SC DEPARTMENT *of*
ENVIRONMENTAL
SERVICES

SCAC Fall Advocacy Meeting

October 27, 2026



Size and Types of Data Centers

- **Enterprise data centers –** owned by a single organization for its own use such as banks, hospitals, universities, government agencies
- **Colocation data centers –** facilities that rent IT space to businesses within a building that is supplying power, cooling and security while the customers supply their servers.
- **Hyperscale data centers** – These are the largest type usually built by Google, Amazon Web Services, Meta, Microsoft. These require 100 -500 mw will have several buildings per site.
- **AI training and high-performance computing campuses –** Large hyperscale data centers used to train AI models and can use 500-2000 mw.

3 types of cooling systems

- These are the most well-known cooling systems for data centers. Some of which are used in the data centers we have right here in South Carolina.
- Air conditioning
- Water (evaporative and direct-to-chip)
- Dielectric liquid

(1 and 2 Phase liquid immersion Cooling)



Air conditioning



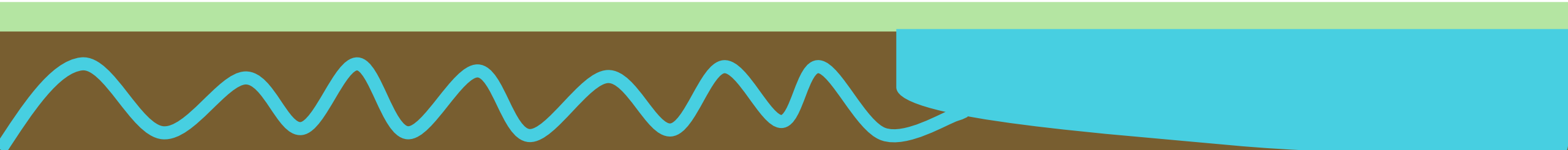
Pulling hot air through a condenser fan and blows out cold air.



Uses energy- which requires water.

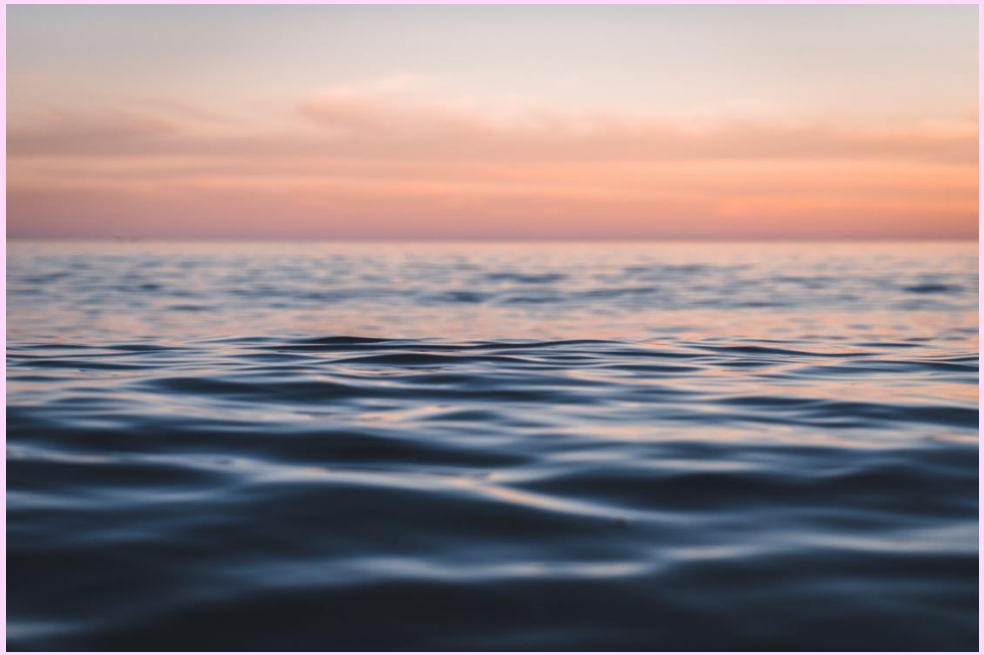


Used in smaller data centers with slower computers.



Water cooling

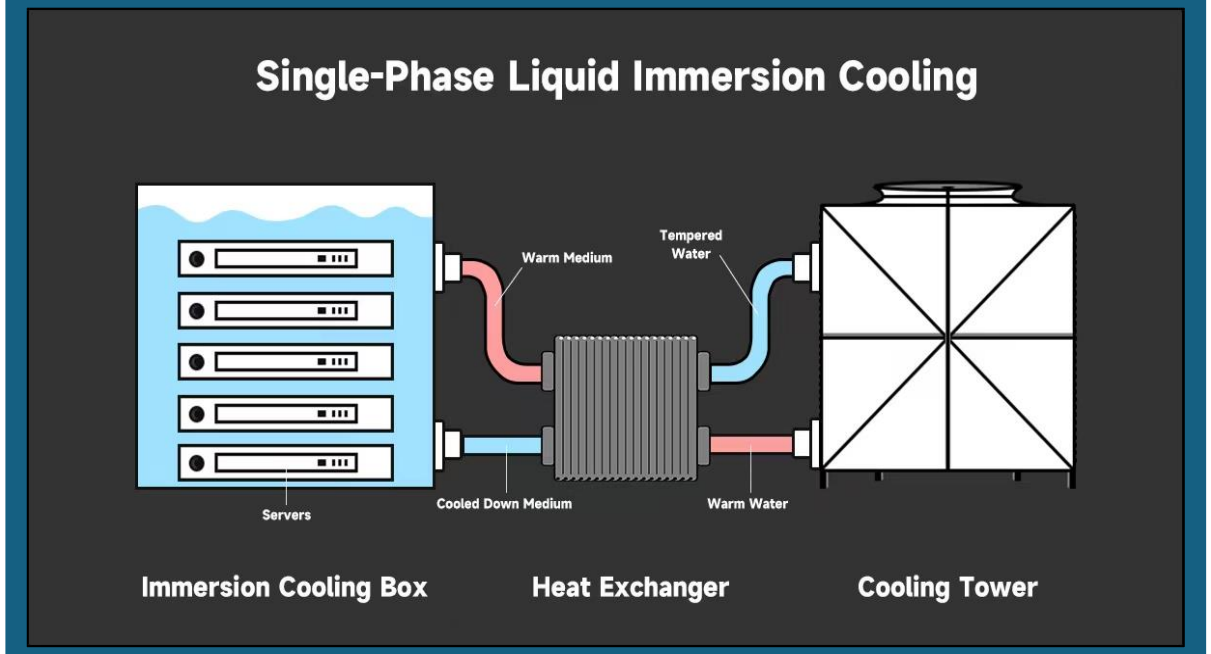
- Evaporative cooling: Pulling hot dry air through water-saturated cooling pads. Much of the water evaporates. Leading to brine and waste.



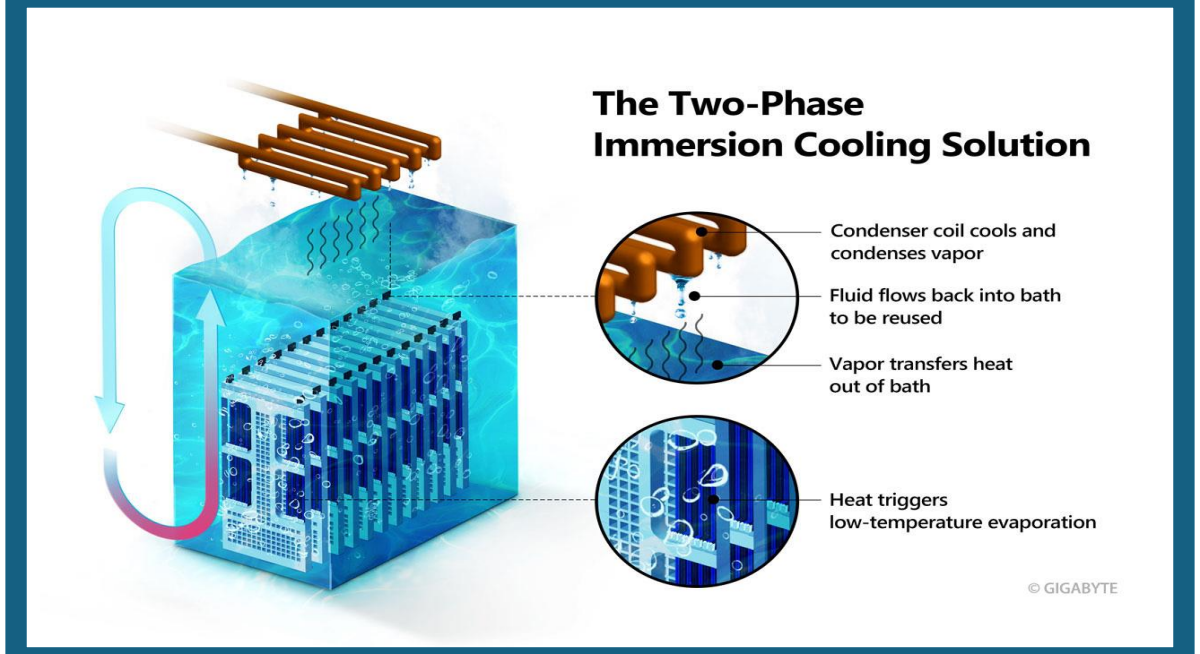


Direct-to-chip cooling: CPU and GPU get super hot, water blocks are placed on top of, next to, or below these components.

Dielectric liquid (1 and 2 PIC)



- In 1PIC, The computer components are submerged in dielectric liquid – a liquid that holds a very high boiling point (141.8 Fahrenheit). When the liquid absorbs the heat from the machines, it will run through pipes to a cooling station where cold air is pushed through, to cool the liquid down for reuse.



- In 2PIC, the computer parts are still submerged, but the dielectric liquid vaporizes when it is heated. The vaporization does not allow for reuse of that dielectric liquid. Even so, 2PIC is considered more efficient than 1PIC because it allows smaller amounts of liquid to carry more heat before being released.



2025 SOUTH CAROLINA STATE WATER PLAN

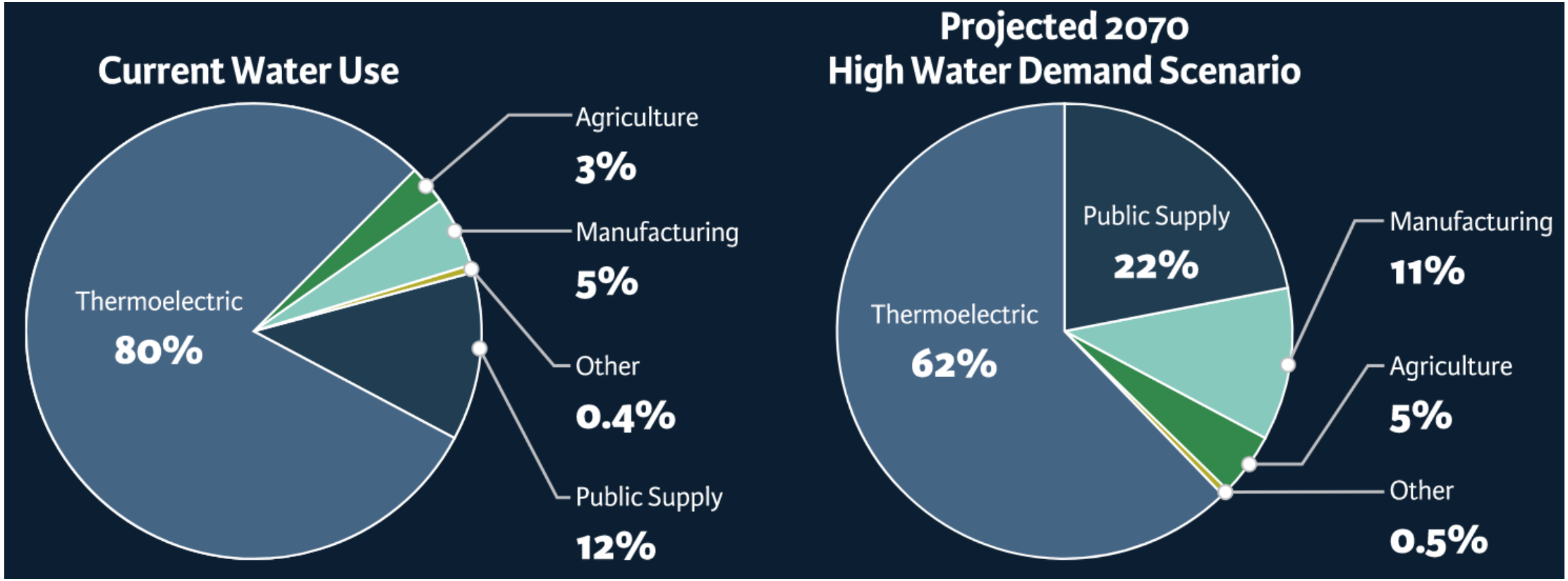
THIRD EDITION



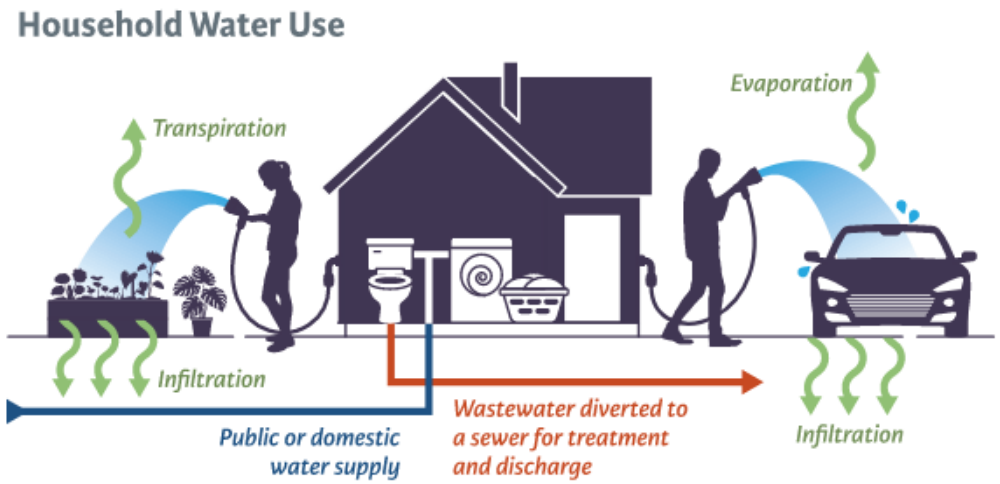




Summary of Current and Future Water Demand

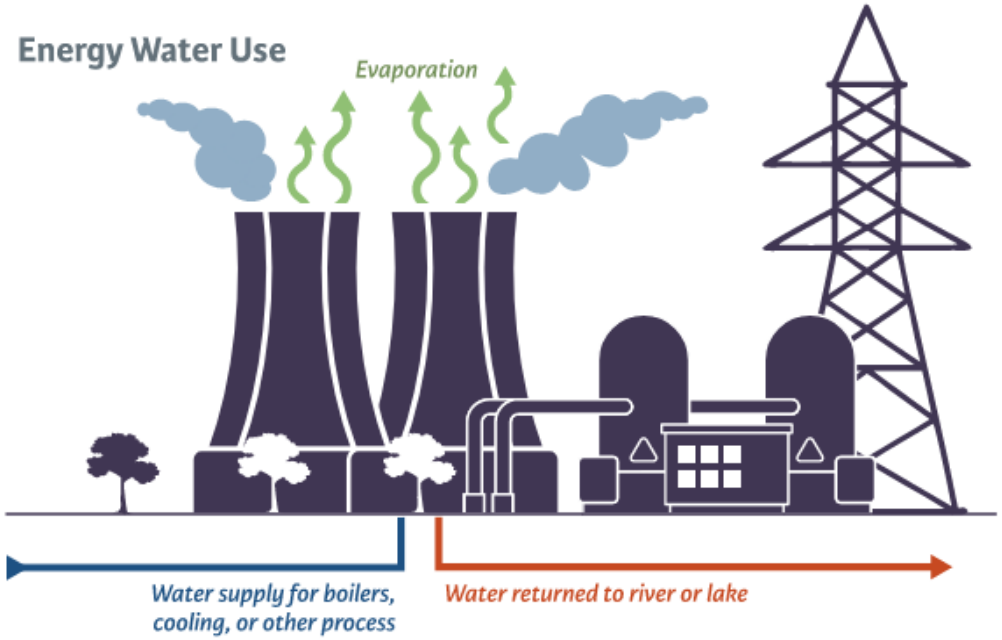


Consumptive and Nonconsumptive Water Use



*Watering a garden and washing a car are examples of **consumptive use** of water, since the water is lost to evaporation, used in transpiration, or infiltrates into the ground.*

*Flushing a toilet and washing clothes are examples of **nonconsumptive use**, assuming the water is collected via a sewer system, treated at a water reclamation facility, and discharge to a river or lake.*



*In South Carolina, about 94 percent of water that is used for thermoelectric energy generation is returned to a river or lake, representing **nonconsumptive use**, and 6 percent is lost to evaporation, representing **consumptive use**.*

Energy Production Uncertainties

- With the increasing use of cloud computing, artificial intelligence, and cryptocurrency mining, data centers have just recently become a more prominent user of energy and water and represent an uncertainty in future demands.
- Future planning cycles will assess the total and consumptive water use of any newly proposed energy-producing facilities and will continue to revisit and address how data centers impact water use in South Carolina.



Richard B. Russell Dam and Hydropower Facility

Water Withdrawal Regulations

- R.61-113 – Groundwater Use and Reporting

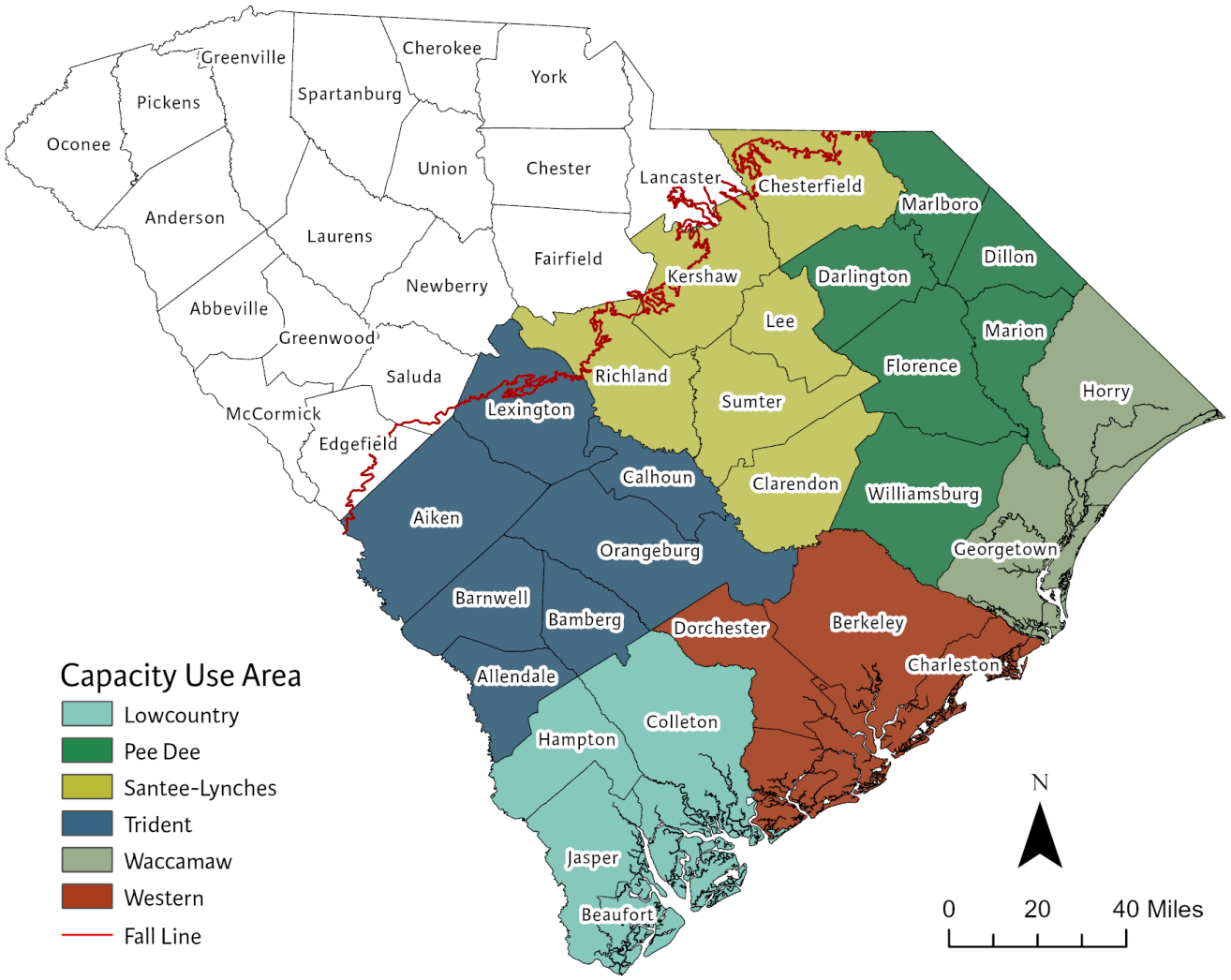
  Anyone withdrawing 3 million gallons a month from a well or group of wells under common ownership is required to be Registered/Permitted and report their monthly withdrawal annually

- R.61-119 – Surface Water Withdrawal, Permitting, Use and Reporting

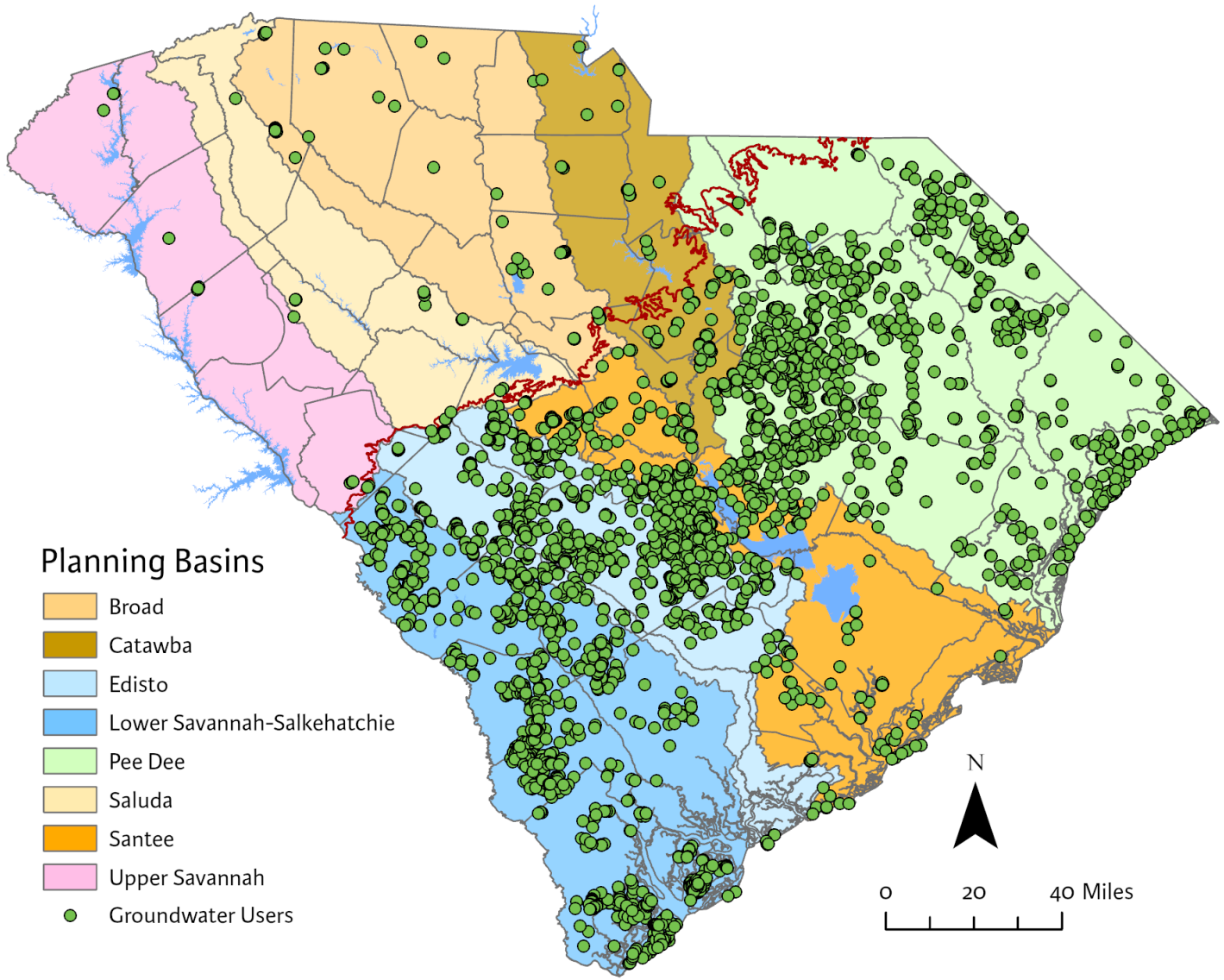
  Anyone withdrawing 3 million gallons a month from an intake or group of intakes under common ownership is required to be Registered/Permitted and report their monthly withdrawal annually

Groundwater Capacity Use Areas (CUAs)

- 6 Capacity Use Areas
- Areas are reviewed on a 5-year rotating schedule
- Withdrawal Permits are renewed every 5 years

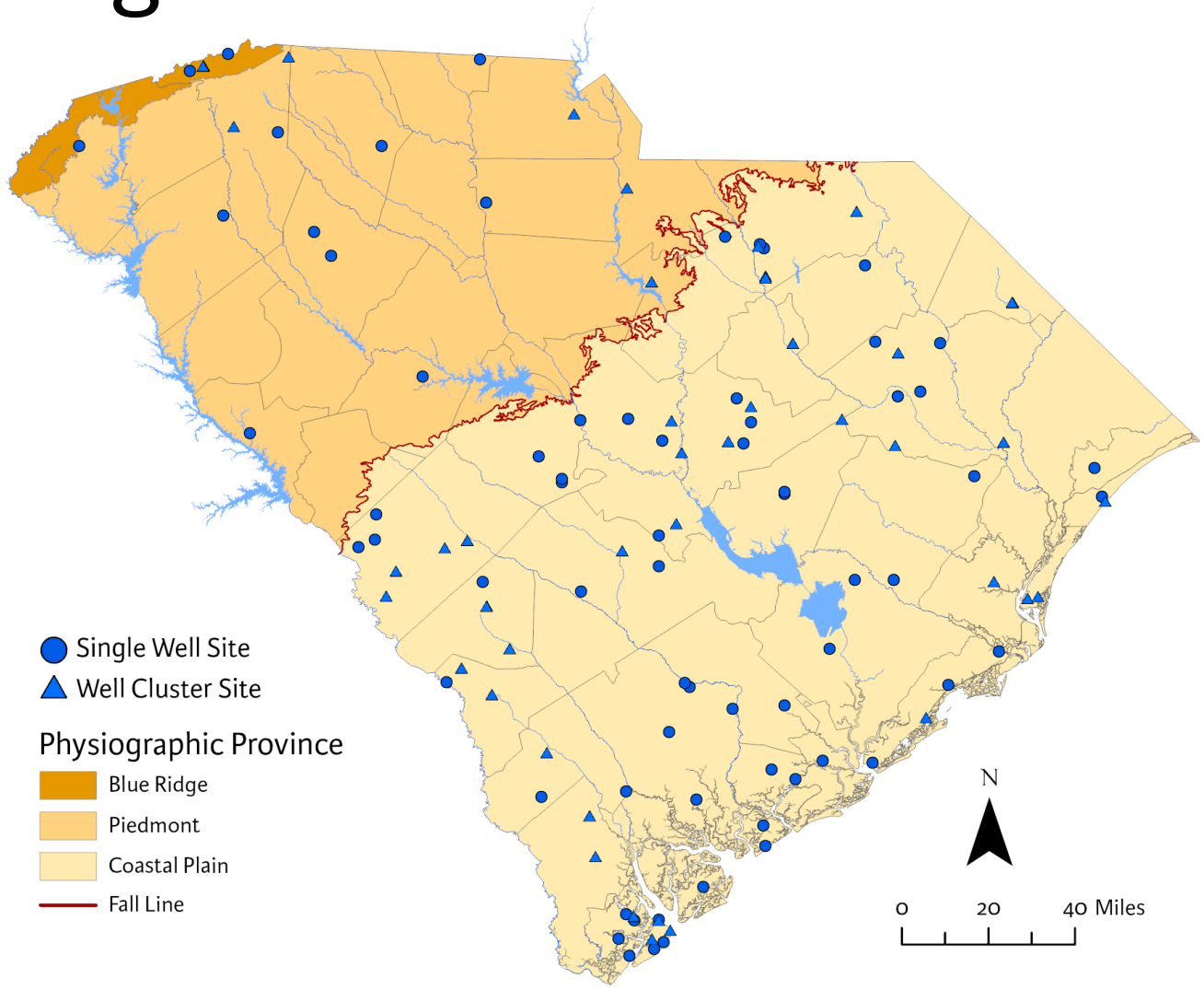


Permitted & Registered Groundwater Users

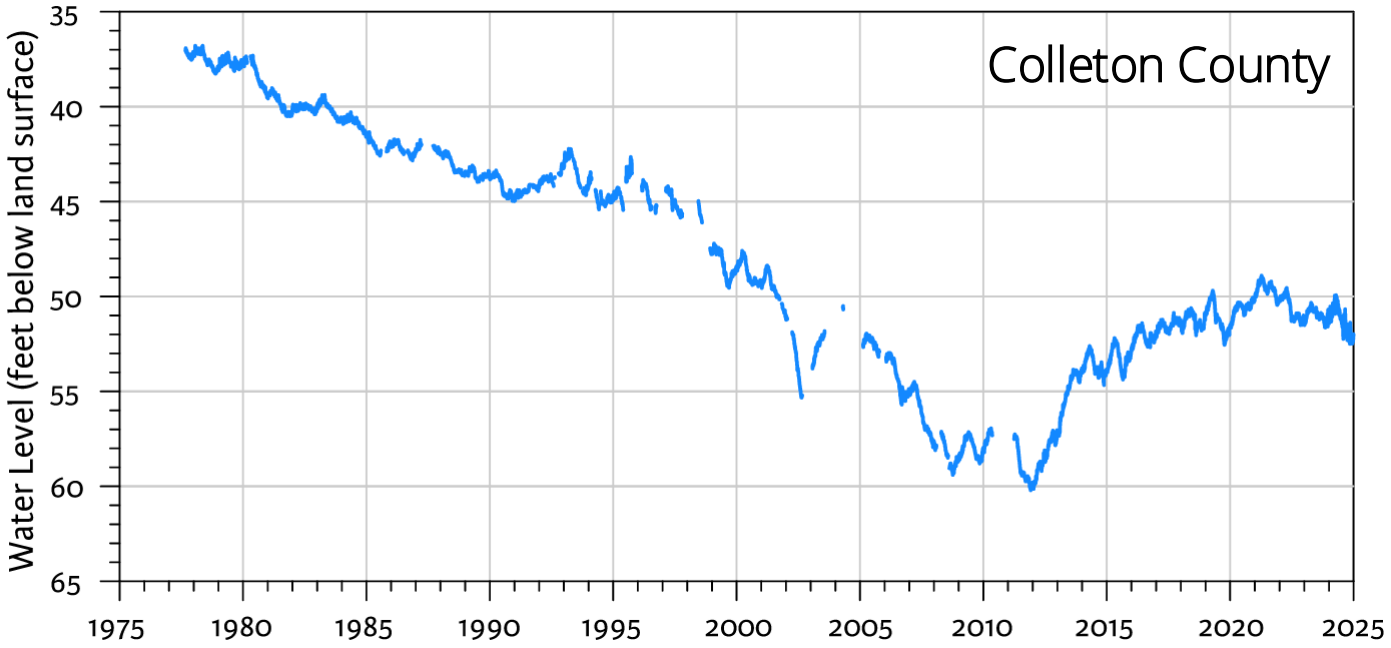


Groundwater Monitoring Network

- SCDES regularly monitors approximately 190 wells at more than 100 sites, almost all of which are in the Coastal Plain.
- USGS monitors another 20 wells in South Carolina.
- Wells monitor different aquifers.
- Used for monitoring saltwater intrusion.



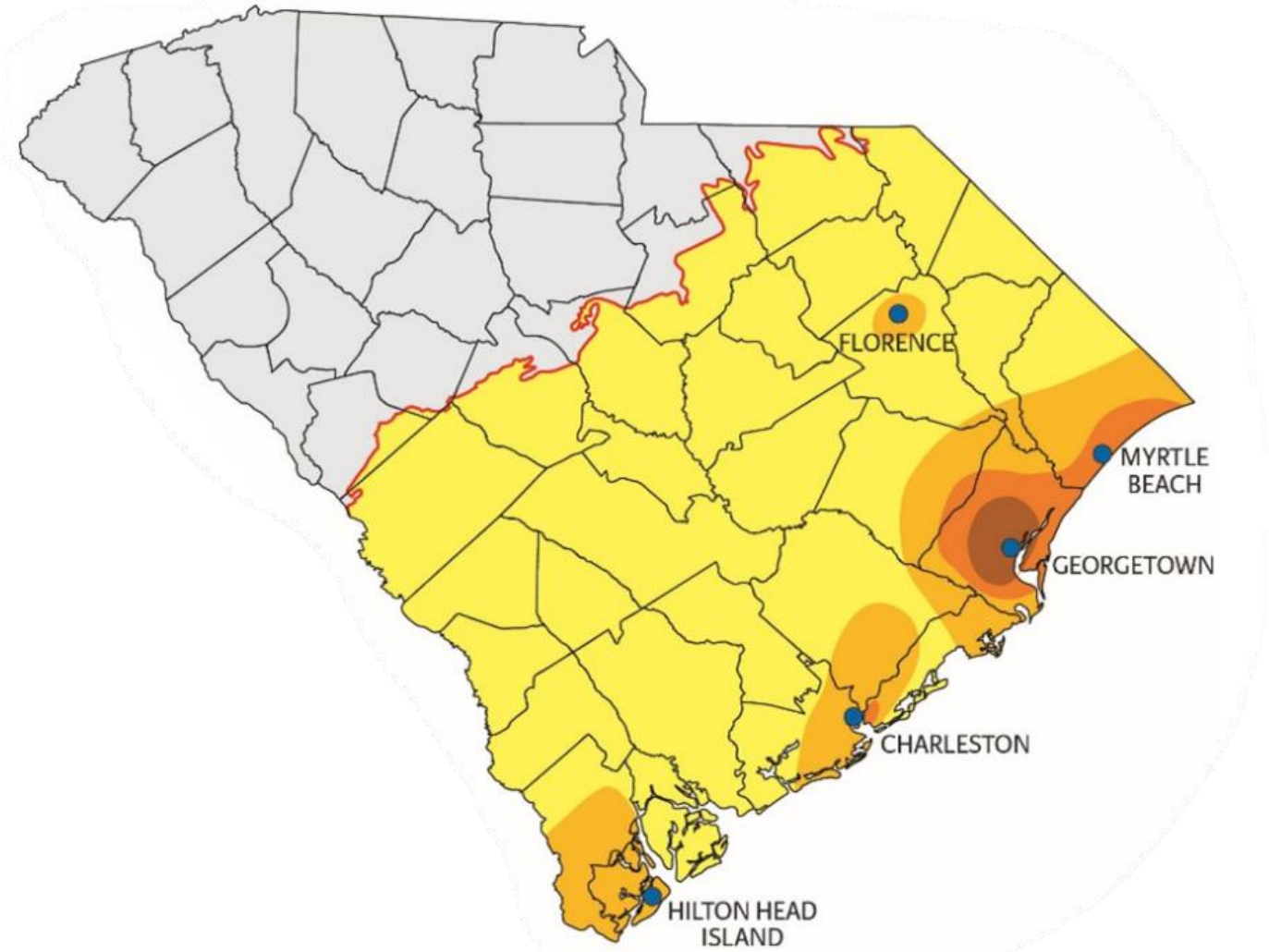
Groundwater Monitoring Network



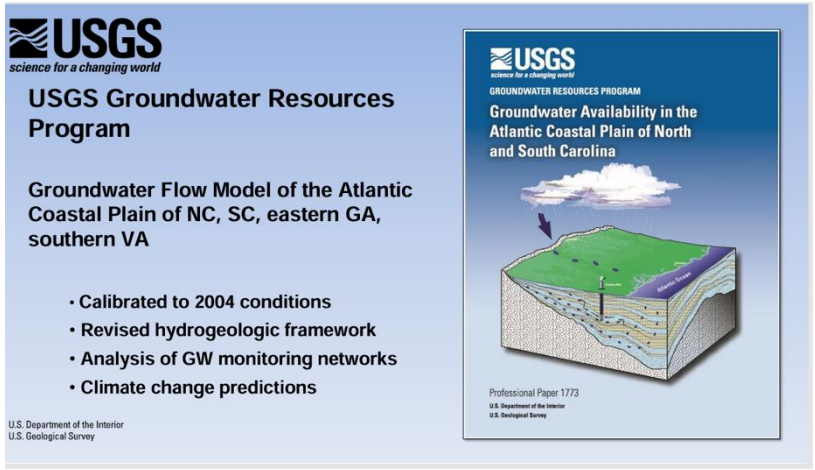
- Declining **groundwater levels** indicate the amount of water stored in an aquifer is decreasing.
- SCDES typically produces new potentiometric maps for the **Floridan, Gordon, Crouch Branch, McQueen Branch** and **Charleston aquifers** every 3 years.

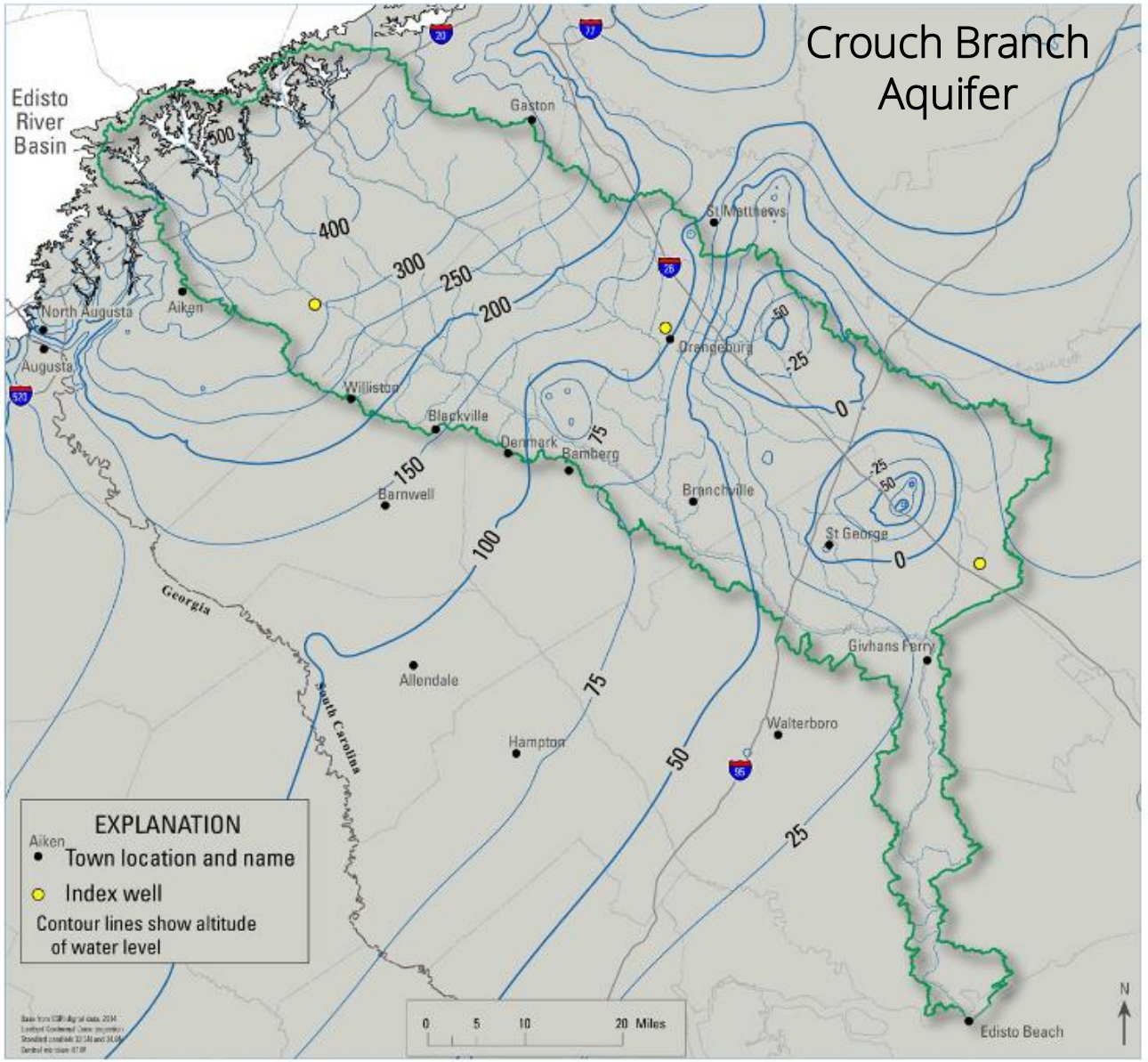
Groundwater Level Declines

- Groundwater level declines from predevelopment water levels have occurred in the South Carolina Coastal Plain aquifer system.
- Although these cones of depression occur in different aquifers and have developed at different times, they all occur where groundwater use is concentrated near city centers.



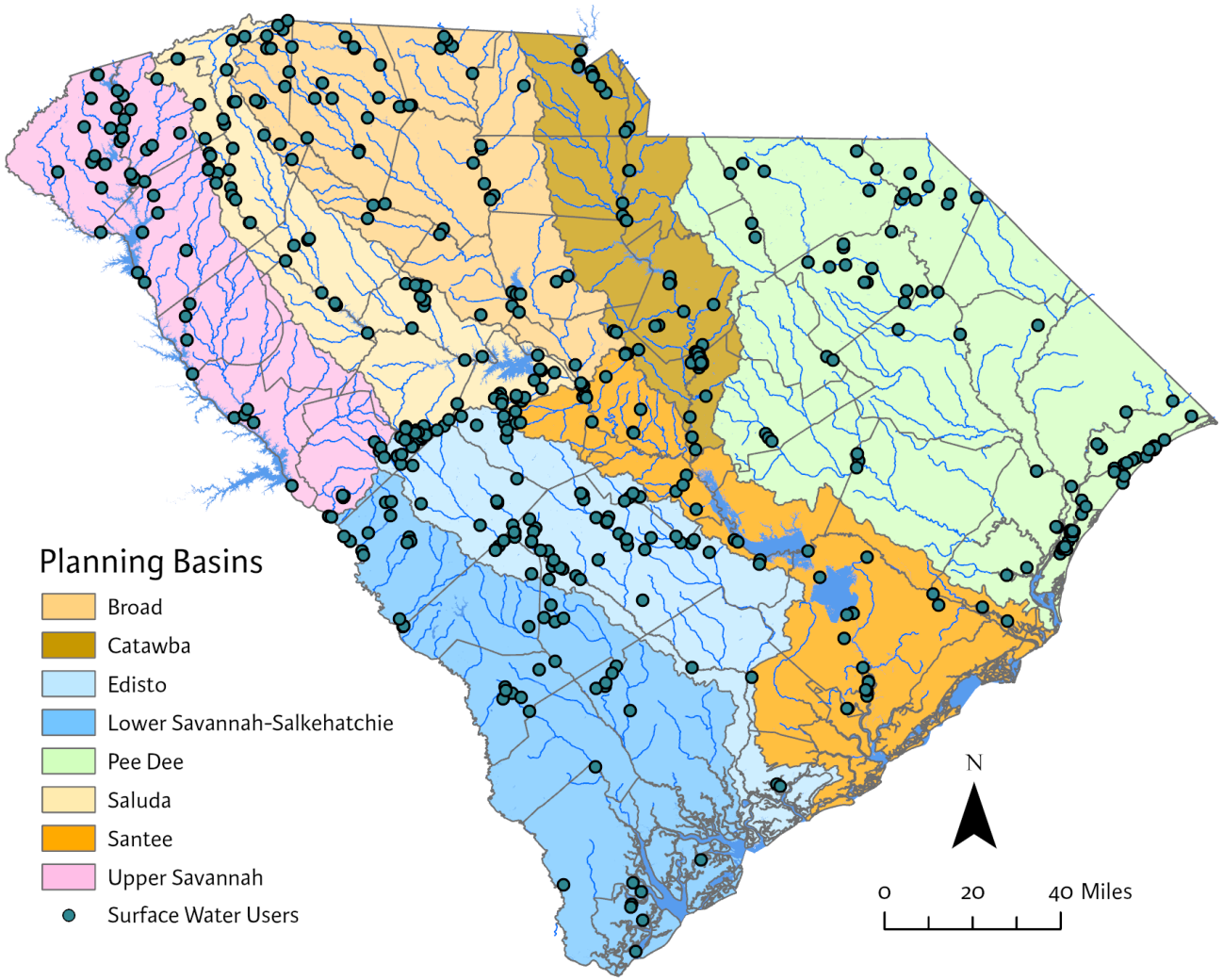
Coastal Plain Groundwater Model





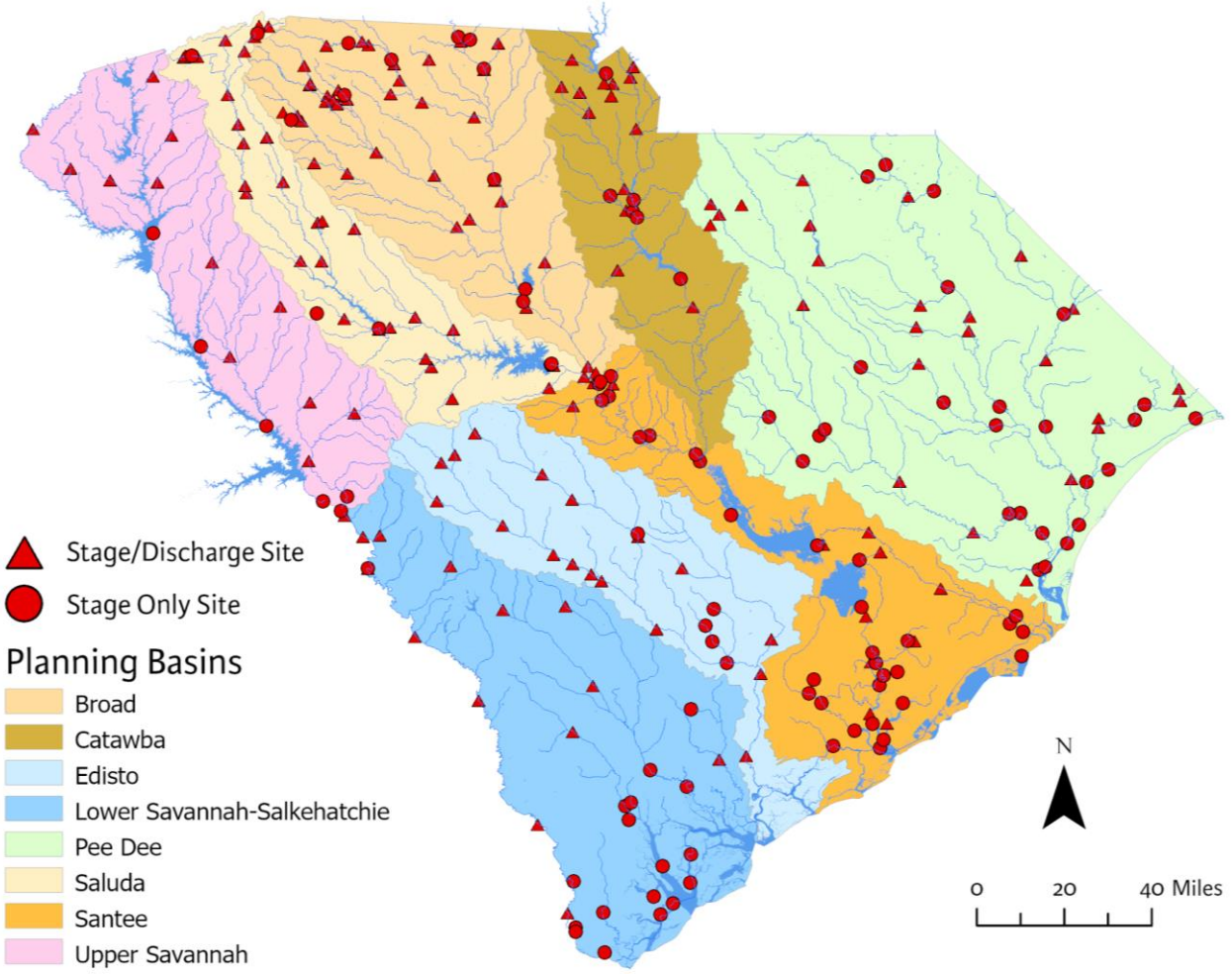
Permitted or Registered Surface Water Withdrawals

- Surface water withdrawers obtain a permit or registration.
- Permits are issued for a duration of 20 to 50 years
- Agricultural Registrations have no expiration date.



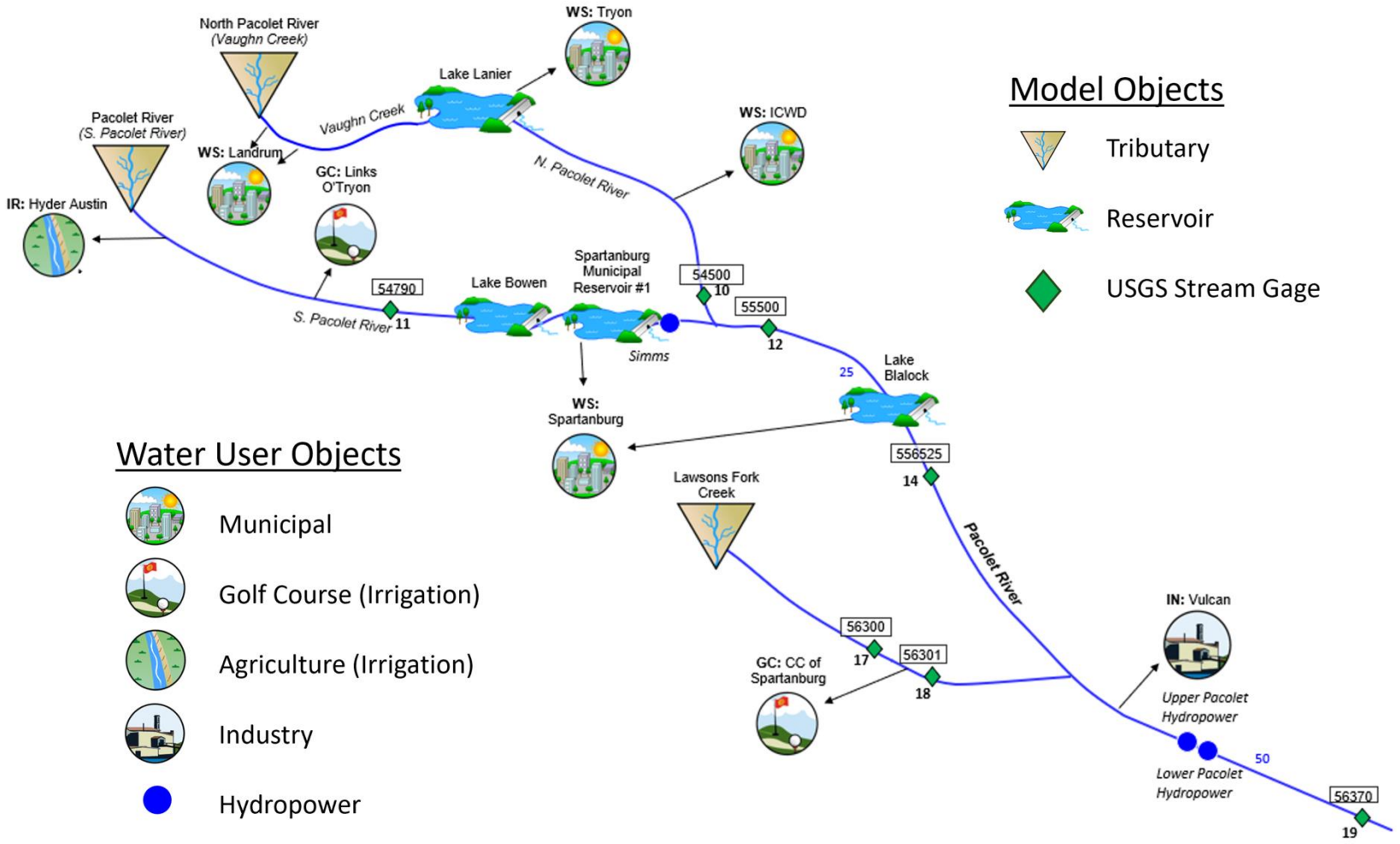
Surface Water Monitoring Network

- 275 USGS gages, with most measuring stream stage and stream discharge and the remaining gages measuring stage only.
- Streamflow data are critical to activities such as:
  - Drought assessments
  - Determining low-flow statistics
  - Ecological flow assessments
  - Flood frequency studies and forecasting



Surface Water Models

The ***Surface Water Allocation Model (SWAM)*** computes water availability at user-defined nodes in a networked river system.



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