

Hydrology Section — Land, Water and Conservation Division

South Carolina Department of Natural Resources

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DNR

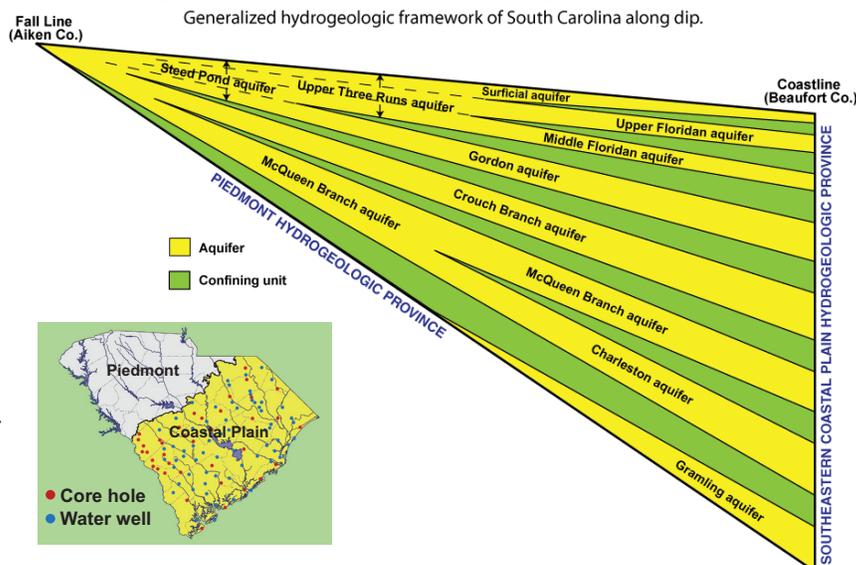
PROJECT: Aquifer Delineation

OBJECTIVE: Delineate, map, and characterize the principal aquifers and confining units of the Coastal Plain

Groundwater is a major source of water for public supply, irrigation, industry, and power generation. The Coastal Plain covers two-thirds of the State yet contains about 95% of its groundwater resources. It consists of layers of unconsolidated sand, clay, and limestone. These layers thicken from zero feet at the Fall Line to as much as 3,800 feet in Beaufort County. Sand and limestone layers are porous and constitute the water-bearing zones called aquifers. Clay layers are relatively impervious and constitute the confining units.

In an ongoing study, DNR is determining the location, depth, and thickness of each aquifer and confining unit of the Coastal Plain by examining data collected from water wells and core holes. Geophysical logs, lithologic and fossil data from cores, and water-level data are used to delineate and map the aquifers and confining units.

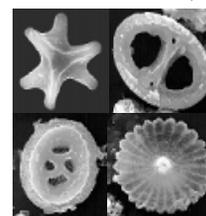
Geophysical logs measure the electrical and nuclear properties of the earth and are used to locate permeable zones in water wells. Cores are cylindrical samples of the earth that provide a wealth of geologic and hydrologic information, such as mineralogy, sediment grain size, and boundaries of the aquifers, confining units, and geologic formations. The photo below shows cores (on the ground) from a well at Swansea Middle School in Lexington County. The drill rig is visible in the background.



Core samples often contain microfossils, which scientists use to determine the age of sediments. This information is used to correlate the aquifers and confining units from one well to another well. The photo to the right shows tiny calcite platelets (magnified thousands of times) that are produced by single-celled, golden-brown algae. The unique shapes of these platelets are used to identify different species, which reveal the age of the sediments.

Water levels measured in monitoring wells help determine if the various layers are hydraulically connected. The photo to the right shows a groundwater monitoring site in Jackson, S.C. that has four wells, each screened in a sand layer at a different depth. Water levels from all four wells are nearly identical, indicating that the sand layers are hydraulically connected.

Using this information, hydrogeologic cross sections and maps are drawn depicting the location, depth, and thickness of the aquifers and confining units of the Coastal Plain.



Selected reports:

SCDNR Water Resources Report 5: *Hydrogeologic framework of west-central South Carolina* (1995) Aadland, R.K., Gellici, J.A., and Thayer, P.A.: http://www.dnr.sc.gov/water/hydro/HydroPubs/Abs_dnr_R05.htm

SCDNR Water Resources Report 42: *Hydrostratigraphy of the ORG-393 core hole at Orangeburg, South Carolina* (2007) Gellici, J.A.: http://www.dnr.sc.gov/water/hydro/HydroPubs/Abs_dnr_R42.htm

SCDNR Water Resources Report 43: *Hydrostratigraphy of the AIK-2448 and AIK-2449 core holes in the Breezy Hill area of Aiken County, South Carolina* (2007) Gellici, J.A.: http://www.dnr.sc.gov/water/hydro/HydroPubs/Abs_dnr_R43.htm

USGS Professional Paper 1773: *Groundwater availability in the Atlantic Coastal Plain of North and South Carolina* (2010) Campbell, B.G. and Coes, A.L., editors: <http://pubs.usgs.gov/pp/1773/>

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