Little River, Georgia

(An ARS Benchmark Research Watershed, one of 24 CEAP watershed projects.)

Characteristics

The USDA-ARS Southeast Watershed Research Lab has collected hydrologic and climatic data on the 334 km^2 Little River Watershed (LRW) (Figure 1) near Tifton, Georgia since 1968. The watershed is typical of the heavily vegetated, slow moving stream systems in the Coastal Plain Region of the U.S. Land use within the watershed is approximately 40% woodland, 36% row crops (primarily peanuts and cotton), 18% pasture, and 4% water. The LRW is located in the Southern Coastal Plain physiographic province in the Tifton Upland subprovince. The watershed is located on sands, silts, and clay underlain by the limestone that form the Floridian aquifers. The major soil series within the watershed are loamy sands with infiltration rates of approximately 5 cm/hr. Upland slopes within the watershed are 2 to 5% while channel slopes are on the order of 0.1 to 0.5%. Precipitation occurs almost exclusively as rainfall, with an annual mean at Tifton, Georgia of 1200 mm. Distribution of rainfall within the year is highly variable, although the fall months are typically dry. Water balance studies on the watershed indicate streamflow is around 30% of annual rainfall, evapotranspiration is 70%, and percolation to deep groundwater is negligible. The streamflow is composed of direct surface runoff (6% of annual rainfall) and return flow from the shallow aquifer (24% of annual rainfall). Deep seepage and recharge to regional groundwater systems is impeded by the Hawthorn geologic material 0 to 6 m below the land surface, promoting lateral movement of excess water from uplands downslope as shallow return flow to surface drainage systems. While sediment and agrochemical losses from upland cultivated fields can be high, filtering within the dense riparian buffers which surround the watershed streams reduces the loading to streams substantially. Based upon GA-EPD monitoring, many streams within the Coastal Plain are impaired by low dissolved oxygen. Preliminary assessments indicate that on the average, a 40% reduction in nitrogen and phosphorous loading must be achieved in the impaired watersheds. Because of their widespread use within the region, pesticides in streamflow are also a concern.

Environmental Impacts

Environmental concerns include: low dissolved oxygen; high Fecal coliform and other bacterial indicators; nutrient enrichment; pesticides and sediment in field runoff; drought impacts on irrigation water supplies; erosion; and carbon storage in the soil.

Management Practices

1. Riparian Buffers (NRCS practice code 391)
2. Vegetated filter strips (393)
3. Nutrient management (590)
4. Manure management (590)
5. Precision farming (449, 590, 595)
6. Pest Management (595)
7. Residue Management (344)
8. Conservation Tillage (329A)
9. Terraces (600)
10. Cover crops (327)
11. Irrigation Scheduling (449)

Research Objectives

General: Evaluate field and watershed responses to agricultural practices and develop beneficial agricultural management strategies.

Specific:

1. Evaluate controlling relationships between landscape characteristics and hydrologic and water quality responses for Suwannee River Basin water quality and water resource management.
2. Determine water quality impacts of conservation buffers and Best Management Practices at field, farm, and watershed scales on nutrient, pesticide, and sediment transport.

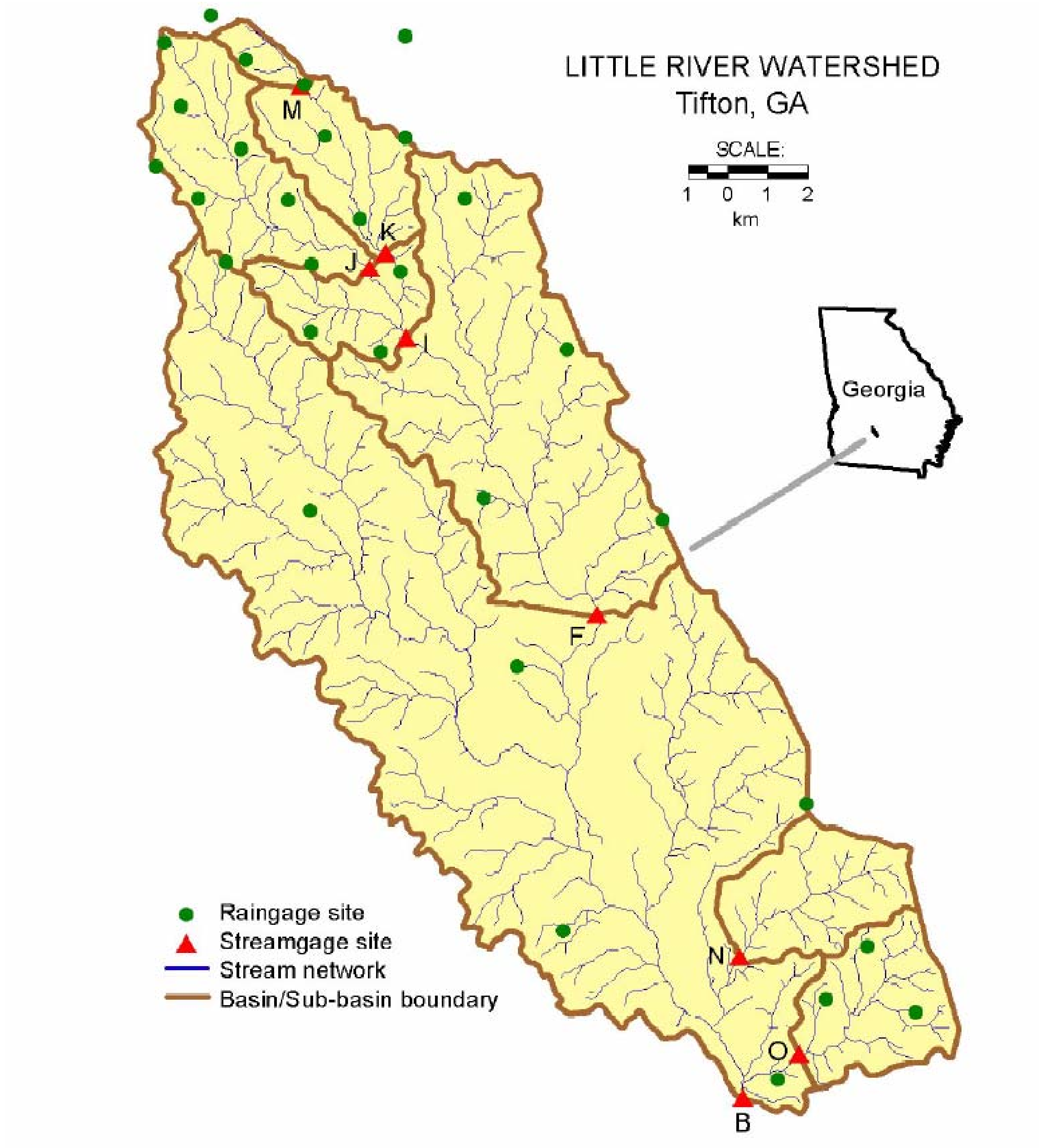
Approaches

Characterize the quantity and quality of water within watersheds in the Coastal Plain Region through enhancement of current landscape and watershed scale studies. Relate water quantity and quality to geophysical, climatic, and management features. Large-scale studies will assess the impact of spatially distributed antecedent moisture condition on runoff quantity and aquifer recharge. Evaluate the interaction between low gradient streams landscape and watershed scale models based upon their ability to simulate hydrologic, chemical, and ecological processes. Develop a systems model for determining the potential impact of conservation initiatives, proposed land use changes, and water resource requirements for the Little River Watershed (defined by USGS 8-digit Hydrologic Unit Code).

Use plot and small watershed experiments to examine the effects of both infield and buffer BMPs on chemical and sediment transport in both Georgia Coastal Plain and South Florida agroecosystems. Incorporate pesticide transport algorithms into the Riparian Ecosystem Management Model (REMM) and test using data from plot, field, and small watershed studies in the Coastal Plain and from other agricultural regions of U.S. through work with other ARS units. Link REMM with the USEPA fate and transport models PRZMEXAMS to provide a more complete model of pesticide risk assessments. Use from a long-term watershed research project to test the linkage of REMM and the ARS watershed model AnnAGNPS. Use water quality data from farms and watersheds of the Suwannee River Basin to determine effects of BMPs on nonpoint source pollution that relate to TMDL assessments. Compare dissolved oxygen (DO) levels in impaired farm scale watersheds streams that drain similar sized areas with little or no agriculture. Develop carbon pool and flux estimates for riparian buffer systems to estimate carbon sequestration.

Collaborators and Cooperating Agencies and Groups

University of Georgia, Georgia Technical Institute, Georgia-EPD, Georgia Cotton Commission, NRCS, USGS


LITTLE RIVER WATERSHED
Tifton, GA
SCALE:
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km
Georgia
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O
B
Raingage site
Streamgage site
Stream network
Basin/Sub-basin boundary