South Carolina Department of Health and Environmental Control

Option to Call In

If you are experiencing audio problems, join the virtual meeting by phone:

Phone number: **1 864-558-7311**
Access Code: **967 858 473#**

Exits the meeting. (If you accidentally exit the meeting, you can rejoin.)

dhec
Healthy People. Healthy Communities.

South Carolina Department of Health and Environmental Control

dhec

Stay Healthy.
Stay SC Strong.

STAY SC
STRONG

scdhec.gov/stayscstrong
#StopCovidSC #SpreadCaringSC

scdhec.gov/COVID19

Santee-Lynches Proposed Capacity Use Area Designation
PUBLIC MEETING

All lines will be muted to avoid echo or feedback

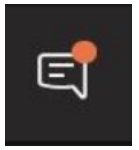
Opportunity for comments following presentation

Meeting will be recorded to share as a resource

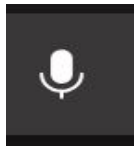
How to Participate

- Click the Hand Raise icon to be called on to speak
- Questions may be typed into the chat & will be addressed as time allows
- Unmute with the microphone icon or by dialing *6 on your phone when called on to speak

Hand Raise
(click this icon to indicate you would like to speak)



Chat
(type to share a question)



Unmute
(click the microphone icon to unmute when called upon)

South Carolina Department of Health and Environmental Control

Proposed Santee-Lynches Capacity Use Area

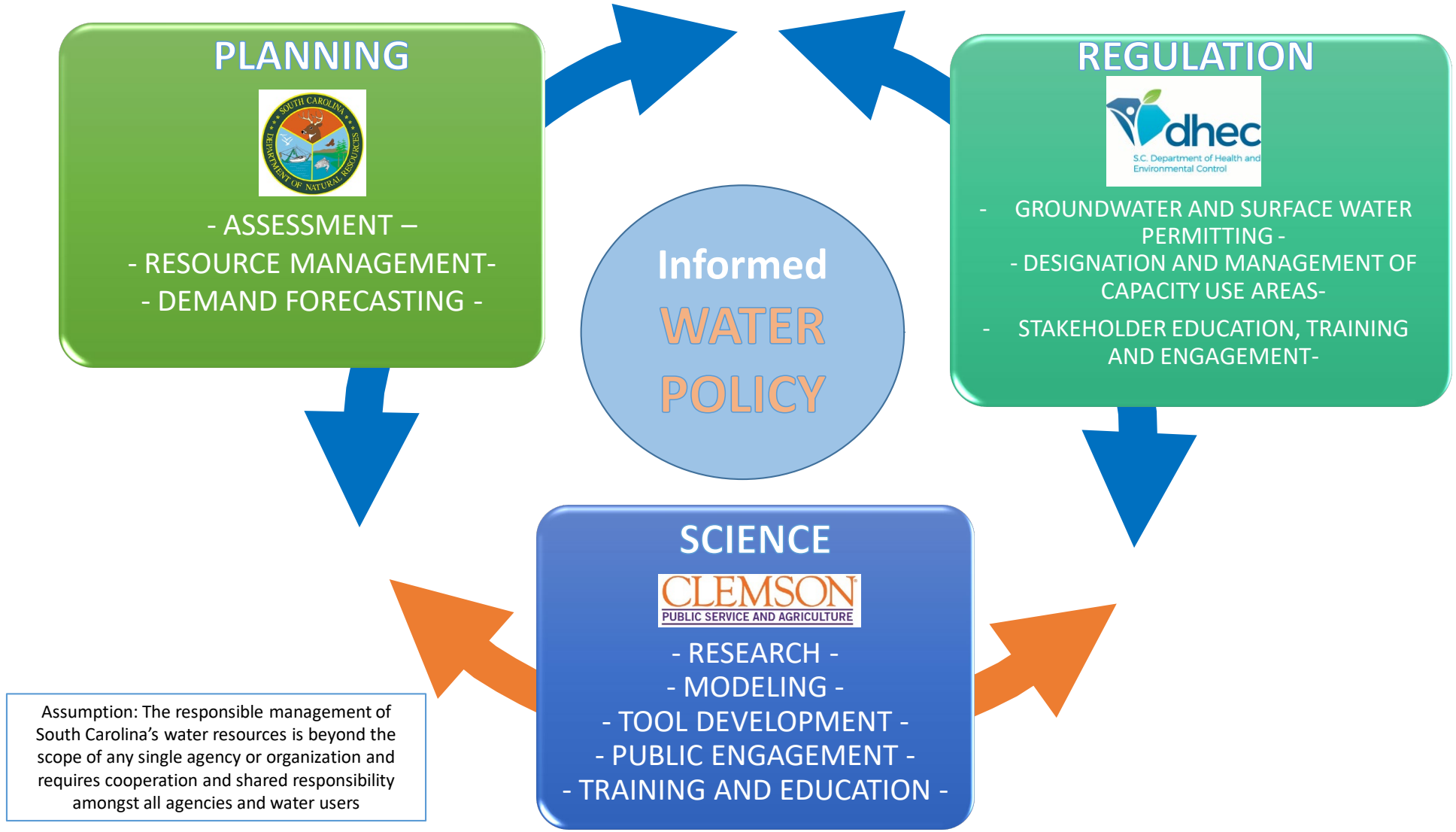
Chesterfield, Clarendon, Kershaw, Lee, Richland, and Sumter Counties

Agenda

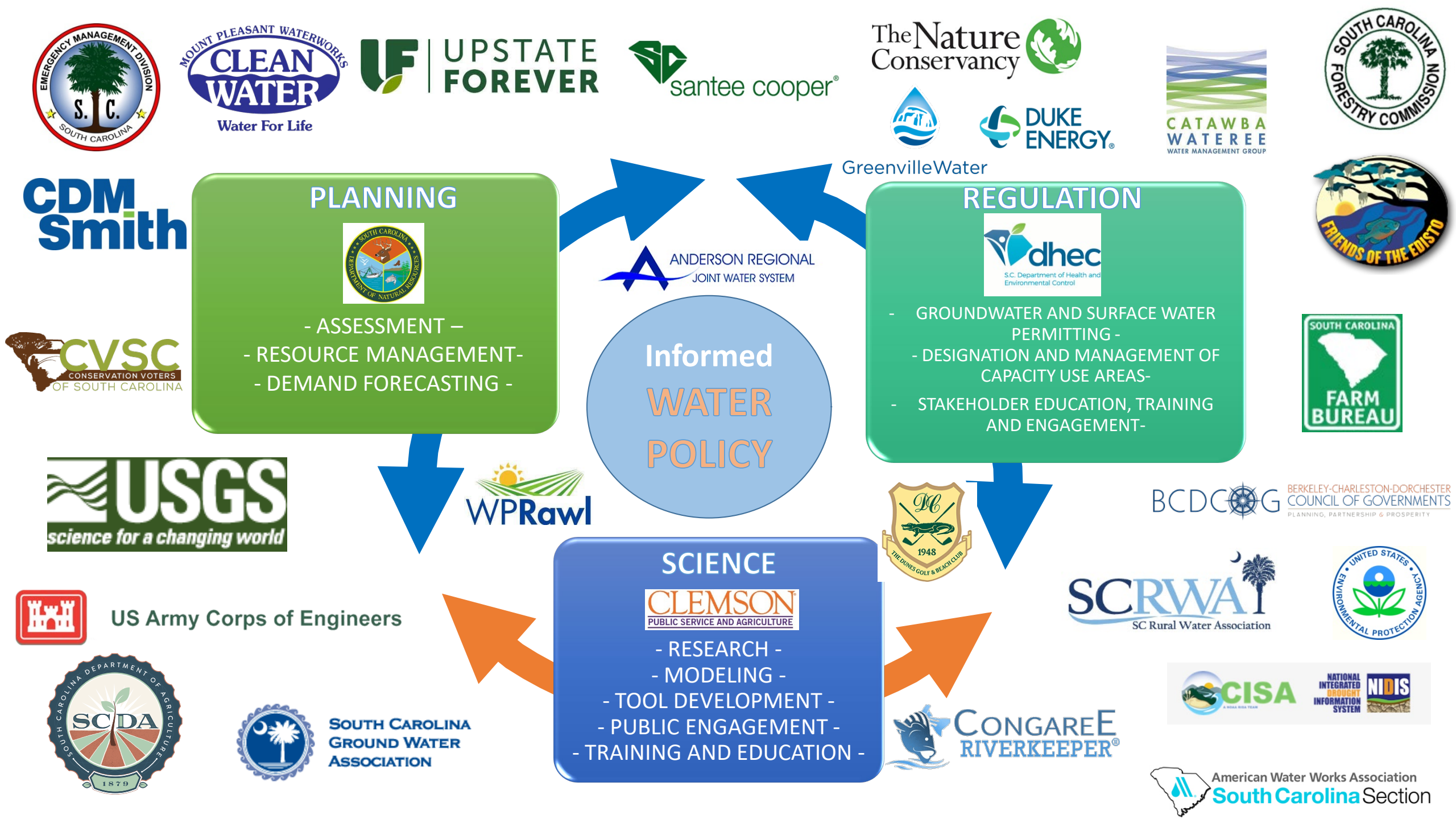
- Capacity Use Program Overview
  - Alex Butler, Manager
- Santee-Lynches Area Background
  - Lance Foxworth, Hydrogeologist
- Current and Historic Water Use
  - Ashley Carothers, Hydrogeologist
- Current Groundwater Conditions
  - Andrea Hughes PhD, Hydrogeologist
- Summary and Next Steps
  - Alex Butler, Manager
- Questions

South Carolina Department of Health and Environmental Control

Capacity Use Program Overview



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
dhec S.C. Department of Health and Environmental Control
Friends of the Edisto
CVSC Conservation Voters of South Carolina
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
Clemson Public Service and Agriculture
CISA
National Integrated Drought Information System NIDIS
South Carolina Department of Agriculture SCDA 1879
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."


Prevent Waste
Conserve and Protect
CAPACITY USE PROGRAM
Maintain for Development And Use
dhec

Groundwater Use and Reporting Act
Capacity Use Area Designation

Where groundwater withdrawal :

- Presents potential adverse effects to the natural resources
- Poses a threat to public health, safety, or economic welfare
- Poses a significant threat to the long-term integrity of the groundwater source

The Department, local government or groundwater withdrawers may initiate a Capacity Use Area designation process

Groundwater Permitting

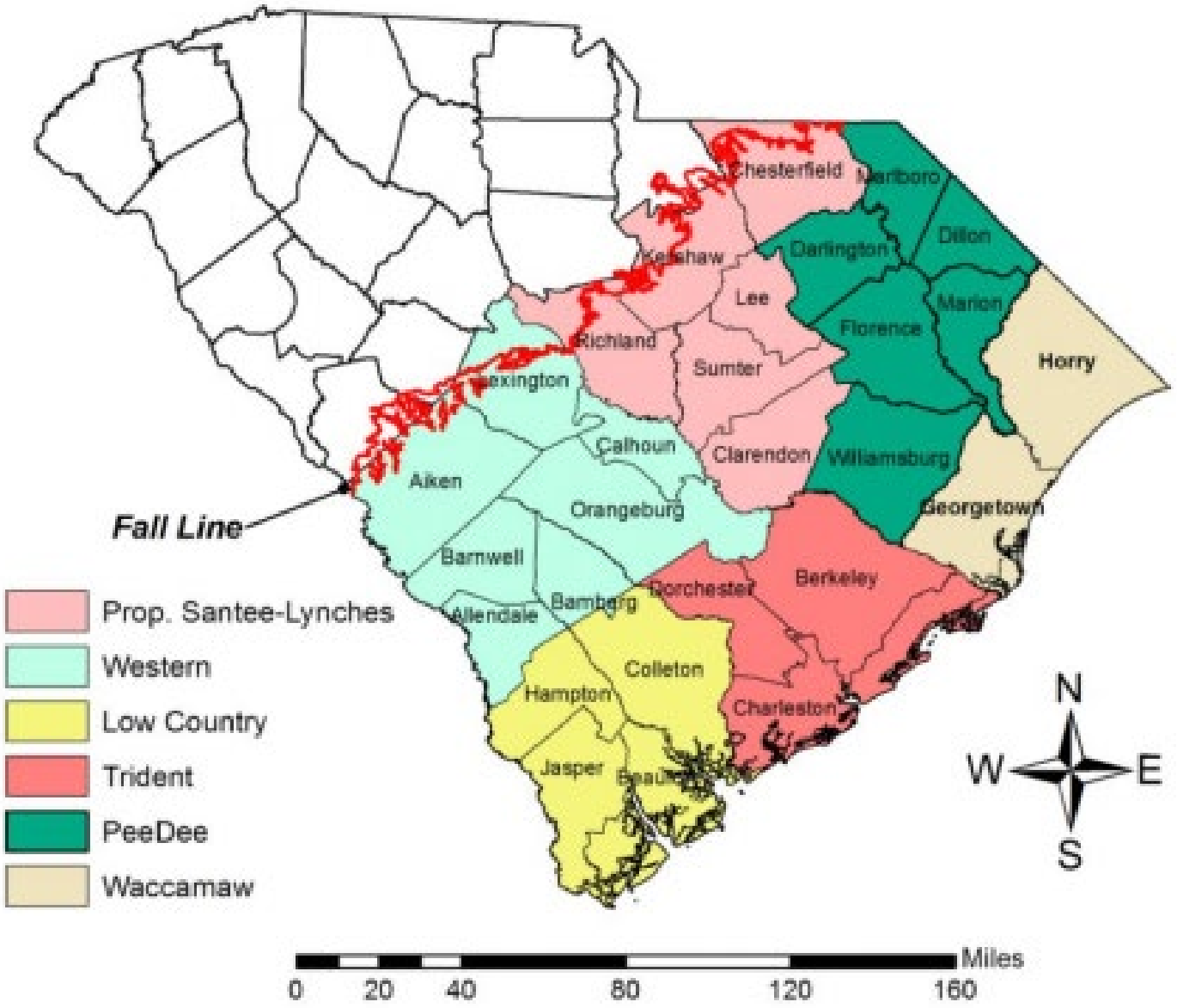
Groundwater withdrawal permits are required to ***withdraw and use groundwater equal to or greater than three million gallons in any month*** in a Capacity Use Area.

Groundwater use categories that are typically permitted:

- Public Water Supply
- Industry
- Irrigation
- Golf Course
- Mining
- Thermo Power

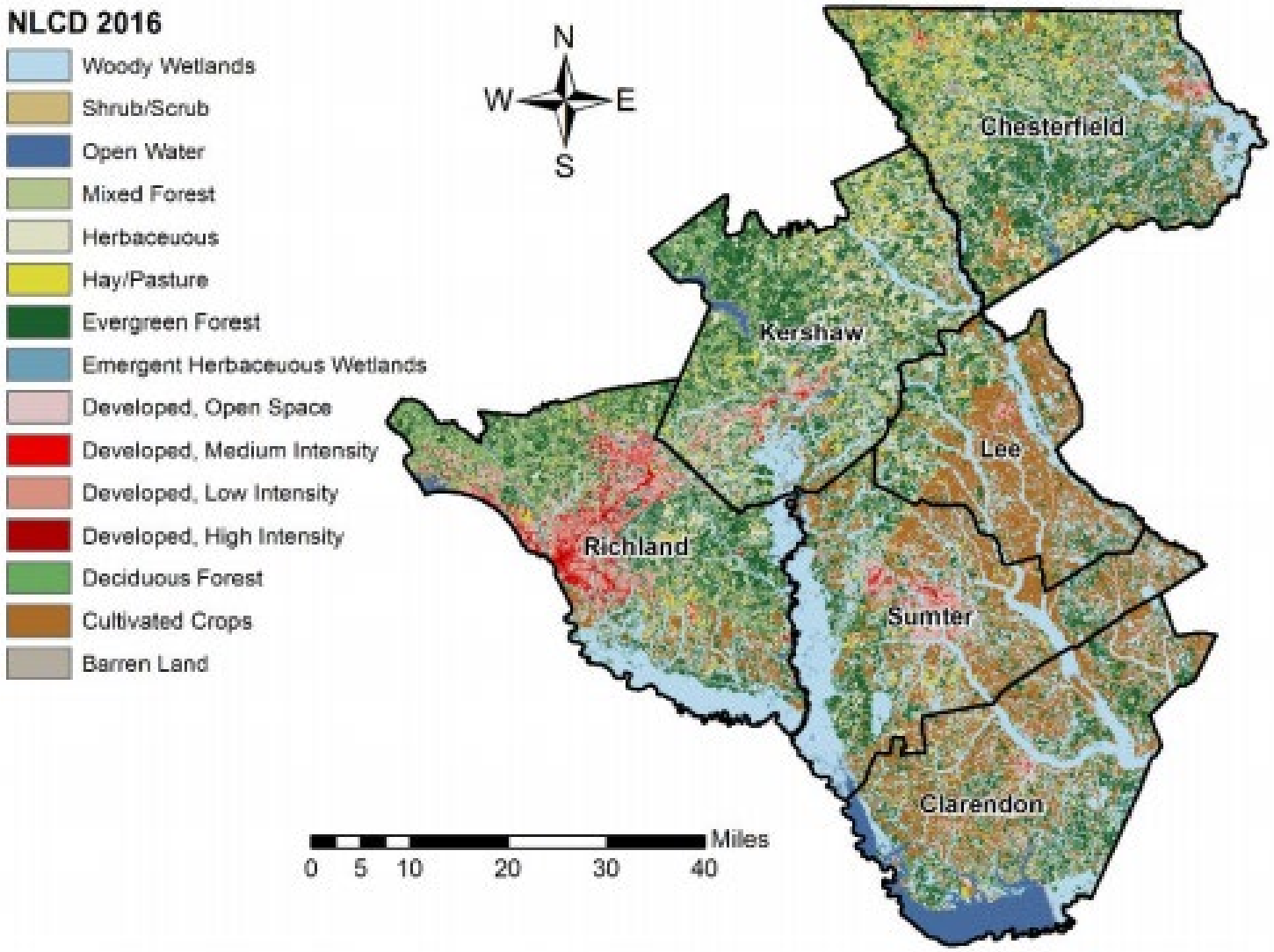
South Carolina Department of Health and Environmental Control

Santee-Lynches Area Background



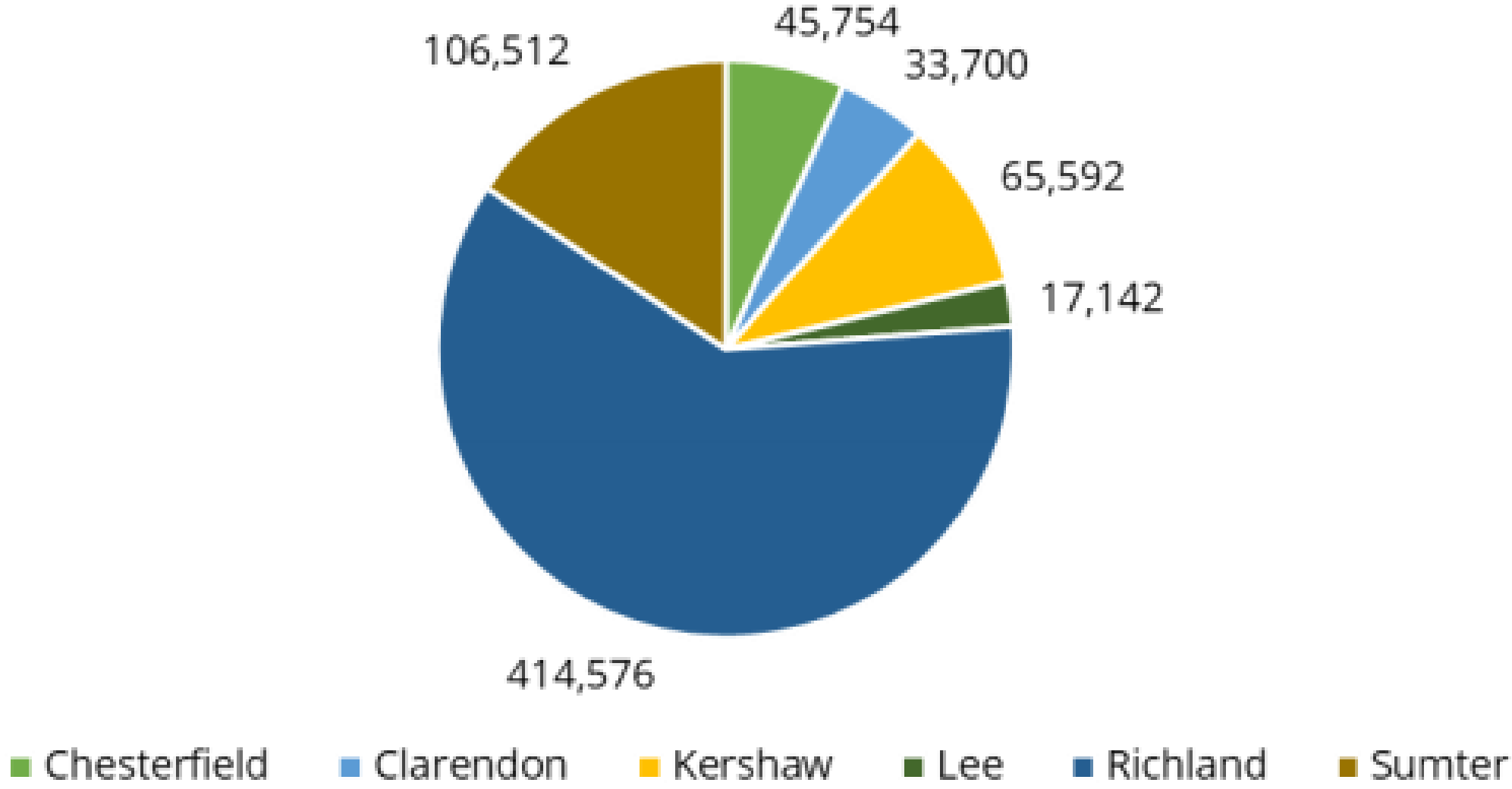
- 6th Capacity Use Area
- Entire Coastal Plain Recommended for Groundwater Management Program in 2004
- 6 County Area: Chesterfield, Clarendon, Kershaw, Lee, Sumter, and Richland Counties

Location, Topography, Land Use

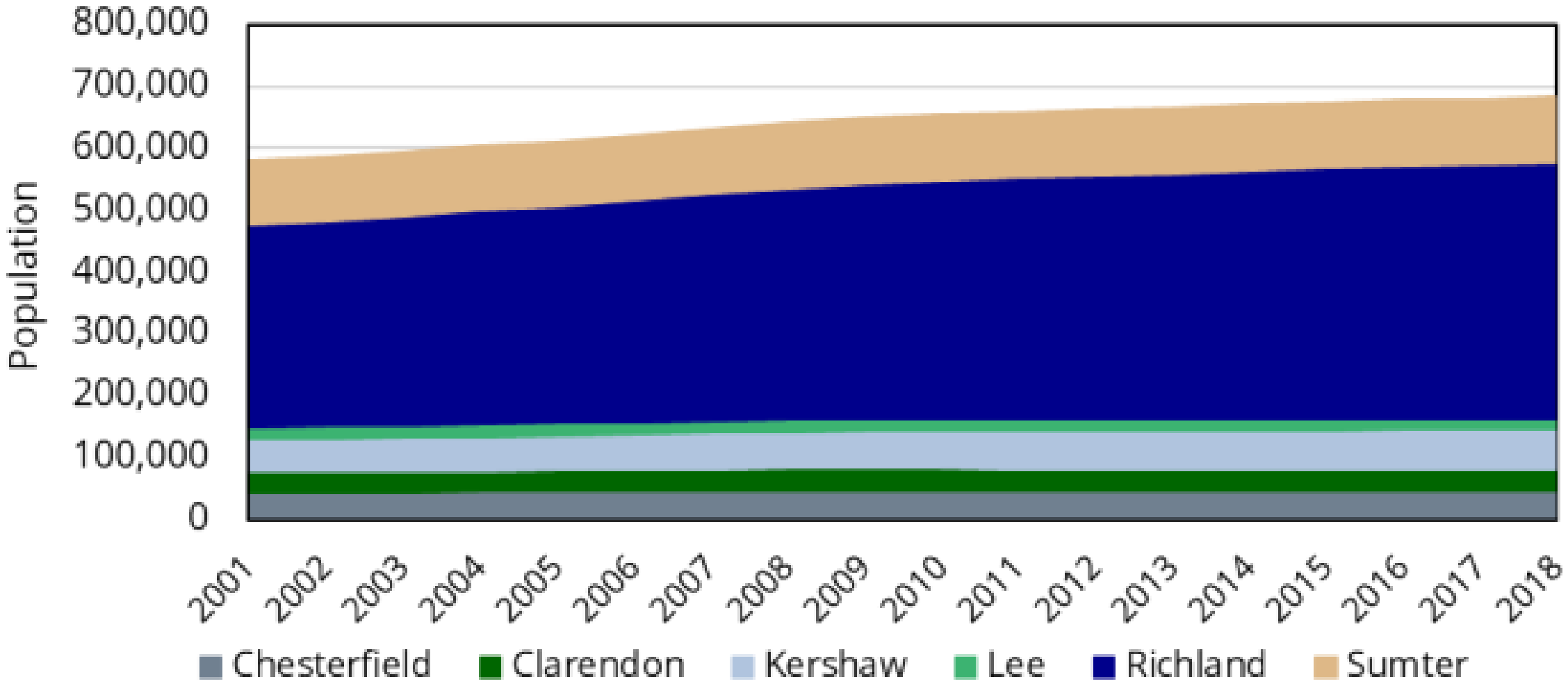


- North East Central part of SC
- 25 feet to 720 feet above mean sea level
- Bounded by Fall Line to North-West and Congaree/Santee System to South-West
- Upper Coastal Plain, Sandhills, Lower Coastal Plain to South-East

Population


45,754
33,700
65,592
17,142
414,576
106,512
Chesterfield
Clarendon
Kershaw
Lee
Richland
Sumter

Population

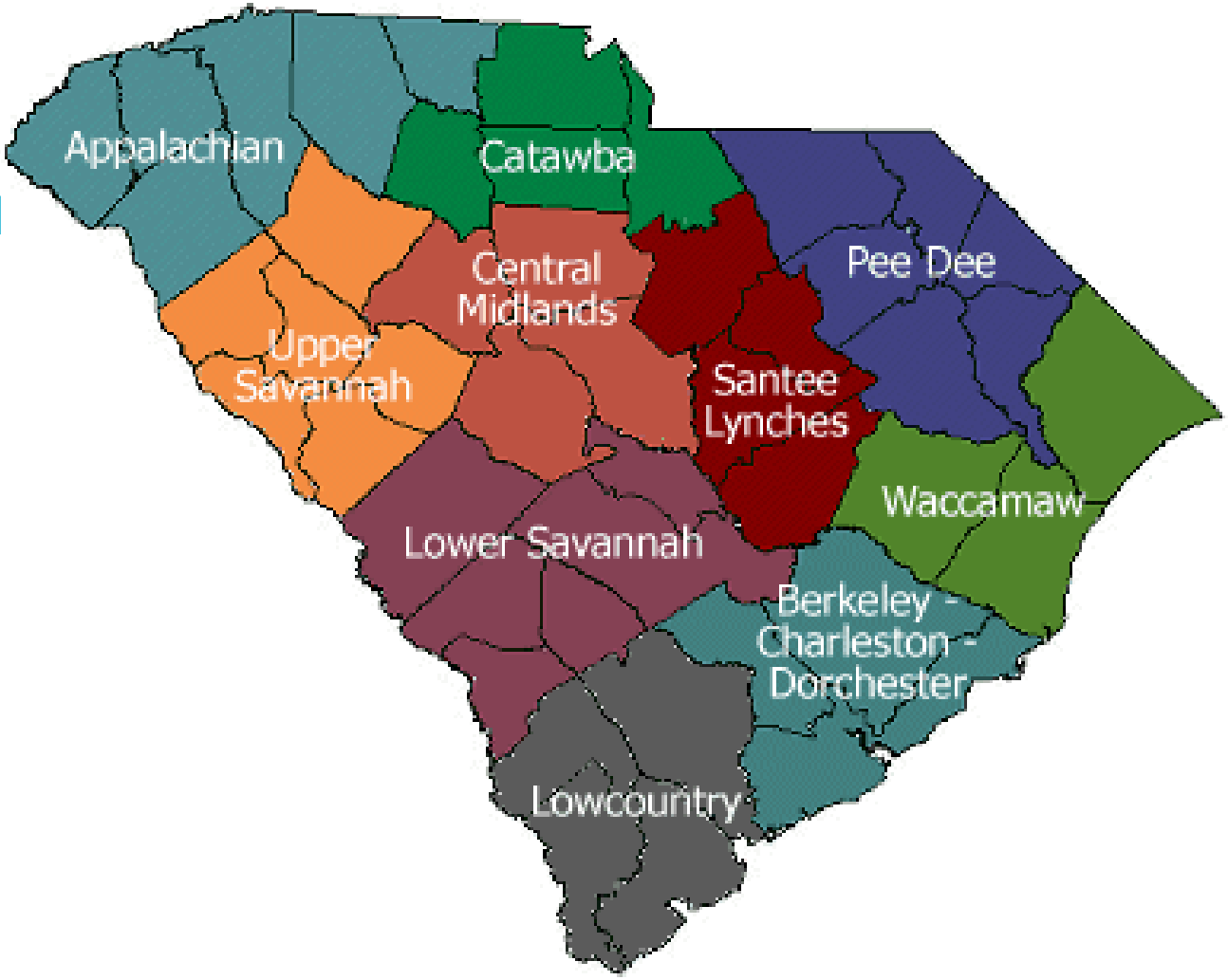

800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Population
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Chesterfield
Clarendon
Kershaw
Lee
Richland
Sumter

Geopolitical Structure
Council of Government (COG)

- PDCOG is currently governed by a 27-member Board of Directors from six participating counties and serves 33 incorporated municipalities (8 in Chesterfield County).

- SLCOG is currently governed by a 29-member Board of Directors from four participating counties and serves 12 incorporated municipalities.

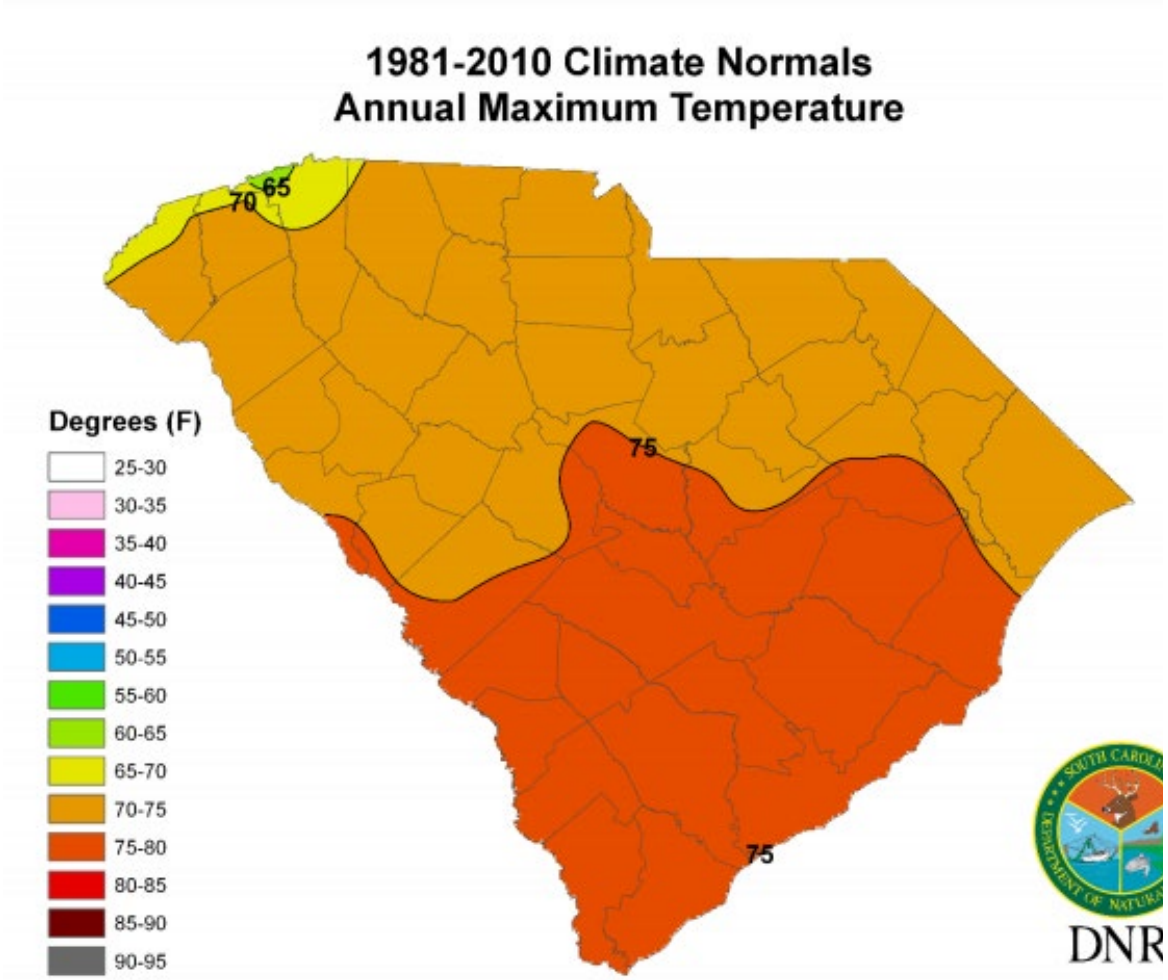
- CMCOG is currently governed by a 51-member Board of Directors from four participating counties and serves 30 incorporated municipalities including the state capital of Columbia, South Carolina.

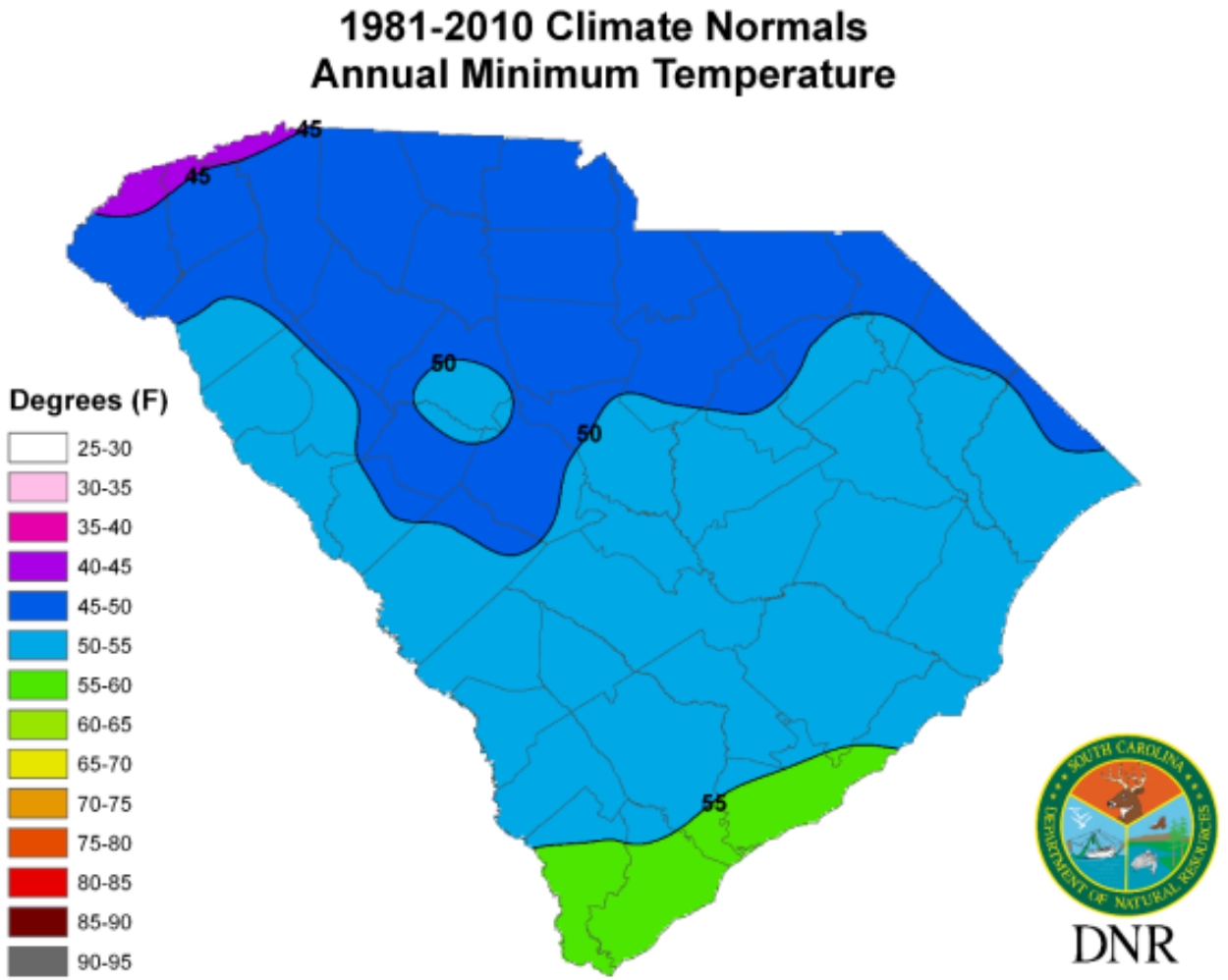


Geopolitical Structure Continued

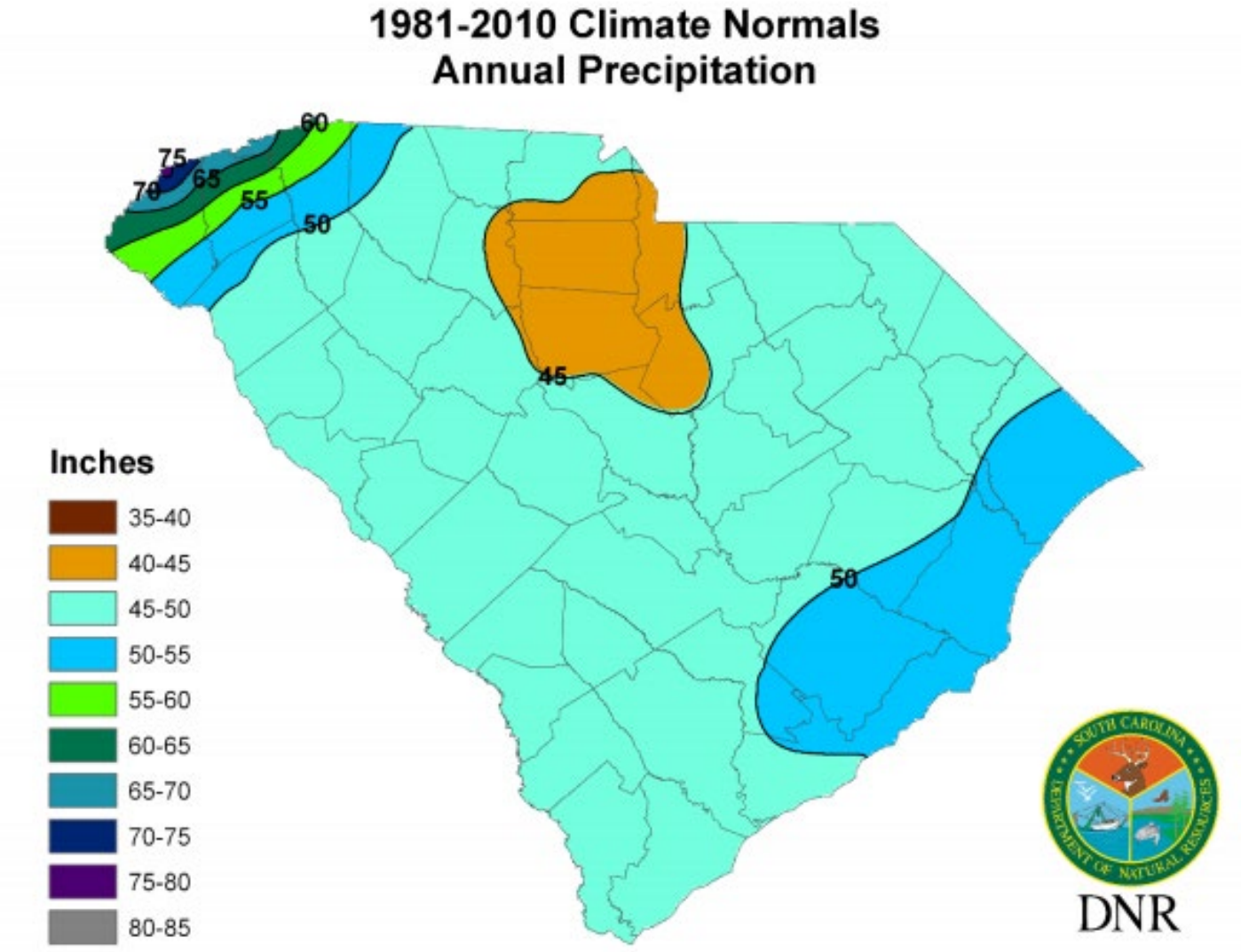
- Chesterfield, Clarendon, Lee and Sumter counties are governed by a Council/Administrator form of government.
- Kershaw and Richland counties are governed by a Council form of government.
- Cities, towns, and municipalities in the proposed Santee-Lynches CUA implement various forms of government, including Mayor/Council, Council/Manager, or Council only.

Climate

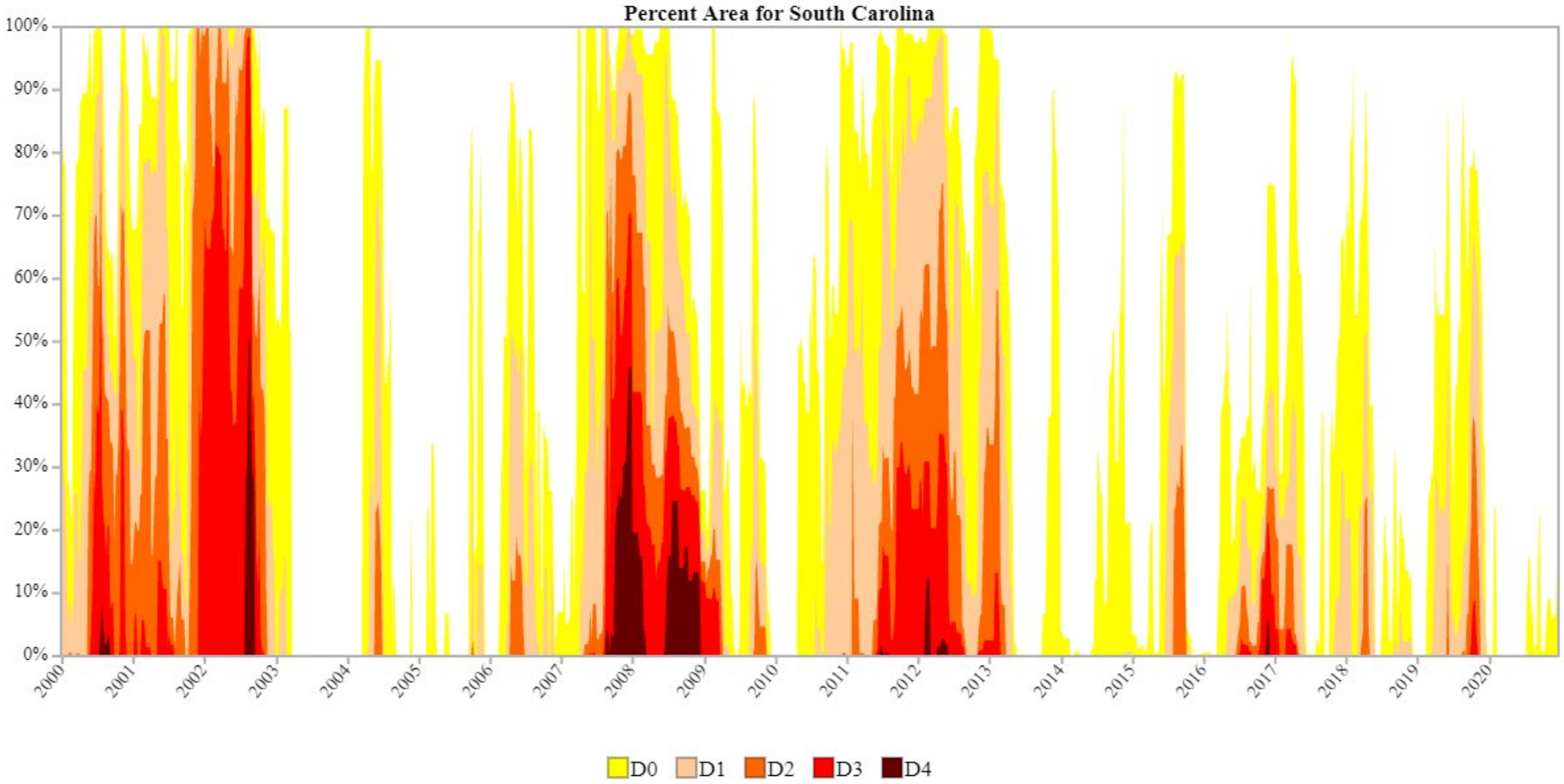

1981-2010 Climate Normals
Annual Maximum Temperature
Degrees (F)
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
65
70
75
75
DNR


1981-2010 Climate Normals
Annual Minimum Temperature
Degrees (F)
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
45
45
50
50
55
DNR

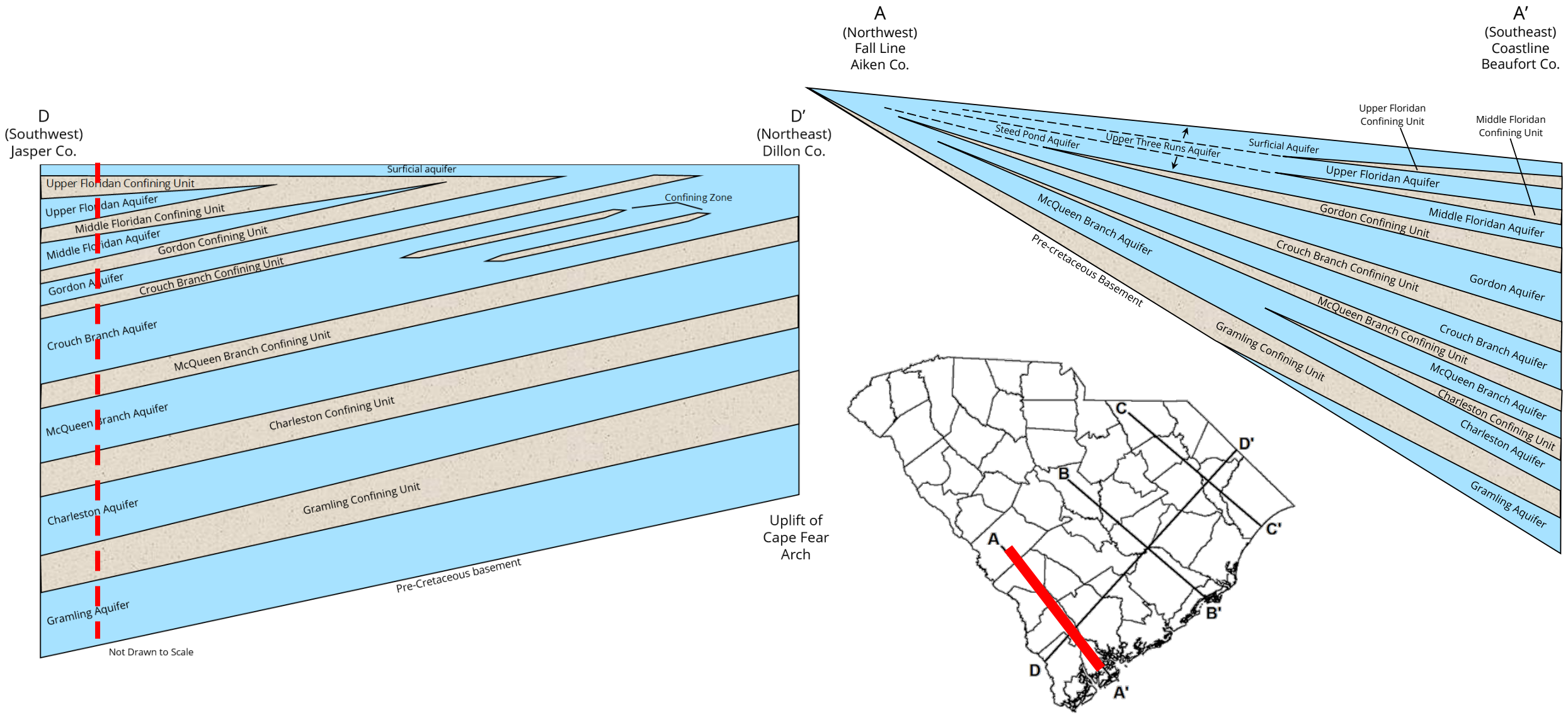
Climate


1981-2010 Climate Normals
Annual Precipitation
60
75
65
70
55
50
45
50
Inches
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
DNR

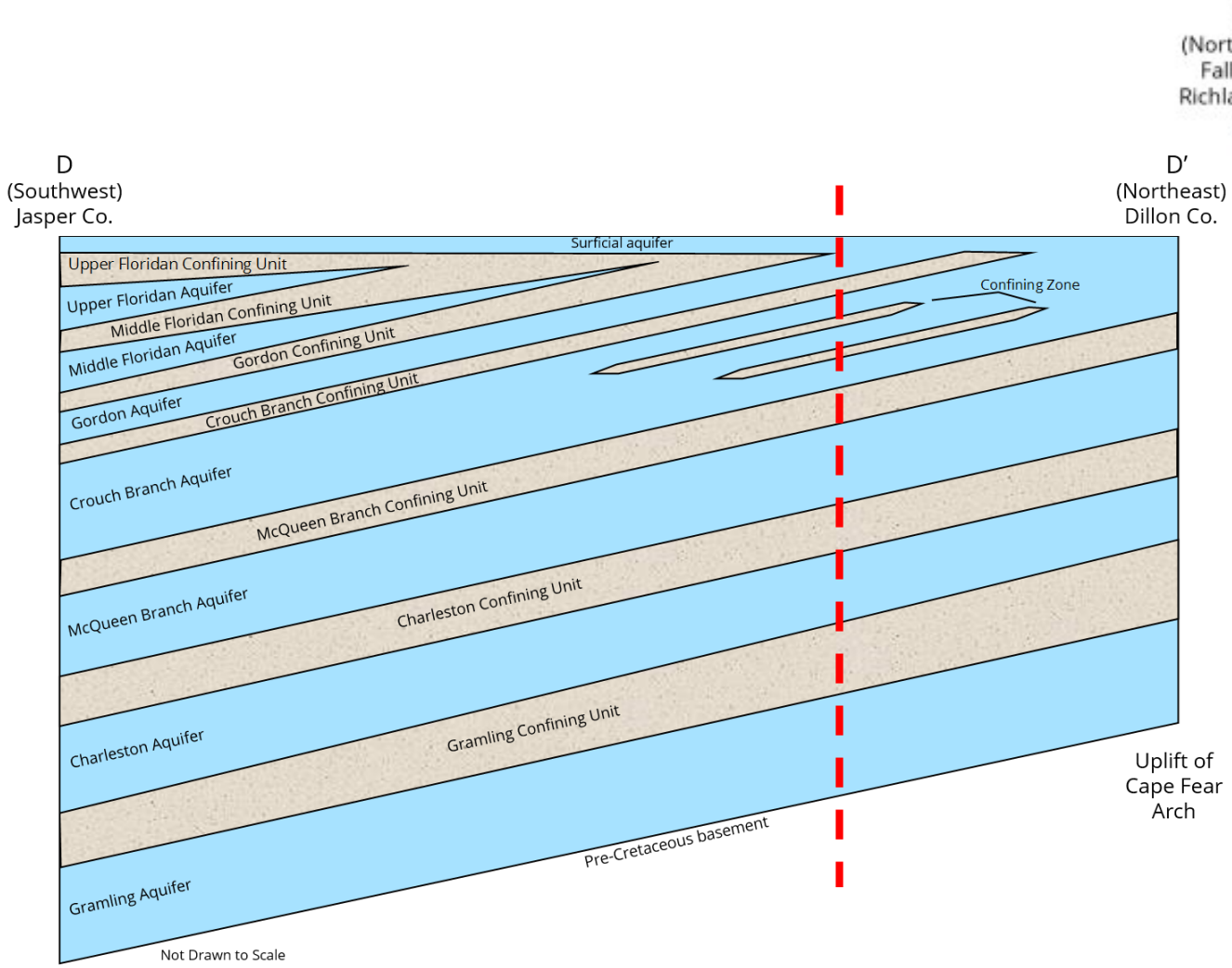
Drought

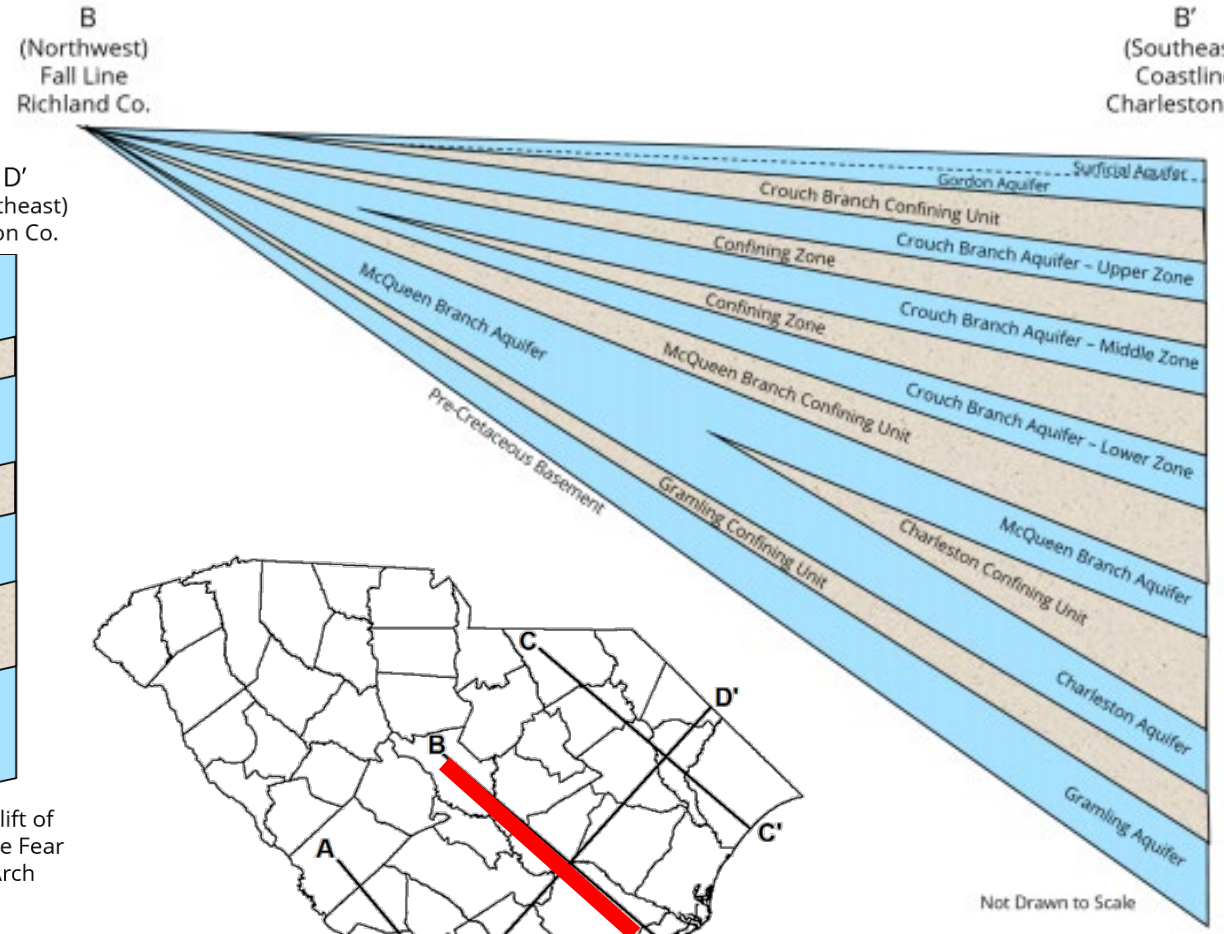

Percent Area for South Carolina
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
D0
D1
D2
D3
D4

Hydrogeologic Setting

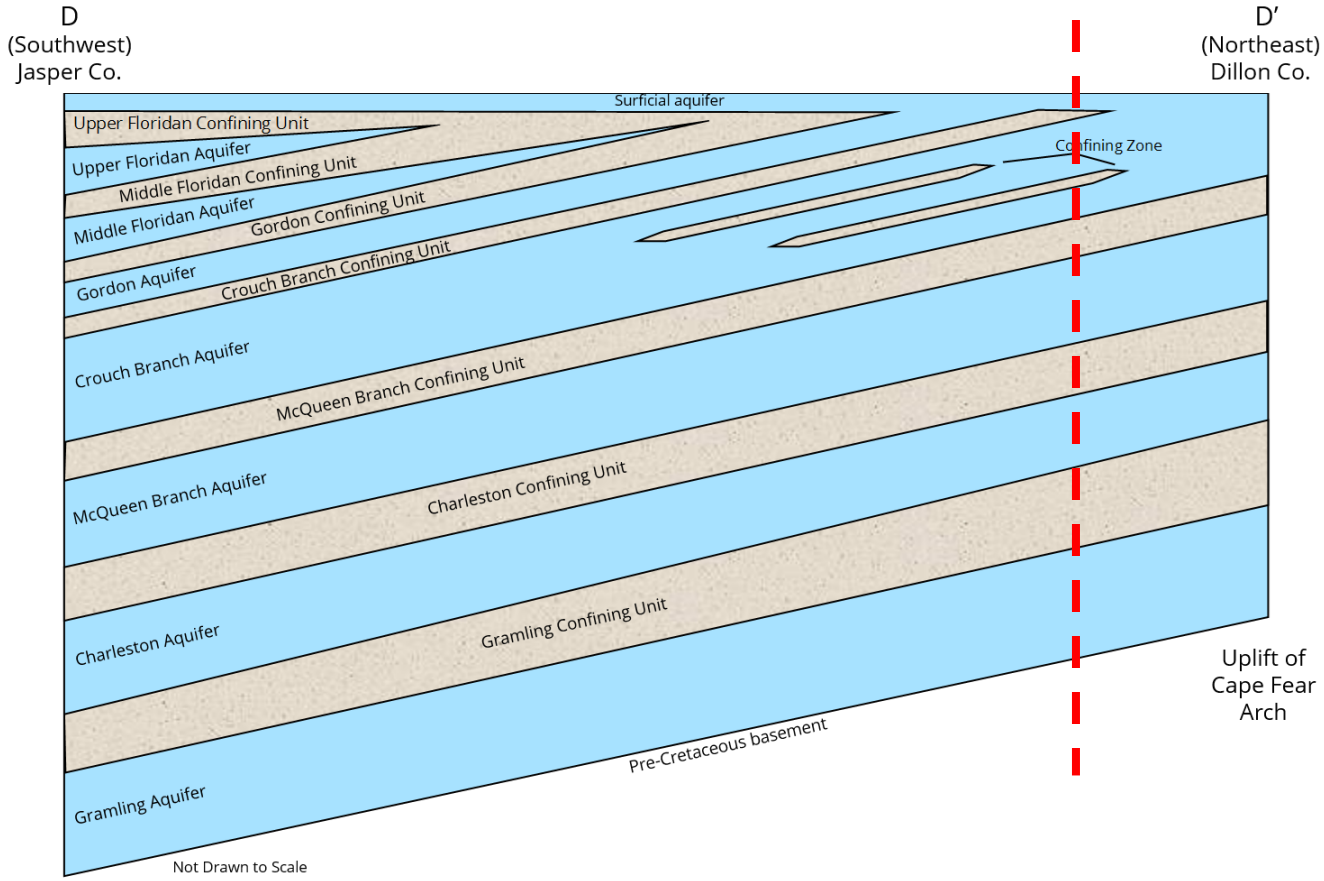


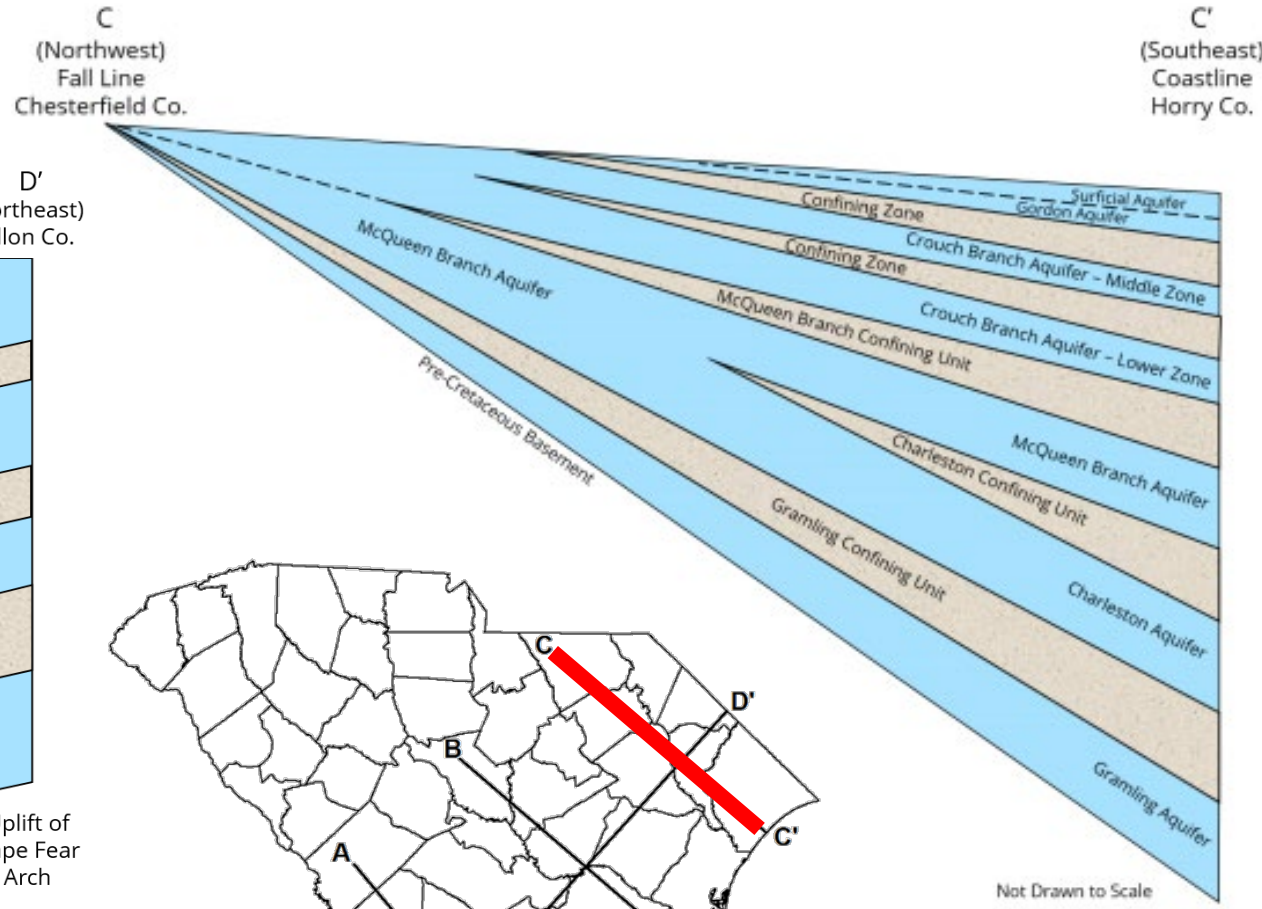
Hydrogeologic Setting



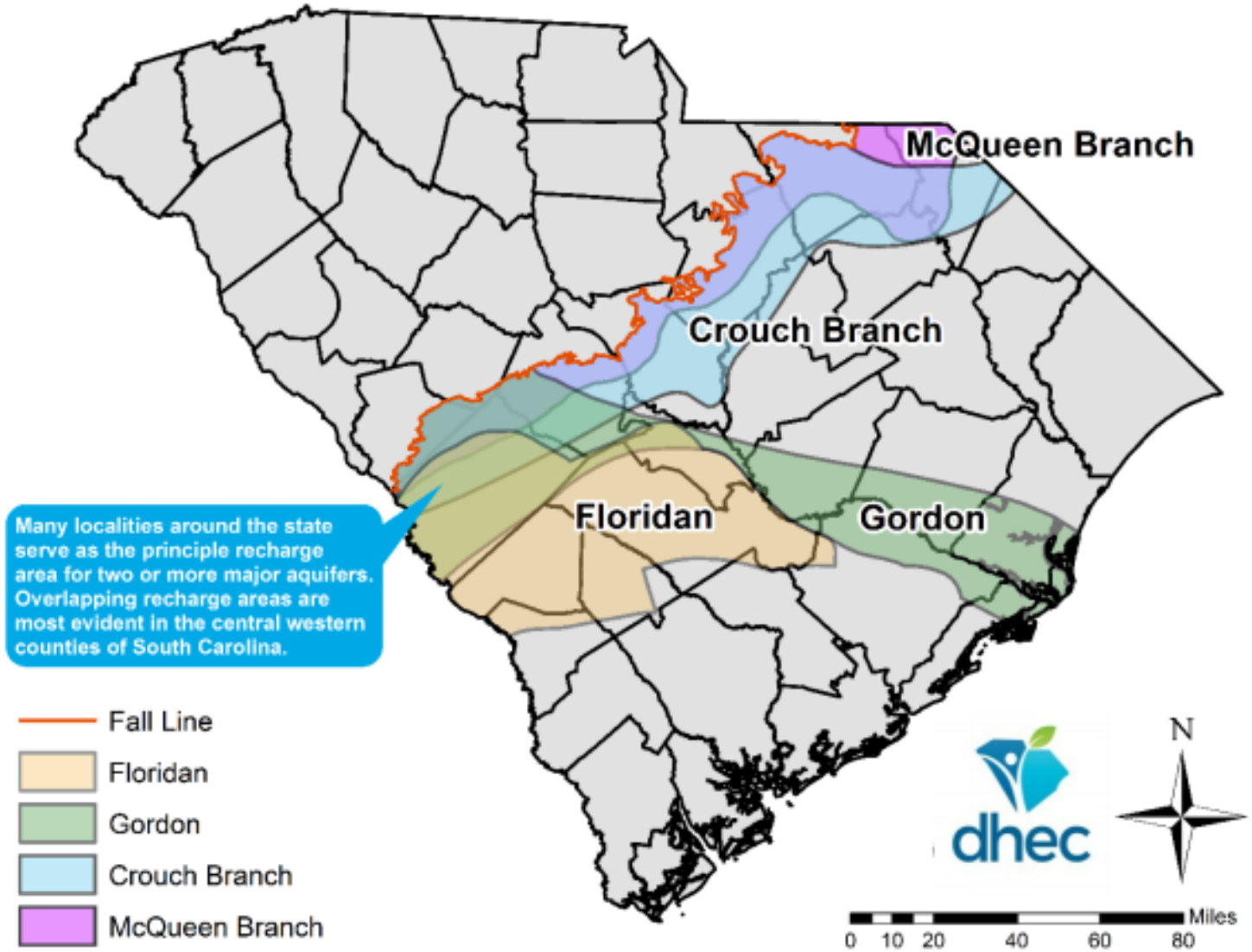


Hydrogeologic Setting





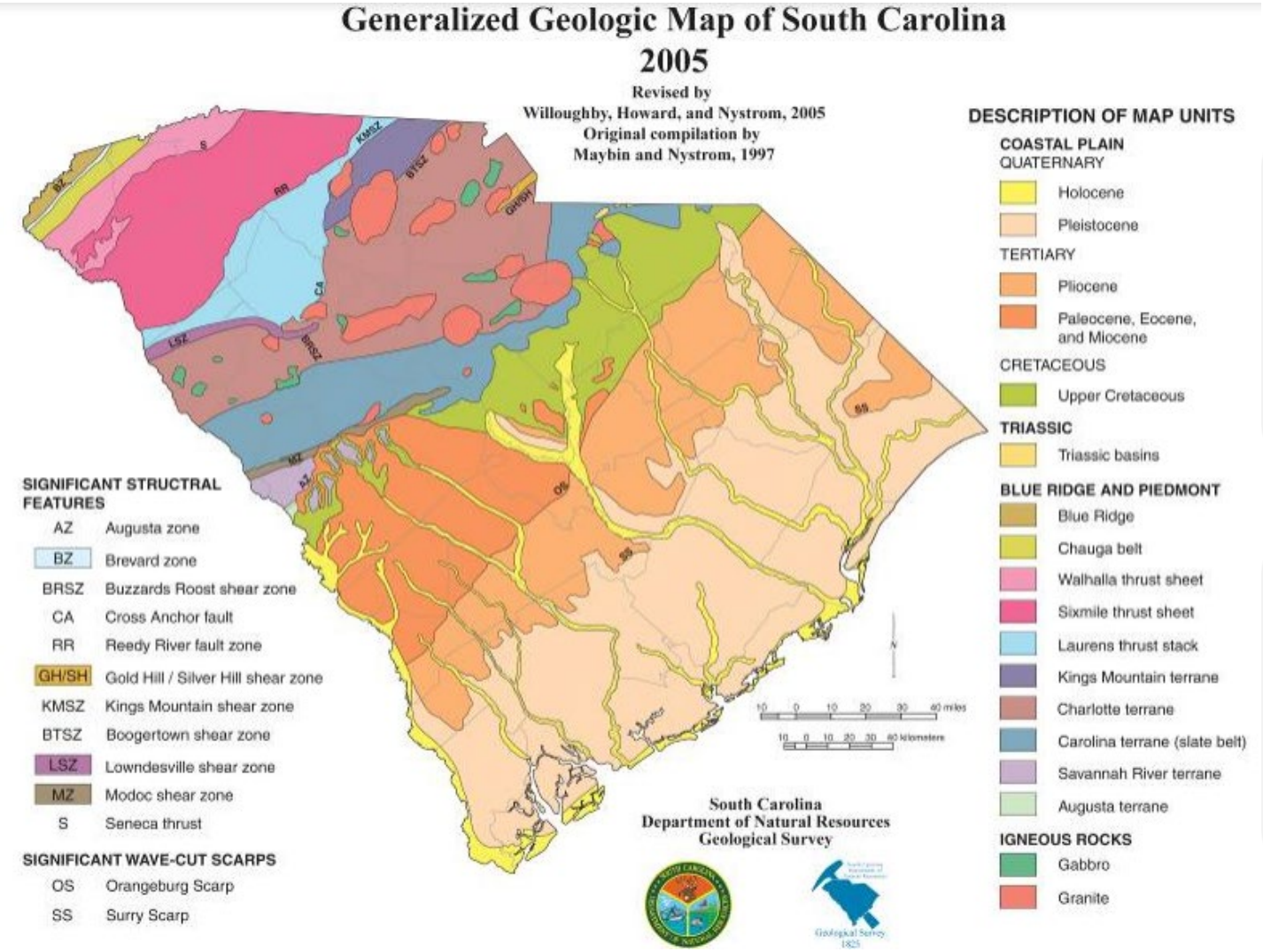
Groundwater Recharge Areas

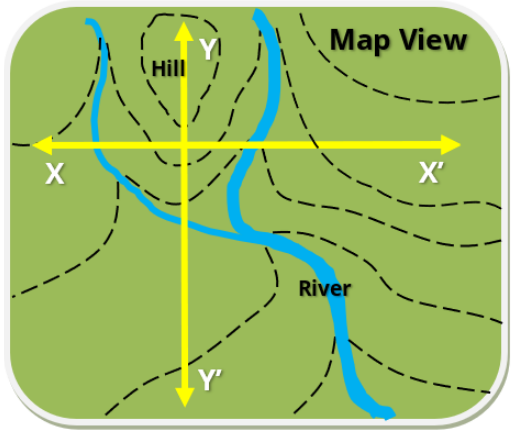


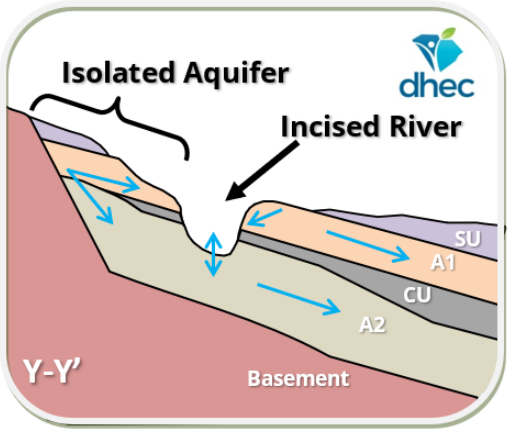
Surface Water

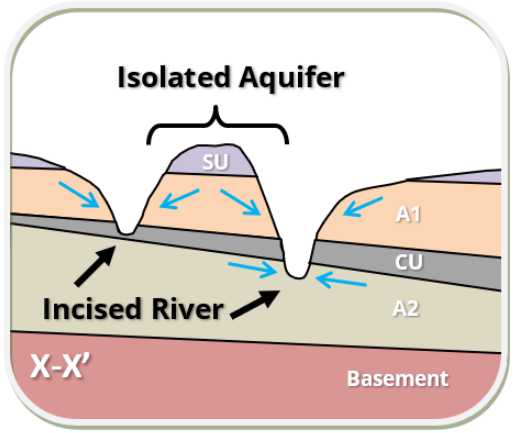
SC Major River Basins

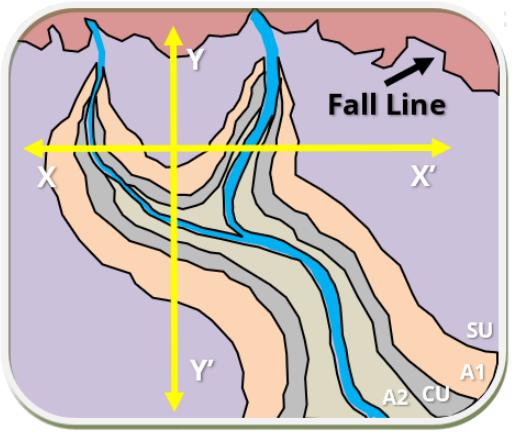
Groundwater Surface Water Interactions







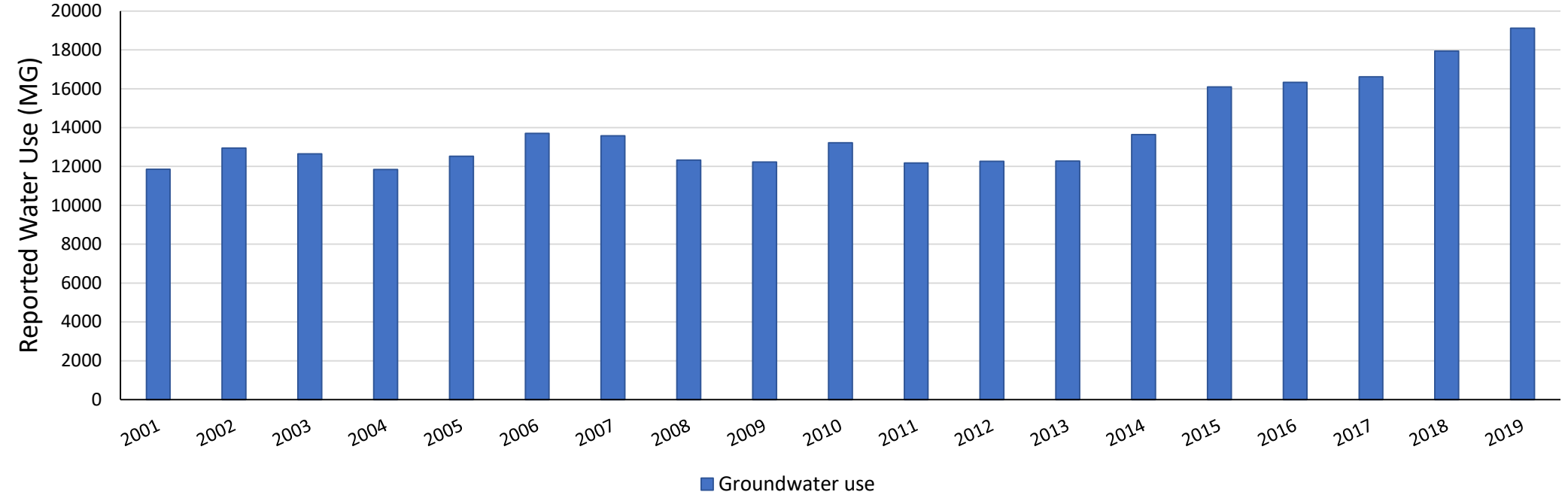


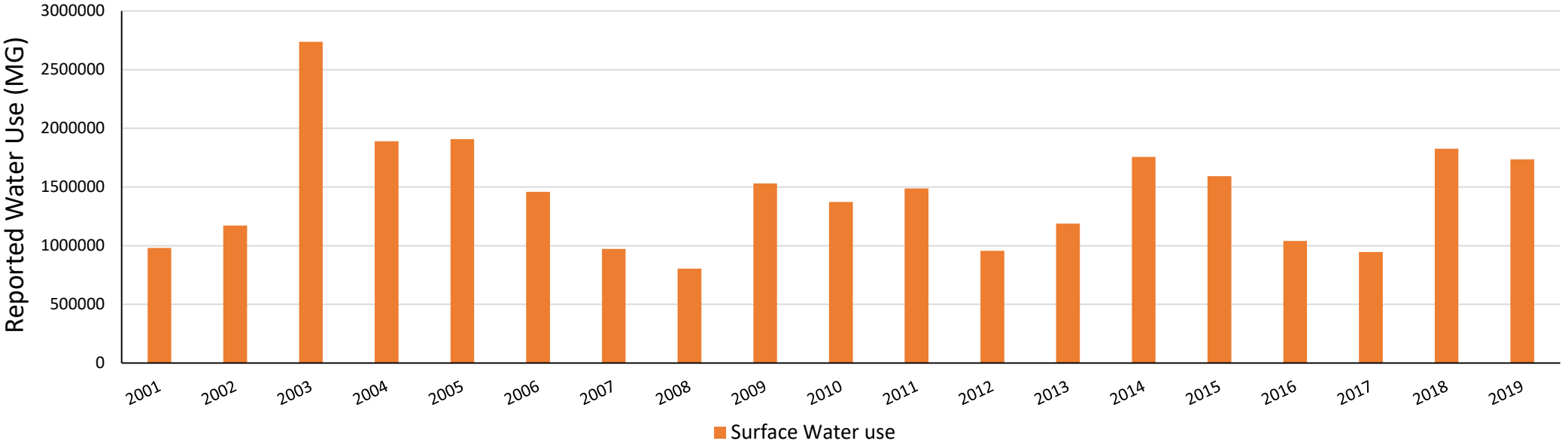


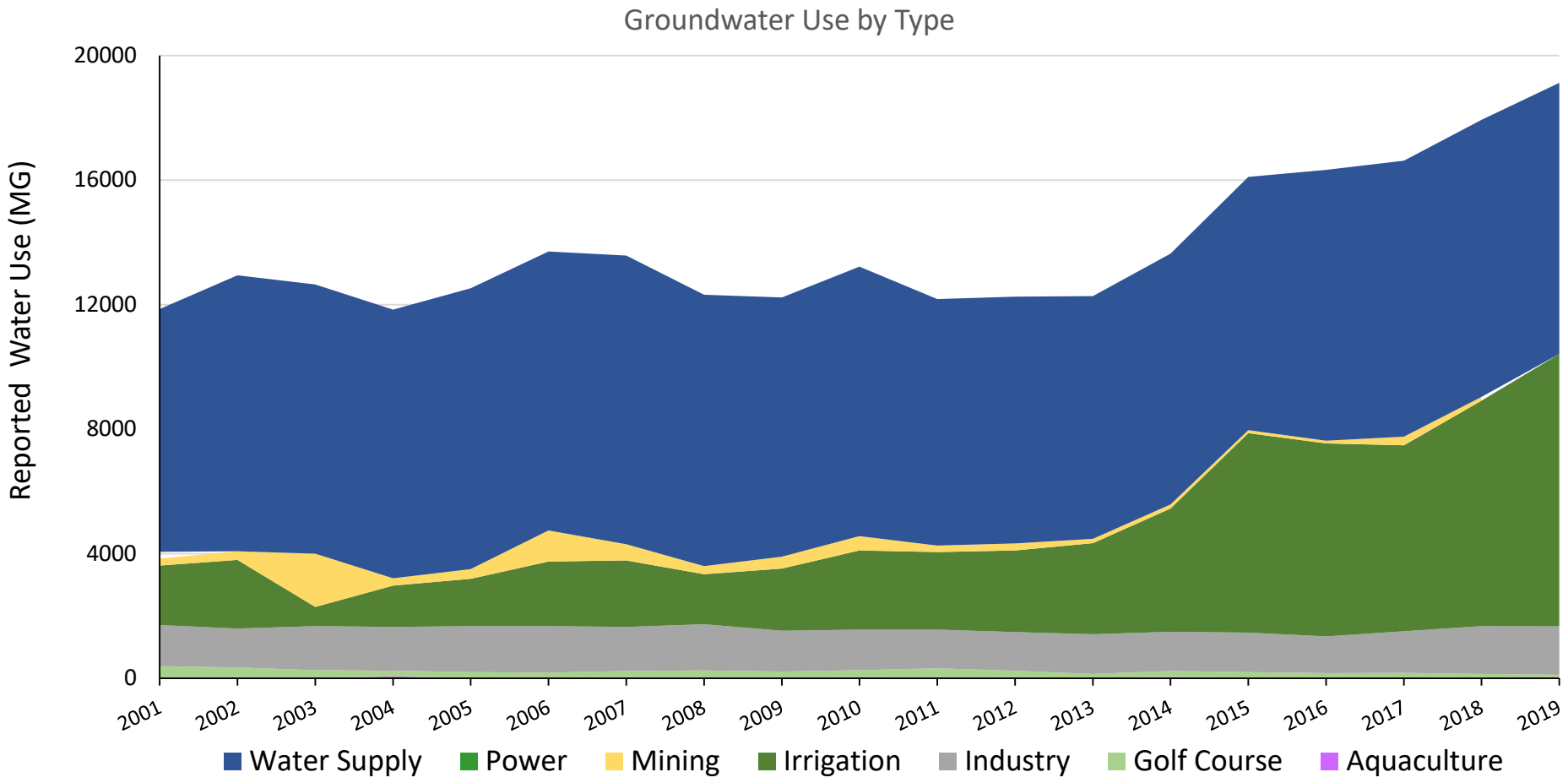
Incising Rivers Isolate Aquifer Units

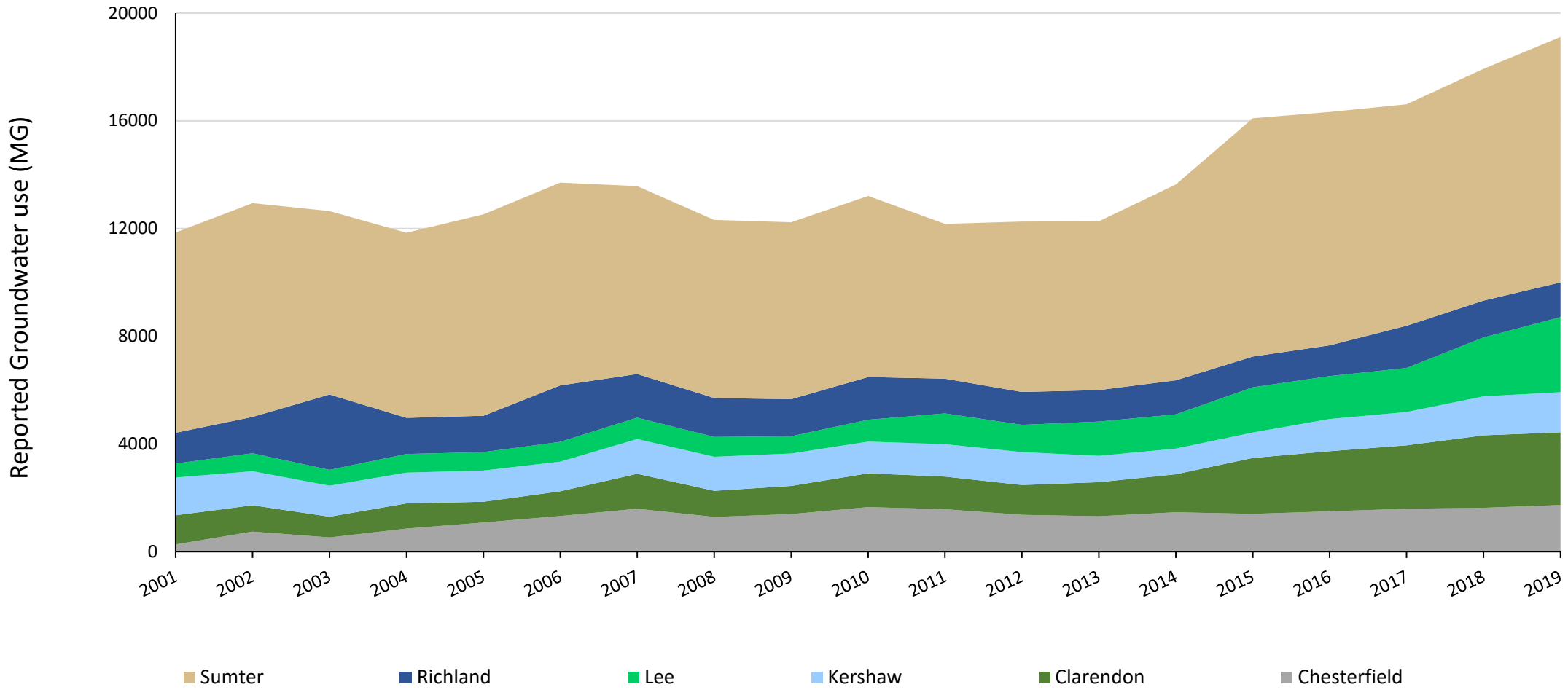
South Carolina Department of Health and Environmental Control

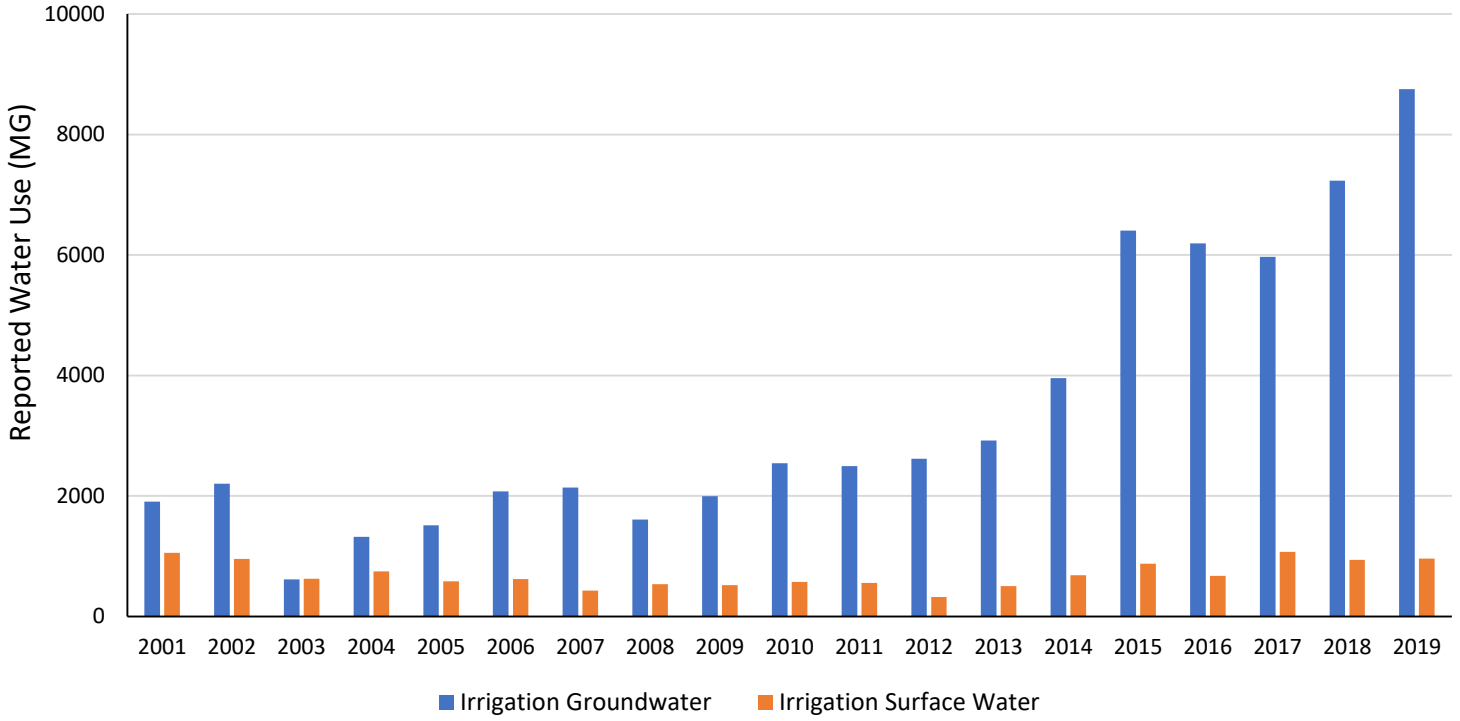
Current and Historic Water Use

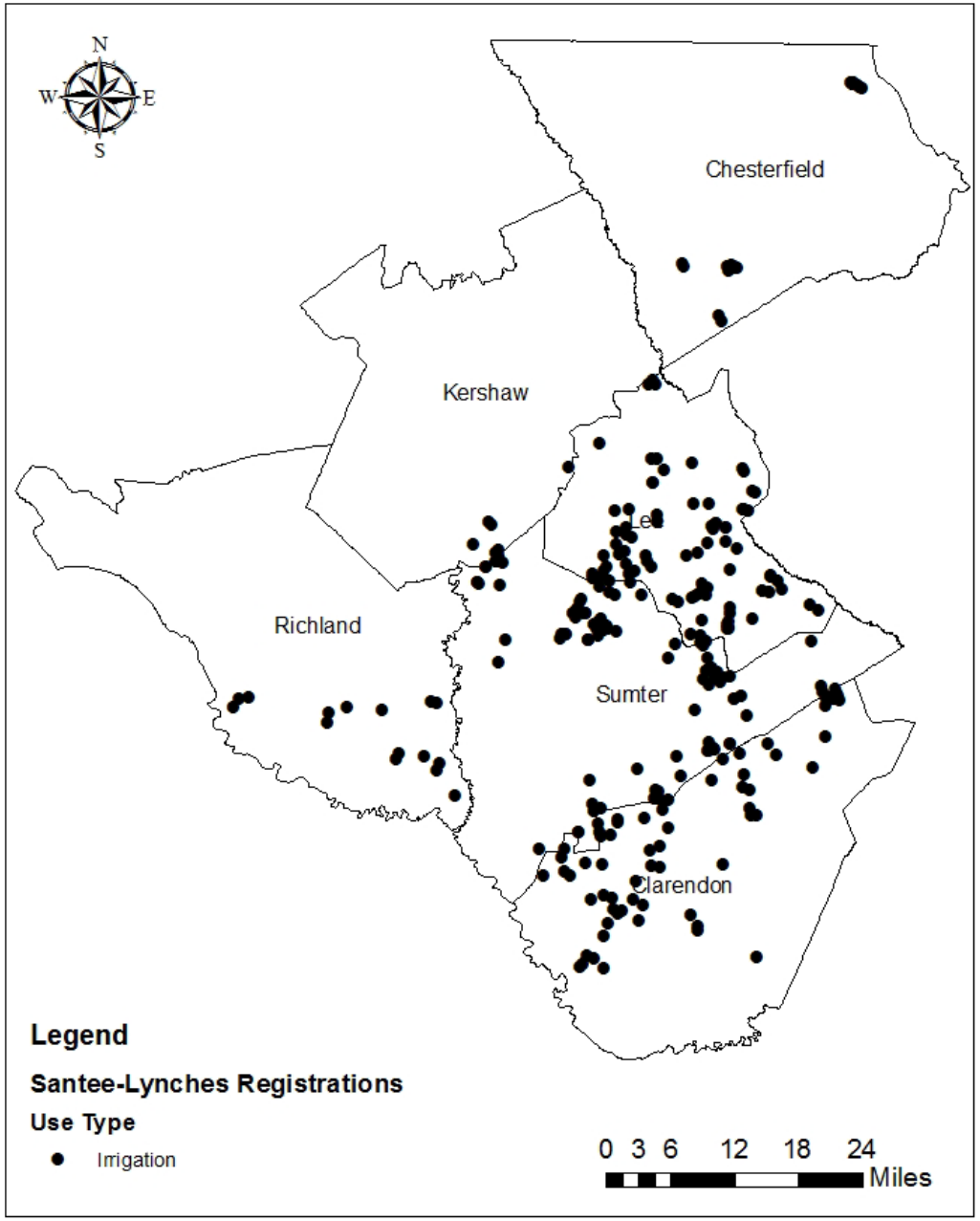

Reported Water Use (MG)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Groundwater use

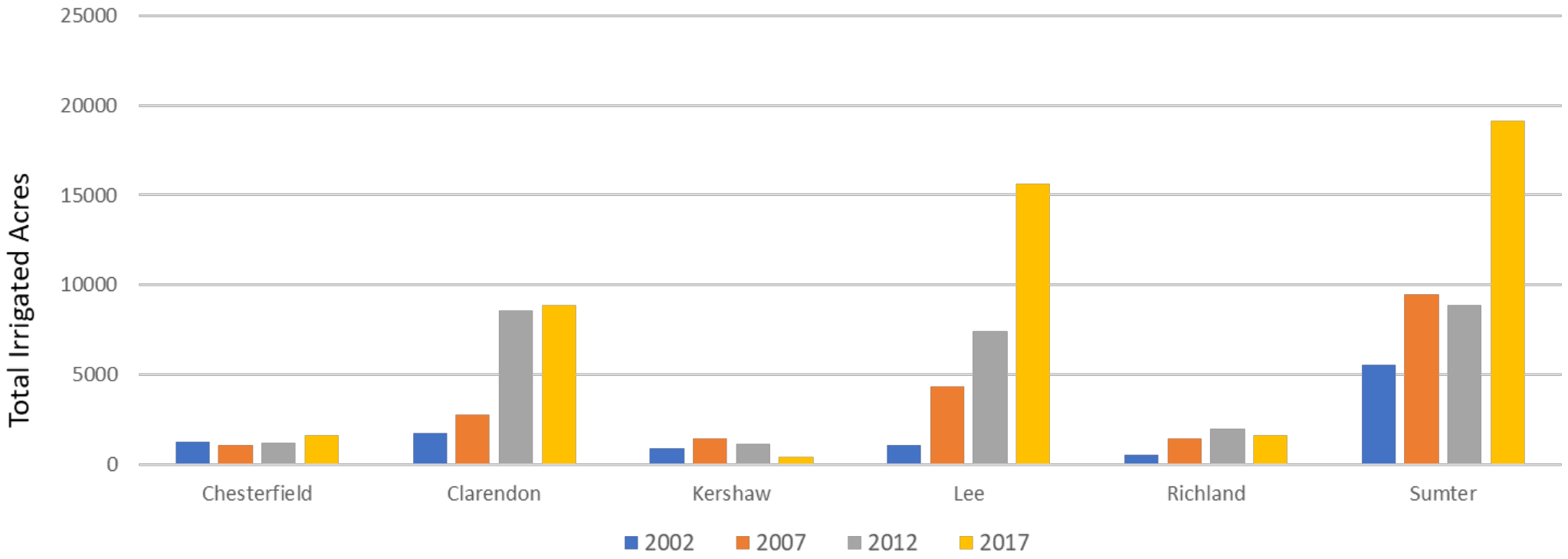

Reported Water Use (MG)
3000000
2500000
2000000
1500000
1000000
500000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Surface Water use


Groundwater Use by Type
Reported Water Use (MG)
20000
16000
12000
8000
4000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Water Supply
Power
Mining
Irrigation
Industry
Golf Course
Aquaculture

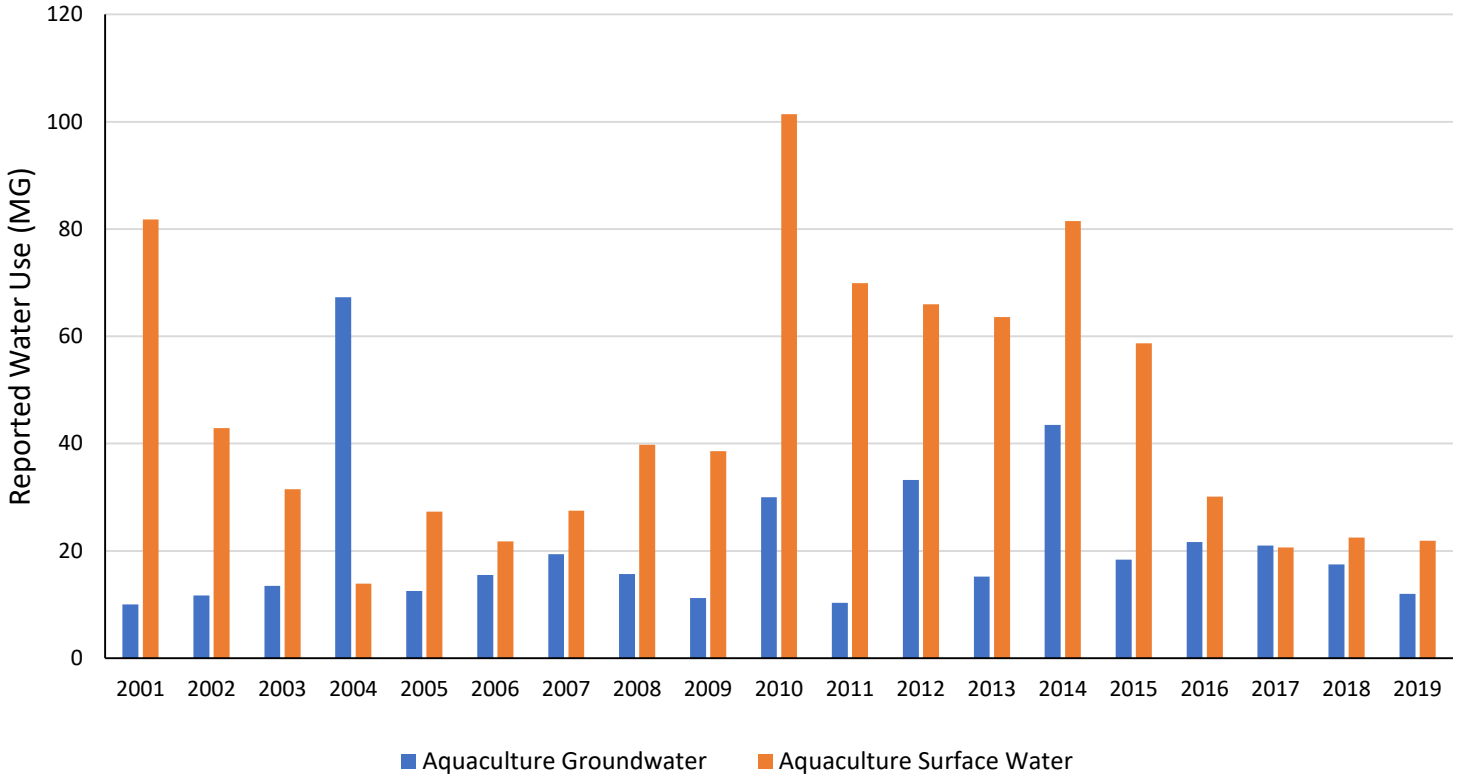

Reported Groundwater use (MG)
20000
16000
12000
8000
4000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Sumter
Richland
Lee
Kershaw
Clarendon
Chesterfield

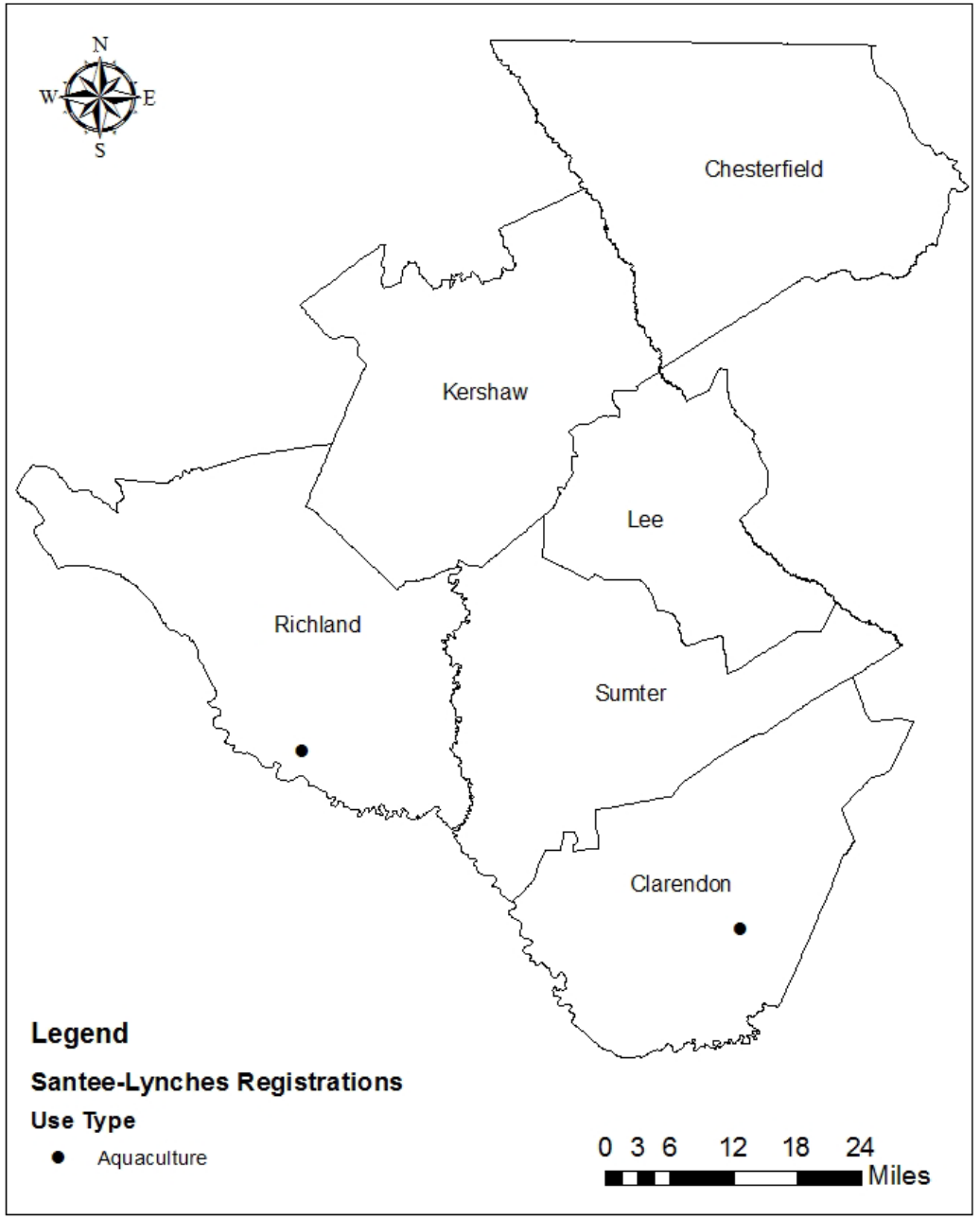

Reported Water Use (MG)
10000
8000
6000
4000
2000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Irrigation Groundwater
Irrigation Surface Water

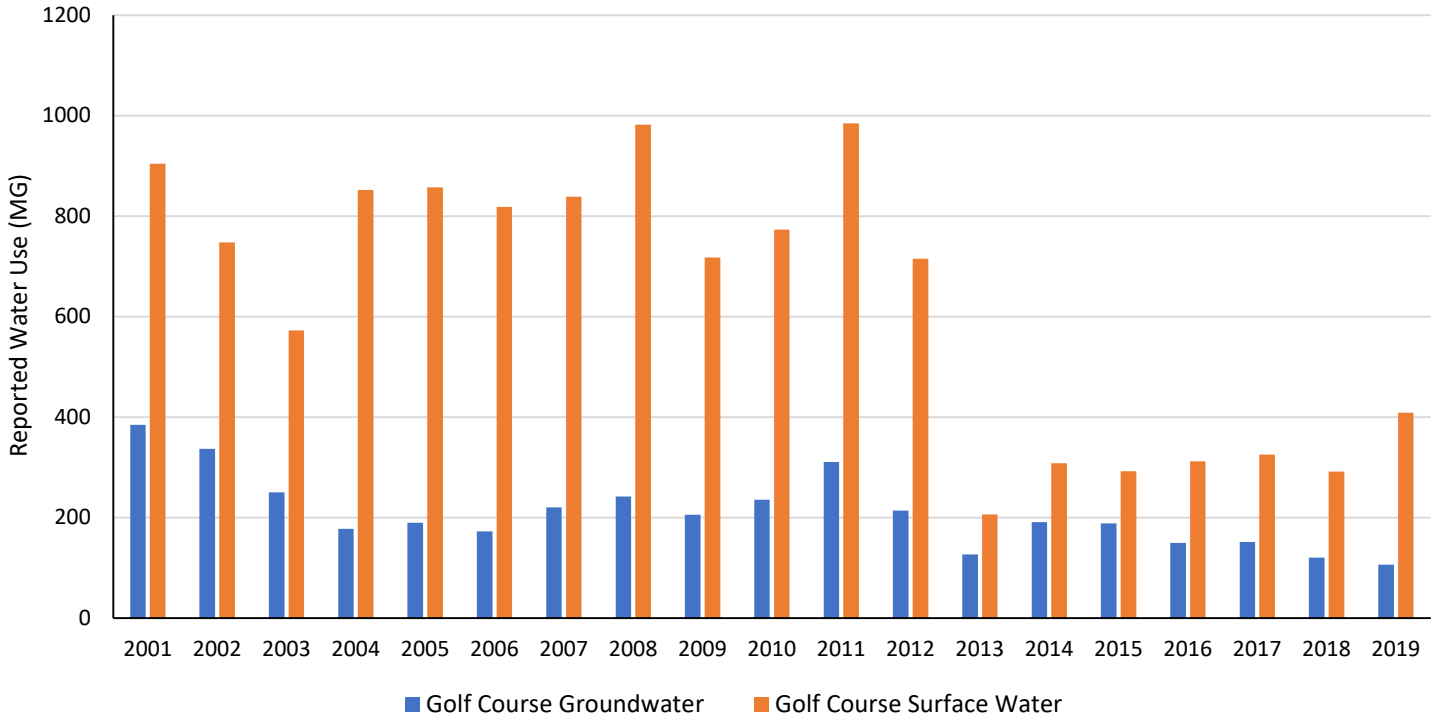

N
W
E
S
Chesterfield
Kershaw
Richland
Sumter
Clarendon
Legend
Santee-Lynches Registrations
Use Type
Irrigation
0 3 6 12 18 24
Miles

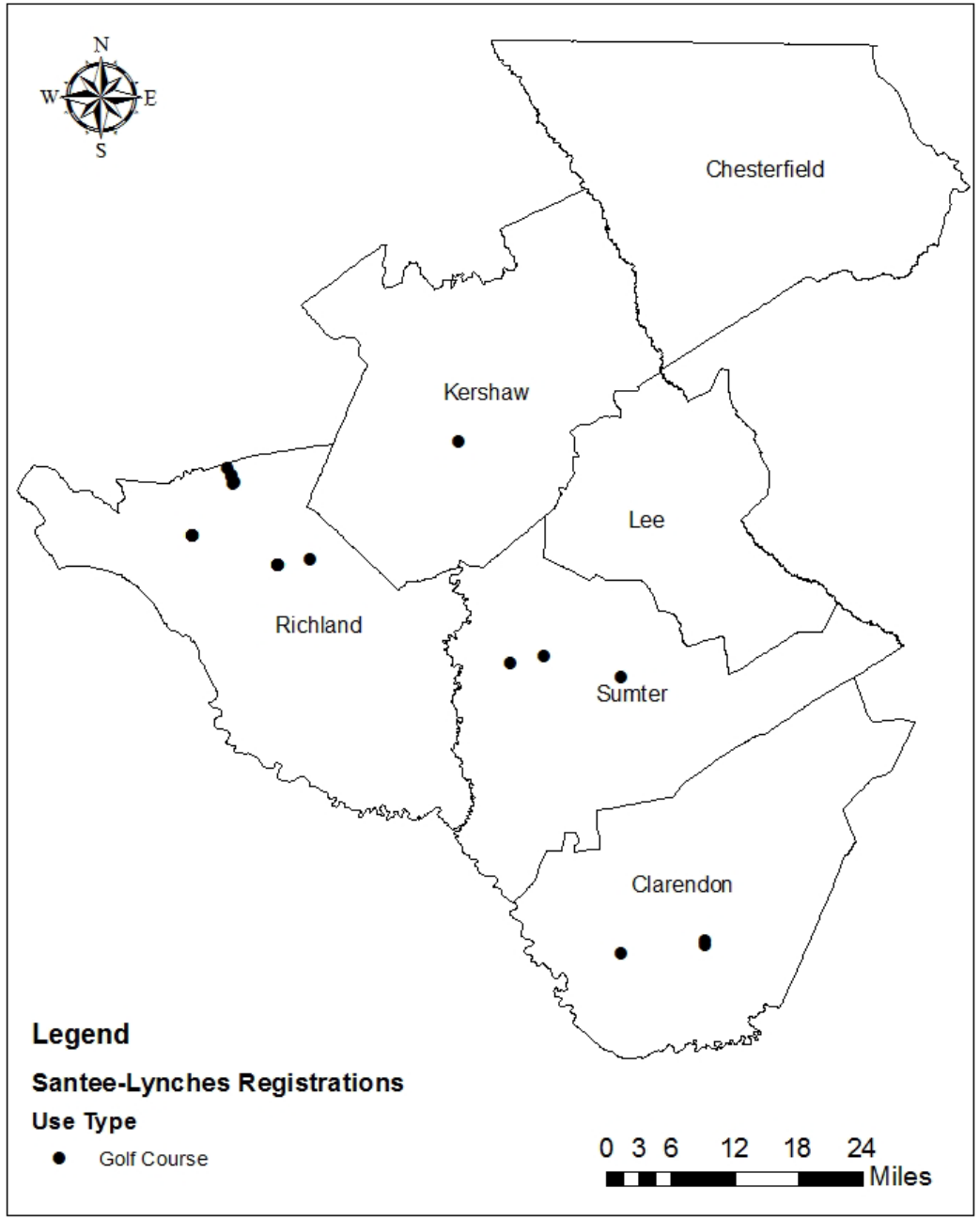


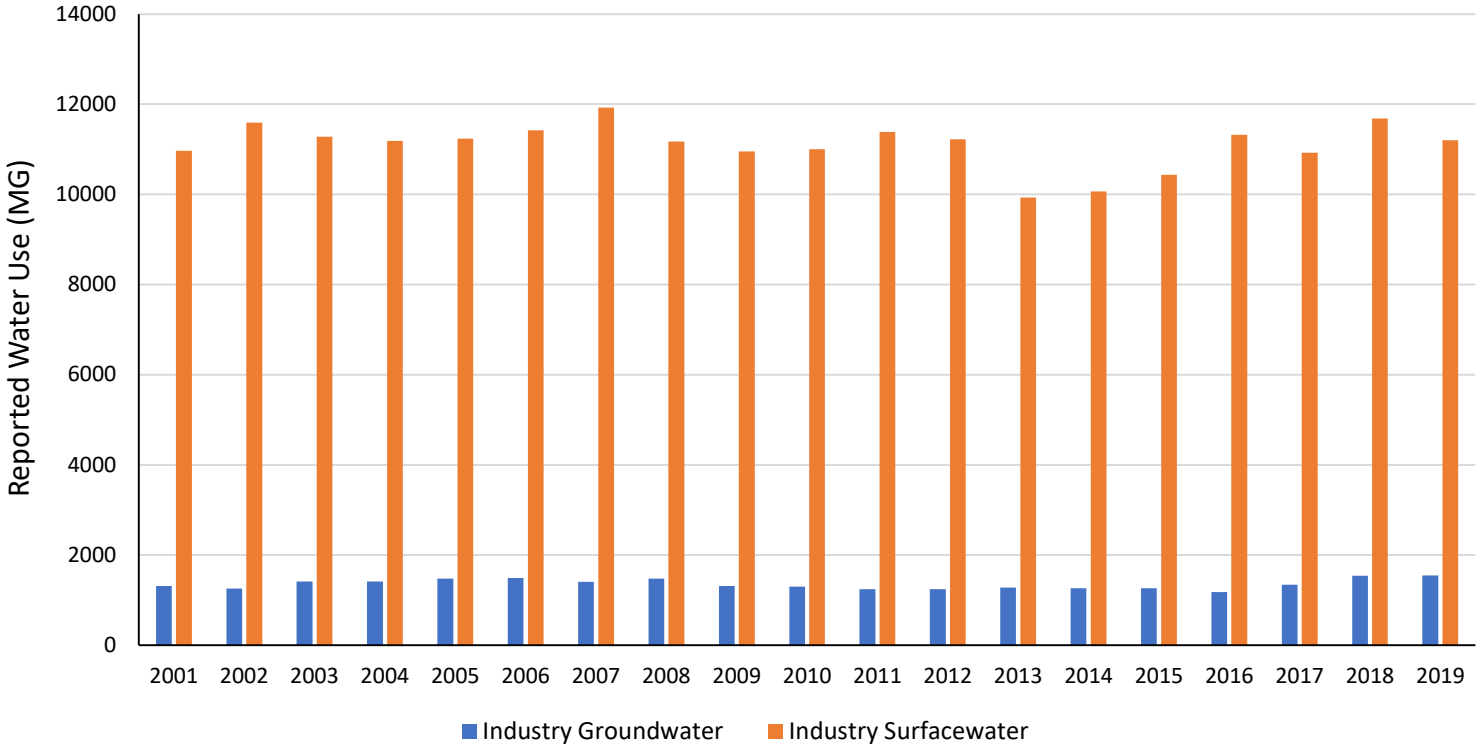
National Agricultural Statistics Service (USDA)

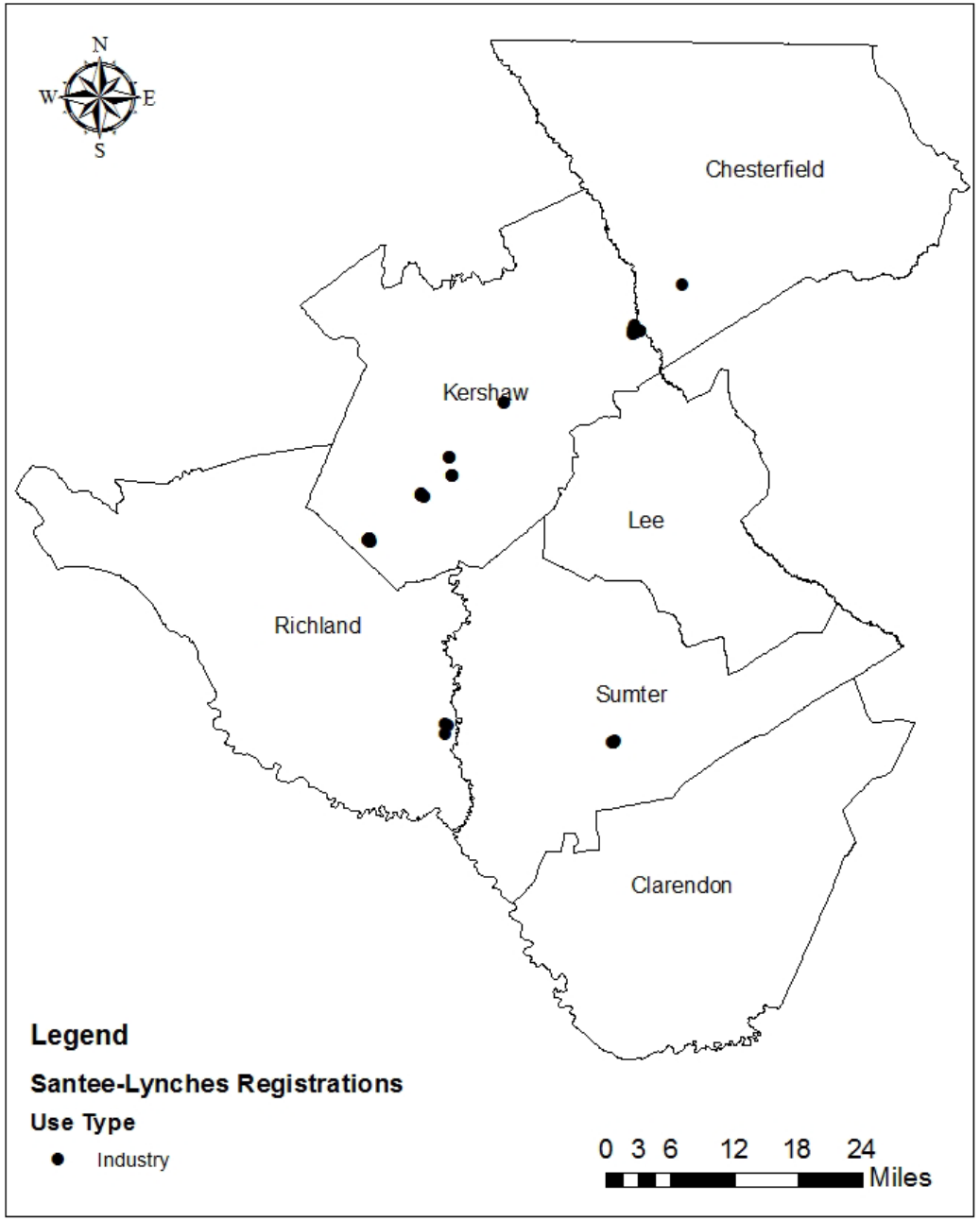

Reported Water Use (MG)
120
100
80
60
40
20
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Aquaculture Groundwater
Aquaculture Surface Water

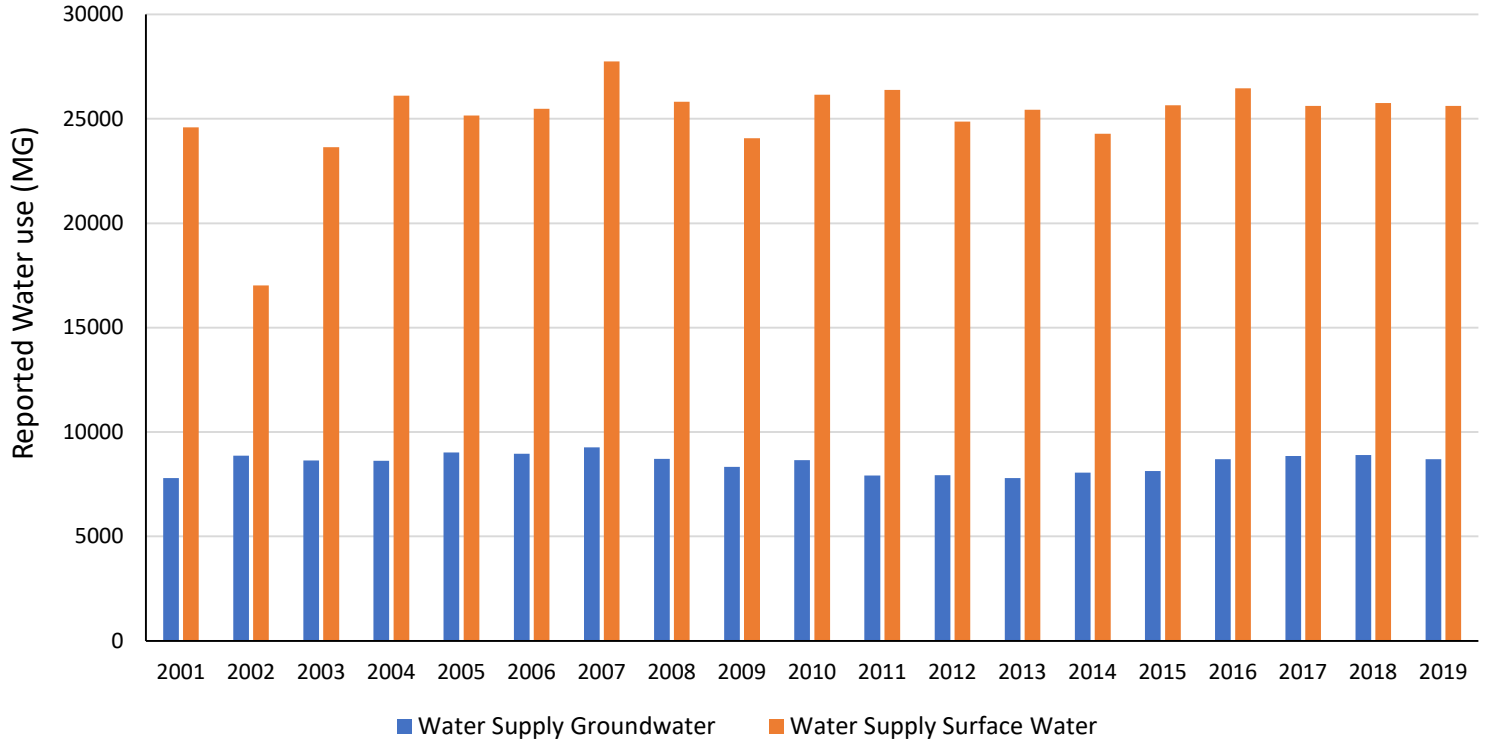

N
W
E
S
Chesterfield
Kershaw
Lee
Richland
Sumter
Clarendon
Legend
Santee-Lynches Registrations
Use Type
Aquaculture
0 3 6 12 18 24
Miles

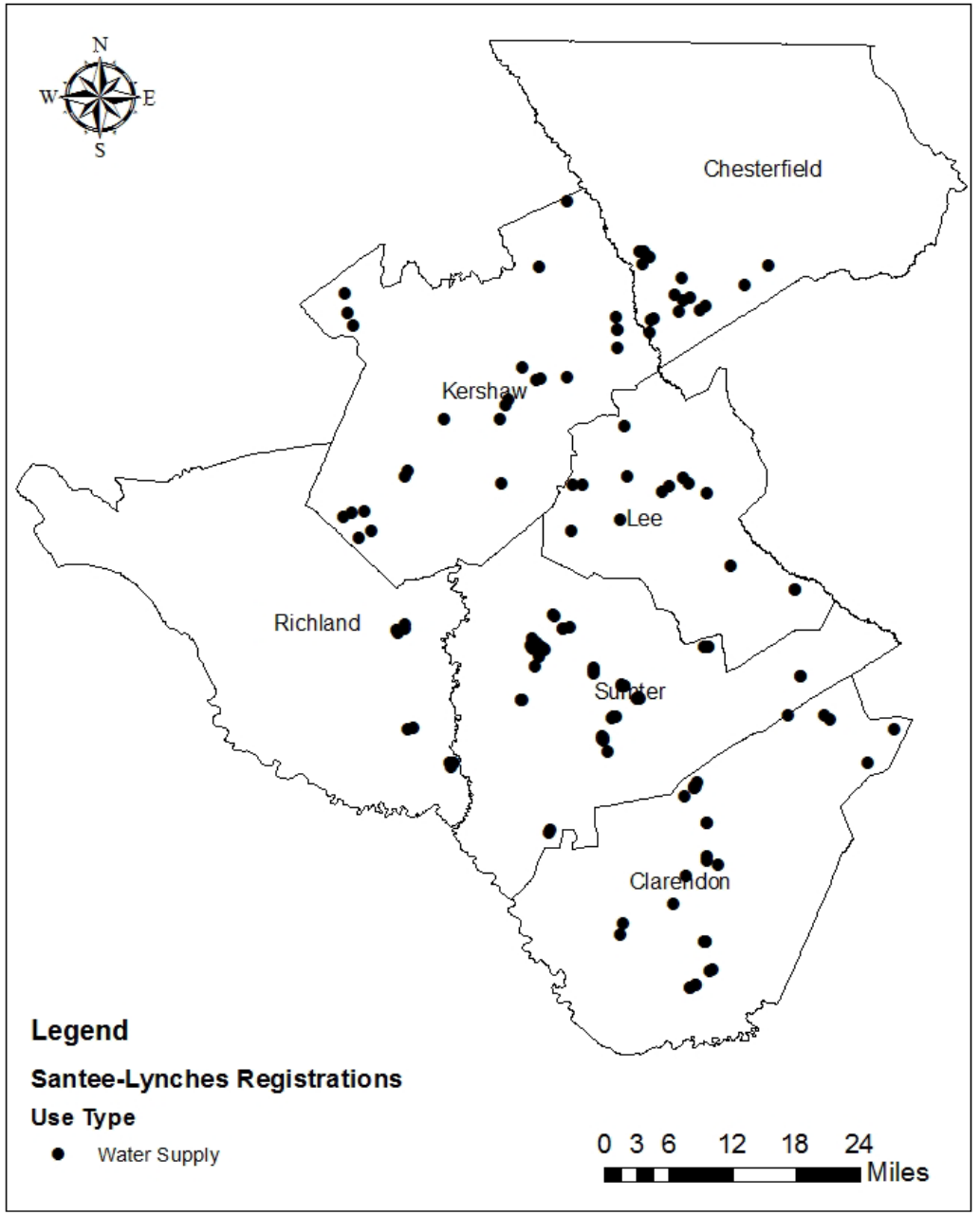

Reported Water Use (MG)
1200
1000
800
600
400
200
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Golf Course Groundwater
Golf Course Surface Water

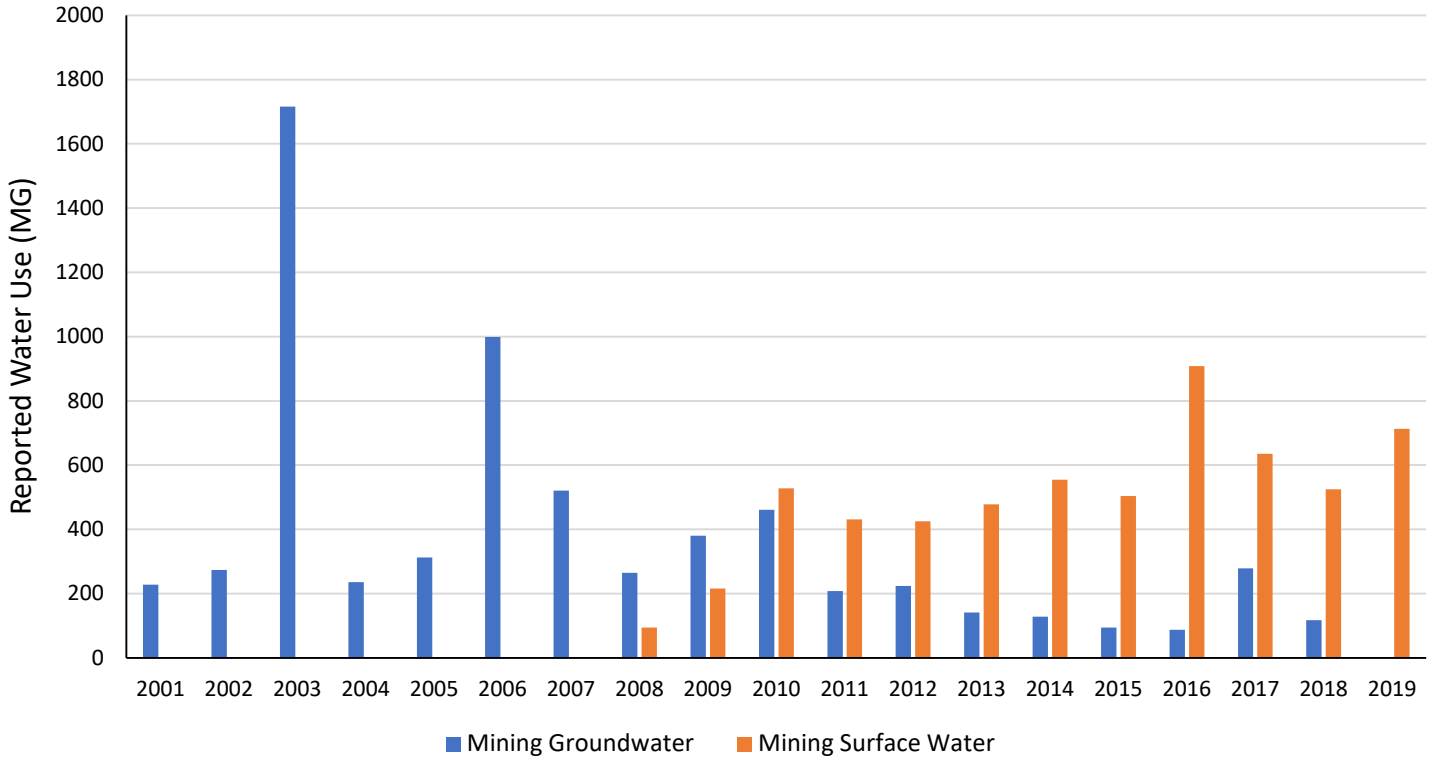

N
W
E
S
Chesterfield
Kershaw
Lee
Richland
Sumter
Clarendon
Legend
Santee-Lynches Registrations
Use Type
Golf Course
0 3 6 12 18 24
Miles

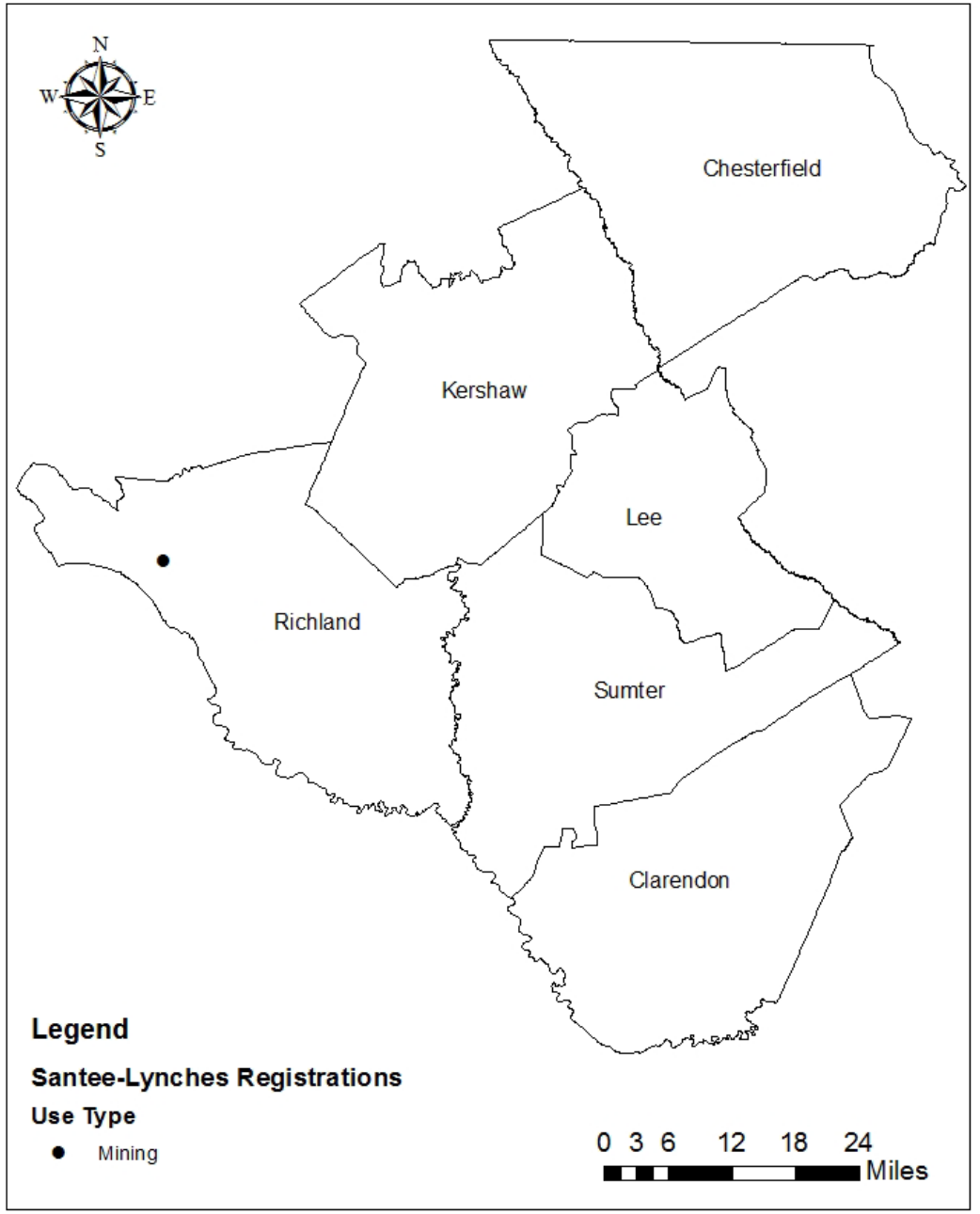

Reported Water Use (MG)
14000
12000
10000
8000
6000
4000
2000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Industry Groundwater
Industry Surfacewater


N
W
E
S
Chesterfield
Kershaw
Lee
Richland
Sumter
Clarendon
Legend
Santee-Lynches Registrations
Use Type
Industry
0 3 6 12 18 24
Miles

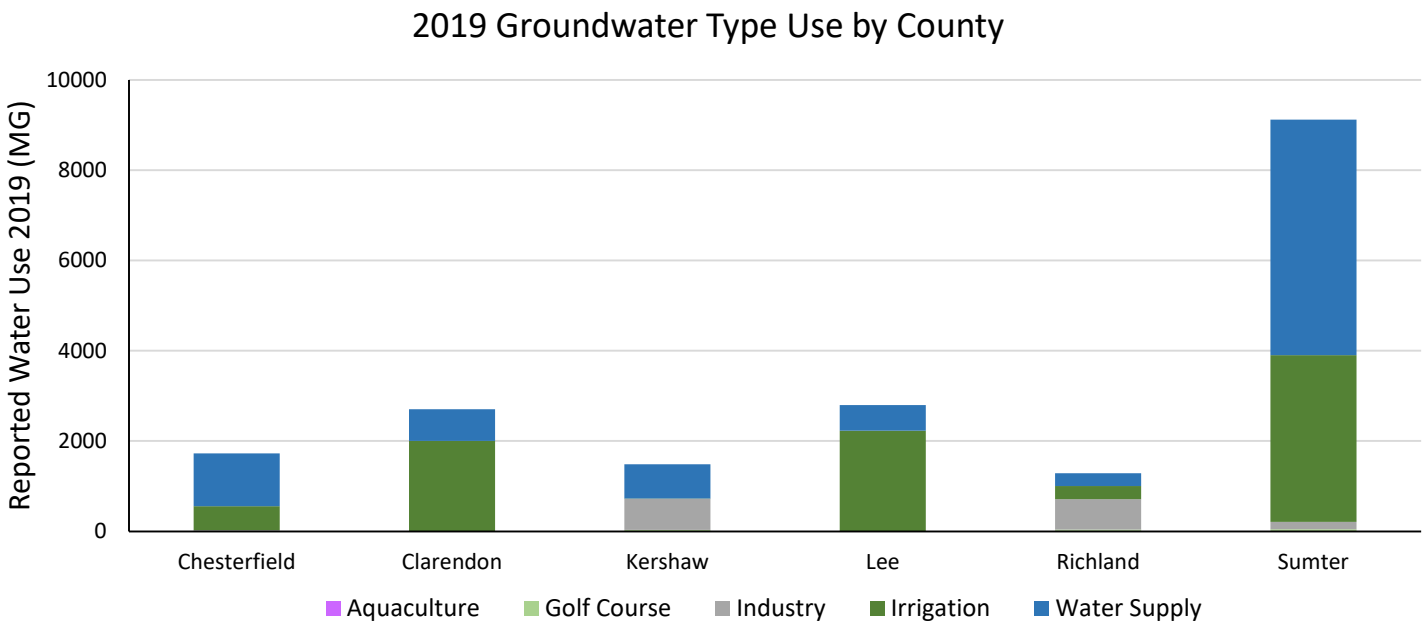

Reported Water use (MG)
30000
25000
20000
15000
10000
5000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Water Supply Groundwater
Water Supply Surface Water

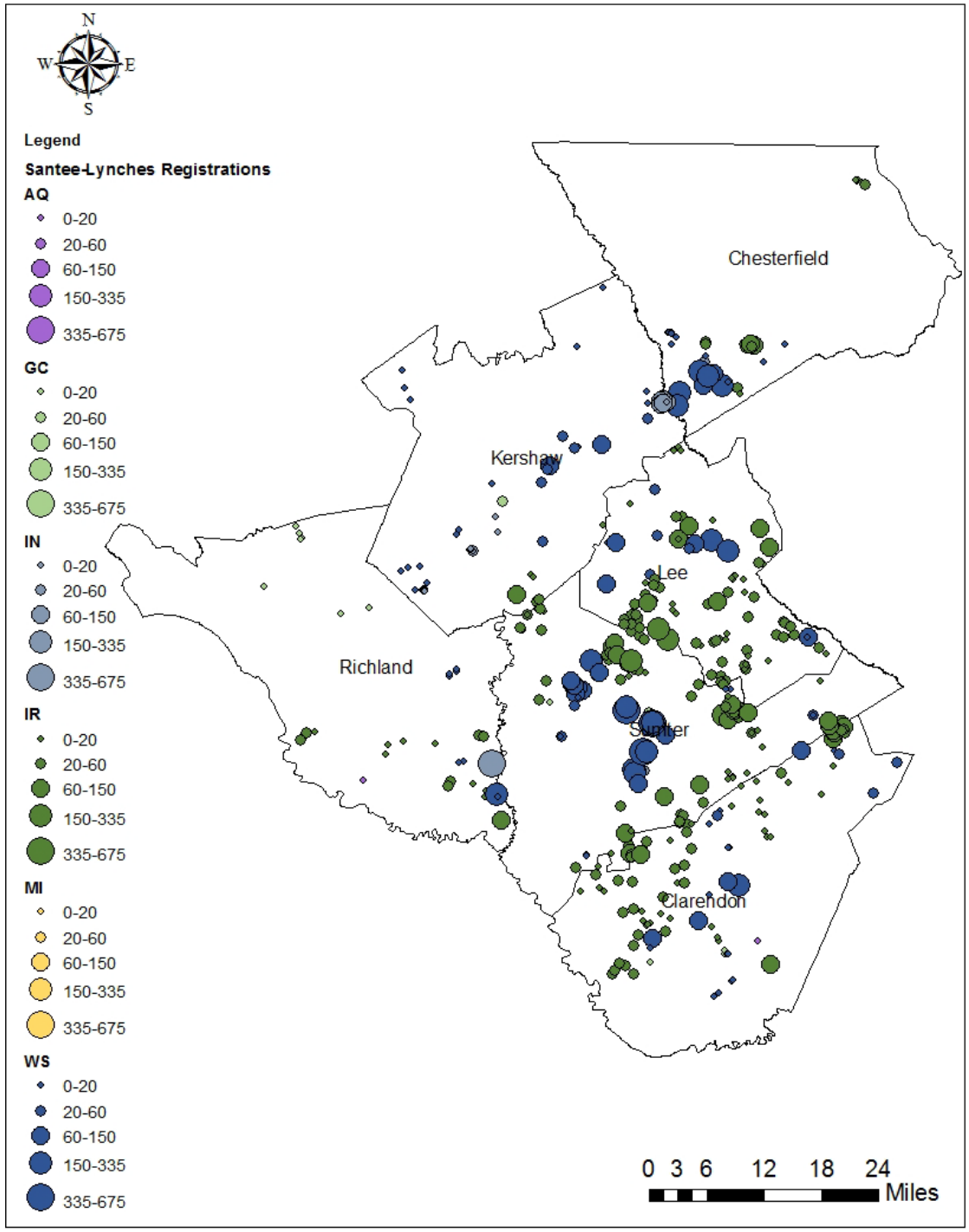

N
W
E
S
Chesterfield
Kershaw
Lee
Richland
Sumter
Clarendon
Legend
Santee-Lynches Registrations
Use Type
Water Supply
0 3 6 12 18 24
Miles


Reported Water Use (MG)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
Mining Groundwater
Mining Surface Water


N
W
E
S
Chesterfield
Kershaw
Lee
Richland
Sumter
Clarendon
Legend
Santee-Lynches Registrations
Use Type
Mining
0 3 6 12 18 24
Miles

There are currently 510 registered Groundwater wells reporting water use in the Santee-Lynches proposed area.





South Carolina Department of Health and Environmental Control

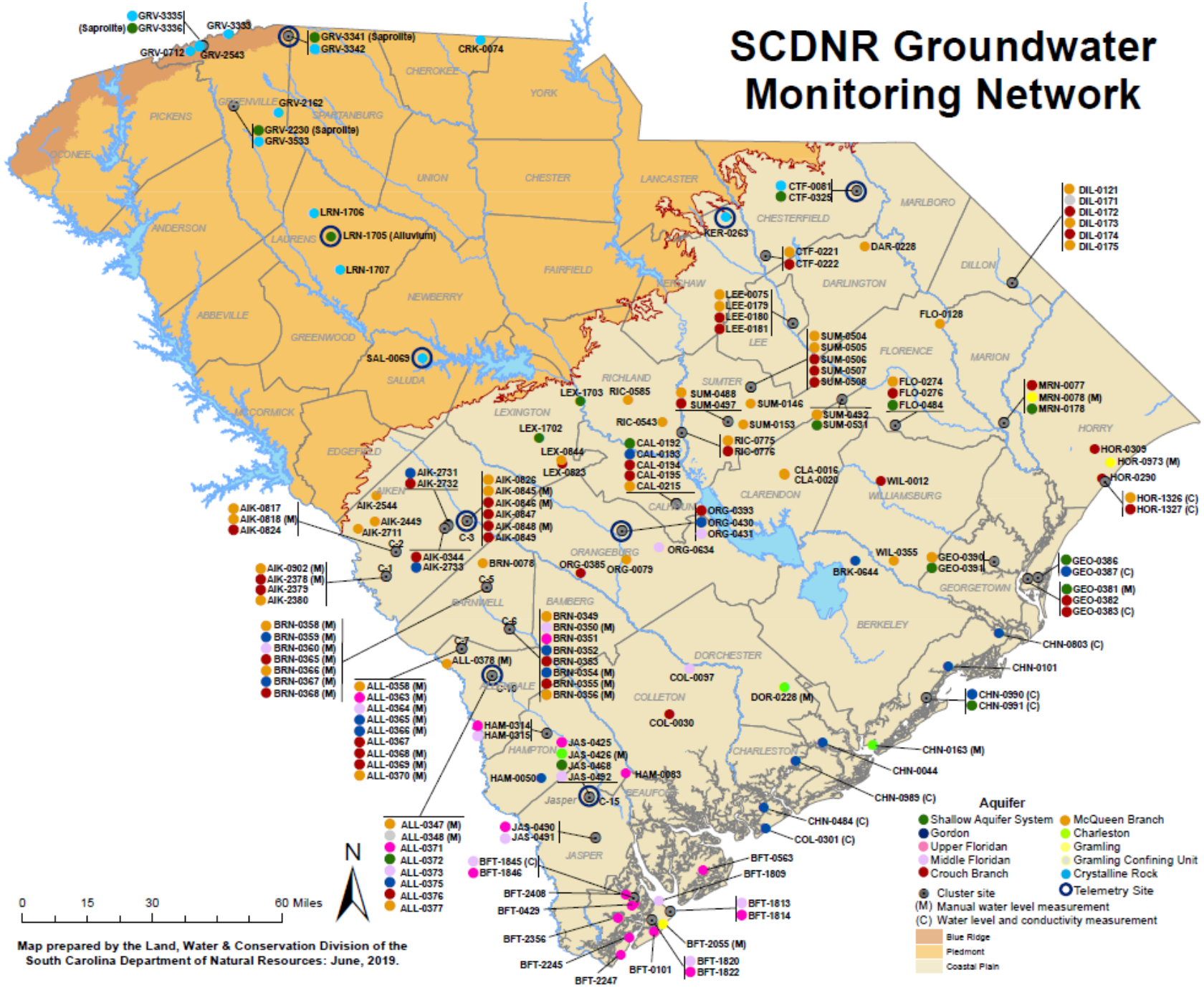
Current Groundwater Conditions

Water Level Measurements

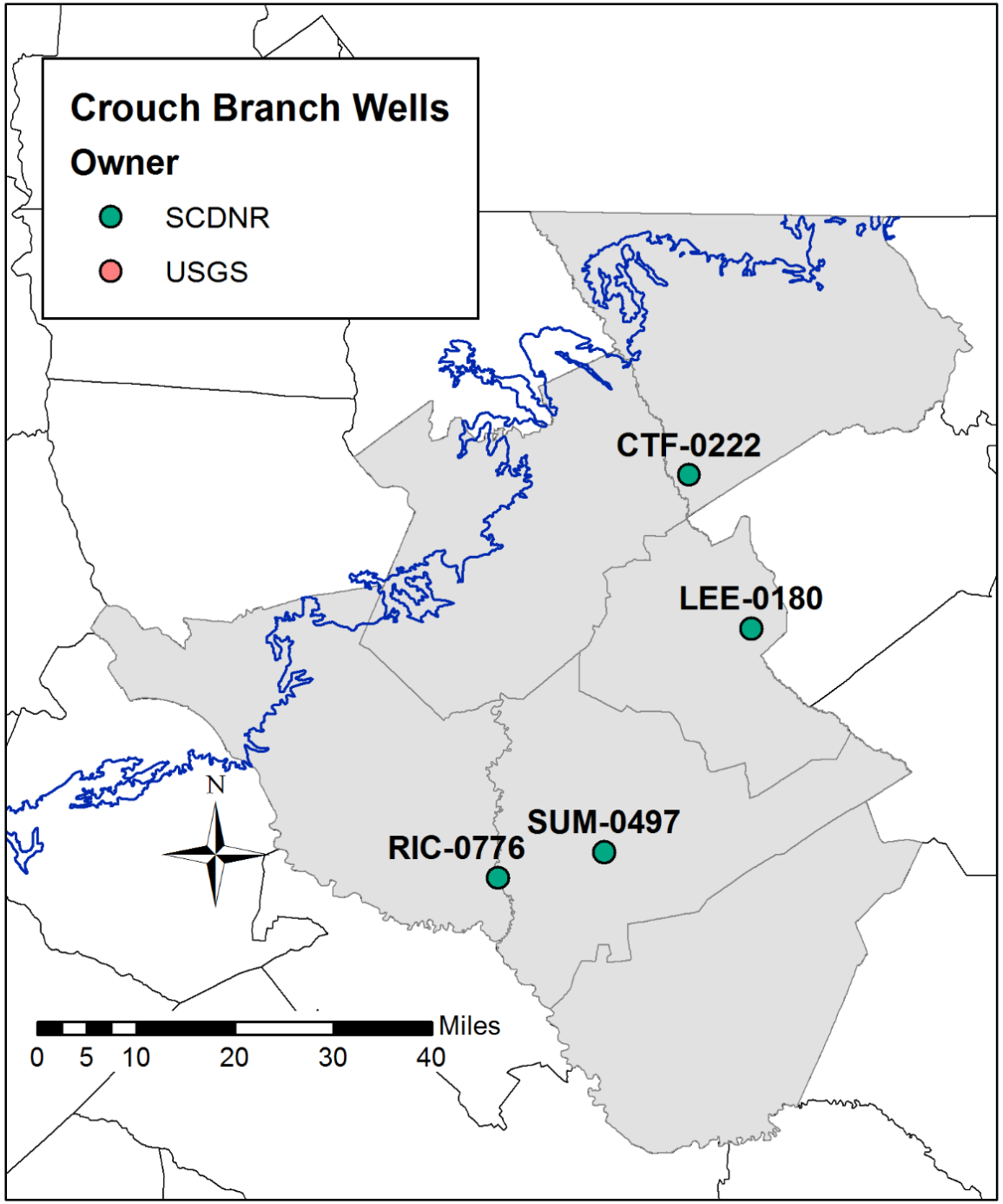
- Time-series measurements of the water level below land surface (BLS) at a specific place.
  - How has the water level at this location changed over time?

- ‘Snapshot’ of water level in wells screened in an aquifer.
  - What is the current condition of groundwater over a large area?

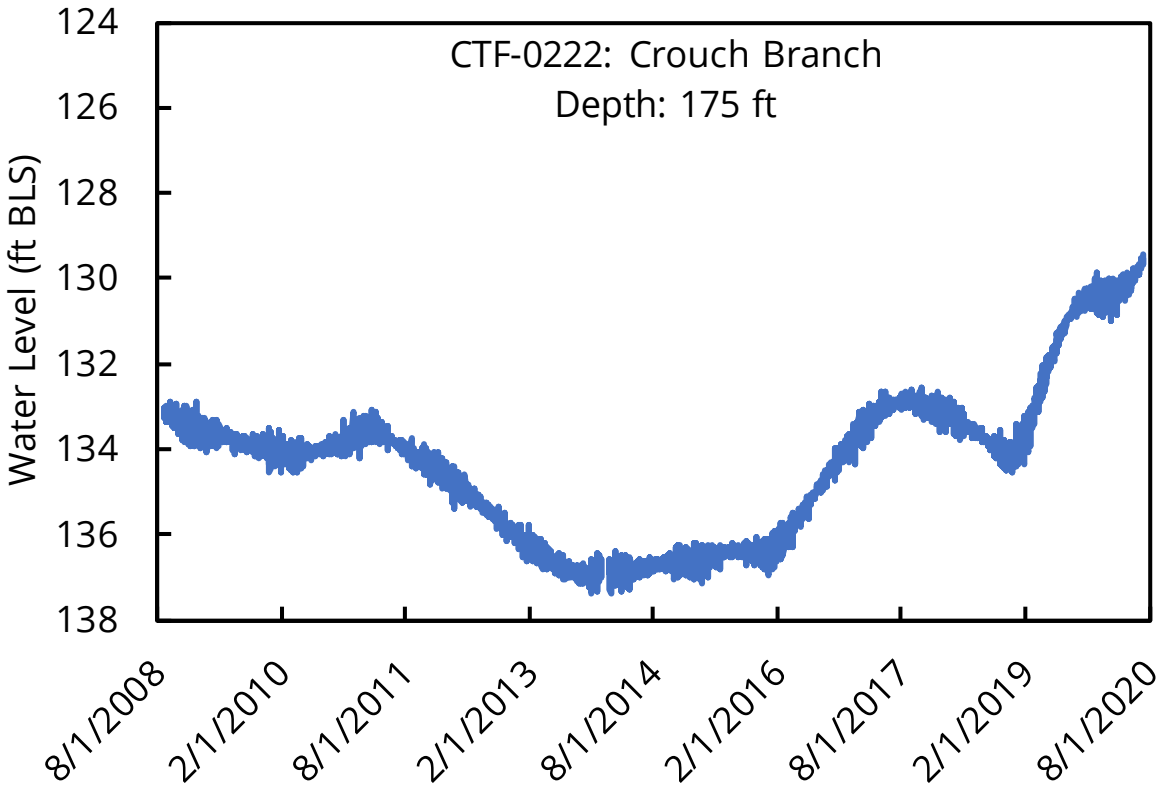
- Wells maintained by SCDNR and USGS.

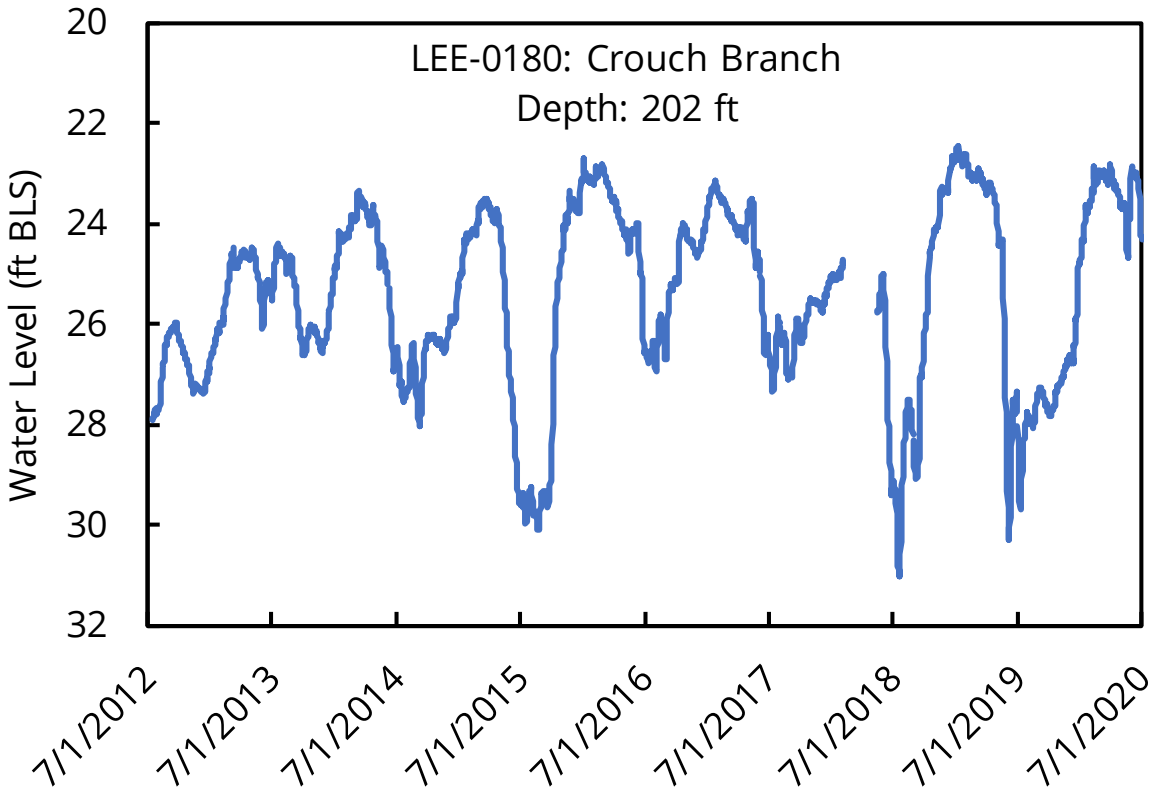

SCDNR Groundwater Monitoring Network
GRV-3335 (Saprolite)
GRV-3336
GRV-3338
GRV-0712
GRV-2543
GRV-3341 (Saprolite)
GRV-3342
CRK-0074
GRV-2162
GRV-2230 (Saprolite)
GRV-3533
LRN-1706
LRN-1705 (Alluvium)
LRN-1707
SAL-0063
CTF-0081
CTF-0325
KER-0263
CTF-0221
CTF-0222
DAR-0228
LEE-0075
LEE-0179
LEE-0180
LEE-0181
SUM-0504
SUM-0505
SUM-0506
SUM-0507
SUM-0508
SUM-0488
SUM-0497
SUM-0146
SUM-0153
SUM-0492
SUM-0531
RIC-0543
RIC-0775
RIC-0776
LEX-1703
RIC-0585
LEX-1702
LEX-0844
LEX-0823
CAL-0192
CAL-0193
CAL-0194
CAL-0195
CAL-0215
CLA-0016
CLA-0020
WIL-0012
FLO-0128
FLO-0274
FLO-0276
FLO-0484
DIL-0121
DIL-0171
DIL-0172
DIL-0173
DIL-0174
DIL-0175
MRN-0077
MRN-0078 (M)
MRN-0178
HOR-0305
HOR-0973 (M)
HOR-0290
HOR-1326 (C)
HOR-1327 (C)
AIK-2731
AIK-2732
AIK-2544
AIK-2449
AIK-2711
AIK-0826
AIK-0845 (M)
AIK-0846 (M)
AIK-0847
AIK-0848 (M)
AIK-0849
AIK-0817
AIK-0818 (M)
AIK-0824
C-1
C-2
C-3
C-4
C-5
C-6
C-7
C-8
C-15
AIK-0902 (M)
AIK-2378 (M)
AIK-2379
AIK-2380
AIK-0344
AIK-2733
BRN-0078
ORG-0385
ORG-0079
ORG-0634
ORG-0333
ORG-0430
ORG-0431
BRK-0644
WIL-0355
GEO-0390
GEO-0391
GEO-0386
GEO-0387 (C)
GEO-0381 (M)
GEO-0382
GEO-0383 (C)
CHN-0803 (C)
CHN-0101
CHN-0990 (C)
CHN-0991 (C)
CHN-0163 (M)
CHN-0044
CHN-0989 (C)
CHN-0484 (C)
COL-0301 (C)
BRN-0358 (M)
BRN-0359 (M)
BRN-0360 (M)
BRN-0365 (M)
BRN-0366 (M)
BRN-0367 (M)
BRN-0368 (M)
BRN-0349
BRN-0350 (M)
BRN-0351
BRN-0352
BRN-0353
BRN-0354 (M)
BRN-0355 (M)
BRN-0356 (M)
ALL-0378 (M)
COL-0097
DOR-0228 (M)
COL-0030
ALL-0358 (M)
ALL-0363 (M)
ALL-0364 (M)
ALL-0365 (M)
ALL-0366 (M)
ALL-0367
ALL-0368 (M)
ALL-0369 (M)
ALL-0370 (M)
HAM-0314
HAM-0315
HAM-0050
HAM-0063
JAS-0425
JAS-0426 (M)
JAS-0468
JAS-0492
JAS-0490
JAS-0491
ALL-0347 (M)
ALL-0348 (M)
ALL-0371
ALL-0372
ALL-0373
ALL-0375
ALL-0376
ALL-0377
BFT-1845 (C)
BFT-1846
BFT-2408
BFT-0429
BFT-2356
BFT-2245
BFT-2247
BFT-0101
BFT-2055 (M)
BFT-1820
BFT-1822
BFT-0563
BFT-1809
BFT-1813
BFT-1814
YORK
CHEROKEE
SPARTANBURG
UNION
CHESTER
LANCASTER
PICKENS
OCONEE
GREENVILLE
ANDERSON
LAURENS
FAIRFIELD
NEWBERRY
ABBEVILLE
GREENWOOD
SALUDA
MCCORMICK
EDGEFIELD
AIKEN
LEXINGTON
RICHLAND
SUMTER
KERSHAW
CHESTERFIELD
MARLBORO
DARLINGTON
DILLON
FLORENCE
MARION
HORRY
LEE
CLARENDON
CALHOUN
ORANGEBURG
WILLIAMSBURG
GEORGETOWN
BERKELEY
CHARLESTON
DORCHESTER
COLLETON
BEAUFORT
JASPER
HAMPTON
ALLENDALE
BARNWELL
BAMBERG
N
0
15
30
60 Miles
Aquifer
Shallow Aquifer System
Gordon
Upper Floridan
Middle Floridan
Crouch Branch
McQueen Branch
Charleston
Gramling
Gramling Confining Unit
Crystalline Rock
Cluster site
Telemetry Site
(M) Manual water level measurement
(C) Water level and conductivity measurement
Blue Ridge
Piedmont
Coastal Plain
Map prepared by the Land, Water & Conservation Division of the South Carolina Department of Natural Resources: June, 2019.

Crouch Branch Aquifer

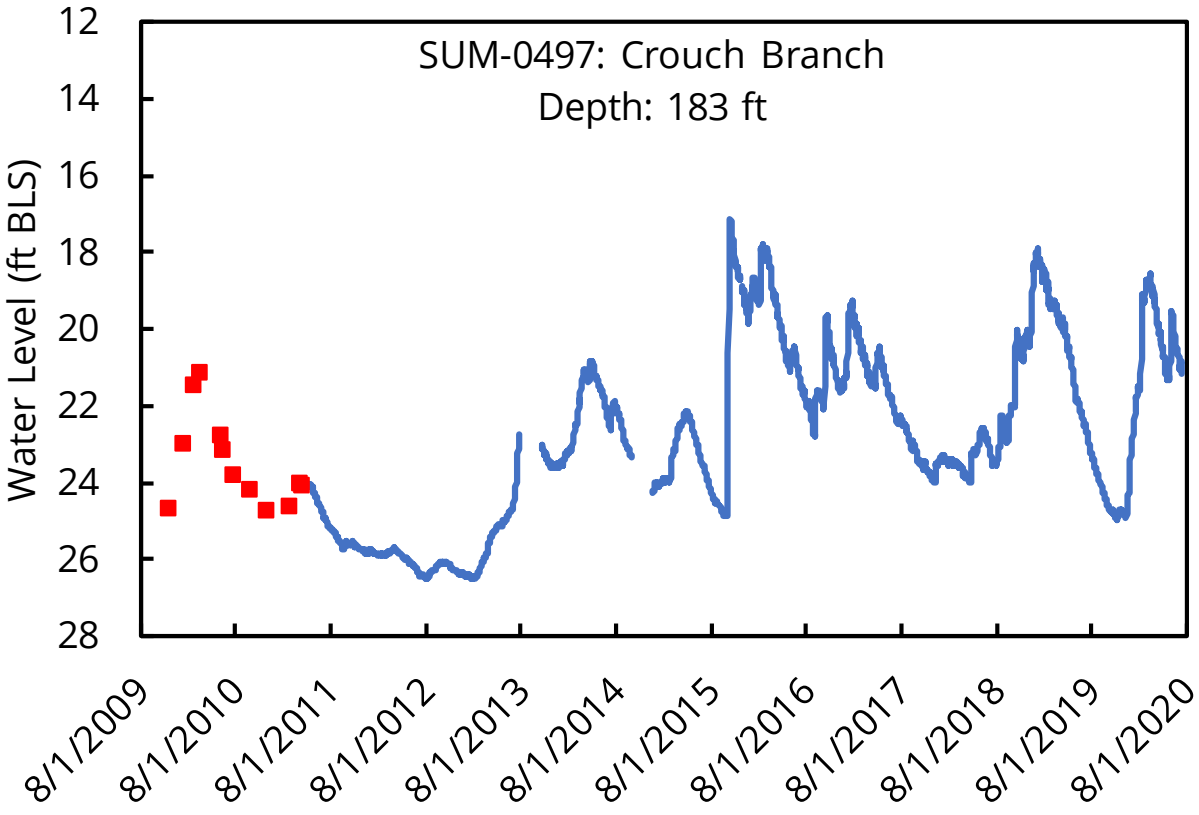


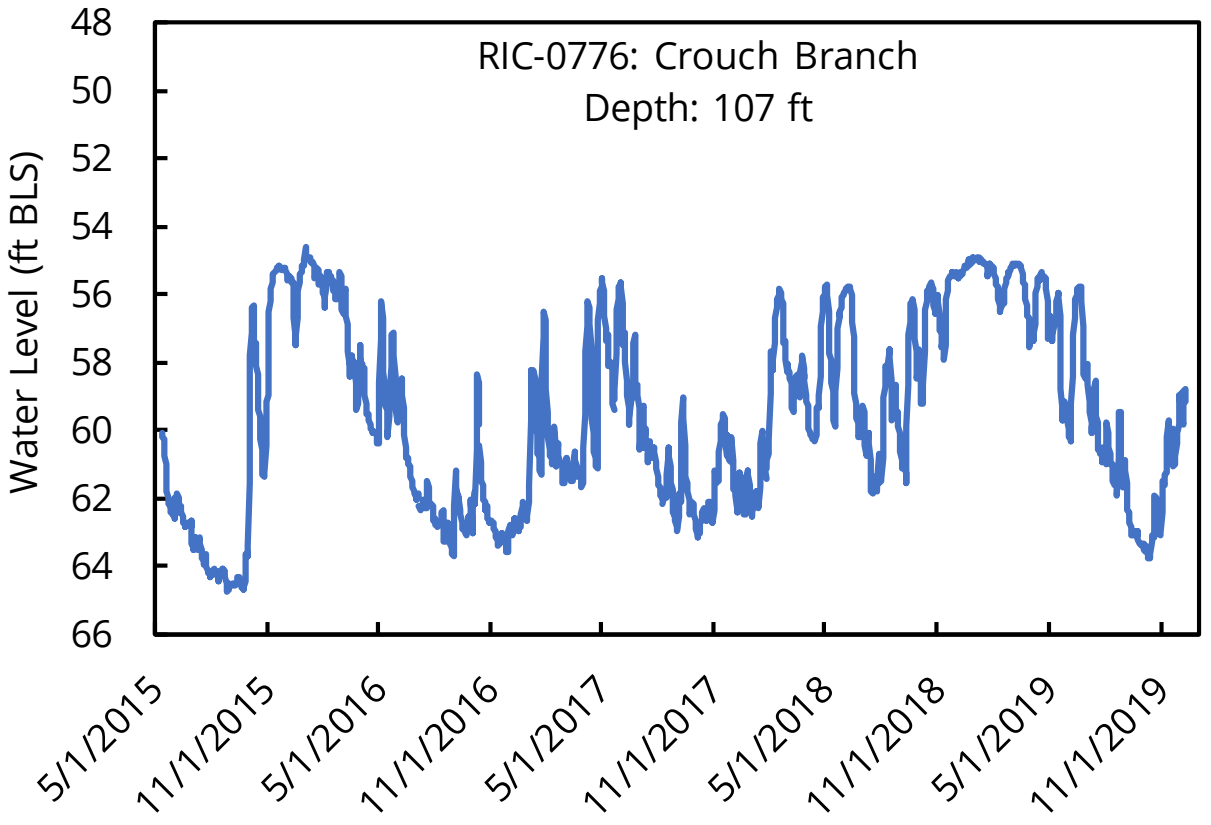
Crouch Branch Aquifer



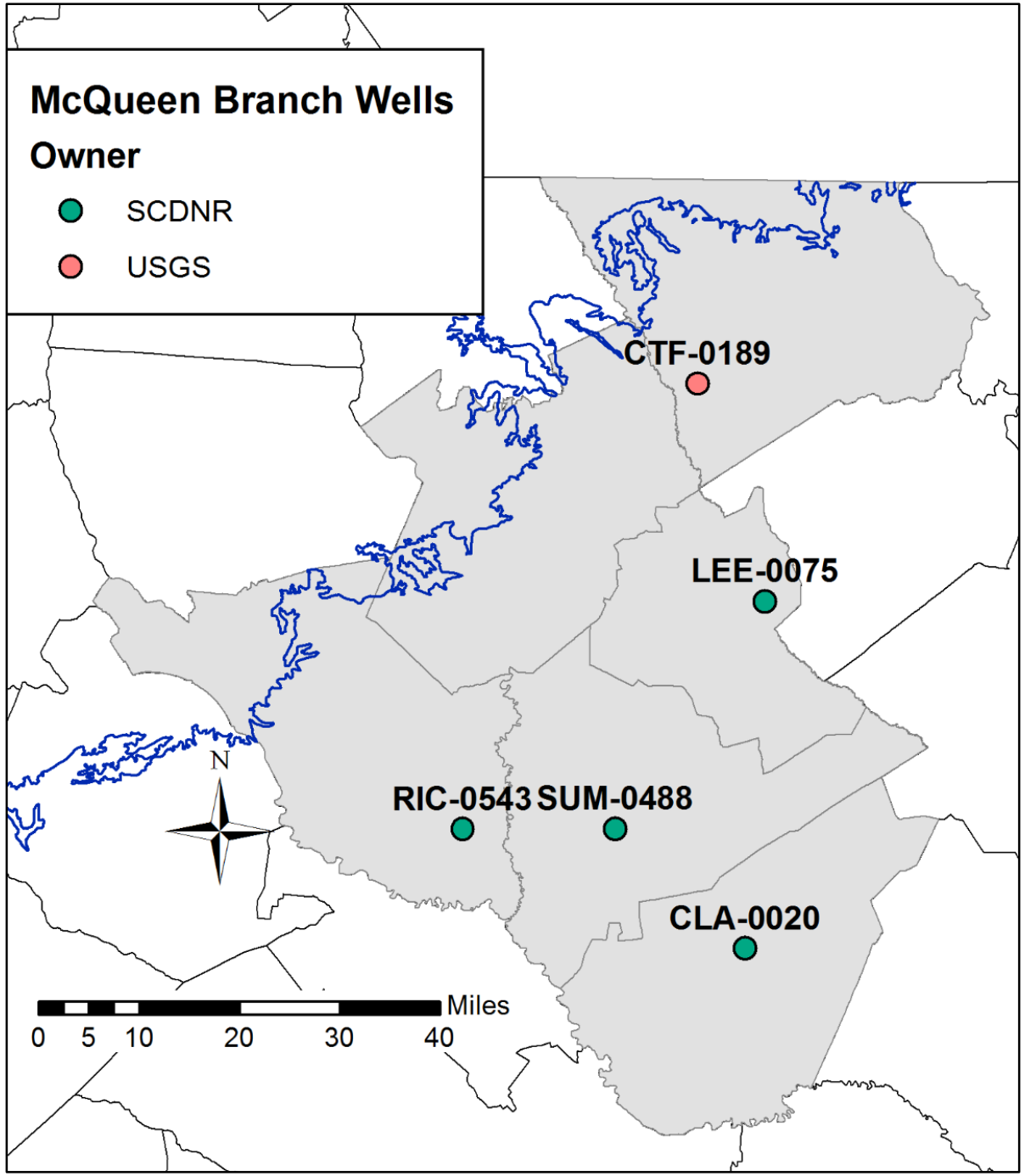


Crouch Branch Aquifer

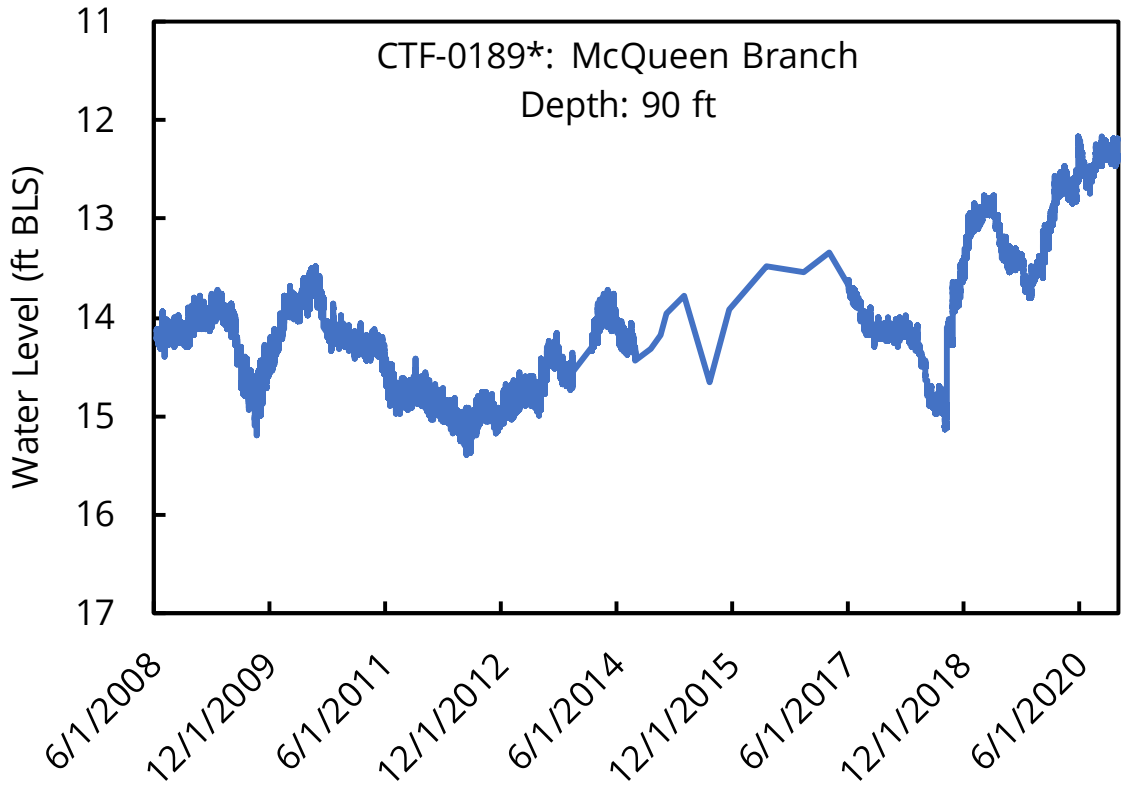


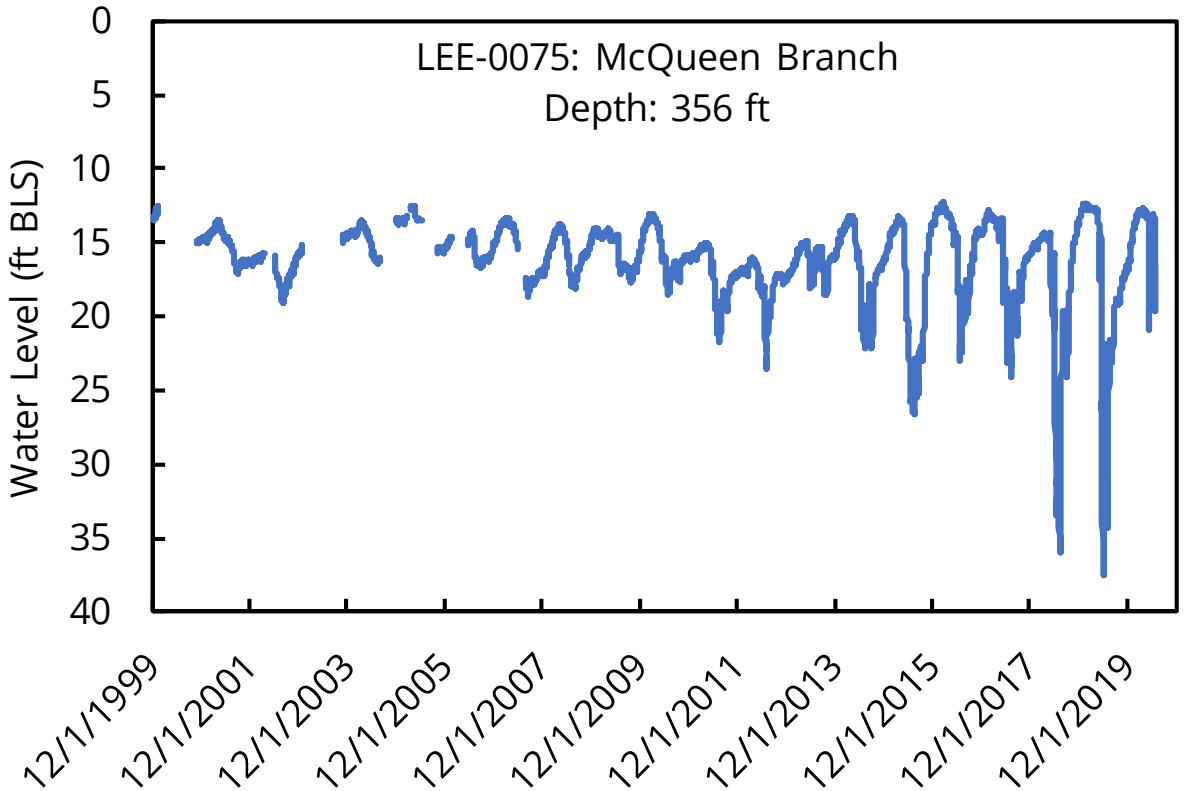


McQueen Branch Aquifer

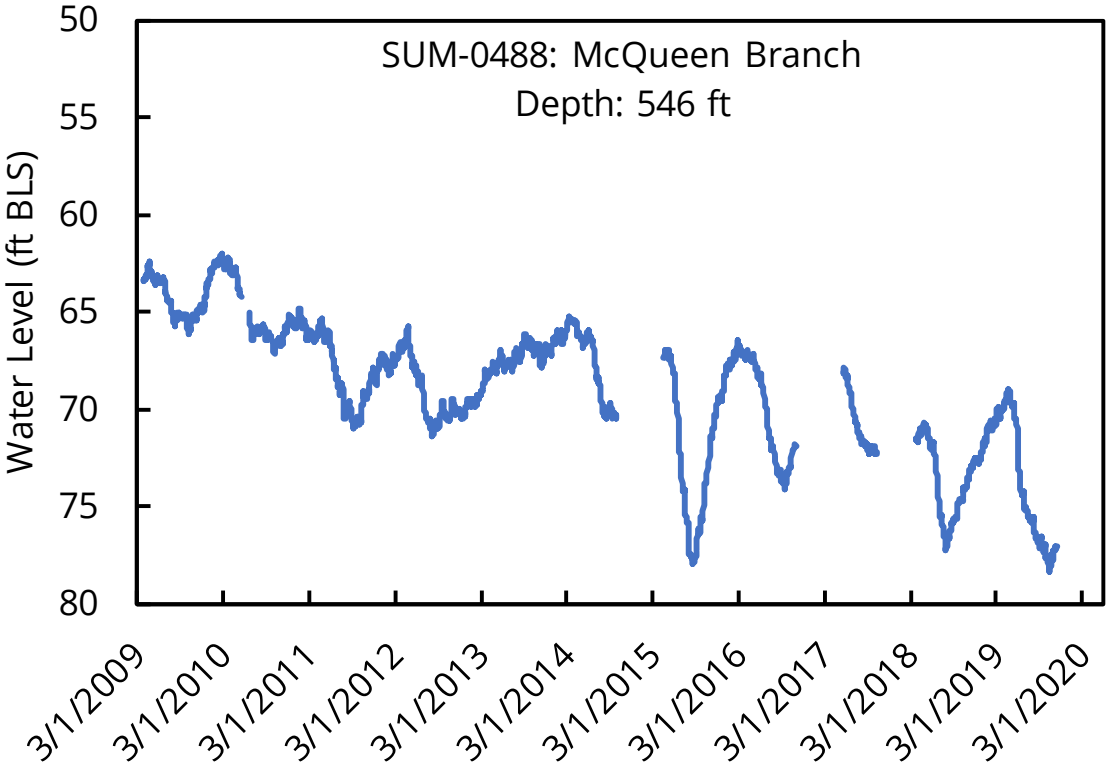


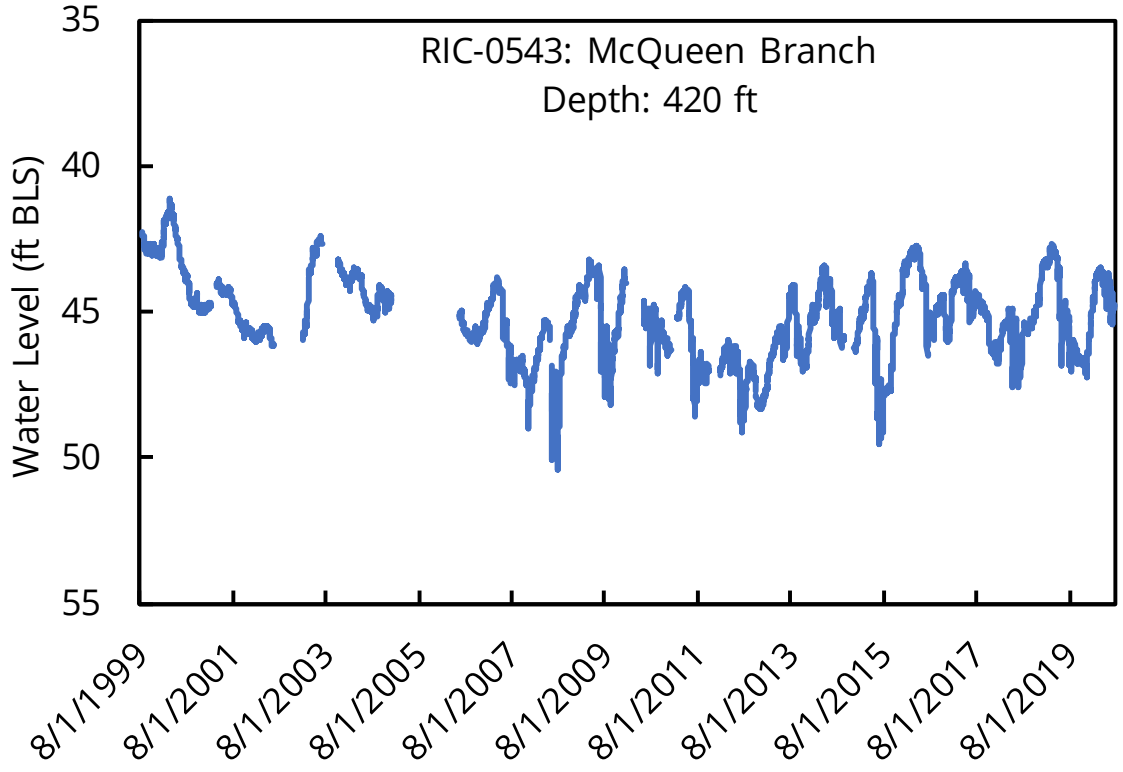
McQueen Branch Aquifer



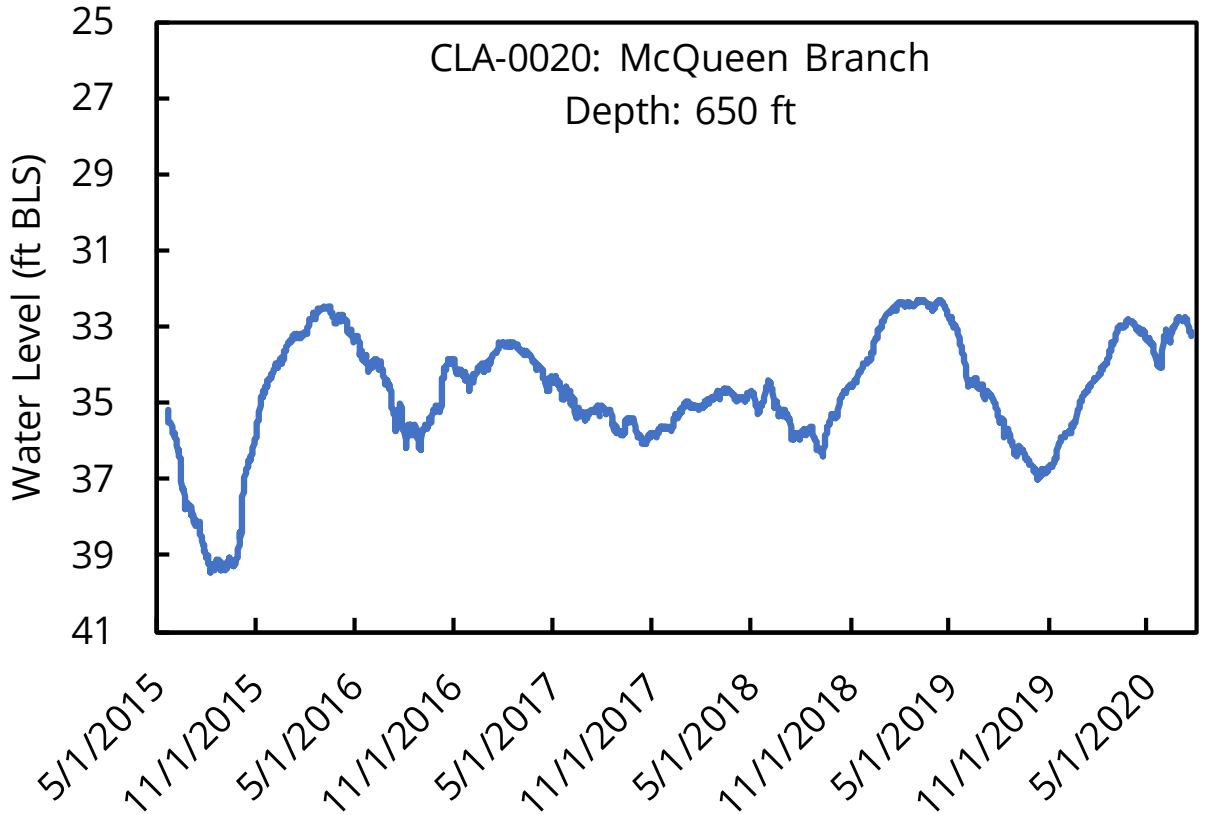


McQueen Branch Aquifer





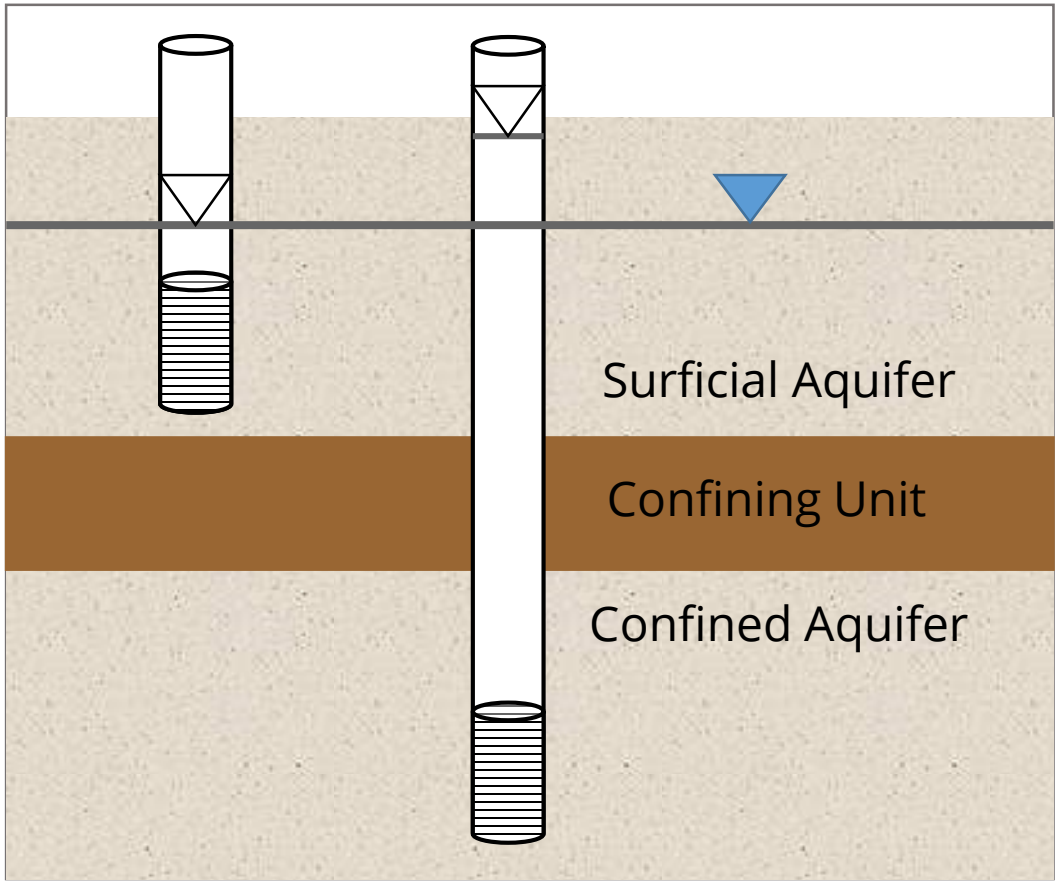
McQueen Branch Aquifer



Impact of Groundwater Withdrawal

Measuring Water Levels and Potentiometric Surfaces

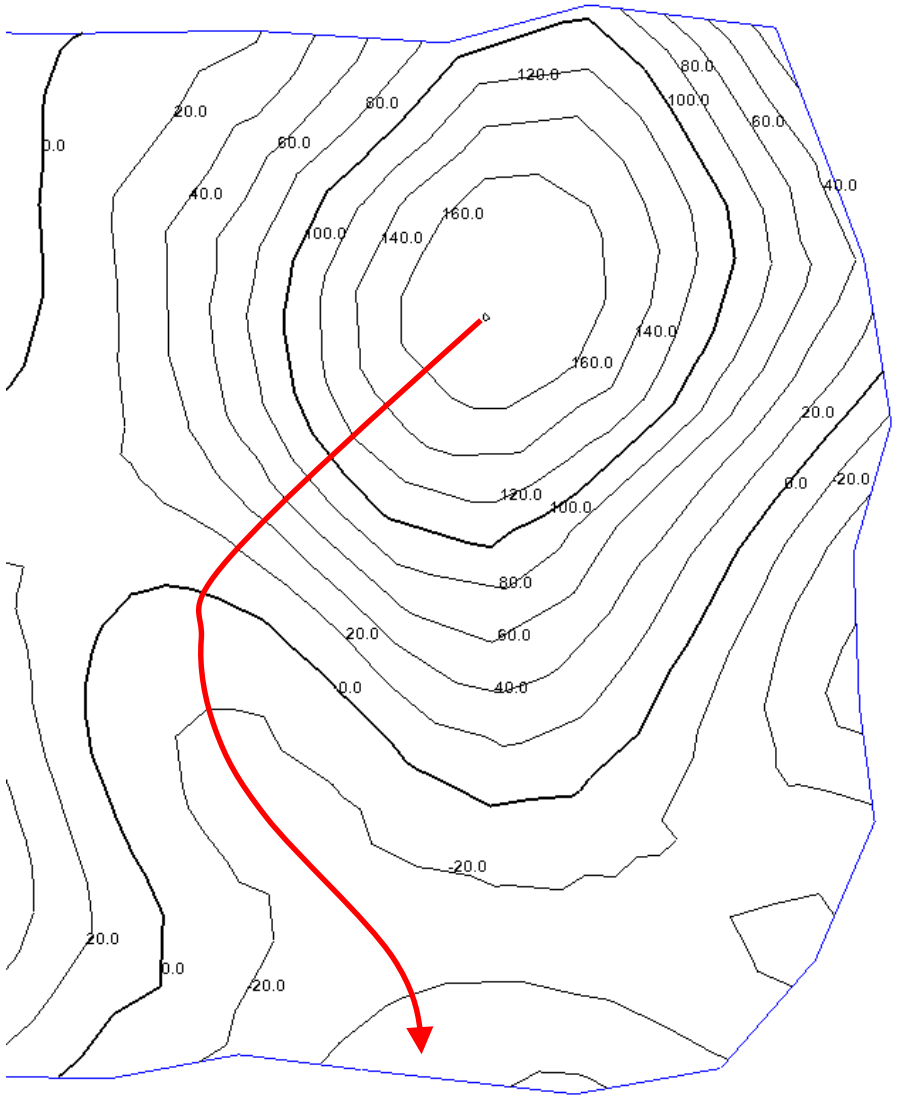
- Water Table (free surface of the groundwater)
- Potentiometric Surface (pressure surface of groundwater in the confined aquifer)
- Water flows from high to low water levels (or hydraulic head)

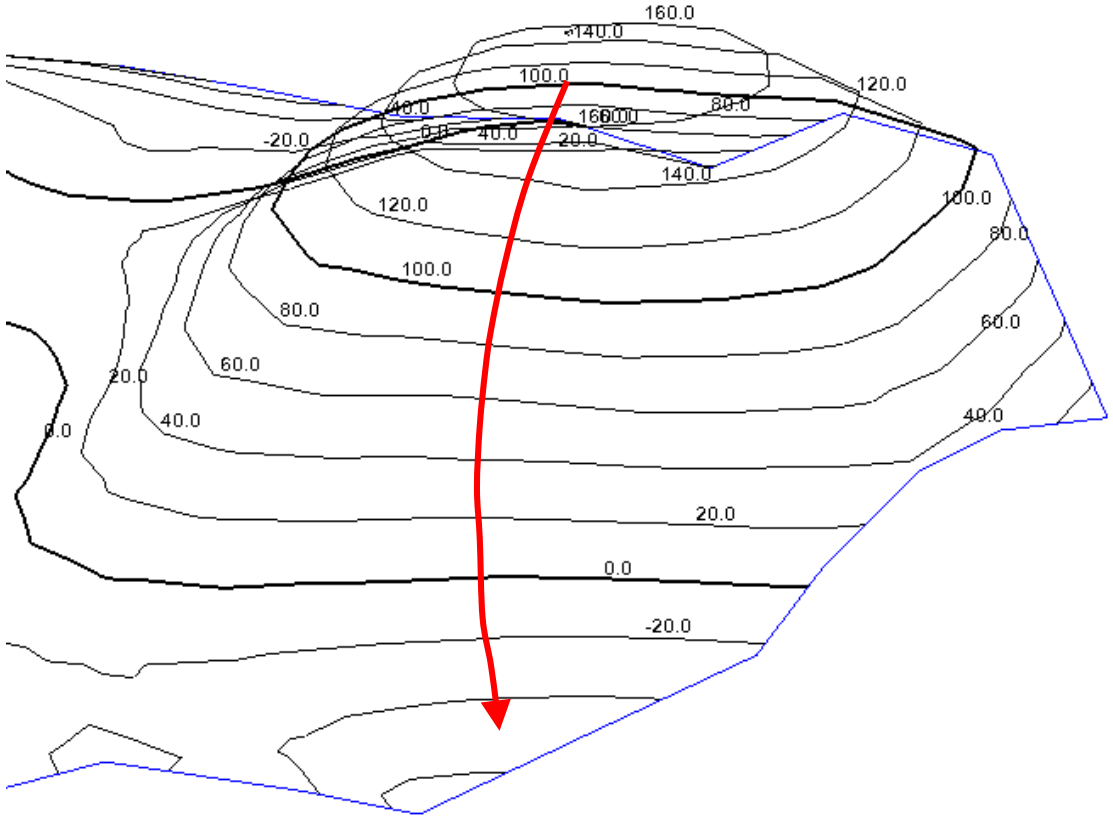


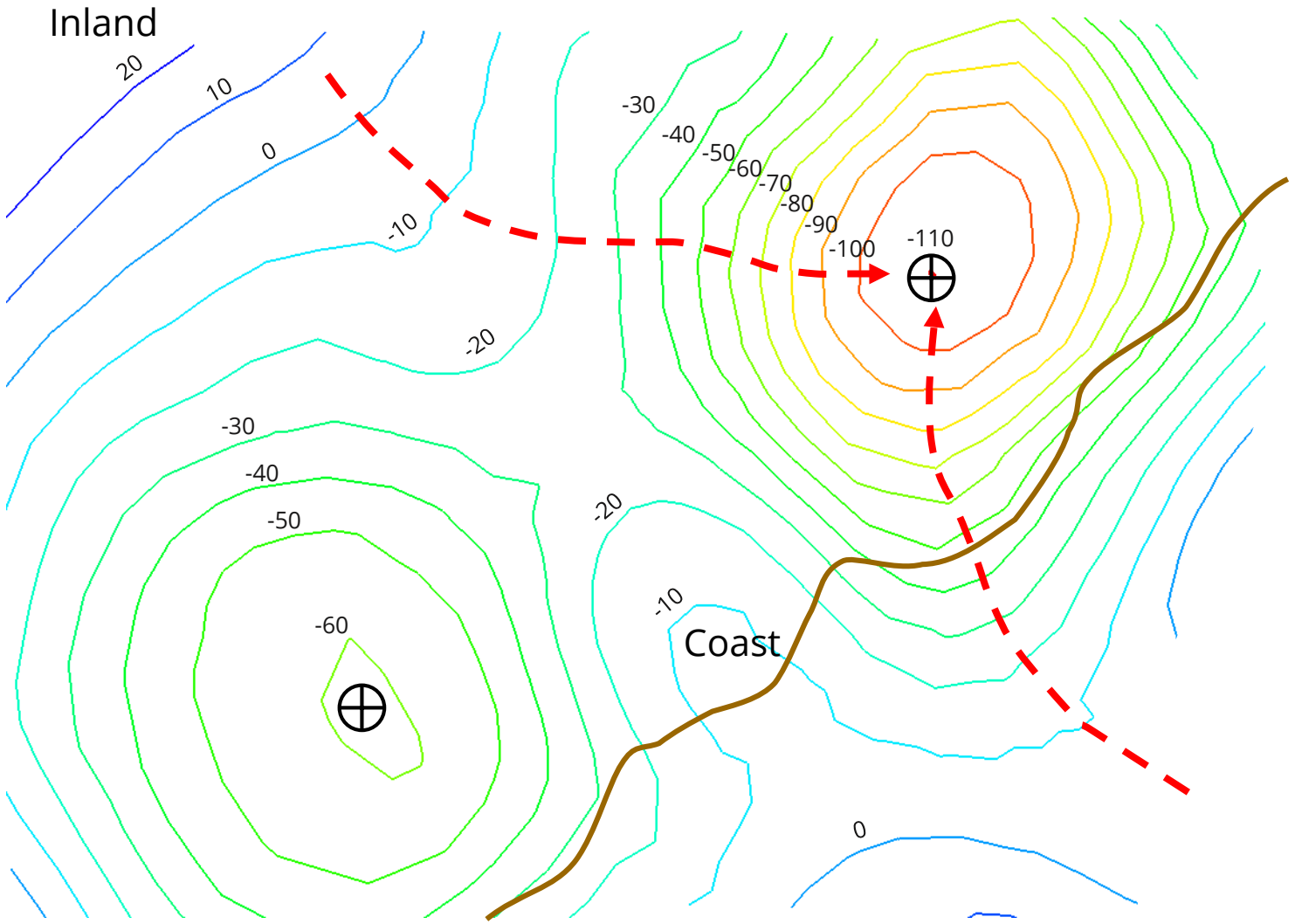
Contour Lines and Groundwater Flow Directions

Closely spaced contour lines represent a steeper gradient.

Groundwater flows “downhill” at 90º to the contour lines.

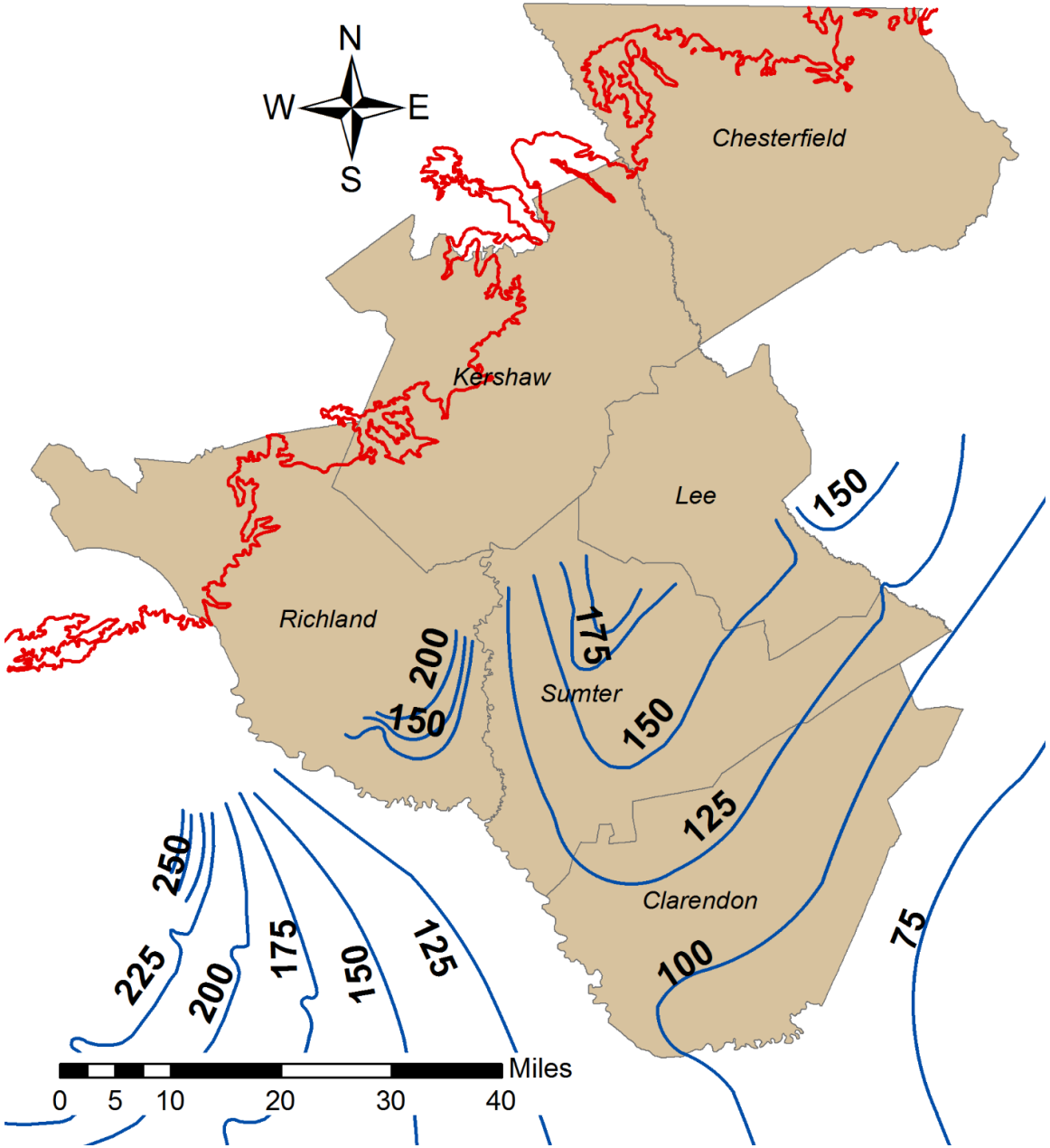




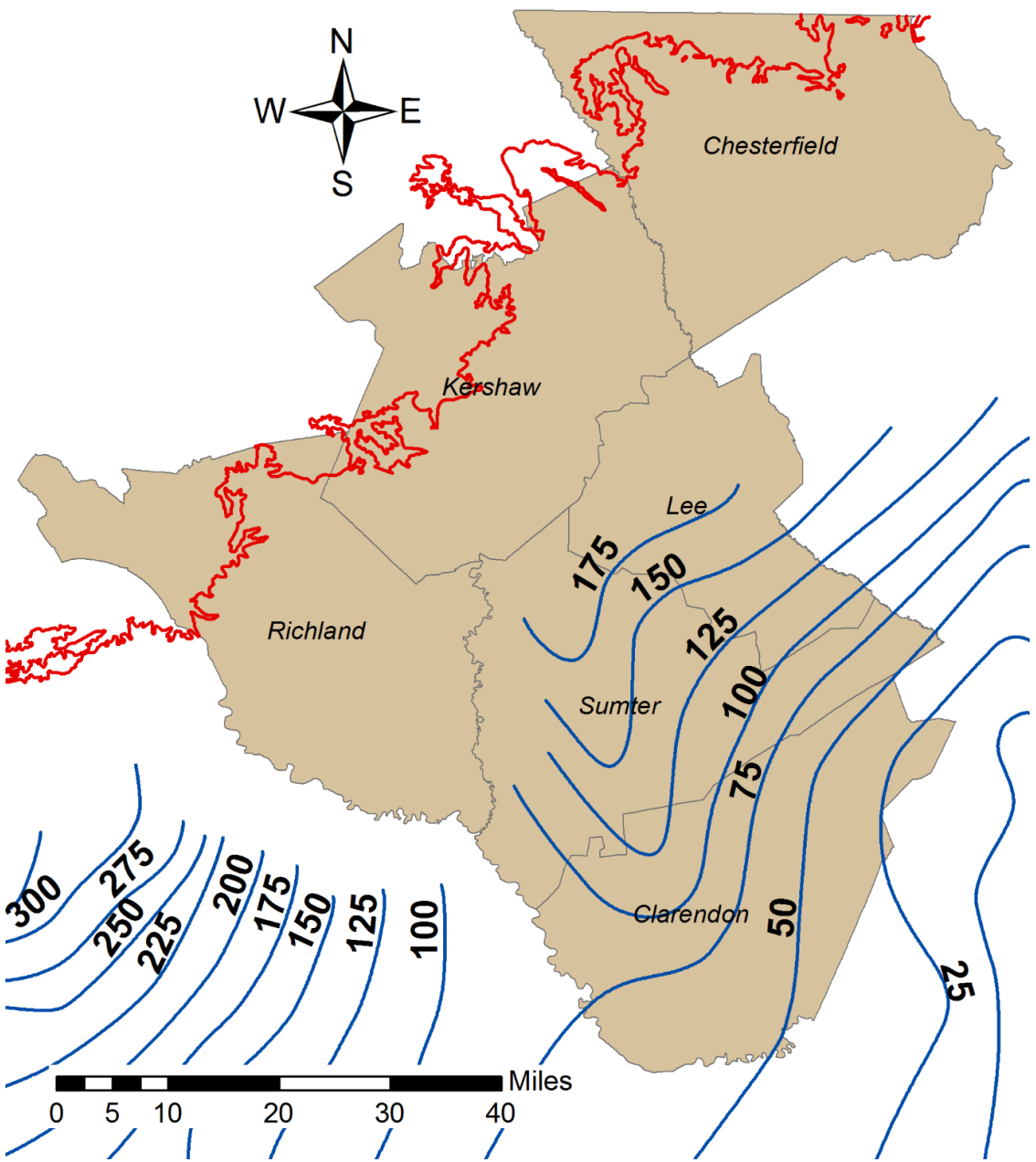


Pumping Cones (Cones of Depression)

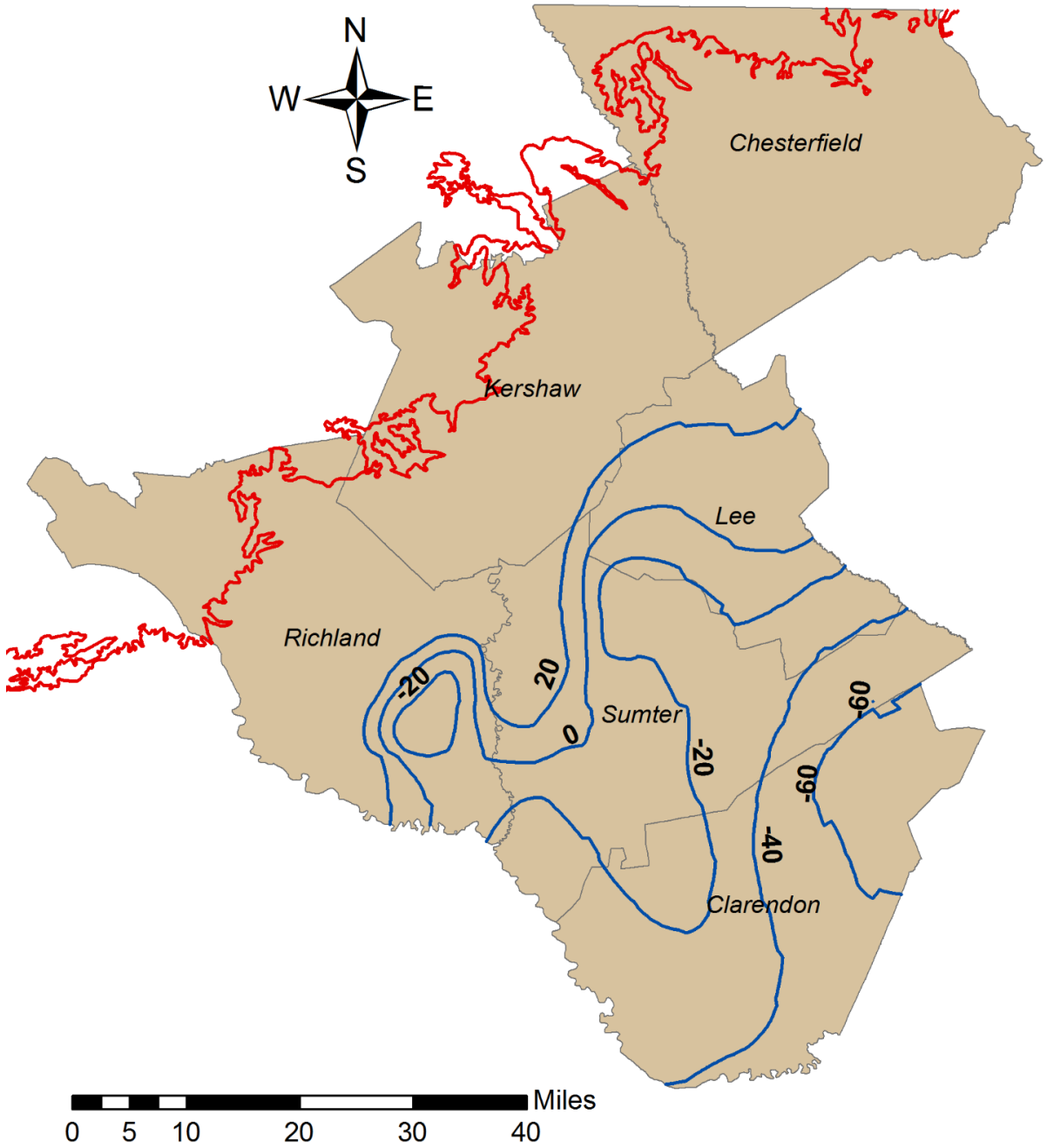
- Excessive groundwater withdrawal alters the water table or potentiometric surface resulting in:
  - changes to inland flow paths.
  - reverses in the normal off-shore direction of net groundwater flow.
- Reversal of groundwater flow at the coast can cause coastal water supply (and other) wells to become salty.



Crouch Branch: Pre-Development

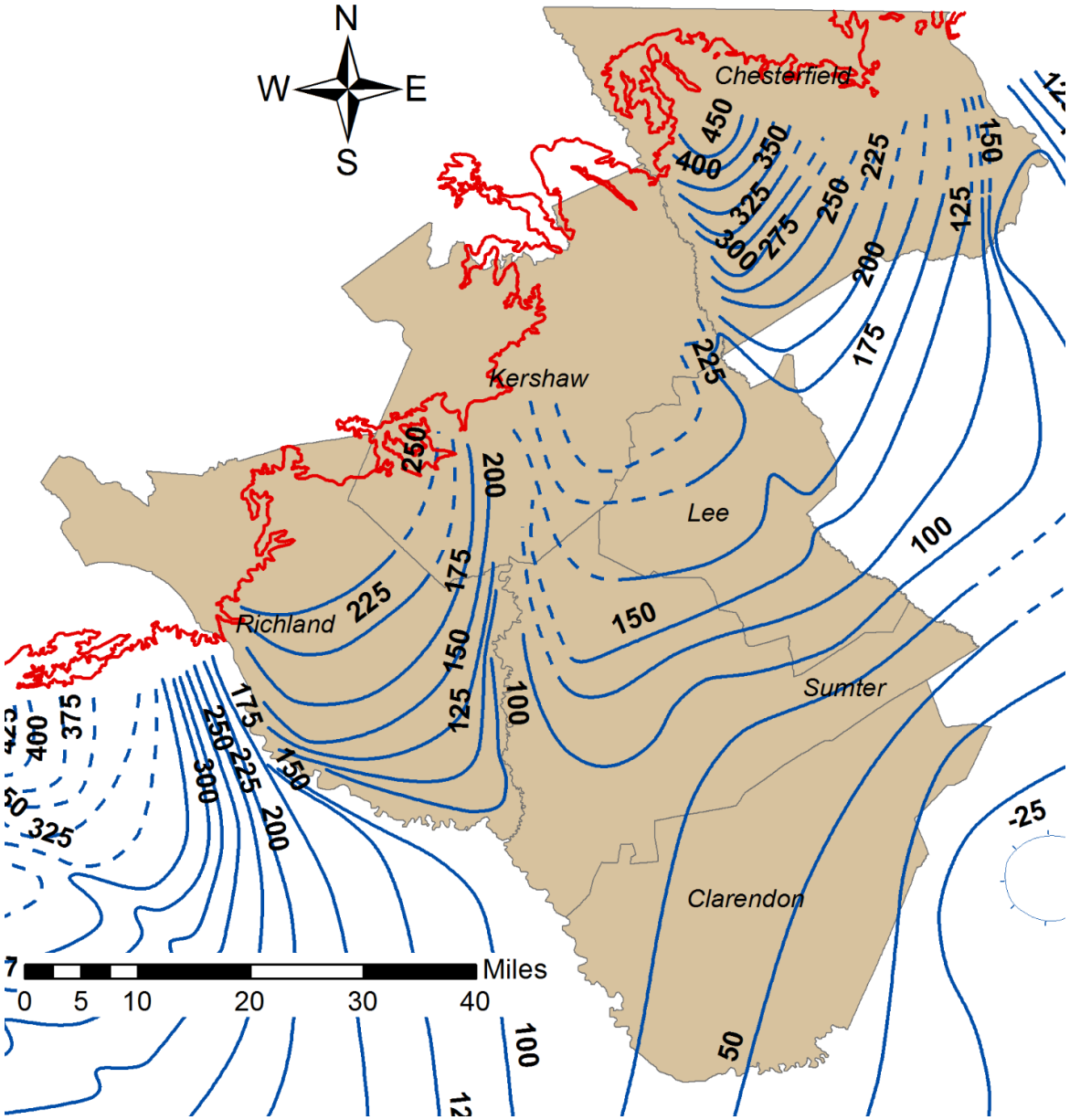


Crouch Branch: 2016

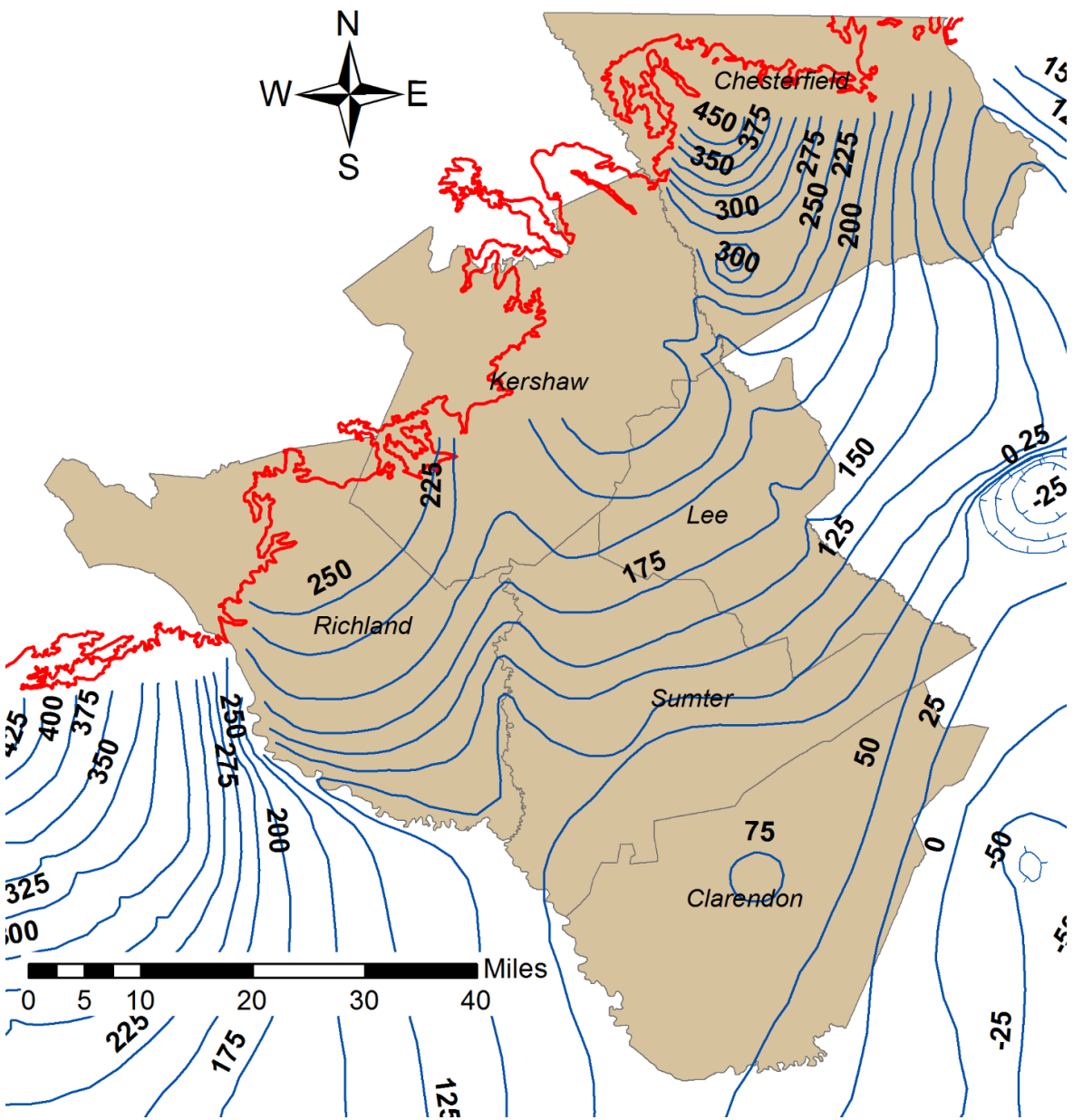


Crouch Branch Change in Water Level: Pre-Development to 2016

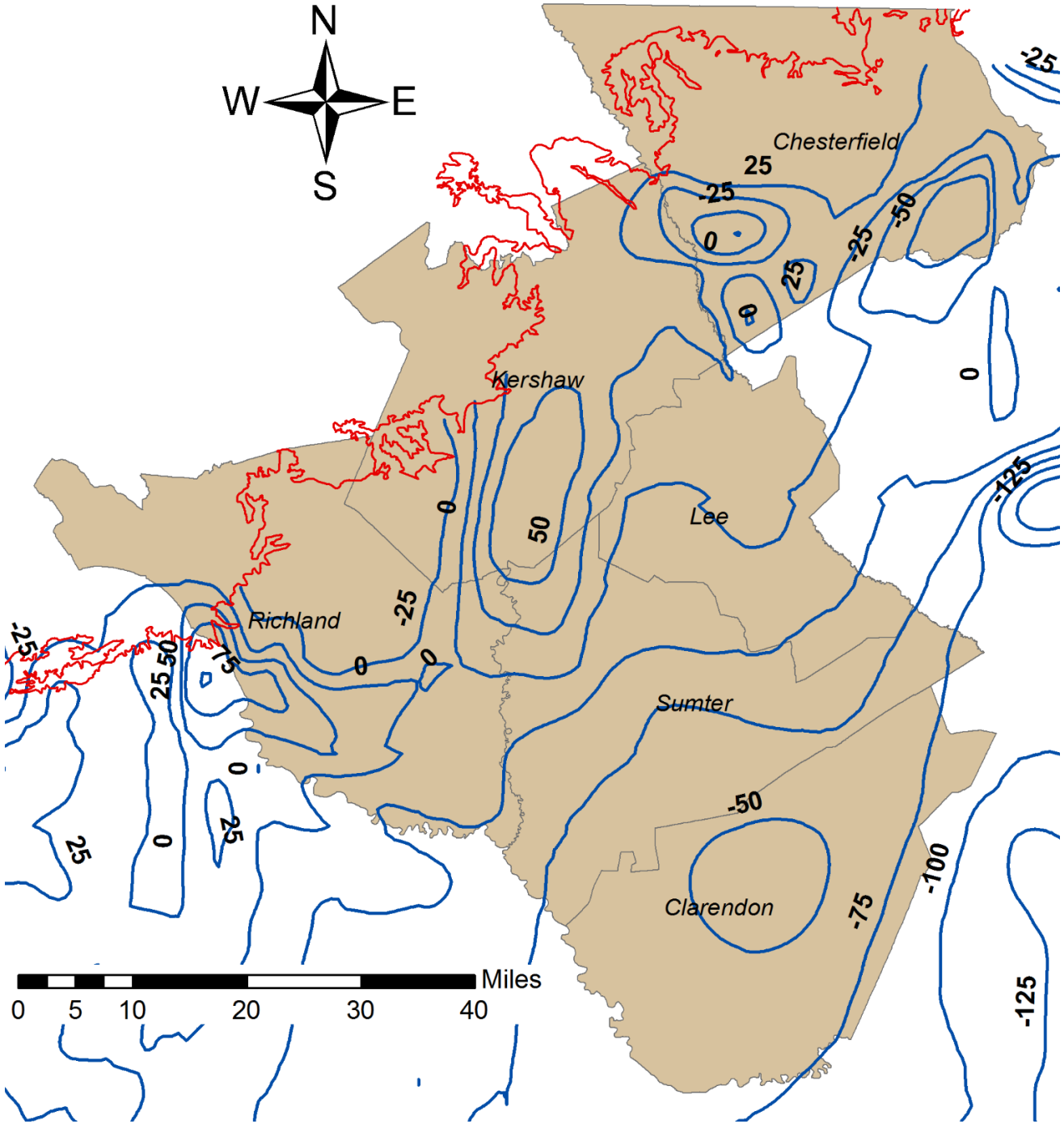
Potentiometric surface has declined in Sumter and Clarendon Counties more than 60 feet.



McQueen Branch (Middendorf): Pre-Development



McQueen Branch: 2019



McQueen Branch Change in Water Level: Pre-Development to 2019

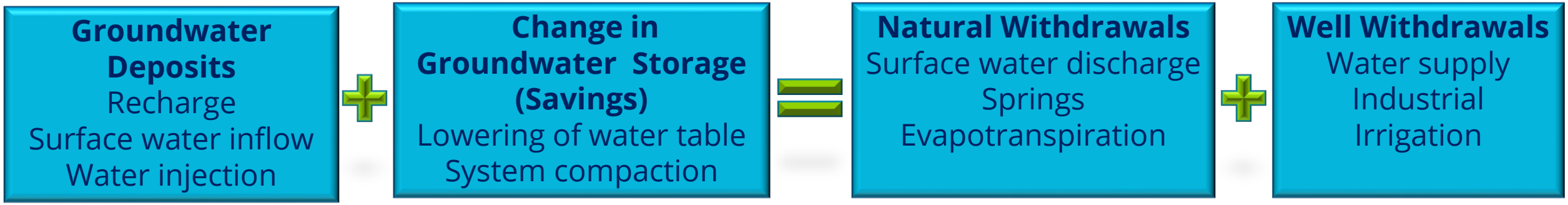
Potentiometric surface has declined in south Richland, Sumter and Clarendon Counties more than 75 feet.

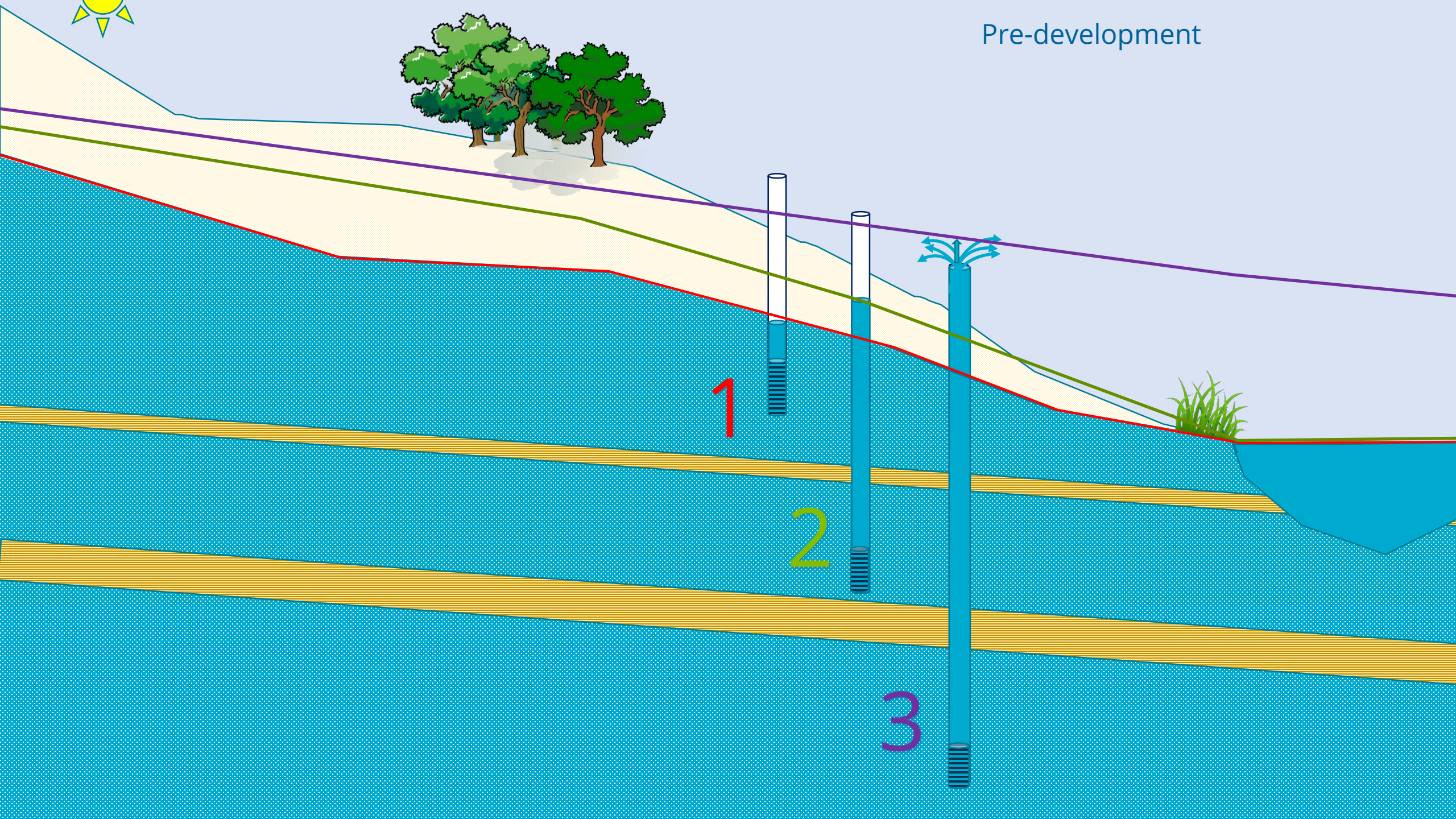
Healthy People. Healthy Communities.

South Carolina Department of Health and Environmental Control

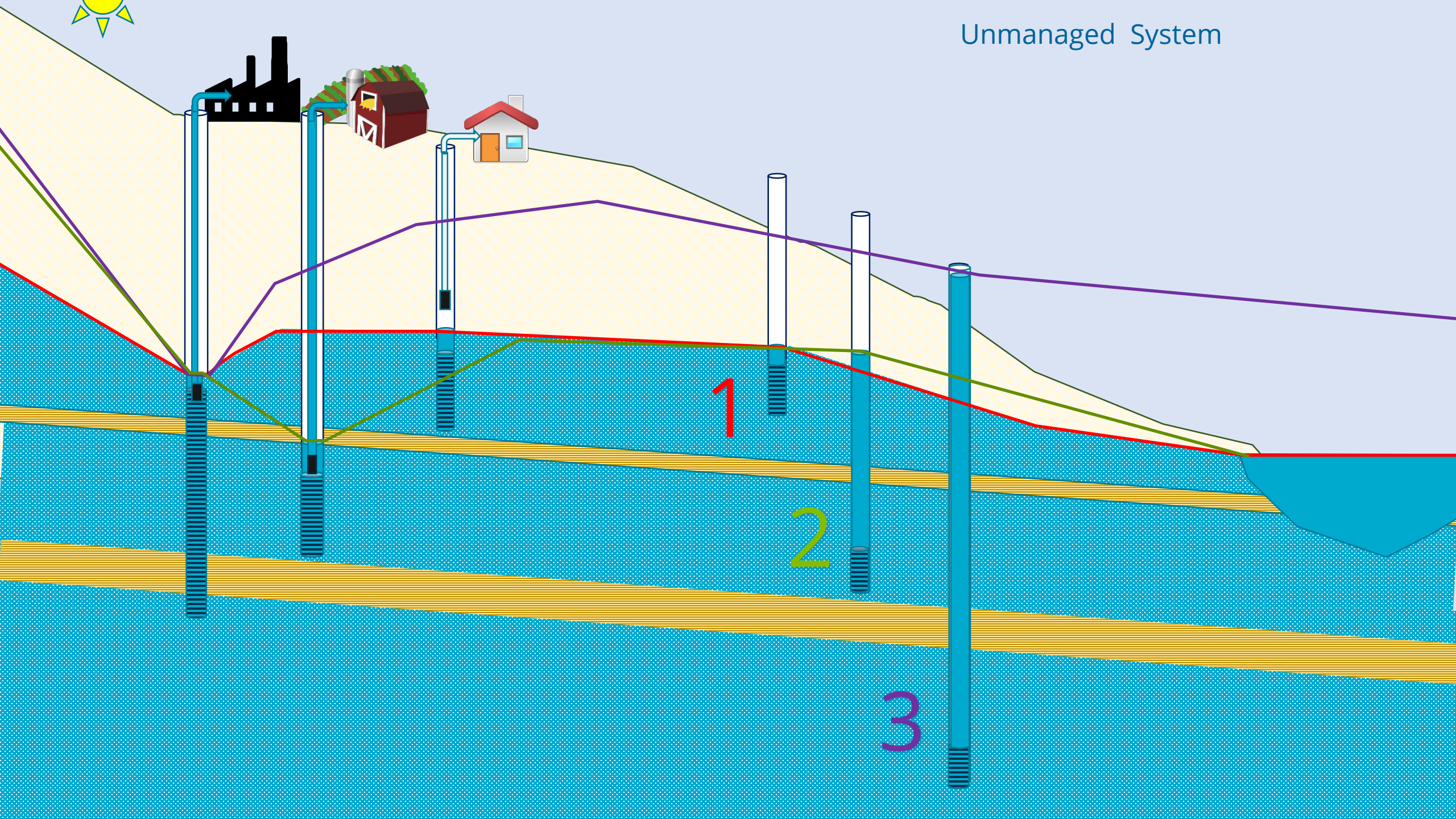
Summary and Next Steps

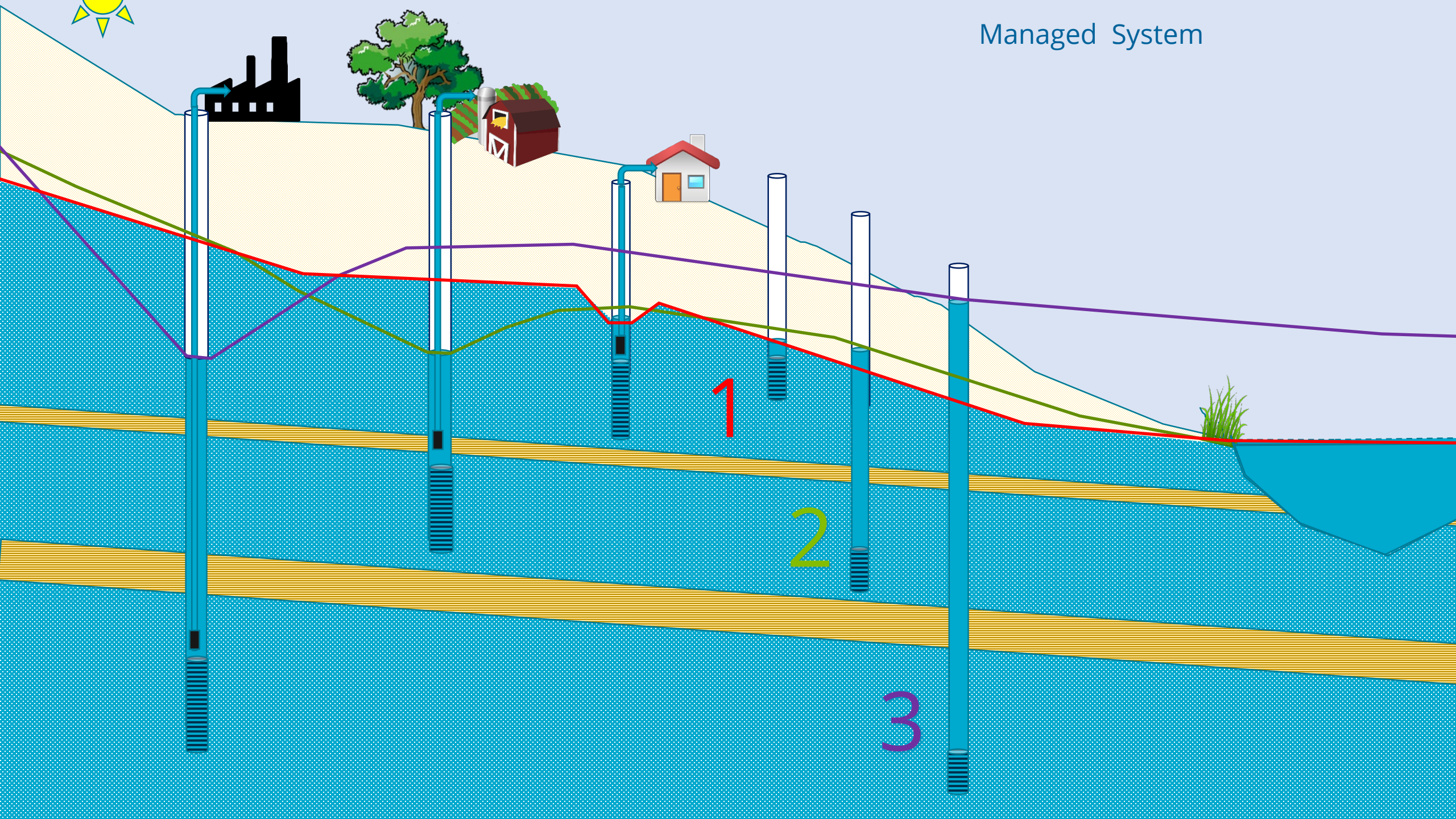
Groundwater Balance



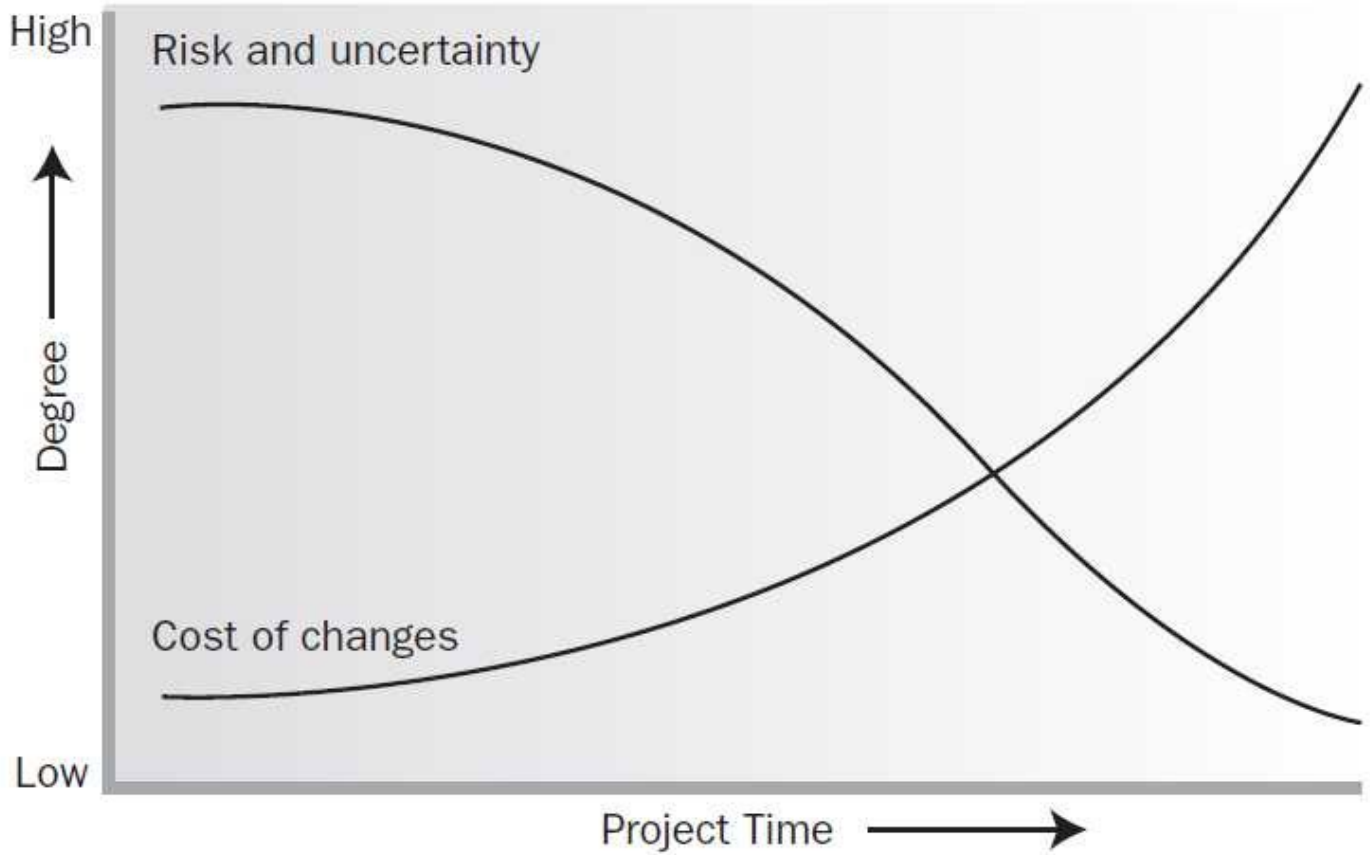

Pre-development
1
2
3

Unmanaged System




Managed System
1
2
3

Project Lifecycle



Capacity Use Designation is Appropriate

- Number of high capacity wells has increased
- Increased demand on groundwater system has occurred and is expected to continue
- Potential for negative impacts to existing users and the natural system
- Management of the resource will get more difficult in the future

Next Steps

- Department will receive comments until February 13
- Notice of Public Hearing will be placed in State Register
- Public Hearing/ Presentation to the DHEC Board

South Carolina Department of Health and Environmental Control

Groundwater Management Plan Timeline*

* Subject to Board Approval

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

CONTACT US

GWQuantity@dhec.sc.gov