive in increasingly demanding agricultural markets while ensuring environmental sustainability, irrigators need up-to-date information and know-how as well as simple and practical tools and technologies. Networks of agricultural meteorology stations in the U.S. and elsewhere provide a wealth of online data as well as near real-time irrigation information for research and practice. Continuing effort is needed to further encourage the wider use of readily available climate data by consultants and practitioners in addition to installing new stations and networks to fill the many existing and large-area gaps.

In the Southern region, lack of agro-meteorology data coverage or an automated network is obvious in Alabama, Arkansas, South Carolina, and Tennessee, as well as parts of Texas and the Florida Panhandle. In South Carolina for example, there is no network of reference ET data for ET-based irrigation scheduling or an irrigator-friendly website with up-to-date irrigation information. Statewide agro-meteorology networks as well as collaborative and innovative education and training in the principles and practices of irrigation water and system management is a critical need in many Southern states. It is thus incumbent upon scientists and educators to enjoin the skills, knowledge and commitment to effectively address shortcomings in agricultural irrigation water management and efficiency.

Ferrier & Silitonga: Regional Collaboration to Protect Drinking Water Resources

To avoid negative impacts on water quality, it is critical to provide information to the public about both on-site consequences and off-site impacts, particularly at the rural/urban interface. To address this issue, we propose to build a regional network of educated volunteers who are motivated to share their knowledge with others based on Pennsylvania's highly successful "Master Well Owner Network" and Master Gardener Programs.

A regional education curriculum and network will reach land owners and rural residents in the topic areas listed below. Hence, any Southern Region State will have the option to use the entire curriculum or a portion that fit their needs. Some States already have curriculum and publications on these topics. These resources will be accumulated and incorporated into the manual and shared with the community of practice through eXtension.

Adams & Borisova: Determining Water Conservation Policy Tools Appropriate for Local Conditions in Southern States

This project supports the development of water conservation programs in several Southern states. We address the following specifically-identified needs and goals outlined in the Southern Regional Water Resources Program (SRWRP) work plan approved by USDA-CSREES:

- We focus directly on providing baseline information on alternative water conservation policy tools that can be used to address water supply shortages. Included in the analysis is an evaluation of behavioral changes (water use) in relation to alternative policy tools.
- We expect the project to improve the understanding of the use of alternative water policy tools and their relative effectiveness (e.g., cost, adoption rates, water savings) by professionals in the land grant system, policymakers, and other stakeholders.
- The PIs and collaborators have expertise in economics, policy analysis, law and other fields represented within the land grant system. We draw from this expertise to create deliverables that should improve the recognition of this expertise by stakeholders, particularly relating to water policy decision-making and drought management. Results of the project are also relevant to water rights, which can constrain available water policy tools.

Smolen: Water Law and Water Rights Primer for the Southeast States

Current work by the PIs and collaborators summarizes and compares water law and water rights in four states with Western (prior appropriation) or hybridized (riparian & prior appropriation) water law systems. These include New Mexico, Oklahoma, Texas and Arkansas. This proposal will expand the study to include three or four Eastern states with riparian or hybridized water law systems. Project outputs will include a Primer on Water Law and Water Rights for use by Extension Educators, Policymakers, and the general public. The project will culminate in a series of water rights/water law seminars in two or three locations.

Saraswat & Tsegaye: Watershed Assessment Tools for Extension and Research (WATER) Training Project

The Regional Watershed Assessment and Modeling (WAM) Team decided to focus on the expansion of the use of technology-mediated watershed assessment tools among various target audiences (cooperative extension personnel and other watershed assessment groups) through the development of a watershed assessment training initiative referred to as **W**atershed **A**ssessment **T**ools for **E**xtension and **R**esearch (WATER). The general consensus of the regional WAM focus team was that by providing this type of training for county extension agents, municipal water managers, water quality volunteers, and other relevant stakeholders, more professionals will gain a better understanding of regional watershed issues and more effective local watershed protection and restoration efforts can be implemented. The team also felt that by designing specific training programs for rural youths and community leaders, they can also be integrated within the focus of the team objectives. The WAM team decided to use web technology for data dissemination to the full range of clientele, from extension agents, watershed researchers, and watershed managers to watershed stakeholders. The goal is to enhance the Southern Regional Water Program (SRWP) website (<http://srwqis.tamu.edu>) by adding information related to water quality and quantity for individual watersheds and provide more detail on impairments. These enhancements will be offered using point-and-click mechanisms, keeping user friendliness in mind. The team regards regular maintenance of the existing website to reflect current content as an item of critical importance for the success of the WATER objectives. These measures will help educate watershed stakeholders and other water resource professionals and volunteers in using watershed assessment tools. This will lead to a true understanding of the dynamics of watersheds, better conservation and land use decisions, and ultimately allow them to extend the knowledge to their constituents and communities.

Osborne: 4-H₂O Ambassador Program

The 4-H₂O Ambassador Program will address key concepts related to watershed education. This

program is part of an ongoing effort in Kentucky and Tennessee to educate and empower youth to conserve and protect our water resources, and will be in collaboration with two additional ambassador programs currently taking place in central and western Kentucky. At the end of the four year program, results will be shared at local events, and regional and national conferences. Other states within the Southern Region will be encouraged to promote the 4-H2O Ambassador Program within their states, and will have access to program materials (i.e., units, agendas, and promotional materials). The program will include five units, each of which will focus on a specific question related to water quality and watersheds. Each unit will include hands-on, investigative activities (e.g., chemical, biological, and physical analysis of local water bodies, watershed mapping using GPS/GIS technologies, community-based research). Volunteers trained on unit curriculum will assist youth in these activities. After completing all units, youth will become 4-H2O Ambassadors. As ambassadors, youth will be required to develop and implement a community-based service project.

Brantley: Watershed Academy – Principles of Water Monitoring, Planning, and Restoration

Watershed Academy trainings are designed to introduce diverse watershed topics including hydrology, natural resource based planning, stormwater management, erosion and sediment control, ecosystem restoration, stakeholder involvement, and project funding. Regional expertise of Extension water professionals is used to deliver effective and engaging presentations to agents, watershed nonprofit representatives, local, state, and federal agency contacts, and natural resource professionals. Multi-state partnerships in planning and conducting Watershed Academies tailor trainings to be uniquely relevant for each location.

To date, over 200 natural resource professionals have been trained in Watershed Academies that have been held in the southern region. Eight unique Watershed Academies have been held since 2004: Fairhope, AL; Asheville, NC; Clemson, SC (2); Athens, GA; Duck, NC; Nashville, TN; Georgetown, SC.

Hartup: Southern Regional Water Program: Supplement for Residential Water Harvesting

This program proposes to increase knowledge and accelerate the adoption of simple, on-the-ground practices that may be implemented in urban and suburban landscapes that improve the quality of stormwater runoff and promote water conservation. Program development of residential stormwater harvesting, especially rain barrels and cisterns, and backyard rain gardens will be shared through a 'train-the-trainer' program led by NC Cooperative Extension.

Hawkins: Alternative Uses for Animal Manure

Communication among the Region 4 and 6 animal waste management specialists confirms a recent spike in producer interest recovering energy from manure. Recurring inquires concern generating biogas from broiler or dairy wastes for heat energy recovery or electricity generation. Currently, the southern region lags well behind the nation as a whole with only eight operating manure digesters (7% of the national total); the vast majority of states (9/13) contain no manure digesters. In addition, producers are increasingly expressing interest in direct combustion of animal manure, particularly to offset costs for propane and natural gas used to heat broiler houses.

The increasing interest of producers in alternative manure management technologies is coincidental with other segments of the US economy seeking creative ways to manage high strength organic waste byproducts (e.g. food processing wastes and municipal yard and wood wastes). Mixing these waste streams with manure could enhance their conversion to energy and more stable organic matter that can be land applied without degrading water quality. For liquid waste streams, this could involve co-digestion to produce biogas that is converted to heat or electrical energy. For solid waste streams, this could involve

co-composting animal manure with high carbon municipal waste and/or food processing byproducts. In either case, farmer cooperative or community organic waste management systems could prove to be a better management solution in areas with dense animal numbers or communities with the right mix of animal agriculture and non-farm organic wastes. However, a potential hindrance to implementing these alternative manure management schemes is confusion in the regulatory community about how to regulate cooperatives and combined waste streams.

2009-2010 Special Projects

Boellstorff: A Southern Region Well Owner Network to Safeguard Private Well and Aquifer Integrity

Management and protection of private, domestic drinking water sources are under the control of the landowner, and therefore, depend primarily on education rather than regulation. Socio-geographic changes are placing increased pressure on water resources, and population expansion in areas where municipal and industrial demands already are great, and in arid regions where water is always scarce, are intensifying concerns. To avoid diminished groundwater quality, it is critical to provide information to well owners regarding the consequences of linkages between contaminated surface and near-surface water and groundwater. Impacts include both on-site health consequences for private well owners and their families, and adverse off-site impacts to underlying aquifers. Contaminant conveyance may be established by inadequate wellhead protection, aging and failure of well construction materials, improper well construction techniques, abandoned wells, improperly sited and functioning on-site wastewater treatment systems, and changes in land use. The aim of the proposed Southern Region Well Owner Network (SRWON) program is to improve private well management to safeguard drinking water supplies and aquifer integrity. The SRWON will improve rural and rural-urban interface environmental management by providing outreach information necessary for private well owners to protect the health of their families and groundwater resources vital to meeting increasing water needs in the South.

Jennings: Agent Training in Watershed Education and Restoration

This project will support three components with the overall goal of increasing Southern Region Extension Agent competence in watershed education and restoration:

- Component 1 is a 3-day “hands-on” Agent Training Workshop on “Effective Education in Developing Watersheds” for 35 Extension Agents working in high-growth watersheds in the Southern Region.
- Component 2 is a Webinar for Extension Agents and other watershed professionals on “Vegetation Applications for Ecosystem Restoration.”
- Component 3 is support for 20 Agents to participate in the “Southeast Stream Restoration Conference” to be held in Charlotte in November, 2010.

All of the proposed Agent Training components will build capacity within the Southern Region Extension network for Agents with primary responsibilities in Agriculture, Natural Resources, Horticulture, 4-H, and Community Resource Development. The strengthened network will ultimately lead to better local watershed education and restoration programs and better water quality and ecosystem health.

Sharpley: Impact of Biofuel Production on Water Quality in the Southern Region: A Workshop Dialogue Focusing on Research and Extension Needs

Increased fluctuations in energy prices and the proposal of former President George W. Bush in his 2006 State of the Union Address that biofuels replace 75% of imported oil by 2025, has fueled tremendous interest and activity in biofuel production, which has focused to a large extent on grain-based ethanol. Cellulosic fuel-stocks from perennials, such as switchgrass and woody materials, have the potential to produce bioenergy either through producing ethanol or other liquid fuels or through direct combustion to co-generate heat and electricity.

These uses of cellulosic renewable energy could provide multiple ecosystem services that include energy, carbon sequestration, and improved water quality. Several Freshwater Initiatives are being developed by Federal and NGO’s to address broader issues facing water quality in the Southern Region that will impact

biofuel production. These Initiatives encourage redesign of the agricultural landscape by using buffers and/or wetlands wherever intensive row crops are grown and to make perennial-based cellulosic ethanol economically viable so perennials can be grown on both productive and marginal lands.

While several recent conferences and white papers have addressed national and regional issues related to grain and cellulosic feedstock production and conversion to biofuel, none have addressed issues specific to the Southern Region (i.e., AL, AR, FL, GA, KY, LA, MS, NC, NM, OK, SC, TN, TX). This proposal outlines a Workshop to fill this important research, extension, and education gap for the Southern Region.

Saraswat: Watershed Assessment and Modeling (WAM)

The Regional Watershed Assessment and Modeling (WAM) Team conducted a region-wide survey during early 2009 to assess interest, knowledge, and needs of extension agents from both 1890 and 1862 Land Grant Institutions regarding GPS/GIS technology. The purpose was to direct the course for promoting the use of spatial technologies for watershed protection and restoration purposes. The survey was an outcome of the strategic process that was started during a meeting at the 2007 Southern Regional Water Quality Conference in Fayetteville, Arkansas. The WAM Team intends to use the survey results to focus on ways to expand the use of technology-mediated watershed assessment tools among various target audiences (cooperative extension personnel and other watershed assessment groups) through the development of a watershed assessment training initiative referred to as **W**atershed **A**ssessment **T**ools for **E**xtension and **R**esearch (WATER). The team feels that by providing this type of training for county extension agents, municipal water managers, water quality volunteers, and other relevant stakeholders, more professionals will gain a better understanding of regional watershed issues and more effective local watershed protection and restoration efforts can be implemented. The goal is to also enhance the Southern Regional Water Program (SRWP) website (<http://srwqis.tamu.edu>) by adding information related to water quality and quantity for individual watersheds and by providing more detail on specific water quality impairments.

These measures will help educate watershed stakeholders and other water resource professionals and volunteers in using watershed assessment tools. This will lead to a true understanding of the dynamics of watersheds; better conservation and land use decisions, and ultimately allow them to extend the knowledge to their constituents and communities.

Osborne: Southern Region 4-H₂O Ambassador Program

The Southern Region 4-H₂O Ambassador Program Team is currently developing four curriculum units, each of which focuses on a specific question related to water quality and watersheds. Each unit (stated below) will include hands-on, investigative activities (e.g., chemical, biological, and physical analysis of local water bodies, watershed mapping, and community-based research).

The units will be piloted in KY, TN, and GA in Fall 2009 and Spring 2010. Revisions will be made and units completed by Summer 2010. Train-the-trainer webinar sessions will be offered in Fall 2010 and Spring 2011. In addition to webinar sessions, training sessions will be offered at regional and national conferences.

Wilson: Assessing and Improving Nutrient Management Plan Implementation across the Southern Region

This multi-year project is designed to improve nutrient management plan implementation by livestock farmers throughout the southern region and thereby protect and improve water quality. The proposed work will establish a multi-state, collaborative framework to identify needed Extension education efforts

to accomplish this goal. These overarching objectives and methods are directly relevant to the primary goals of the Southern Region Water Program.

Despite the regulatory emphasis nutrient management planning and the largely cost free management plan development process, the Animal Waste Management Team has concluded that the larger Extension community broadly recognizes that livestock producers do not readily adopt or often successfully implement nutrient management plans. Thus, the more specific objectives of this project are to identify obstacles to nutrient management plan adoption and implementation and better governmental policy and incentives to improve animal waste/nutrient management on livestock farms. This objective strengthens the link between the southern land grant university system and federal/state/local agencies that are stakeholders in the nutrient management process on livestock.

Adams: Evaluating Public Support for Water Conservation Tools Appropriate for Local Conditions

This project supports the development of water conservation programs in several Southern states. We address the following specifically-identified needs and goals outlined in the Southern Regional Water Resources Program (SRWRP) work plan approved by USDA-CSREES:

- We focus directly on providing baseline information on alternative water use efficiency and conservation policy tools that can be used to address water supply shortages.
- We expect the project to improve the understanding of potential public acceptance and support for alternative water policy tools by professionals in the land grant system, policymakers, and other stakeholders.
- The PIs and collaborators have expertise in economics, policy analysis, law and other fields represented within the land grant system. We draw from this expertise to create deliverables that should improve the recognition of this expertise by stakeholders, particularly relating to water policy decision-making and drought management.

Osmond: Slow-Release Fertilizers

Nitrogen impacts important water resources, such as Tampa Bay, the Neuse Estuary and the Gulf of Mexico, causing hypoxia and fish kills. Nitrogen leaching and runoff losses due to crop production are a major source of nitrogen to streams, rivers and estuaries in the southeast. Typically, nitrogen use efficiency of cereal crops is around 50% (grain + stover). Slow release nitrogen fertilizers have potential to improve nitrogen use efficiency corn and other field crops, and thus release nitrogen losses to water resources. With this in mind, we are proposing regional slow-release fertilizer tests.

Risse: Southeastern US Water Resources Initiative

The purpose of this project is to support the development of a strategic framework for a Water Resources Initiative in the Southeastern U.S. A broad spectrum of academic, federal, and state entities have expressed interest in collaborating in the development of this initiative to provide a foundation for regional water resources assessment and management. While the initial effort is to utilize resources at the University of Georgia (including the Athens, Tifton, and Griffin campuses), the expectation is that this would expand to partner with other academic institutions within Georgia (e.g., Georgia Tech, Georgia State, Emory, etc.), as well as other academic institutions within the Southeastern U.S. (other public and private universities in the region). Although focused primarily on building a consortium of institutes of higher education, it is also intended to provide a forum for bringing together the relevant federal, regional, state, and local governmental and nongovernmental organizations, as well as related professional organizations. To get such an initiative underway, UGA is proposing to host the first regional conference in 2010. A series of meetings leading up to this regional meeting, focused on the role of science in

solving interstate water disputes is also being proposed. The purpose of this grant is to insure that the Southern Region Water Quality program is an active participant in this process.

2010-2011 Special Projects

Osmond: Slow-Release Fertilizers

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Shober: Low Cost Stormwater Treatment Structures Demonstration and Education

Land managers face increased pressure to reduce non-point source nutrient pollution originating from agricultural and urban land uses. Prevention of non-point source pollution in impaired watersheds in the Southern Region is needed to comply with increased regulations to protect water resources. For example, Florida land managers will soon be required to meet the EPA numeric nutrient criteria values of total nitrogen and phosphorus for lakes, streams, and water bodies. Agricultural and turf systems are known to be two major non-point sources of nutrients to surface waters. This project seeks to: 1) demonstrate innovative, low-cost options for reducing stormwater inputs of nutrients (mainly phosphorus) to surface water bodies from agricultural and urban land uses (at the urban-rural interface) and 2) educate watershed stakeholders (farmers and land managers) to reduce non-point source pollution using low-cost options.

Wilson: Southern Region Water Conference

The 2011 National Water Conference will be held in Washington D.C. and the goal is to showcase the best of the best water programs to facilitate future federal funding in water programs. Due to the objective of the 2011 National Water Conference, the attendance and presented programs will be very limited.

By far the strongest regional water program exists in the Southern Region. One of the keys to the regional success is our ability to collaborate, network, and learn from other programs around the region. The past Southern Region and National Water Conferences have always been a great facilitator for networking opportunities. Since these opportunities will be limited at the 2011 National Water Conference, we are proposing to hold a Southern Region Water Conference in Athens, GA in May 2011.

Stringam: Internet Evapotranspiration Tool to Help Water Users Estimate Water Requirements and Conserve Water for Use in Southern Region States

Past research has demonstrated that ET estimation, can help water users estimate crop water use so that the crop can be irrigated with the water that it needs. This helps conserve water, pumping costs are reduced and inputs are conserved.

Tracking ET requires data, time, and sometimes equipment that water users are not willing to expend. However, weather and remote sensed data can be collected, used to estimate ET, and posted on the internet. This ET data can be used to provide a tool to help farmers estimate ET and help them determine the required water for their crops with a minimum of effort. This internet site would have the necessary information that is required to approximate the crop ET for the farmer. All that would be required is that the farmer log into the internet site, input the type of crop, planting date, and the crop acreage. The internet site would estimate the ET for the crop and make recommendations for water quantity and timing of irrigation.

Bauske: A Tool for Water Conservation Education: Take the 40-gallon Challenge

This project is designed to encourage people to take “The 40 Gallon Challenge” by completing a home water audit. The audit is outlined on a “Challenge Card” (Appendix A). This card can be adjusted as needed. For example, it could be called “The 30 Gallon Challenge” and audit practiced can be adjusted for local conditions. The self-audit checklist on the Challenge card will provide an estimate of water savings resulting from implementation of water-saving practices, thus providing a total daily savings for the pledge cards.

This program will be utilized as a “teaching tool” in conjunction with educational seminars developed to address water issues. It will be as effective in rural areas as in the rural/urban interface. The pledge card is an effective complement to on-going educational programs and can be used in adult education programs and 4H programs. The pledge card can be effectively used by teachers, Master Gardener volunteers, and Extension educators. This program can be sustained by seeking additional door prize donations from local businesses in future years, and implementation of this program to a broader audience. Other government agencies, local water providers and others can easily adapt this program.

Saraswat & Tsegaye Watershed Assessment Tools for Extension and Research (WATER) Training Project

As populations increase throughout the Southern Region, the rural/urban interface becomes more critical as forest and farm give way to suburbs and malls. It is both a challenge and a priority to reach populations in the rural/urban interface with water conservation messages. It is critical to reach this expanding population struggling with finite water supplies. This project will support ongoing educational programs and addresses drinking water and rural/urban interface issues. It can be effectively used by educators in schools, government officials, landscape contractors, architects, developers and farmers. The project will result in multistate collaboration and generate information on water savings. It will provide landowners the knowledge needed to minimize water use and protect their water resources.

Brantley: Southeastern Tool for Resource Preservation Kit

Nonpoint source pollution is recognized as the leading contributor to water quality degradation in the United States. Additionally, the effectiveness of streamside vegetated buffers in reducing pollutant loads to streams is well known. This project will meet Southern Regional Water Program priorities to improve water quality and provide watershed education through the development of a Resource Protection Kit.

It is common for Extension agents and natural resource professionals to receive requests for assistance to correct severe stream erosion that has resulted from a variety of causes including removal of vegetation and an increase in impervious surfaces in the watershed. These concerns are communicated after the problem is so advanced that it is beyond the technical expertise of local Extension staff to provide assistance. The goal of this project is to provide Extension agents with tools to inform landowners on how they can address small stream instability issues before they become large, expensive problems that have already contributed to the degradation of local water quality.

McLaughlin: Improved Construction Site Practices using Hands-on Demonstrations for Erosion, Sediment, and Turbidity Control in the Southeast

A series of workshops throughout the Southeast is proposed to provide needed training to small local contractor businesses and municipal employees. Each workshop will reinforce the correct installation of many common construction site BMPs through hands-on practice and participants will be informed of the new regulations and of the new techniques and products needed to meet the standards. As residential

development has drastically slowed over the past few years, particularly in large parts of the Southeast, we feel that now is the perfect time to push for the education of contracting crews. When construction activity becomes more energized over the next few years, they will be better prepared to deal with the stricter regulatory environment. We feel it's particularly important to reach this specific audience as they have not been especially targeted for this type of training in the past, despite the fact that they're the individuals in the field who approve, inspect, or install the devices and perform the approved practices.

Shober: Changing Residential Landscape Practices for Water Quality and Conservation in the Southern Region

This project seeks to reduce non-point source pollution of water resources and increase water conservation in Southern landscapes. The project addresses the action item for the Watershed Education and Restoration Program Team as outlined on p. 16-17 of the Southern Region Water Resource Project Plan of Work. Our project proposes to develop and adapt materials from existing Extension-led programs such as Florida Friendly Landscaping, Carolina Yards and Neighborhoods, and Texas Earth Kind for regional application in local program development. Our initial goal is to provide training with a consistent message to agents and Master Gardener (MG) volunteers and provide materials for them to use in local program delivery. The overall goal of this project is to educate stakeholders (e.g., landowners, landscapers, land managers, etc.) to reduce non-point source pollution and conserve water use in residential landscapes.