

Hydrology - Water Resources Report 5

Hydrogeologic Framework of West-Central South Carolina

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ABSTRACT

A detailed analysis of the hydrologic, geophysical, and core data from wells penetrating the updip Mesozoic-Cenozoic Coastal Plain sequence in west-central South Carolina and adjacent east-central Georgia was made to evaluate ground water movement and contaminant transport potential in a comprehensive regional context.

The classification of the aquifer and confining units utilizes a hierarchy of terms ranked at four levels. Level one is the hydrogeologic province and corresponds generally to the hydrologic systems classification of Miller and Renken (1988). The hydrogeologic province defines major regional rock and/or sediment packages that behave as a single unified hydrologic unit. Level two defines the aquifer and confining systems that transmit or retard ground water movement regionally. Level three, aquifer and confining units, are mappable units more than 400 square miles in area. Level four refers to aquifer and confining zones and differentiates aquifer and confining units on the basis of locally significant hydrogeologic characteristics.

The basement complex is designated the Piedmont hydrogeologic province and consists of Lower Paleozoic-Precambrian igneous and metamorphic rocks and Triassic terrigenous clastics of the Dunbarton basin. Overlying the Piedmont hydrogeologic province is the Southeastern Coastal Plain hydrogeologic province, which consists of unconsolidated sediments of Cretaceous and Tertiary age.

The Southeastern Coastal Plain hydrogeologic province is divided into three aquifer systems; in descending order the Floridan, Dublin, and Midville aquifer systems. The Floridan and Dublin aquifer systems are separated by the Meyers Branch confining system; and the Dublin aquifer system is separated from the underlying Midville aquifer system by the Allendale confining system. Towards the northwest, the Dublin and Midville aquifer systems coalesce, forming the Dublin-Midville aquifer system. Farther northwest the Floridan and Dublin-Midville aquifer systems coalesce, forming the Floridan-Midville aquifer system. The Appleton confining system is at the base of the Southeastern Coastal Plain hydrogeologic province; near the coast the system thickens considerably and contains several aquifers.

The three aquifer systems extend southward from the study area to the coast. The Floridan aquifer system in the study area is the updip clastic equivalent of the carbonate sequence that

constitutes the Floridan aquifer system in coastal South Carolina and Georgia. The Dublin and Midville aquifer systems also extend to the coast. Each aquifer system is subdivided into aquifers and confining units. In site-specific studies, the aquifers and/or confining units may be further subdivided into aquifer zones and confining zones as needed.

A set of comparative chronostratigraphic, lithostratigraphic, and hydrostratigraphic charts and a series of lithostratigraphic and hydrostratigraphic sections, isopachous, and unit-surface maps, potentiometric-surface maps, and well-cluster profiles illustrate the hydrogeologic setting of the study area.

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