# Little River Experimental Watershed database

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[1] The U.S. Department of Agriculture Agricultural Research Service Southeast Watershed Research Laboratory (SEWRL) initiated a hydrologic research program on the Little River Experimental Watershed in south-central Georgia, United States, in 1967. The primary intent of the program was to develop an improved understanding of basic hydrologic and water quality processes on Coastal Plain watersheds and to evaluate the effects of agricultural management practices on the region's natural resources and environment. Long-term (up to 37 years), research-quality streamflow data have been collected for up to eight flow measurement sites within the Gulf-Atlantic Coastal Plain physiographic region, an important agricultural production area in the southeastern United States. Forty-six precipitation gauges and three climate stations are currently in operation to collect data in support of the hydrologic network. Over the past 20 years, sediment and agrichemical concentrations in streamflow have also been monitored to permit evaluation of the impacts of agriculture on regional surface and groundwater quality. Along with the hydrologic and water quality data, geographic spatial data layers for terrain, soils, geology, vegetation, and land management have also been developed. These databases, described in five accompanying data reports, can be accessed via an ftp site supported by the SEWRL (ftp://www.tiftonars.org/).

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## 1. Introduction

[2] Long-term, watershed-scale hydrologic and climatic data are invaluable for natural resource and environmental planning and management. Historically, long-term hydrologic records have proved critical for flood forecasting, water conservation and management, agricultural and drought planning, and addressing critical environmental and water quality issues. As directed by Senate Document 59 [*U.S. Congress*, 1959], the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) established regional watershed hydrology research centers across the nation in the 1960s. Each regional watershed center was located to address specific research needs and important natural resource and environmental issues at the watershed scale within the respective land resource areas. Experimental watersheds were instrumented at each of the centers to serve as outdoor laboratories providing field data required for conducting scientific investigations aimed at developing a greater understanding of hydrologic processes.

[3] An overview of the research program of one of the regional ARS watersheds, the Little River Experimental Watershed (LREW), is provided here. Additional details on other components of the LREW research program including streamflow [*Bosch and Sheridan*, 2007], precipitation [*Bosch et al.*, 2007], geography [*Sullivan et al.*, 2007], water quality [*Feyereisen et al.*, 2007], and land management [*Sullivan and Batten*, 2007] are available. Further details are available on the LREW database anonymous ftp site (ftp://www.tiftonars.org/). This series of papers is presented to document these ARS long-term hydrologic and ancillary databases for the Coastal Plain region of the southeastern United States and to make this unique data resource more accessible to natural resource and environmental professionals.

## 2. Southeast Watershed Research Laboratory

[4] The Gulf-Atlantic Coastal Plain physiographic region, an important agricultural production area within the southeastern United States, was identified in 1965 as a priority location for a regional hydrology research center. The Southeast Watershed Research Laboratory (SEWRL) was established later that year and the Little River in south-central Georgia, United States, was subsequently selected as the primary field research site. The Little River was considered to be generally representative of the climate, topography, soils, geology, stream networks, and agricultural production systems within the Coastal Plain region. Additionally, the contribution of surface water to deep seepage was believed to be relatively small, simplifying defining experimental watershed water budgets.

## 3. Little River Experimental Watershed

[5] The LREW is located in the western headwaters area of the Suwannee River Basin, centered at approximately

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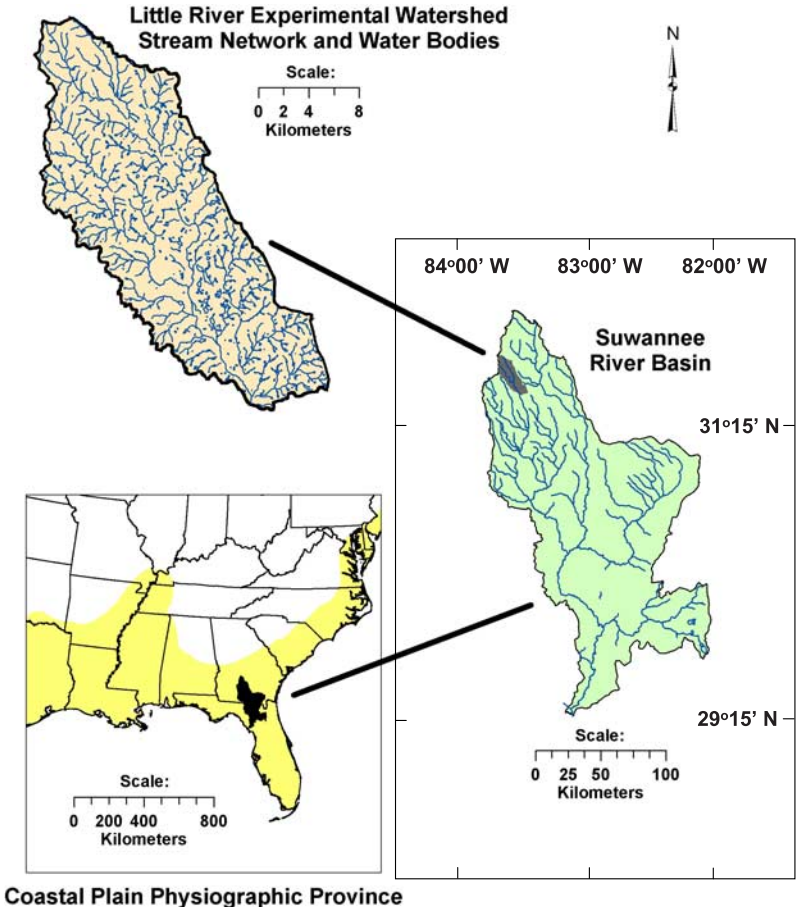


**Figure 1.** Little River Experimental Watershed geographic location.

N31.61° and W83.66° (Figure 1). The Suwannee River Basin is completely contained in the Gulf-Atlantic Coastal Plain physiographic region of the United States and is the largest free-flowing river in the region. The SEWRL initiated construction of a hydrologic monitoring network on the Little River in 1967. Construction of flow measurement devices and installation of the original LREW hydrologic monitoring instrumentation was completed in 1971. The LREW stream monitoring program has provided fundamental data for scientific research evaluating landscape and watershed-scale hydrologic and water quality processes, precipitation-runoff relationships, hydrograph characteristics, water yield, as well as the integrative effects of climate, vegetation, soils, and land use. Ultimately, the data are being used to develop and test prediction methodologies and for evaluating the impacts of agricultural and conservation management alternatives on water quantity and quality in the low-gradient streams that are characteristic of the region. Continued operation of this hydrologic network also supports the extensive environmental quality and riparian research programs of the SEWRL and its cooperators.

[6] The 334 km$^2$ LREW originates approximately 9.6 km west of Ashburn, Georgia near the northwest corner of Turner County. The watershed flows in a generally southerly direction to its confluence with the Withlacoochee River, eventually joining the Suwannee River which empties into the Gulf of Mexico west of Gainesville, Florida (Figure 1).

[7] The LREW was instrumented to measure rainfall and streamflow for a 334 km $^2$ drainage area and for seven subwatersheds that range from approximately 3 km$^2$ to 115 km$^2$ (Figure 2). The subwatersheds are located in a paired and nested arrangement that facilitates testing of analytical formulas and modeling concepts. The original hydrologic monitoring network installed in the late 1960s and early 1970s has been in continuous operation since that time, with some upgrades and modifications [*Bosch and Sheridan*, 2007]. Precipitation and climatic data are collected in support of the hydrologic data. The network currently consists of 46 rain gauges and 3 climate stations installed throughout the LREW and the Upper Suwannee River Basin (Figure 3). Twenty nine of the rain gauge sites include soil moisture measurements in the top 300 mm of the soil profile.

[8] The LREW is in an area of broad floodplains, river terraces, and gently sloping uplands. Moderately wide interstream divides separate relatively broad valleys. The watershed is located on sandy soils underlain by limestones that form the Floridan Aquifers. Locally the Floridan aquifers are confined and stream networks are generally not incised into deeper groundwater aquifers. A seasonally dependent shallow aquifer exists throughout the watershed that drains into the stream network. The upland watershed divides are

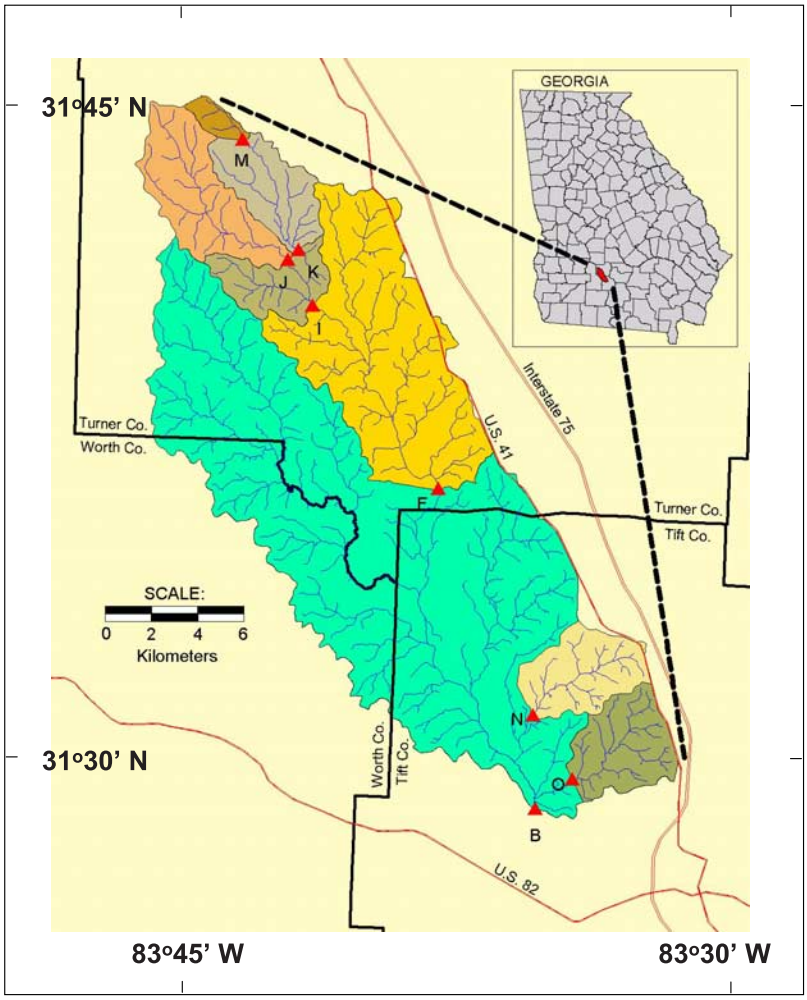


**Figure 2.** Little River Experimental Watershed subbasins.

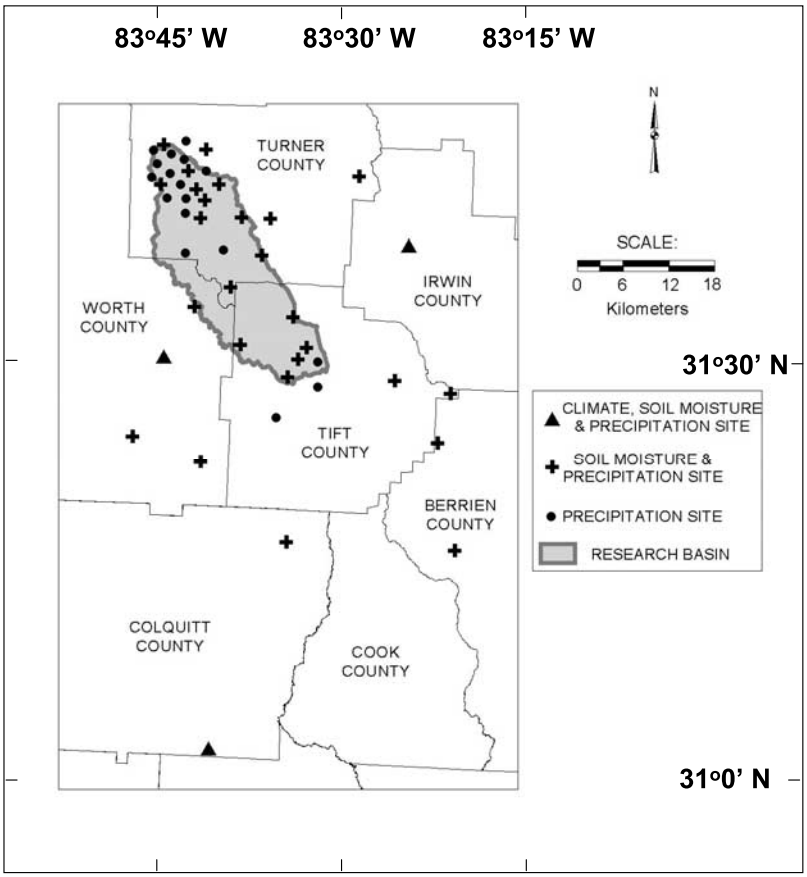


**Figure 3.** Little River Experimental Watershed rain gauge, soil moisture, and climate stations.

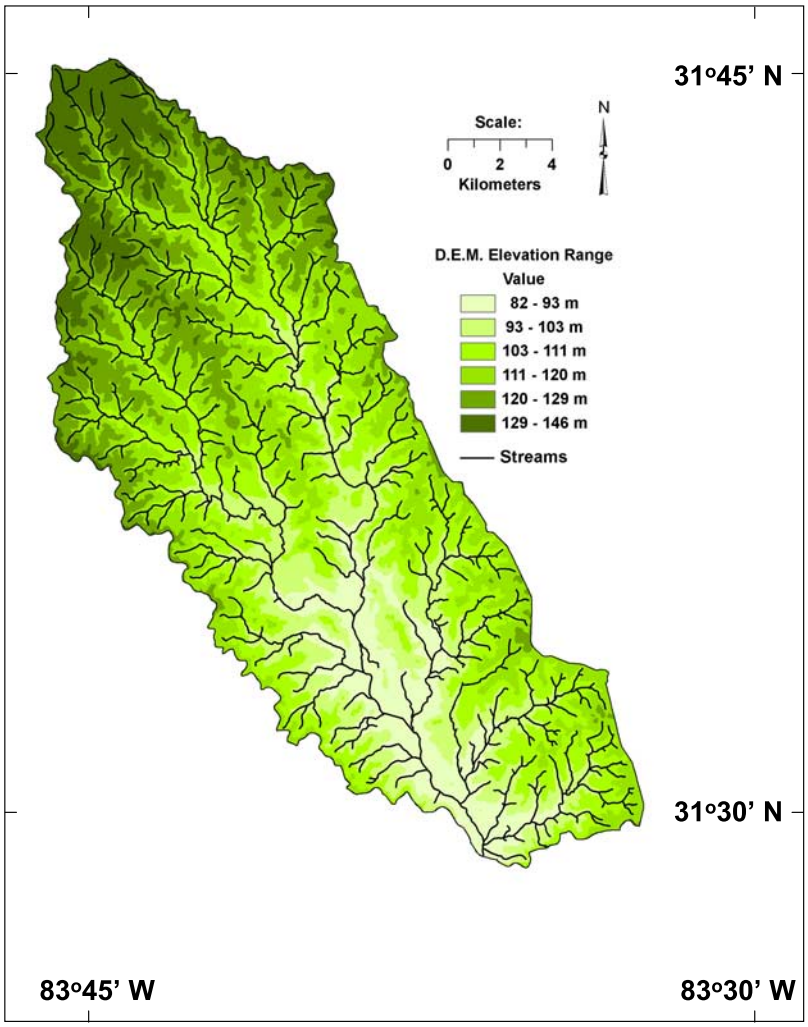


**Figure 4.** Topography of the Little River Experimental Watershed.

nearly level, very gently sloping or undulating. Valley bottoms are nearly level and valley sides are gently sloping. Most slopes are less than 5%, although some valley side slopes range from 5 to 15% (Figure 4). Further descriptions of the watershed are available [*Sheridan*, 1997; *Hubbard et al.*, 1990; *Rawls and Asmussen*, 1973].

## 4. Little River Experimental Watershed Data Reports

[9] The Little River Watershed Water Resources Research data reports (2007) are intended to provide documentation to facilitate use of archived databases from the LREW network. In the accompanying series of data reports, five types of basic data are discussed: streamflow hydrology, climatology and soil moisture, geography, water quality, and land management. Each report discusses data collection methodologies, period of available record, details on data access, and examples of data use. Databases described in each of these reports are available from the anonymous ftp site ftp://www.tiftonars.org/in the subdirectory databases/lrew maintained by the USDA-ARS, SEWRL.

[10] **Acknowledgments.** This is a contribution from the USDA-ARS, Southeast Watershed Research Laboratory, in cooperation with University of Georgia Coastal Plain Experimental Station. All programs and services of the U.S. Department of Agriculture are offered on a nondiscriminatory basis without regard to race, color, national origin, religion, sex, age, marital status, or disability.

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