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Potentiometric Surface of the Crouch Branch Aquifer in South Carolina, November–December 2020

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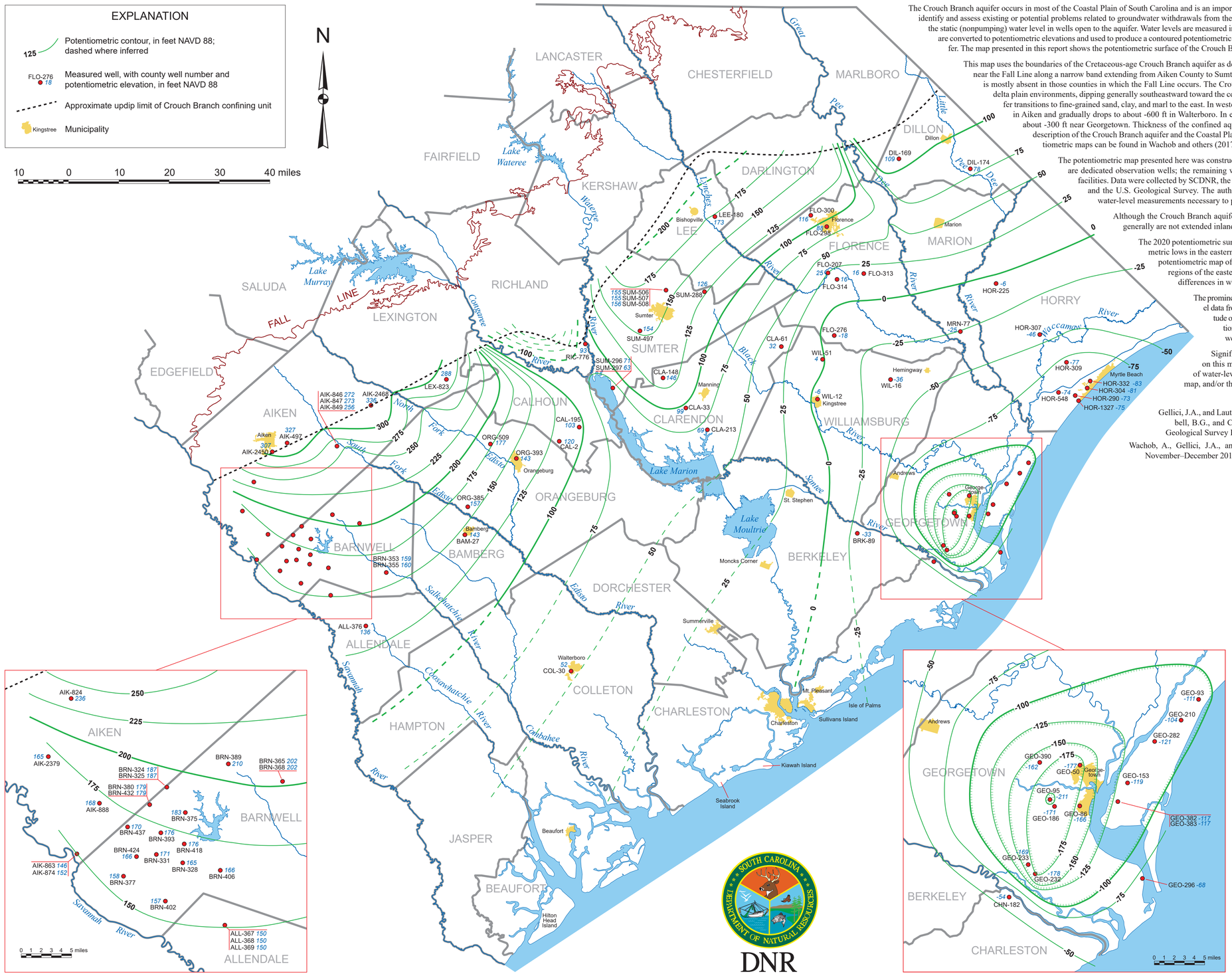

The Crouch Branch aquifer occurs in most of the Coastal Plain of South Carolina and is an important source of groundwater for public-supply, industrial, agricultural, and domestic uses in the State. To help identify and assess existing or potential problems related to groundwater withdrawals from the Crouch Branch aquifer, the South Carolina Department of Natural Resources (SCDNR) routinely measures the static (nonpumping) water level in wells open to the aquifer. Water levels are measured in numerous wells located throughout the aquifer at about the same time, and those water-level measurements are converted to potentiometric elevations and used to produce a contoured potentiometric surface map, which shows the elevation where water would stand in tightly cased wells completed in the aquifer. The map presented in this report shows the potentiometric surface of the Crouch Branch aquifer as determined by SCDNR based on water-levels measured in November and December 2020.

This map uses the boundaries of the Cretaceous-age Crouch Branch aquifer as defined by Gellici and Lautier (2010). The aquifer occurs throughout most of the Coastal Plain and crops out near the Fall Line along a narrow band extending from Aiken County to Sumter County and along a wider area from Sumter County to Dillon County. The Crouch Branch confining unit is mostly absent in those counties in which the Fall Line occurs. The Crouch Branch aquifer comprises thin- to thick-bedded quartz sand and clay, deposited in marginal marine or delta plain environments, dipping generally southeastward toward the coast. The coarsest sand and least clay content are found in the western part of the Coastal Plain, and the aquifer transitions to fine-grained sand, clay, and marl to the east. In western South Carolina, the elevation of the top of the aquifer is approximately 350 ft (feet) (relative to sea level) in Aiken and gradually drops to about -600 ft in Walterboro. In eastern South Carolina, the elevation of the aquifer top is approximately 100 ft near Florence and drops to about -300 ft near Georgetown. Thickness of the confined aquifer ranges from less than 100 ft in Aiken County to more than 400 ft along the coast. A more thorough description of the Crouch Branch aquifer and the Coastal Plain hydrogeologic framework, as well as a listing of previous Crouch Branch and Black Creek aquifer potentiometric maps can be found in Wachob and others (2017).

The potentiometric map presented here was constructed by using water levels measured in 91 wells in late 2020 (see table). Slightly more than half these wells are dedicated observation wells; the remaining wells are privately-owned production wells that serve public-supply systems and agricultural or industrial facilities. Data were collected by SCDNR, the Savannah River National Laboratory, the South Carolina Department of Health and Environmental Control, and the U.S. Geological Survey. 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.

Although the Crouch Branch aquifer extends almost to the Fall Line everywhere in South Carolina, the potentiometric contours on this map generally are not extended inland beyond the approximate limit of the Crouch Branch confining unit.

The 2020 potentiometric surface of the Crouch Branch aquifer shows a general southeastwardly groundwater flow affected by potentiometric lows in the eastern half of the State. Compared to the 2016 map (Wachob and others, 2017), which is the most recent previous potentiometric map of this aquifer, only minor changes in water level are seen in the western half of the Coastal Plain and in updip regions of the eastern part of the State, and contours in the eastern half of the state have shifted somewhat primarily because of differences in which wells were used to construct the two maps.

The prominent cone of depression centered in Georgetown County continues to deepen and expand. The inclusion of water-level data from six wells in eastern Georgetown County not used on earlier maps helped to better define the extent and magnitude of this cone, which appears to extend farther northward along the coast than previously mapped. The ongoing potentiometric decline in Georgetown County is confirmed by continuously measured water-level data from monitoring wells in that area, which show declines of about 2 ft per year in the Crouch Branch aquifer.

Significant cones of depression seen on earlier maps (such as near the cities of Florence and Marion) do not appear on this map, and the existence of those potentiometric lows is uncertain. This discrepancy may be caused by a lack of water-level data near the sites of those previously identified cones, the measurement of different wells from map to map, and/or the inclusion of wells not currently thought to be open to the Crouch Branch aquifer on older maps.

References

Gellici, J.A., and Lautier, J.C., 2010, Hydrogeologic framework of the Atlantic Coastal Plain, North and South Carolina, *in* Campbell, B.G., and Coes, A.L., eds., Groundwater availability in the Atlantic Coastal Plain of North and South Carolina: U.S. Geological Survey Professional Paper 1773, p. 49–162.

Wachob, A., Gellici, J.A., and Czwartacki, B., 2017, Potentiometric surface maps of the South Carolina Coastal Plain Aquifers, November–December 2016: South Carolina Department of Natural Resources, Water Resources Report 60, 35 p., 3 plates.

SCDNR Well ID	2020 potentiometric elevation (ft NAVD88)	2020 water level (ft)*	Change in water level (ft) since 2016**
AIK-497	327	169	2
AIK-824	236	183	2
AIK-846	272	25	4
AIK-847	273	26	4
AIK-849	256	42	1
AIK-863	146	5	3
AIK-874	152	-1	2
AIK-888	168	96	11
AIK-2379	165	59	1
AIK-2450	307	181	6
AIK-2468	336	148	5
ALL-367	150	95	0
ALL-368	150	95	0
ALL-369	150	91	0
ALL-376	136	145	-2
BAM-27	143	6	-2
BRK-89	-33	68	0
BRN-324	187	106	1
BRN-325	187	106	1
BRN-328	165	83	0
BRN-331	171	81	1
BRN-353	159	47	0
BRN-355	160	47	1
BRN-365	202	61	0
BRN-368	202	62	0
BRN-375	183	103	-1
BRN-377	158	24	-1
BRN-380	179	94	1
BRN-389	210	121	1
BRN-393	176	120	1
BRN-402	157	49	0
BRN-406	166	48	0
BRN-418	176	137	1
BRN-424	166	98	1
BRN-432	179	94	1
BRN-437	170	125	2
CAL-2	120	51	13
CAL-195	103	84	8
CHN-182	-54	63	-6
CLA-33	99	53	3
CLA-61	32	64	11
CLA-148	146	38	3
CLA-213	69	33	3
COL-30	52	8	4
DIL-169	109	5	0

SCDNR Well ID	2020 potentiometric elevation (ft NAVD88)	2020 water level (ft)*	Change in water level (ft) since 2016**
DIL-174	78	4	0
FLO-207	25	56	5
FLO-276	-18	95	4
FLO-298	88	19	-29
FLO-300	116	17	n/a
FLO-313	16	90	n/a
FLO-314	16	63	n/a
GEO-50	-177	192	n/a
GEO-86	-166	196	n/a
GEO-93	-111	130	n/a
GEO-95	-211	226	-13
GEO-153	-119	136	-10
GEO-186	-171	198	n/a
GEO-210	-104	119	n/a
GEO-232	-178	198	-35
GEO-233	-169	191	2
GEO-282	-121	147	-7
GEO-296	-68	73	-15
GEO-382	-117	126	-12
GEO-383	-117	126	-17
GEO-390	-162	180	n/a
HOR-225	-6	108	-3
HOR-290	-73	94	5
HOR-304	-81	100	1
HOR-307	-46	72	-4***
HOR-309	-77	118	3
HOR-332	-83	107	0
HOR-548	-74	90	11
HOR-1327	-75	91	7
LEE-180	173	24	0
LEX-823	288	17	2
MRN-77	-25	58	-3
ORG-385	157	15	22
ORG-393	143	114	6
ORG-509	177	22	6
RIC-776	93	57	6
SUM-288	126	18	4
SUM-296	71	87	1
SUM-297	63	94	7
SUM-497	154	23	-2
SUM-506	155	11	n/a
SUM-507	155	10	n/a
SUM-508	156	10	n/a
WIL-12	-6	69	-3
WIL-16	-36	88	-5
WIL-51	4	68	-4

* *Depth to water from land surface. Negative value indicates flowing well.*
** *Change in water level from measurement made for 2016 potentiometric map. Positive number indicates higher water level in 2020.*
*** *Change in water level from measurement made for 2015 potentiometric map.*