South Carolina Department of Natural Resources
Land, Water and Conservation Division
Water Resources Report 67
2022

Potentiometric Surface of the Upper and Middle Floridan Aquifers in South Carolina, November–December 2021

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The Upper Floridan and Middle Floridan aquifers are the source of water for many public, industrial, and agricultural supplies in the southwestern portion of the South Carolina Coastal Plain. To help identify and assess existing or potential problems related to groundwater withdrawals from the aquifers, the South Carolina Department of Natural Resources (SCDNR) routinely measures the static (nonpumping) water level in wells open to the aquifers. Water levels are measured in numerous wells located throughout the aquifers, 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.

This map uses the boundaries of the Paleogene-age Upper and Middle Floridan aquifers as defined by Aadland and others (1995) and Gellici and Lautier (2010). In the updip areas (Aiken and Barnwell Counties), the Upper and Middle Floridan aquifers are generally hydraulically connected and were mapped at the Savannah River Site (SRS) as a single aquifer–the Upper Three Runs aquifer–which is the (unconfined) water table aquifer at SRS (Aadland and others 1995). For this map, the Upper Three Runs aquifer is treated as part of the Upper and Middle Floridan aquifers. The lowermost portion of the Upper Three Runs aquifer at SRS in Aiken County is mapped as the Steed Pond aquifer, and wells completed in the middle to upper portions of the Steed Pond are included in this map. Unconfined portions of the Upper and Middle Floridan aquifers are indicated with green and yellow shading, respectively. A more thorough description of these updip regions can be found in Wachob and others (2017).

The November–December 2021 potentiometric surface map for the Upper and Middle Floridan aquifers were constructed from water levels collected at 133 wells. Of that total, 78 wells are open to or screened in the Upper Floridan, 51 are open to or screened in the Middle Floridan, three are open to both the Upper and Middle Floridan aquifers, and one is open to the Upper and Middle Floridan and Gordon aquifers. To account for water level fluctuations due to tide in wells close to the coast, tidal correction factors were applied to 22 Upper Floridan aquifer measurements.

Potentiometric elevations ranged from a high of 278 feet in Barnwell County to a low of -37 feet in southern Jasper County. Groundwater flow is generally toward the southeast. Although no significant cones of depression are indicated, the potentiometric low near Savannah, Georgia continues to impact water levels and the groundwater flow direction in southern Beaufort and Jasper Counties. No significant changes were observed from the 2018 map (Czwartacki and others, 2019).

In Beaufort County, water levels north of the Broad River were generally slightly above sea level, while south of the Broad River water levels were below sea level, decreasing steadily toward the southwest. Saltwater intrusion is a chronic problem in wells close to the coast that have water levels at or below sea level.

At SRS, in Aiken and Barnwell Counties, a potentiometric high creates a local groundwater divide. West of the divide, groundwater flow is directed toward the Savannah River; east of the divide, flow is directed towards the Edisto River. This groundwater flow pattern likely results from the absence of a confining layer above the aquifer, allowing groundwater to flow as an unconfined water table, and there is likely some connection between groundwater and surface water systems in this area.

Acknowledgements

Water level measurements were collected by SCDNR, Savannah River National Laboratory, South Carolina Department of Health and Environmental Control, and U.S. Geological Survey. The authors are grateful for the participation of these cooperating agencies and for the cooperation of the many well owners who provided the access to their wells needed to obtain the water level measurements used for this map.

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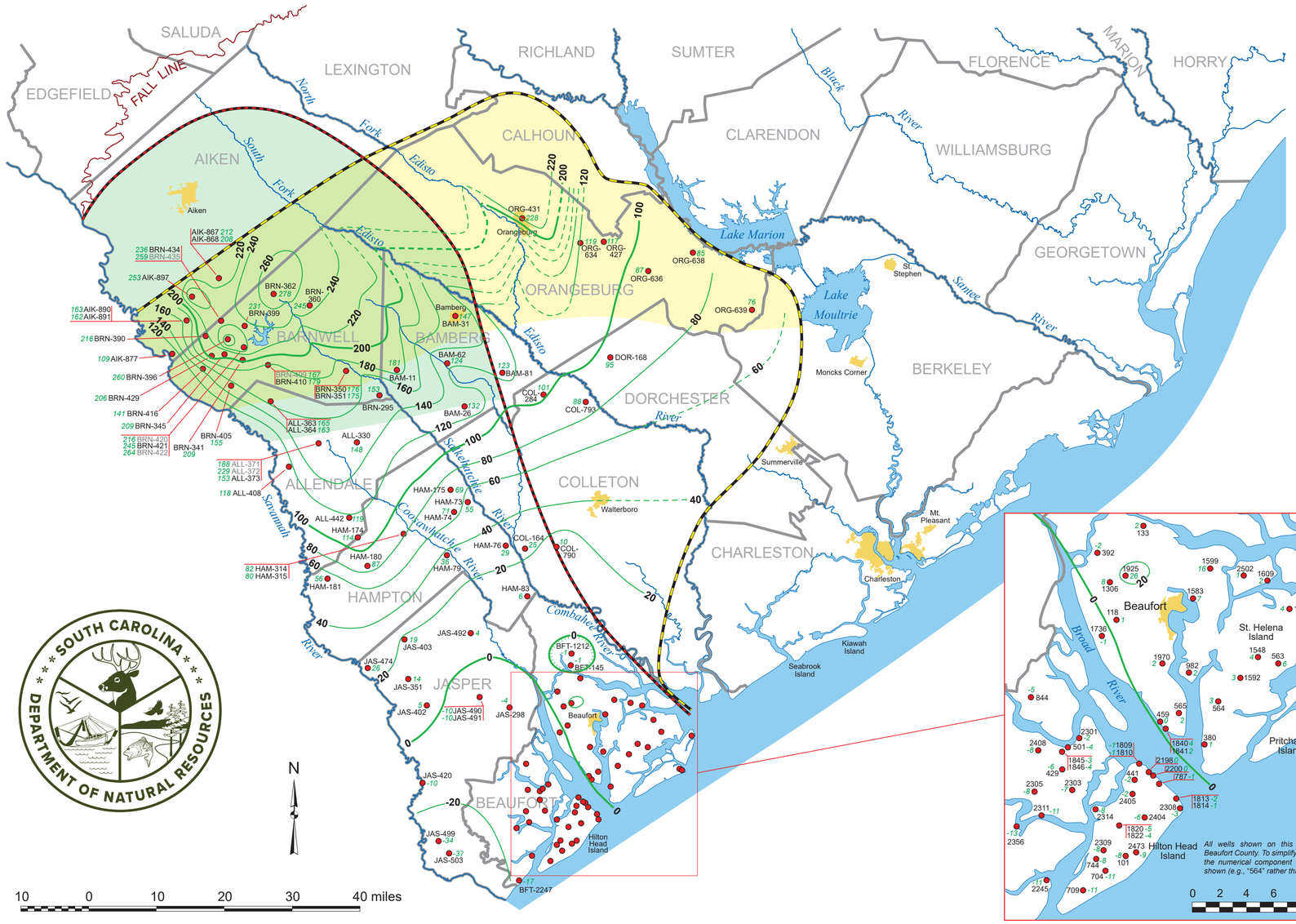

EXPLANATION

- 20 — Potentiometric contour for the Upper Floridan and Middle Floridan aquifers, in feet above vertical datum (NAVD88); dashed where inferred
- HAM-175 69 — Measured well, with county well number and potentiometric elevation. For sites having multiple wells screened in different zones, a gray well number indicates the measurement was not used for contouring.
- Approximate updip limit of Upper Floridan aquifer
- Approximate area in which Upper Floridan aquifer is unconfined
- Approximate updip limit of Middle Floridan aquifer
- Approximate area in which Middle Floridan aquifer is unconfined

SCDNR Well ID	Aquifer[1]	2021 potentiometric elevation (ft NAVD88)	2021 water level (ft)[2]	Change in water level (ft) since 2018[3]
AIK-867	UF	212	50	3
AIK-868	MF	208	53	12
AIK-877	MF	109	42	-1
AIK-890	MF	163	104	-1
AIK-891	UF	162	103	-1
AIK-897	MF	253	101	-1
ALL-330	MF	148	24	-1
ALL-363	UF	165 ‡	81	-2
ALL-364	MF	163 ‡	83	-1
ALL-371	MF	188 ‡	94	-2
ALL-372	UF	229 ‡	53	-4
ALL-373	MF	153 ‡	127	-2
ALL-408	UF/MF	118	22	-2
ALL-442	UF	119	21	0
BAM-11	UF/MF	181	28	-2
BAM-26	MF	132	8	-2
BAM-31	MF	147	12	-3
BAM-62	MF	124	18	-1
BAM-81	MF	123	13	-3
BFT-101	UF	-8 ‡	22	-1
BFT-118	UF	1	20	0
BFT-133	UF	2	9	0
BFT-145	UF	-1	22	1
BFT-380	UF	1 †	6	-1
BFT-392	UF	-2	29	-4
BFT-429	UF	-6 ‡	25	-1
BFT-441	UF	-2 †	11	-2
BFT-449	UF	2 †	4	1
BFT-452	UF	3 †	2	0
BFT-455	UF	2	3	N/A
BFT-459	UF	0 †	3	-1
BFT-488	UF	5	6	1
BFT-501	UF	-4 †	22	-1
BFT-563	UF	6	13	0
BFT-564	UF	3	14	0
BFT-565	UF	2 †	8	0
BFT-704	UF	-11	19	-2
BFT-709	UF	-11	20	-2
BFT-744	UF	-8	17	2
BFT-787	UF	-1 †	13	0
BFT-844	UF	-5 †	16	4
BFT-982	UF	2 †	10	0
BFT-1212	UF	-1	25	1
BFT-1306	UF	8	27	-1
BFT-1540	UF	4	9	1
BFT-1548	UF	4	21	0
BFT-1583	UF	7	10	0
BFT-1592	UF	3	19	0
BFT-1599	UF	16	4	-1
BFT-1609	UF	2	4	-1
BFT-1736	UF	-1	22	-2
BFT-1809	MF	-1 ‡	12	0
BFT-1810	UF	-1 ‡	12	1
BFT-1813	MF	-2 ‡	12	-1
BFT-1814	UF	-1 ‡	11	0
BFT-1820	MF	-5	15	-1
BFT-1822	UF	-4	14	0
BFT-1840	MF	4	6	0
BFT-1841	UF	2 †	6	0
BFT-1845	MF	-3 ‡	17	-1
BFT-1846	UF	-4 ‡	18	-1
BFT-1925	UF	26	12	1
BFT-1970	UF	2 †	11	-1
BFT-2198	UF	0 †	18	0
BFT-2200	UF	0 †	18	0
BFT-2245	UF	-11 ‡	22	-1
BFT-2247	UF	-17 ‡	24	-1

SCDNR Well ID	Aquifer[1]	2021 potentiometric elevation (ft NAVD88)	2021 water level (ft)[2]	Change in water level (ft) since 2018[3]
BFT-2301	UF	-2 †	16	-2
BFT-2303	UF	-7 †	21	-2
BFT-2305	UF	-8 †	30	0
BFT-2308	UF	-3 †	9	0
BFT-2309	UF	-8 †	16	-2
BFT-2311	UF	-11 †	14	-1
BFT-2314	UF	-8 †	13	-4
BFT-2356	UF	-13 ‡	28	0
BFT-2404	UF	-6 ‡	19	0
BFT-2405	UF	-2 †	16	0
BFT-2408	UF	-8 ‡	28	-1
BFT-2473	UF/MF/G	-9	26	-2
BFT-2502	UF	1	14	-1
BRN-295	MF	153	47	-2
BRN-341	MF	209	39	-5
BRN-345	MF	209	43	-4
BRN-350	MF	176 ‡	34	0
BRN-351	UF	175 ‡	34	0
BRN-360	MF	245 ‡	23	-6
BRN-362	MF	278	53	-2
BRN-390	MF	216	79	-2
BRN-396	MF	260	37	-6
BRN-399	MF	231	54	-3
BRN-405	UF	155	51	-2
BRN-409	MF	167	48	-3
BRN-410	UF	179	35	-11
BRN-416	UF	141	43	0
BRN-420	MF	216	97	-4
BRN-421	MF	245	68	-4
BRN-422	UF	264	48	-6
BRN-429	UF/MF	206	57	0
BRN-434	MF	236	37	-3
BRN-435	UF	259	14	-5
COL-164	MF	25	44	0
COL-284	MF	101	14	1
COL-790	MF	10	83	-8
COL-793	MF	88	8	-1
DOR-168	MF	95	26	-2
HAM-73	MF	55	37	1
HAM-74	MF	71	46	3
HAM-75	MF	69	37	0
HAM-76	MF	29	37	-3
HAM-79	MF	36	46	3
HAM-83	UF	6 ‡	37	0
HAM-174	MF	114	31	6
HAM-175	UF	69	41	2
HAM-180	MF	87	42	7
HAM-181	MF	56	30	0
HAM-314	UF	82 ‡	24	1
HAM-315	MF	80 ‡	25	1
JAS-298	UF	-4	20	3
JAS-351	UF	14	42	-3
JAS-402	UF	5	49	2
JAS-403	UF	19	51	-4
JAS-420	UF	-10	29	3
JAS-474	MF	26	10	-3
JAS-490	MF	-10 ‡	40	0
JAS-491	UF	-10 ‡	40	1
JAS-492	MF	4 ‡	58	-3
JAS-499	UF	-34	44	5
JAS-503	UF	-37	47	4
ORG-427	MF	117	32	0
ORG-431	MF	228 ‡	28	-1
ORG-634	MF	119 ‡	46	0
ORG-636	MF	87	25	-3
ORG-638	MF	85	43	4
ORG-639	MF	76	13	0

1 *UF: Upper Floridan; MF: Middle Floridan; G: Gordon.*
2 *Depth to water from land surface. Negative value indicates flowing well.*
3 *Change in water level from measurement made for 2018 potentiometric map. Positive number indicates higher water level in 2021.*
† *Water level has been corrected for tidal influences.*
‡ *Water level is an average calculated from hourly measurements recorded in monitoring well.*