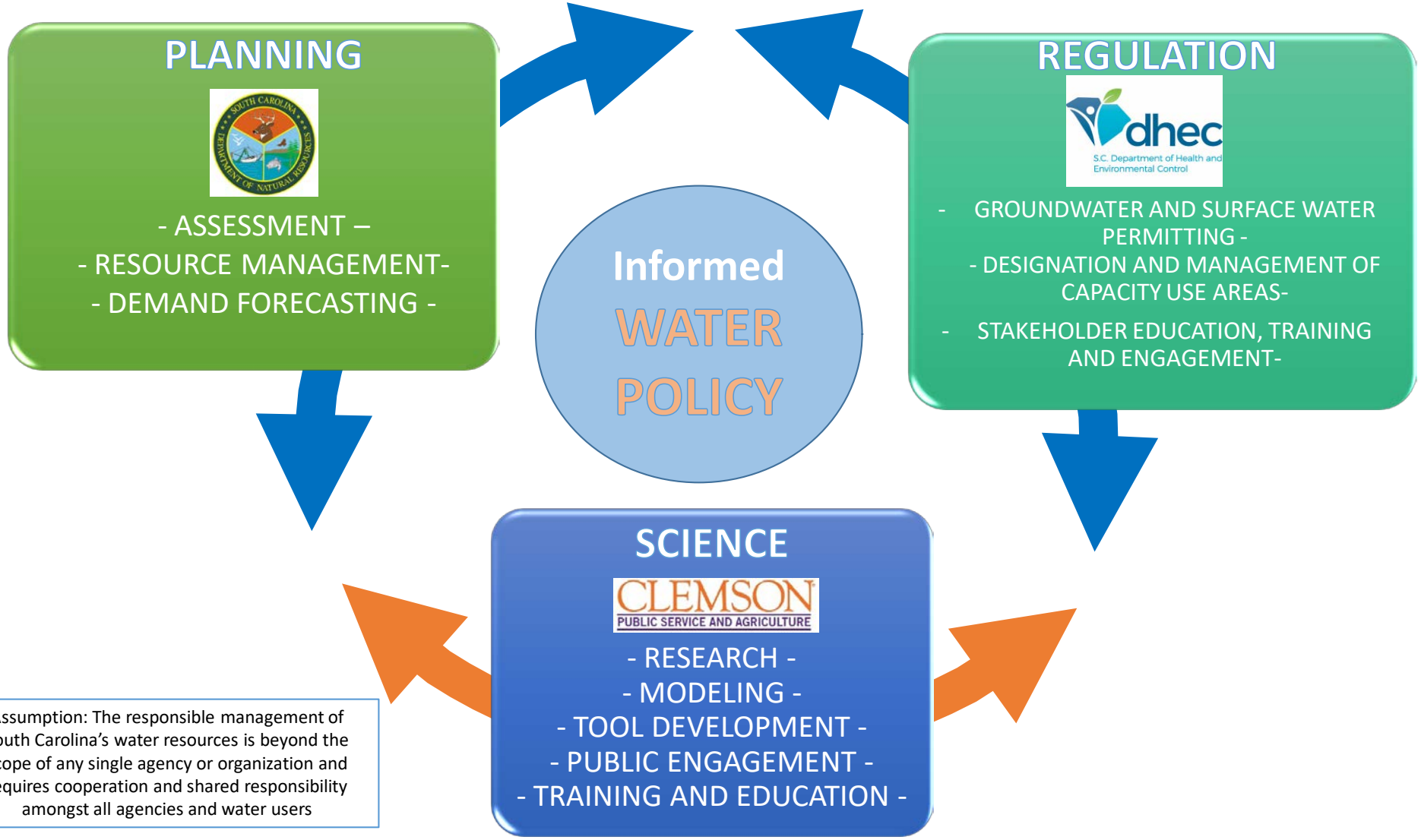
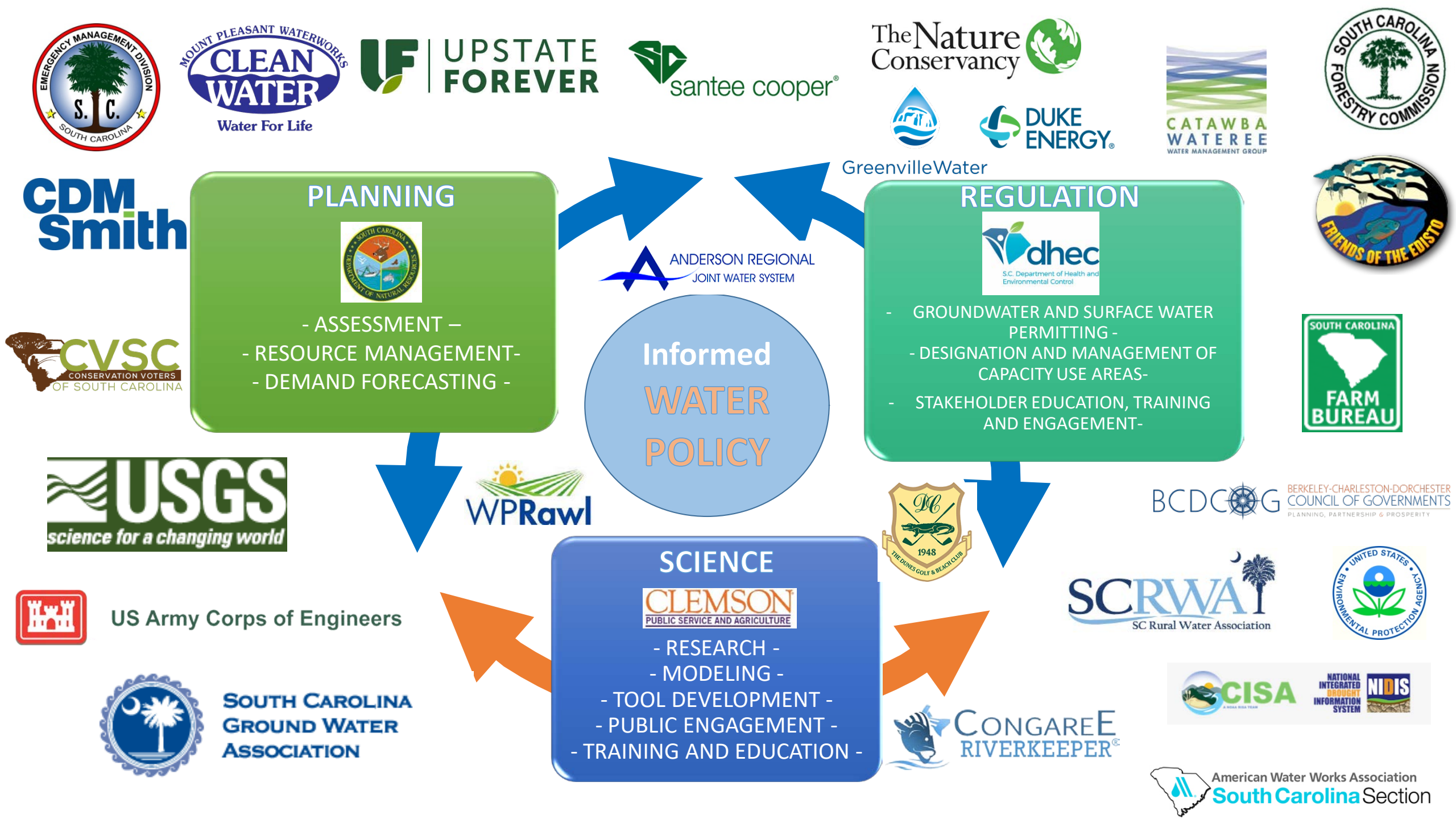
South Carolina Department of Health and Environmental Control

Western Capacity Use Area Groundwater Management Plan Development

Bureau of Water



Assumption: The responsible management of South Carolina's water resources is beyond the scope of any single agency or organization and requires cooperation and shared responsibility amongst all agencies and water users


PLANNING
- ASSESSMENT –
- RESOURCE MANAGEMENT-
- DEMAND FORECASTING -
REGULATION
- GROUNDWATER AND SURFACE WATER PERMITTING -
- DESIGNATION AND MANAGEMENT OF CAPACITY USE AREAS-
- STAKEHOLDER EDUCATION, TRAINING AND ENGAGEMENT-
Informed
WATER
POLICY
SCIENCE
- RESEARCH -
- MODELING -
- TOOL DEVELOPMENT -
- PUBLIC ENGAGEMENT -
- TRAINING AND EDUCATION -
Emergency Management Division S.C. South Carolina
Mount Pleasant Waterworks Clean Water Water For Life
UF Upstate Forever
santee cooper
The Nature Conservancy
GreenvilleWater
Duke Energy
Catawba Wateree Water Management Group
South Carolina Forestry Commission
CDM Smith
Anderson Regional Joint Water System
Friends of the Edisto
CVSC Conservation Voters of South Carolina
dhec S.C. Department of Health and Environmental Control
South Carolina Farm Bureau
USGS science for a changing world
WPRawl
BCDCOG Berkeley-Charleston-Dorchester Council of Governments Planning, Partnership & Prosperity
1948 The Dunes Golf & Beach Club
SCRWA SC Rural Water Association
United States Environmental Protection Agency
US Army Corps of Engineers
CISA
National Integrated Drought Information System NIDIS
South Carolina Ground Water Association
Congaree Riverkeeper
American Water Works Association South Carolina Section

Water Quantity Programs

- **Groundwater Use and Reporting**
  - Since the 1970s
  - Issue permits in designated capacity areas of the coastal plain over for use over **3 million gallons in any month** (~1in of water per week for 28 acres or average use for 1000 people)
  - Users outside of Capacity Use Areas must register wells if well or well system will use over 3 million gallons in any month
  - All registered and permitted groundwater withdrawers report their annual water use to the Department
- **Surface Water Withdrawal, Permitting and Reporting**
  - Since June 2012
  - Issue permits / registrations statewide if over 3 million gallons in any month
  - All registered and permitted surface water withdrawers report their annual water use to the Department

Groundwater Use and Reporting Act
Legislative Declaration of Policy

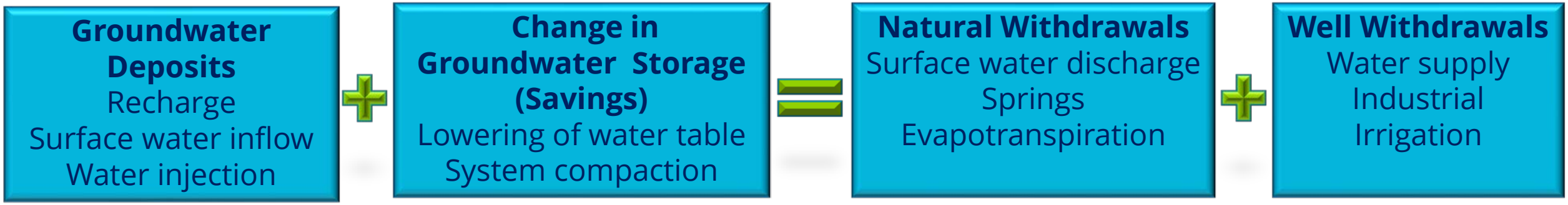
"The General Assembly declares that the general welfare and public interest require that the groundwater resources of the State be put to beneficial use to the fullest extent to which they are capable, subject to reasonable regulation, in order to conserve and protect these resources, prevent waste, and to provide and maintain conditions which are conducive to the development and use of water resources."

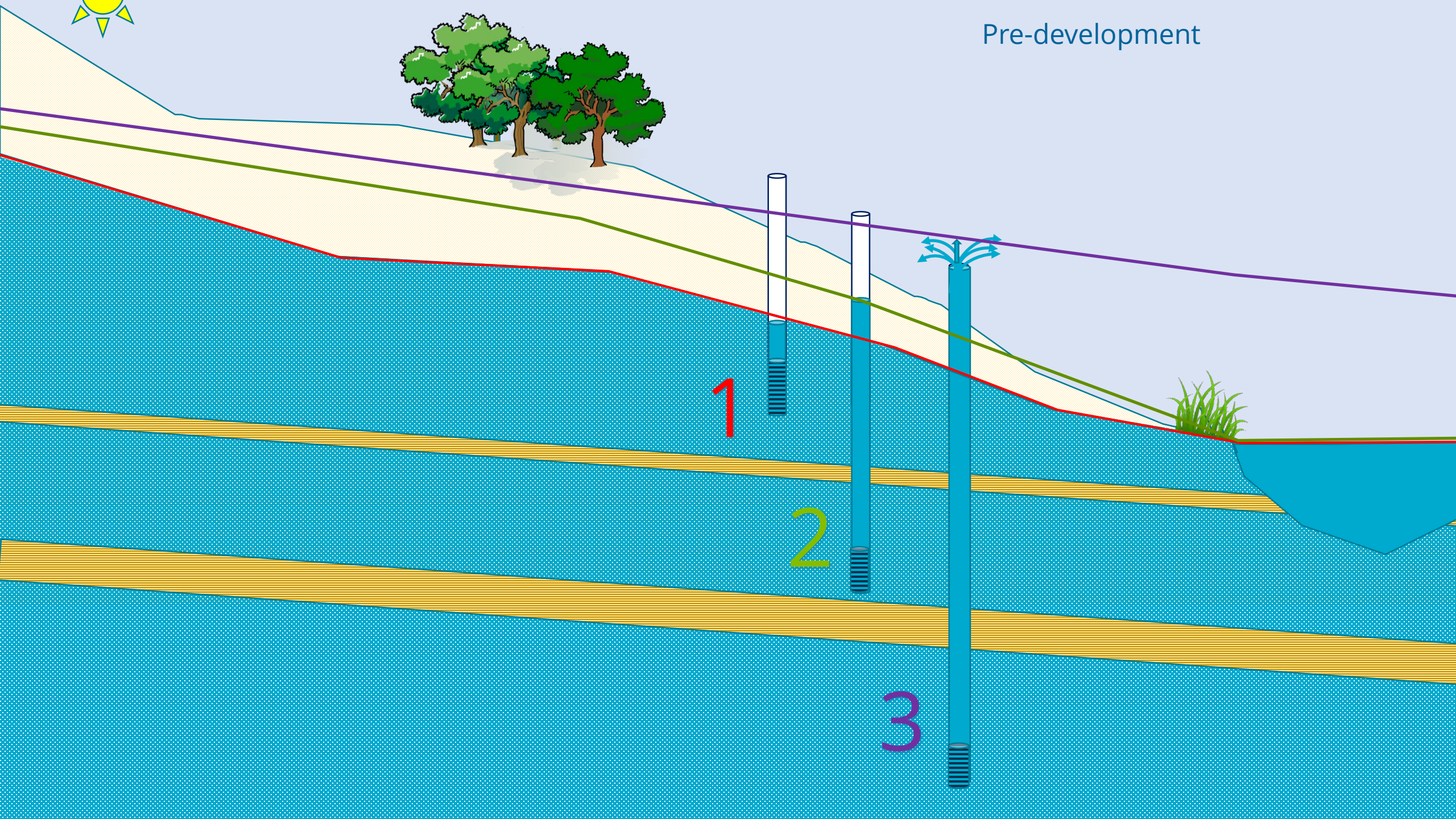
Groundwater Management Planning

After notice and public hearing, the department shall coordinate the affected governing bodies and groundwater withdrawers to develop a groundwater management plan to achieve goals and objectives stated in [Legislative Declaration of Policy] .

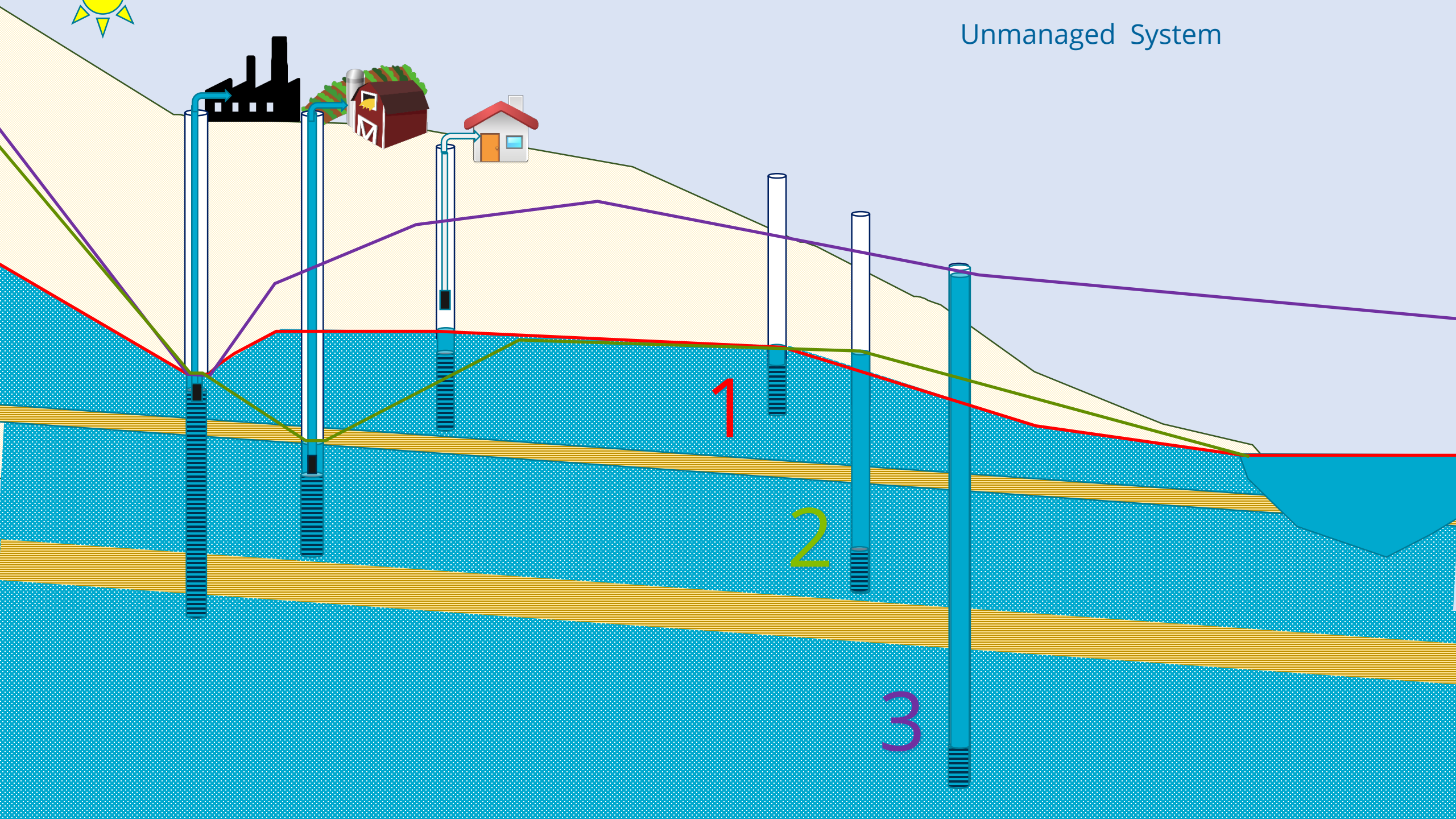
In those areas where the affected governing bodies and withdrawers are unable to develop a plan, the department shall take action to develop the plan.

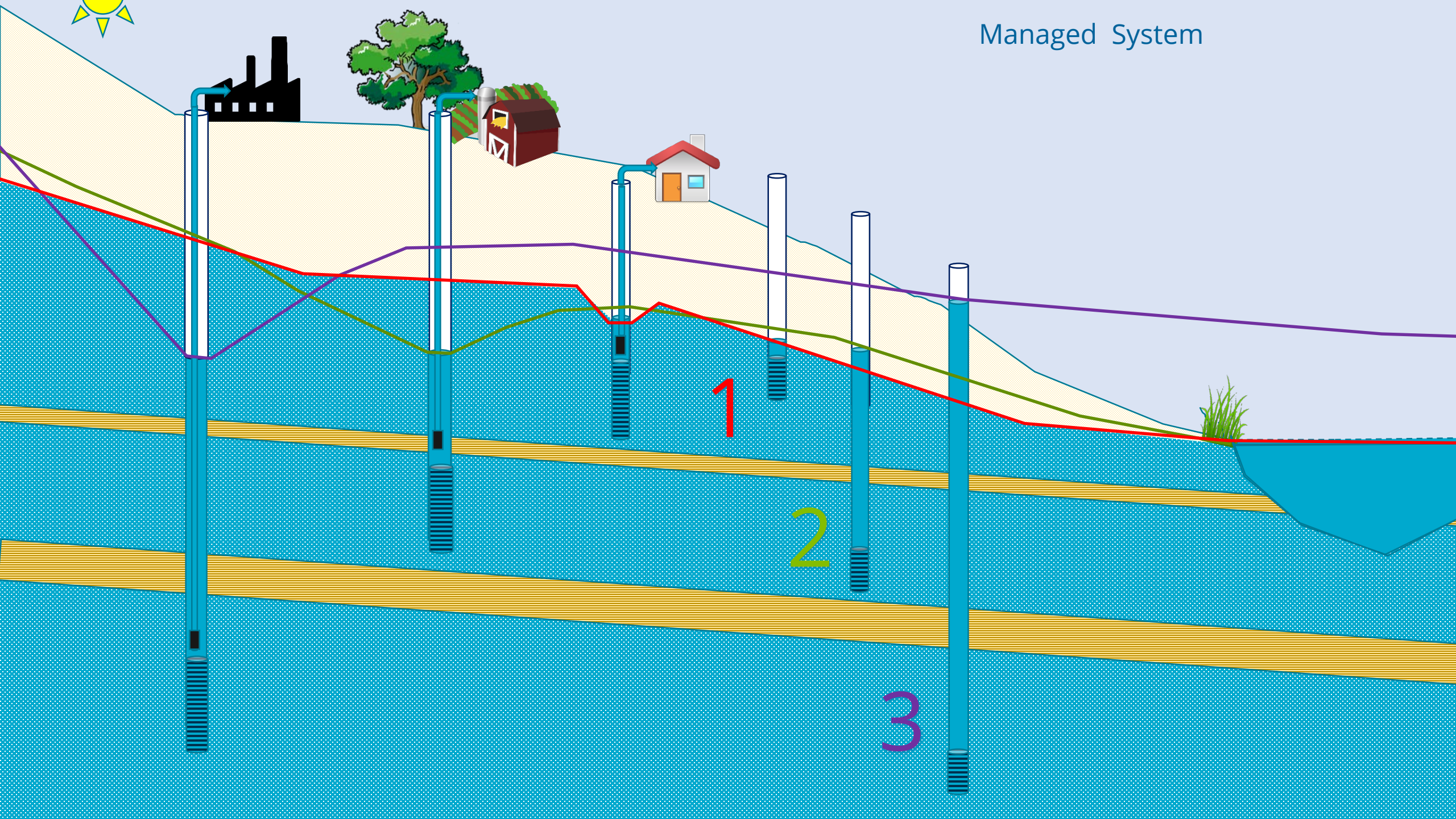
Groundwater Balance




Pre-development
1
2
3

Unmanaged System




Managed System
1
2
3

South Carolina Department of Health and Environmental Control

Spring 2019	Summer 2019	Fall 2019
Convene Planning Workgroup	**Open House Forums**	**Finalize Plan & Submit to DHEC Board**
Publish full calendar of meetings and workgroup members	Input from stakeholders on the draft Groundwater Management Plan	Additional public hearing prior to Board vote
Written comments from public shared with workgroup		Review & issue permits consistent with the plan

South Carolina Department of Health and Environmental Control

Questions?

South Carolina Department of Health and Environmental Control

Example Groundwater Management Plan

Waccamaw Capacity Use Area

Waccamaw GWMP Table of Contents

Groundwater Level Trends

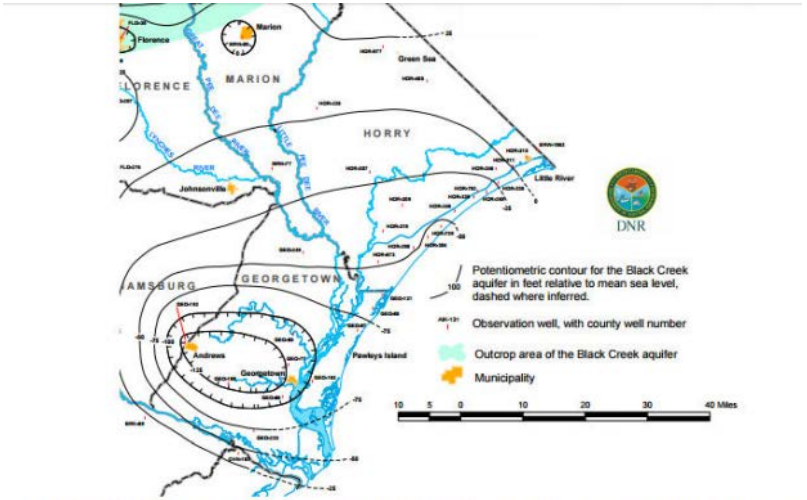


Figure 8. Water level map for the Black Creek Aquifer (Crouch Branch), 2004. Source: Hockensmith, 2008, SCDNR Water Resources Report 47.

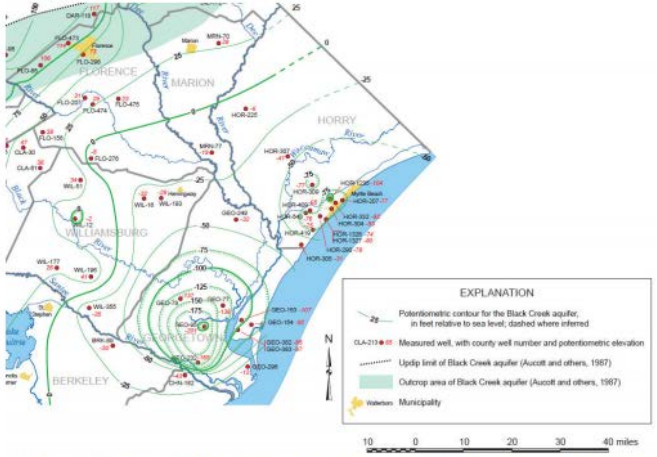


Figure 9. Water level map of the Crouch Branch Aquifer, 2015. Source: Wachob and Czwartacki, 2015, SCDNR Water Resources Report 59.

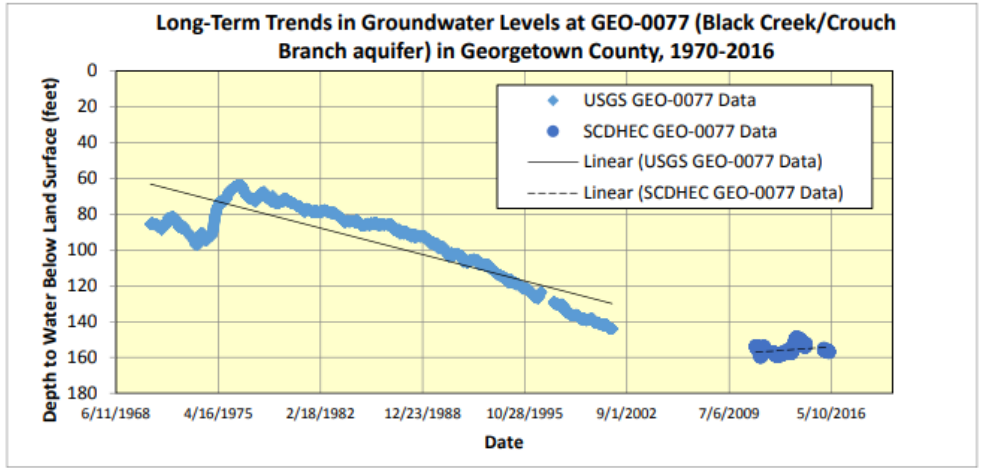
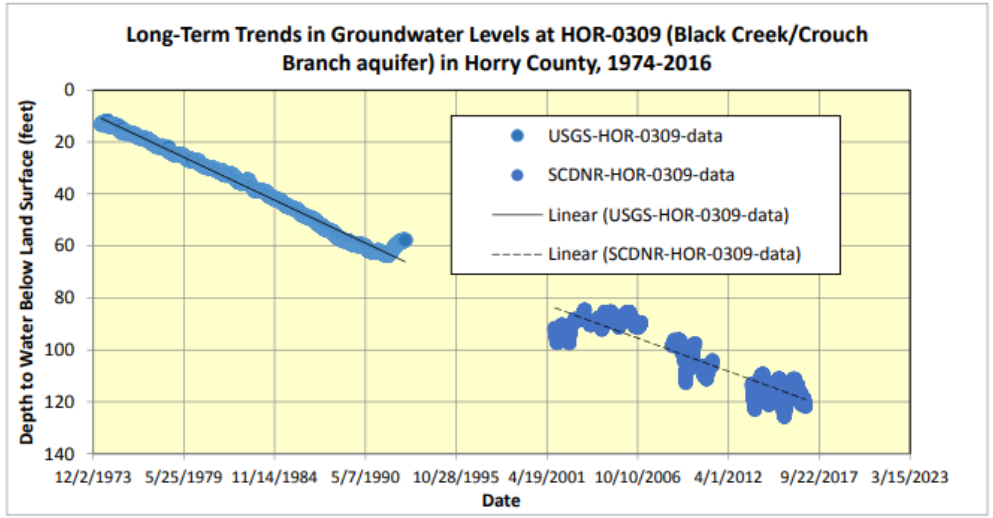
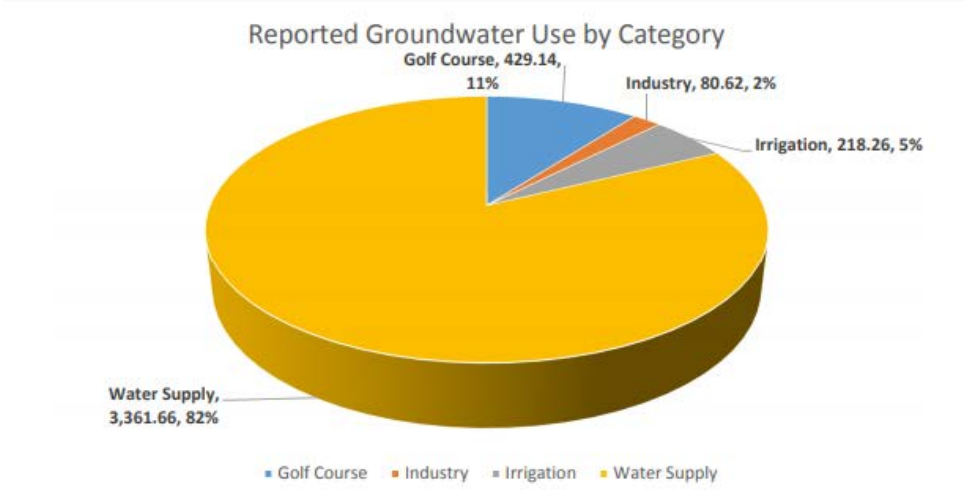


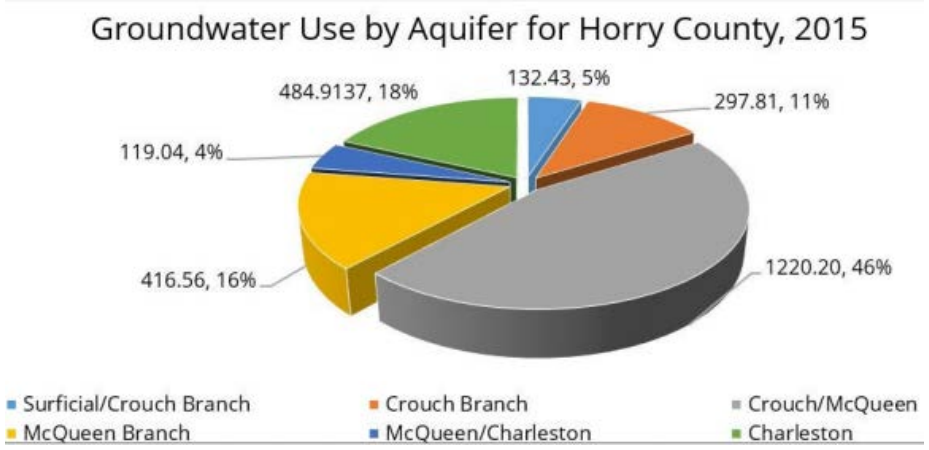
Figure 10: Long-Term Trends in Groundwater Levels at GEO-0077 in Georgetown County, 1970-2016

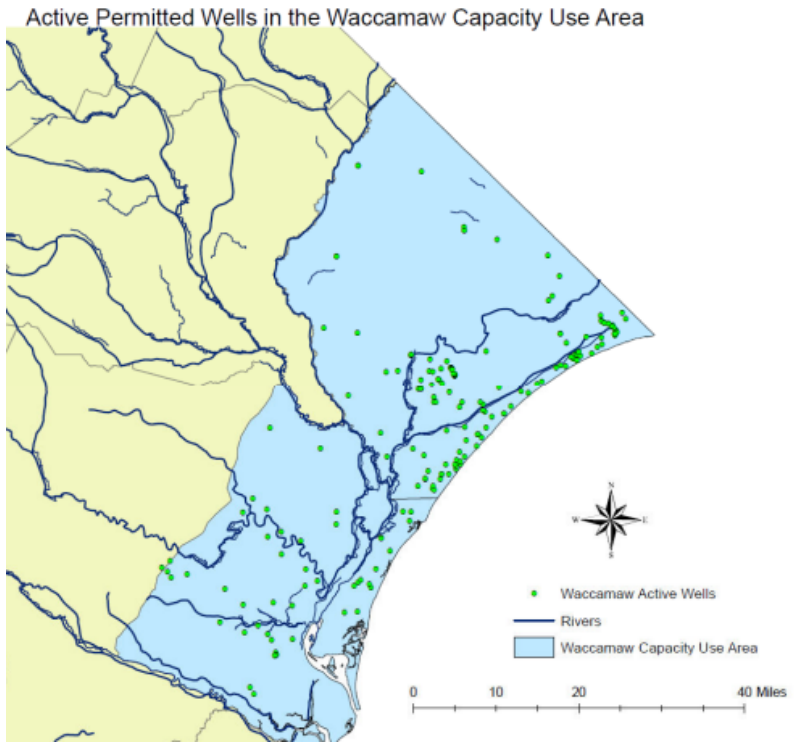


Current Groundwater Demand

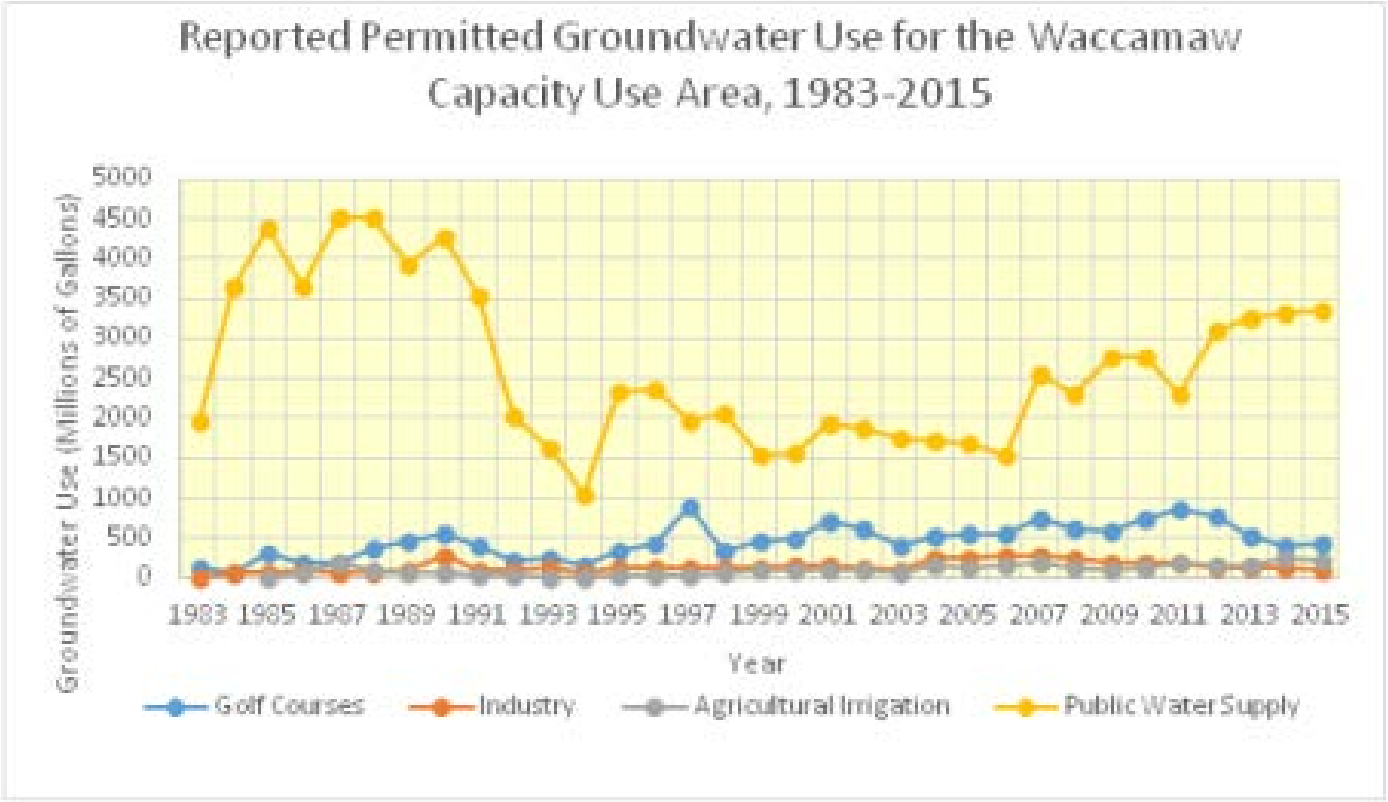


Category	Georgetown County	Horry County	Totals
Golf Courses	2	22	**24**
Industry	4	3	**7**
Agricultural Irrigation	1	7	**8**
Public Water Supply	5	6	**11**
Totals	**12**	**38**	**50**





Groundwater Demand Trends



Population, Growth, and Water Use Projections

Population Counts and Projections 2000-2030								
County	**April 1, 2000 Census**	**April 1, 2010 Census**	**July 1, 2015 Projection**	**July 1, 2020 Projection**	**July 1, 2025 Projection**	**July 1, 2030 Projection**	**Projected Change**	**Projected Percent Change**
Georgetown	55,797	60,158	61,300	62,500	63,800	65,100	9,303	17%
Horry	196,629	269,291	294,600	319,900	345,800	371,700	175,071	89%
Waccamaw Area	**252,426**	**329,449**	**355,900**	**382,400**	**409,600**	**436,800**	**184,374**	**73%**

Table 9. Total projected groundwater demand-Waccamaw Area (million gallons).

	2015	**2020**	**2025**	**2030**
Water Supply	3361.66	3,770.66	4,229.43	4,744.01
Other	728.03	816.61	915.96	1,027.40
Total MGY	4,089.69	4,587.27	5,145.39	5,771.41
Total MGD	11.20	12.57	14.10	15.81

** SCDNR is currently developing demand projections as for updating the SC State Water Plan

Groundwater Management Strategies

Strategy #1: Identify areas where a leveling and/or reduction in pumping is appropriate.

Prior to each permit renewal cycle, SCDHEC 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 Waccamaw Area.

Groundwater Management Strategies

Strategy #2: Review of permit applications based on demonstrated reasonable use.

Proposed withdrawals will be evaluated considering reasonableness of 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

Groundwater Management Strategies

Strategy #3: Establish a comprehensive groundwater monitoring program.

With increased population 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. SCDHEC 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 Waccamaw Area.

Groundwater Management Strategies

Strategy #4: Establish a conservation educational plan for the general public and existing groundwater withdrawers.

Water conservation has increasingly become a cornerstone to the development of water management strategies.

Groundwater Management Strategies

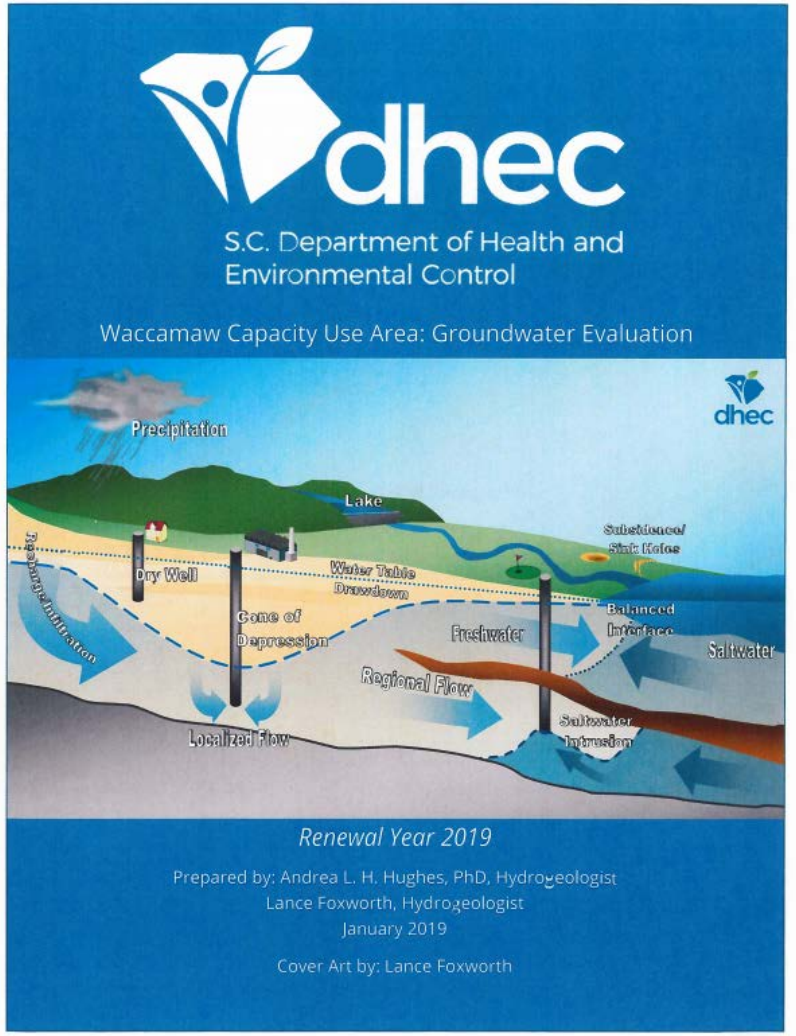
Strategy #5: Regulation and Planning.

The Groundwater Use and Reporting Act provides for regulation of water withdrawals in South Carolina. Groundwater regulation is necessary to protect and provide for the long-term sustainability of the resource. As data are developed on the groundwater resources of the designated Capacity Use Areas, the regulations should will be reviewed to ensure that sufficient and adequate protection of the resource is provided.

Groundwater Management Plan Reports

Every 5 years, or length of the permitting cycle, total annual groundwater withdrawals will be compiled and compared to available aquifer potentiometric maps. The report will include the following

- Listing of all permitted withdrawers, permitted withdrawal limits, and average groundwater withdrawal;
- Evaluation of withdrawal by category and by aquifer;
- Identification of areas of aquifer stress and all withdrawers utilizing the stressed aquifer(s).



Groundwater Evaluation Recommendations

1) Place a hold on the groundwater withdrawal rates for current permit holders in the Crouch Branch aquifer.

2) No new wells that increase withdrawal rates should be permitted for construction and production in the Crouch Branch aquifer. Keep in place until the Waccamaw Area undergoes its next 5-year review in 2024. At that time, the hold on new construction should be re-evaluated based on new water level information

3) Applications which propose to use the Crouch Branch aquifer should be diverted to the surficial, McQueen Branch, Charleston, or Gramling aquifers in Georgetown and Horry Counties as appropriate for the proposed use.

Groundwater Evaluation Recommendations

4) Encourage surface water as a source for future water demands.

5) Conduct a targeted public education campaign on water conservation practices and the extent of the current over-pumping evidence.

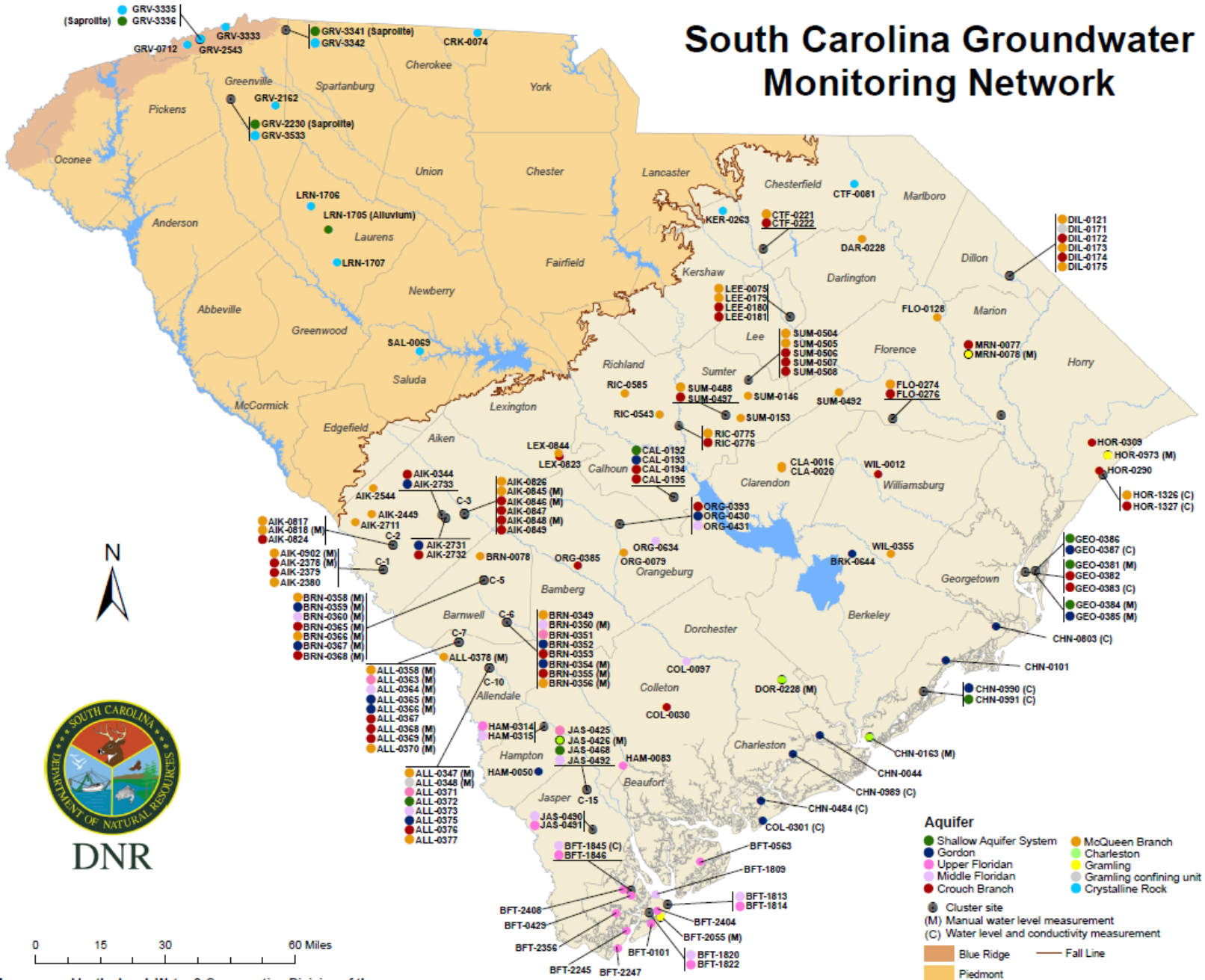
6) Each new and renewal permit for water supply wells should require that a water audit be conducted annually in accordance with the American Water Works Association policy statement for Water Loss Management, Metering and Accountability

Western Capacity Use Area

South Carolina Department of Health and Environmental Control

Groundwater Levels in the Western Capacity Use Area

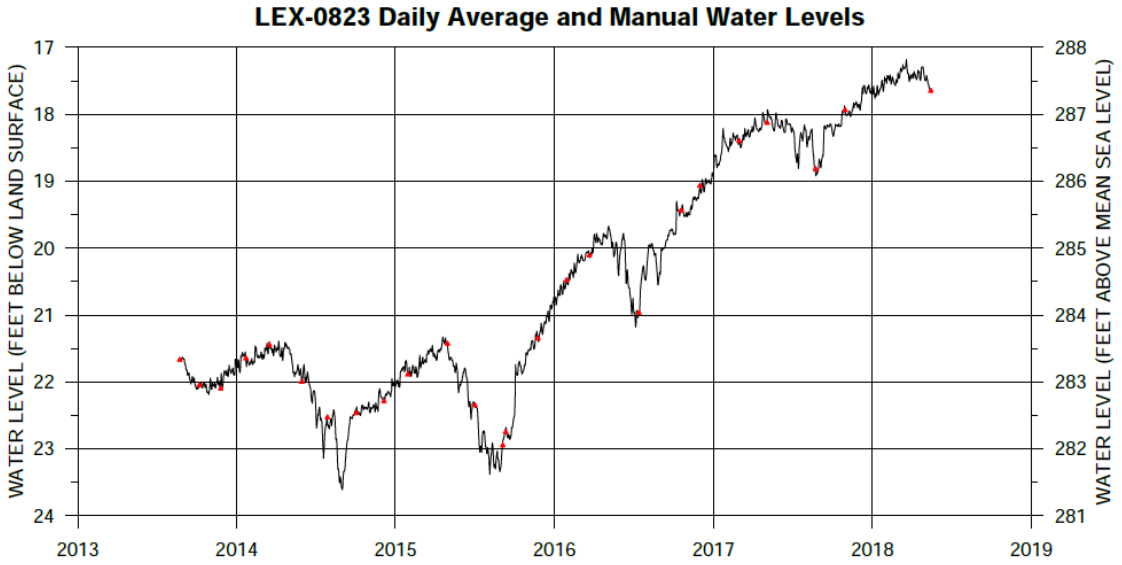
South Carolina Groundwater Monitoring Network



DNR

Map prepared by the Land, Water & Conservation Division of the South Carolina Department of Natural Resources: Nov. 2017

Lexington County



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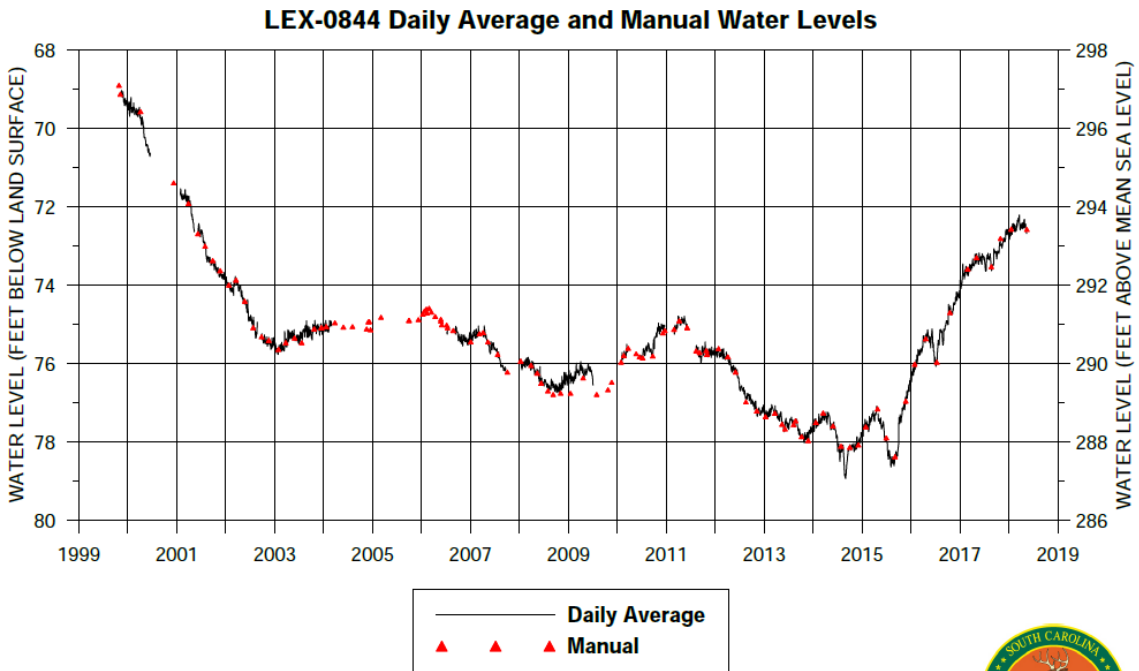
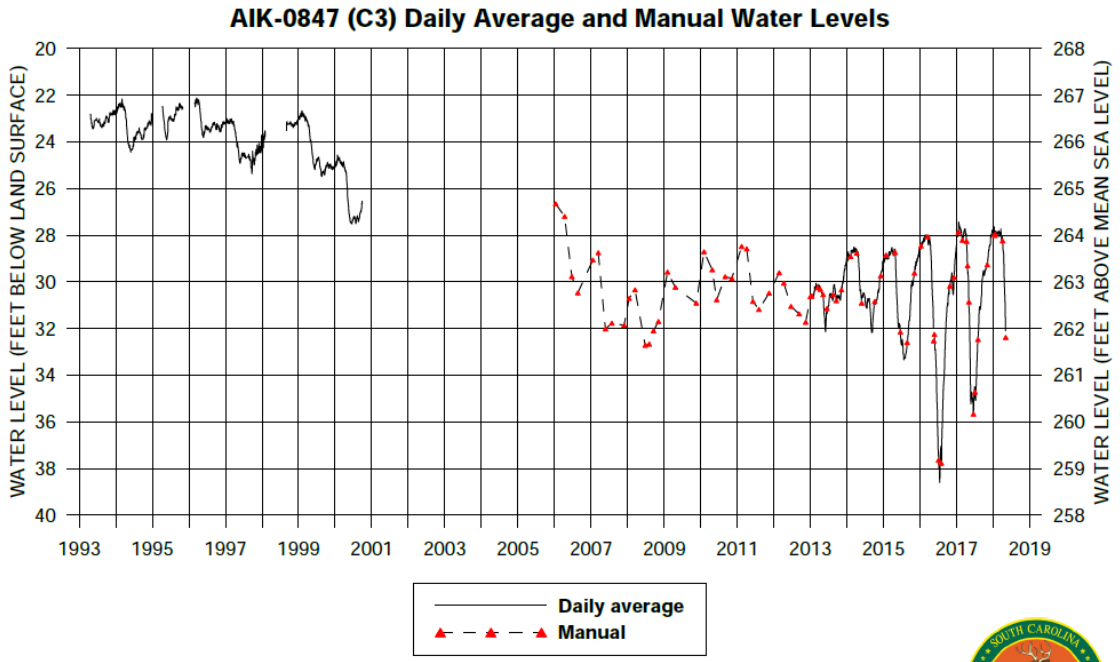


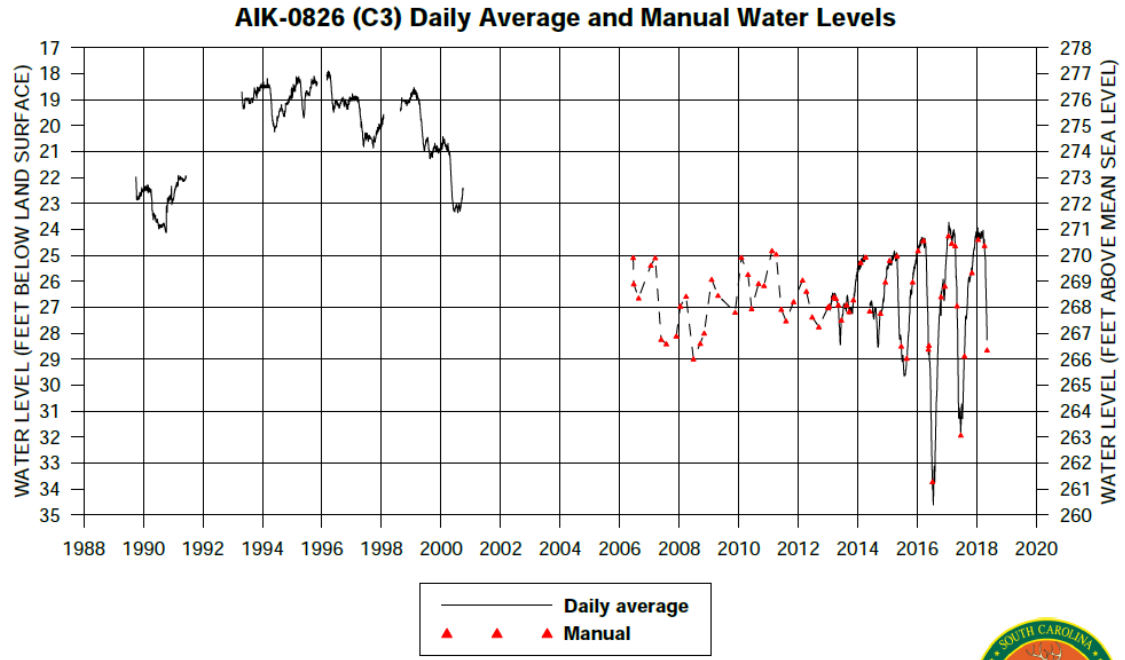
DNR

Aiken County



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

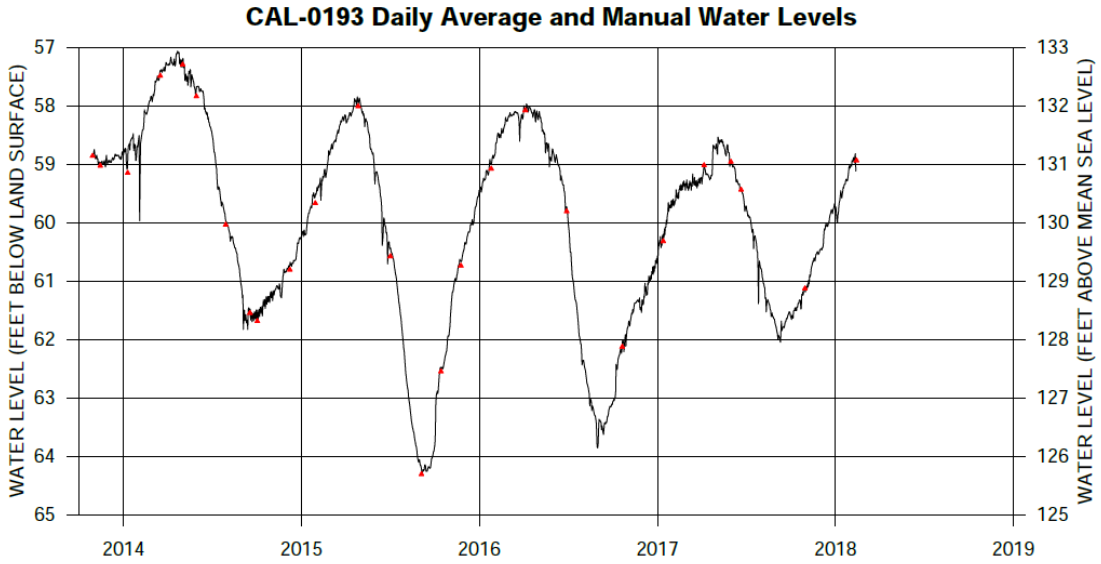
DNR



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

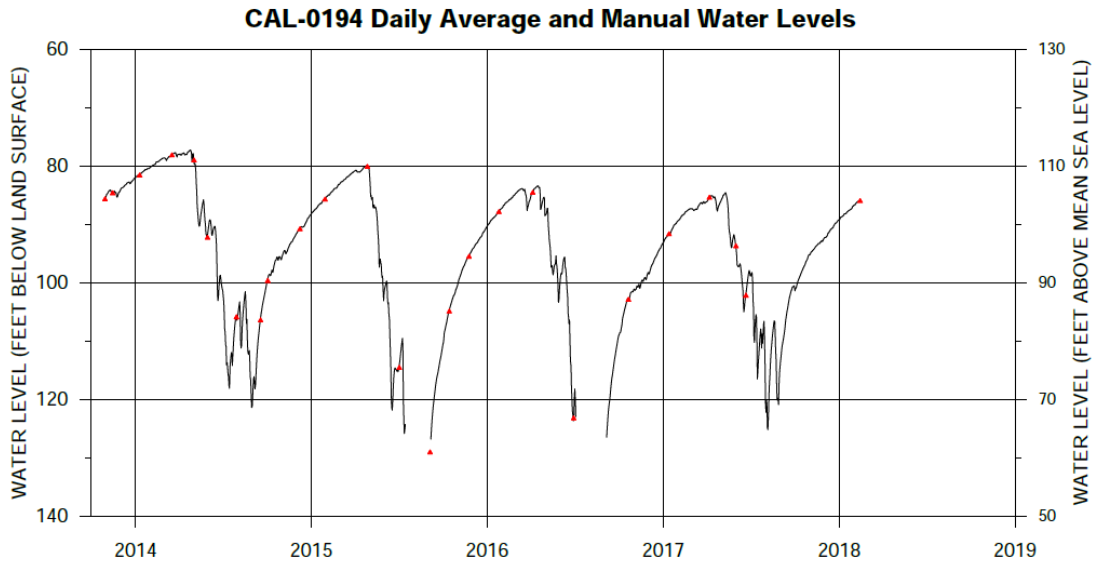
DNR

Calhoun County



Aquifer: Gordon
Elevation: 190 ft
Depth: 100 ft
Screen: 85-95 ft

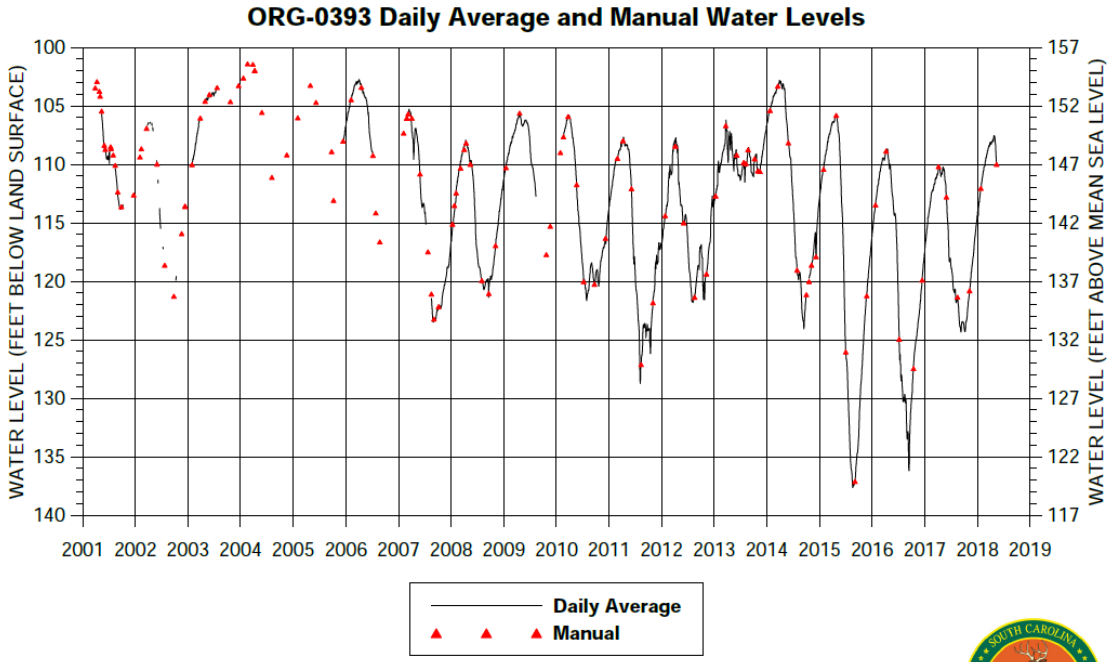
DNR



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

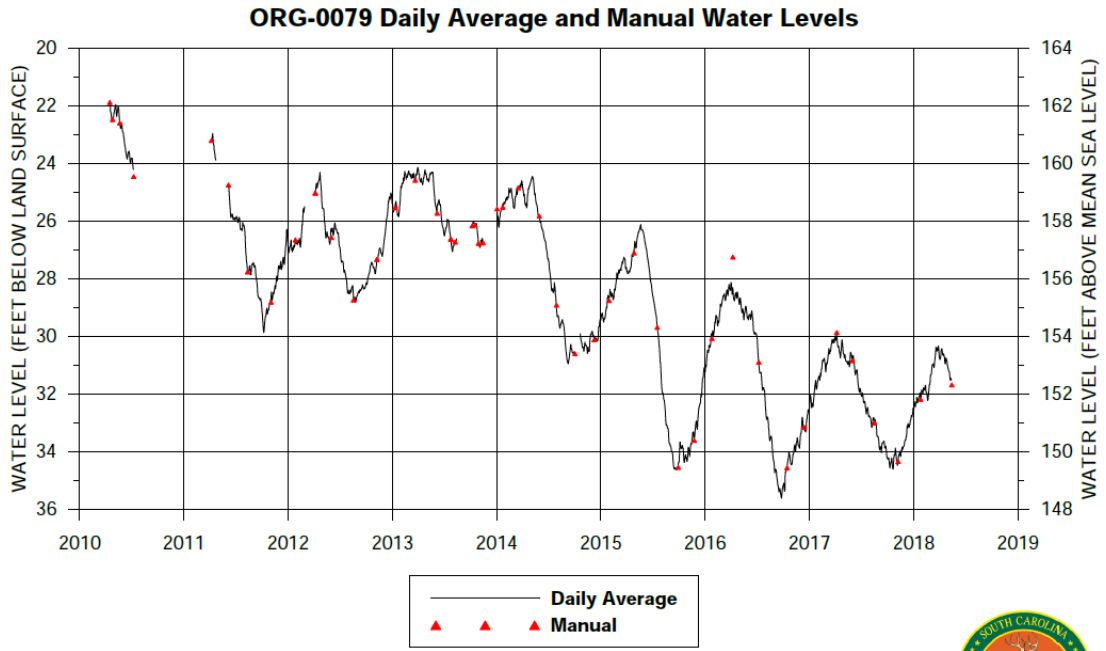
DNR

Orangeburg County



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

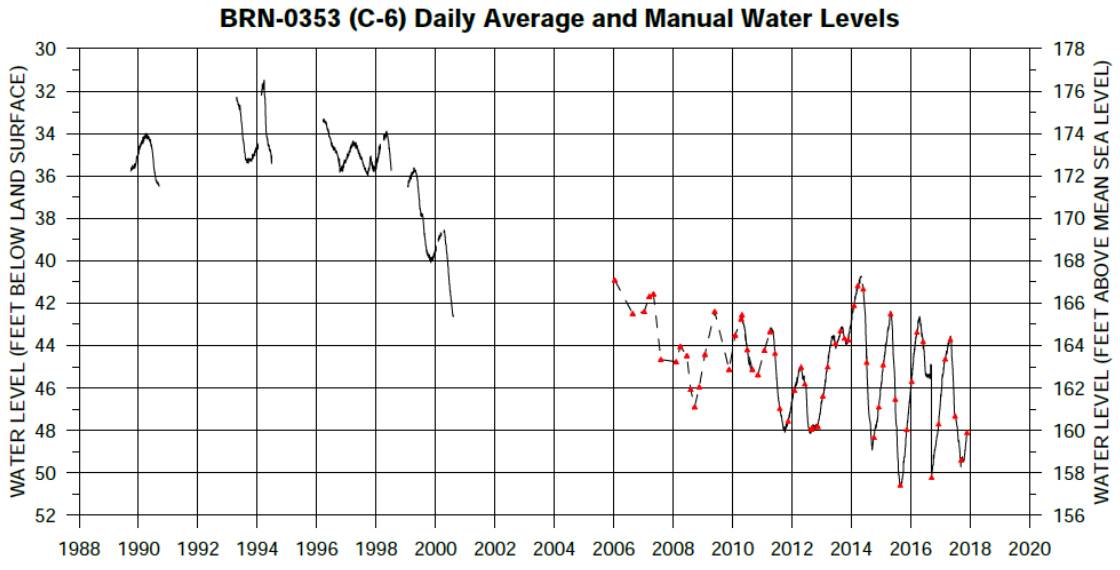
DNR



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

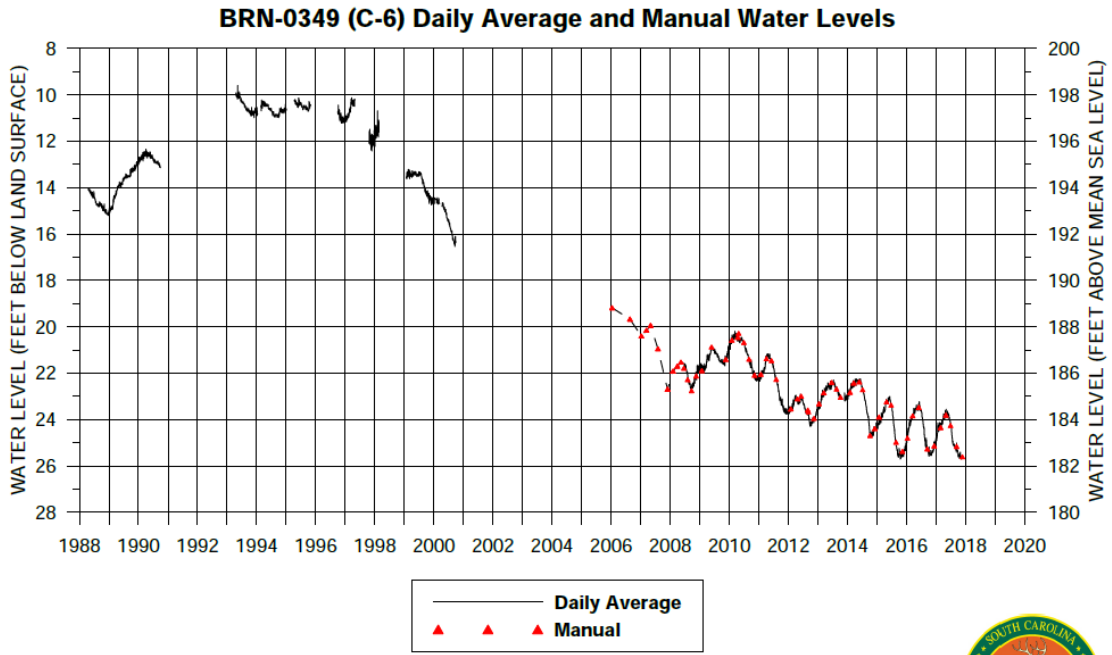
DNR

Barnwell County



Aquifer: Crouch Branch
Elevation: 208 ft
Depth: 588 ft
Screen: 573-583 ft

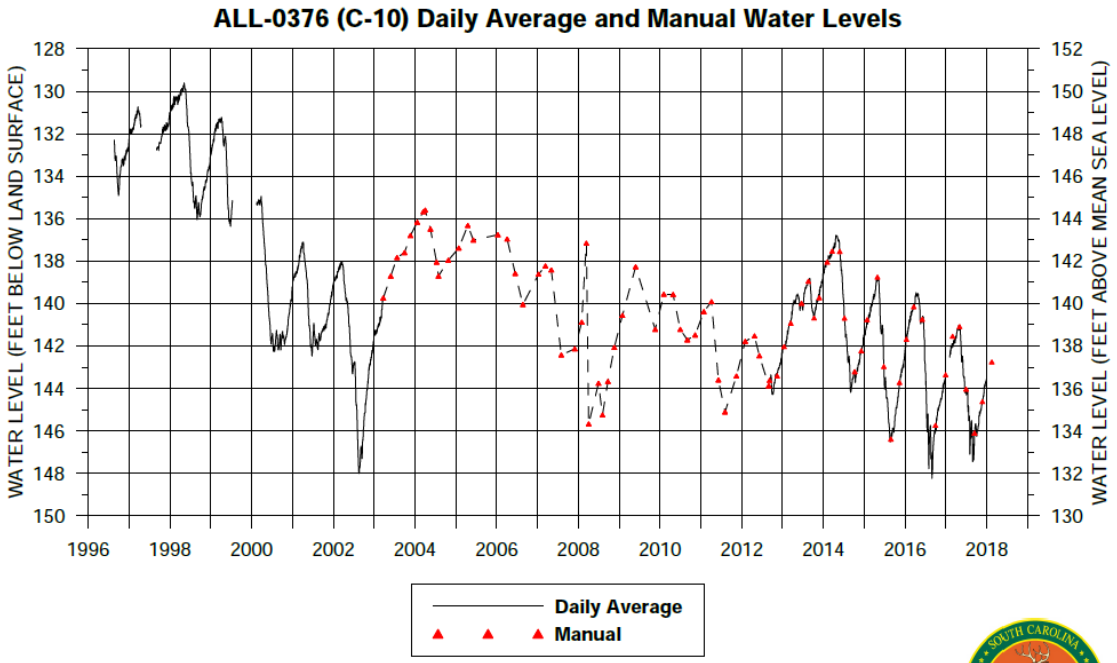
DNR

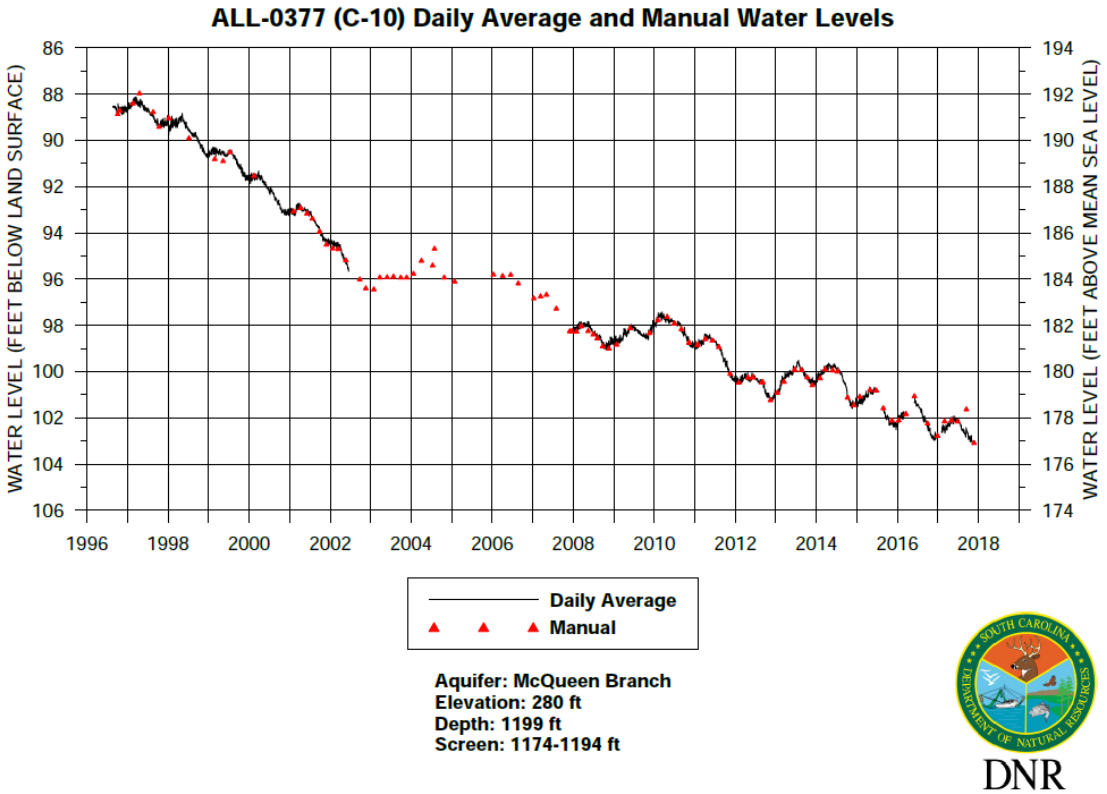


Aquifer: McQueen Branch
Elevation: 208.6 ft
Depth: 1045 ft
Screen: 1030-1040 ft

DNR

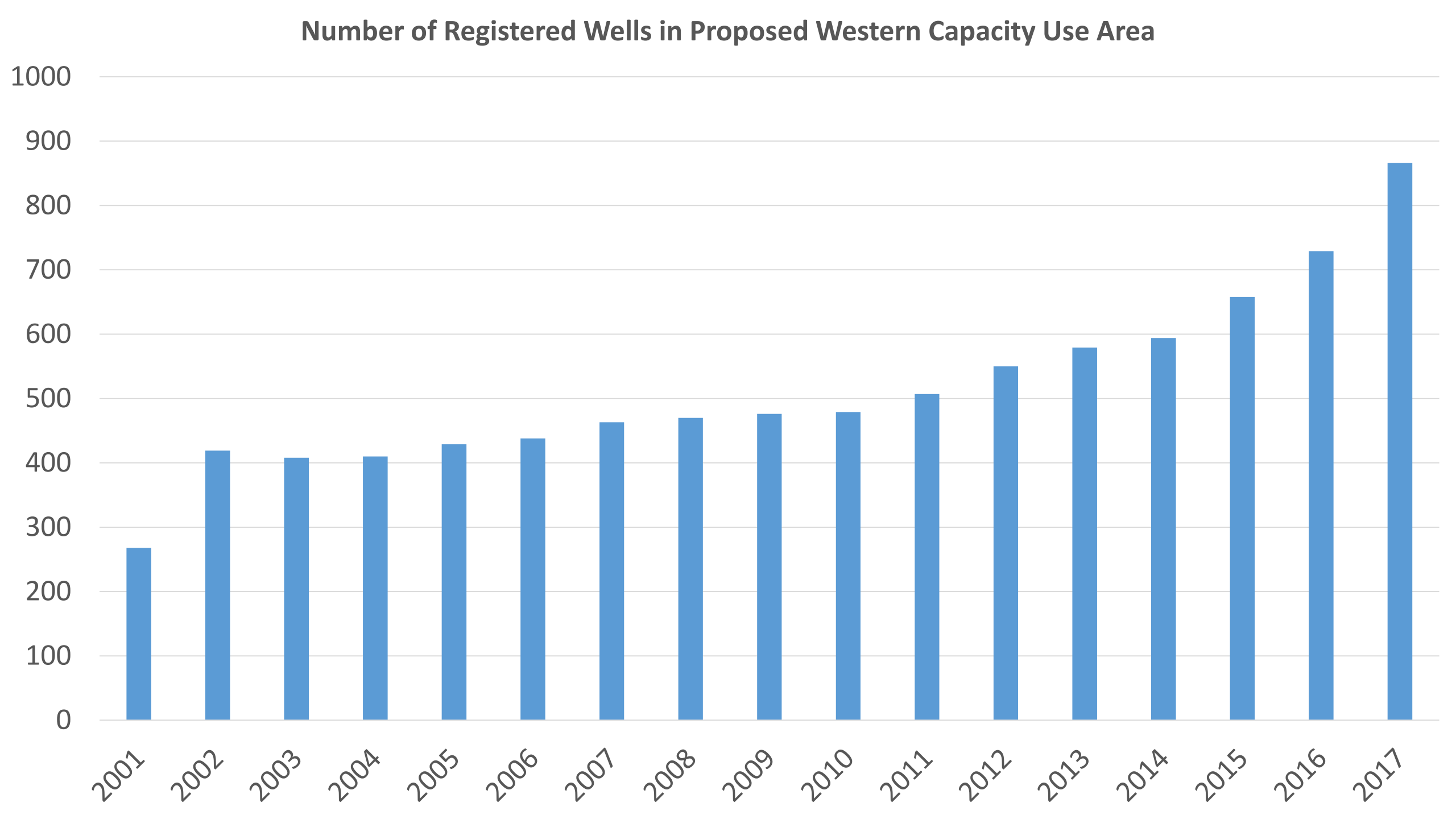
Allendale County

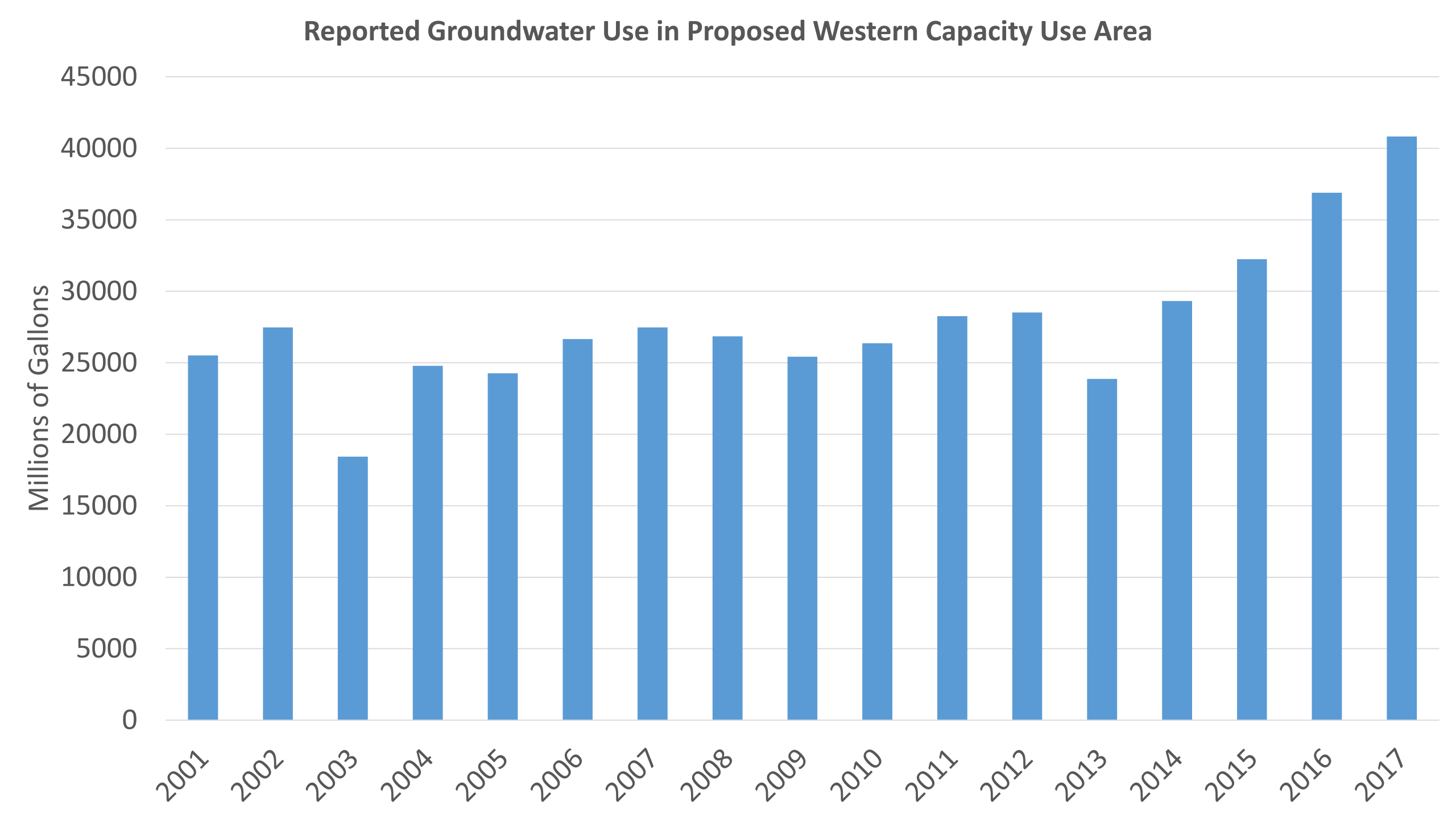




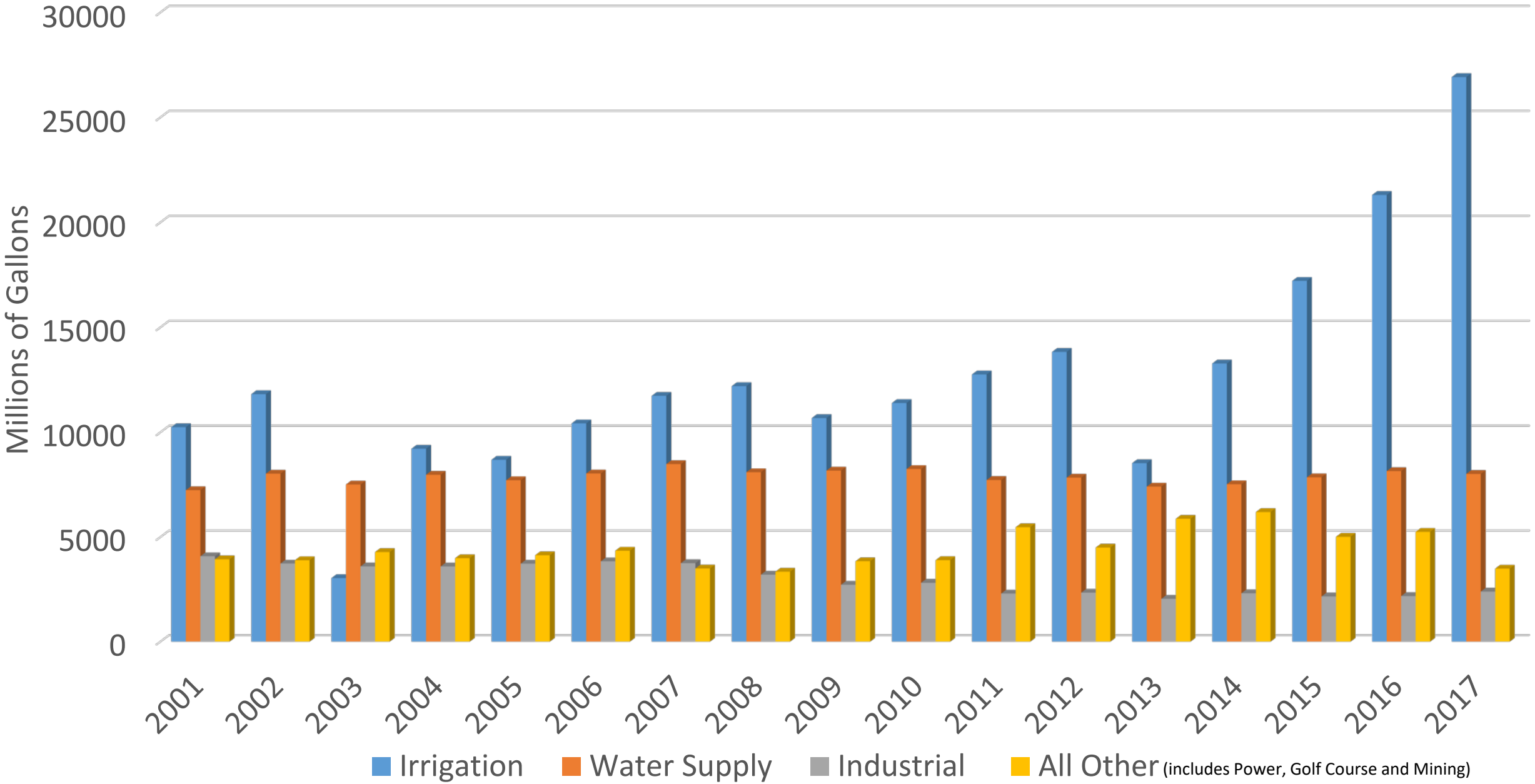
South Carolina Department of Health and Environmental Control

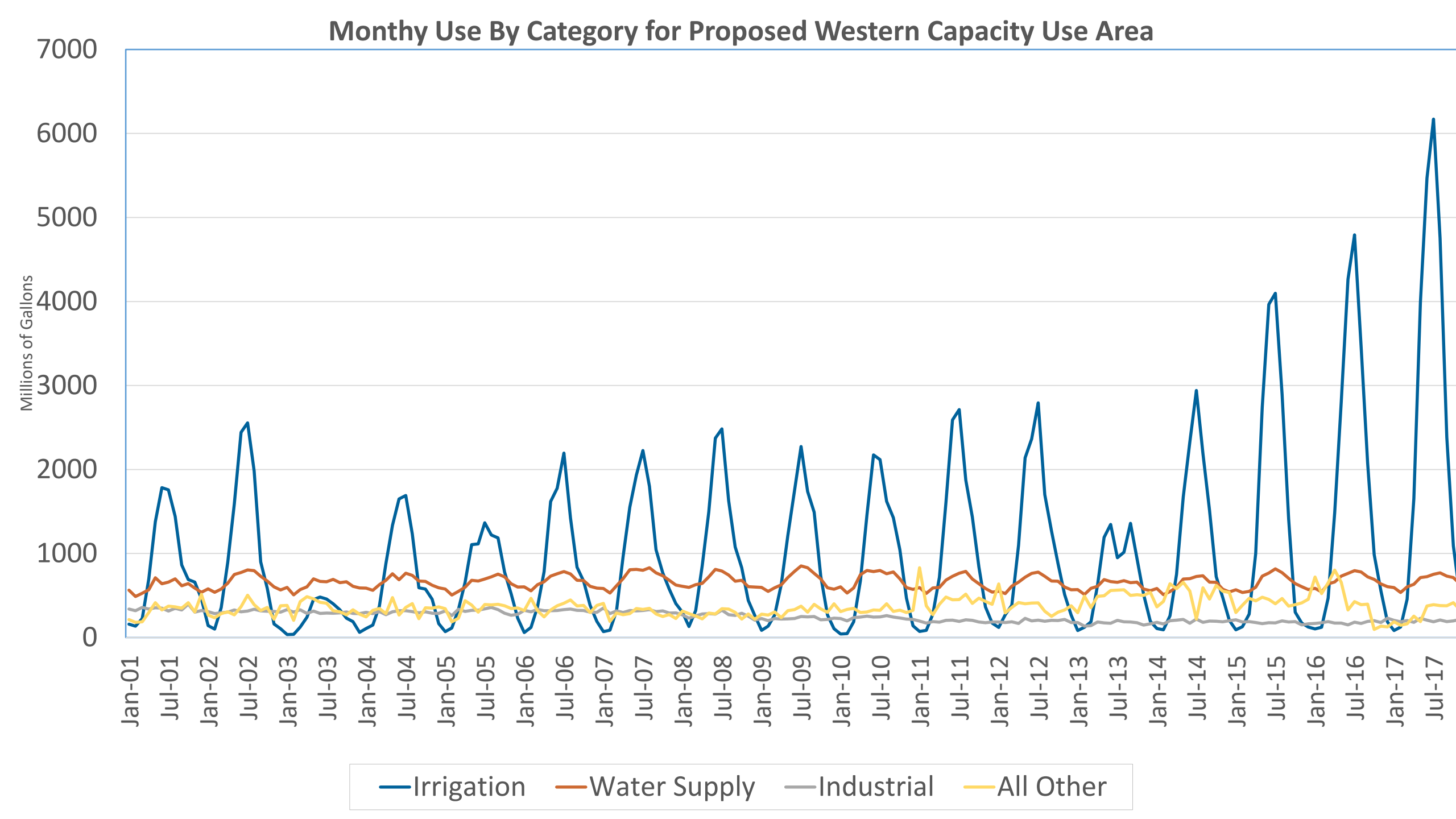
Groundwater Use in the Western Capacity Use Area

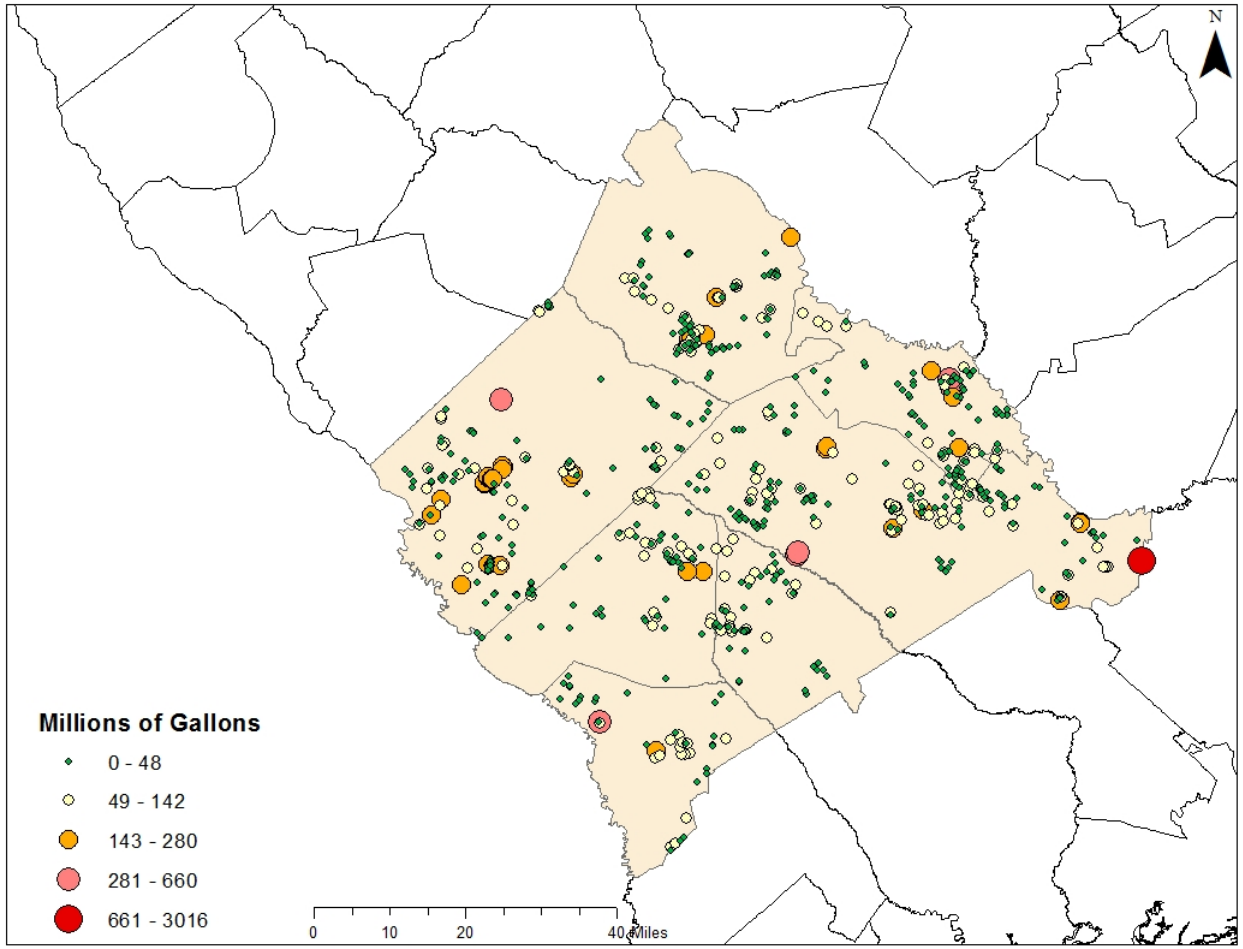

Number of Registered Wells in Proposed Western Capacity Use Area
1000
900
800
700
600
500
400
300
200
100
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

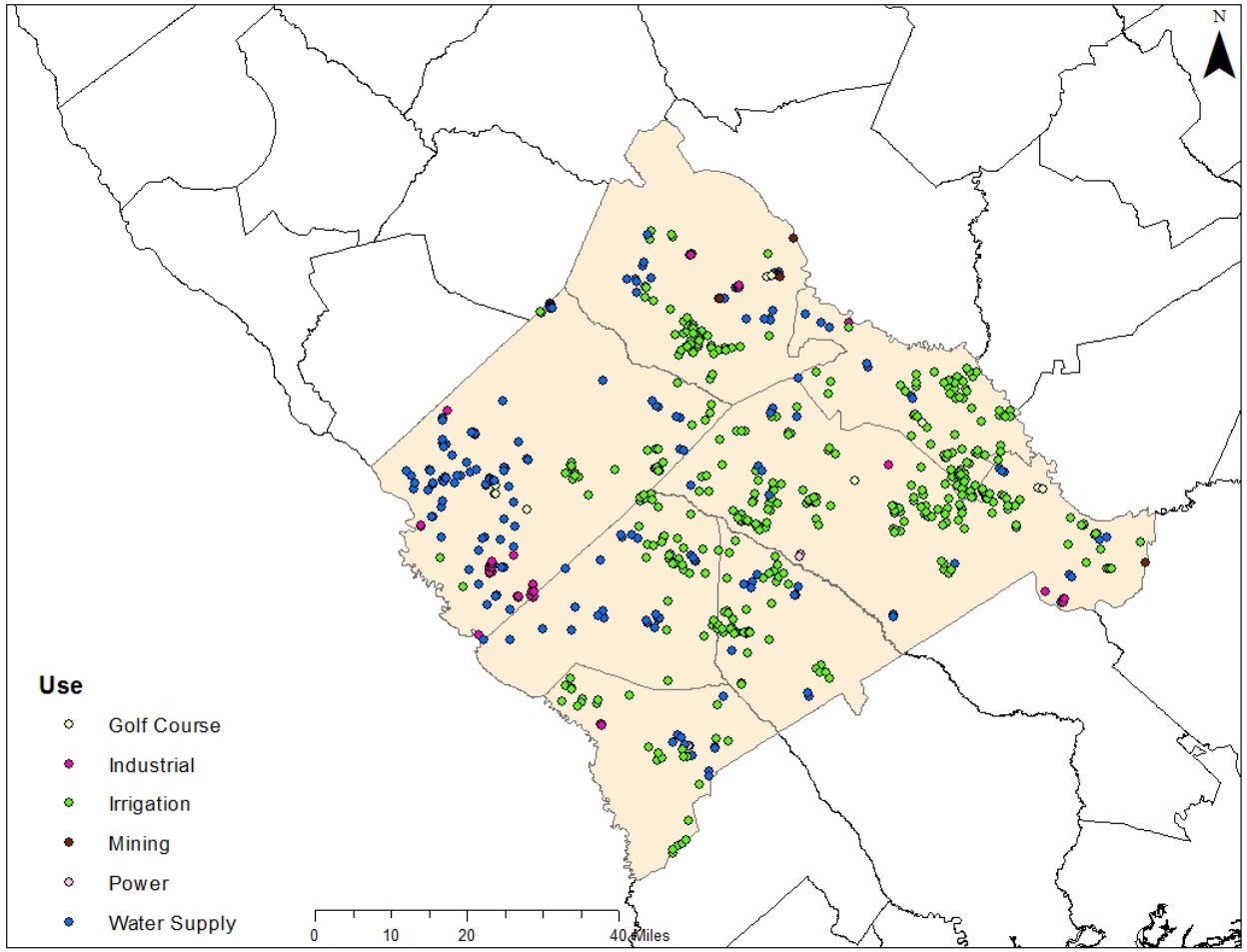

Reported Groundwater Use in Proposed Western Capacity Use Area
Millions of Gallons
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

Groundwater Use By Water Use Sector in Proposed Western Capacity Use Area




Monthy Use By Category for Proposed Western Capacity Use Area
Millions of Gallons
7000
6000
5000
4000
3000
2000
1000
0
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
Jul-12
Jan-13
Jul-13
Jan-14
Jul-14
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Irrigation
Water Supply
Industrial
All Other


N
Millions of Gallons
0 - 48
49 - 142
143 - 280
281 - 660
661 - 3016
0
10
20
40 Miles


N
Use
Golf Course
Industrial
Irrigation
Mining
Power
Water Supply
0
10
20
40 Miles

Alex Butler, Manager
Water Quantity Permitting Section
butlerap@dhec.sc.gov
(803) 898-3575

Permitting Process

1. An application and required documentation is submitted to the Department by a potential groundwater withdrawer
2. Department reviews application for completeness
3. Department performs a technical review of permit
4. All new and modified permits are Public Noticed
5. A Permit to Construct is issued if new wells are requested to be installed
   - Is not a Permit to Withdraw, only authorized construction of the well(s)
6. Permit to Withdraw is issued
   - If a new well was installed, the Department requires well records be submitted prior to issuance of a permit

Groundwater Withdrawal Permit Application
Bureau of Water

A. General Information.

1. Facility Name:

2. Facility Owner:	7. Contact:
3. Facility Address: City: State: Zip:	8. Contact Address: City: State: Zip:
4. Facility Telephone Number:	9. Contact Telephone Number:
5. Facility Fax Number:	10. Contact Fax Number:
6. Owner E-mail Address:	11. Contact E-mail Address:

12. Type of Application: ☐ New ☐ Modification ☐ Renewal

13. Total Requested Withdrawal Rates.

A. Million Gallons per Month: B. Million Gallons per Year:

14. Purpose of Groundwater Withdrawal: (please indicate number of wells beside description which best applies, total below should equal total number of wells owned).

Aquaculture (AQ)	Number:	Agricultural Irrigation (IR)	Number:
Golf Course Irrigation (GC)	Number:	Other (OT)	Number:
Industrial (IN)	Number:	Water Supply (WS)	Number:

15. **Road map of Facility must be included for application review** (please make sure all roads leading to the site entrance are labeled). ☐

16. **Site map of all wells labeled for the facility must be included for application review** (wells for agricultural irrigation must indicate fields to be irrigated as well as the size of each field, and crop to be grown). ☐

17. **Describe all groundwater conservation practices in use, or to be in use, including Best Management Practices.** (These include, but are not limited to, highly efficient equipment, wetting agents, other water sources, groundwater recycling, withdrawing from alternate aquifer, equipment maintenance.)

18. Complete the following table for proposed wells.

Well ID	Latitude	Longitude	Depth	Screened/Open Interval	Est. Yield (In GPM)	Flow Measurement Method
1)						
2)						
3)						
4)						
5)						
6)						
7)						
8)						

19. Complete the following table for *all* wells. Use abbreviations provided on previous page for Type of Use.

Well ID	Type of Use	Max. monthly withdrawal rate (in million gallons)	Max. yearly withdrawal rate (in million gallons)
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			
12)			
13)			
14)			
15)			
16)			
17)			
18)			

20. Please complete the following table for all other sources of water.

Owner ID - Purchased, Effluent, or Surface Water	Type of Use	Million Gallons per Month	Million Gallons per Year

B. Agricultural Irrigation.

	Field / Course ID	Vegetation	Acres
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			
12)			
		Total Acres Irrigated:	

2. Groundwater Requirements.

	Crop	Length of Growing Season (wks)	Water Requirement (in)
1)			
2)			
3)			
4)			
5)			
6)			
7)			

C. Industry.

1. Describe your operation, including the types of products produced, and the uses for groundwater in the industrial process. Please include reason to use groundwater rather than alternative sources of water.

2. Please Estimate to the best of your ability the volume of groundwater to be withdrawn and used for each industrial process. i.e. If you have 3 seperate cooling processes, please list them seperately by a known name such as 1,2,3, etc.

Process ID	Million Gallons per Month	Million Gallons per Year
Processing:		
Cleaning:		
Cooling:		

D. Golf Course.

1. Number of acres irrigated:

2. Type of grass on course:

3. Are there any groundwater alternatives available?

E. Public Water Supply.

1. Current number of customers served:

2. Current number of taps:

3. Amount of water sold to other entities (i.e. public water supply, industry, etc.):

Entity	Amount of Water Sold (million gallons)
1)	
2)	
3)	
4)	
5)	
6)	
7)	
8)	

F. Signature.

I hereby certify the information enclosed is true, complete, and that conservation measures will be researched and enacted when economically feasible.

Printed/Typed Name | Title

Personal information provided on this document is subject to public scrutiny or release.

Signature | Date (MM/DD/YYYY)

An application guideline, permitting process outline, and a brief summary of the Groundwater Use and Reporting Act is included with this application. The Groundwater Use and Reporting Act summary provides the owner with a brief description of the laws that govern this application. The guideline is provided to help the applicant correctly complete the application. The outline provides a list of steps to be completed by the applicant and the Department. It is important that these steps be followed closely, because no action will be taken by the Department until each step in the outline is completed and correct. If any information received is not correct then the party in charge of the permitting will be informed. If the required information is not received, or is late, and the Department is not notified at least 15 days prior, the permit may be delayed, denied, or revoked.

- Site Map showing proposed withdrawal locations
- Proposed well construction diagram
- Additional Information may be needed on site specific basis

*No fee for application

What is needed now?

- Existing registered users do not need to take action until contacted by the department.
  - When the GWMP is approved by the DHEC Board
  - Application for groundwater withdrawal permit will be needed at that time

- New or unregistered users should submit an application for Groundwater Withdraw to DHEC.
  - Permits will be reevaluated and reissued once the GWMP is approved