

# COMPARISON OF PRE- AND POST-IMPOUNDMENT GROUND-WATER LEVELS NEAR THE JIM WOODRUFF LOCK AND DAM SITE, JACKSON COUNTY, FLORIDA

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**Abstract.** In 1999, the U.S. Geological Survey (USGS) and the Georgia Department of Natural Resources, Environmental Protection Division, began a cooperative study to investigate the hydrology and hydrogeology of the Lake Seminole area, southwestern Georgia, and northwestern Florida. Lake Seminole is a 37,500-acre impoundment that was created in 1954 by the construction of the Jim Woodruff Lock and Dam just south of the confluence of the Chattahoochee and Flint Rivers (fig. 1). Recent negotiations between the States of Alabama, Florida, and Georgia over water-allocation rights have brought attention to the need for a better understanding of both the hydrologic and hydrogeologic systems associated with Lake Seminole.

Vernon and others (1958) studied the geology in the Lake Seminole area just before the reservoir was filled. They indicated that underlying the study area immediately to the west of the Jim Woodruff Lock and Dam is a sequence of units composed of alternating layers of sand and clay grading into carbonate rock units.

Current and pre-Lake Seminole ground-water levels and flow paths were compared as part of this study. Pre-impoundment ground-water levels measured in the 1940's by the U.S. Army Corps of Engineers in the vicinity of the then-proposed dam (U.S. Army Corps of Engineers, 1948) were examined and compared with a potentiometric-surface map based on ground-water levels that were measured in July 2000 by the USGS as part of this investigation.

Comparing pre-impoundment and post-impoundment ground-water levels indicate that the creation of Lake Seminole has altered local ground-water flow directions on the southwest side of the impoundment. Pre-impoundment water levels indicate that ground-water flowed in an easterly direction to the Chattahoochee and Apalachicola Rivers. A recent (July 2000) potentiometric-surface map of the area indicates flow directions have shifted to a southerly direction just west of the Jim Woodruff Lock and Dam.

The effect of filling the reservoir on ground-water levels also is indicated by long-term water-level data from a well near Lake Seminole in Florida. Sporadic, long-term water-level measurements began at this well in 1950 and have continued during filling of the reservoir (1954-1957) until 1982. These data indicate that the water level in this well has risen more than 10 feet since the filling of the reservoir. Prior to filling, the hydraulic gradient at this location sloped east and northeast to the Chattahoochee River. Now it slopes in a southerly direction near the western end of Jim Woodruff Lock and Dam and to the Apalachicola River.

In conclusion, pre- and post-impoundment ground-water levels indicate that the creation of Lake Seminole has altered ground-water-flow directions in the area immediately to the west of the Jim Woodruff Lock and Dam. Lack of pre-impoundment data precludes comparing pre- and post-water levels in other areas around the lake.

## LITERATURE CITED

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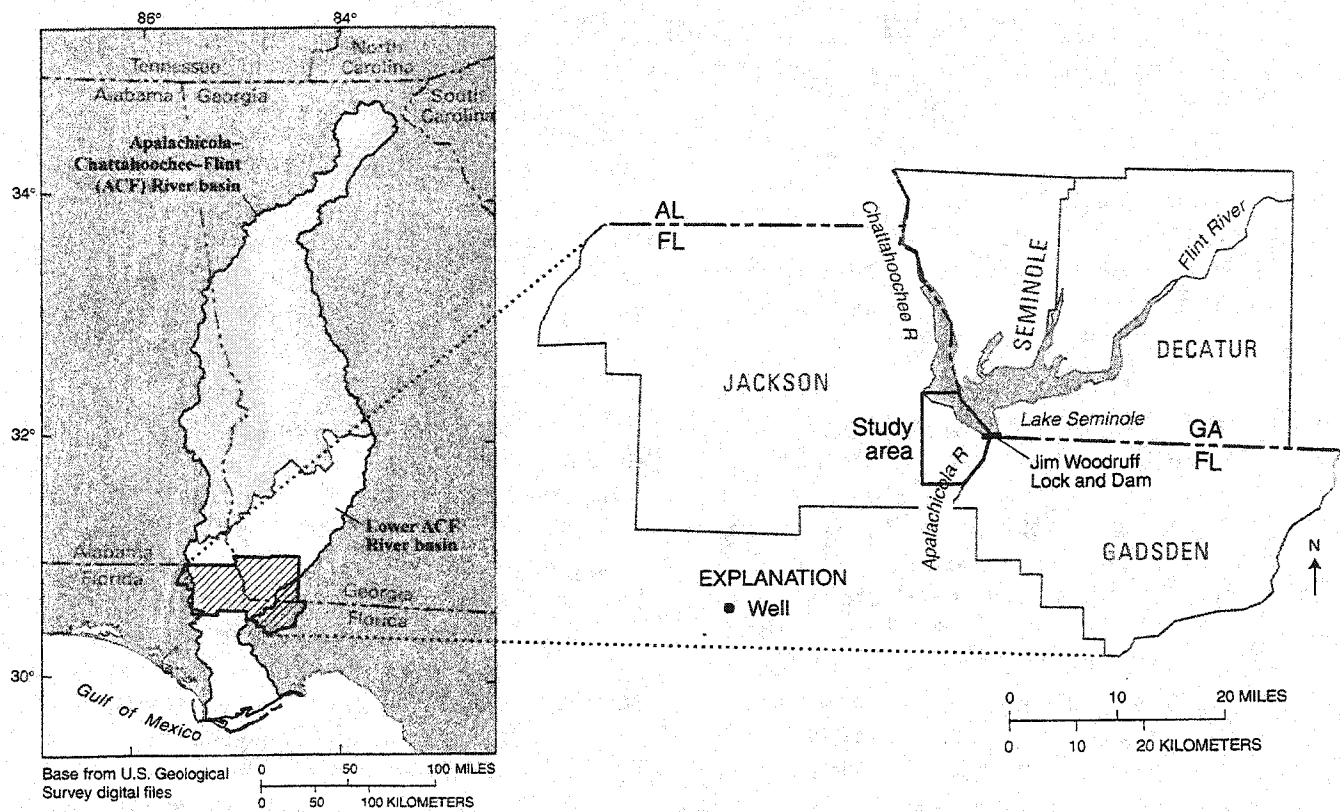


Figure 1. Location of study area.