

# Hydrology - Open-File Report 36

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## Ground Water in the Pee Dee Region of South Carolina

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### ABSTRACT

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The Pee Dee Region of South Carolina is underlain by the Peedee, Black Creek, Middendorf, and Cape Fear Formations of Cretaceous age. All four of these formations consist of clastic sand and clay sediments that strike northeast and dip southeast. Crystalline bedrock underlies the sediments.

The units of major hydrologic importance are the Black Creek, Middendorf, and Cape Fear Formations. The Black Creek, which overlies the Middendorf, is utilized more extensively in the downdip portions of the study area, while the Middendorf and Cape Fear are utilized more in the updip areas.

In general, the transmissivity of the Middendorf aquifers is greater than that of the Black Creek aquifers. Subtle trends of increasing transmissivity toward the southwest were noted in both units. Cones of depression (areas of locally depressed hydraulic head) occur at the cities of Florence, Johnsonville, and Marion.

Chemically, the water in the Black Creek aquifers is different from that in the Middendorf aquifers, the former being of a bicarbonate type and the latter characterized by high percentages of sulfate and chloride. Two water-quality problems affecting the area are locally high iron concentration and increased sodium concentration in the downdip part of the Middendorf. A general trend of increased dissolved solids to the southeast (downdip and down-flowpath) was also noted.

Many of the observed water-quality patterns are related to the environments in which the sediments were deposited, because the chemistry of water in marine sediments differs from that of nonmarine sediments. In the Middendorf Formation alone, three depositional zones, nonmarine, transitional, and marine, have been identified in the study area. Evidence suggests that similar zones may exist in the Black Creek.

Future work in the investigation will include the development and implementation of a computer ground-water flow model, refinement of the water-level monitoring network, implementation of a water-quality monitoring network, further delineation of the hydrogeology through the drilling of additional test holes, and investigation into the degree of hydraulic connection among the various geologic formations.

Copies of this report are available in the SCDNR's Columbia office.