

Potentiometric Surface Maps of the Middendorf, Black Creek, and Floridan Aquifers of South Carolina

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Potentiometric surface maps

Presented here are the most recent potentiometric surface maps developed by the South Carolina Department of Natural Resources (SCDNR) for each of South Carolina's three major aquifers.

The Middendorf, Black Creek, and Floridan aquifers are the three major aquifers of the Coastal Plain of South Carolina and are important sources of water for many public, industrial, and agricultural supplies. In an effort to assess groundwater conditions in these three aquifers and to identify areas where declining water levels may be a concern, the SCDNR regularly maps the potentiometric surface of each aquifer. The potentiometric surface of an aquifer is defined by the elevations at which water stands in tightly cased wells completed in that aquifer.

Potentiometric surface maps are a valuable tool for assessing groundwater conditions throughout the Coastal Plain, as they help to identify areas where excessive pumping has lowered groundwater levels to an extent that groundwater management strategies should be developed and implemented. Comparing maps of the same aquifer created at different times can help indicate regional trends in groundwater levels.

Water-level data used for these maps were collected primarily by the SCDNR, with assistance from the U.S. Department of Energy, the South Carolina Department of Health and Environmental Control, and the U.S. Geological Survey. The boundaries of the aquifers used in these investigations are those defined by Aucott, Davis, and Speiran (1987).

Middendorf aquifer—2011

The potentiometric map of the Middendorf aquifer presented here was constructed by using water levels measured in 136 wells in late 2011. More detailed information about this map and the wells used to construct it can be found in SCDNR Water Resources Report 54 (Hockensmith and others, 2013a).

SCDNR has produced similar potentiometric maps for the Middendorf aquifer for the years 2009, 2004, 2001, and 1996 (see Hockensmith and others, 2013a). Like on previous maps, the 2011 potentiometric surface shows that the generally southeastward groundwater flow is affected by several potentiometric lows. These cones of depression, which have developed because of groundwater pumping in Florence, Williamsburg, Berkeley, and Charleston Counties, are generally consistent in size and depth with how they appeared in 2009.

Black Creek aquifer—2012

The potentiometric map of the Black Creek aquifer was constructed by using water levels measured in 100 wells in late 2012. More detailed information about this map and the wells used to construct it can be found in SCDNR Water Resources Report 55 (Hockensmith and others, 2013b).

SCDNR has produced similar potentiometric maps for the Black Creek aquifer for the years 2009, 2004, 2001, and 1995 (see Hockensmith and others, 2013b). Consistent with the maps produced in those previous years, the potentiometric surface in 2012 shows that the generally southeastward groundwater flow

is affected by several potentiometric lows. The cones of depression that have developed because of groundwater pumping in Georgetown, Florence, and Williamsburg Counties are 25 to 50 feet deeper in 2012 than they were on the 2009 map.

Floridan/Tertiary sand aquifer—2013

The potentiometric map of the Floridan aquifer and its updip clastic equivalent, the Tertiary sand aquifer, was constructed using water levels measured in 212 wells in late 2013. More detailed information about this map and the wells used to construct it can be found in SCDNR Water Resources Report 56 (Wachob and others, 2014).

SCDNR has produced similar potentiometric maps for the Floridan and Tertiary sand aquifers for the years 2010, 2004, 1998, and 1986 (see Wachob and others, 2014). Consistent with previous potentiometric surface maps of the Floridan/Tertiary sand aquifer, the potentiometric surface for late 2013 indicates a generally southeastward groundwater flow, with water levels in Jasper and Beaufort Counties affected by pumping in the Savannah, Ga. area. Unlike earlier maps, however, no significant cones of depression are delineated on the 2013 map.

Of the 158 wells measured for both this map and the previous (2010) map, 104 wells had higher potentiometric levels in 2013, while 31 wells had lower potentiometric levels in 2013. Changes in potentiometric levels from 2010 to 2013 were generally less than 5 feet, although a few wells showed significantly higher water levels, probably owing to reductions in local pumping rates.

References

- Aucott, W.R., Davis, M.E., and Speiran, G.K., 1987, Geohydrologic framework of the Coastal Plain aquifers of South Carolina: U.S. Geological Survey Water-Resources Investigations Report 85-4271, 7 sheets.
- Hockensmith, B.L., Wachob, A., Howard, C.S., and Koch, E., 2013a, Potentiometric surface of the Middendorf aquifer in South Carolina, November 2011: South Carolina Department of Natural Resources, Water Resources Report 54, 1 sheet.
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- Miller, J.A., 1985, Geohydrologic framework of the Floridan aquifer system in Florida, Georgia, and parts of Alabama and South Carolina: U.S. Geological Survey Professional Paper 1403-B, 91 p., 33 plates.
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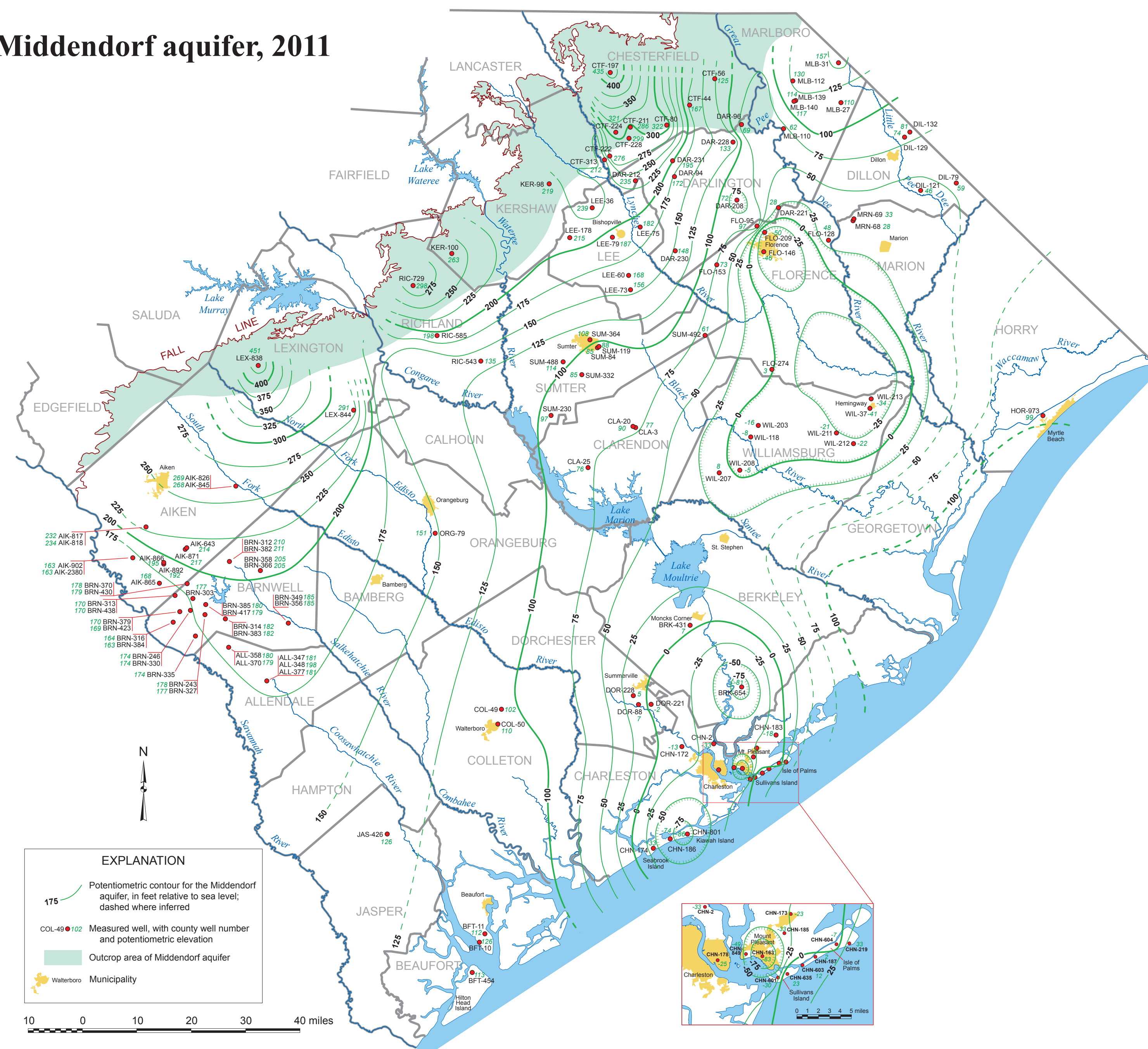
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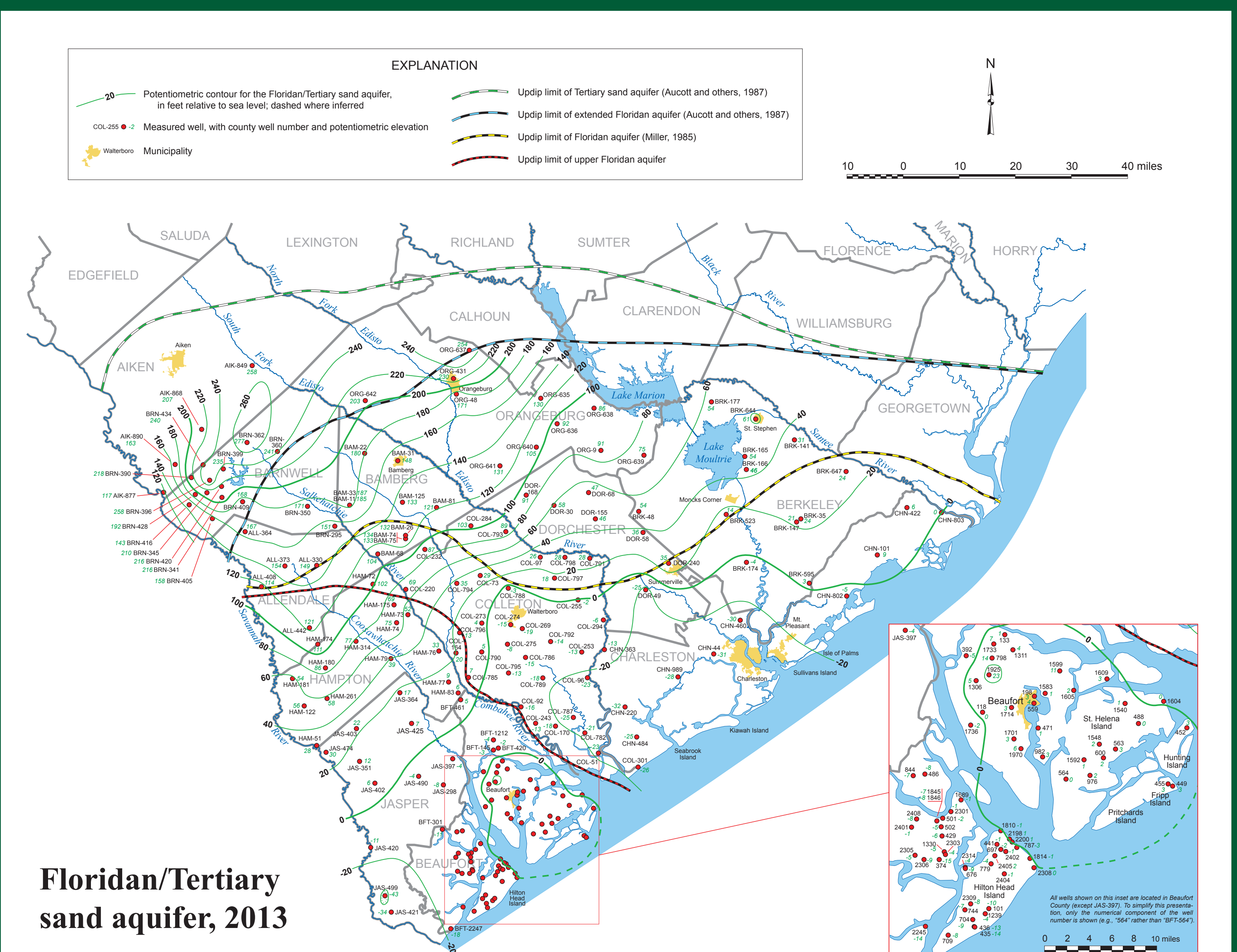
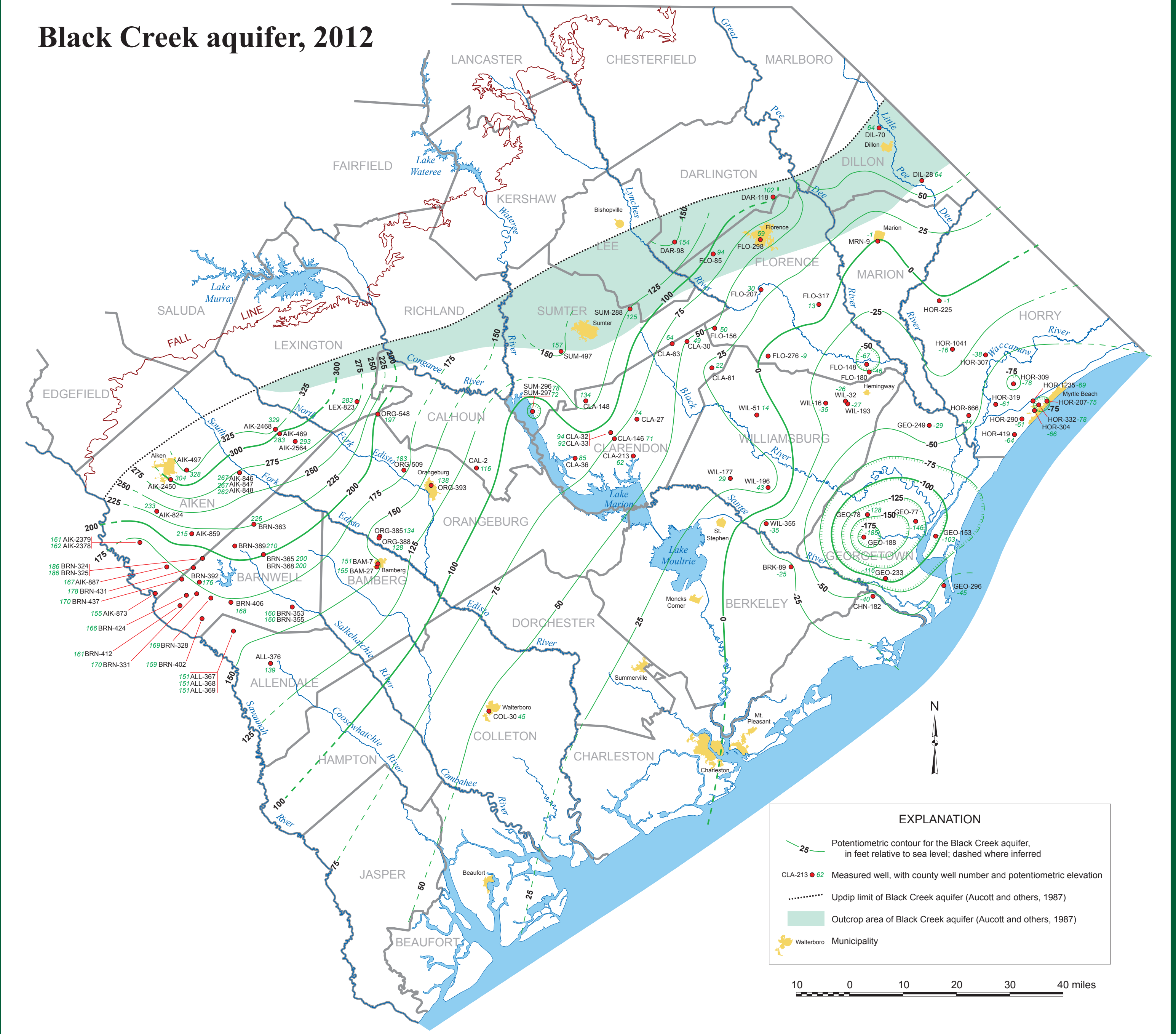
These map reports are available through the SCDNR website:

<http://dnr.sc.gov>

Middendorf aquifer, 2011



Black Creek aquifer, 2012



Floridan/Tertiary sand aquifer, 2013