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Potentiometric Surface of the Black Creek Aquifer in South Carolina, November 2012

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 levels 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), who delineated the aquifer on the basis of geologic data (primarily geophysical well logs), water-level data, water-chemistry data, and previous investigations. 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 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 potentiometric map presented here was constructed by using water levels measured in 100 wells in late 2012 (see table). Data were collected by the South Carolina Department of Natural Resources, the U.S. Department of Energy, the South Carolina Department of Health and Environmental Control, and the U.S. Geological Survey. Similar maps have been produced for the Black Creek aquifer describing the potentiometric surface in 2009 (Hockensmith, 2012), 2004 (Hockensmith, 2008), 2001 (Hockensmith, 2003), and 1995 (Hockensmith, 1997).

The potentiometric surface of the Black Creek aquifer for November 2012 shows that the generally southeastward groundwater flow is affected by several potentiometric lows. These cones of depression have developed because of groundwater pumping in Georgetown, Florence, and Williamsburg Counties.

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.

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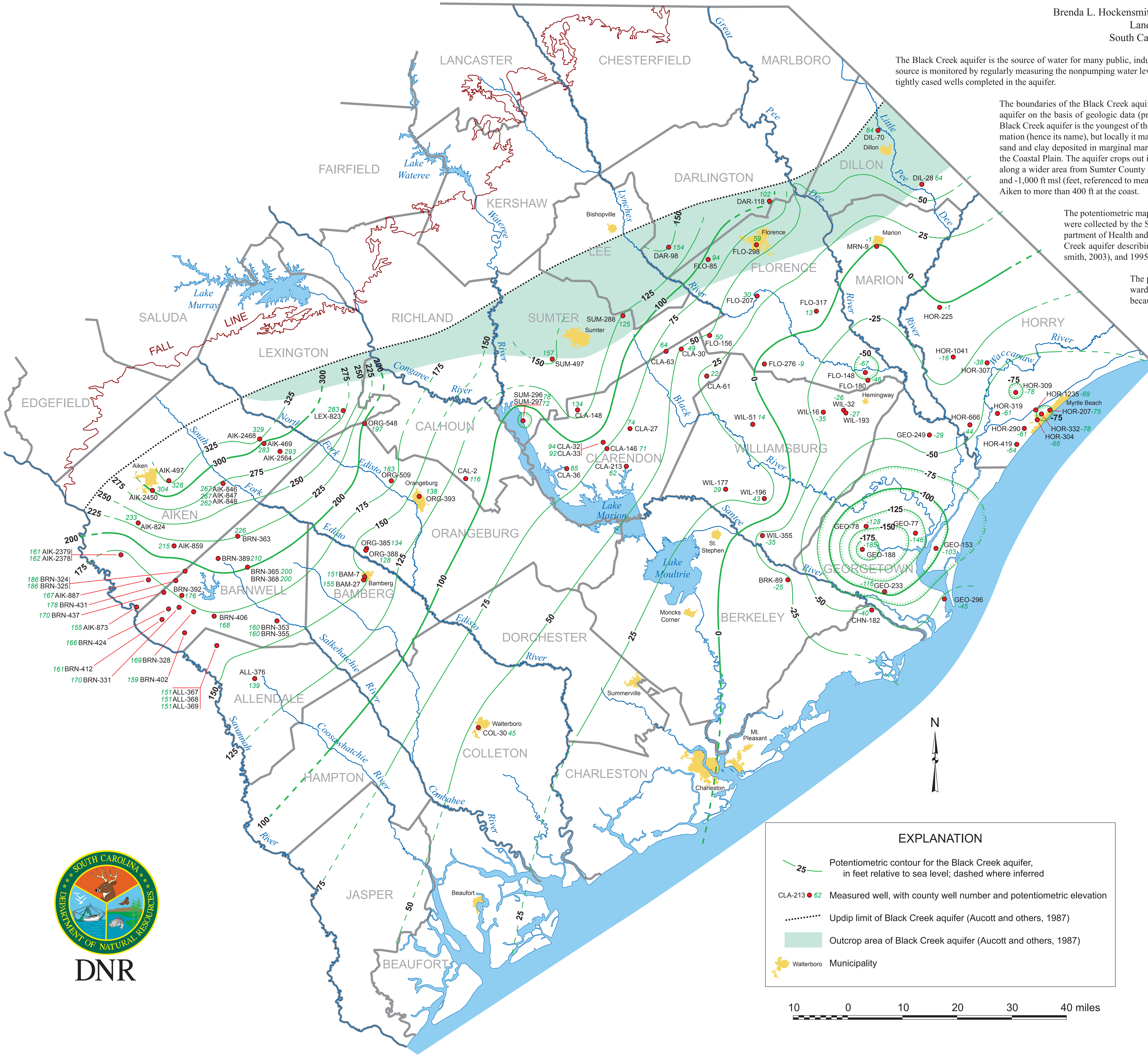

Well ID county number	Well ID grid number	Latitude (decimal degrees)	Longitude (decimal degrees)	Water level elevation (ft msl)
AIK-469	35T-b3	33.64872	-81.35569	283
AIK-497	38U-f1	33.55028	-81.65722	328
AIK-824	40V-s5	33.43778	-81.75417	233
AIK-846	36U-o3	33.54222	-81.48556	267
AIK-847	36U-o4	33.54222	-81.48556	267
AIK-848	36U-o5	33.54222	-81.48556	262
AIK-859	38W-n2	33.37725	-81.64086	215
AIK-873	40Y-k8	33.21438	-81.75898	155
AIK-887	39X-n63	33.28678	-81.72213	167
AIK-2378	40W-q2	33.35250	-81.81000	161
AIK-2379	40W-q3	33.35333	-81.80917	162
AIK-2450	39U-r6	33.52472	-81.70889	304
AIK-2468	35T-c1	33.66053	-81.36981	329
AIK-2564	34T-n6	33.62806	-81.30556	293
ALL-367	37Z-t8	33.11333	-81.50611	151
ALL-368	37Z-t9	33.11361	-81.50556	151
ALL-369	37Z-x10	33.11306	-81.50583	151
ALL-376	35AA-q9	33.02472	-81.38500	139
BAM-7	31X-m3	33.29500	-81.03750	151
BAM-27	31X-m6	33.28694	-81.04111	155
BRK-89	15X-lo1	33.28493	-79.69436	-25
BRN-324	38X-i3	33.31070	-81.60628	186
BRN-325	38X-i4	33.31056	-81.60611	186
BRN-328	37Y-o5	33.20238	-81.57804	169
BRN-331	33Y-m4	33.21422	-81.62386	170
BRN-353	34Y-x5	33.17861	-81.31500	160
BRN-355	34Y-x7	33.17889	-81.31528	160
BRN-363	36W-b1	33.40336	-81.43931	226
BRN-365	35X-e5	33.32083	-81.40778	200
BRN-368	35X-e8	33.32056	-81.40778	200
BRN-389	37W-u8	33.34465	-81.50030	210
BRN-392	38Y-b4	33.24604	-81.61619	176
BRN-402	36Z-i8	33.14682	-81.60749	159
BRN-406	37Y-t4	33.19120	-81.51336	168
BRN-412	39-u4	33.18250	-81.67889	161
BRN-424	38Y-o11	33.21089	-81.65756	166
BRN-431	38X-n59	33.28595	-81.63501	178
BRN-437	39X-u8	33.25308	-81.67260	170
CAL-2	27U-q2	33.55639	-80.71778	116
CHN-182	12Y-l1	33.20106	-79.43525	-40
CLA-27	21S-s1	33.68825	-80.19344	74
CLA-30	19Q-i3	33.88544	-80.01008	49
CLA-32	22T-b1	33.65175	-80.28008	94
CLA-33	22T-b2	33.65147	-80.27997	92
CLA-36	23U-d1	33.58147	-80.39419	85
CLA-61	18R-b1	33.82600	-79.94919	22
CLA-63	19Q-f1	33.89231	-80.07792	64
CLA-146	22T-i1	33.63544	-80.26672	71
CLA-148	23S-b2	33.73828	-80.35828	134
CLA-213	21T-w4	33.58872	-80.20608	62

Well ID county number	Well ID grid number	Latitude (decimal degrees)	Longitude (decimal degrees)	Water level elevation (ft msl)
COL-30	27CC-j1	32.89583	-80.67778	45
DAR-98	19M-y2	34.16944	-80.06722	154
DAR-118	15L-o3	34.28806	-79.74694	102
DIL-28	10L-a1	34.32944	-79.26472	64
DIL-70	11J-f1	34.47306	-79.40139	64
FLO-85	18I-i1	34.13500	-79.94194	94
FLO-148	12R-b3	33.83111	-79.44444	-67
FLO-156	18P-v1	33.93306	-79.93972	50
FLO-180	12R-i1	33.81028	-79.43944	-46
FLO-207	16O-m2	34.03611	-79.78889	30
FLO-276	16Q-s2	33.85611	-79.76667	-9
FLO-298	16M-w6	34.17222	-79.78889	59
FLO-317	14P-b1	33.99444	-79.60139	13
GEO-77	10W-c1	33.40417	-79.29306	-146
GEO-78	12V-v1	33.42389	-79.44917	-128
GEO-153	9W-q2	33.36333	-79.22833	-103
GEO-188	12W-r1	33.36194	-79.46167	-185
GEO-233	11Y-e3	33.24972	-79.39222	-116
GEO-249	9T-e1	33.66278	-79.24639	-29
GEO-296	9Y-h2	33.22750	-79.20500	-45
HOR-207	5S-i1	33.71777	-78.85954	-75
HOR-225	9P-c2	33.99861	-79.20389	-1
HOR-290	6S-v2	33.67056	-78.93972	-61
HOR-304	5S-q2	33.69361	-78.89763	-66
HOR-307	7Q-x2	33.84944	-79.05750	-38
HOR-309	6R-q3	33.76861	-78.96750	-78
HOR-319	7S-l1	33.71222	-79.02389	-61
HOR-332	5S-n2	33.71184	-78.88526	-78
HOR-419	6T-m1	33.62994	-78.96492	-64
HOR-666	8S-r4	33.68800	-79.11840	-44
HOR-1041	8Q-p2	33.86492	-79.16356	-16
HOR-1235	5S-f4	33.72139	-78.90278	-69
LEX-823	32S-b3	33.73578	-81.10542	283
MRN-9	11M-p2	34.16583	-79.40833	-1
ORG-385	31W-l6	33.36889	-81.03083	134
ORG-388	31W-s3	33.36361	-81.03417	128
ORG-393	29U-v1	33.50833	-80.86500	138
ORG-509	30U-h1	33.55011	-80.95381	183
ORG-548	31S-r1	33.70342	-81.03572	197
SUM-288	21P-c3	33.98583	-80.21333	125
SUM-296	25S-l1	33.71056	-80.53222	78
SUM-297	25S-l2	33.71056	-80.53222	72
SUM-497	24Q-l2	33.87444	-80.43778	157
WIL-16	13-h1	33.72667	-79.58139	-35
WIL-32	13S-i1	33.73083	-79.51722	-26
WIL-51	16R-n2	33.69639	-79.80722	14
WIL-177	17U-q1	33.52481	-79.89211	29
WIL-193	13S-j2	33.72167	-79.51000	-27
WIL-196	16U-v1	33.49889	-79.77028	43
WIL-355	16W-b2	33.40252	-79.77831	-35