



# Santee-Lynches Capacity Use Area Groundwater Management Plan

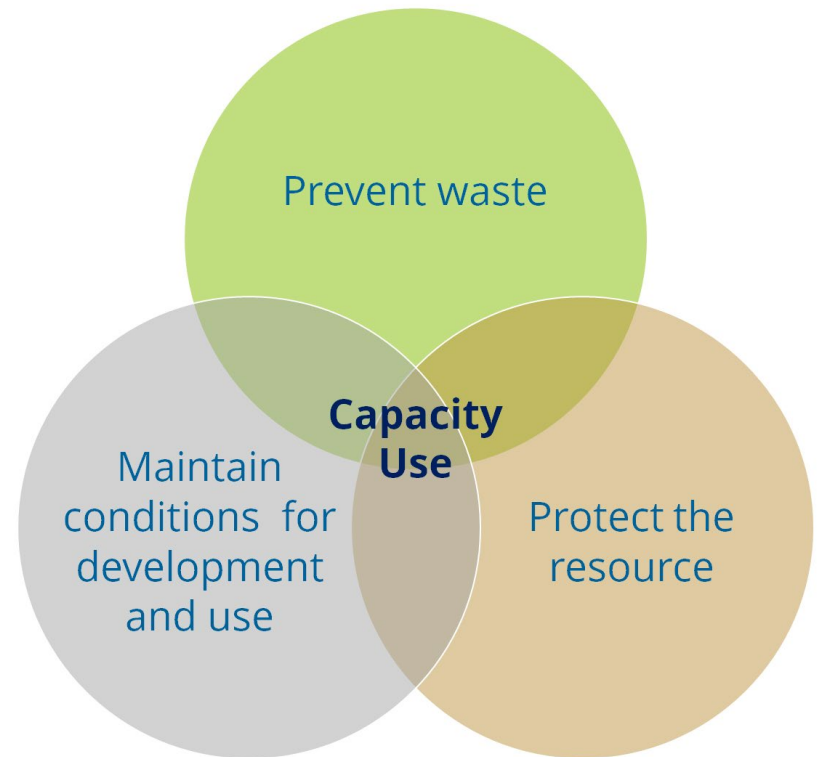
South Carolina Department of Health and Environmental Control  
Healthy People. Healthy Communities.

# Components

- Executive Summary
- Introduction
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- Regional Description
- Groundwater Level Trends
- Current Groundwater Demand
- Groundwater Demand Trends
- Population, Growth, and Water Use Projections
- Groundwater Management Strategy
- Groundwater Management Plan Reports

# Executive Summary

- South Carolina's Groundwater Use and Reporting Act (Chapter 5, Section 49-5-60)
- Legislative Mandate and Authority to Establish GMP
- Regional Engagement
- Present and Future Needs



# Introduction

- **SLCUA:** Chesterfield, Clarendon, Kershaw, Lee, Richland, Sumter
- Management Strategies and Provide Direction
- General Goals:
  - Ensure sustainable development of the groundwater resource by management of groundwater withdrawals; and,
  - Monitoring of groundwater availability to evaluate conditions.
- **Current** groundwater sources utilized; water demand by type and amount used; aquifer storage and recovery and water reuse;
- **Projected** population and growth; water demand; opportunities for aquifer storage and recovery, as well as water reuse; groundwater and surface water options; and,
- Water conservation measures.
- Adaptive Management and Continuous Improvement

# 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.
- **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.
- **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.
- **Groundwater User:** A person using groundwater for any purpose.
- **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.
- **\*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.
- **\*Sustainable Use:** Use of ground water in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social consequences.

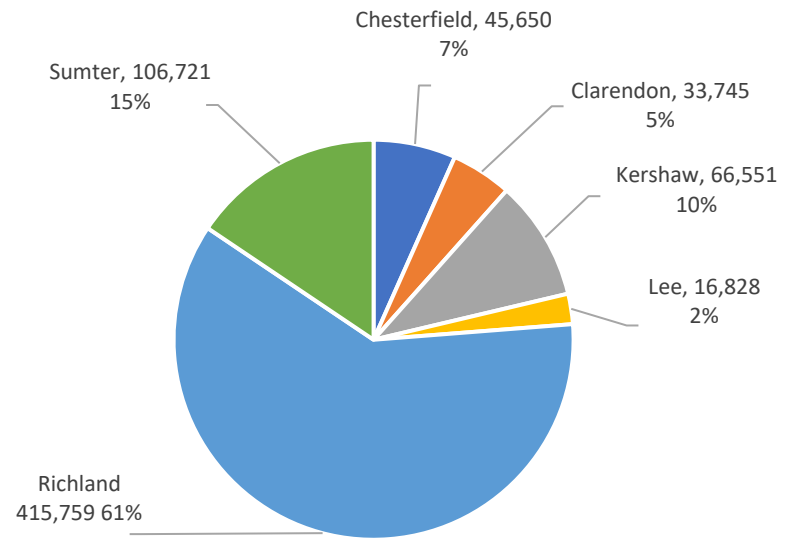
# Geopolitical Structure

- Three COGs in SLCUA

- “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.”

- CMCOG (51-member; 1-county)
- PDCOG (27-member; 1-county)
- SLCOG ( 29-member; 4-county)

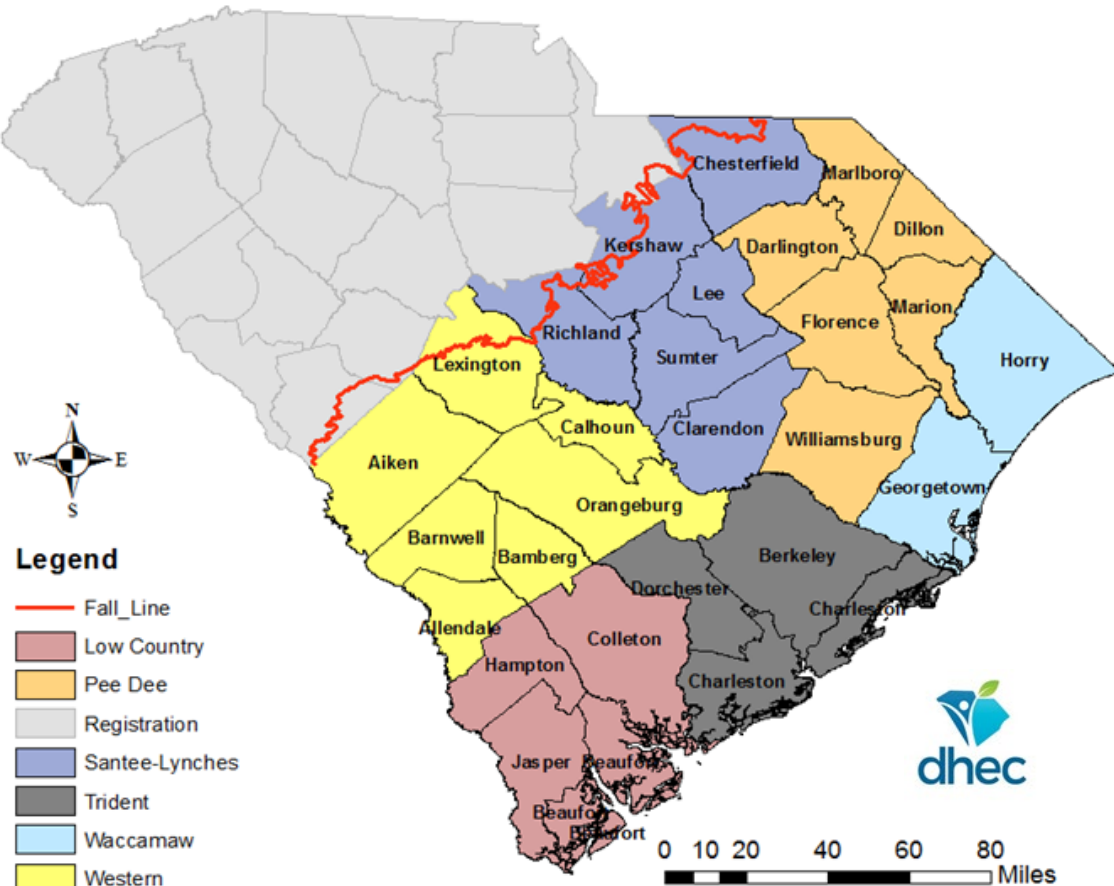
- Population: 685,254
- SCDHEC Has Permit Authority for All Withdrawals



- Forms of Government:

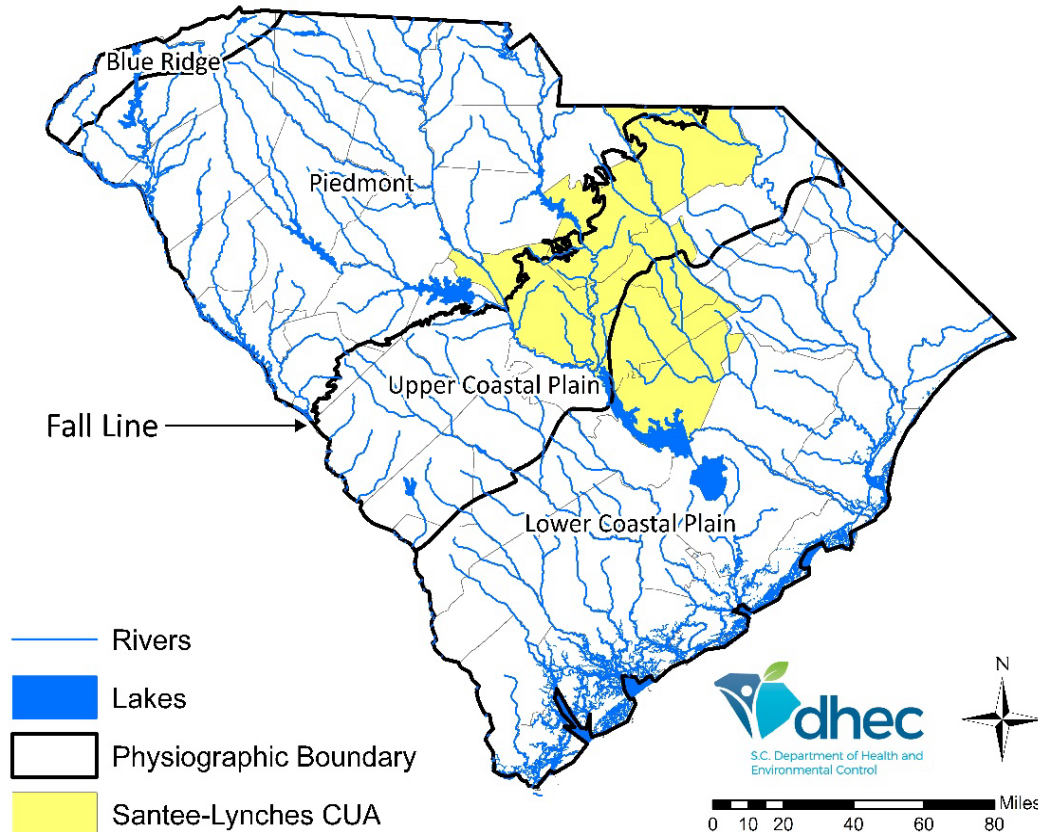
- Council-Administrator: Richland, Clarendon, Kershaw, Lee, Sumter
- Council: Chesterfield

# Regional Description



- 6-County Area
- Northeastern South Carolina
- Total Area: 4,104 mi<sup>2</sup>
  - Largest County: Chesterfield (805 mi<sup>2</sup>)
  - Smallest County: Lee (411 mi<sup>2</sup>)
  - Surface Water Area: 159.7 mi<sup>2</sup>
  - Largest SW Area: Lake Marion (90.2 mi<sup>2</sup>)
  - Smallest SW Area: Lake Robinson (1.7 mi<sup>2</sup>)
- **N-S: 93 mi / W-E: 84 mi**

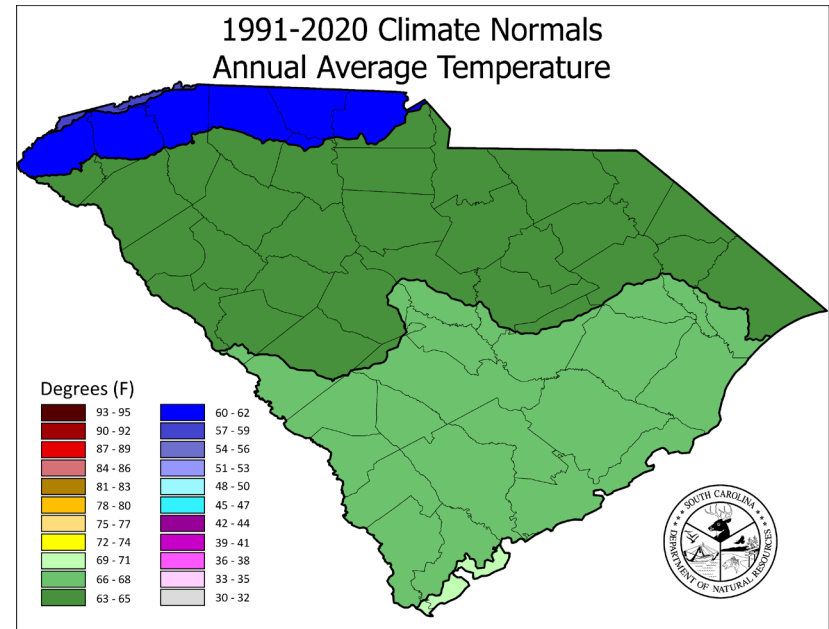
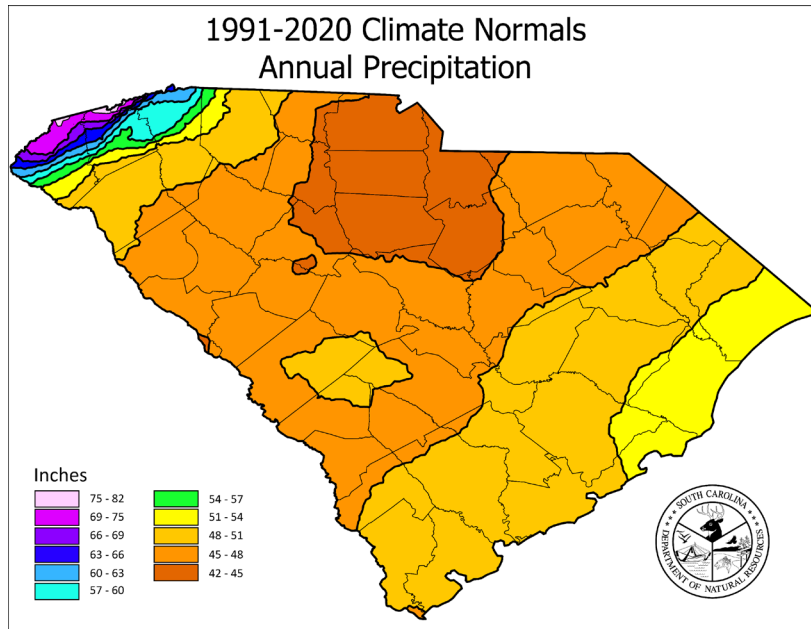
# Regional Description (cont.)



- Elevation: 25-720 ft Above MSL
- Generalized Geology
  - Fall Line »»»» Lower Coastal Plain
- 5/8 Major SC River Basins
  - Broad, Catawba, Pee Dee, Saluda, Santee
- Significant Rivers



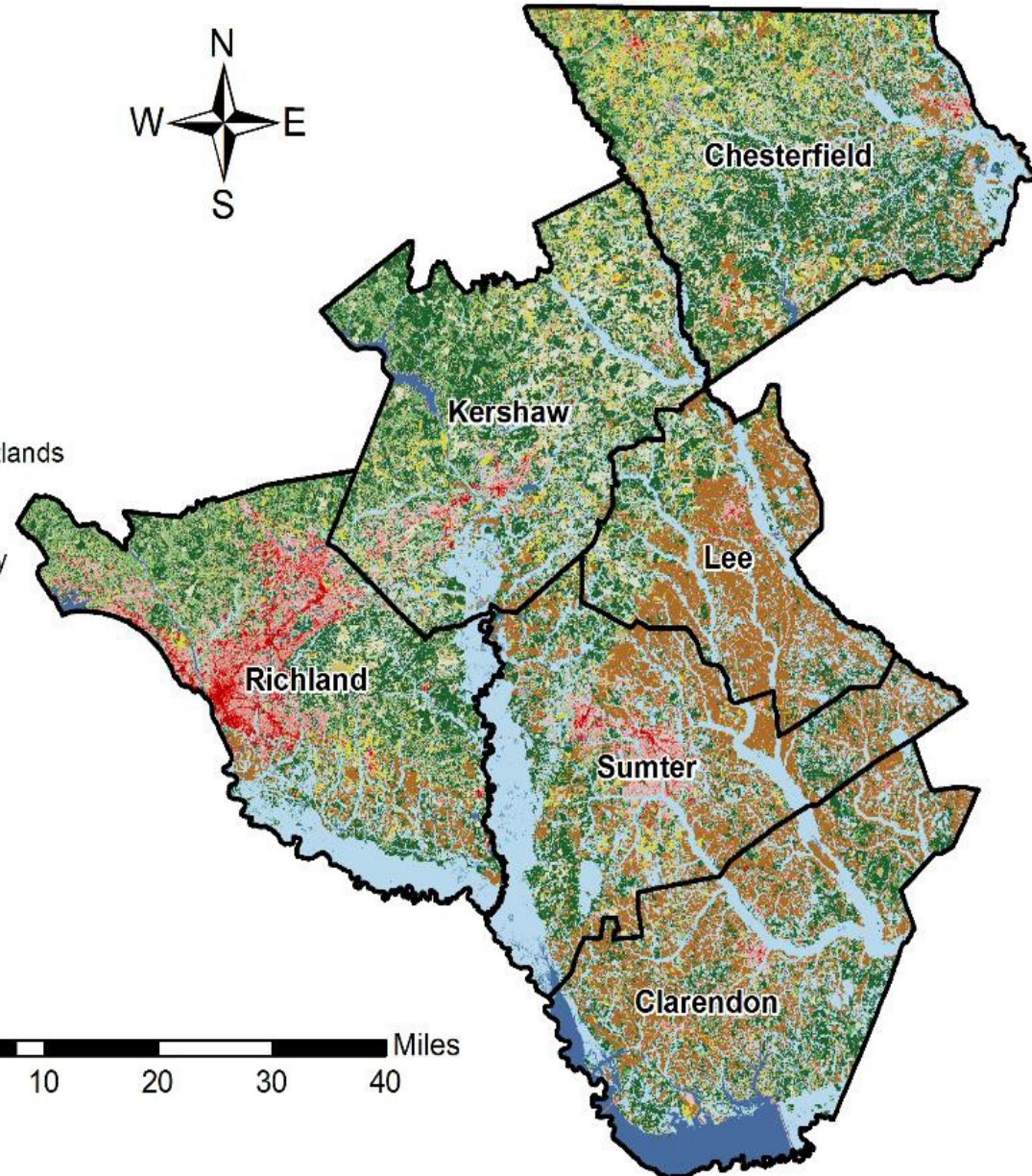
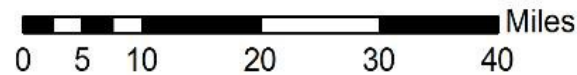
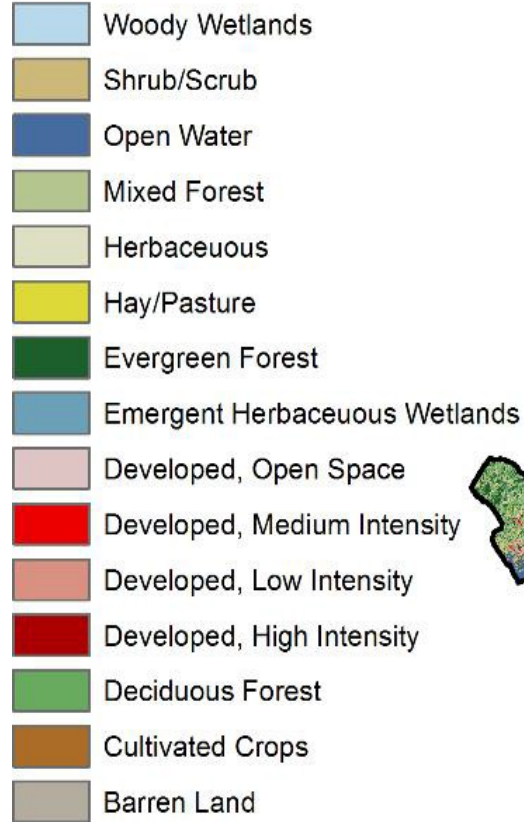
# Regional Description (cont.)

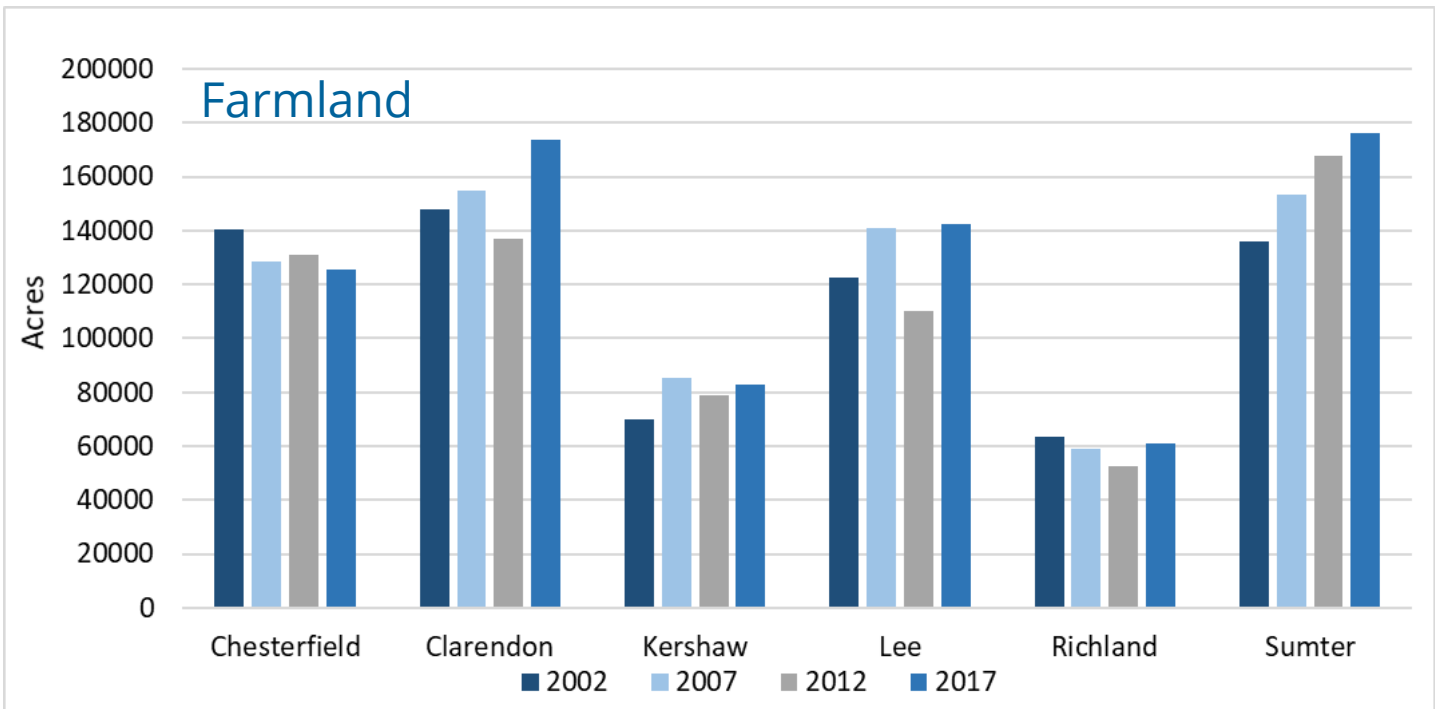
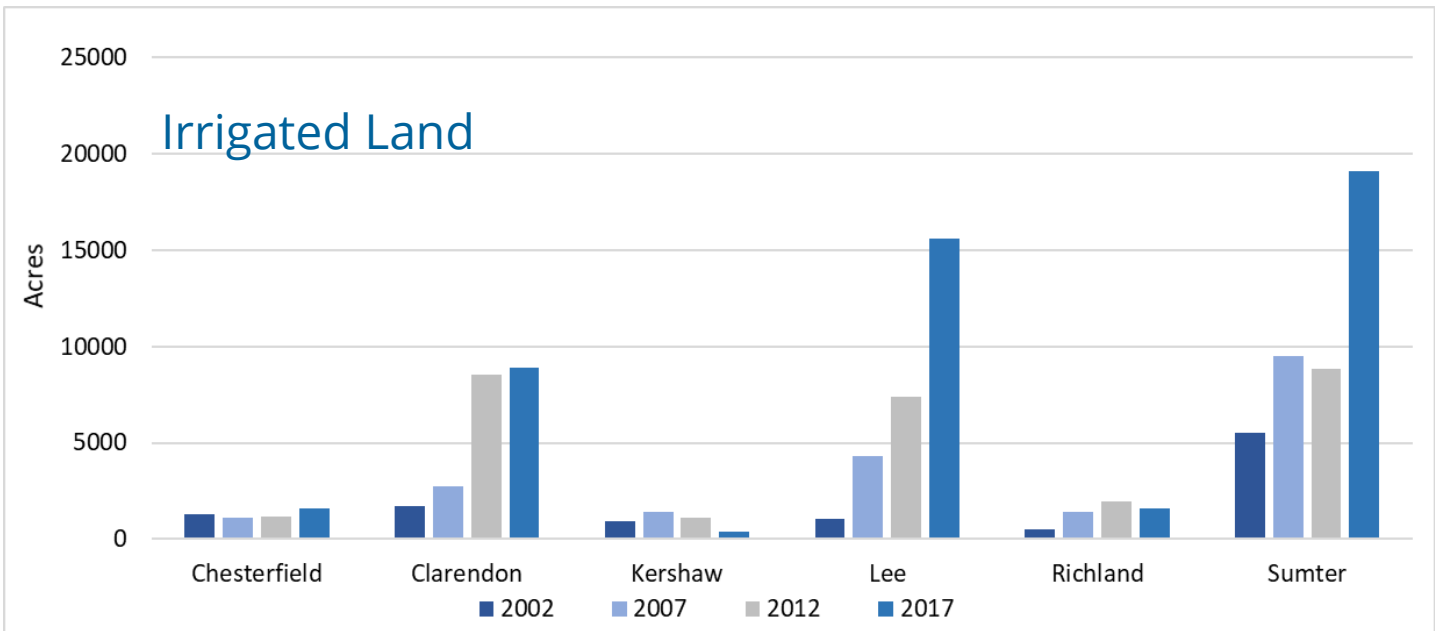


- Sub-Tropical Climate
- Warm Humid Summer
- Mild Winters
- Mountain/Ocean Influences
- Avg. Annual Temp.: 63.57°F
- Normal Max: 75.73°F
- Normal Min: 51.41°F
- Avg. Annual Precip.: 47.78 in

# Regional Description (cont.)

## NLCD 2016





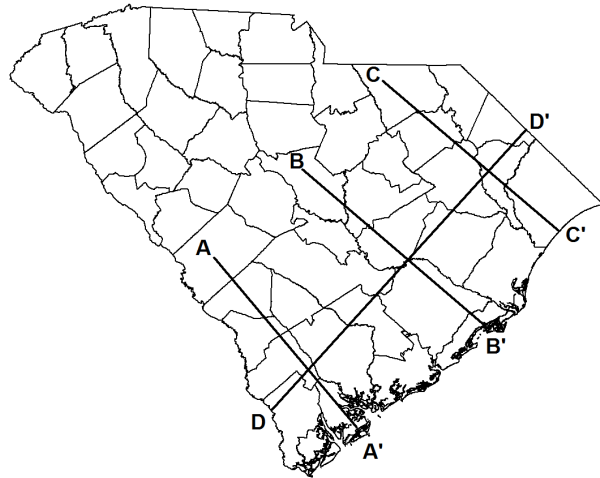
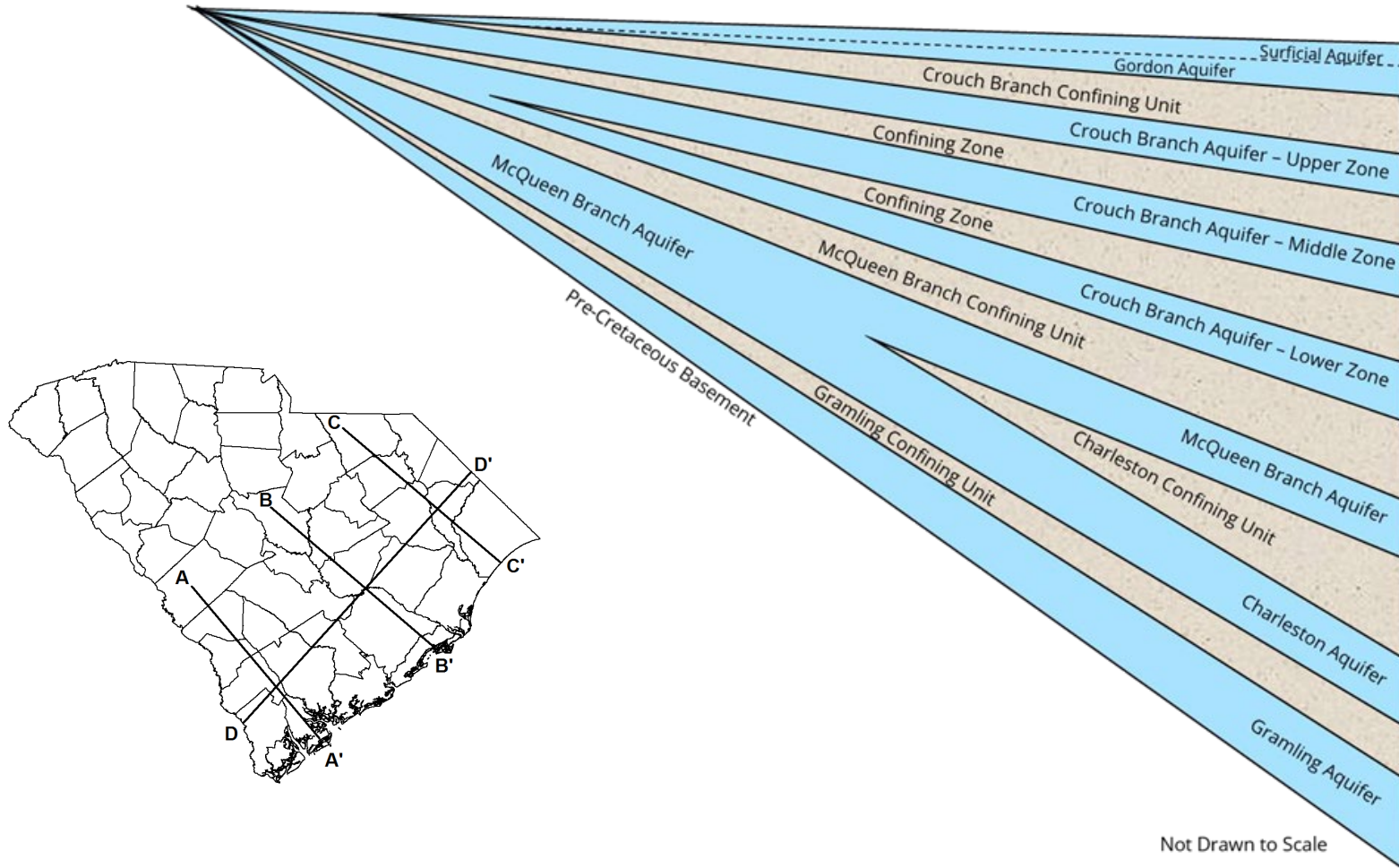
# Question

- What do we need to know regionally with regards to groundwater management?

# Hydrogeologic Setting

B  
(Northwest)  
Fall Line  
Richland Co.

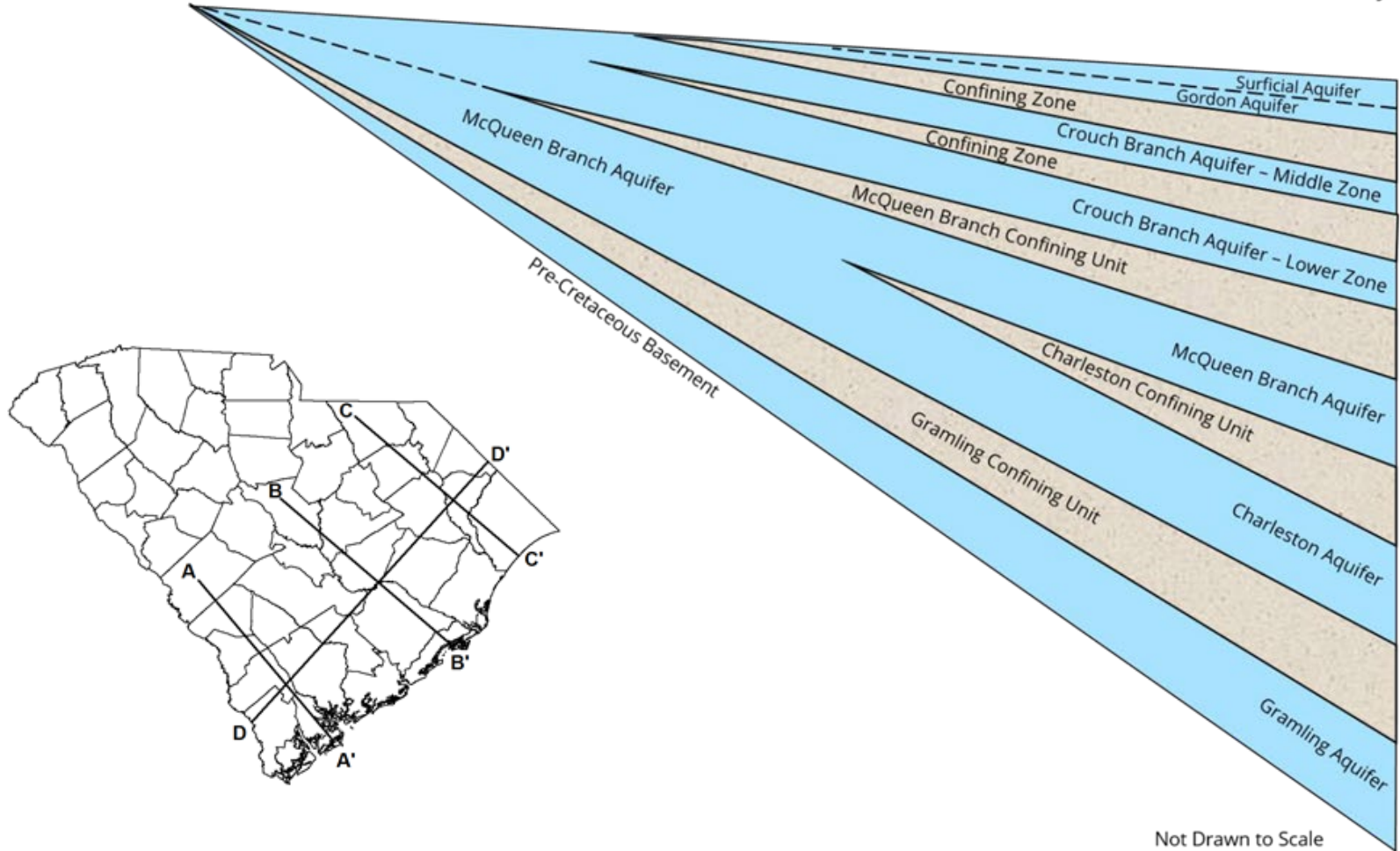
B'  
(Southeast)  
Coastline  
Charleston Co.



# Hydrogeologic Setting

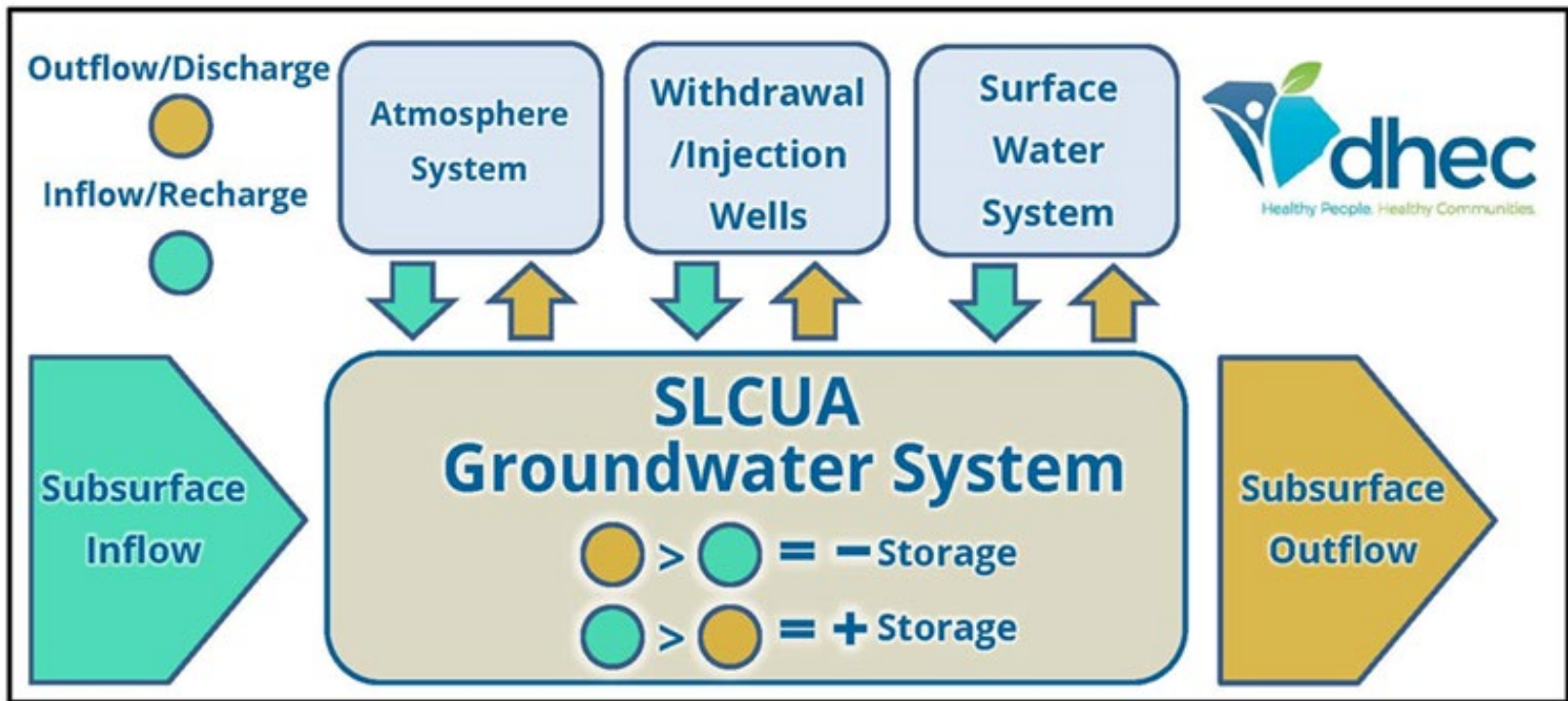
C  
(Northwest)  
Fall Line  
Chesterfield Co.

C'  
(Southeast)  
Coastline  
Horry Co.

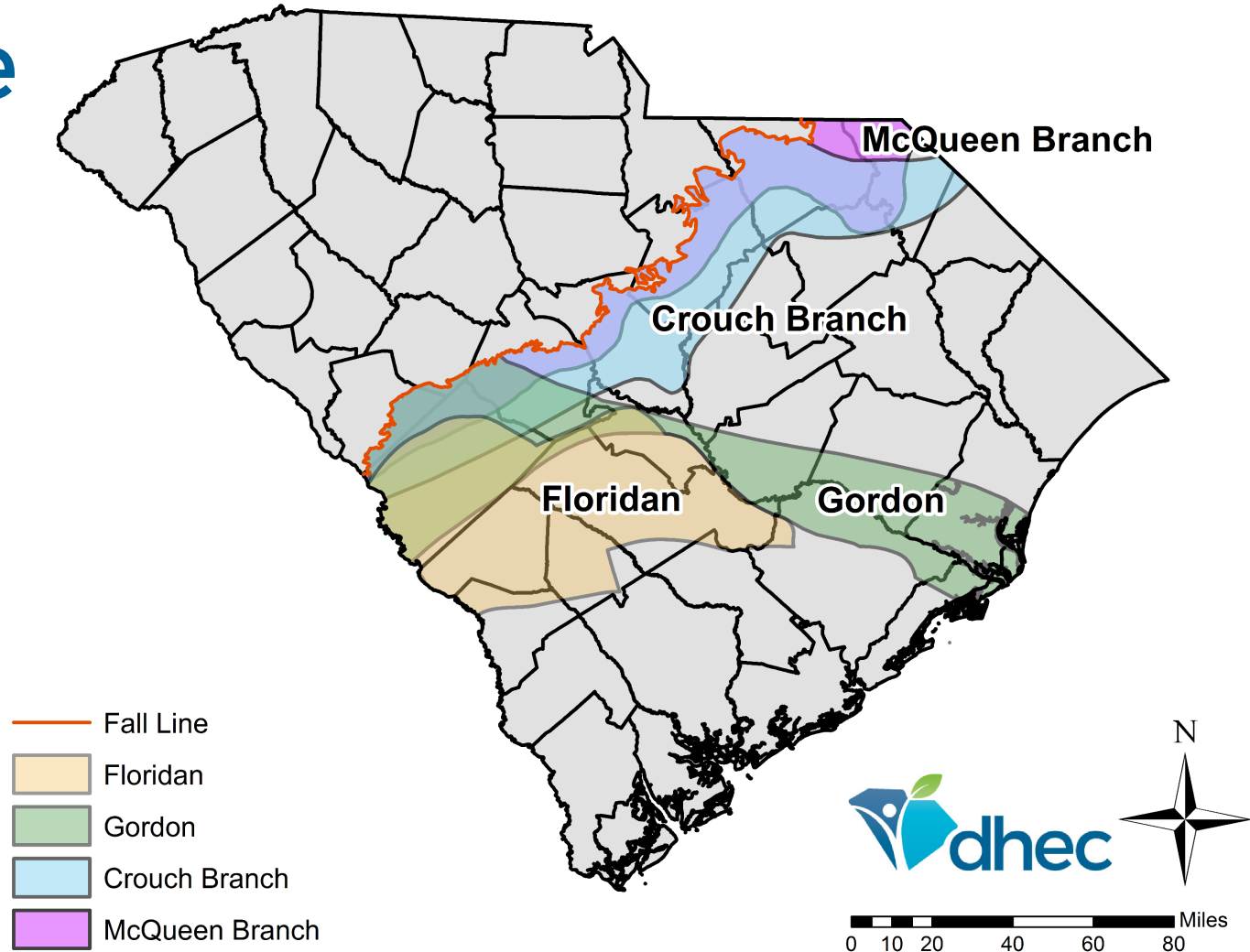


Not Drawn to Scale

# Recharge



# Recharge





# Question

- What questions or additional information on the Santee-Lynches region would be helpful?

# Strategy #1:

Identify areas where a leveling and/or reduction in pumping is appropriate.

- Gather the best available information on the geologic and hydrogeologic characteristics of the aquifer(s) and groundwater withdrawals
  - to protect against adverse effects on the aquifer(s) and water users

## Strategy #2:

Review of permit applications based on demonstrated reasonable use.

Proposed withdrawals will be evaluated considering:

- reasonableness of use/need
- aquifer(s) being utilized
- potential adverse effects on adjacent groundwater withdrawers
- previous reported water use
- anticipated demand
- availability of alternate water sources
- reported water use at facilities with similar activities
- Need a “Water Use Plan” or a “Best Management Strategy”

## Strategy #3:

Establish a comprehensive groundwater monitoring program.

- Water demand is increasing at an expanding rate.
- not stabilizing declines in aquifers 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 to facilitate using resources in designing and maintaining a monitoring network

## 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.

# 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.
- With more data, the regulations will be reviewed to ensure sufficient and adequate protection of the resource

Statutes, Laws, and Regulations

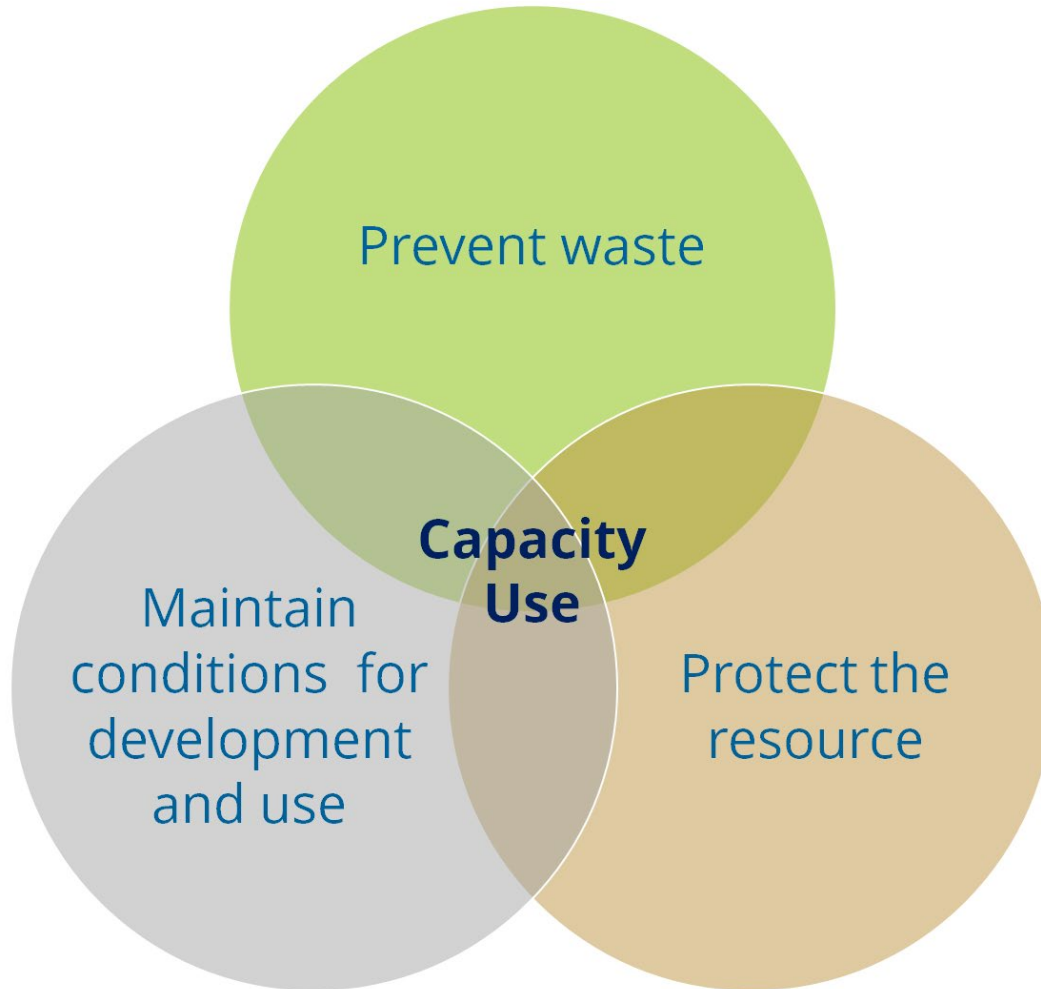
Groundwater Management  
Plans

Groundwater Evaluation  
Reports

Permits

SC Groundwater Use  
and Reporting Act (Chapter  
5, Section 49-5-60)







## What Strategies are Most Appropriate for the Santee-Lynches Region?

- Strategy #1: Identify areas where a leveling &/or reduction in pumping is appropriate.
- Strategy #2: Review of permit applications based on demonstrated reasonable use.
- Strategy #3: Establish a comprehensive groundwater monitoring program.
- Strategy #4: Establish a conservation educational plan for the general public and existing groundwater withdrawers.
- Strategy #5: Regulation and Planning.

# Next Steps

- How do we continue to share information with others and gather additional input on this groundwater management plan?



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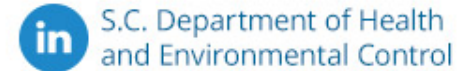
# Questions?

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## Stay Connected

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# Definitions

- **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
- **\*Farmland Acreage (USDA Definition):** 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
- **\*Irrigated Acreage (USDA Definition):** 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
- **Physiographic Province:** a region having a particular pattern of relief features or landforms that differs significantly from that of adjacent regions
- **\*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 SLCUA
- **\*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



## Elements of a Golf Course Irrigation Best Management Plan

Reasonable and appropriate conservation techniques, application processes, and alternative sources of water, including but not limited to, surface water(s) and/or availability of treated effluent, to minimize or eliminate groundwater sources. Examples may include but are not limited to:

- a. Determine soil type and monitor soil moisture to determine watering needs
- b. Determine weekly site-specific precipitation amounts using a centrally located rain gauge; adjust irrigation schedule accordingly
- c. Implement low-water demand landscaping
- d. Prevention of excessive water use by spot watering dry areas, using drip or trickle irrigation, and/or watering at night or early in the morning

Based on current and/or proposed withdrawal rates, provide reasonable and appropriate documentation that the proposed water use is necessary to the anticipated needs of the applicant **to include, but not limited to**, the following:

- a. Irrigated acreage (differentiating actual golf course areas and aesthetic landscaping)
- b. Water use per acre
- c. Calculated irrigation requirement (including available precipitation)
- d. Annual water use statistics
  - i. Monthly average
  - ii. Peak summer/winter consumption
- e. Nutrient and pest management strategy

**Please specify flow measurement method in this section.**

Maintenance schedule to preserve the integrity and deficient operation of water conveyance system(s). Examples may include but are not limited to:

- a. Routine inspections
- b. Meter installation, replacement, and calibration
- c. Leak detection and repair
- d. Upgrade old equipment with new water-efficient equipment

A statement specifying the beneficial use of the groundwater being withdrawn as necessary to meet the reasonable needs of the applicant.



## Elements of a Water Supply Best Management Plan

Reasonable and appropriate conservation techniques, application processes, and alternative sources of water, including but not limited to, surface water(s) and/or availability of treated effluent, to minimize or eliminate groundwater sources. Examples may include but are not limited to:

- a. Assessment of water supply alternatives, including implementation of water conservation and reuse practices, and the utilization of alternate sources, including purchasing water from adjacent facilities.
- b. Cross connection control program.
- c. Using a water loss modeling program.
- d. Reducing pressure seasonally and/or where available to reduce loss from background leaks.
- e. Monitor night flow measurements.
- f. Develop water balance by comparing water produced to water consumed.
- g. Metering individual pressure zones.
- h. Develop water utility rate structures that promote water conservation.
- i. Water bill structure and comparison- highlight historical use patterns for residential customers.
- j. Send water conservation notices using bill stuffers to customers.
- k. Promote customer low flow plumbing fixtures incentive programs.

**Please specify flow measurement method in this section.**

Based on current and/or proposed withdrawal rates, provide reasonable and appropriate documentation that the proposed water use is necessary to the anticipated needs of the applicant to include, but not limited to, the following;

- a. Population served,
- b. Anticipated growth,
- c. Annual water use statistics.

Maintenance schedule to preserve the integrity and deficient operation of water conveyance system(s). Examples to include:

- a. Develop and implement a metering program based on current AWWA practices and standards.
- b. Meter calibration/replacement.
- c. Install temporary or permanent leak noise detectors and loggers.
- d. Conducting water loss surveys to uncover long running leaks, underlying leaks masked by sounds of larger leaks, and new leaks.
- e. Reducing repair time on leaks.
- f. Performing annual inspection of facility.
- g. Performing annual maintenance of facility.

A statement specifying the beneficial use of the groundwater being withdrawn as necessary to meet the reasonable needs of the applicant

## Elements of an Agricultural Irrigation Best Management Plan

Reasonable and appropriate conservation techniques, application processes, and alternative sources of water, including but not limited to, surface water(s) and/or availability of treated effluent, to minimize or eliminate groundwater sources. Examples may include but are not limited to:

- a. Determine soil type and monitor soil moisture to determine watering needs
- b. Prevention of excessive water use by spot watering dry areas, using drip or trickle irrigation, and/or watering at night or early in the morning
- c. Utilize micro-irrigation wherever possible (ex. Drip emitters, soaker hoses, bubblers, or micro-sprayers)

Based on current and/or proposed withdrawal rates, provide reasonable and appropriate documentation that the proposed water use is necessary to the anticipated needs of the applicant **to include, but not limited to**, the following:

- - a. Irrigated acreage
  - b. Water use per acre
  - c. Major crops (with irrigated acreage for each crop)
  - d. Water use by crop (per acre)
  - e. Calculated irrigation requirement (including available precipitation)
  - f. Critical period growth requirements
  - g. Growing season
  - h. Nutrient and pest management strategy

**Please specify flow measurement method in this section.**

Maintenance schedule to preserve the integrity and deficient operation of water conveyance system(s). Examples may include but are not limited to:

- a. Routine inspections
- b. Meter installation, replacement, and calibration
- c. Leak detection and repair
- d. Upgrade old equipment with new water-efficient equipment

A statement specifying the beneficial use of the groundwater being withdrawn as necessary to meet the reasonable needs of the applicant.



## Elements of an Industrial Best Management Plan

Reasonable and appropriate conservation techniques, application processes, and alternative sources of water, including but not limited to, surface water(s) and/or availability of treated effluent, to minimize or eliminate groundwater sources. Examples may include but are not limited to:

- a. Establish programs to improve long-term efficiency of water use
- b. Clean products, equipment, and facility only when necessary, and utilize dry cleaning methods wherever possible
- c. Reuse water wherever possible by reclaiming wash and rinse water, reusing blow-down water, employing recirculation technology on reverse osmosis and deionized water systems, installing an evaporative cooling tower system, and/or reusing single-pass or cooling tower discharge
- d. Irrigate only when necessary or not at all

Based on current and/or proposed withdrawal rates, provide reasonable and appropriate documentation that the proposed water use is necessary to the anticipated needs of the applicant **to include, but not limited to**, the following:

- a. Industry type
- b. Anticipated growth
- c. Annual water use statistics
  - i. Monthly average
  - ii. Peak summer/winter consumption

**Please specify flow measurement method in this section.**

Maintenance schedule to preserve the integrity and deficient operation of water conveyance system(s). Examples may include but are not limited to:

- a. Routine inspections
- b. Meter installation, replacement, and calibration
- c. Leak detection and repair
- d. Upgrade old equipment with new water-efficient equipment

A statement specifying the beneficial use of the groundwater being withdrawn as necessary to meet the reasonable needs of the applicant.



## 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 Santee-Lynches CUA



## 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.

## Strategy #3:

Establish a comprehensive groundwater monitoring program.

With increased population and a growing industrial base, water demand 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 Santee-Lynches CUA.

# 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 will be reviewed to ensure that sufficient and adequate protection of the resource is provided.