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Potentiometric Surface of the Black Creek (Crouch Branch) Aquifer in South Carolina, November 2015

by
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The Black Creek aquifer is the source of water for many public, industrial, and agricultural supplies in much of the Coastal Plain of South Carolina. This important water resource is monitored by regularly measuring the nonpumping water level in wells. The potentiometric surface of an aquifer is defined by the elevations at which water stands in tightly cased wells completed in the aquifer.

The boundaries of the Black Creek aquifer used in this investigation are those defined by Aucott, Davis, and Speiran (1987). The Black Creek aquifer is the youngest of the Cretaceous aquifers in the region. It is composed mostly of permeable sediments of the Black Creek Formation (hence its name), but locally it may include sediments from underlying or overlying formations. The aquifer comprises thin- to thick-bedded sand and clay deposited in marginal marine or delta plain environments. The coarsest sand and least clay content are found in the western part of the Coastal Plain. The aquifer crops out in the eastern Coastal Plain along a narrow band extending from Lexington County to Sumter County and along a wider area from Sumter County to Dillon County. It dips southeastward toward the coast. The top of the aquifer is approximately at elevation 300, -300, and -1,000 ft msl (feet, referenced to mean sea level) at Aiken, Myrtle Beach, and Charleston, respectively. Thickness ranges from about 100 ft near Aiken to more than 400 ft at the coast.

The hydrogeologic framework of South Carolina developed by Aucott and others (1987) was revised, first by Aadland and others (1995) for the area near the Savannah River Site, and then by Gellici and Lautier (2010) for the entire South Carolina Coastal Plain. The Black Creek aquifer of Aucott and others (1987) is generally equivalent to the Crouch Branch aquifer of the newer hydrogeologic framework.

The potentiometric map presented here was constructed by using water levels measured in 104 wells in late 2015 (see table). Data were collected by the South Carolina Department of Natural Resources, the Savannah River National Laboratory, the South Carolina Department of Health and Environmental Control, and the U.S. Geological Survey. (Water level data were collected and provided by the Savannah River National Laboratory under Contract No. DE-AC09-08SR22470 with the U.S. Department of Energy.) The authors are grateful for the assistance of these agencies and the cooperation of well owners in obtaining the water-level measurements necessary to produce this map.

Similar maps have been produced for the Black Creek aquifer describing the potentiometric surface in 2012 (Hockensmith and others, 2013), 2009 (Hockensmith, 2012), 2004 (Hockensmith, 2008), 2001 (Hockensmith, 2003), and 1995 (Hockensmith, 1997).

The potentiometric surface of the Black Creek aquifer for November 2015 shows that the generally southeastward groundwater flow is affected by potentiometric lows in the eastern half of the State. Compared to previous potentiometric maps, the 2015 map shows little change in water levels in the western half of the Coastal Plain and in the updip regions of the eastern part of the State. The large cone of depression centered in Georgetown County continues to expand and deepen, and significant water-level declines are also occurring in the Myrtle Beach area of Horry County, probably as a result of increased groundwater pumping associated with golf course irrigation. The potentiometric lows in Georgetown and Horry Counties may lead to saltwater intrusion into the aquifer in these areas.

References

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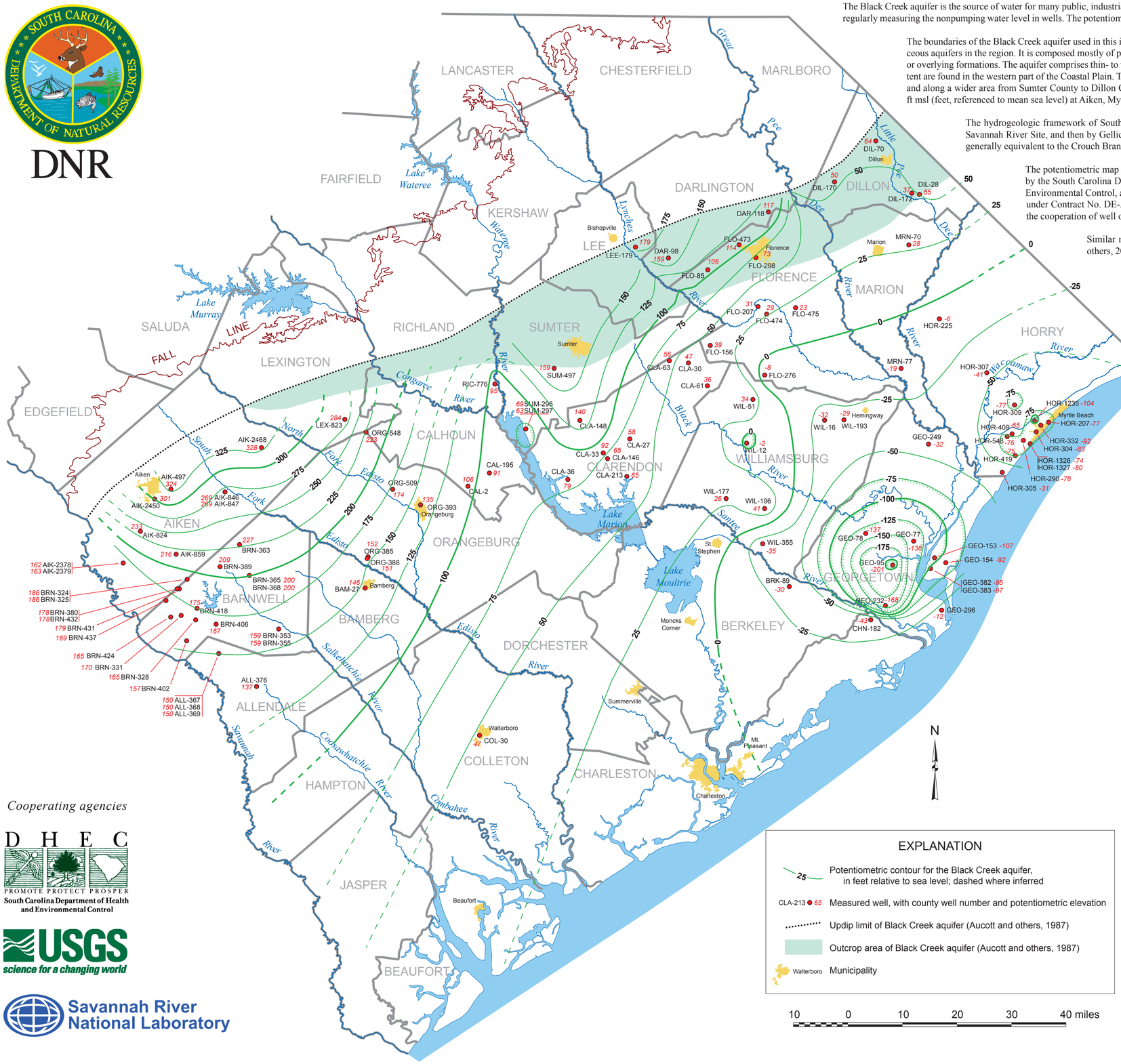

Cooperating agencies

South Carolina Department of Health and Environmental Control

USGS science for a changing world

Savannah River National Laboratory

SCDNR Well ID	Latitude (NAD 83)	Longitude (NAD 83)	2015 WL Elevation (ft NAVD 88)
AIK-497	33.55092	-81.65740	323
AIK-824	33.43784	-81.77030	233
AIK-846	33.54234	-81.48559	269
AIK-847	33.54245	-81.48553	269
AIK-859	33.37739	-81.64069	216
AIK-2378	33.35329	-81.80902	162
AIK-2379	33.35339	-81.80895	163
AIK-2450	33.52489	-81.70869	301
AIK-2468	33.66051	-81.36985	328
ALL-367	33.11339	-81.50602	150
ALL-368	33.11351	-81.50600	150
ALL-369	33.11313	-81.50609	150
ALL-376	33.02489	-81.38481	137
BAM-27	33.28836	-81.04081	146
BRK-89	33.28494	-79.69440	-30
BRN-324	33.31085	-81.60611	186
BRN-325	33.31071	-81.60594	186
BRN-328	33.20253	-81.57787	165
BRN-331	33.21437	-81.62369	170
BRN-353	33.17887	-81.31431	159
BRN-355	33.17896	-81.31437	159
BRN-363	33.40298	-81.43940	227
BRN-365	33.32163	-81.40678	200
BRN-368	33.32148	-81.40682	200
BRN-380	33.28615	-81.63492	178
BRN-389	33.34480	-81.50013	209
BRN-402	33.14697	-81.60732	157
BRN-406	33.19135	-81.51319	167
BRN-418	33.22987	-81.57519	175
BRN-424	33.21104	-81.65739	165
BRN-431	33.28610	-81.62484	179
BRN-432	33.28612	-81.63488	178
BRN-437	33.25323	-81.67243	169
CAL-2	33.55644	-80.71641	106
CAL-195	33.59858	-80.64786	91

SCDNR Well ID	Latitude (NAD 83)	Longitude (NAD 83)	2015 WL Elevation (ft NAVD 88)
CHN-182	33.20098	-79.43516	-43
CLA-27	33.68827	-80.19344	58
CLA-30	33.88542	-80.01019	47
CLA-33	33.65142	-80.27992	92
CLA-36	33.58147	-80.39420	79
CLA-61	33.82599	-79.94917	36
CLA-63	33.89226	-80.07793	56
CLA-146	33.63546	-80.26667	65
CLA-148	33.73825	-80.35829	140
CLA-213	33.58871	-80.20605	65
COL-30	32.89593	-80.67781	47
DAR-98	34.16941	-80.06714	158
DAR-118	34.28821	-79.74672	117
DIL-28	34.32960	-79.26449	55
DIL-70	34.47312	-79.40152	64
DIL-170	34.36335	-79.53416	49
DIL-172	34.33028	-79.28690	37
FLO-85	34.13516	-79.94173	106
FLO-156	33.93322	-79.93951	39
FLO-207	34.03692	-79.78519	31
FLO-276	33.85582	-79.76658	-8
FLO-298	34.17020	-79.78815	73
FLO-473	34.20332	-79.84087	114
FLO-474	34.01725	-79.75446	29
FLO-475	34.03346	-79.66170	23
GEO-77	33.40662	-79.29373	-136
GEO-78	33.42590	-79.45020	-137
GEO-95	33.34015	-79.36215	-201
GEO-153	33.36303	-79.22768	-107
GEO-154	33.35050	-79.19419	-92
GEO-232	33.23595	-79.39252	-168
GEO-249	33.66252	-79.24560	-32
GEO-296	33.22504	-79.20454	-12
GEO-382	33.33580	-79.24458	-95
GEO-383	33.33580	-79.24453	-97

SCDNR Well ID	Latitude (NAD 83)	Longitude (NAD 83)	2015 WL Elevation (ft NAVD 88)
HOR-207	33.71777	-78.85954	-77
HOR-225	33.99861	-79.20389	-6
HOR-290	33.67079	-78.93916	-78
HOR-304	33.69361	-78.89763	-83
HOR-305	33.58643	-79.00870	-31
HOR-307	33.84987	-79.05737	-41
HOR-309	33.76762	-78.96631	-77
HOR-332	33.71184	-78.88526	-92
HOR-409	33.68933	-78.98089	-65
HOR-419	33.62994	-78.96492	-75
HOR-548	33.68128	-78.99569	-76
HOR-1325	33.72111	-78.90306	-104
HOR-1326	33.65721	-78.92680	-74
HOR-1327	33.65709	-78.92686	-79
LEE-179	34.20225	-80.17436	179
LEX-823	33.73578	-81.10539	284
MRN-70	34.19334	-79.29605	28
MRN-77	33.86178	-79.33055	-19
ORG-385	33.36904	-81.03065	152
ORG-388	33.36232	-81.03298	151
ORG-393	33.50826	-80.86494	135
ORG-509	33.55011	-80.95374	174
ORG-548	33.70342	-81.03570	223
RIC-776	33.83714	-80.62544	95
SUM-296	33.71022	-80.53203	69
SUM-297	33.71022	-80.53203	63
SUM-497	33.87416	-80.43776	158
WIL-12	33.67307	-79.82708	-2
WIL-16	33.72701	-79.57423	-32
WIL-51	33.78720	-79.80723	34
WIL-177	33.52482	-79.89203	26
WIL-193	33.73004	-79.50975	-29
WIL-196	33.50031	-79.76979	41
WIL-355	33.40250	-79.77832	-35