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## Executive Summary

South Carolina's Groundwater Use and Reporting Act (Chapter 5, Section 49-5-60) gives the South Carolina Department of Health and Environmental Control (SC DHEC) the legal authority and mandate to establish and implement a local groundwater management program in the designated Western Capacity Use Area (WCUA). Per the enabling legislation:

The General Assembly declares (Chapter 5, Section 49-5-20) that the general welfare and public interest require that the groundwater resources of the State be put to beneficial use to the fullest extent to which they are capable, subject to reasonable regulation, in order to:

- Conserve and protect these resources,
- Prevent waste, and to
- Provide and maintain conditions which are conducive to the development and use of water resources.

As aquifers and the relative social and economic requirements of the State vary by area and region, groundwater management should be locally and/or regionally assessed, balancing all needs and interests (more information on the WCUA specifics and defining characteristics can be found in the Hydrogeologic Setting and Regional Description sections). In this regard, SC DHEC coordinates with local stakeholders to achieve the stated goals of the plan leading to sustainable use of the groundwater resources. Sustainable use is the key guiding principle, where South Carolina's groundwater resources are managed so that development meets the needs of the present without compromising the ability of future generations to meet their needs.

## Introduction

On November 8, 2018, the South Carolina Department of Health and Environmental Control Board, as established in Section 49-5-60, Capacity Use Designation, declared the whole of Aiken, Allendale, Bamberg, Barnwell, Calhoun, Lexington, and Orangeburg Counties as the **Western Capacity Use Area** (Figure 1). The WCUA is the fifth of five currently declared Capacity Use Areas in South Carolina. Within the WCUA, no person shall withdraw, obtain, or otherwise utilize groundwater at or in excess of three (3) million gallons in any month for any purpose without first obtaining a Groundwater Withdrawal Permit from SC DHEC.

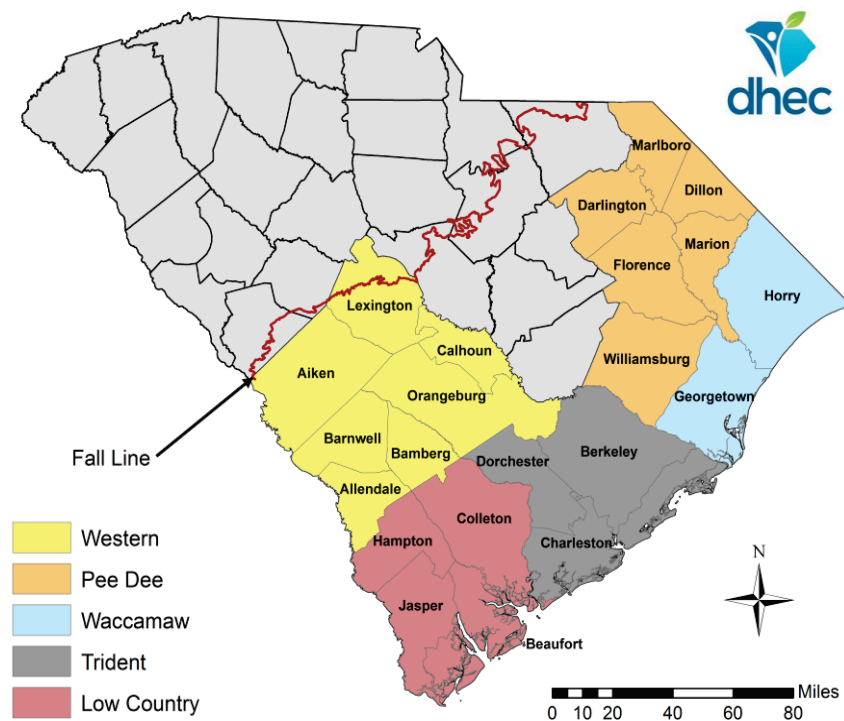


Figure 1: Capacity Use Areas and Their Associated Counties

The Western Capacity Use Area Groundwater Management Plan (GMP) will guide the initial groundwater management strategy and provide direction for future groundwater management goals by evaluating, as data become available, the hydrologic, environmental, social, and economic impacts of groundwater withdrawals at various rates on the long-term sustainable levels for the aquifers of the WCUA. Sustainable use meets the needs of the present without compromising the ability of future generations to meet their needs and requirements. Therefore, in addition to the three statutory components of the Capacity Use program set forth in Chapter 5, Section 49-5-20, the three general goals of the GMP are:

1. Ensure sustainable use of the groundwater resource by management of groundwater withdrawals;
2. Monitor groundwater conditions to evaluate availability; and
3. Promote educational awareness of the resource and its conservation.

To accomplish the above goals, the GMP addresses the following aspects of water use in the Western region:

- Current groundwater sources utilized;
- Current water demand by type and amount used;
- Current aquifer storage and recovery and water reuse;
- Projected population and growth;
- Projected water demand;
- Projected opportunities for aquifer storage and recovery, as well as water reuse;
- Projected groundwater and surface water options; and,
- Water conservation measures.

Planning is a multi-stage process that includes provisions for updating/amending as conditions change over time. In this first plan, only general goals can be established. As more data are developed about the groundwater resources of the WCUA, more specific goals and withdrawal limits may be incorporated into the GMP. Modifications or updates to the goals and content of the GMP based on the quinquennial GMP Reports shall be made by SC DHEC authority or considered upon request by the WCUA Stakeholder Workgroup.

Groundwater management is locally and regionally conducted to best fit an area's need and incorporates the acknowledgement of regional differences that necessitate varying strategies. Quantitative thresholds that activate a specific management action cannot be explicitly stated and established in any GMP to then be equally applied to all users across all counties in a CUA due to large variations in hydrogeologic setting and groundwater conditions. Instead, the GMP utilizes several management strategies in conjunction to abate potential adverse effects, determine when certain management actions are necessary, and to adhere to the statutory framework as laid out in Chapter 5, Section 49-5-20.

## Definitions

**Adverse Effects:** undesirable consequences of withdrawing groundwater that may include: changes in water quality, significant reduction in water level of the aquifer, saltwater intrusion, land subsidence, and decreases in stream flow

**Aquifer Storage and Recovery (ASR):** a process by which water is injected into an aquifer for storage and then subsequently withdrawn from the same aquifer from the same well or other nearby wells

**Best Management Plan:** a document that supports the design, installation, maintenance, and management of water conveyance systems and/or water withdrawal systems (water supply, commercial, industrial, agricultural, etc.), which promotes water conservation, and protects water quality

**Farmland Acreage (USDA):** consists primarily of agricultural land used for crops, pasture, or grazing; including woodland and wasteland not actually under cultivation or used for pasture or grazing, provided it was part of the farm producer's total operation

**Groundwater User:** a person using groundwater for any purpose

**Groundwater Withdrawer:** any person withdrawing groundwater at or in excess of three (3) million gallons during any one month from a single well or multiple wells within a one-mile radius of any existing or proposed well

**Irrigated Acreage (USDA):** all land watered by any artificial or controlled means, such as sprinklers, flooding, furrows or ditches, subirrigation, and spreader dikes including supplemental, partial, and preplant irrigation

**Person:** an individual, firm, partnership, association, public or private institution, municipality or political subdivision, local, state, or federal government agency, department, or instrumentality, public water system, or a private or public corporation organized under the laws of this State or any other state or county

**Physiographic Province:** a region having a particular pattern of relief features or land forms that differs significantly from that of adjacent regions

**Reasonable Use:** the use of a specific amount of water without waste that is appropriate under efficient practices to accomplish the purpose for which the appropriation is lawfully made

**Stakeholder Workgroup:** the SC DHEC designated committee, diverse in geographic and type-use representation, maintained as an advisory and collaborative partner concerning groundwater permitting, planning, education, and evaluation of the WCUA

**Sustainable Use:** use of ground water in a manner that can be maintained for an indefinite time without causing adverse environmental, economic, or social consequences

**Water Quality:** chemical, physical, biological, and radiological characteristics of the water and measure of the condition of water relative to the intended use

**Water Reuse:** water that is recycled and used more than once and is treated to a standard that permits the intended beneficial reuse

### Reasonable Use Determination by Water Use Type

SC DHEC establishes reasonable use of groundwater and develops limits depending on several factors, including, but not limited to the purpose(s) for which the water is withdrawn, application of type-based formulae, technical reviews of hydrogeologic conditions, groundwater use trends, demands on the resource, and availability of alternative sources of water. Each water use type has its own guidelines and standardized procedures in reasonable use determination (Table 1).

Table 1: Generalized Water Quantity Permitting Section Reasonable Use Guidelines by Water Use Type

Water Use Type	General Reasonable Use Guidelines
<b>Aquaculture (AQ)</b>	<ul style="list-style-type: none"> <li>• Size of operation (acreage)</li> <li>• Depth of holding ponds, lagoons, or lakes</li> <li>• Refill rates</li> </ul>
<b>Golf Course (GC)</b>	<ul style="list-style-type: none"> <li>• Based on current systematic and industry based standards</li> <li>• Application rates</li> <li>• Acreage irrigated</li> <li>• Duration of irrigation</li> </ul>
<b>Industry (IN)</b>	<ul style="list-style-type: none"> <li>• Based on current systematic and industry based standards</li> <li>• Variability based on size and type of industry</li> </ul>
<b>Irrigation (IR)</b>	<ul style="list-style-type: none"> <li>• Based on current systematic and industry based standards</li> <li>• Crop type</li> <li>• Irrigation method</li> <li>• Acreage irrigated</li> <li>• Duration of irrigation</li> <li>• Stress period buffering</li> </ul>
<b>Mining (MI)</b>	<ul style="list-style-type: none"> <li>• Based on current systematic and industry based standards</li> <li>• Variability based on size and type of industry</li> </ul>
<b>Hydro Power (PH)</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Thermo Power (PT)</b>	<ul style="list-style-type: none"> <li>• Based on current systematic and industry based standards</li> <li>• Availability of alternative water sources</li> </ul>
<b>Nuclear Power (PN)</b>	<ul style="list-style-type: none"> <li>• Based on current systematic and industry based standards</li> </ul>
<b>Water Supply (WS)</b>	<ul style="list-style-type: none"> <li>• Based on current systematic and industry based standards</li> <li>• Population served</li> <li>• Per capita use</li> </ul>
<b>Other (OT)</b>	<ul style="list-style-type: none"> <li>• Variability based on size and type of industry</li> </ul>

## Geo-Political Structure

The State of South Carolina is divided into ten official planning districts under the South Carolina Association of Regional Councils (SCARC). Each district is referred to as a Council of Governments (COG). The purpose of the COGs is to provide a “uniform geographical framework within which the planning, programming, and delivery of services by state, federal, and local government might be undertaken with maximum efficiency and effectiveness.” Two separate COGs operate within the WCUA counties: Lower Savannah Council of Governments (LSCOG) and Central Midlands Council of Governments (CMCOG).

LSCOG governs six of the seven counties in the WCUA: Aiken, Allendale, Bamberg, Barnwell, Calhoun, and Orangeburg. LSCOG is currently governed by a 39-member board appointed by the participating county governments. LSCOG has 44 incorporated municipalities serving a total population of 315,087.

CMCOG governs four counties: Fairfield, Lexington, Newberry and Richland. Lexington County is represented by 18 of the 53-member board appointed by the participating county governments to serve on the COG. CMCOG has 29 incorporated municipalities, 14 of which are in Lexington, serving a total population of 763,329. Lexington County has 290,642 people, and in addition to the population of LSCOG, brings the total WCUA population to 605,729 (Figure 2).

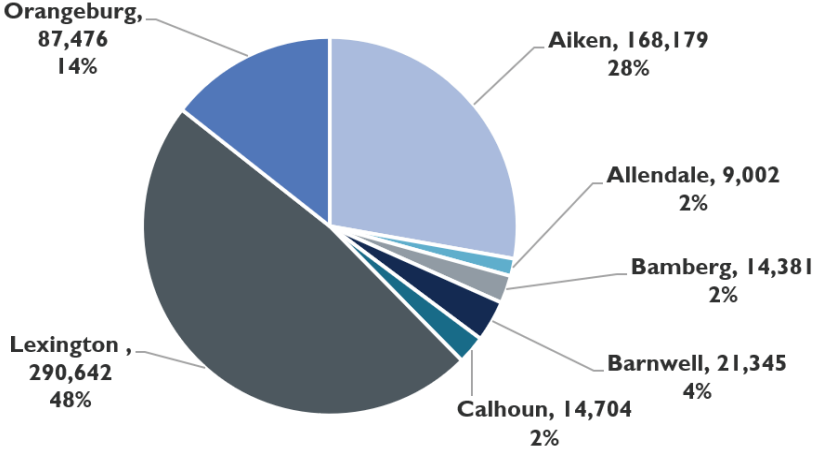


Figure 2: Population by County (U.S. Census Bureau, 2017)

As counties, Aiken, Bamberg, Lexington, and Orangeburg are conducted through a Council-Administrator form of government, while Allendale, Barnwell and Calhoun are governed by a Council. The various cities, towns, and municipalities in the WCUA are administrated by Mayor/Council, Council/Manager, or Council forms of government.

SC DHEC has permit authority for all groundwater withdrawals in the WCUA. Permits are issued after appropriate review in accordance with Chapter 5, The Groundwater Use and Reporting Act, Groundwater Use and Reporting Regulation, R.61-113, and the goals and management strategies developed in the GMP.



## Hydrogeologic Setting

The Coastal Plain of South Carolina is part of the larger Atlantic Coastal Plain consisting of alternating layers of water-bearing, permeable sand or carbonate rock (aquifers) with fine grained clay, silts, or low-permeability carbonate rock (confining units).

## Aquifer Characteristics

The aquifers of South Carolina underlying the WCUA were deposited during the late Cretaceous to Tertiary Periods. From oldest to youngest, the Cretaceous units are the Gramling, Charleston, McQueen Branch, and Crouch Branch aquifers; and the Tertiary units are the Gordon, Middle Floridan, Upper Floridan, and Surficial aquifers (Figure 3). In the WCUA, the confining units gradually thin and taper out 'up-dip', causing the Surficial and Floridan aquifers to connect and become the Upper Three Runs aquifer, which eventually coalesces with the Gordon aquifer to form the Steed Pond aquifer (Figure 3). Due to this setting, the aquifers closest to the fall line are shallower, have greater interconnectivity, and greater surface water interaction when compared to the WCUA's southeastern extent where aquifers become more defined by their confining units.

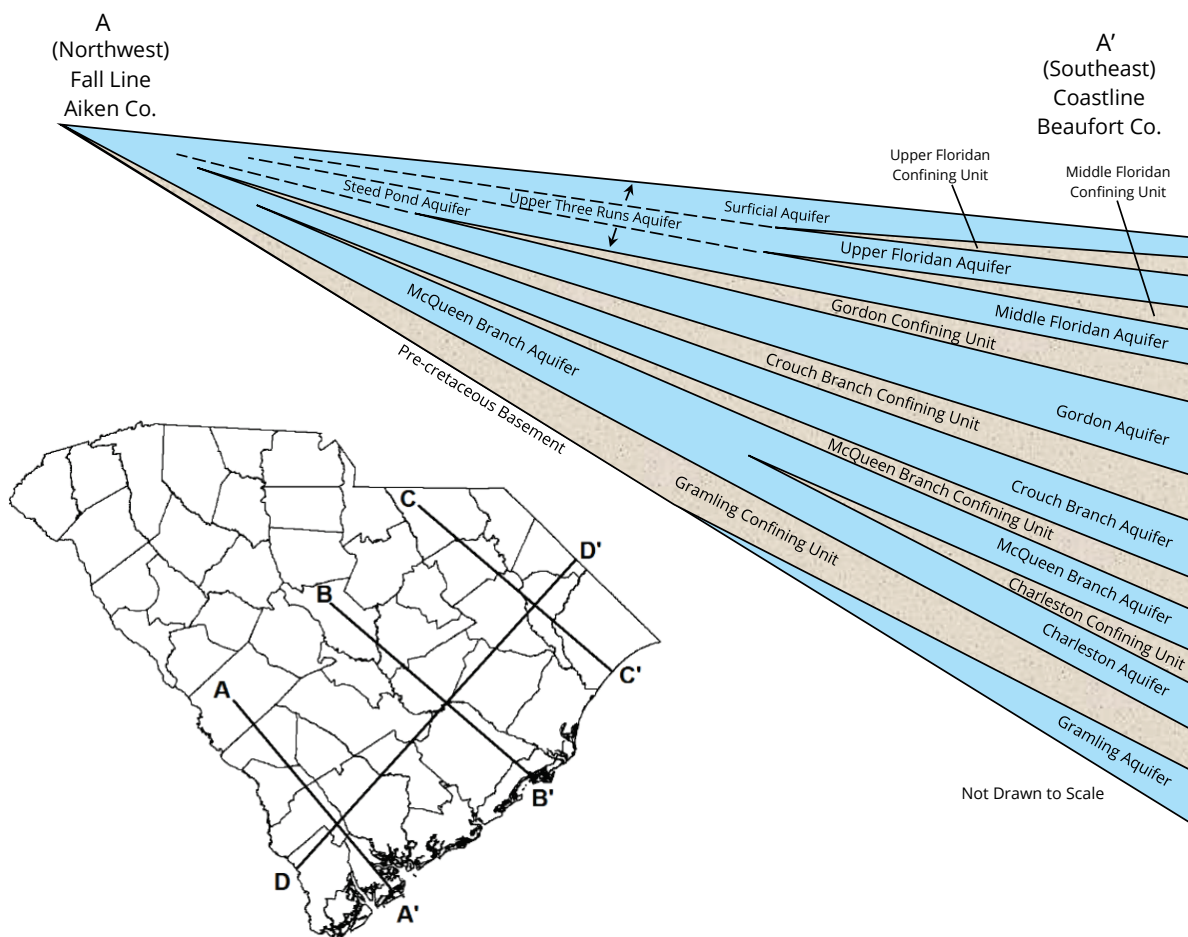
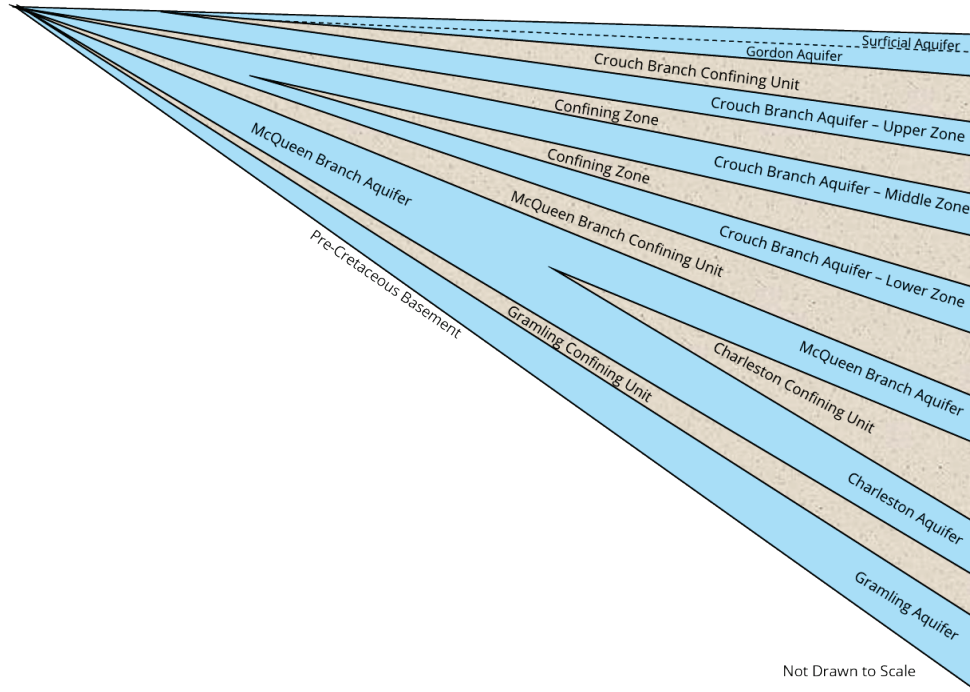


Figure 3: Generalized Cross Sections of South Carolina's Hydrogeologic Framework (Blue = Aquifers; Tan = Confining Units) (Not Drawn to Scale)

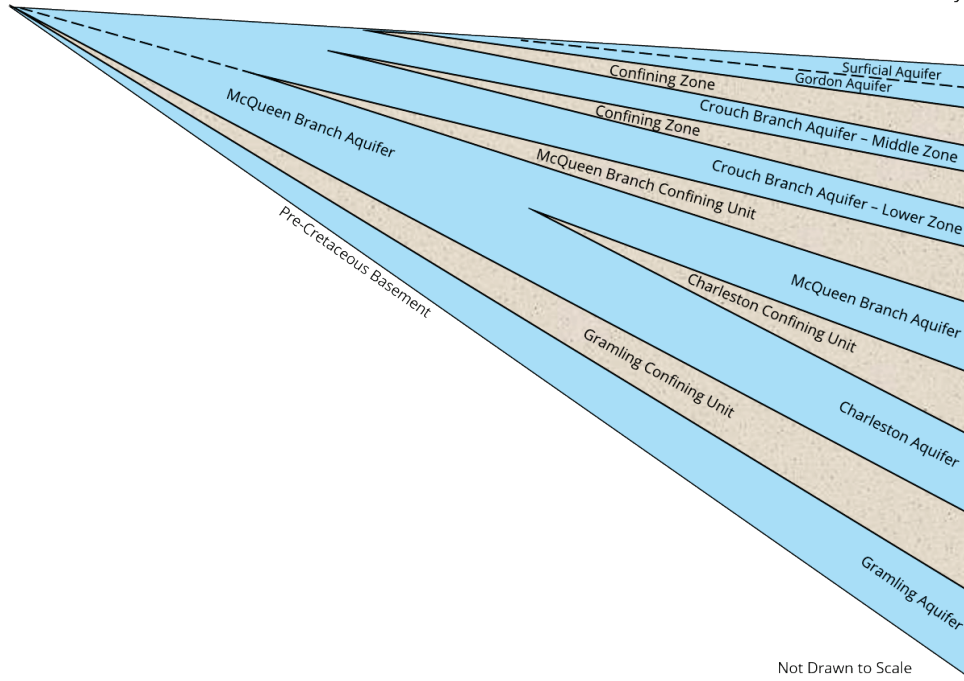
B  
(Northwest)  
Fall Line  
Richland Co.

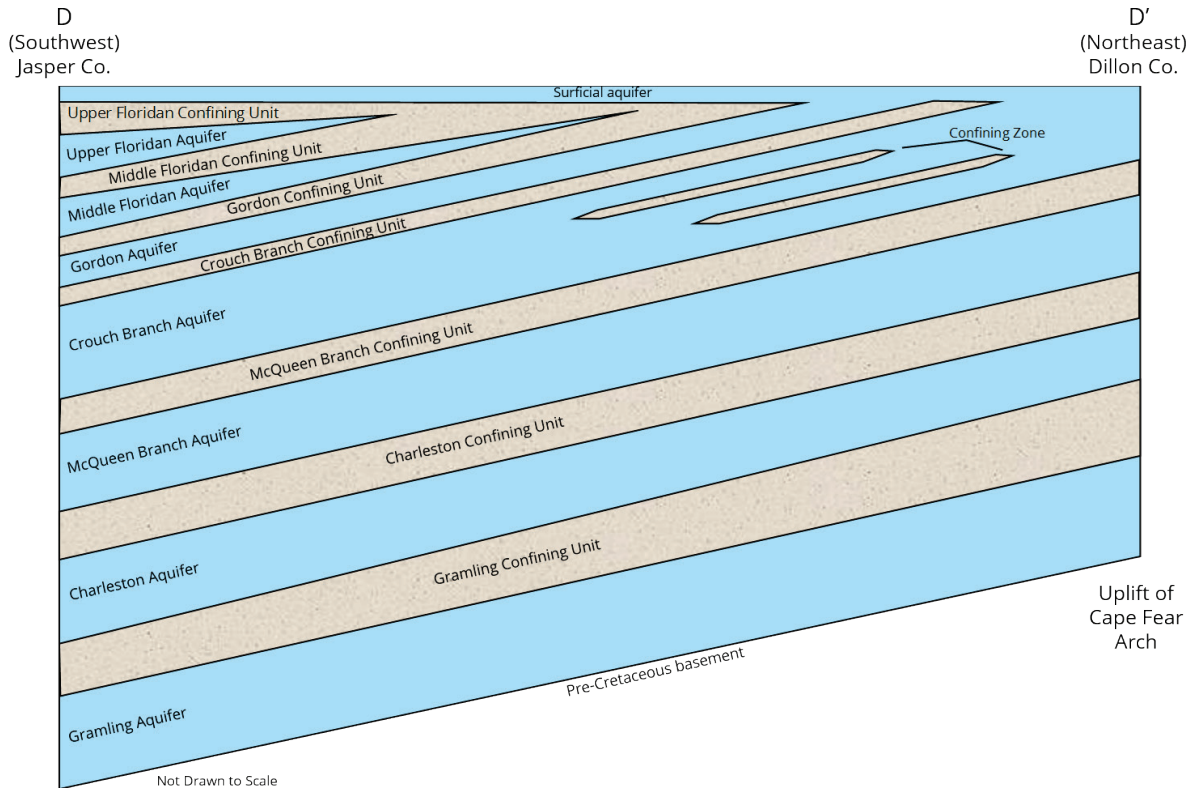
B'  
(Southeast)  
Coastline  
Charleston Co.



C  
(Northwest)  
Fall Line  
Chesterfield Co.

C'  
(Southeast)  
Coastline  
Horry Co.





### Aquifer Recharge

The recharge areas for the state’s major aquifers are generally within the Upper Coastal Plain, an exception being surficial aquifers, which are recharged locally. Shallow and deeper aquifers, which extend all the way to the coast, are dependent on precipitation infiltrating in the recharge areas further ‘up-dip’ to continuously replenish groundwater supply. Groundwater in the major aquifers is replenished by precipitation that infiltrates in the Upper Coastal Plain and then moves slowly ‘down-dip’. Consequently, the rate at which groundwater is replenished in the aquifers is controlled by the rate at which groundwater travels from the recharge areas, closer to the Fall Line, to the coast. Typical groundwater flow rates for silts to well-sorted sands range from 0.003 to 300 feet per day. This means that once the precipitation becomes part of the groundwater, it may take from a few years to tens of thousands of years to reach the deeper aquifers located along the coast.

<insert recharge map updated Figure 4>

## Water Budget

A water budget is a generalized accounting of all water that flows in and out of a given system. A water budget can be described with the following equation:

$$\text{Inflow} - \text{Outflow} = \text{Change in Water Storage}$$

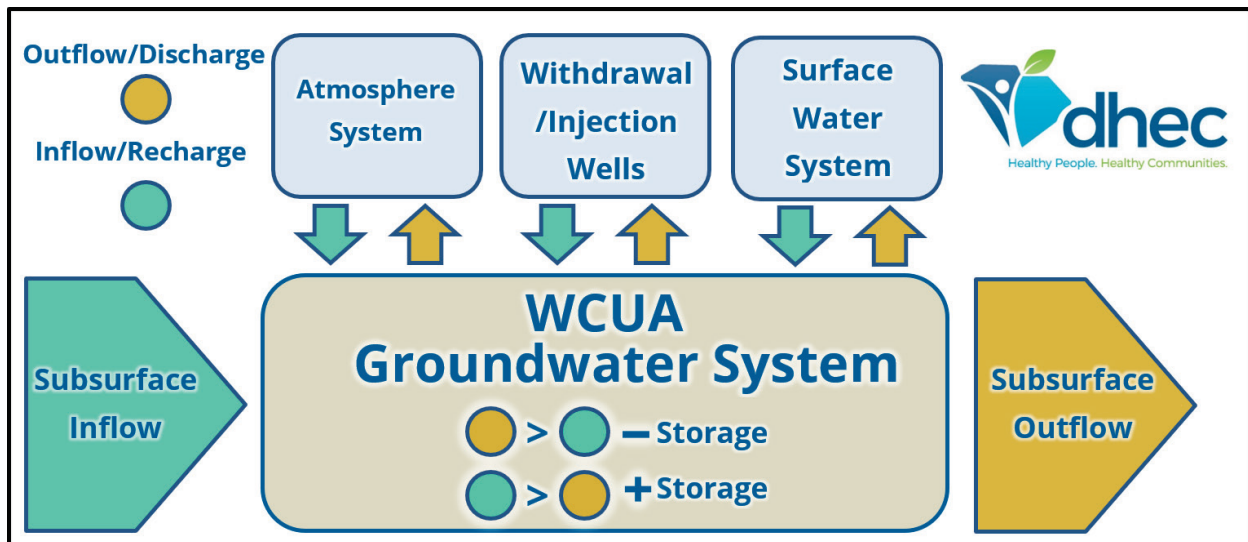


Figure 4: WCUA Generalized Water Budget

When the sum of all outflow components is greater than the sum of all inflow, there is a decrease in storage within a groundwater system (Figure 4). Groundwater storage increases when the opposite is true: the sum of inflow is greater than the sum of outflow. Any change in the components of inflow and/or outflow affect the budget's equilibrium; therefore, changing the various fluxes in and out of the entire system.

In a typical year, South Carolina receives most of its water from precipitation, and the remainder is predominantly surface and subsurface inflow from neighboring states. A relatively small amount of the inflow is attributed to injection wells, which are used to abate against localized adverse effects or provide back-up storage. Outflow from the state's water budget is almost entirely attributed to evapotranspiration and to surface water discharge into the ocean. A small amount of the outflow is aquifer discharge into the ocean, and an even smaller amount is due to water withdrawals.

Although South Carolina receives large amounts of water, most of it never percolates past the root system or is lost as discharge into surface water systems; therefore, limiting the amount of water that enters as groundwater storage. Inflow into the groundwater system is also heavily dependent on when and where precipitation occurs. The portions of the state where water infiltrates into the aquifers are known as recharge areas. Much of the WCUA acts as a recharge area for confined aquifers that extend to the coast. Weather patterns vary from year to year, so the total volume of water that enters the system is not a static number. Precipitation during hot, summer months when evapotranspiration is at its highest, contributes significantly less to aquifer recharge than if that same amount of precipitation fell during cool, winter months when evapotranspiration is at its lowest.

Variations in inflow and outflow necessitates an adaptive management approach to using and conserving groundwater resources. A water budget is a valuable tool and provides relevant information regarding water resource availability and management; however, a statewide or CUA-wide water budget cannot be used and applied in determining individual permit decisions.

## Regional Description

The WCUA is comprised of the following seven counties: Aiken, Allendale, Bamberg, Barnwell, Calhoun, Lexington, and Orangeburg. Situated in the mid-southwestern region of South Carolina, it covers approximately 4,723 mi<sup>2</sup> (Figure 5). The largest of the counties, Orangeburg County, covers a quarter of the total area; while the smallest, Calhoun County, covers just 8.3%. Roughly 117 mi<sup>2</sup> of the entire WCUA (2.4%) is surface water coverage. Lexington County encompasses half of the entire WCUA's total surface water coverage with 59 mi<sup>2</sup> due to significant portions of Lake Murray within its county lines. Bamberg County encompasses the least amount of surface water coverage with 2.2 mi<sup>2</sup> (1.9%) of WCUA's total. The WCUA stretches 100 miles from north to south and 103 miles in east to west directions.

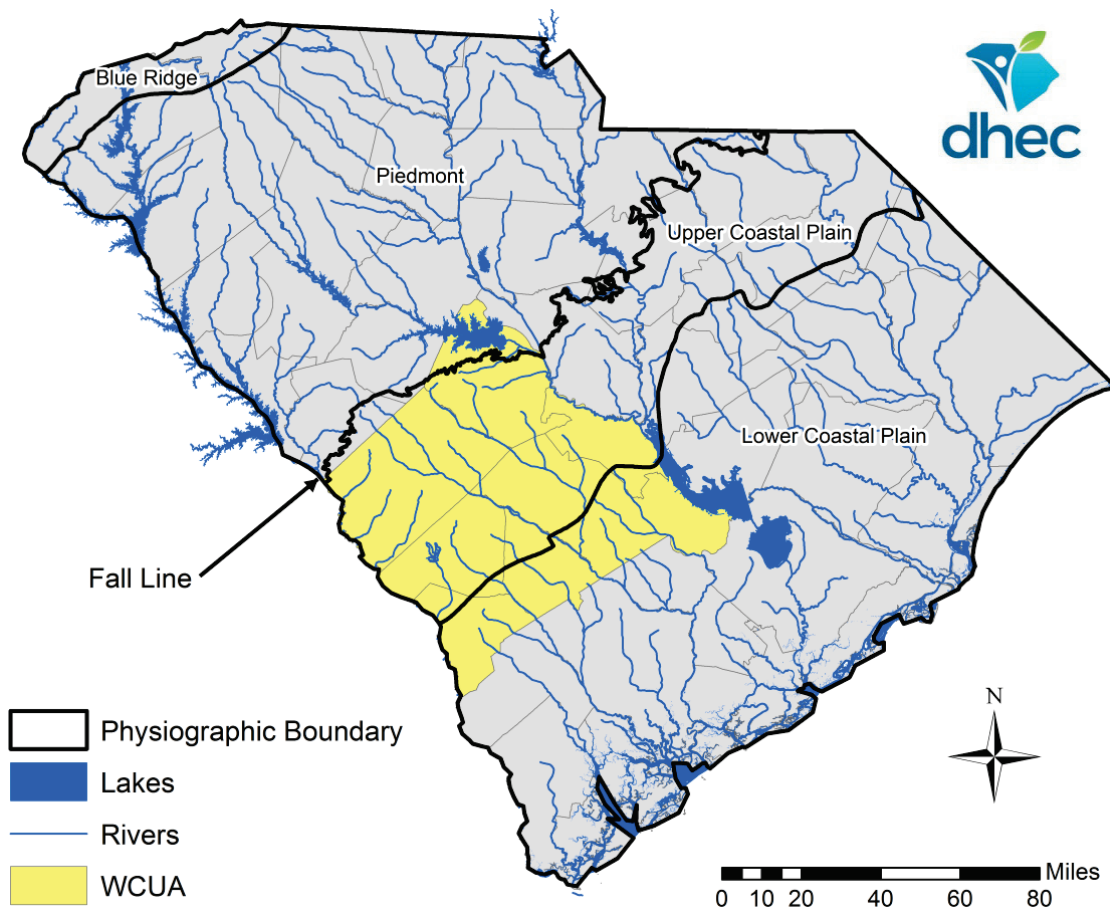


Figure 5: Physiographic Provinces of South Carolina and Major Water Bodies

The entirety of the southwestern border of the WCUA runs along the Savannah River. The northwestern border is vaguely defined by the fall line (the geologic boundary that separates the Piedmont from the Coastal Plains) with only portions of Lexington County extending beyond this boundary (Figure 5). Along the northeastern edge, several water bodies define the WCUA's extent: Lake Murray, lower Saluda River, Congaree River, upper Santee River, and Lake Marion. There are no significant physiographic features at the surface that define the southeastern edge of the WCUA. As a region, the WCUA principally lies within the

physiographic province known as the Upper Coastal Plain. However, portions of Allendale, Bamberg, Barnwell, Calhoun, and Orangeburg counties extend into the Lower Coastal Plain, and a portion of Lexington County into the Piedmont. The boundary between the Upper and Lower Coastal Plains is a wave-cut, steeped gradient representative of the ocean's limit during the middle Pliocene epoch known as the Orangeburg scarp. The scarp separates different topographic and geologic regions of the state.

## Surface Water

The WCUA is drained by five of the eight major river basins in South Carolina: Savannah, Edisto, Salkehatchie, Saluda, and Santee basins. Significant rivers within the WCUA include: lower Saluda, Congaree, upper Santee, Four Hole Swamp, North Fork Edisto, South Fork Edisto, Edisto, Little Salkehatchie, Salkehatchie, Coosawhatchie, and Upper Three Runs rivers. There are no natural forming lakes in the state, only those created by dammed river systems. The three largest lakes in the WCUA are Lake Murray, Lake Marion, and Par Pond. Surface water bodies incise and interact heavily with underground aquifer systems within the region, especially closest to the fall line. In some cases, the incised valleys isolate water-bearing units from the greater regional aquifer(s) (Figure 6). The intimate interconnectivity of surface and groundwater in the WCUA is a defining regional characteristic.

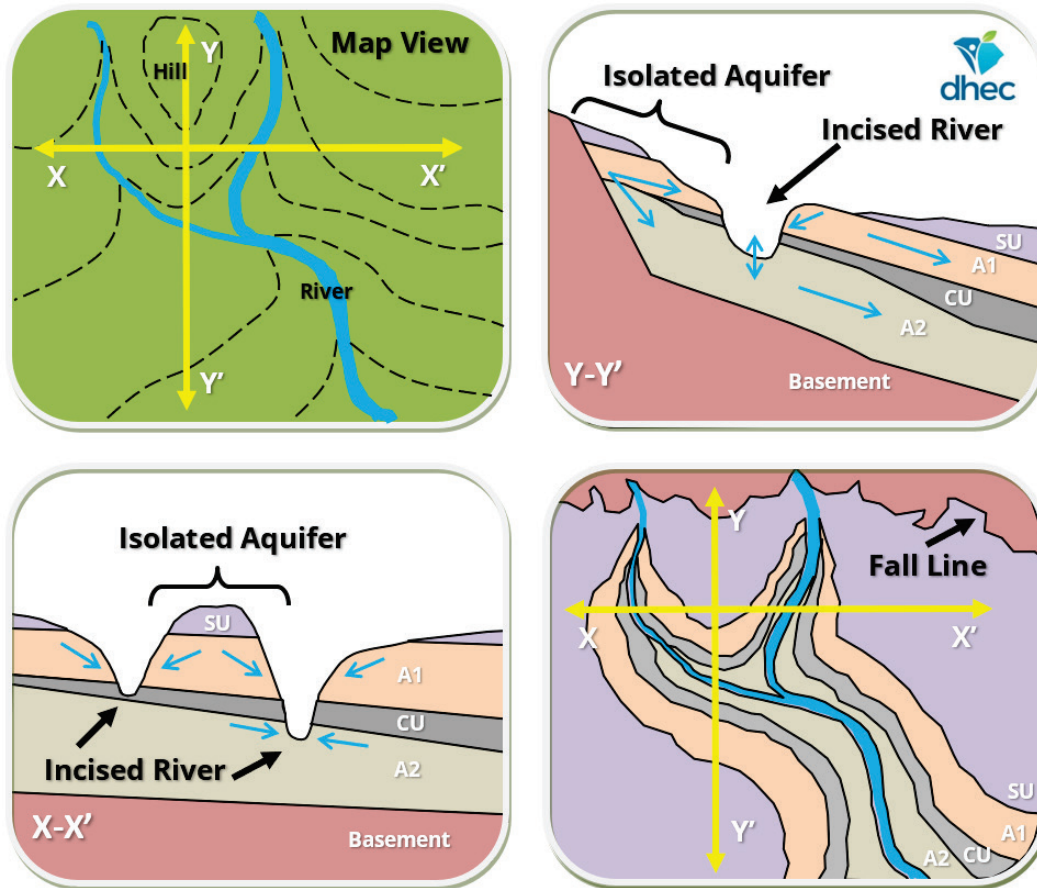


Figure 6: Isolated Aquifer Diagram (Top Left: Map View with Lines of Elevation; Top Right: Y-Y' Cross Section; Bottom Left: X-X' Cross Section; Bottom Right: Map View Showing Surface Exposure of Hydrogeologic Units) (SU=Surface Unit; A1=Aquifer 1; CU=Confining Unit; A2=Aquifer 2; Blue Arrows=General Groundwater Flow)

## Topography and Geology

Elevation ranges in the WCUA are between 60 and 650 feet above mean sea level. In Aiken and Lexington counties, there are several hard-rock outcrops along the fall line exposing the underlying granitic and gneissic bedrock of the Piedmont. Beginning at the fall line and traveling seaward, the topography transitions from undulating hills incised by stream valleys into low-relief plains with broad meandering rivers. The higher relief hills are predominantly composed of micaceous and kaolinitic sands with clay lenses deposited from marine to marginal marine environments. Much of the landscape has also been reworked by streams and rivers leaving behind fluvial deposits of fertile, loamy soils. The WCUA is scattered with isolated wetlands known as Carolina Bays, expansive floodplains, and cypress swamps with organic rich material underlying and surrounding these areas.

## Climate

The Western Capacity Use Area, much like the entire southeastern United States, is characterized as a sub-tropical climate. The WCUA experiences warm, humid summers and mild winters. Proximity to the lower Appalachian Mountains and the Atlantic Ocean considerably affect the regions climate. The middle portion of the state tends to be warmer and drier than other areas of South Carolina. The WCUA does not receive as much of the cooling effects associated with the higher altitudes of the upstate or from the ocean breezes of the coast. Furthermore, the area is too far inland to be significantly influenced by coastal storm cells and is too far from the mountains to be influenced by the temperate rainforest conditions of lower Appalachia. The average annual temperature of the seven-county area from (1981-2010) is 63.57°F with normal maximum and minimum annual temperatures of 75.73°F and 51.41°F, respectively (Figure 7). On average, the WCUA receives 47.78 inches of precipitation annually (Figure 7).

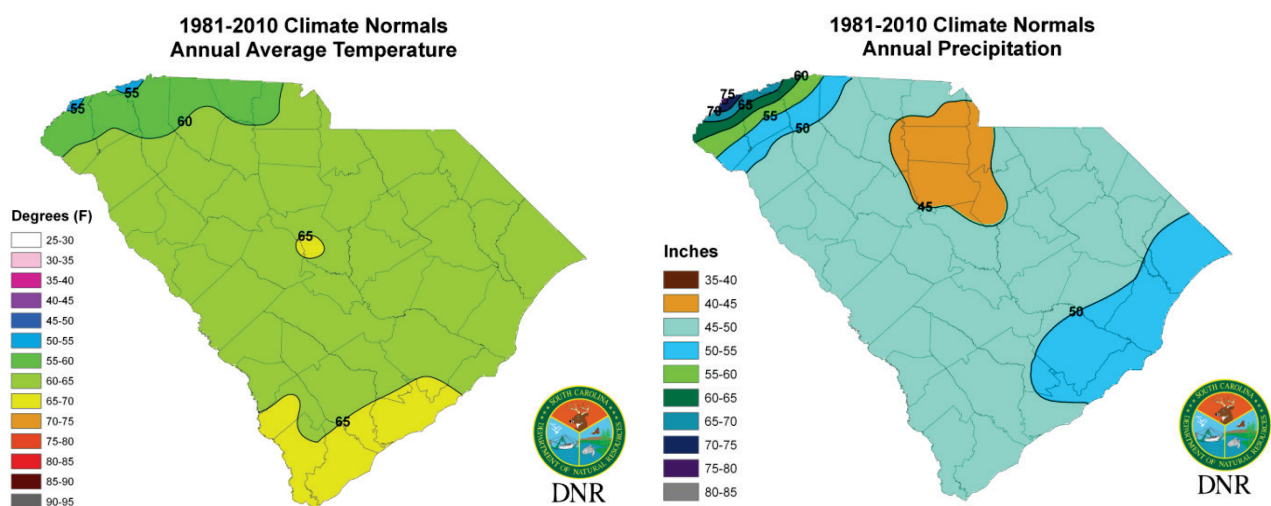


Figure 7: Climate Normals (1981-2010) (Left: Annual Average Temperature; Right: Annual Average Precipitation)



Climate has direct effects on South Carolina’s aquifers, and the strength of those effects varies based on depth, location, and interconnectivity of the aquifers with the surface. Deeper aquifers have shallower aquifers and confining units between them and the surface, which makes them less affected by variable climate patterns. During drier periods, groundwater level monitoring can show decreases in groundwater levels, and conversely, during wetter periods show an increase. Figure 8 illustrates the impact that climate variation can have on water levels by comparing the 24-Month Standard Precipitation Index to Water Levels in Lex-0844. Lex-0844 is believed to have minimal impacts from nearby pumping and therefore, represents how the water levels in the Upper Coastal Plain respond to changes in recharge.

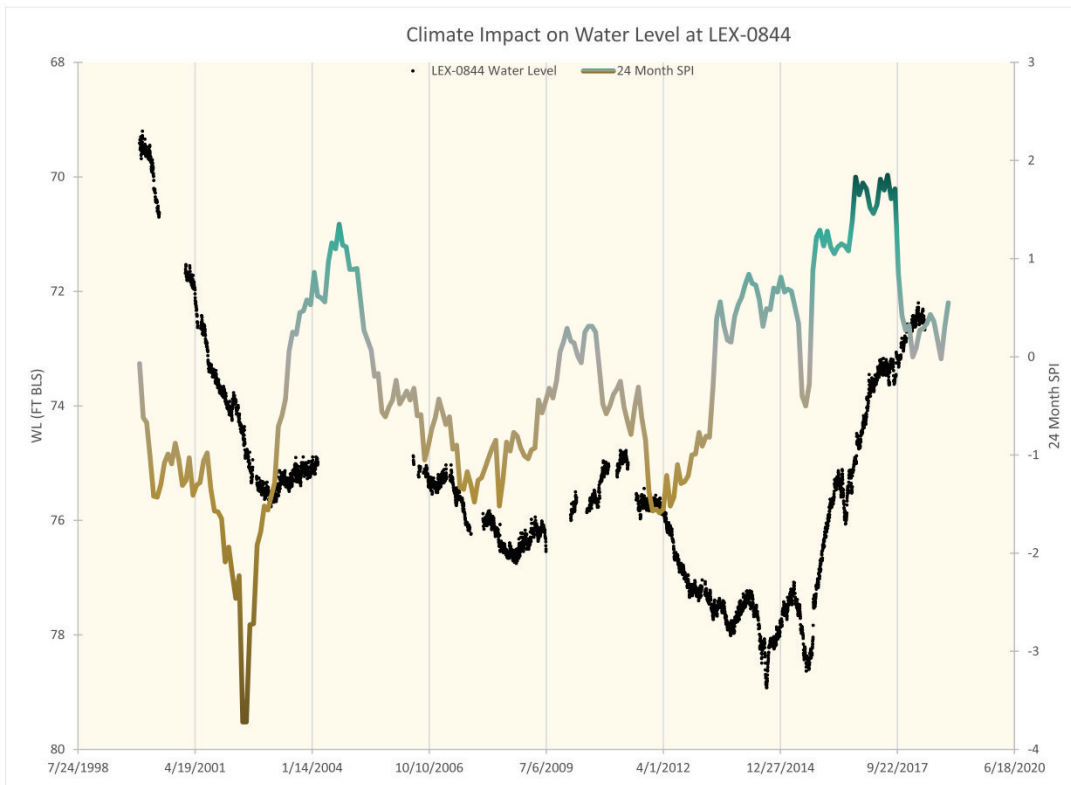


Figure 8: Climate Impact on Groundwater Levels (Black Dotted Line=Water Level in Feet Below Surface; Brown-Green Line: 24-Month SPI Where Brown is Drier and Green is Wetter)

### Land Cover

The WCUA is predominantly a rural portion of the state with sparse regions of urban land cover. Most urban coverage is concentrated in eastern Lexington County, central and western Aiken County, and central Orangeburg County (Figure 9). These regions have seen developmental growth and increases in population and urban land cover in recent years. Much of the seven-county area, however, is covered in forest, wetlands, and farmlands (Figure 9).

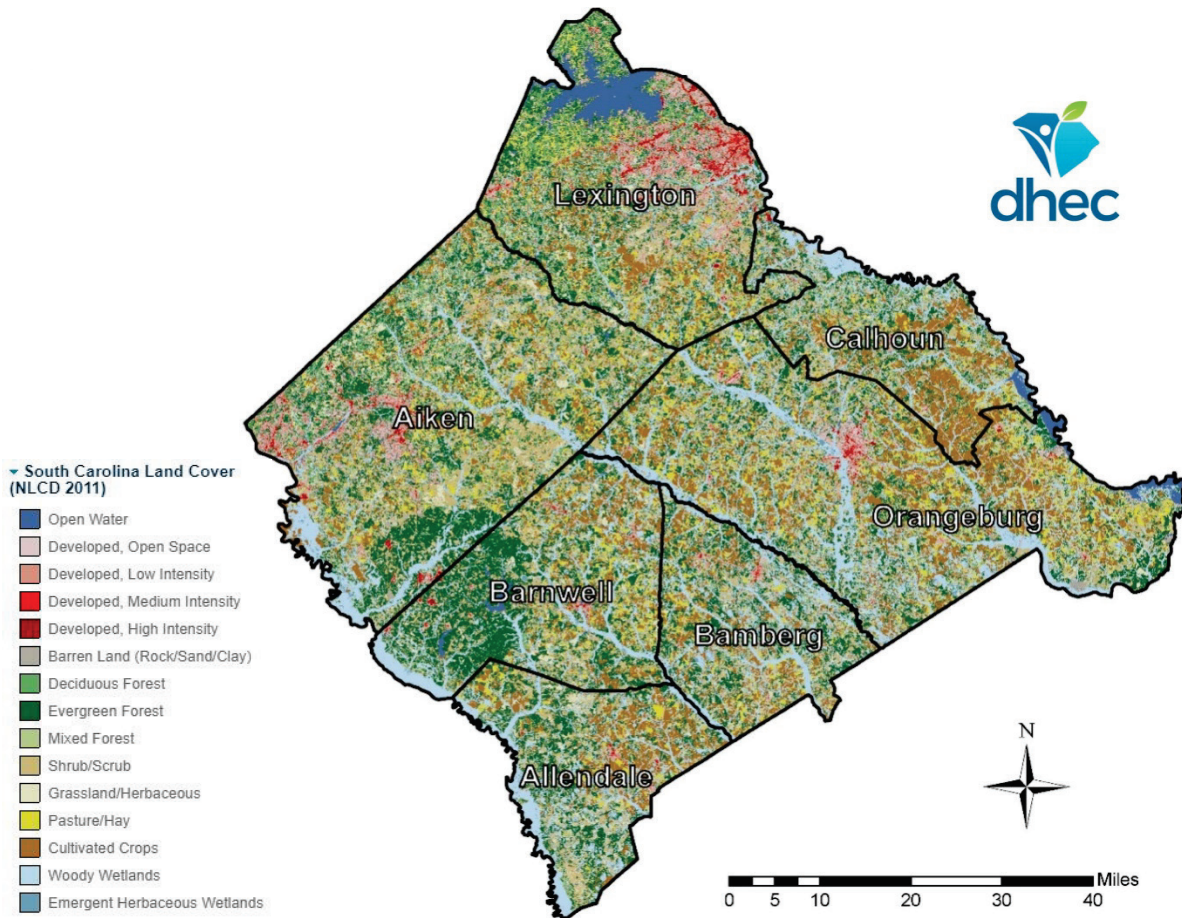


Figure 9: Western Capacity Use Area Land Cover (National Land Cover Database, 2011)

Per the latest USDA Census of Agriculture (2017), one-third (971,205 acres) of the land cover within the WCUA is used for farmland operations (Figure 10). Overall, there was a 6.2% increase in farmland operational use since 2002; however, the growth varied across the region. While Aiken, Calhoun, and Orangeburg counties reported increases, Allendale, Bamberg, Barnwell, and Lexington counties reported declines (Figure 10).

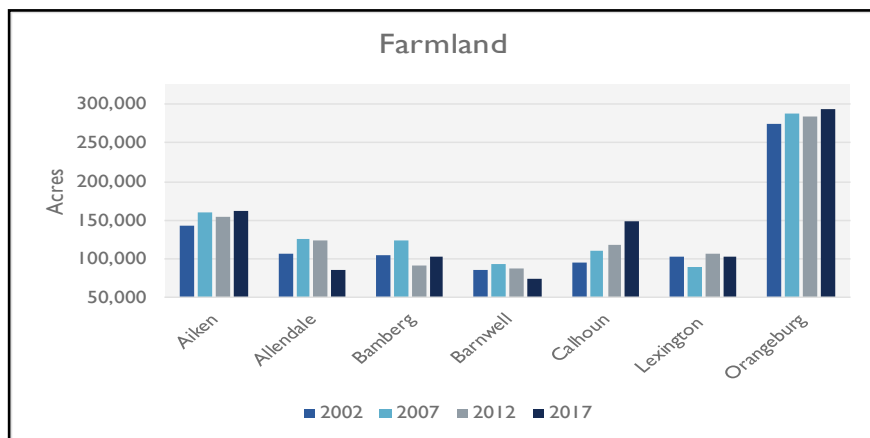


Figure 10: Farmland Operational Use Acreage by WCUA County (USDA, 2002-2017)

During the period of 2002 to 2017, agricultural cropland acreage reported to the USDA saw an overall 30.3% increase. Six of the seven counties reported increases in agricultural cropland, the exception being Allendale, which reported an overall decrease since 2002 (Figure 11). Total reported agricultural cropland acreage in 2017 was 366,394 acres.

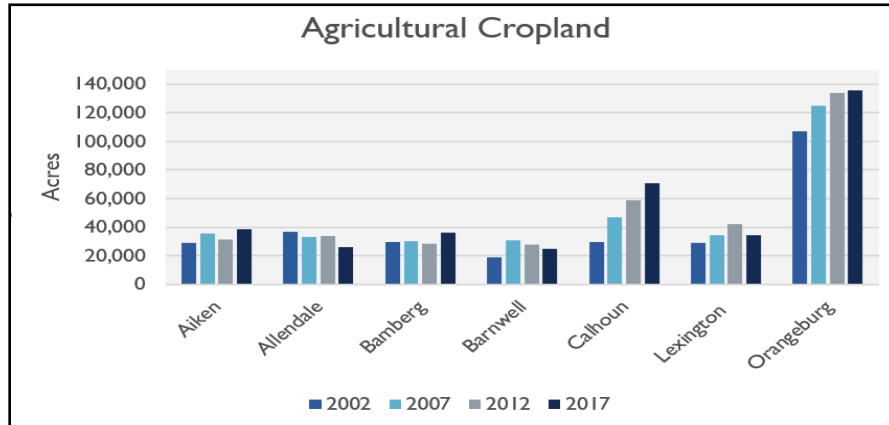


Figure 11: Agricultural Cropland Acreage by WCUA County (USDA, 2002-2017)

Irrigated acreage within the WCUA, as reported to the USDA, saw a 134.7% increase between the years 2002 and 2017. All the counties have reported increases in irrigated acreage, except Allendale, which reported decreases in each census since the turn of the century (Figure 12). Total reported irrigated acreage in 2017 was 104,288 acres.

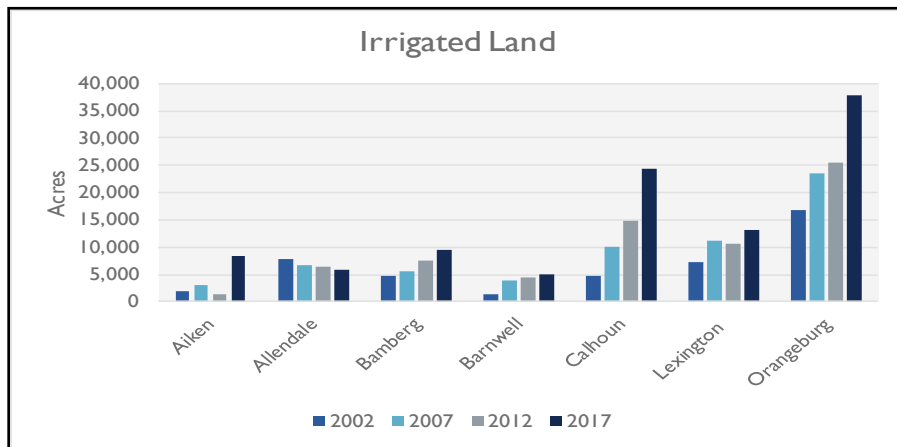


Figure 12: Irrigated Land Acreage by WCUA County (USDA, 2002-2017)

## Groundwater Trends

A detailed review of groundwater trends in the seven Western Area counties may be found in the initial assessment<sup>1</sup>. Briefly, the SC DNR Groundwater Monitoring Network wells indicate long-term water level declines of up to 15 feet for the Floridan/Gordon, Crouch Branch, and McQueen Branch aquifers. Seasonal water level declines associated with increased water use during the summer months are also apparent in many of these water-level records. A map of the SC DNR Groundwater Monitoring Network wells along with the most current water level records for wells within the WCUA may be found in Appendix A.

SC DNR has prepared potentiometric surface maps of the coastal plain aquifers of South Carolina since the 1980s<sup>2</sup>. Appendix B contains a subset of these maps in the WCUA for the major aquifers beginning with data from 2001. Please note that measurements were not made in each aquifer for each year. Groundwater flow within all three major aquifers is generally to the southeast with a portion of the flow curving to the southwest in Aiken, Barnwell, and Allendale counties. There have been no major cones of depression apparent in the seven counties.

## Current Groundwater Demand

There are 1,041 currently-permitted Capacity Use wells in the WCUA (Table 2). One-third of these wells are located in Orangeburg County and nearly three-fourths are permitted for irrigation use. The number of Irrigation wells exceeds those of other use categories for all of the WCUA with the exception of Aiken County in which the water supply category contains the highest number of wells.

Table 2: WCUA: Current Number of Wells by Permit Category and County

Water Use Category	Aiken	Allendale	Bamberg	Barnwell	Calhoun	Lexington	Orangeburg	Totals
Aquaculture (AQ)	0	0	0	0	0	0	0	0
Golf Course (GC)	4	0	0	0	1	2	3	10
Industry (IN)	45	3	0	2	1	10	9	70
Irrigation (IR)	50	44	64	44	164	80	308	754
Mining (MI)	0	0	0	0	1	10	1	12
Hydro Power (PH)	0	0	0	0	0	0	0	0
Thermo Power (PT)	0	3	0	0	0	0	2	5
Nuclear Power (PN)	0	0	0	0	0	0	0	0
Water Supply (WS)	92	12	13	24	8	20	21	190
Other (OT)	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>191</b>	<b>62</b>	<b>77</b>	<b>70</b>	<b>175</b>	<b>122</b>	<b>344</b>	<b>1,041</b>

Water use reported for 2018 totaled 40,801 million gallons (MG) (Table 3). Aiken and Orangeburg Counties reported the highest total water use comprising 20% and 28%,

<sup>1</sup> SC DHEC and SC DNR (2017). A Preliminary Assessment of the Groundwater Conditions in Aiken, Allendale, Bamberg, Barnwell, Calhoun, Lexington, and Orangeburg Counties, South Carolina. May 2017. Columbia, South Carolina.

<sup>2</sup> SC DNR Website. <http://www.dnr.sc.gov/water/hydro/PubsDNRrep.htm>. Accessed June 11, 2019.

respectively, and Bamberg and Barnwell Counties reported the least at roughly 7% each. The majority of reported water use was for irrigation (67.5%), followed by water supply (19.9%), industry (5.4%), mining (4.1%), thermal power generation (2.8%), and golf course irrigation (0.3%). Monthly water use for 2018 shows the seasonality inherent in irrigation, which increases during the spring months and peaks between June and August (Figure 13). Monthly reported water use for industry, water supply, thermo power and mining remained comparatively constant during 2018.

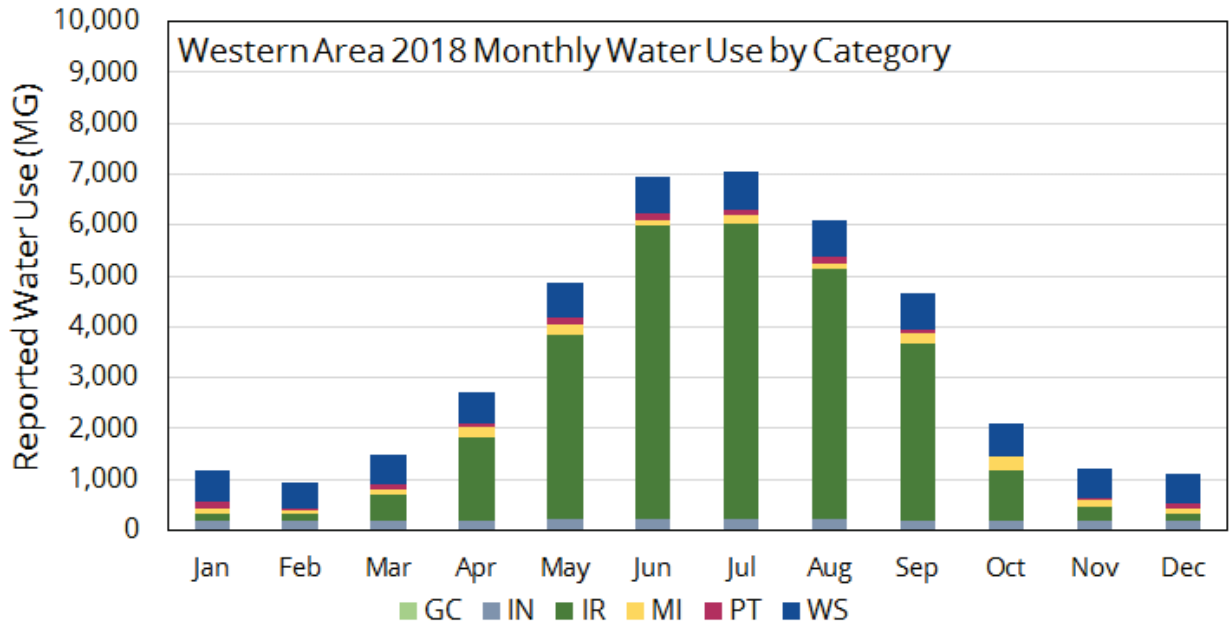


Figure 13: WCUA: Reported Monthly Water Use by Category, 2018

Table 3: WCUA: Reported Water Use<sup>a</sup> by Permit Category and County, 2018

<b>Water Use Category</b>	<b>Aiken</b>	<b>Allendale</b>	<b>Bamberg</b>	<b>Barnwell</b>	<b>Calhoun</b>	<b>Lexington</b>	<b>Orangeburg</b>	<b>Totals</b>	<b>Percent Of Total</b>
Aquaculture	0	0	0	0	0	0	0	0	0%
Golf Course	17	0	0	0	1	21	78	117	0.3%
Industry	620	739	0	133	3	345	376	2,215	5.4%
Irrigation	2,269	3,223	2,372	1,578	5,349	3,480	9,267	27,539	67.5%
Mining	0	0	0	0	0	1,212	463	1,675	4.1%
Hydro Power	0	0	0	0	0	0	0	0	0%
Nuclear Power	0	0	0	0	0	0	0	0	0%
Thermo Power	0	136	0	0	0	0	982	1,118	2.8%
Water Supply	5,034	468	339	1,023	378	523	372	8,137	19.9%
Other	0	0	0	0	0	0	0	0	0%
<b>TOTAL</b>	<b>7,941</b>	<b>4,566</b>	<b>2,711</b>	<b>2,734</b>	<b>5,731</b>	<b>5,581</b>	<b>11,538</b>	<b>40,801</b>	<b>100%</b>
<b>Percent of Total</b>	<b>19.5%</b>	<b>11.2%</b>	<b>6.6%</b>	<b>6.7%</b>	<b>14.0%</b>	<b>13.7%</b>	<b>28.3%</b>	<b>100%</b>	

<sup>a</sup>Water use is reported in Millions of Gallons (MG). For example, 9,210 is 9,210,000,000 gallons.

## Historic Water Demand

Water use reported between 2001 and 2018 by county and by use category are presented in Figures 14 and 15. Total reported water use remained relatively stable from 2001 through 2013 with the exception of 2003 and 2013, during which the Western Area counties received precipitation concurrent with the spring growing season. Beginning in 2014, water use increased to reach the maximum of 41,039 MG in 2017. The majority of this recent increase was within the irrigation use category (Figure 15), as all other use categories remained relatively constant, and reported industrial water use decreased.

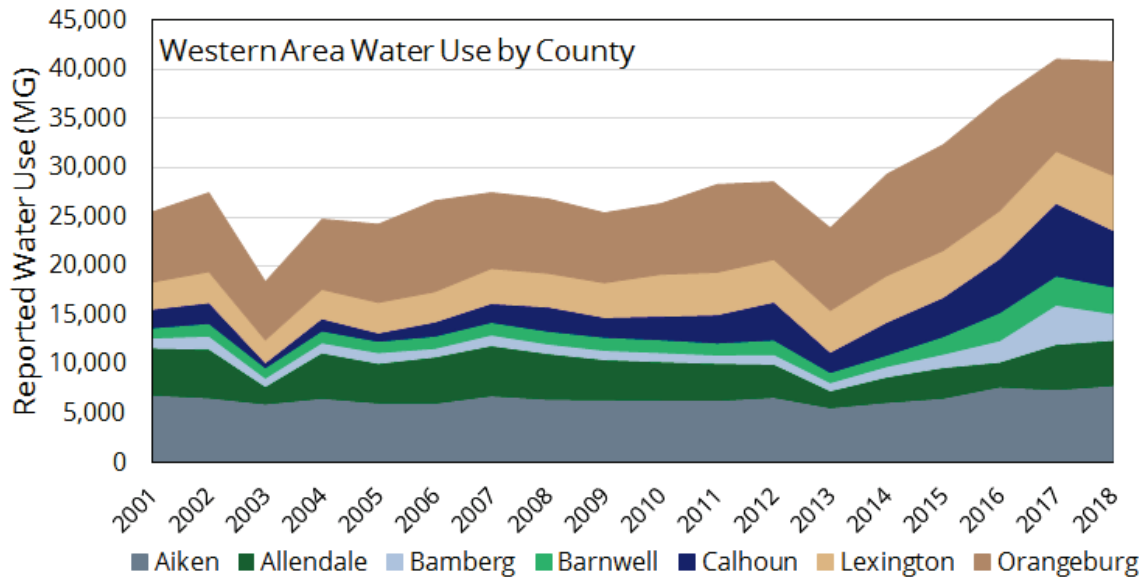


Figure 14: WCUA: Reported Annual Water Use by County, 2001-2018

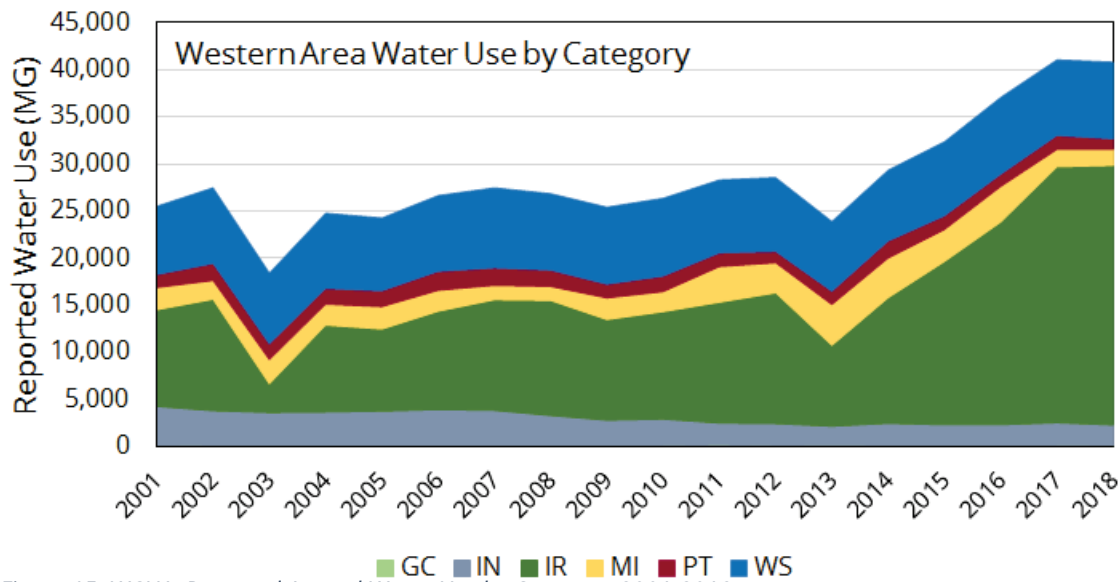


Figure 15: WCUA: Reported Annual Water Use by Category, 2001-2018

During the same period, the total population in the WCUA increased from 520,813 in 2001 to 610,177 in 2018 (Figure 16). This population change was the result of large population increases in Aiken and Lexington Counties while Allendale, Bamberg, Barnwell, Calhoun, and Orangeburg Counties experienced small decreases in population. Comparing the Western Area counties' historic water use (Figure 14) with changes in population (Figure 16) suggests that the increase in reported water use cannot be explained by population changes alone.

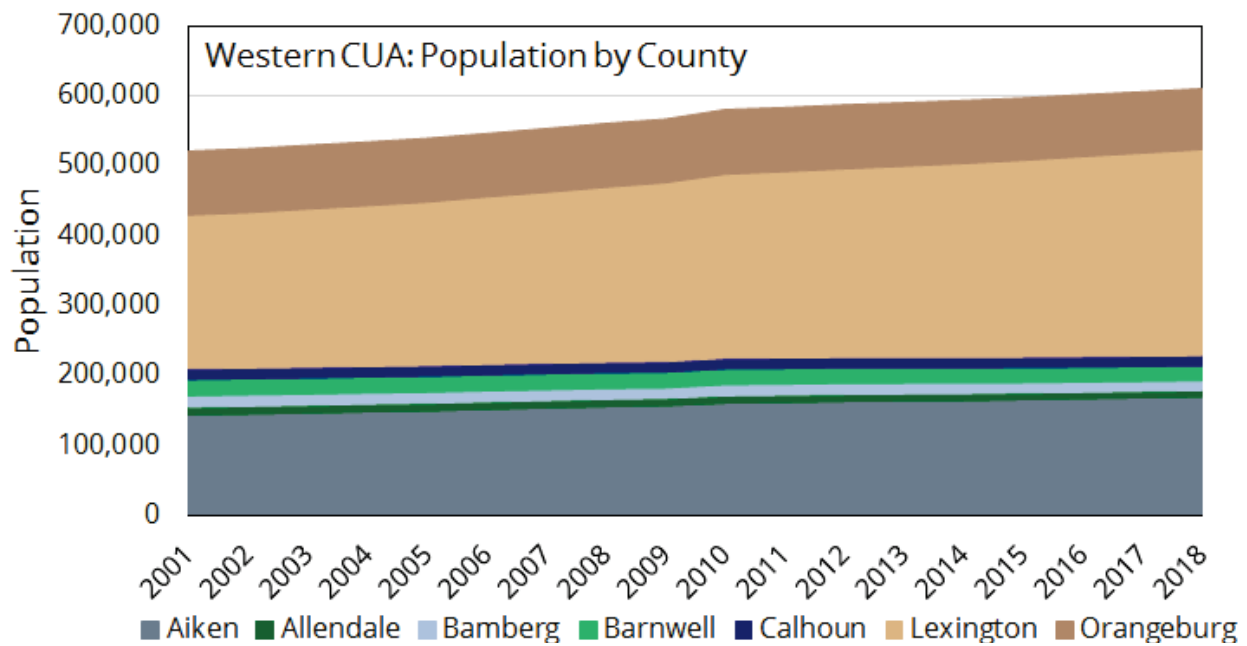


Figure 16: WCUA: Population by County, 2001-2018 (US Census Bureau)

### Western Area Irrigation

The increase in reported water use for irrigation may be the result of several factors including an increased volume per well, an increased number of wells, or an increase in the number of acres irrigated in the Western Area counties. These factors cannot be isolated and analyzed individually. From 2002 to 2018, both the number of reporting irrigation wells and reported water use increased (Figure 17). Part of the rapid increase in number of wells and reported water use beginning in 2014 is at least partly due to greater public awareness during the initial assessment of the Western Area counties. Greater public awareness led to increased compliance with the department reporting requirement under the Groundwater Use and Reporting Act (R.16-113). The increase in the number of irrigation wells and reported water use may not necessarily correspond to increased water withdrawal for each irrigation well (Figure 18).



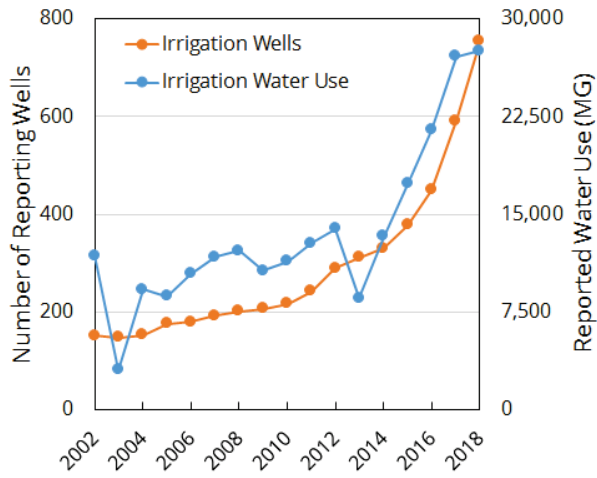


Figure 17: Number of Reporting Irrigation Wells and Reported Water for Irrigation From 2002 to 2018 for All Western Area Counties.

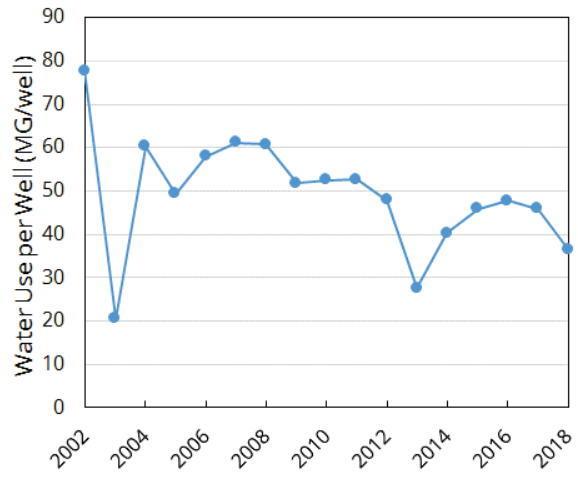


Figure 18: Reported Water Use Per Irrigation Well Reporting from 2002 To 2018 for All Western Area Counties. Calculated as Total Reported Water Use (MG)/Number of Reporting Wells.

## Groundwater Management Strategy

The goal of the Groundwater Management Plan is to outline a process to establish and implement a local groundwater management program in the WCUA so that the groundwater resources of the State be put to beneficial use to the fullest extent to which they are capable, subject to reasonable regulation, in order to conserve and protect these resources, prevent waste, and to provide and maintain conditions which are conducive to the development and use of water resources (Chapter 5, Section 49-5-20). In short, the goal is to develop and implement a sustainable use strategy. Ultimately, SC DHEC will use all available scientific data that allow for informed permitting decisions and monitoring for potential adverse effects. The key strategies to achieve these goals are outlined below.

### Strategy #1: Establish a Comprehensive Groundwater Monitoring Program

With increases in population, irrigated acreage, and a growing industrial base, water demand (from both surface and groundwater) is increasing at an expanding rate. Although water level declines are a normal response to groundwater withdrawals, not stabilizing these declines may cause serious impairment to the aquifers and groundwater quality of the region. SC DHEC will pursue partnerships with local entities, groundwater users, and other agencies (both Federal and State) to facilitate the most effective use of resources in designing and maintaining a monitoring network for the WCUA. Both SC DNR and SC DHEC maintain several groundwater level monitoring locations in the WCUA.

Although the WCUA has the most extensive groundwater monitoring network of all the Capacity Use Areas, expanding the current network will allow more accurate monitoring of groundwater level conditions and facilitate scientifically-based recommendations for strategies to address any stressed conditions identified in the aquifers used in the area (See Appendix A). The existing groundwater monitoring network with the additional locations is necessary to:

- Provide accurate data on the amount and rate of groundwater level changes;
- Provide groundwater withdrawers with timely and accurate information to effectively manage withdrawal activities;
- Establish the correlation between groundwater pumping and water level changes, both on a local and regional scale; and
- Guide management efforts to minimize potential impairment of the aquifers and track progress in reversing water level declines.

A goal for the comprehensive groundwater monitoring network should be a complete coverage and network of wells for each aquifer in each of the Western Area Counties. Additional actions to achieve this goal include the following:

- Cooperate with local, state, and federal partners to expand groundwater monitoring networks and sharing of well data;
- Promote partnerships in the state to identify wells that may be incorporated and of benefit to the well network; and

- Identify wells scheduled for abandonment that may be incorporated and of benefit to the well network.

## Strategy #2: Identify Geographic Areas of Concern and Level/Reduce Pumping Where Appropriate

Prior to each permit renewal cycle, SC DHEC will consider the best available information on the geologic and hydrogeologic characteristics of the aquifer(s) and groundwater withdrawals of the area to protect against or abate unreasonable, or potentially unreasonable, adverse effects on the aquifer(s) and water users of the WCUA. Measures that SC DHEC may require applicants, permit holders, and groundwater withdrawers to take may include, but not be limited to, the following:

- Reduce/Level groundwater withdrawals in areas of concentrated pumping;
- Reduce/Level groundwater withdrawals in areas where it is found to be in the public interest or general welfare, or to protect the water resource;
- Utilize other available freshwater aquifers than those currently used;
- Utilize conjunctive use of aquifers, or waters of less desirable quality, where water quality of a specific character is not essential;
- Utilize the groundwater model of the coastal aquifers that has been developed by the USGS and SC DNR to determine the potential for adverse effects;
- Prohibit the hydraulic connection of aquifers that could result in deterioration of water quality in freshwater aquifers;
- Implement abandonment of wells, which will be filled with cement grout, plugged, and sealed;
- Implement abandonment of wells that have penetrated zones of undesirable water quality where such wells are found to cause contamination of freshwater aquifers where undesirable water quality is defined as not meeting the standards for Class GB Waters as listed in *Water Classifications & Standards*, R.61-68.H.9;
- Implement construction and use of observation or monitoring wells;
- Implement reasonable and practical methods to conserve and protect the water resources and to avoid or minimize adverse effects of the quantity and quality of water available to persons whose water supply has been materially reduced or impaired as a result of groundwater withdrawals; and
- Implement such other necessary and appropriate control or abatement techniques as are technically feasible.

## Strategy #3: Review Permit Applications Based on Demonstrated Reasonable Use

Proposed withdrawals will be evaluated considering reasonable use and need, aquifer(s) being utilized, potential adverse effects on adjacent groundwater withdrawers, previous reported water use, anticipated demand for the proposed activities, availability of alternate water sources, and reported water use at facilities with similar activities. Applications for

groundwater withdrawal will incorporate a “Water Use Plan” or a “Best Management Strategy” detailing actual or proposed water use activities and all conservation techniques for site specific water management including, but not limited, to:

- Provide appropriate documentation that the proposed water use is a beneficial use of the resource and necessary to meet the reasonable needs of the applicant;
- Describe in detail the applications for which the water is being withdrawn and approximate quantities utilized in each application;
- Identify the aquifer(s) currently utilized and the hydrogeologic (groundwater quality, specific capacity/yield, etc.) factors for utilization, and if a less utilized aquifer is suitable to meet the facility’s need;
- Identify additional or alternate sources of water, including surface water, effluent, or recycled water, among others, suitable to meet the needs of the applicant and supplement, minimize, or eliminate groundwater sources;
- Identify reasonable and appropriate conservation methods or practices that maximize efficiency of current water use and reduce current water demand; and
- Identify any existing or anticipated adverse effects on other groundwater withdrawers, including public use, and strategies to eliminate or minimize these effects.

#### Strategy #4: Establish an Educational Plan for the General Public and Existing Groundwater Withdrawers

General public, stakeholder, and permittee education outreach and awareness are a cornerstone to the development of successful water management strategies. SC DHEC will coordinate with the Stakeholder Workgroup and other appropriate partners to develop educational resources, strategies, and incentives for conservation. An effective water management educational plan should incorporate the following:

- Provide audience-based public education and outreach programs;
- Provide best available information on current systematic and industry-based standards;
- Engage with state and local governments;
- Establish and promote conservation measures through:
  1. Enhanced water use efficiency;
  2. Identification of water losses and establishment of corrective actions; and
  3. Preparation for water shortages and implementation of appropriate responses.

#### Strategy #5: Manage Through Regulation and Planning

The Groundwater Use and Reporting Act provides for regulation of water withdrawals in South Carolina. Groundwater regulation is necessary to conserve and protect these resources; prevent waste; and to provide and maintain conditions which are conducive to the development and use of water resources. As data are developed on the groundwater

resources of the designated Capacity Use Areas, the regulations will be reviewed to ensure adequate adherence to the legislative declaration of policy laid out in Title 49, Chapter 5-20.

SC DNR is responsible for developing and updating the State Water Plan. A groundwater model of the coastal aquifers has been developed by the USGS and SC DNR. As the results of the modeling effort and the updates to the State Water Plan become available, they will help inform potential regulatory and policy changes and will be incorporated into this Groundwater Management Plan.

### Strategy #6: Establish A Plan for Continual Stakeholder Engagement And Awareness Of Groundwater Development

As part of the permitting process, stakeholder involvement, comment, and recommendations will be incorporated during the public comment period of the permit application. SC DHEC requires groundwater withdrawers to post a public notice in a newspaper of general circulation for one day within the CUA in which the groundwater is to be withdrawn. SC DHEC additionally posts public notices for the entirety of the 30-day public comment period on the Environmental Public Notices page of the official SC DHEC website. Continuous engagement with stakeholders and other interested persons is important to promote awareness of groundwater development and general education. An effective plan for continued engagement should incorporate the following:

- Maintain the Stakeholder Workgroup that is diverse in geographic and type-use representation to serve in an advisory role and as a partner for engagement within the WCUA communities;
- Provide and maintain the Stakeholder Workgroup to receive direct notice of proposed permitting actions during the public notice period;
- Provide the Stakeholder Workgroup a forum for SC DHEC to present each quinquennial draft GMP Report, receive comments for consideration as the draft is finalized, and evaluate whether considerations are needed for an updated GMP and a reconvening of the Stakeholder Workgroup to do such; and
- Provide the Stakeholder Workgroup an annual update of water use and conditions in the WCUA.

## Groundwater Management Plan Reports

Every 5 years, total annual groundwater withdrawals will be compiled and compared to available aquifer potentiometric maps. The report will include the following information:

- Listing of all permitted withdrawers, permitted withdrawal limits, and average groundwater withdrawal;
- Evaluation of withdrawal by category and by aquifer; and
- Identification of the aquifer(s) and area(s) with observed and potential adverse effects and all withdrawers utilizing the aquifer(s).

Based on the information developed for the plan report, modifications of groundwater withdrawals in identified areas will be reviewed and subsequently the Groundwater Management Plan may be amended. The report will also evaluate, as information is developed, changes in water quality of the aquifers, available storage capacity of the aquifers, project future rates of withdrawal, and estimate future groundwater declines from the projected withdrawal rates. Through time, a safe sustainable yield for each aquifer will be developed and subsequent withdrawal limits will be based on this available yield. The final report and updated GMP will be shared with the stakeholders and the permit renewals will be issued consistent with the report and the plan.

## **Appendix A**

South Carolina Department of Natural Resources  
Groundwater Monitoring Network Hydrographs  
Western Capacity Use Area Counties

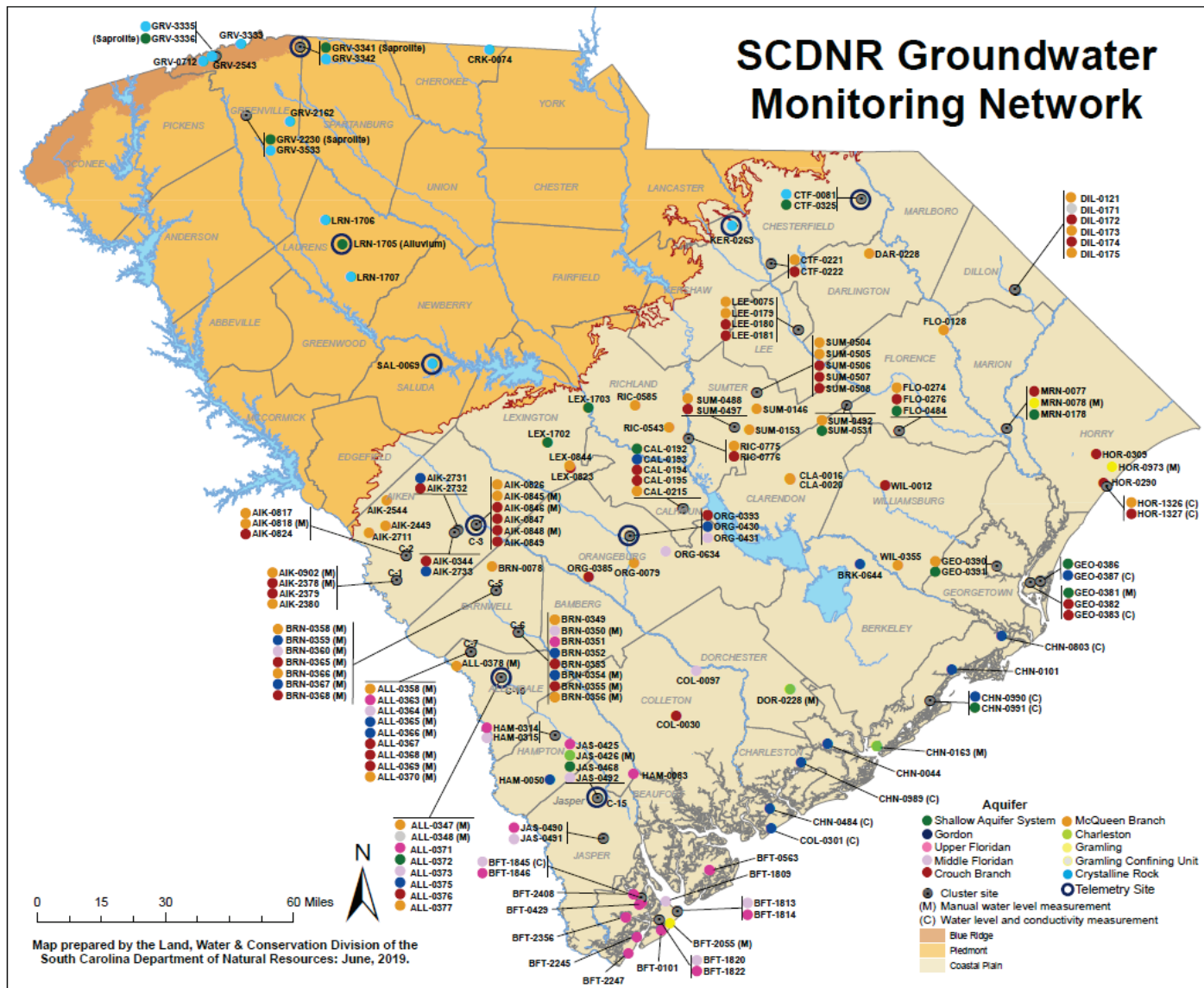
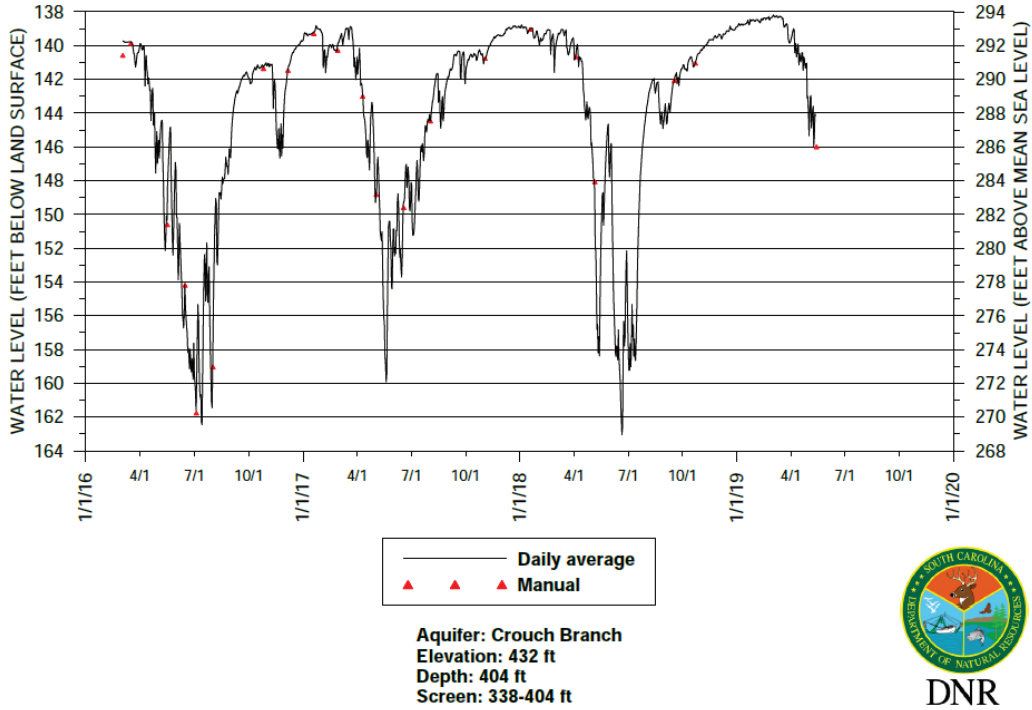


Figure A-19. Map indicating the locations of the wells in the SC DNR groundwater monitoring network. The following pages contain the current hydrographs for each Western Area County with the exception of Bamberg County in which there are no network wells.

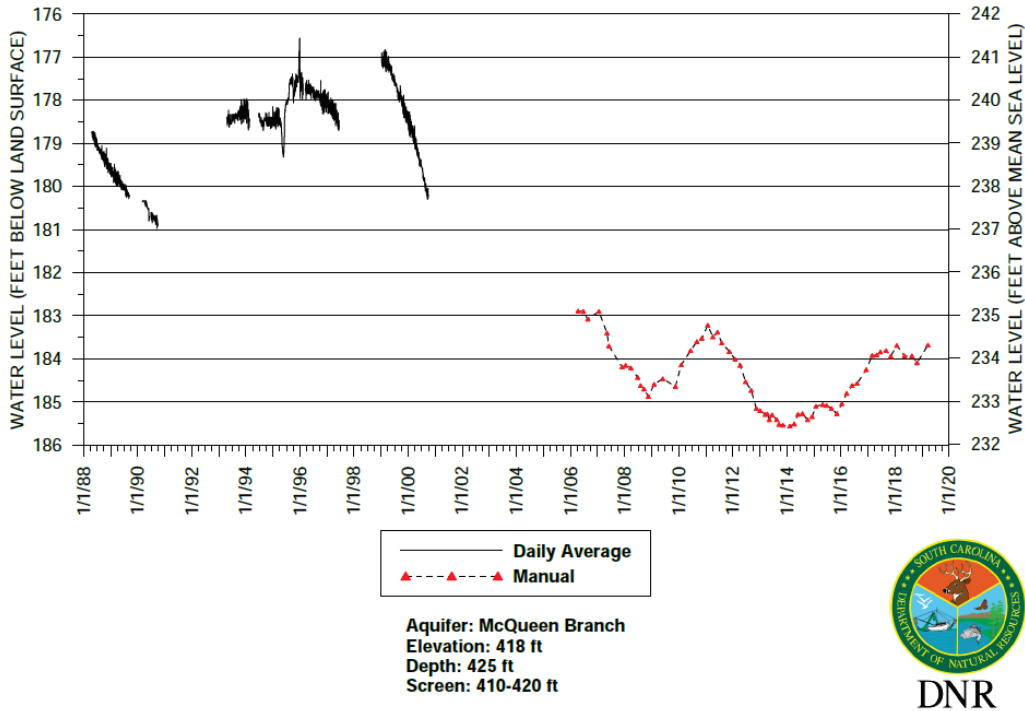


# Aiken County

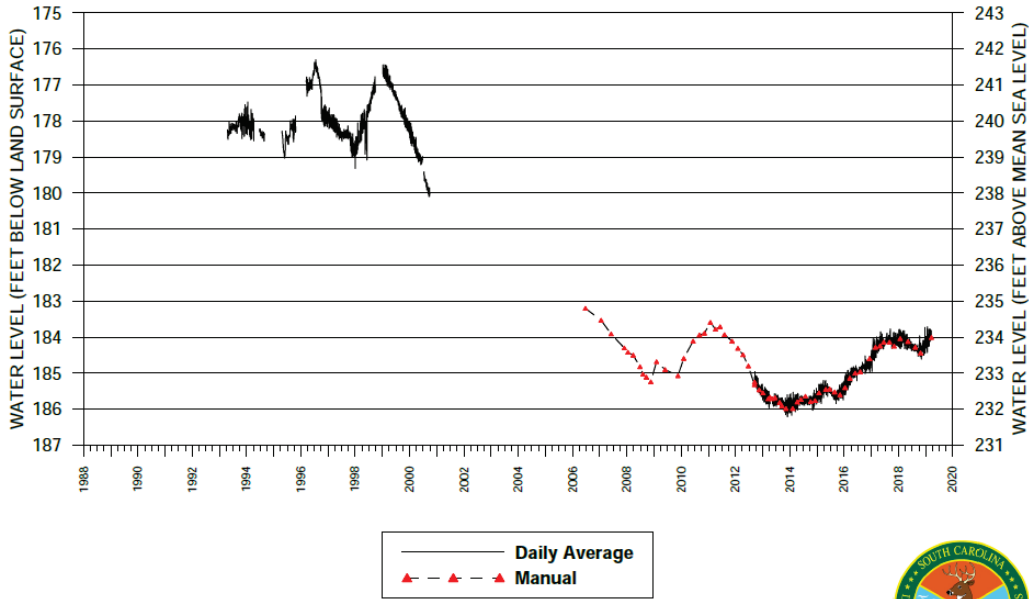
## AIK-0344 Daily Average and Manual Water Levels



## AIK-0818 (C-2) Daily Average and Manual Water Levels



**AIK-0824 (C-2) Daily Average and Manual Water Levels**

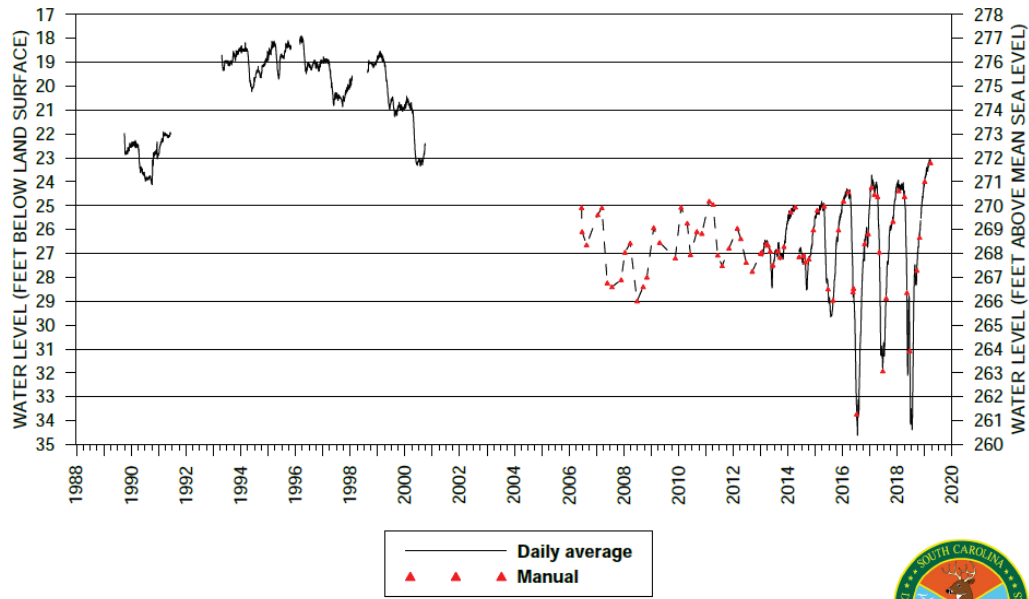


— Daily Average  
 - - - Manual

**Aquifer: Crouch Branch**  
**Elevation: 418 ft**  
**Depth: 365 ft**  
**Screen: 350-360 ft**



**AIK-0826 (C3) Daily Average and Manual Water Levels**

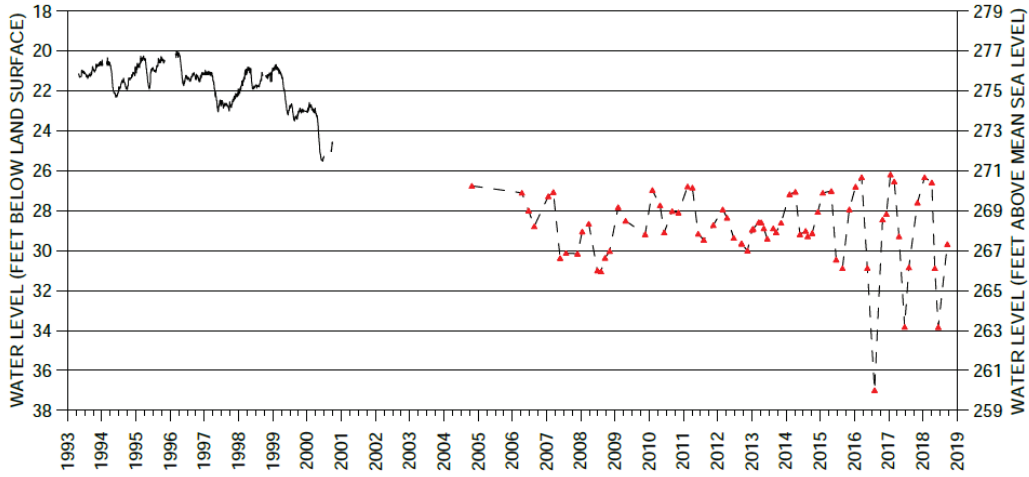


— Daily average  
 - - - Manual

**Aquifer: McQueen Branch**  
**Elevation: 295 ft**  
**Depth: 500 ft**  
**Screen: 485-495 ft**



**AIK-0845 (C3) Daily Average and Manual Water Levels**



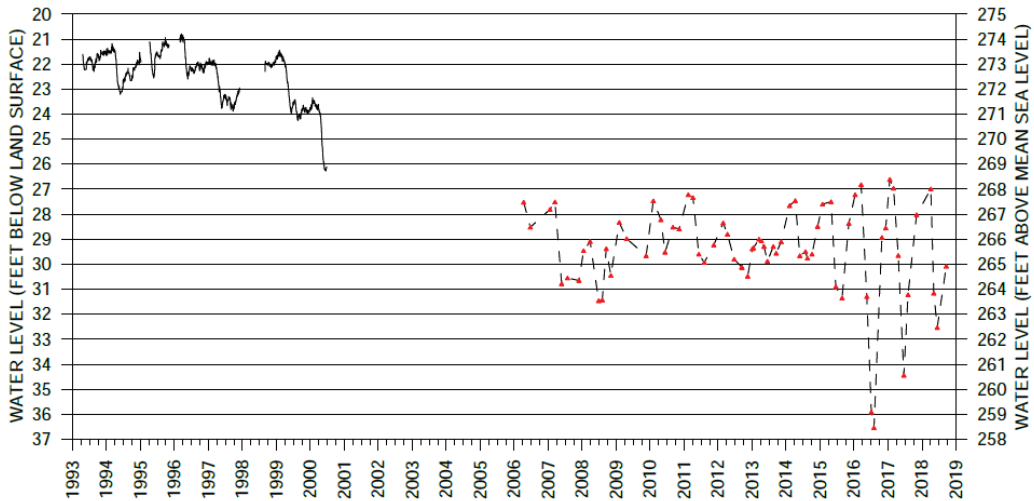
— Daily average  
 ▲ — ▲ — ▲ Manual

**Aquifer: McQueen Branch**  
**Elevation: 297 ft**  
**Depth: 356 ft**  
**Screen: 341-351 ft**



**DNR**

**AIK-0846 (C3) Daily Average and Manual Water Levels**



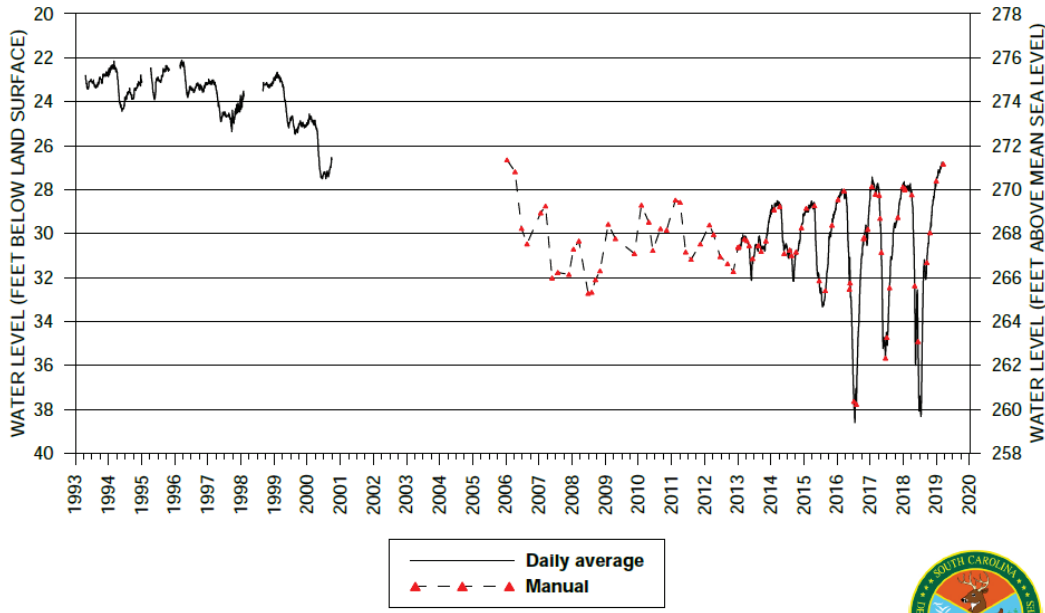
— Daily average  
 ▲ — ▲ — ▲ Manual

**Aquifer: Crouch Branch**  
**Elevation: 295 ft**  
**Depth: 255 ft**  
**Screen: 240-250 ft**



**DNR**

**AIK-0847 (C3) Daily Average and Manual Water Levels**

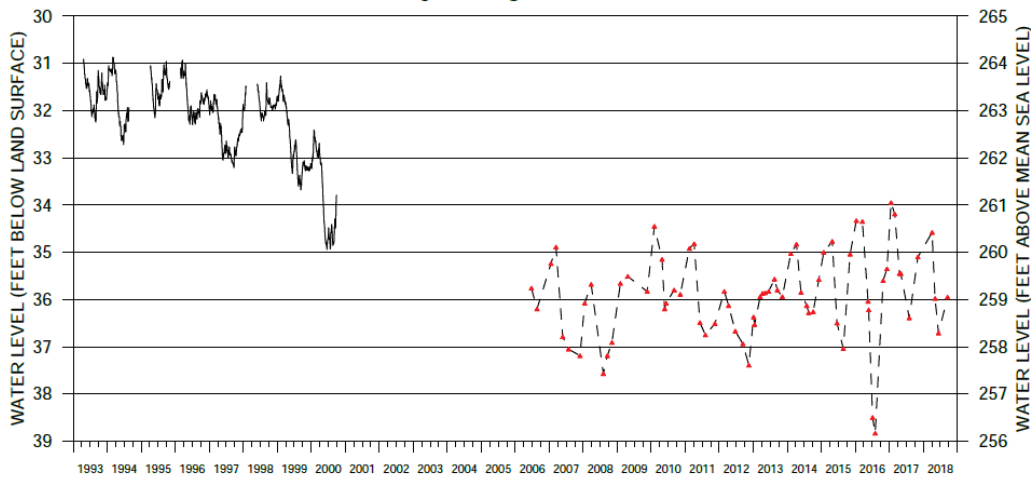


— Daily average  
 ▲ - - - Manual

**Aquifer: Crouch Branch**  
**Elevation: 298 ft**  
**Depth: 193 ft**  
**Screen: 178-188 ft**



**AIK-0848 (C3) Daily Average and Manual Water Levels**

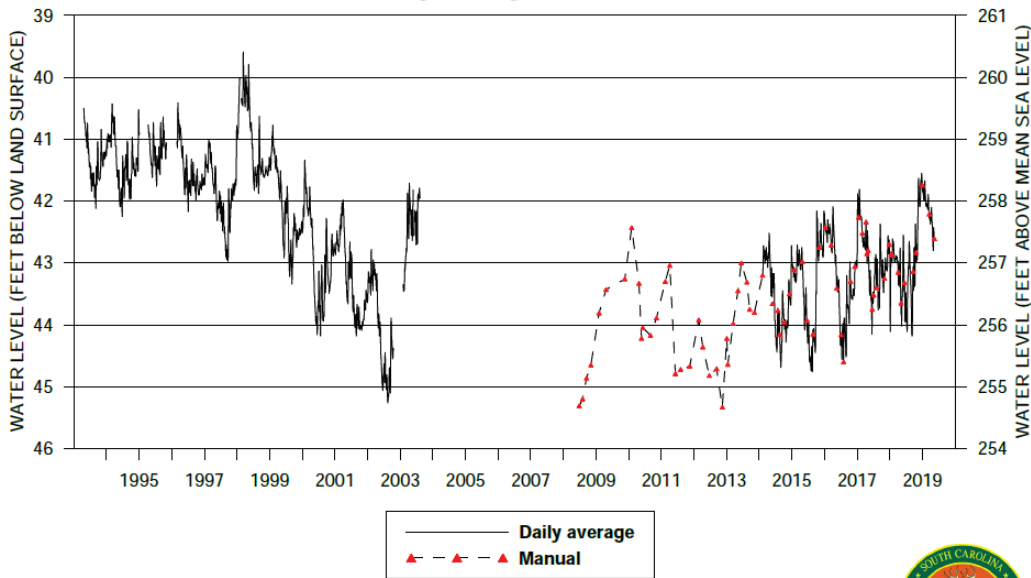


— Daily average  
 ▲ - - - Manual

**Aquifer: Crouch Branch**  
**Elevation: 295 ft**  
**depth: 131 ft**  
**Screen: 116-126 ft**



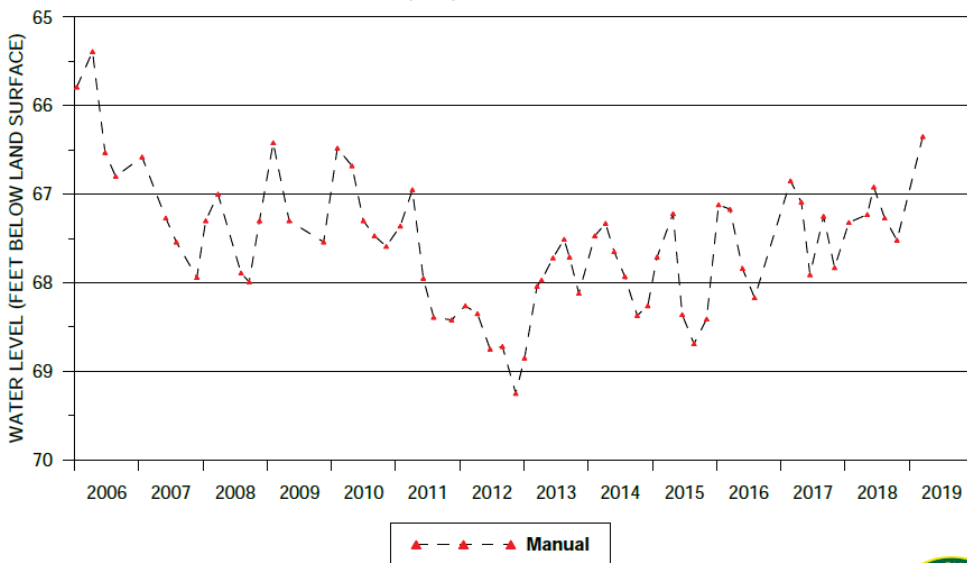
**AIK-0849 (C3) Daily Average and Manual Water Levels**



Aquifer: Crouch Branch  
 Elevation: 300 ft  
 Depth: 97 ft  
 Screen: 82-92 ft



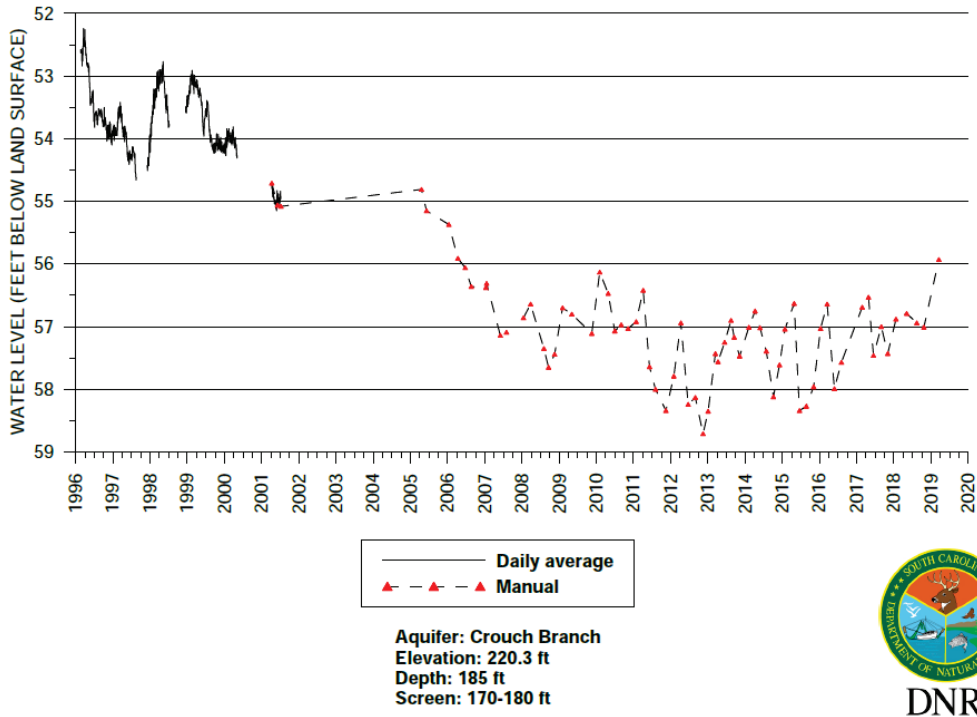
**AIK-0902 (C-1) Manual Water Levels**



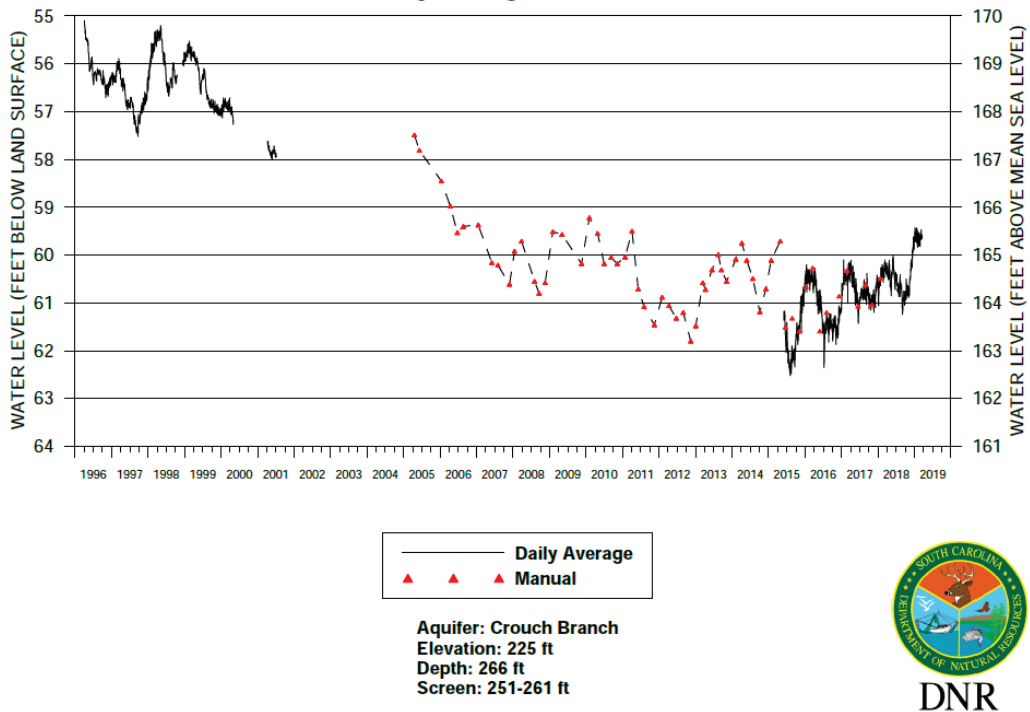
Aquifer: McQueen Branch  
 Elevation: 225 ft  
 Depth: 511 ft  
 Screen: 496-506 ft



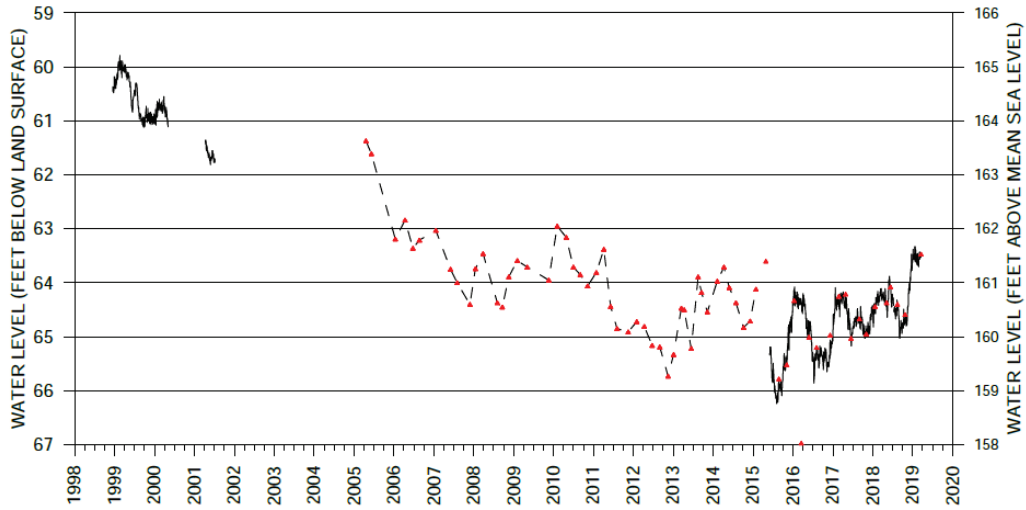
**AIK-2378 (C1) Daily Average and Manual Water Levels**



**AIK-2379 (C1) Daily Average and Manual Water Levels**



**AIK-2380 (C1) Daily Average and Manual Water Levels**

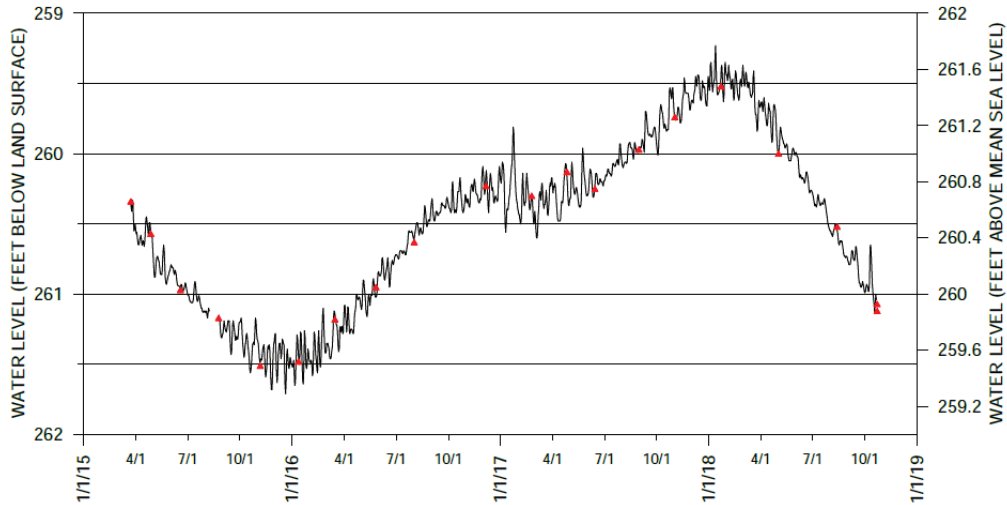


Daily average  
 Manual

**Aquifer: McQueen Branch**  
**Elevation: 225 ft**  
**Depth: 385 ft**  
**Screen: 370-380 ft**



**AIK-2449 Daily Average and Manual Water Levels**

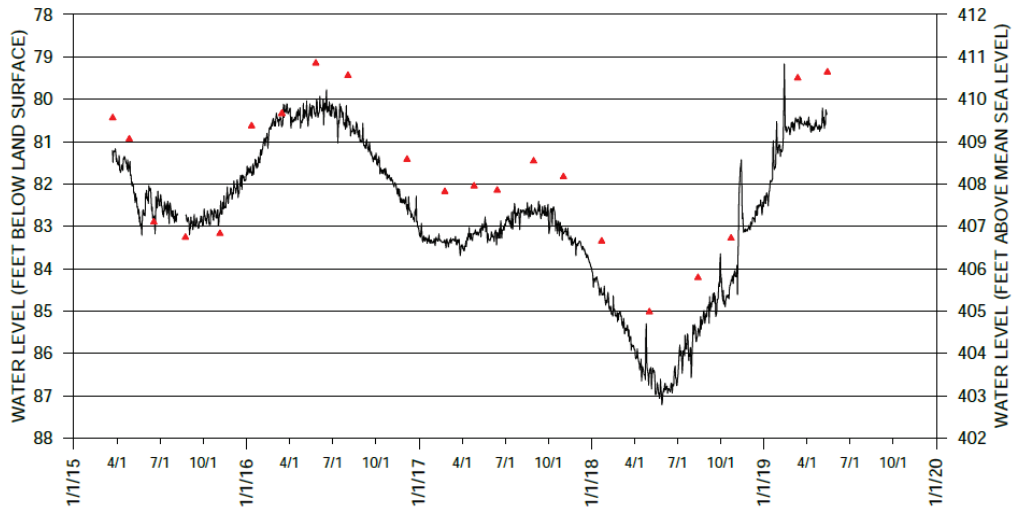


Daily Average  
 Manual

**Aquifer: McQueen Branch**  
**Elevation: 494 ft**  
**Depth: 309 ft**  
**Screen: 289-309 ft**



**AIK-2544 Daily Average and Manual Water Levels**

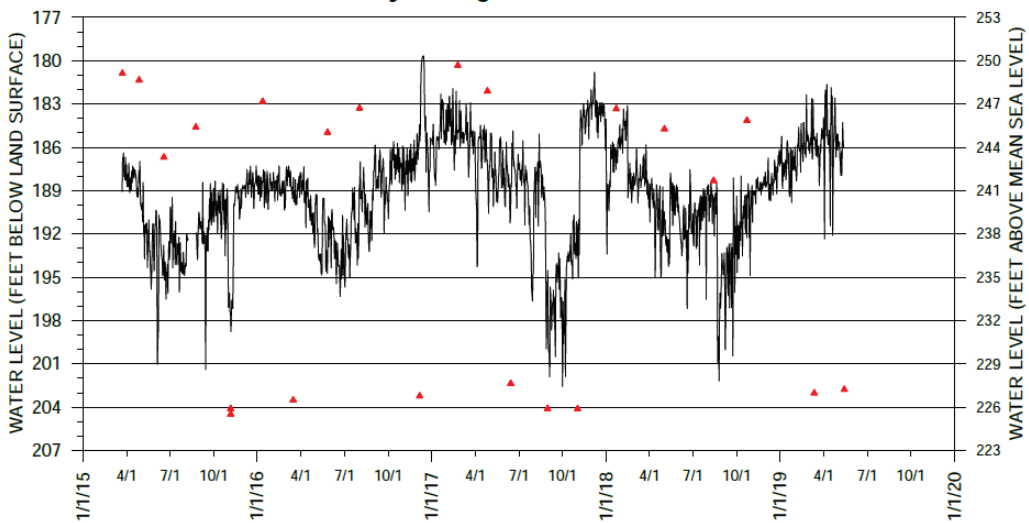


— Daily Average  
 ▲ ▲ ▲ Manual

**Aquifer: McQueen Branch**  
**Elevation: 490 ft**  
**Depth: 130 ft**  
**Screen: 100-130 ft**



**AIK-2711 Daily Average and Manual Water Levels**



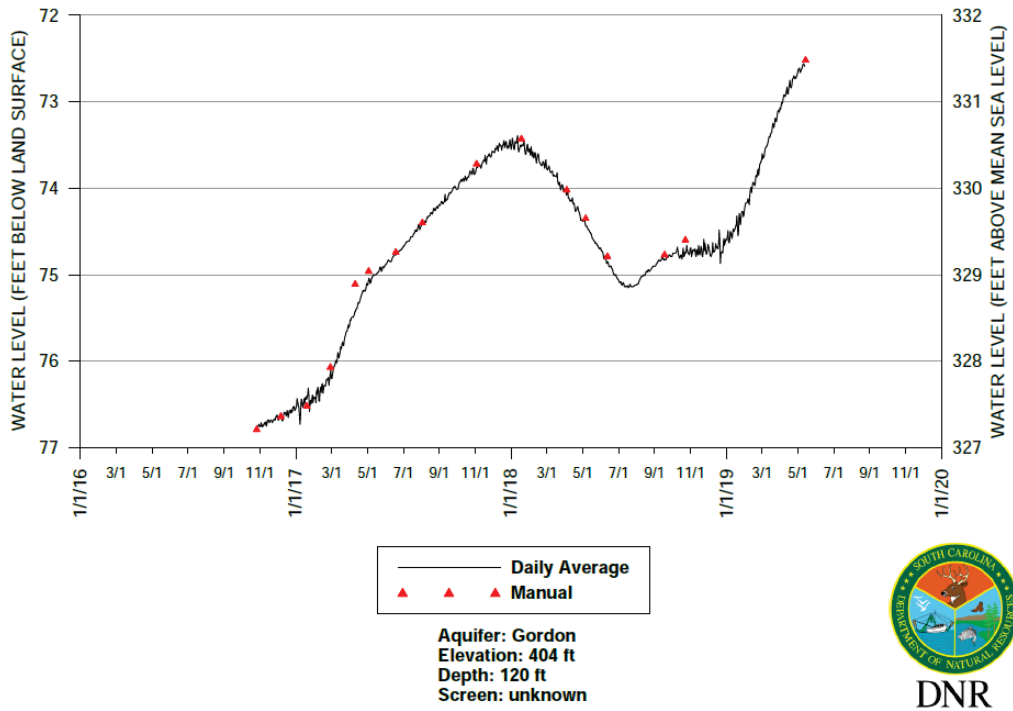
— Daily Average  
 ▲ ▲ ▲ Manual

**Aquifer: McQueen Branch**  
**Elevation: 430 ft**  
**Depth: 239 ft**  
**Screen: 209-239 ft**

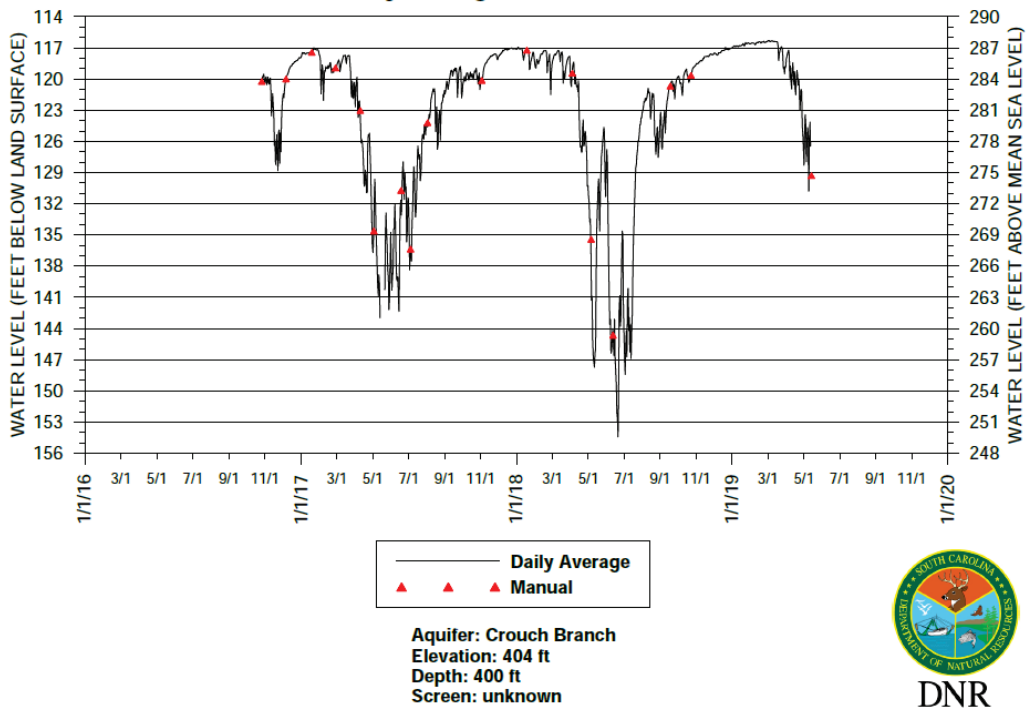




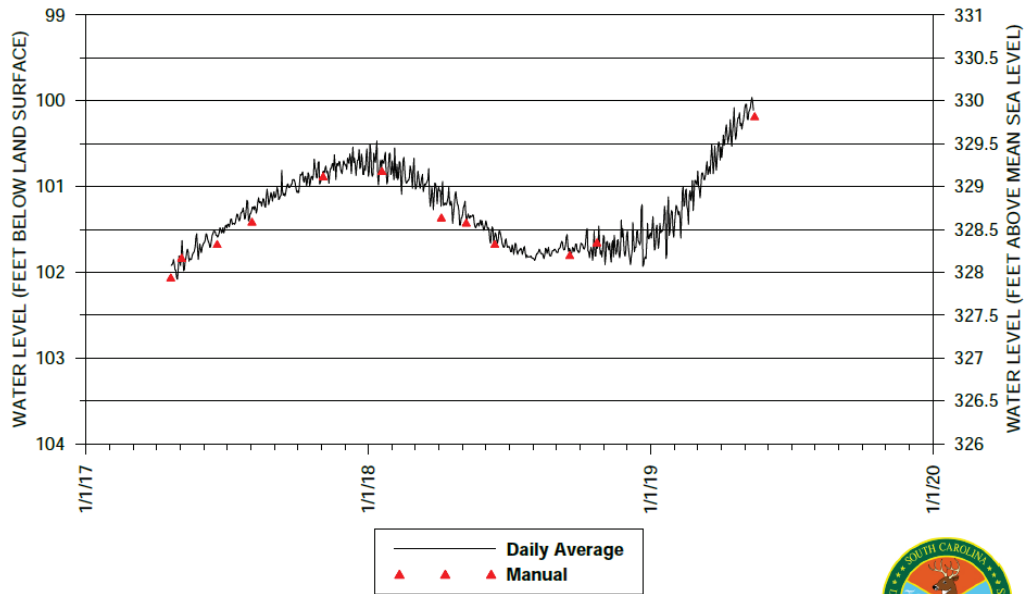
**AIK-2731 Daily Average and Manual Water Levels**



**AIK-2732 Daily Average and Manual Water Levels**



### AIK-2733 Daily Average and Manual Water Levels

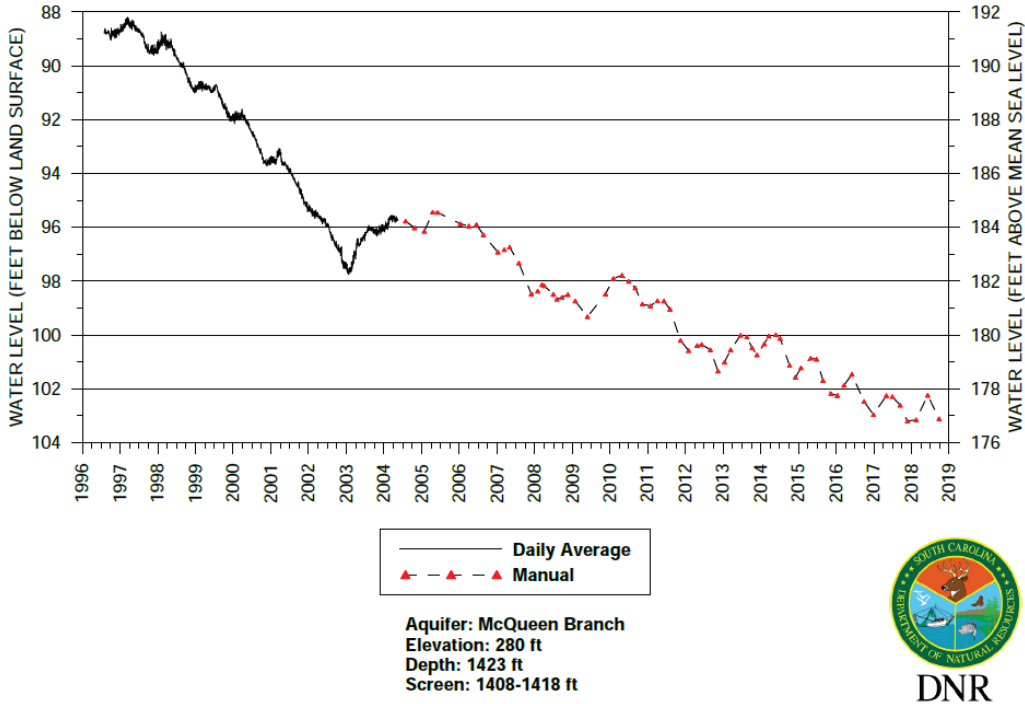


Quifer: Shallow Aquifer System  
Elevation: 430 ft  
Depth: 170 ft  
Screen: 160-170 ft

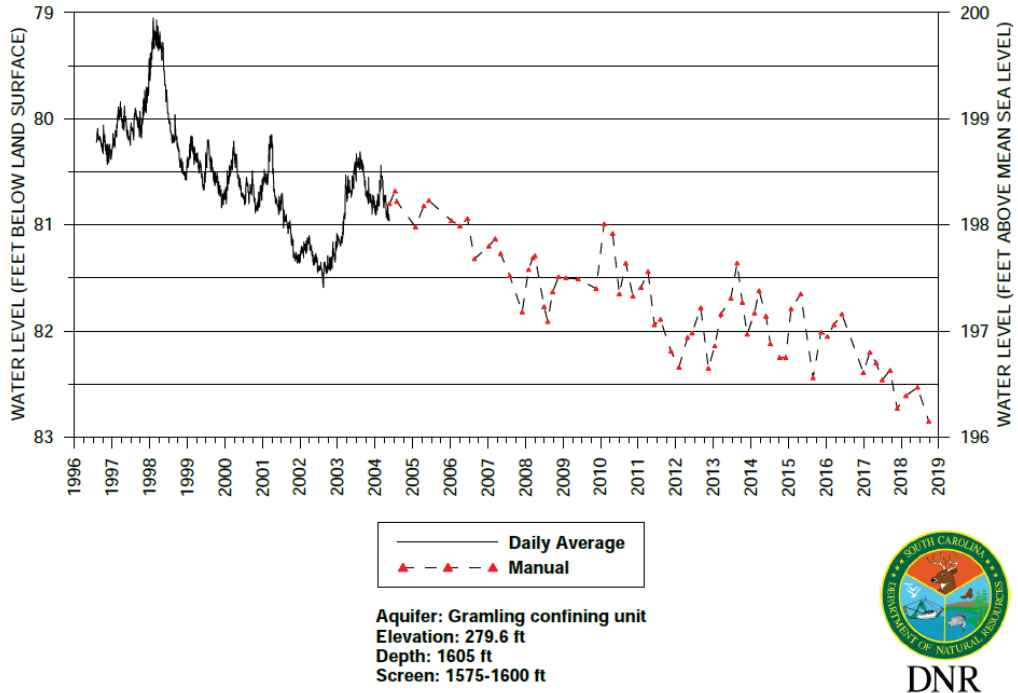


# Allendale County

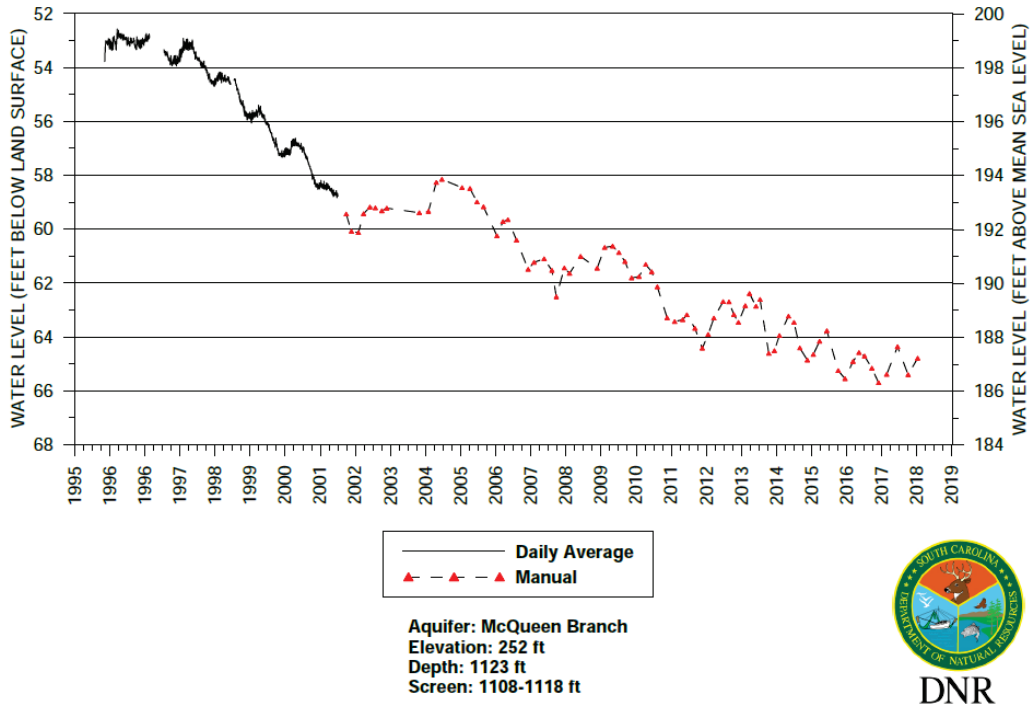
### ALL-0347 (C-10) Daily Average and Manual Water Levels



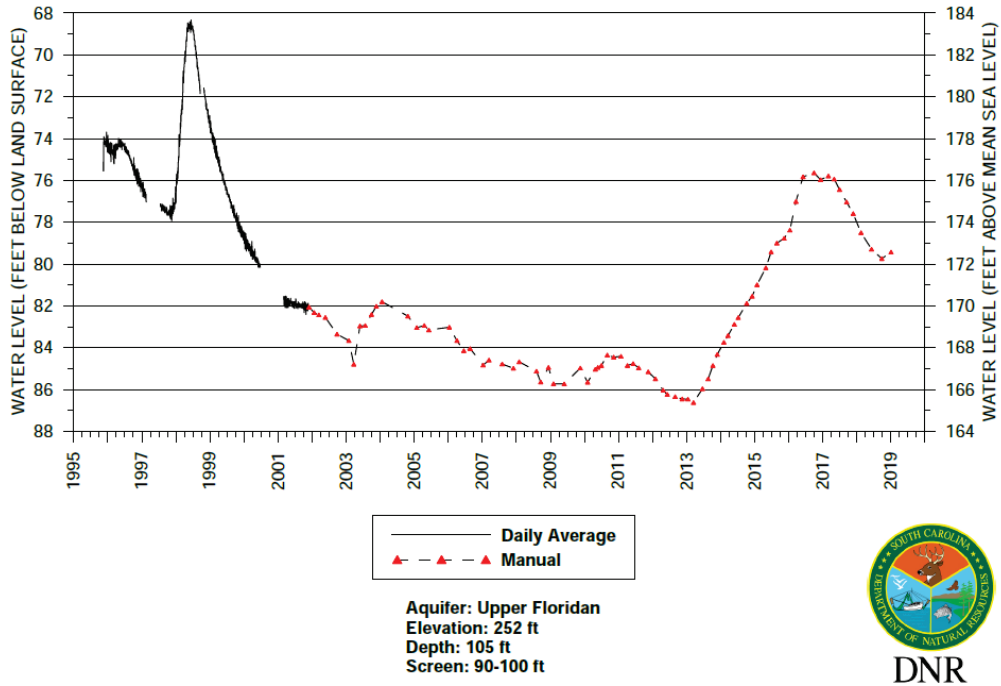
### ALL-0348 (C-10) Daily Average and Manual Water Levels



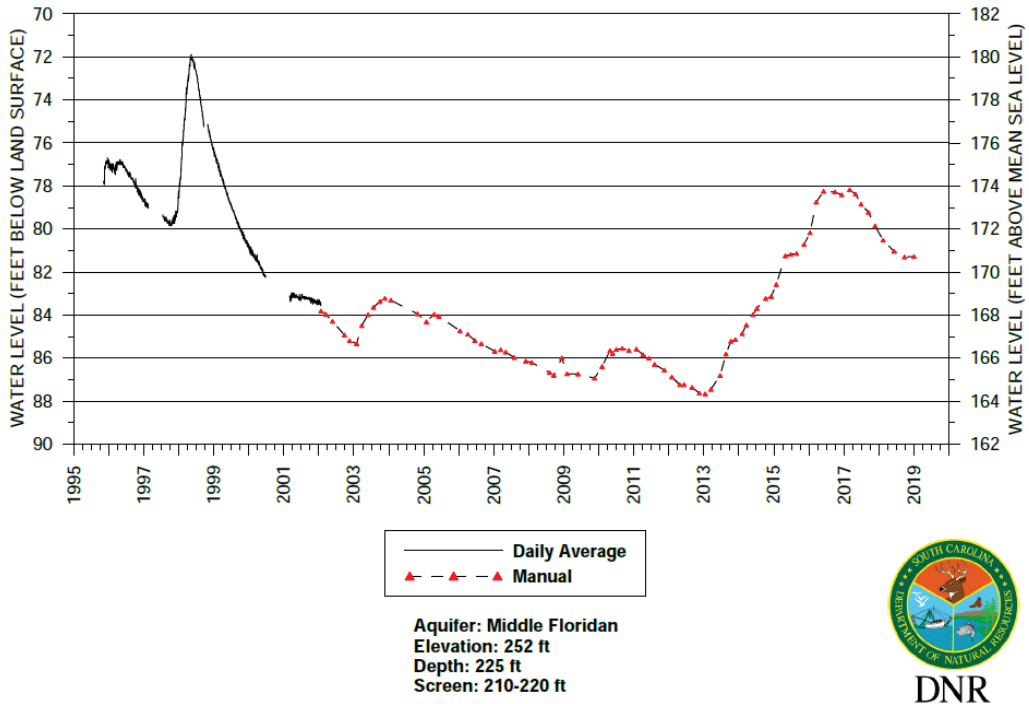
**ALL-0358 (C-7) Daily Average and Manual Water Levels**



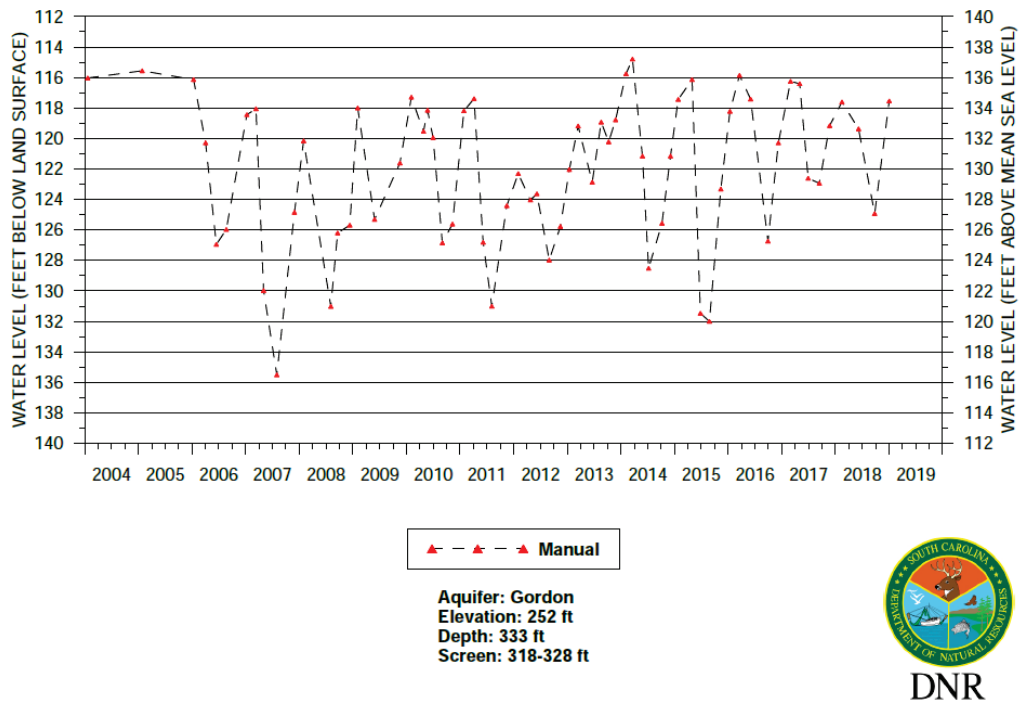
**ALL-0363 Daily Average and Manual Water Levels**



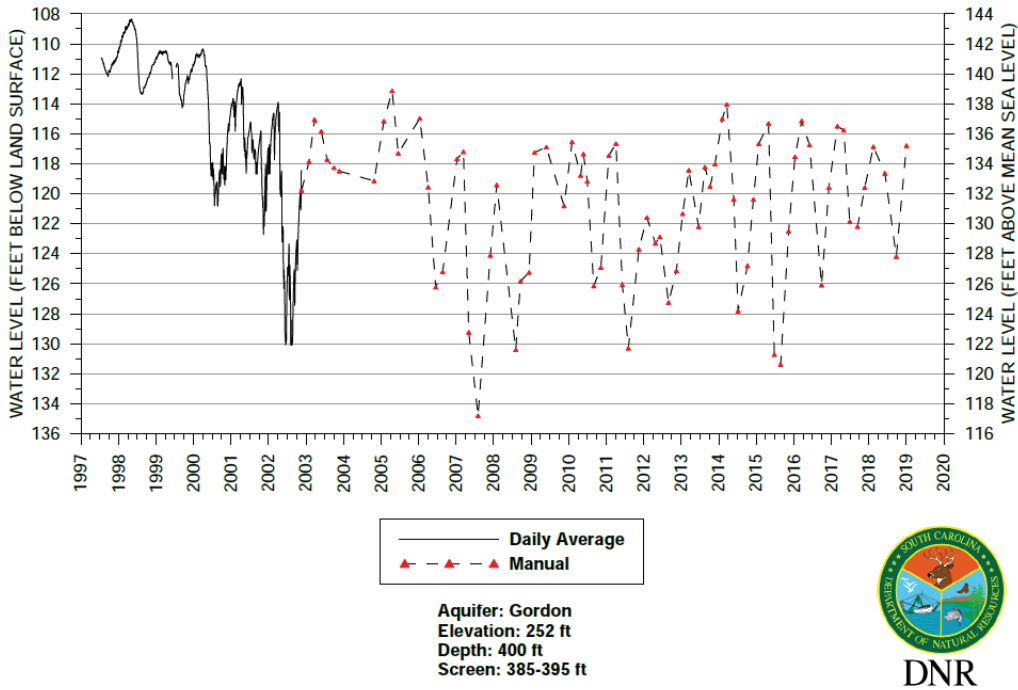
**ALL-0364 (C-7) Daily Average and Manual Water Levels**



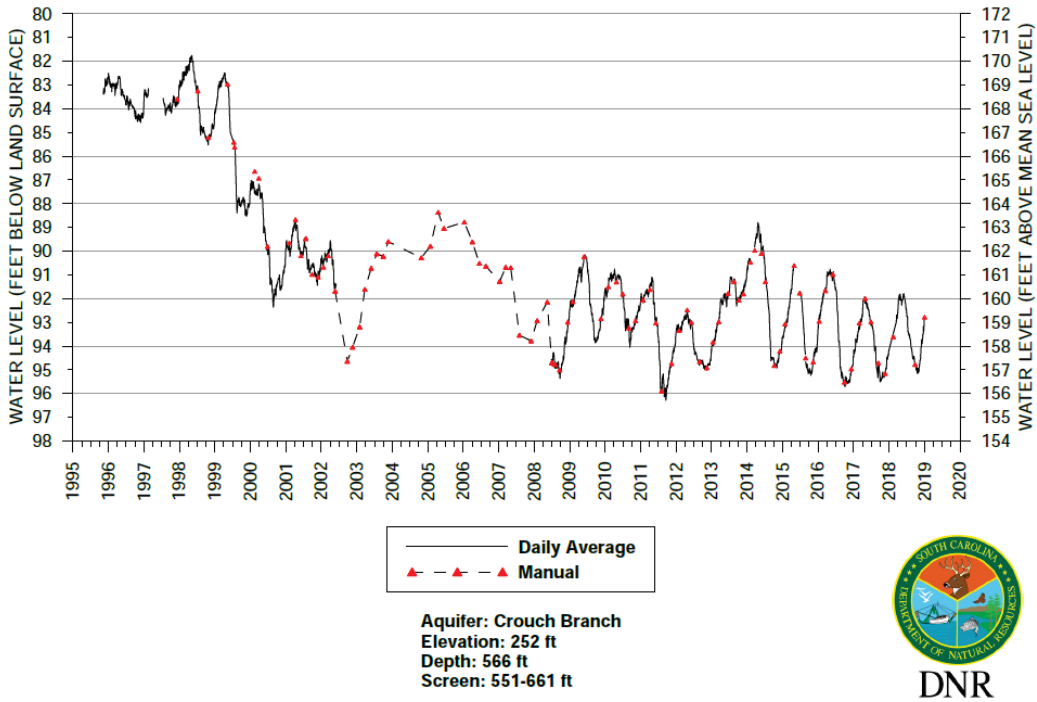
**ALL-0365 (C-7) Manual Water Levels**



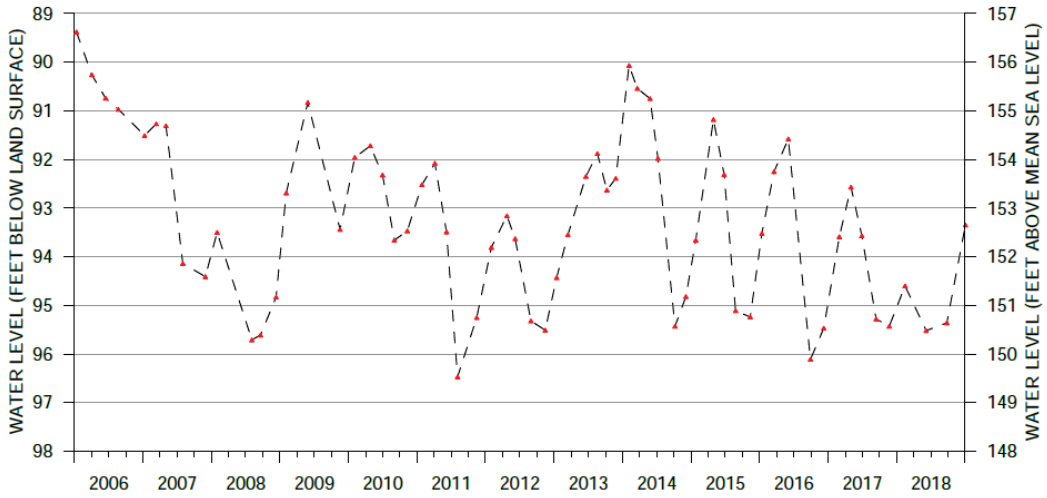
**ALL-0366 (C-7) Daily Average and Manual Water Levels**



**ALL-0367 (C-7) Daily Average and Manual Water Levels**



**ALL-0368 (C-7) Manual Water Levels**

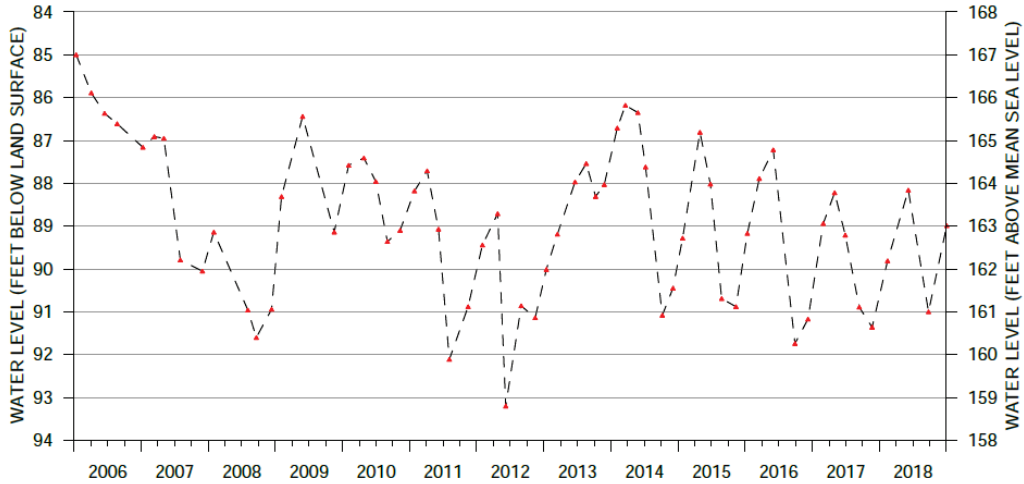


▲ - - ▲ - - ▲ Manual

**Aquifer: Crouch Branch  
Elevation: 246.6 ft  
Depth: 691 ft  
Screen: 676-686 ft**



**ALL-0369 (C-7) Manual Water Levels**

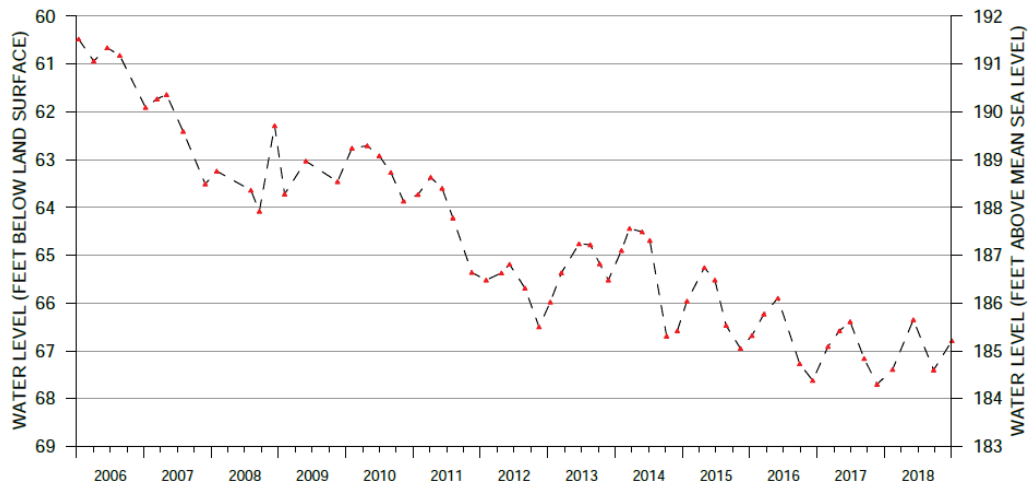


▲ - - ▲ - - ▲ Manual

**Aquifer: Crouch Branch  
Elevation: 252 ft  
Depth: 800 ft  
Screen: 785-795 ft**



**ALL-0370 (C-7) Manual Water Levels**

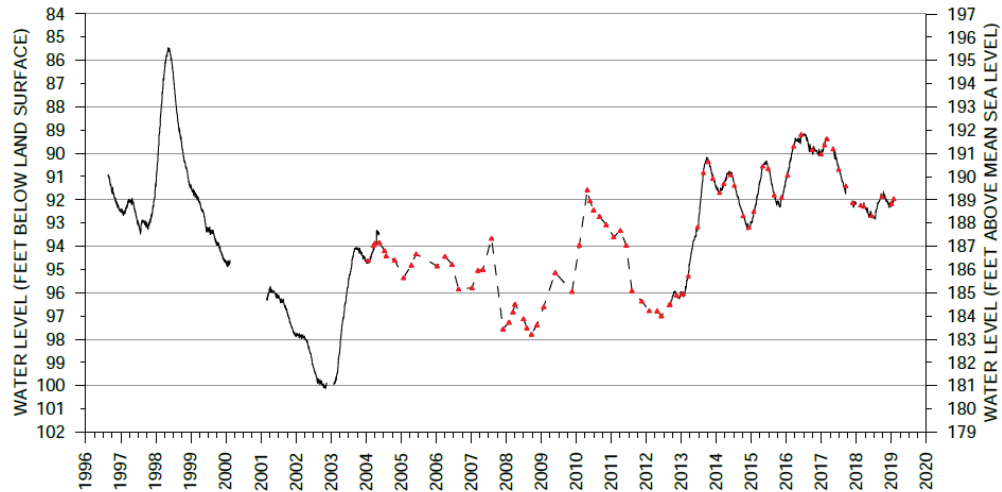


▲ - - ▲ Manual

**Aquifer: McQueen Branch  
Elevation: 252 ft  
Depth: 975 ft  
Screen: 960-970 ft**



**ALL-0371 (C-10) Daily Average and Manual Water Levels**



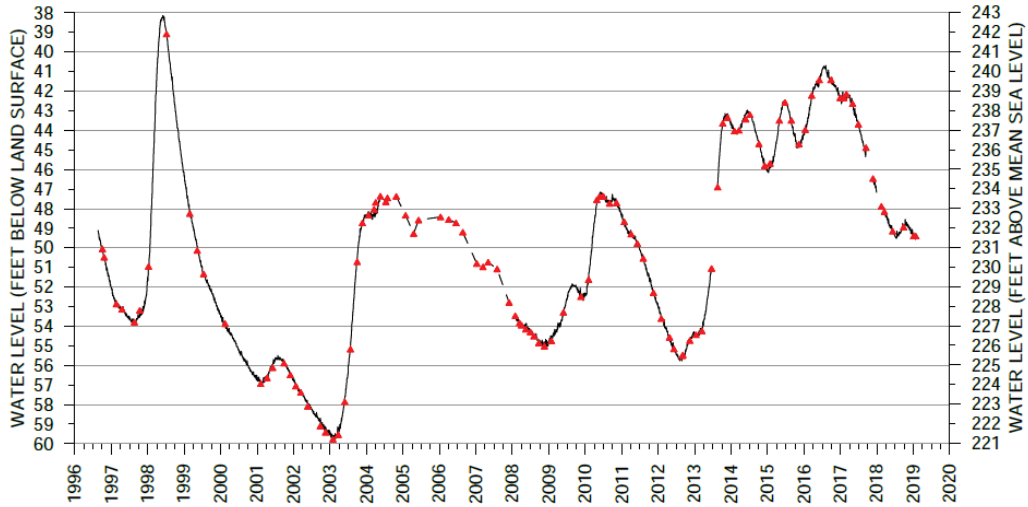
— Daily Average  
▲ - - ▲ Manual

**Aquifer: Upper Floridan  
Elevation: 281 ft  
Depth: 217 ft  
Screen: 192-212 ft**





**ALL-0372 (C-10) Daily Average and Manual Water Levels**

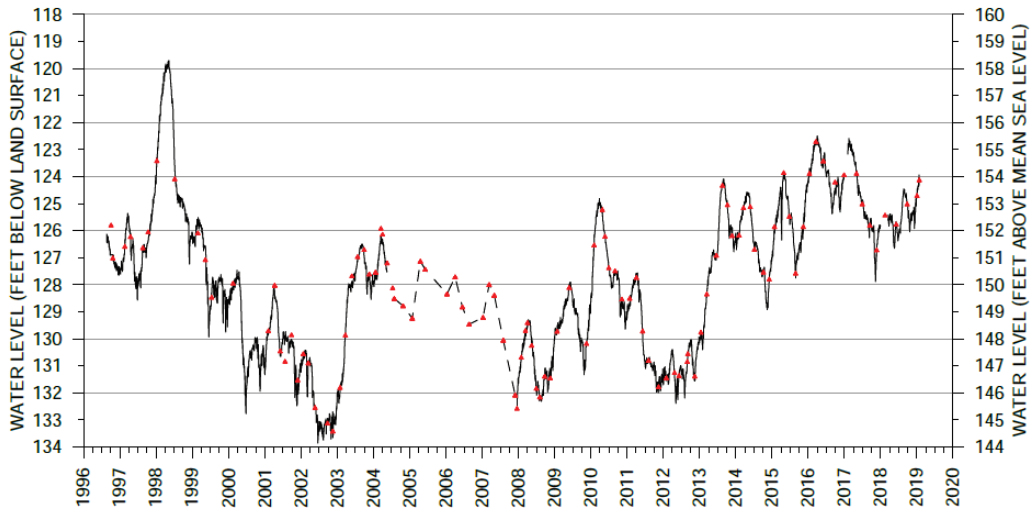


— Daily Average  
 ▲ Manual

**Aquifer: Upper Floridan**  
**Elevation: 281 ft**  
**Depth: 155 ft**  
**Screen: 140-150 ft**



**ALL-0373 (C-10) Daily Average and Manual Water Levels**

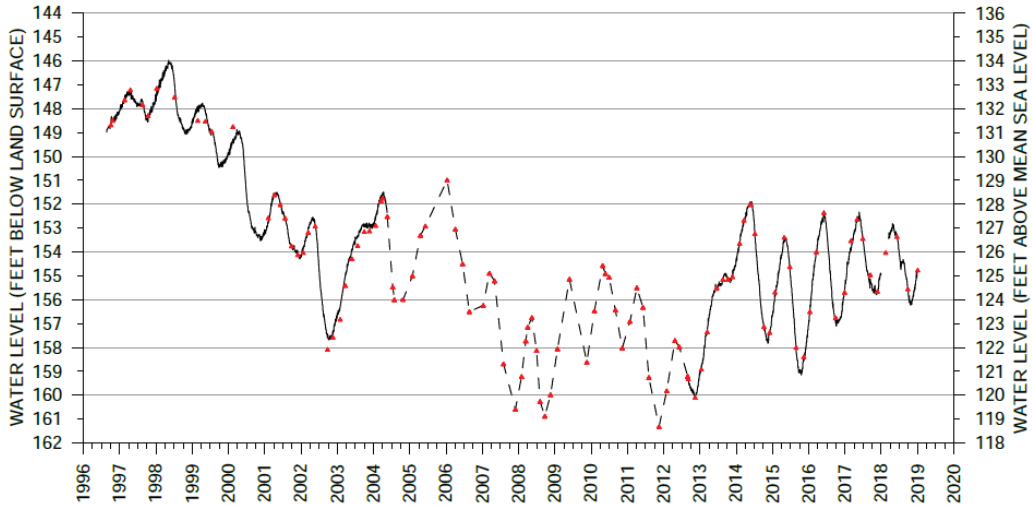


— Daily Average  
 ▲ Manual

**Aquifer: Middle Floridan**  
**Elevation: 278 ft**  
**Depth: 372 ft**  
**Screen: 327-367 ft**



**ALL-0375 (C-10) Daily Average and Manual Water Levels**

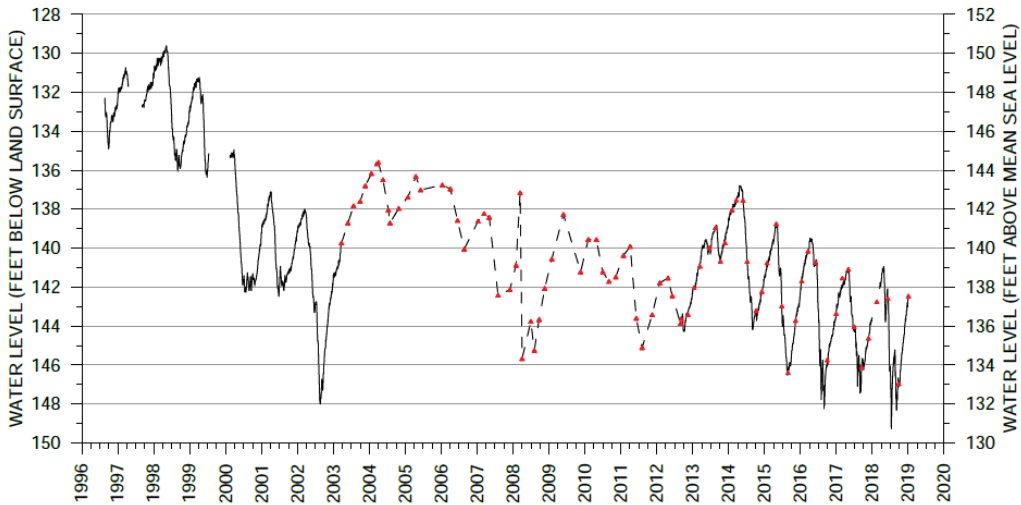


— Daily Average  
 ▲ Manual

**Aquifer: Gordon**  
**Elevation: 280 ft**  
**Depth: 583 ft**  
**Screen: 453-578 ft**



**ALL-0376 (C-10) Daily Average and Manual Water Levels**

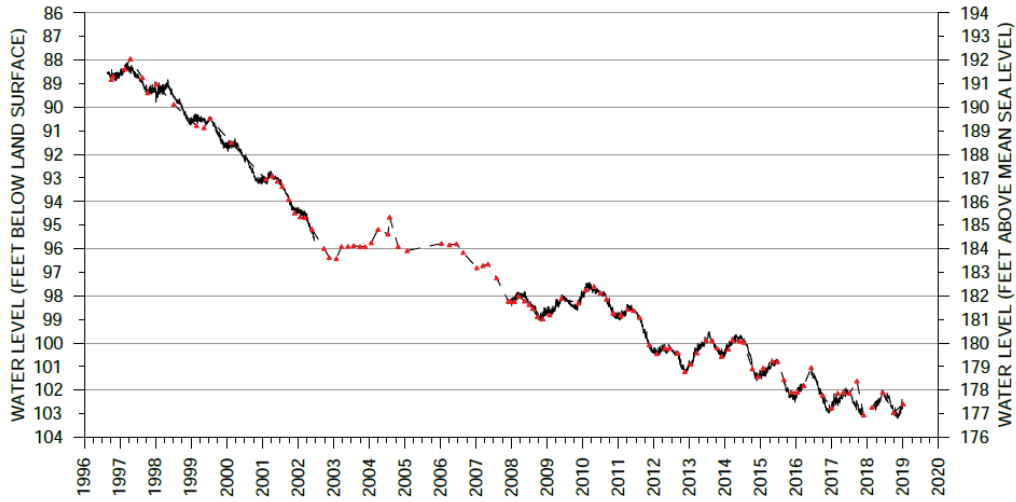


— Daily Average  
 ▲ Manual

**Aquifer: Crouch Branch**  
**Elevation: 280 ft**  
**Depth: 994 ft**  
**Screen: 784-989 ft**



**ALL-0377 (C-10) Daily Average and Manual Water Levels**

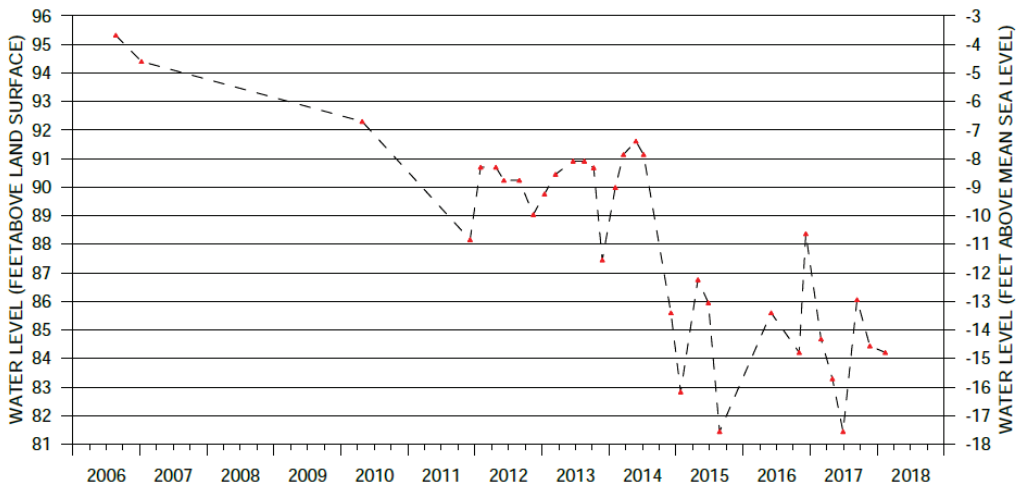


— Daily Average  
 - - - Manual

**Aquifer: McQueen Branch  
 Elevation: 280 ft  
 Depth: 1199 ft  
 Screen: 1174-1194 ft**



**ALL-0378 Manual Water Levels**



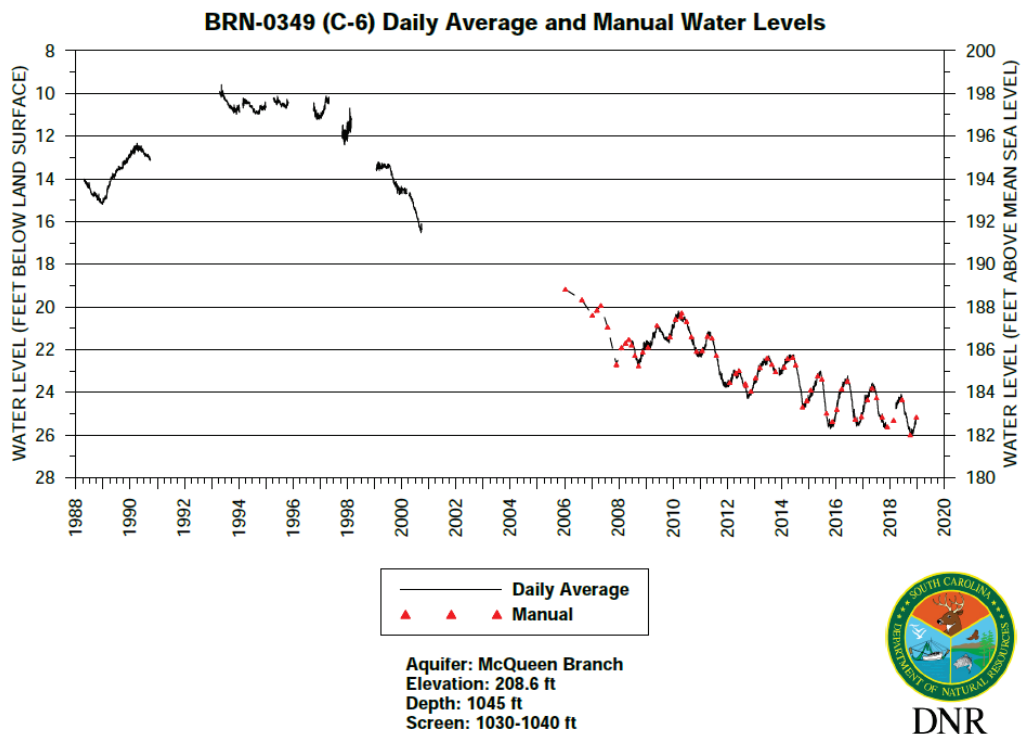
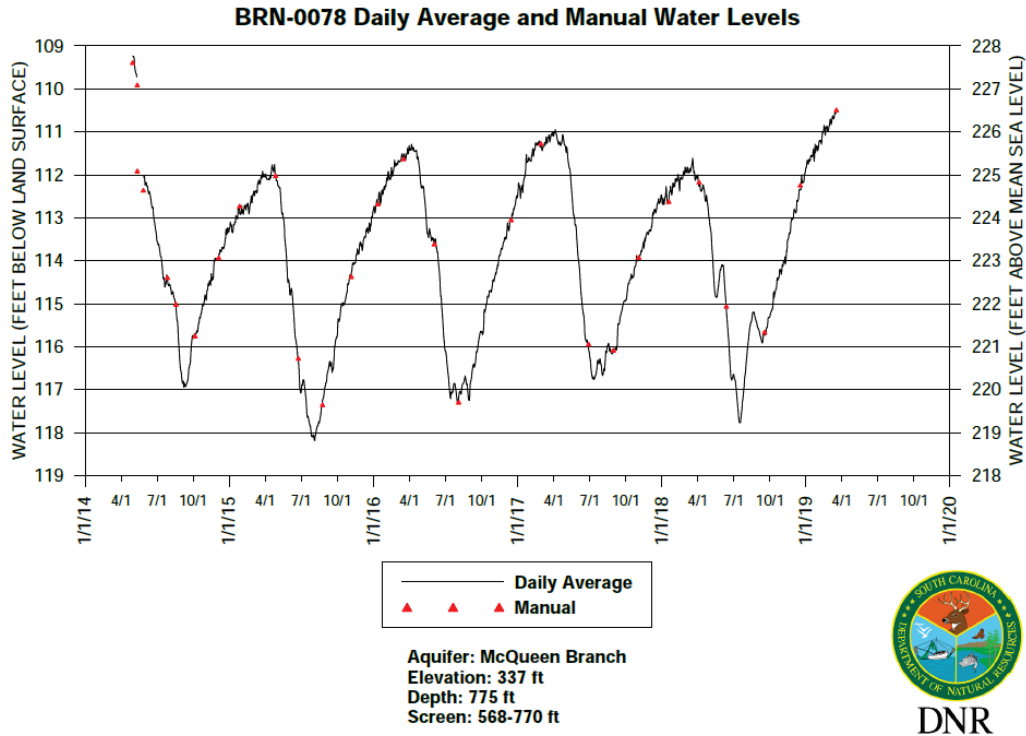
- - - Manual

**Aquifer: McQueen Branch  
 Elevation: 78 ft  
 Depth: 1060 ft  
 Screen: 845-1055 ft**

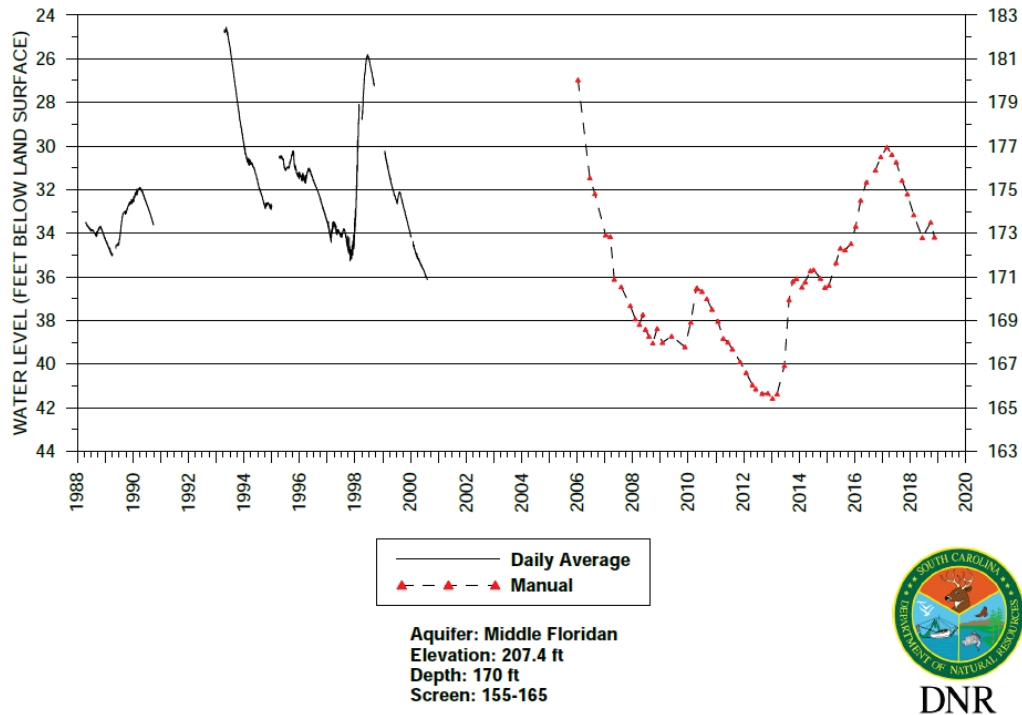


## Barnwell County

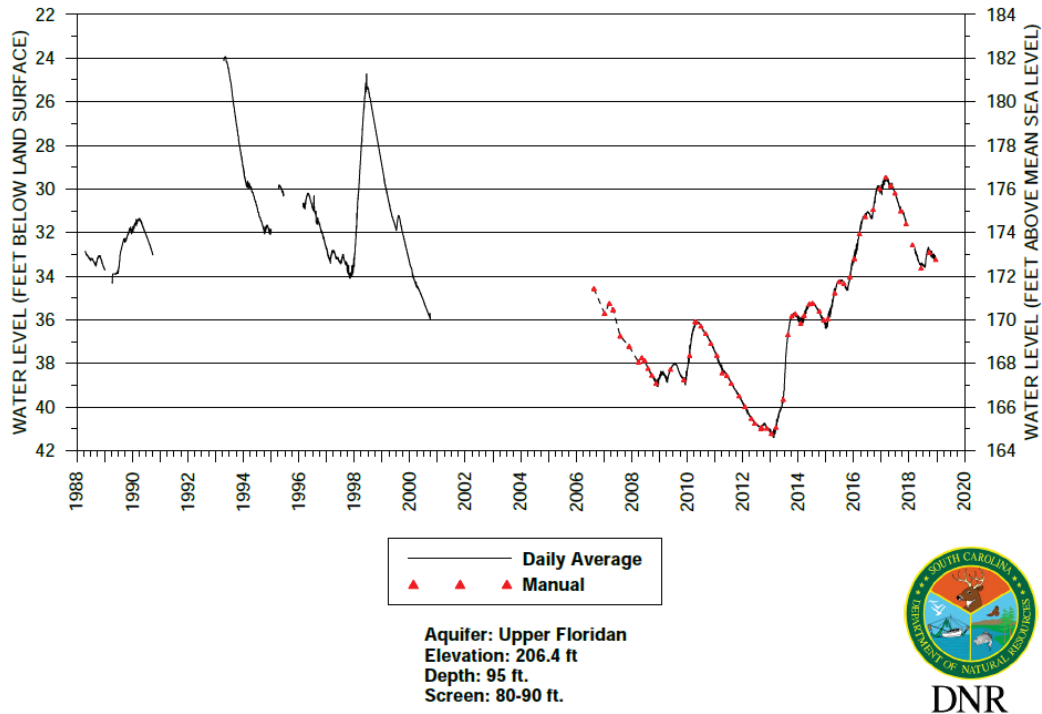
Note: There are no wells in the SC DNR Groundwater Monitoring Network in Bamberg County.



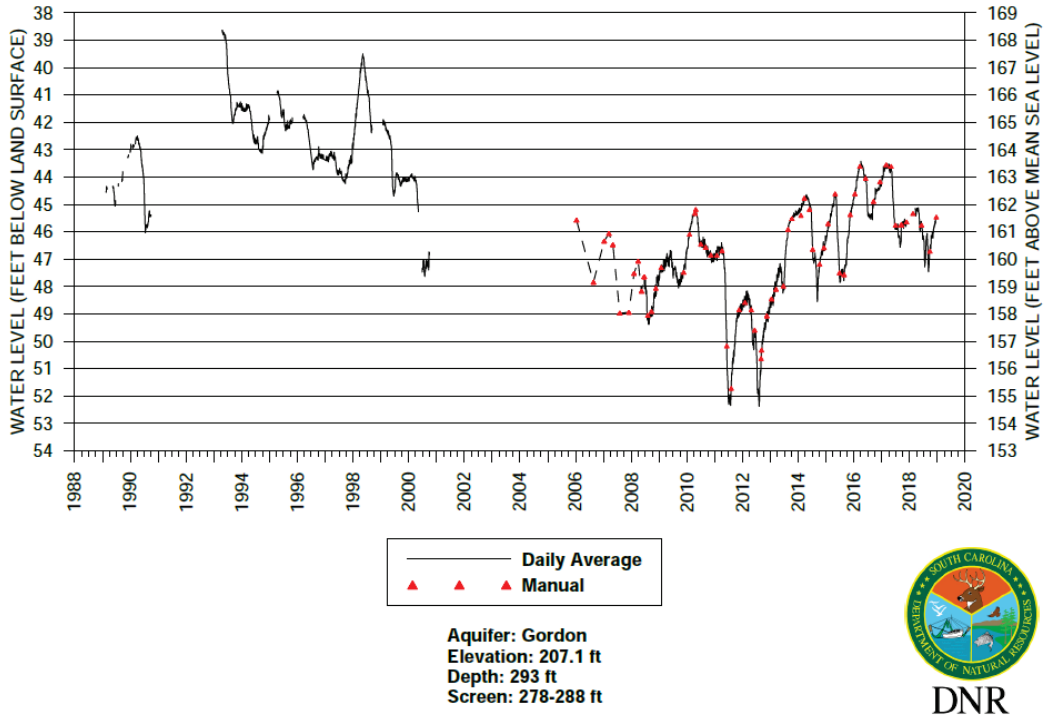
**BRN-0350 (C-6) Daily Average and Manual Water Levels**



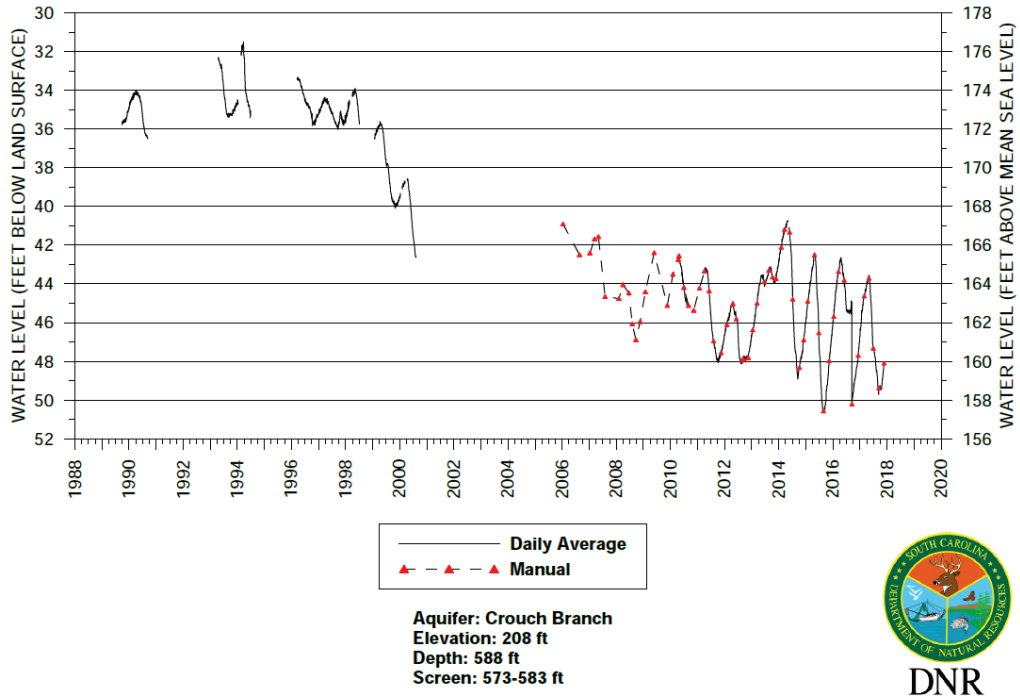
**BRN-0351 (C-6) Daily Average and Manual Water Levels**



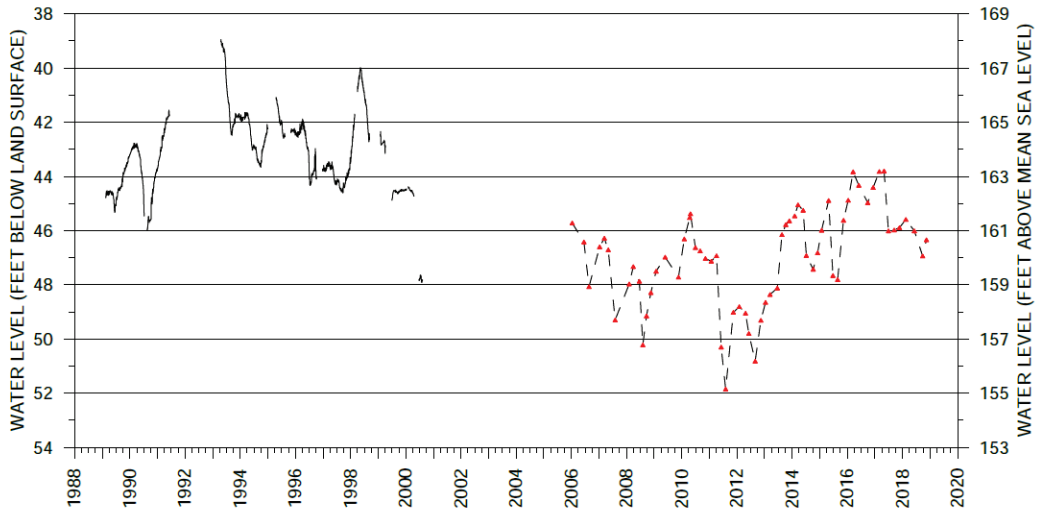
**BRN-0352 (C-6) Daily Average and Manual Water Levels**



**BRN-0353 (C-6) Daily Average and Manual Water Levels**



**BRN-0354 (C-6) Daily Average and Manual Water Levels**

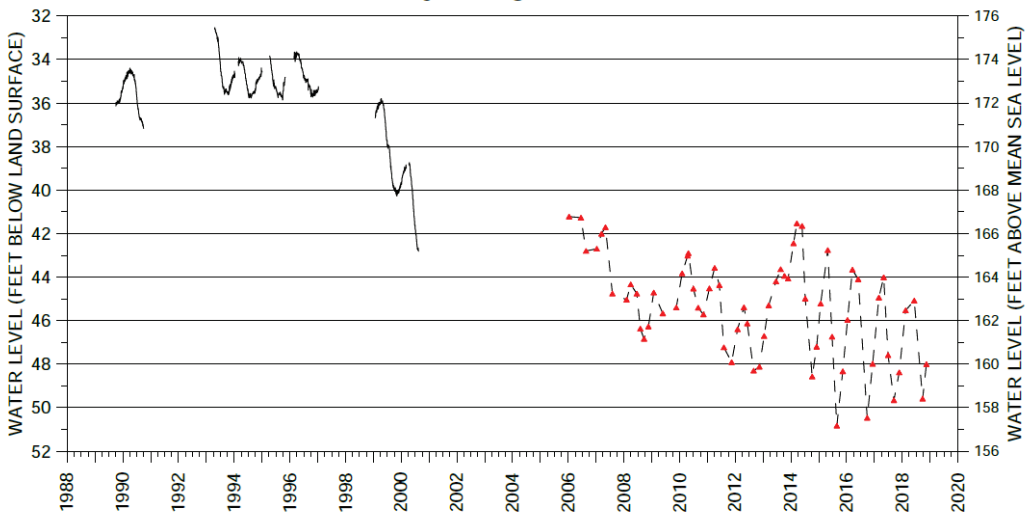


— Daily Average  
 ▲ - - - Manual

**Aquifer: Gordon**  
**Elevation: 207.6 ft**  
**Depth: 411 ft**  
**Screen: 396-406 ft**



**BRN-0355 (C-6) Daily Average and Manual Water Levels**

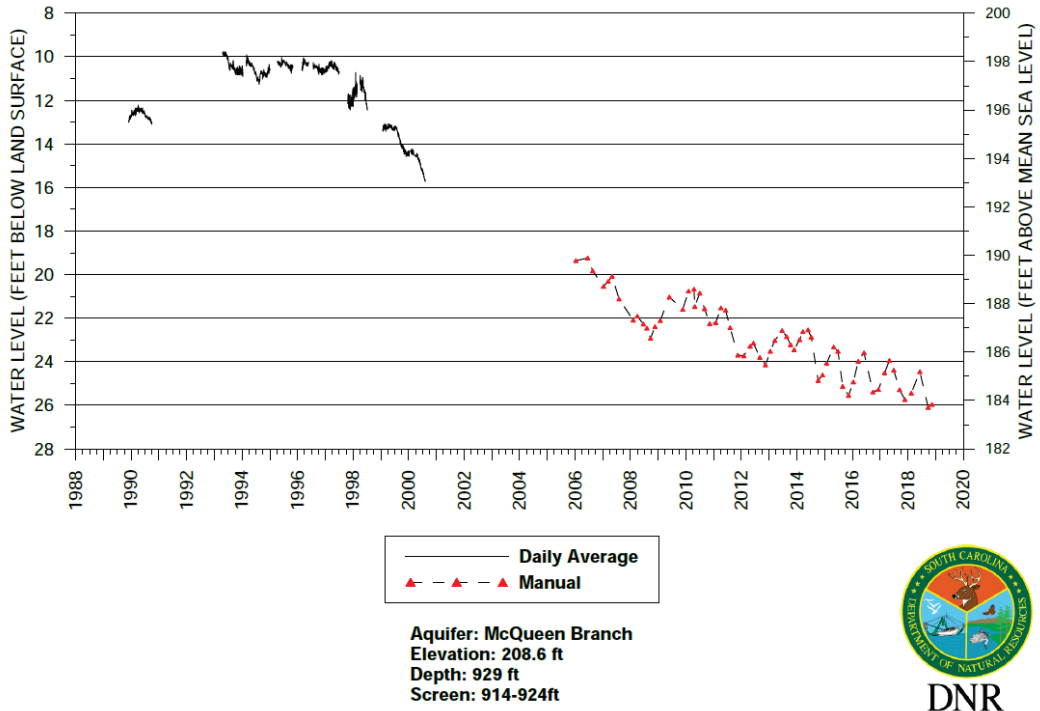


— Daily Average  
 ▲ - - - Manual

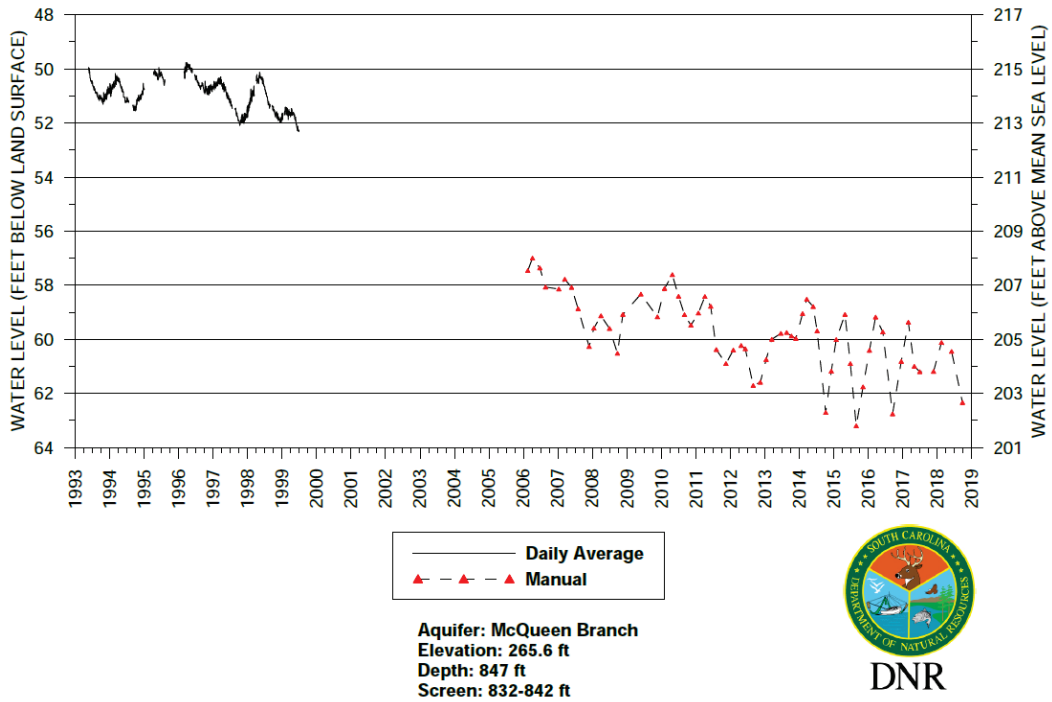
**Aquifer: Crouch Branch**  
**Elevation: 208 ft**  
**Depth: 701 ft**  
**Screen: 686-696 ft**



**BRN-0356 (C-6) Daily Average and Manual Water Levels**

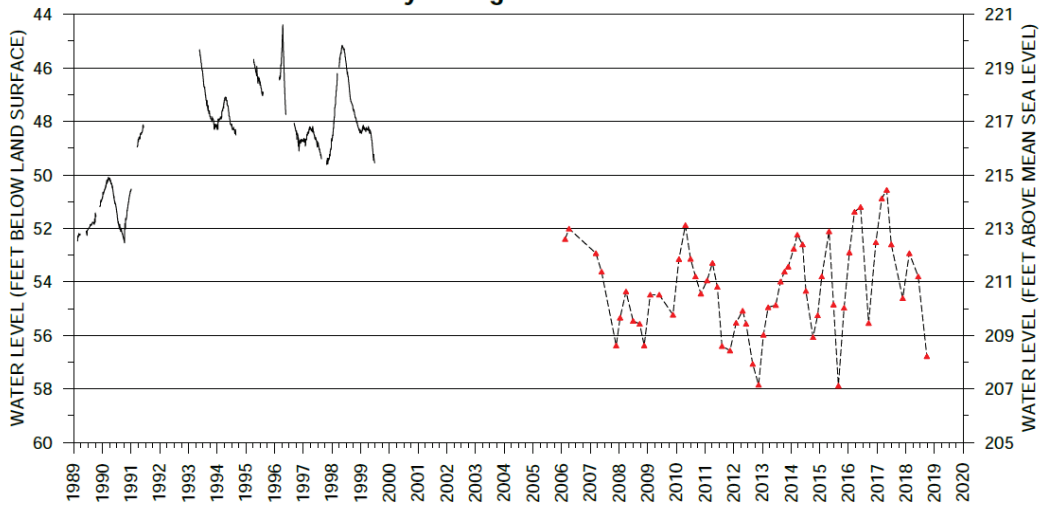


**BRN-0358 (C5) Daily Average and Manual Water Levels**





**BRN-0359 Daily Average and Manual Water Levels**

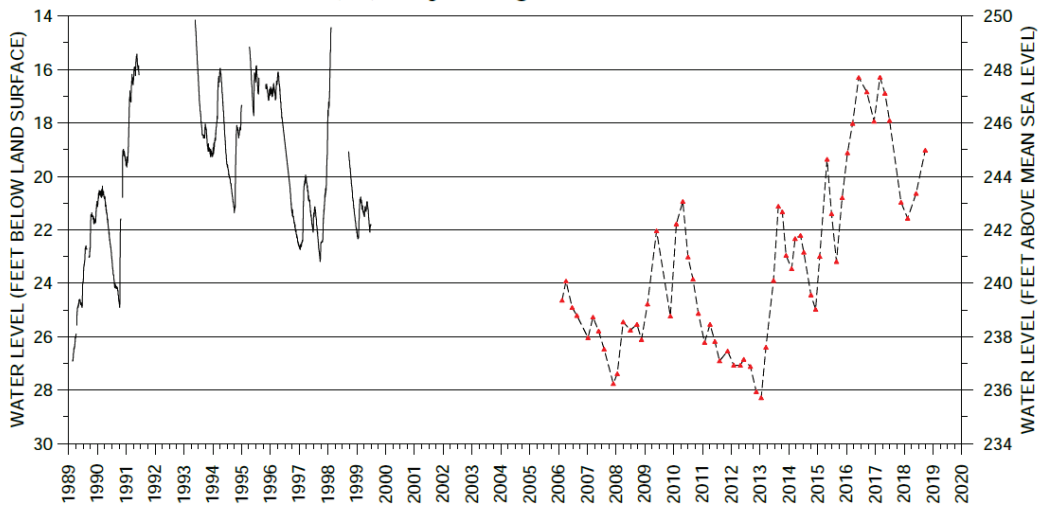


— Daily Average  
 -▲- Manual

Aquifer: Gordon  
 Elevation: 265.5 ft  
 Depth: 214 ft  
 Screen: 199-209 ft



**BRN-0360 (C5) Daily Average and Manual Water Levels**

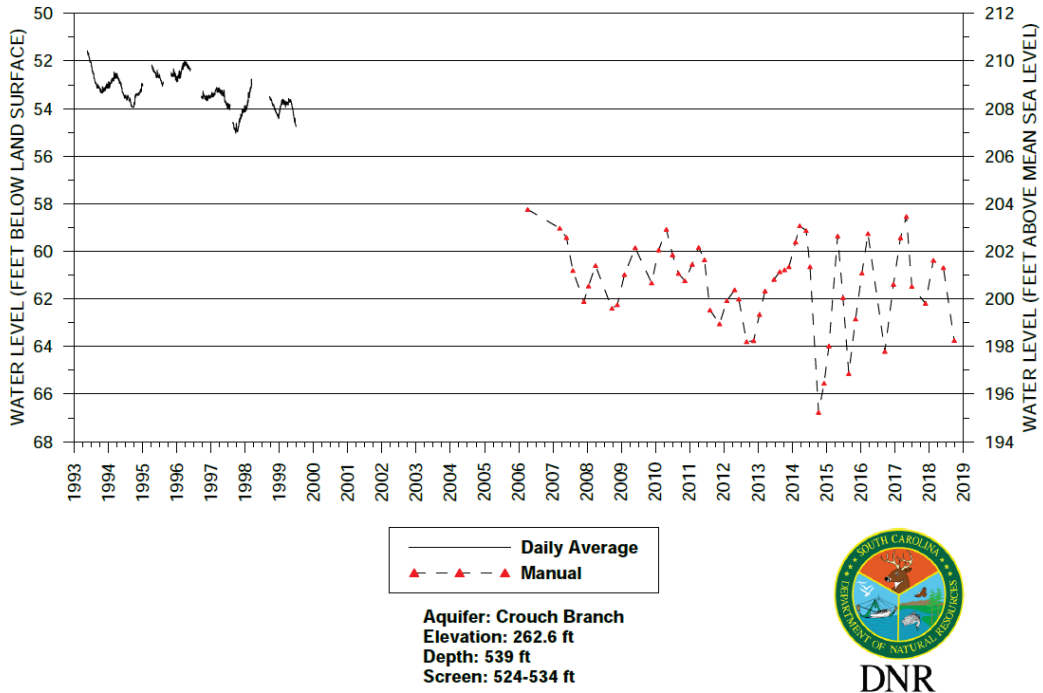


— Daily Average  
 -▲- Manual

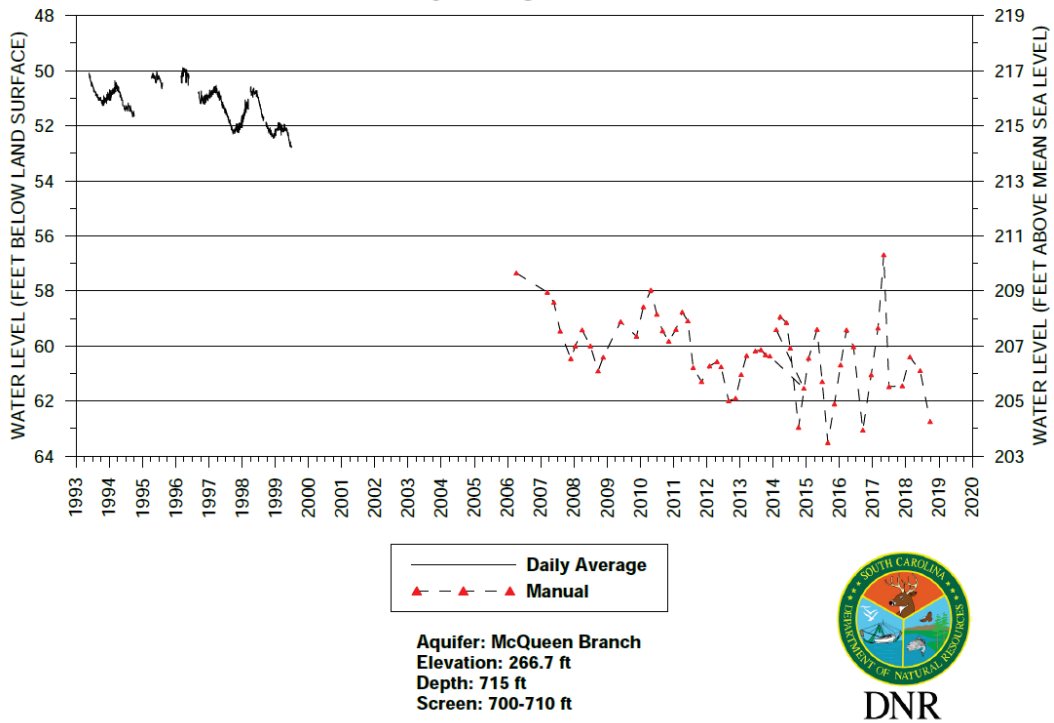
Aquifer: Gordon  
 Elevation: 264.3 ft  
 Depth: 140 ft  
 Screen: 125-134 ft



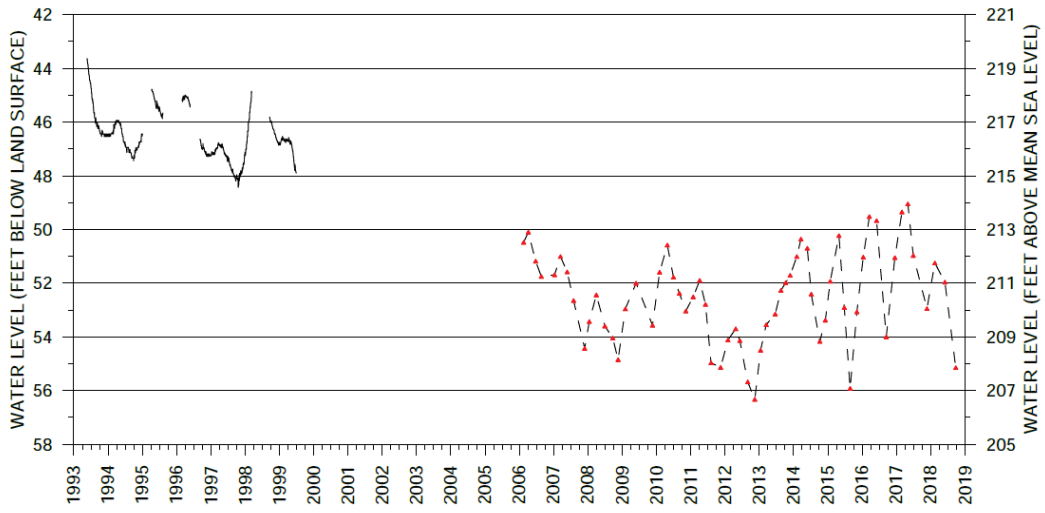
**BRN-0365 (C5) Daily Average and Manual Water Levels**



**BRN-0366 (C5) Daily Average and Manual Water Levels**



**BRN-0367 (C5) Daily Average and Manual Water Levels**

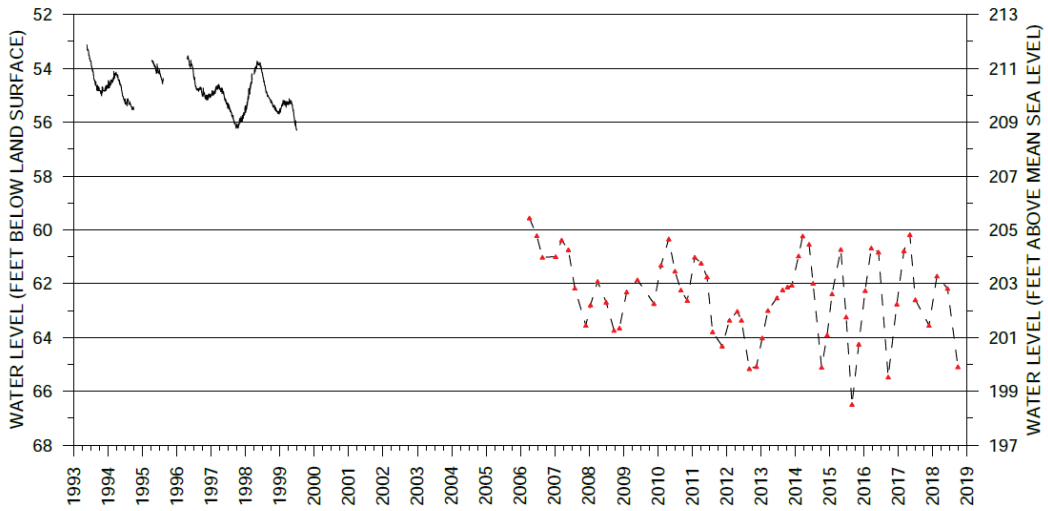


Daily Average  
 Manual

**Aquifer: Gordon**  
**Elevation: 263.8 ft**  
**Depth: 285 ft**  
**Screen: 270-280 ft**



**BRN-0368 (C5) Daily Average and Manual Water Levels**



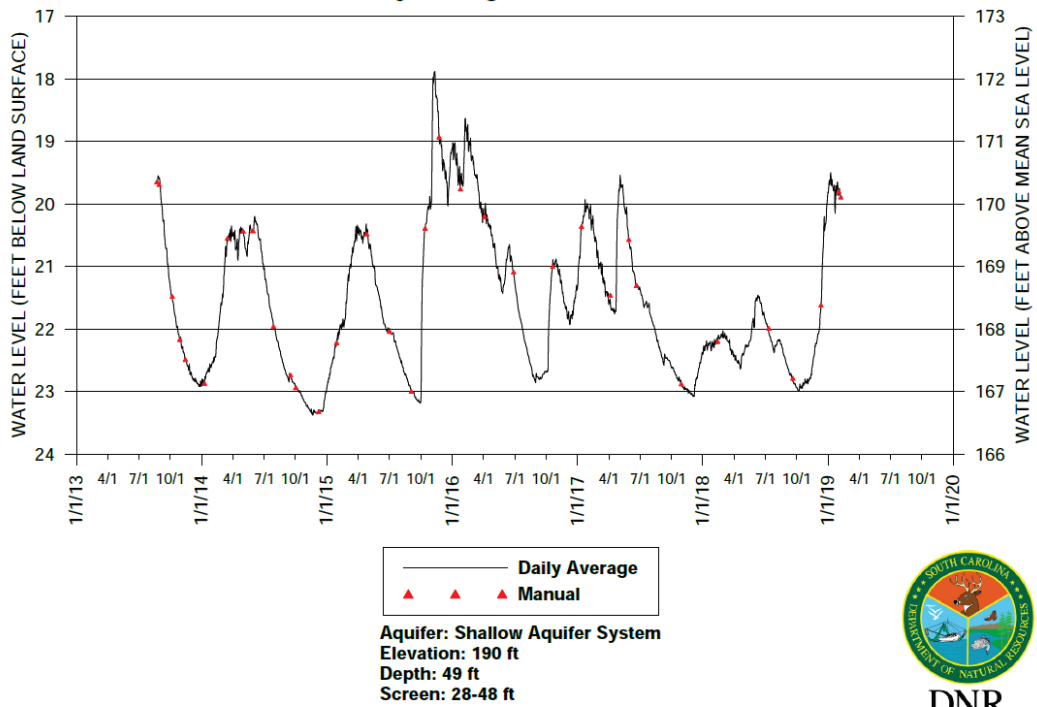
Daily Average  
 Manual

**Aquifer: Crouch Branch**  
**Elevation: 265 ft**  
**Depth: 443 ft**  
**Screen: 428-438 ft**

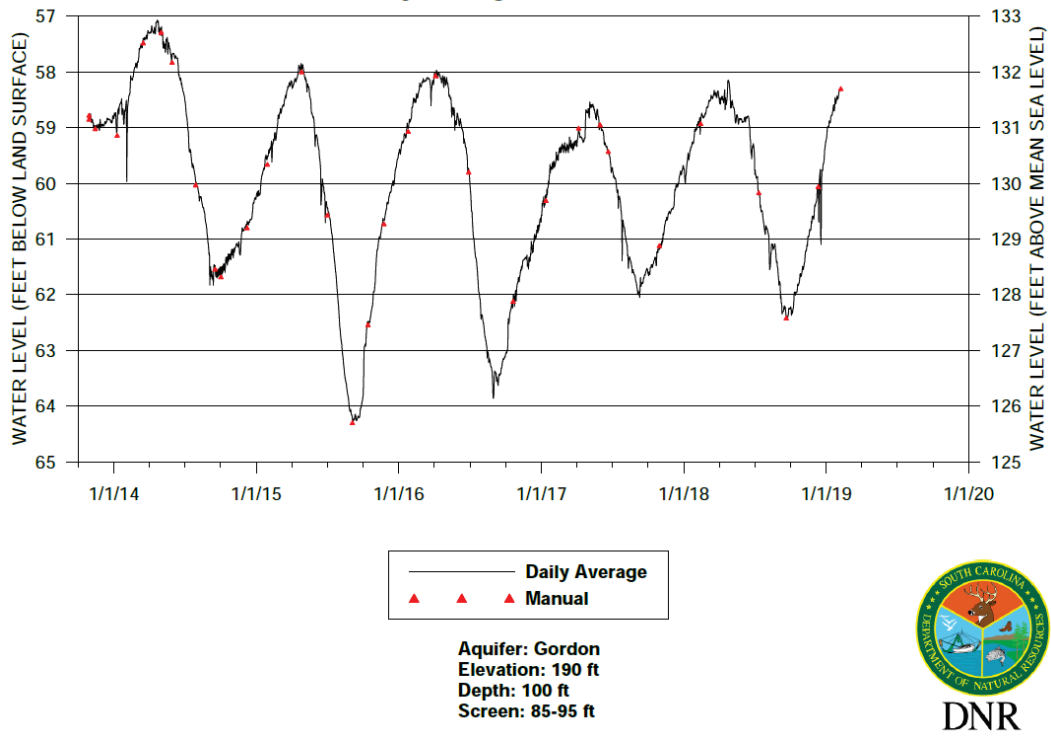


# Calhoun County

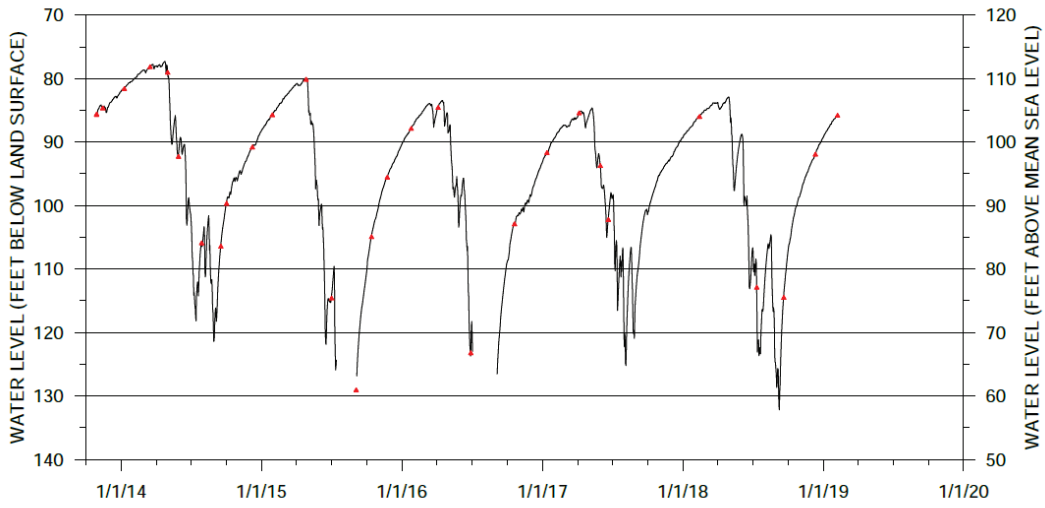
## CAL-0192 Daily Average and Manual Water Levels



## CAL-0193 Daily Average and Manual Water Levels



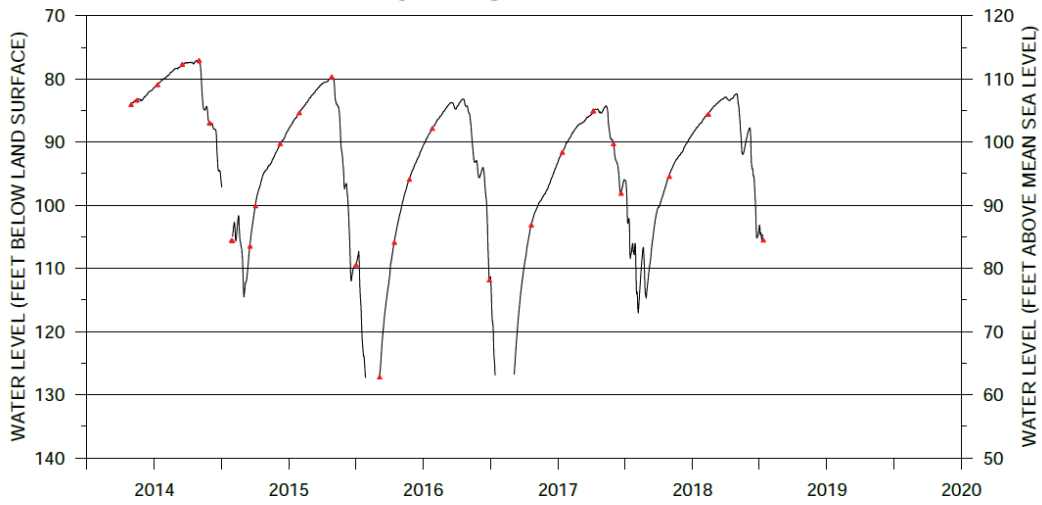
### CAL-0194 Daily Average and Manual Water Levels



**Aquifer: Crouch Branch**  
**Elevation: 190 ft**  
**Depth: 254 ft**  
**Screen: 239-249 ft**



### CAL-0195 Daily Average and Manual Water Levels

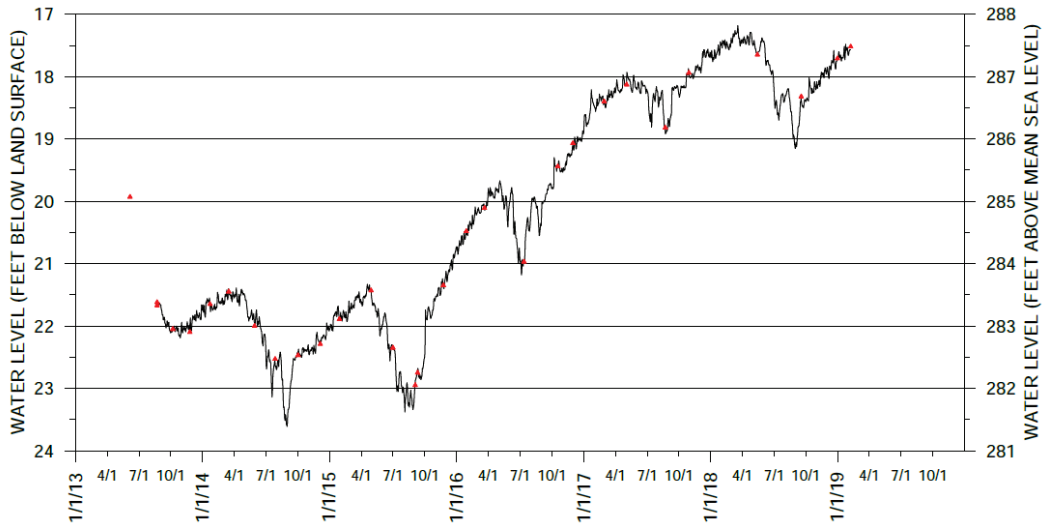


**Aquifer: Crouch Branch**  
**Elevation: 190 ft**  
**Depth: 360 ft**  
**Screen: 345-355 ft**



# Lexington County

### LEX-0823 Daily Average and Manual Water Levels



Daily Average  
▲ ▲ ▲ Manual

**Aquifer: Crouch Branch**  
**Elevation: 305 ft**  
**Depth: 225 ft**  
**Screen: 150-220 ft**



### LEX-0844 Daily Average and Manual Water Levels



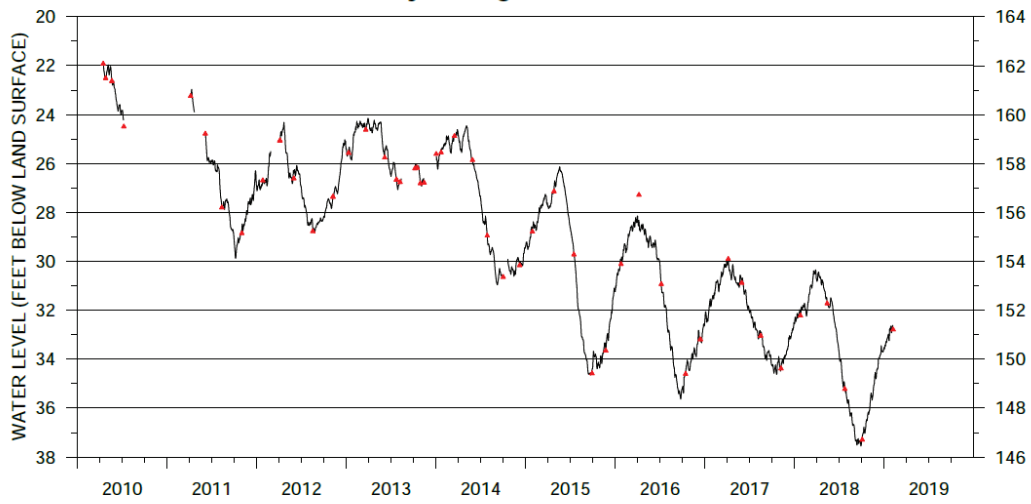
Daily Average  
▲ ▲ ▲ Manual

**Aquifer: McQueen Branch**  
**Elevation: 366 ft**  
**Depth: 522 ft**  
**Screen: 392-502 ft**



# Orangeburg County

## ORG-0079 Daily Average and Manual Water Levels

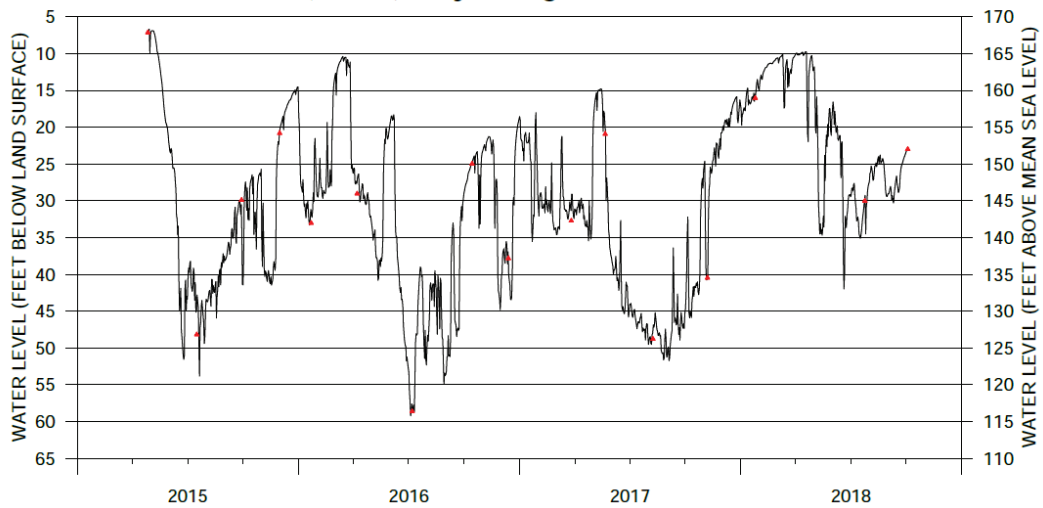


Daily Average  
▲ ▲ ▲ Manual

**Aquifer: McQueen Branch**  
**Elevation: 184 ft**  
**Depth: 995 ft**  
**Screen: 843-974 ft**



## ORG-0385 (SMW-1) Daily Average and Manual Water Levels

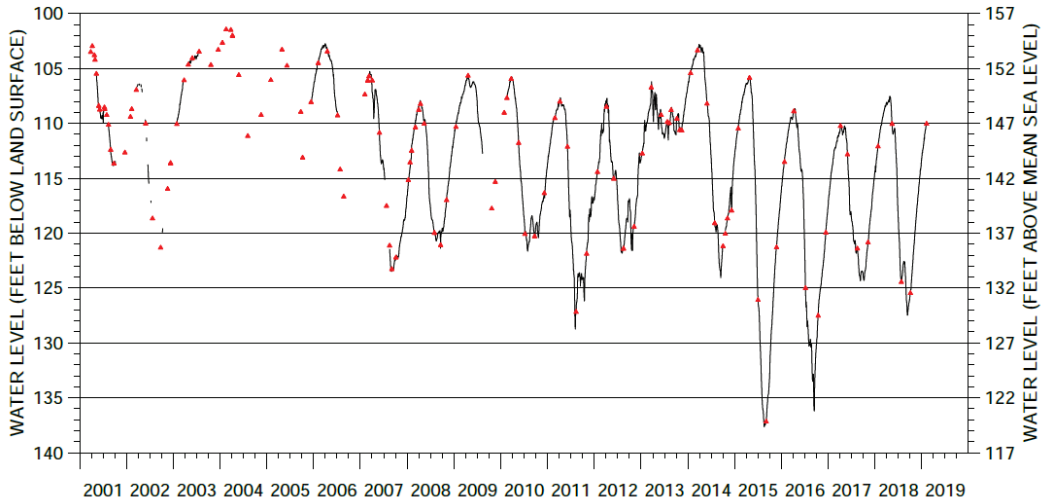


Daily Average  
▲ ▲ ▲ Manual

**Aquifer: Crouch Branch**  
**Elevation: 175 ft**  
**Depth: 565 ft**  
**Screen: 475-565 ft**



**ORG-0393 Daily Average and Manual Water Levels**

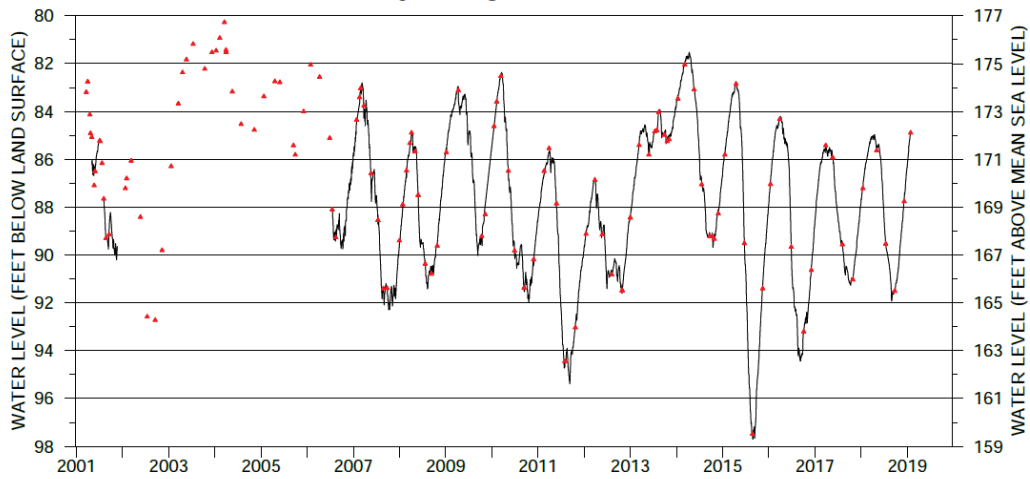


— Daily Average  
 ▲ ▲ ▲ Manual

**Aquifer: Crouch Branch**  
**Elevation: 257 ft**  
**Depth: 463 ft**  
**Screen: 423-463 ft**



**ORG-0430 Daily Average and Manual Water Levels**



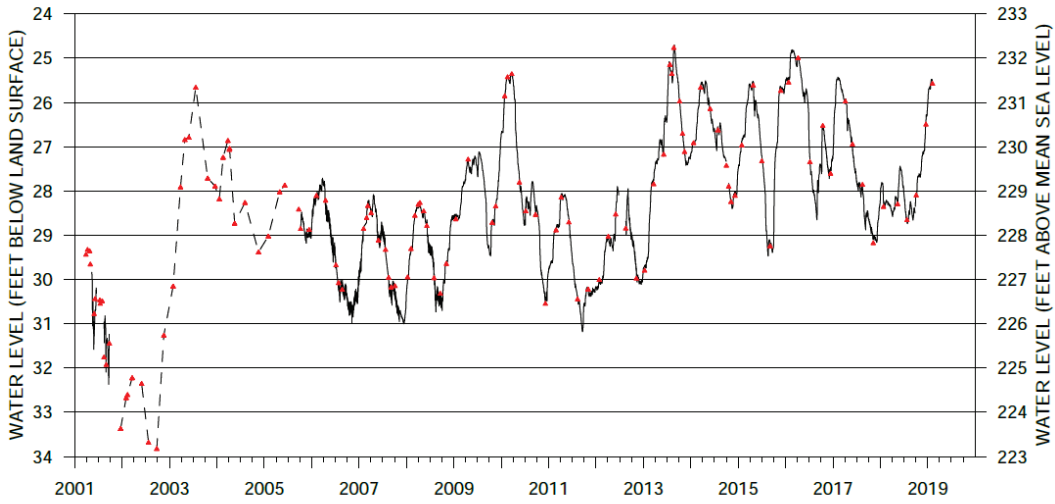
— Daily Average  
 ▲ ▲ ▲ Manual

**Aquifer: Gordon**  
**Elevation: 257 ft**  
**Depth: 275 ft**  
**Screen: 205-265 ft**





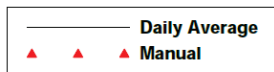
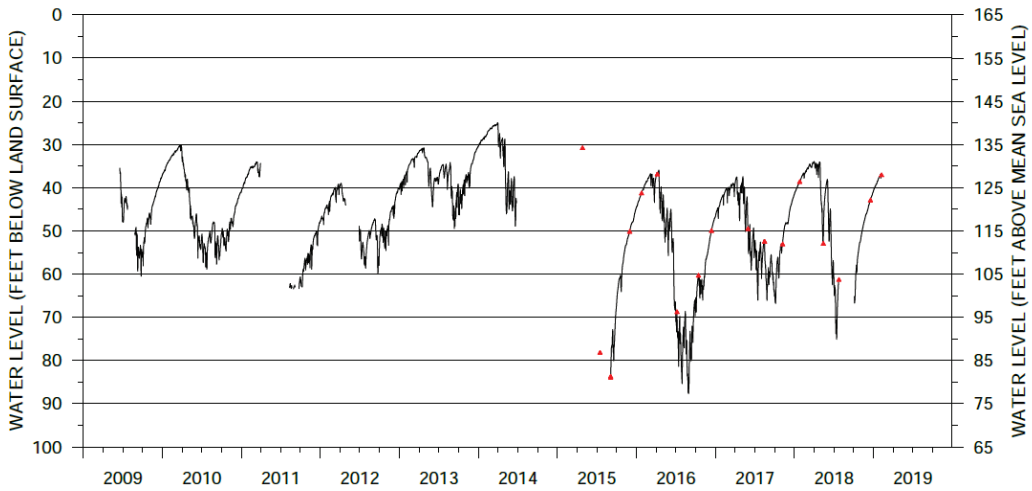
**ORG-0431 Daily Average and Manual Water Levels**



**Aquifer: Middle Floridan  
Elevation: 257 ft  
Depth: 93 ft  
Screen: 83-88 ft**



**ORG-0634 Daily Average and Manual Water Levels**



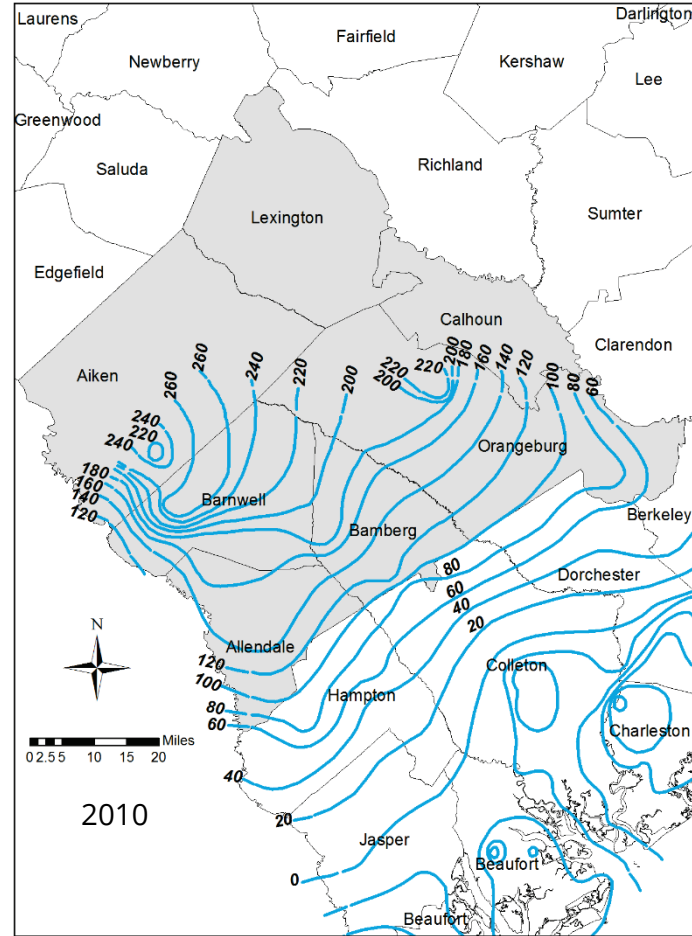
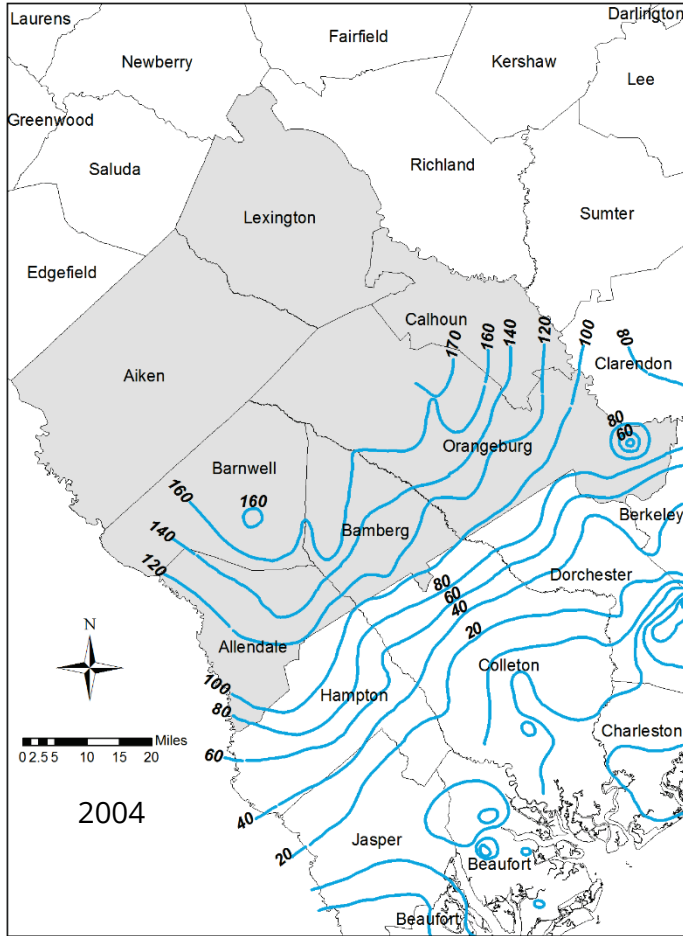
**Aquifer: Middle Floridan  
Elevation: 165 ft  
Depth: 256 ft  
Open Hole: 228-256 ft**



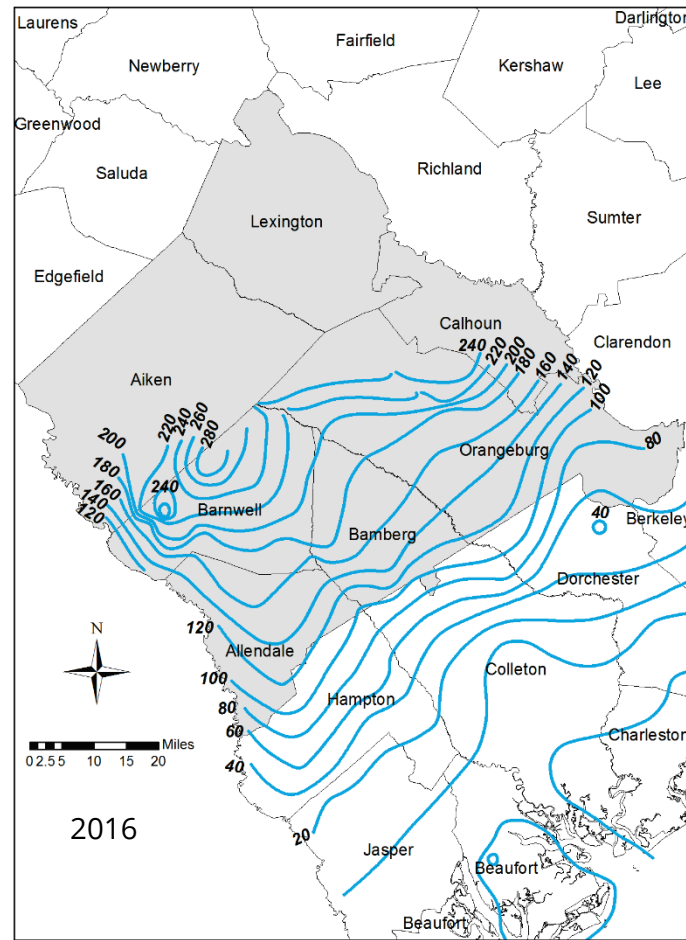
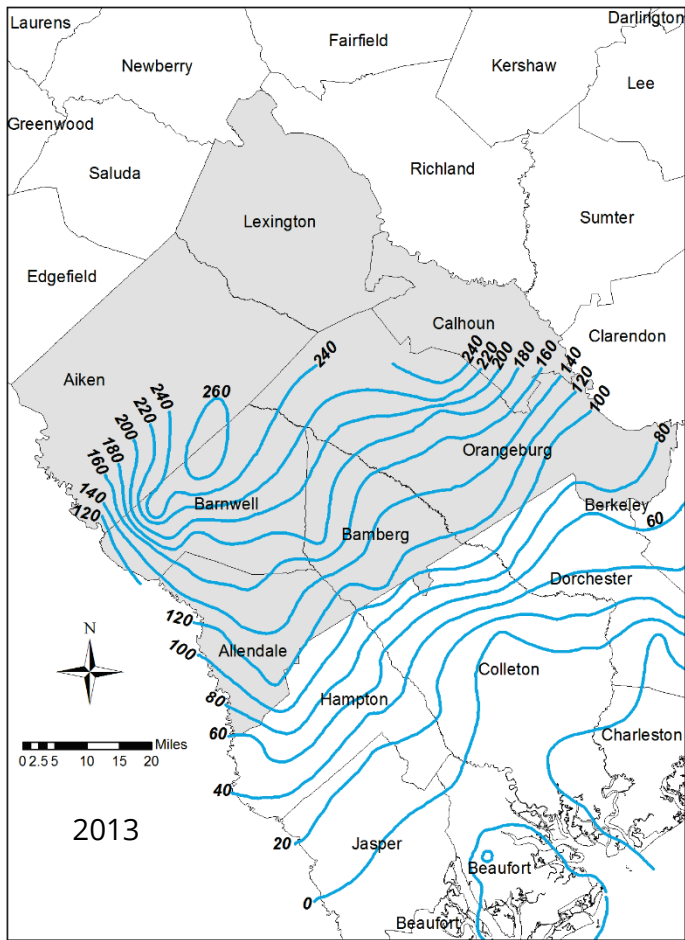
## **Appendix B**

Historic Equipotential Maps  
Western Capacity Use Area Counties

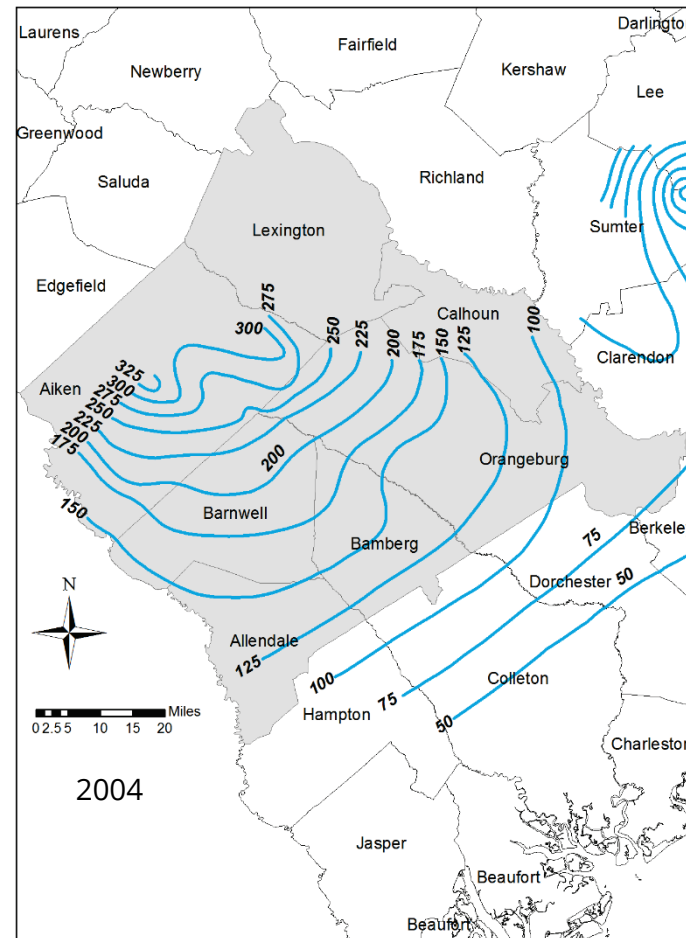
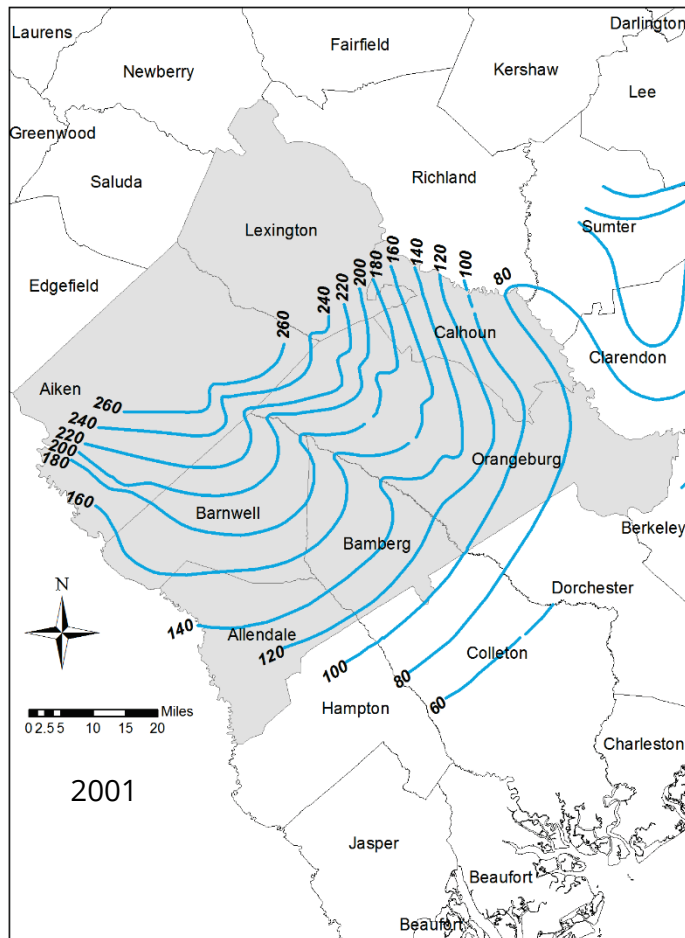
# Floridan/Gordon Aquifer

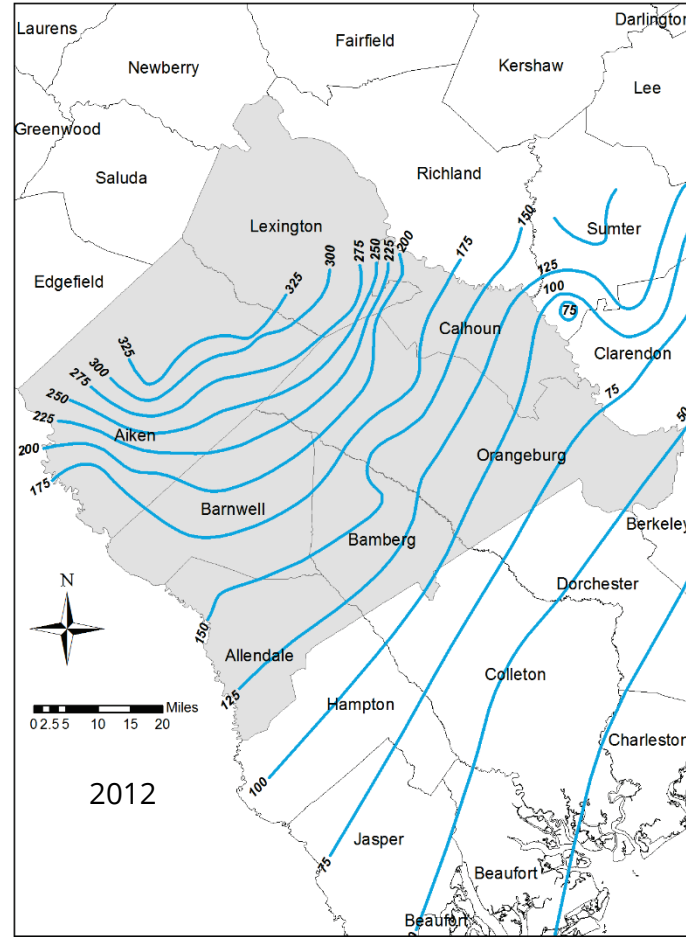
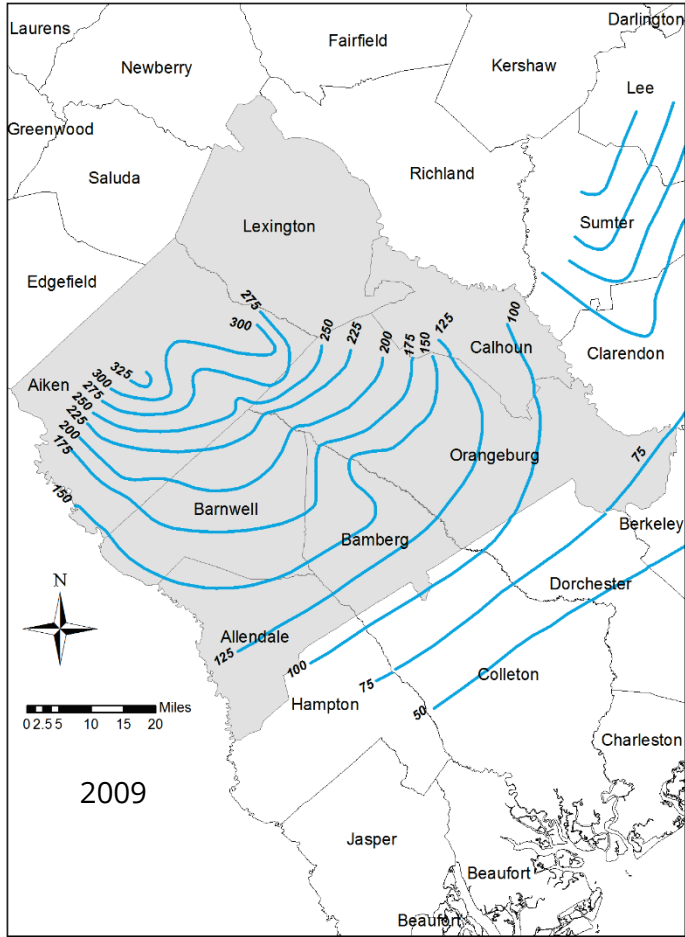


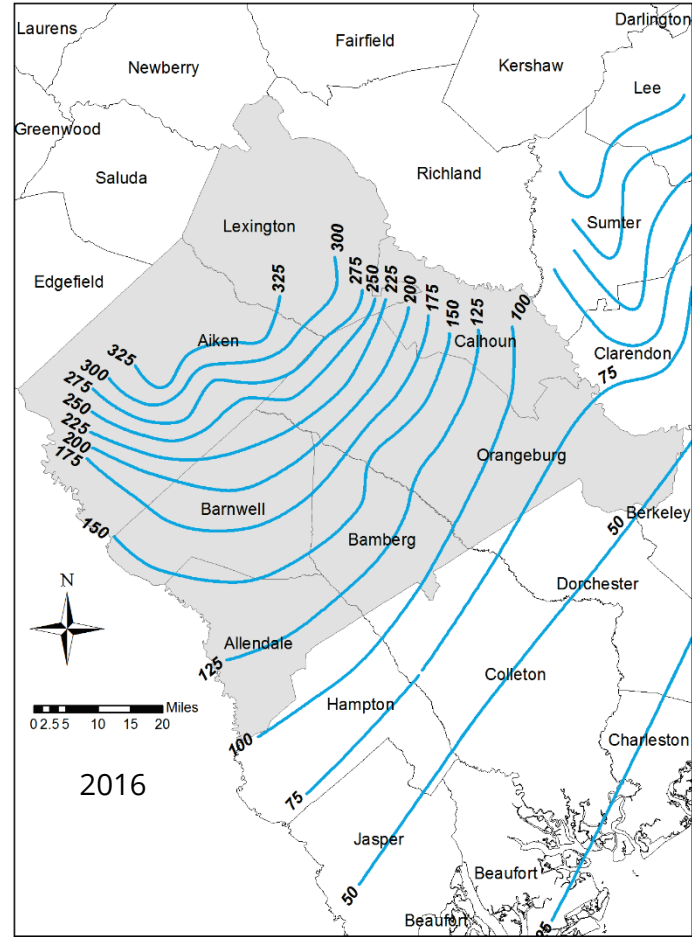
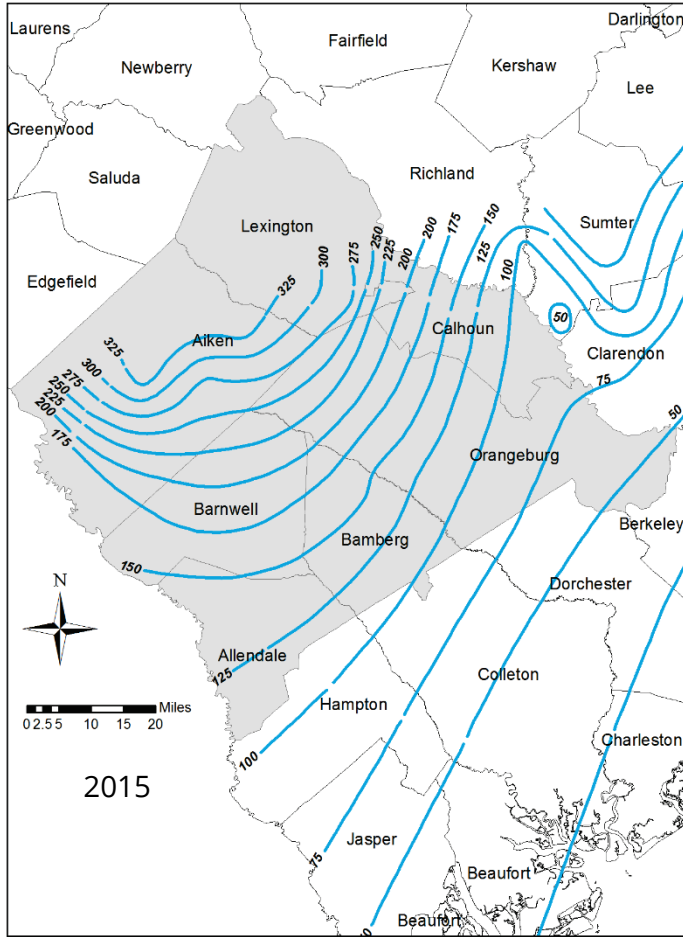
Equipotential Maps: The blue lines indicate water level relative to mean sea level (NAVD 88). The Western Area Counties are highlighted in gray.



# Crouch Branch Aquifer







# McQueen Branch Aquifer

