South Carolina Water Resources Center
Strom Thurmond Institute

Annual Technical Report
2018

SCWRC Introduction:
The South Carolina Water Resources Center (WRC) is South Carolina's representative to the National Institutes for Water Resources (NIWR) and serves as a liaison between the U.S. Geological Survey, the university community and the water resources constituencies of those institutions. This is accomplished by serving as a water resources information outlet through the WRC website, serving as a research facilitator through an annual grants competition, and by operating as a catalyst for research and educational projects and programs across South Carolina. WRC also serves as a conduit for information necessary in the resource management decision-making arena, as well as the water policy arena of the state. A critical component of the conduit is the S.C. Water Resources Conference held every two years and managed by Clemson Public Service and Agriculture through the S.C. Water Resources Center.

To fulfill the need for continuous assessment of South Carolina's water resource capacities, Clemson University has been successful in securing funding from the SC General Assembly for the creation of a comprehensive science-based water resources program. Clemson University's goal is to create a comprehensive science-based Water Resources Program to continuously assess South Carolina's capacity to provide water with regard to demand and availability. The program will support the assessment procedures and management guidelines outlined in the South Carolina Water Plan and will provide an objective source of data for projecting future needs, capacity, and impacts to continue the ongoing efforts of implementing a 'comprehensive' statewide water management plan. The new Water Resources Program is based in Clemson University's South Carolina Water Resources Center which is housed in a 34,200 square foot facility offering spacious office, meeting and laboratory space.

Clemson University is ideally positioned to lead effort statewide water resources assessment effort. As a land-grant institution, it is the University's mission to solve problems associated with natural resources through research, education, and extension. Clemson Public Service and Agriculture (PSA) has an array of statewide programs that address a wide-range of agriculture and natural resource issues including water resources for agriculture, forested watershed management, and numerous other water-related natural resource topics.

Creating a complete and integrated water resources program
Clemson University has already committed major capital and personnel investment to understanding and conserving the state's water resources**.** While existing University water programs and research infrastructure address many aspects of the state's water resources, the SCWRC now has the funding necessary to secure the additional expertise and program support to unify the individual programs into a complete and integrated Water Resources Program. The creation of this premier Program will establish South Carolina as a national leader in science-based water resources management. The resulting research and resources will guide the efforts of state and federal agency collaborators to implement sound water-based policy making for the benefit of the state and region.

Water Resources Resiliency: The S.C. Water Resources Center will unite existing successful water-based programming and research efforts with faculty support and need-based hires. By way of this strategy, and with feedback from engaged statewide stakeholders, expertise will be sought in agricultural water use, water quality and treatment, crop production, soil science and hydrogeology, water and soil informatics, biofuels (including Algal-Based Biofuels) production, decision support systems and systems modeling, resource management, policy and economics, sustainability and life cycle assessment and public perception and acceptance of water use and policy.

Integrated Watershed Management Assistance to South Carolina Communities: Water touches every natural resources management, engineering, and agriculture systems management concern, research effort, and outreach mechanism. The proposed program will connect research with applied instruction and assistance to more proactively meet stakeholder needs. Water pollution prevention outreach, typically conducted in the state's more urban centers, will be expanded to include a 'whole systems' approach - increasing the number of programs and instructional resources for better management decision making and implementation of water-protective best management practices. Due to water's crosscutting nature, these programs will provide interdisciplinary training to all natural resources and 4-H Extension program teams. Strategic placement of Clemson Extension agents to engage agricultural sectors in water reuse, water management, pollution prevention, and ecosystem services in a changing climate will unite downstream urban educators for comprehensive, basin-driven programming.

Connecting the Water Resources Research Community: The biennial South Carolina Water Resources Conference (SCWRC) is sponsored by Clemson University Public Service and Agriculture (PSA) and coordinated by the SC Water Resources Center staff, in conjunction with a planning committee made up of statewide water resource professionals. The conference purpose is to provide an integrated forum for discussion of water policies, research projects and water management in order to prepare for and meet the growing challenge of providing water resources to sustain and grow South Carolina's economy, while preserving our natural resources.

In spring 2007, Clemson University first announced that it would establish a biennial conference on water resources in South Carolina to be held in even-numbered years, with the first slated for October 2008. The conference goals are to: (1) communicate new research methods and scientific knowledge; (2) educate scientists, engineers, and water professionals; and (3) disseminate useful information to policy makers, water managers, industry stakeholders, citizen groups, and the general public.

Each of the four previous conferences brought together over 300 registered attendees, featured over 120 presenters and hosted popular plenary speakers. A wider public audience was reached in 2012 and 2014 with live streaming video of the plenary sessions through the conference website. Conference attendees have included those from colleges and universities; municipal water authorities and entities; environmental

engineering, consulting and law firms; state and federal agencies; nonprofit organizations; economic development associations; utility companies and land trusts. Participants have responded in an overwhelmingly positive manner about the organization of the conference, the speakers, and the information that has been presented and shared. The conference web site, www.scwaterconference.org, provides up to date information for all conference audiences from contributors to presenters and exhibitors and houses the archives for all proceedings to date, including manuscripts and posters. Due to its success and popularity, the conference has become self-sustaining financially.

The most recent conference in 2018 marked the fifth occurrence of the biennial event. The program schedule featured four plenary sessions, six tracks, 35 breakout sessions, and 108 oral presentations. The conference was held at the Columbia Metropolitan Convention Center in Columbia, SC for the fourth time in a row due to its central location in the state and accommodating venue space. In the wake of recent severe weather impact on the state's water resources due to drought and flooding, the theme of the 2018 conference was "*SC Water Resources at a Crossroads: Response, Readiness and Recovery*". Planning is currently underway for the 2020 conference with a tentative theme of *"South Carolina Water Resources: Working Across Communities and Across Borders."*

SCWRC Research Overview:
The SC Water Resources Center works under the Vice-President Public Service and Agriculture (PSA). Clemson University PSA is part of a national network of 50 major land-grant universities - one in each state - that work in concert with the USDA National Institute of Food and Agriculture. Clemson PSA has state and federal mandates to conduct research, extension and regulatory programs that support economic growth in South Carolina and improved, sustained management solutions of one of our state's and the nation's most important natural resources – water.

Current programs of the SC Water Resources Center include:
The S.C. State Water Assessment and Planning Program: involves working with the S.C. Department of Natural Resources (S.C. DNR), S.C. Department of Health and Environmental Control (S.C. DHEC), U.S. Army Corps of Engineers, USGS and CDM Smith (an engineering consulting firm) to develop the first complete river basin plans for all eight major river basins. The SCWRC coordinated an eighteen month process to develop the framework for statewide river basin planning.
The U.S. Geological Survey National Competitive Grants Program: provides research infrastructure and funding for water scientists at Clemson and across South Carolina in cooperation with the National Institutes for Water (NIWR).
The PSA Water Research Program is a competitive research initiative for Clemson University faculty who are engaged in research activities that contribute to water planning and management activities as well as cutting edge science to increase our understanding of sustainable water use issues.
The Sustainable Water Resources Program is an international effort with Clemson University and Linnaeus University in Kalmar, Sweden. Current efforts include a study abroad program hosted by Linnaeus University with shared faculty as well as a new research effort aimed at cross cultural student led projects. Future plans include an internship program with students shared between institutions.
The S.C. Sea Grant Consortium Stormwater Ponds Research and Management Collaborative: is an initiative to compile background data and information on stormwater pond policy for a state-of-the-knowledge report.
The Savannah River Assessment: utilizes remote sensing and other modeling data to understand the impacts of changing land use to the Savannah River.
The U.S. Army Corps of Engineers Lower Savannah Economic Study: utilizes the Regional Economic Modeling System to understand how changing flow regimes affect the regional economy of the Lower Savannah River Basin.

The Clemson University Intelligent River® Research Enterprise: has successfully developed a range of buoy sensor technologies and remote data collection systems that enable advanced environmental and hydrologic monitoring to improve scientific-based decision making. Cost-effective and reliable monitoring of water quantity and quality at nearly any location in South Carolina is now possible through the Intelligent River® system of data acquisition, transmission, archiving and analysis. By storing this data at a central server in a standard format, long-term monitoring and analysis is possible. Examples of successful and ongoing Intelligent River® projects include:

The City of Aiken stormwater monitoring project: uses continuous monitoring of storm drain flow within the city to quantify hydrologic flows during storm events, evaluate and optimize potential locations for further green infrastructure, enhance site-level remote data acquisition capabilities throughout the Sand River watershed, and inform stakeholders, policymakers and planning agencies.
Furthermore, the Intelligent River® program has the ability to deploy small UAVs (drones) to quickly image water bodies and after-flood events, develop high-resolution 3D models, and help quickly evaluate infrastructure status and damage. Researchers are also developing a small bridge-based sensor pack that will enable scientists to monitor in near real-time water levels and status under bridges.

Clemson University Center for Watershed Excellence:
In 2007 the U.S. Environmental Protection Agency Region 4 Office created the Centers of Excellence for Watershed Management in order to utilize the diverse talent and expertise of colleges and universities from across the Southeast. The Centers and provide hands-on practical products and services to help communities identify watershed-based problems and develop and implement locally sustainable solutions. The Clemson University Center for Watershed Excellence received its designation in 2008 and takes a leadership role in water resources and watershed issues in South Carolina by collaborating with other state agencies, organizations, and institutions to provide education and outreach to residents. The Center has an ongoing partnership with the U.S. EPA and S.C. DHEC to help new MS4 communities gain a better understanding of the permit and compliance process. The Center also collaborates on workshops to give community staff an overview of their responsibilities under Phase II of the National Pollutant Discharge Elimination System (NPDES) stormwater program and gain feedback on how agencies can assist them under this new designation.
South Carolina Adopt-a-Stream (SC AAS) creates a network of watershed stewardship, engagement, and education through involvement. SC AAS volunteers can play an important role in monitoring and tracking water quality while sharing information about local water resources with their communities. In providing baseline information about stream conditions, volunteers, local communities, educators, and local government agencies can partner to protect and restore our waters.
Microbial Source Tracking is an emerging technology to source the species of bacteria loading and cause for failure to meet state and federal thresholds. Specifically, Clemson University is piloting a technical service using qPCR, or quantitative polymerase chain reaction, to quantify loading from warm-blooded mammals. Species available for detection are **swine, bovine, human, and dog**.

USGS Funding:

The past year the Water Center oversaw the funding of two research studies: 1) “Statewide survey of irrigation source water quality and water use techniques in the specialty crops production industry” with Sarah White (Clemson University) as principal investigator; and 2) “Monitoring Distribution and Toxicity of Coal Tar Chemicals in the

Congaree River Using Passive Samplers” with Peter van den Hurk (Clemson University) as principal investigator.

This coming year the Water Center will oversee the funding of two research studies: 1) “Fecal Coliform Pollution and Antibiotic Resistance in Sand River in Aiken, SC” with Sarah Michele Harmon (University of South Carolina Aiken) as principal investigator; and 2) “Tire Wear Particles in Road Runoff as Non-point Source Microplastic Pollution in SC Waterways” with Peter van den Hurk (Clemson University) as principal investigator.

Funded Projects 104b:

Final Report

Statewide survey of irrigation source water quality and water use techniques in the specialty crops production industry

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Over the last few decades, water availability in South Carolina has steadily decreased due to reductions in average daily precipitation and increased severity and incidence of drought (1,2). Competition among domestic, agricultural and industrial water use within the state has increased due to decreasing supply. About 125 million gallons per day are used for irrigation purposes in South Carolina, accounting for roughly 10% of consumptive (excluding thermoelectric) water use in the state (3). In South Carolina, over 234,000 acres of harvested cropland and 65,000 irrigated acres are devoted to specialty crops production, with over 600 registered nursery, greenhouse, and floriculture farms operating in the state (4). Specialty crops accounted for almost $500 million in state revenue in 2012, with greenhouse, floriculture, and nursery products consistently contributing over half of cash receipts for crops in South Carolina (5). South Carolina ranks as one of the top five states in the country with the highest percentage contribution of the horticulture industry to gross state product (6). Though agricultural irrigation accounts for a considerable portion of consumptive water use in the state, there is a substantial knowledge gap concerning water use practices at nursery and greenhouse operations throughout South Carolina. A comprehensive statewide study of irrigation source water use practices was critically needed to inform long-term water use management, allocation, and policy decisions in South Carolina.

Currently, knowledge related to irrigation water sources, irrigation application methods, and correlations between production type and water use for the greenhouse and nursery industry is severely limited. While time and research are directed to solve both irrigation and runoff problems for the industry, published baseline research describing water quality issues and producer-wide irrigation practices is scarce. As water resources dwindle and states look to restrict water usage, specialty crop growers can better safeguard their water resources and usage rates if they have baseline information regarding these practices. We collected data from nursery (field and container) and greenhouse operations across South Carolina, developed a database corroborating major water problems that will help to direct future research and resources, and collated information useful for both growers and policy makers regarding water quality and water use patterns.

This grant provided opportunities for three graduate students and two undergraduate student workers to develop skills in communication and coordination, experimental design, water sampling, and statistical analysis of results. Furthermore, this grant served as a chance for graduate students to develop skills in management and teaching undergraduate students. The

research within this grant was incorporated into a Creative Inquiry course at Clemson University. The Creative Inquiry, "Hands-On Water for Agriculture" and allowed five undergraduate students to assist with selection of nursery and greenhouses for assessment as well as engage in interpretation of the results to guide future projects and research.

Outputs from the study were incorporated into individual water quality reports, distributed to growers who participated in the study. Results will also be collated, anonymized and incorporated into numerous Land Grant Press fact sheets, workshops, and consulting materials to help South Carolina growers better understand water quality problems, solutions, and management. The methods implemented in this study and associated results could be incorporated into a standard operating procedure that extends the objectives posed in this grant to regional and nationwide outlook into the quality of source water for the greenhouse and nursery industry.

An assessment of irrigation quality, quantity, and source was conducted with 30 collaborating nursery and greenhouse growers throughout South Carolina. Ten growers were selected to represent each of the three ecoregions of the state: Coastal (Coastal Plain), Central (Southeastern Plain), and Piedmont **(Fig. 1)**. Growers were asked to complete an online survey (IRB# 2018-086) that included questions related to water source, irrigation method, water volumes used, and best management practices implemented within their operation. This information was confirmed and expanded upon through on-site visits to each growing operation. During the visit, water sources were observed and interviews were conducted with either the owner or individual responsible for the irrigation of the operation.

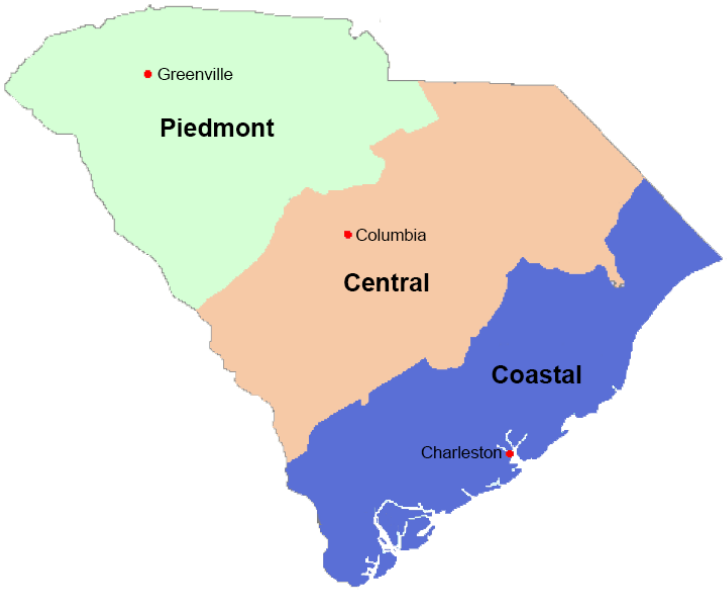

Figure 1. The three major ecoregions of South Carolina are comprised of (1) the Coastal region or the Mid-Atlantic Coastal Plain, (2) the Central region or Southeastern Plain, and (3) the Piedmont region.

Survey responses serve as a benchmark of irrigation sources for South Carolina in 2018, with future survey administration strongly encouraged to develop longitudinal analysis. Data are reported only as percentages to protect the anonymity of the respondents. Statistical analysis for the data presented were challenging due to the use of categorical, multi-response variables. In other words, respondents could select more than one response if, for example, a grower produces most of their crops in a container, with a small proportion produced in a greenhouse. Permitting this type of response violates an underlying assumption of most statistical analyses, that of the

independence of responses, and results in unknown degrees-of-freedom (i.e., with 30 growers we received many more than 30 responses). Due to the use of multi-response questions, percentages discussed within this study can equal greater than one hundred percent.
We specifically selected diverse operations to survey, both in terms of size and operation type. Operational sizes ranged from 33% of respondents with operations on >100 acres, 45% of respondents with operations on ≤15 acres, and the remaining 22% of respondents growing on 16 to 100 acres of land. Historic data and future survey collection could serve to further confirm this trend in operation size distribution. Operation size was not assessed by ecoregion to protect the anonymity of the respondents.

Plant production was broken out into three categories: greenhouse production, plants grown within an enclosed structure; container production, plants grown within a container outside of an enclosure (i.e., on a gravel or landscape pad; this includes pot-in-pot production); and field production, plants grown in the ground. In the Piedmont region of South Carolina, 70% of

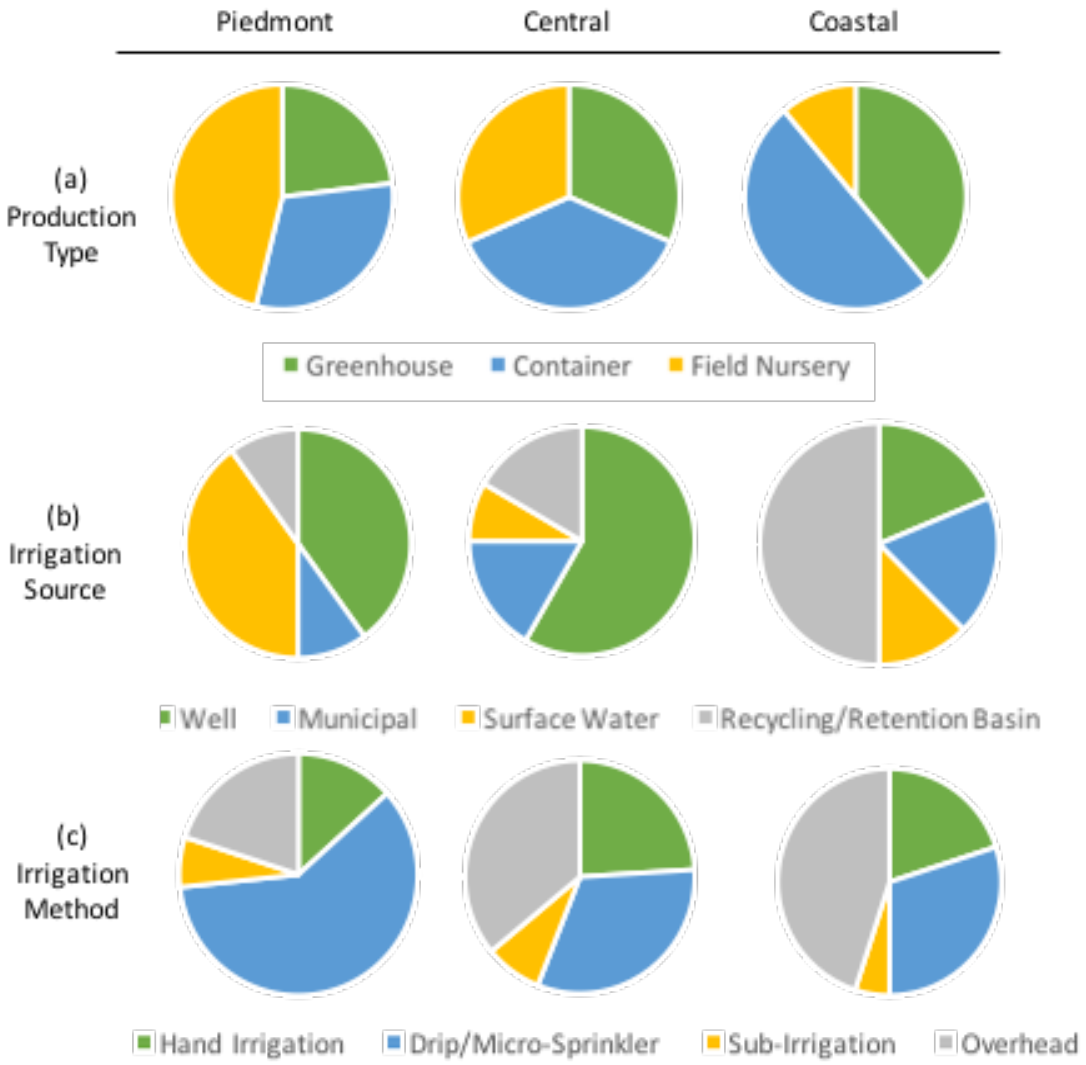

Figure 2. Distribution of responses when taken as a percent of the total for production type (a), irrigation source (b), and irrigation method (c) by region of South Carolina.

growers utilize field production, while only 20% in the Coastal region do (**Fig. 2a**). Conversely, 100% of growers in the Coastal region utilize container production, while only 40% do in the Piedmont. The high incidence of container production is most likely attributable to the high-water table, flooding, and sandy soils of the Coastal region which prevent efficient field production. The Central area of the state is an even mixture of the three production types, a blend of the Coastal and Piedmont conditions.

Irrigation of crops grown within the Piedmont region relies heavily upon well and surface water, with 80% of growers using one or both (**Fig. 2b**). Only 10% of growers in the Piedmont region use a recycling or retention basin to capture and reuse their runoff. Coastal growers are far more reliant upon recycling and retention basins for irrigation, with 80% of growers capturing and reusing their runoff. Well water is used for irrigation by 80% of the Central region with only 10-20% of growers applying water from recycling or retention basins, surface water, or municipal water. One factor impacting use of these vastly different water sources is policy and regulation. Within the Coastal region, groundwater access is restricted by capacity use regulations limiting well withdrawals while other regions of the states are not regulated (7; **Fig. 3**). Furthermore, some Coastal operations have experienced salt water intrusion, further limiting surface and well water use (*personal communication*, interviews with growers). Freshwater is plentiful in the Piedmont region due to proximity to the foothills of the Appalachian Mountains in combination with an abundance of springs (8; **Fig 4**).

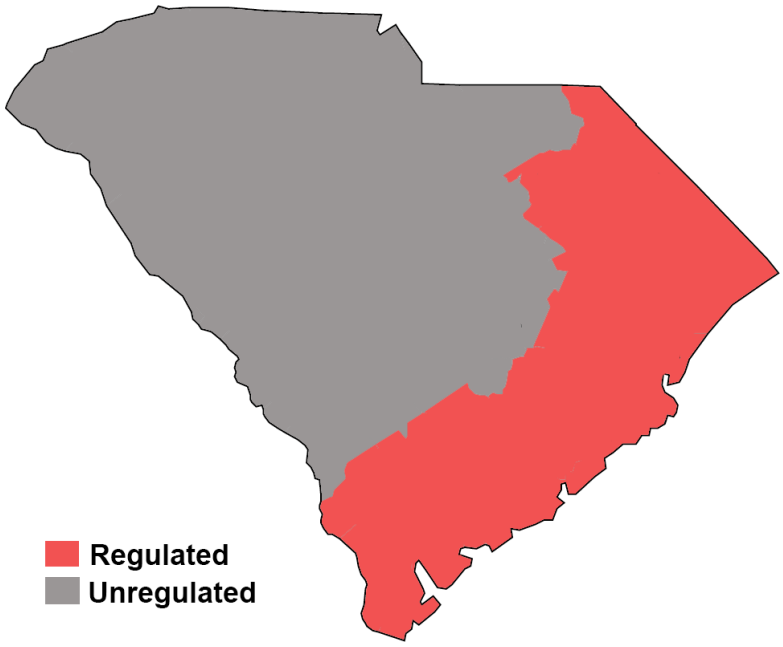

Figure 3. Regulated (red) and unregulated (gray) capacity use areas of South Carolina.

Irrigation methods used by surveyed growers included hand irrigation or manual application, drip/micro-sprinklers, sub-irrigation (e.g., flood floor, ebb and flow, etc.), and overhead application. Piedmont growers specialize in field tree production; because of this production system, 90% of Piedmont growers primarily irrigate using drip/micro-sprinklers (**Fig. 2c**). Only 30% regularly use overhead irrigation (some growers occasionally use overhead in holding bays prior to shipment and are not included). Conversely, 100% of Coastal growers regularly use overhead irrigation, supplemented by drip/micro-irrigation. As seen previously, the Central region is evenly divided between use of both drip/micro and overhead irrigation as their main irrigation method. In no case was an operation that solely used drip irrigation equipped with a recycling or retention basin for water reuse. This may be due to the high water application efficiency and low level of runoff associated with micro-irrigation (9,10). Therefore, while the

Piedmont region had a low level of water reuse in comparison with the Coastal region (**Fig. 2b**), this could be attributable to a lack of water runoff to capture and reuse. Hand irrigation is used in 50% of operations within the state, but in all cases, was a secondary irrigation method. Only 10% of growers within the state, applied water using sub-irrigation, a highly efficient irrigation method (11). This lack of implementation is most likely linked to high system costs (12).

Ecoregion and production type impacted the primary source of irrigation water and how water was applied. Better understanding of these linkages could assist in development of best management practices and extension materials. Determining water quality problems and runoff implications are also pertinent to the future sustainability and security of specialty crop producers. Based upon survey results and in-person interviews, it is clear a "one size fits all" water policy would be detrimental for specialty crop growers in South Carolina because of the variability in water use patterns by ecoregion and production type. Many growers are engaged and interested in understanding their water use and are proactively reducing their water footprint. Involvement of the specialty crop industry in decision-making is key for future water policy and regulation implementation.

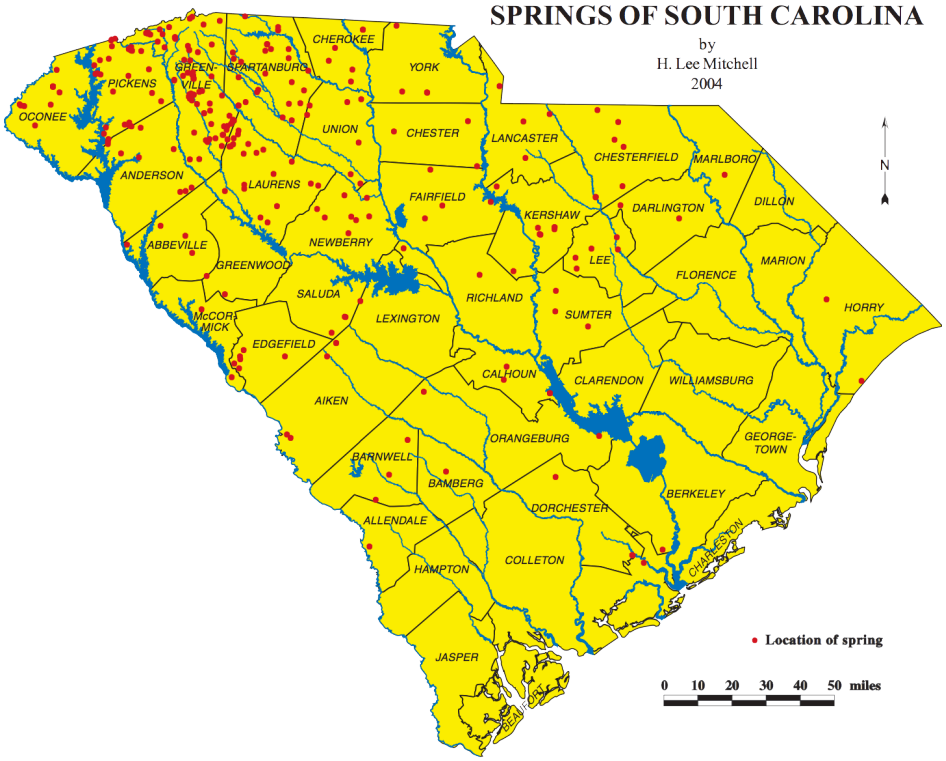

Figure 4. Location of springs within South Carolina denoted by red circle. (8)

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Monitoring Distribution and Toxicity of Coal Tar Chemicals in the Congaree River Using Passive Samplers.

Progress report prepared for the SC Water Resources Center

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Introduction

A significant area of the riverbed of the Congaree River in downtown Columbia, SC is contaminated with coal tar. This coal tar originates from a former nearby manufactured gas plant, and has generated environmental and public health concerns. Coal tar consists of a number of toxic compounds, among which are carcinogenic polynuclear aromatic hydrocarbons (PAHs). No current information is available documenting negative effects of the coal tar on biota in the river, but locals who use river for recreation have complained about health effects after coming in contact with the contaminated sediments. South Carolina Electric & Gas, who has responsibility the plant and its legacy, and the SC Department of Health and Environmental Control are in the process of determining how to clean up the site. An initial assessment revealed that about 11 acres of riverbed are contaminated with coal tar, in concentrations that warrant cleanup. After the initial environmental assessment, SCE&G formulated several different alternatives for managing the site. The preferred option is to remove all contaminated sediment, but after a failed pilot project, and a technical review of the potential impact of altered river flow due to the construction of a required temporary cofferdam, this was deemed not feasible. The current alternative under consideration is to cap the site with geotextile and riprap. Despite intermittent analysis of sediment and water samples, SC DHEC has admitted that little is known about the potential effects of the coal tar contamination on biota in the river. An investigation into the effects on invertebrate communities did not show significant differences between locations downstream and upstream of the site. But invertebrates are known to be relatively insensitive to PAH pollution, which warrants further studies on the effects of the coal tar on fish populations in the river.

We proposed to apply passive samplers around the contaminated site to obtain time integrated data on the leaching of PAHs and their metabolites from the site. This will significantly increase the knowledge about how much toxicants are being released from the sediment, because the samplers are collecting these pollutants over a 4 week period. This time integrated collection of contaminants is a huge improvement over one-time grab samples. The passive samplers are outfitted with two different absorbing materials that collect non-polar and moderately polar chemicals, like the PAHs and their more water soluble metabolites.

The plan was to deploy these passive samplers starting in the summer of 2018, with help of SC DHEC personnel. However, during initial field scouting trips, it was determined that the samplers could not be deployed at the initially selected locations because there were no suitable attachment points for the samplers. The riverbed is mostly solid bedrock, and has very fluctuating water levels. This made it difficult to find sites upstream and downstream of the contaminated area that would allow the passive samplers to be attached in a secure way that would prevent them from washing away during high water levels, being knocked out by passing tree trunks, or being stolen by locals. Also, the samplers need to be permanently submersed for optimal functioning, but not embedding in silt and sand. When good locations were identified in late summer, occasional heavy rains flooded out the collection sites, and the samplers could not be deployed before the winter. In spring 2019, new efforts were undertaken to deploy the samplers, and by the end of March, 3 samplers were deployed; one downstream of the contaminated area, one upstream in the main riverbed, and one in the small tributary that originally dumped the coal tar effluent in the Congaree River, and is still considered a source of PAHs in the river.

Progress timeline

Initial sampler deployment - 3/29/19
Samples collected and absorbent replaced 5/15/19
Samples collected and absorbent replaced 7/2/19
Sample collected and absorbent replaced 9/12/19 (holder canister missing from creek site, but still found the 3 POCIS discs and 2 LDPE replicates from this site. Did not redeploy at this site)
We plan to exchange the LDPE only (as we ran out of POCIS) in October and November.

For now all collected samples are stored at -20 C until all samples are collected. At that point, PAHs will be extracted from the absorbent materials, and analyzed by fluorescence HPLC. In addition, the extracts from the samplers will be tested for toxicity with a fish toxicity test. We expect that all proposed work will be finished and reported by the end of the year.

Other Accomplishments:

Completed work with the S.C. Sea Grant Consortium on incorporating the policy and management chapter for the South Carolina Storm-water Pond State of the Knowledge Report into a potential RFP

Completed report for work on funded project to conduct stakeholder engagement meetings for the SCDNR sponsored South Carolina River Basin Surface Water Assessment.

Continued work for the SCDNR sponsored South Carolina Groundwater Assessment to conduct stakeholder meetings. Held and facilitated initial Groundwater Assessment meetings.

Secured funding for the SCDNR sponsored South Carolina Water Demand Projections Project to assist in model development and conduct stakeholder meetings. Held and facilitated initial Water Demand meetings.

Continued work on project funded through U.S. Department of Agriculture for a project to analyze land use changes and associated water consumption using multiple remote sensing platforms in the Savannah River Basin

Completed work on project funded from U.S. Army Corps of Engineers to conduct an economic analysis of changes to flow regimes in the lower Savannah River Basin

Continued work on program to survey agricultural producers across South Carolina in order to gain a more complete understanding of agricultural irrigation and water use.

Continued work with a study abroad program with Linnaeus University in Kalmar Sweden to share students and resources in an international sustainable water resources program.

Successfully conducted SCWRC statewide research solicitation under the guidelines of USGS.

Successfully conducted the Clemson University PSA Water Research solicitation within the SCWRC and PSA.

Served as chairman of the Planning Committee of the S.C. Water Resources Conference held in 2018 and for the future conference in 2020.

Served on editorial committee for the Journal of South Carolina Water Resources

Planned and conducted workshop with SCDNR and USC-CISA on drought emergency response in conjunction with the South Carolina Emergency Response Center.

Served on the Savannah River Basin Advisory Council.

Served on the Carolinas Integrated Sciences & Assessments Advisory Board

Served on the SC Sea Grant Consortium Coastal Communities Advisory Board

Served on SCDNR State Water Plan Advisory Committee

Served on the SC Sea Grant Consortium Program Advisory Board

Served on the Science Advisory Committee of the Catawba Wateree Water Management Group

Served on the Selection Committee of the Duke Energy Water Fund

Served on the Science Advisory Committee of the Savannah River Clean Water Fund

The 2018 S.C. Water Resources Conference, sponsored by the S.C. Water Resources Center included:

300+ Participants
100+ Groups represented
50+ Students
108 Oral presentations
45+ Posters on display
20+ Exhibitors
7+ Major financial contributors
10+ Supporting financial contributors

The 2020 S.C. Water Resources Conference, sponsored by the S.C. Water Resources Center, planning is underway with goals to match or surpass participation from the 2018 conference.