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Potentiometric Surface of the Middendorf Aquifer in South Carolina, November 2011

by
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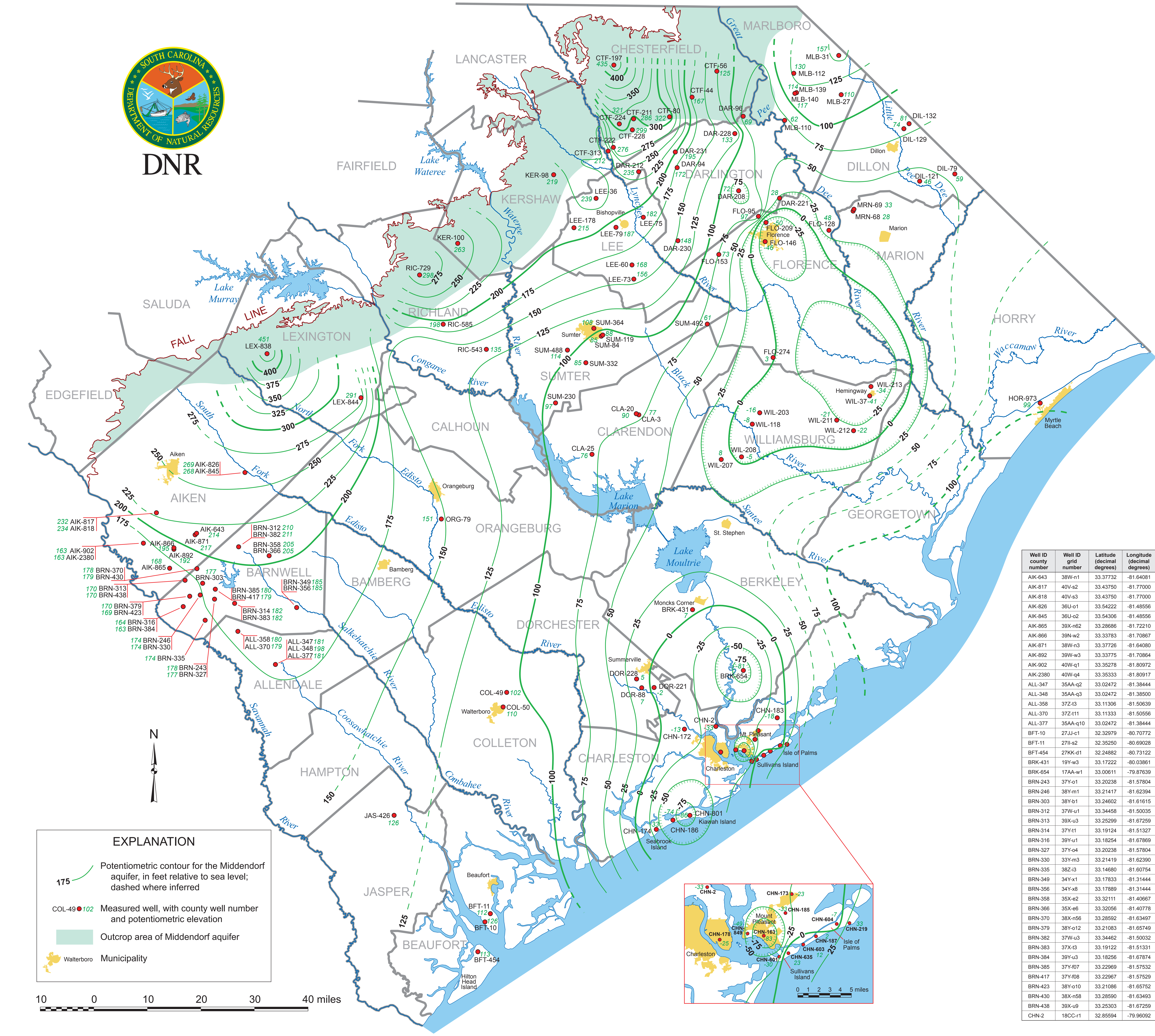

The Middendorf aquifer is the source of water for many public, industrial, and agricultural supplies in the Coastal Plain of South Carolina. This important water resource is monitored by regularly measuring the nonpumping water levels in wells. The potentiometric surface of an aquifer is defined by the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

The boundaries of the Middendorf 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 Middendorf Formation is between the Black Creek Formation and the Cape Fear Formation, the latter being the oldest of the Cretaceous formations in the region. The Middendorf aquifer is composed mostly of permeable sediments of the Middendorf Formation (hence its name), but locally it includes sediment from underlying or overlying formations. In the updip areas, the aquifer is composed of sand interbedded with clay lenses deposited in an upper delta plain environment. Toward the coast, the aquifer is composed of thin- to thick-bedded sand and clay that were deposited in marginal marine or lower delta plain environments. In general, the Middendorf aquifer has coarser sand and less clay in the western part of the Coastal Plain than in the eastern part. The Middendorf crops out along the Fall Line from Chesterfield County to Edgefield County, except for some areas in Aiken County where it is not exposed. Its outcrop is narrowest in southwestern Edgefield County and widest in Chesterfield County. The aquifer dips southeastward near the Fall Line and southward along the coast. The top of the aquifer is at elevation 100, -800, and -1,700 ft msl (feet, referenced to mean sea level) at Aiken, Myrtle Beach, and Charleston, respectively. Thickness ranges from 0 ft at the Fall Line to more than 300 ft in Dorchester County.

The potentiometric map presented here was constructed by using water levels measured in 136 wells in late 2011 (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 Middendorf aquifer describing the potentiometric surface in 2009 (Hockensmith, 2012), 2004 (Hockensmith, 2008), 2001 (Hockensmith, 2003), and 1995 (Hockensmith and Waters, 1998).

The potentiometric surface of the Middendorf aquifer for November 2011 shows that the generally southeastward groundwater flow is affected by several potentiometric lows. These cones of depression have developed because of groundwater pumping in Florence and Williamsburg Counties and Berkeley and Charleston 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.

Hockensmith, B.L., 2003, Potentiometric surface of the Middendorf aquifer in South Carolina, November 2001: South Carolina Department of Natural Resources, Water Resources Report 28, 1 sheet.

——— 2008, Potentiometric surface of the Middendorf aquifer in South Carolina, November 2004: South Carolina Department of Natural Resources, Water Resources Report 46, 11 p., 1 plate.

——— 2012, Potentiometric surface of the Middendorf aquifer in South Carolina, November 2009: South Carolina Department of Natural Resources, Water Resources Report 51, 11 p., 1 plate.

Hockensmith, B.L., and Waters, K.E., 1998, Potentiometric surface of the Middendorf aquifer in South Carolina, November 1996: South Carolina Department of Natural Resources, Water Resources Report 19, 1 sheet.

Revised in April 2014 to correct an erroneous water level elevation for BRK-431; consequently, some potentiometric contours in the Berkeley County area also were revised.

Well ID county number	Well ID grid number	Latitude (decimal degrees)	Longitude (decimal degrees)	Water level elevation (ft msl)	Remarks
AIK-643	38W-n1	33.37732	-81.64081	214	
AIK-817	40V-s2	33.43750	-81.77000	232	
AIK-818	40V-s3	33.43750	-81.77000	234	
AIK-826	36U-o1	33.54222	-81.48556	269	
AIK-845	36U-o2	33.54306	-81.48556	268	
AIK-865	39X-n62	33.28686	-81.72210	168	
AIK-866	39N-w2	33.33783	-81.70867	195	
AIK-871	38W-n3	33.37726	-81.64080	217	
AIK-892	39W-w3	33.33775	-81.70864	192	
AIK-902	40W-q1	33.35278	-81.80972	163	
AIK-2380	40W-q4	33.35333	-81.80917	163	
ALL-347	35AA-q2	33.02472	-81.38444	181	
ALL-348	35AA-q3	33.02472	-81.38500	198	
ALL-358	37Z-t3	33.11306	-81.50639	180	
ALL-370	37Z-t11	33.11333	-81.50556	179	
ALL-377	35AA-q10	33.02472	-81.38444	181	
BFT-10	27JJ-c1	32.32979	-80.70772	126	
BFT-11	27II-s2	32.35250	-80.69028	112	
BFT-454	27KK-d1	32.24882	-80.73122	113	
BRK-431	19Y-w3	33.17222	-80.03861	7	
BRK-654	17AA-w1	33.00611	-79.87639	-81	1
BRN-243	37Y-o1	33.20238	-81.57804	178	
BRN-246	38Y-m1	33.21417	-81.62394	174	
BRN-303	38Y-b1	33.24602	-81.61615	177	
BRN-312	37W-u1	33.34458	-81.50035	210	
BRN-313	39X-u3	33.25299	-81.67259	170	
BRN-314	37Y-t1	33.19124	-81.51327	182	
BRN-316	39Y-u1	33.18254	-81.67869	164	
BRN-327	37Y-o4	33.20238	-81.57804	177	
BRN-330	33Y-m3	33.21419	-81.62390	174	
BRN-335	38Z-i3	33.14680	-81.60754	174	
BRN-349	34Y-x1	33.17833	-81.31444	185	
BRN-356	34Y-x8	33.17889	-81.31444	185	
BRN-358	35X-e2	33.32111	-81.40667	205	
BRN-366	35X-e6	33.32056	-81.40778	205	
BRN-370	38X-n56	33.28592	-81.63497	178	
BRN-379	38Y-o12	33.21083	-81.65749	170	
BRN-382	37W-u3	33.34462	-81.50032	211	
BRN-383	37X-t3	33.19122	-81.51331	182	
BRN-384	39Y-u3	33.18256	-81.67874	163	
BRN-385	37Y-f07	33.22969	-81.57532	180	
BRN-417	37Y-f08	33.22967	-81.57529	179	
BRN-423	38Y-o10	33.21086	-81.65752	169	
BRN-430	38X-n58	33.28590	-81.63493	179	
BRN-438	39X-u9	33.25303	-81.67259	170	
CHN-2	18CC-r1	32.85594	-79.96092	-33	
CHN-163	17DD-m5	32.78819	-79.87186	-83	
CHN-172	19CC-x1	32.84722	-80.06478	-13	
CHN-173	16CC-y1	32.84362	-79.82678	-23	
CHN-174	20GG-e1	32.57639	-80.15997	-33	
CHN-178	18DD-l3	32.78481	-79.94786	-25	
CHN-183	16CC-k1	32.87764	-79.76550	-18	
CHN-185	17DD-a4	32.82053	-79.83706	-33	
CHN-186	20FF-v1	32.60275	-80.10586	-74	
CHN-187	16DD-m2	32.78735	-79.78808	2	
CHN-219	15DD-f1	32.80489	-79.73388	33	
CHN-601	17DD-u7	32.75966	-79.84881	-30	
CHN-603	16DD-q2	32.77697	-79.80981	12	
CHN-604	16DD-j1	32.80259	-79.75481	-7	
CHN-635	16DD-y3	32.76476	-79.83277	23	
CHN-801	19FF-q1	32.61447	-80.05253	-86	
CHN-849	17DD-n1	32.79173	-79.89866	-49	
CLA-3	21S-r2	33.69694	-80.20500	77	
CLA-20	21S-m1	33.69972	-80.21361	90	
CLA-25	23T-u1	33.59408	-80.35486	76	2
COL-49	26BB-n2	32.95067	-80.63464	102	
COL-50	26CC-d1	32.91177	-80.64726	110	
CTF-44	19I-i1	34.56319	-80.03119	167	
CTF-56	18H-l8	34.62678	-79.94067	125	
CTF-80	20I-v1	34.50800	-80.10261	322	
CTF-197	22H-b1	34.65194	-80.27889	435	
CTF-211	21I-x1	34.50639	-80.21833	286	
CTF-222	22J-v2	34.42889	-80.28278	276	
CTF-224	22J-a1	34.49156	-80.26497	321	
CTF-228	21J-g2	34.47461	-80.22211	299	
CTF-313	22J-x3	34.41675	-80.30059	212	
DAR-94	19K-o2	34.37194	-80.07333	172	
DAR-96	17I-v3	34.50583	-79.85611	69	
DAR- 208	17L-h8	34.30750	-79.87639	72	
DAR-212	21K-s1	34.36083	-80.19472	235	
DAR-221	15L-o4	34.28806	-79.74167	28	
DAR-228	17J-m1	34.45889	-79.88000	133	
DAR-230	19M-y3	34.17306	-80.07056	148	
DAR-231	19K-e1	34.41528	-80.08194	195	
DIL-79	9K-u4	34.34556	-79.16781	59	
DIL-121	10L-c2	34.32860	-79.28390	46	
DIL-129	10J-f4	34.46853	-79.33158	74	
DIL-132	10S-g2	34.48264	-79.31456	81	
DOR-88	21BB-m3	32.95971	-80.20160	7	
DOR-221	20BB-o4	32.96032	-80.16283	-2	
DOR-228	21BB-d1	32.98367	-80.21844	5	
FLO-95	16M-d3	34.23694	-79.81306	97	
FLO-128	13M-p3	34.19556	-79.58056	48	
FLO-146	16M-w1	34.16986	-79.78806	-46	
FLO-153	18N-i2	34.13675	-79.93911	73	1
FLO-209	16M-h2	34.21969	-79.78811	-50	3
FLO-274	16Q-s1	33.85556	-79.76639	3	
HOR-973	5S-f1	33.72139	-78.90278	99	4
JAS-426	30FF-o2	33.61833	-80.99528	126	
KER-98	24K-q1	34.35417	-80.47833	219	
KER-100	28M-w1	34.16833	-80.79444	263	
LEE-36	23L-k1	34.29028	-80.34167	239	
LEE-60	21N-q1	34.11000	-80.22611	168	
LEE-73	21O-d1	34.07147	-80.22056	156	
LEE-75	21M-k1	34.23500	-80.18444	182	
LEE-79	22M-l1	34.21111	-80.27361	187	
LEE-178	23M-o1	34.20981	-80.41258	215	
LEX-838	35Q-o3	33.86806	-81.40722	451	
LEX-844	32S-b4	33.74611	-81.10750	291	
MLB-27	13I-h1	34.56333	-79.53528	110	
MLB-31	13G-w1	34.66889	-79.54333	157	
MLB-110	15J-d2	34.49306	-79.71944	62	
MLB-112	15H-l2	34.62083	-79.68750	130	
MLB-139	15I-a1	34.56778	-79.67944	114	3
MLB-140	15I-i1	34.56611	-79.68583	117	
MRN-68	13M-a1	34.24681	-79.50017	28	
MRN-69	12L-y1	34.25114	-79.49739	33	
ORG-79	29V-v1	33.41250	-80.84806	151	
RIC-543	27Q-m1	33.87500	-80.70250	135	
RIC-585	29P-t4	33.94889	-80.84083	198	
RIC-729	30O-a4	34.08278	-80.91722	298	
SUM-84	22Q-e1	33.91639	-80.32444	85	
SUM-119	22P-y2	33.91750	-80.32111	88	
SUM-230	24S-d2	33.73694	-80.46944	97	
SUM-332	23Q-w1	33.84444	-80.37556	85	
SUM-364	23P-t27	33.93639	-80.34944	108	
SUM-488	24Q-l1	33.87444	-80.43778	114	
SUM-492	19P-q3	33.94556	-79.98000	61	
WIL-37	12S-c1	33.74766	-79.45121	-41	1
WIL-118	17S-u1	33.67258	-79.83622	-8	
WIL-203	16S-n6	33.70434	-79.81331	-16	
WIL-207	18U-b1	33.57657	-79.93646	8	
WIL-208	17T-w1	33.58363	-79.87092	-5	
WIL-211	13S-x1	33.68158	-79.55713	-21	
WIL-212	13T-a5	33.65364	-79.50206	-22	
WIL-213	12R-s1	33.77289	-79.44783	-34	

Remarks:
1. Well interference
2. Possible well interference
3. Recovering
4. Measured April 2011.