SC DEPARTMENT of ENVIRONMENTAL SERVICES

Water Demand Projections – Santee Basin

Scott Harder, Hydrology Section Manager

Bureau of Water, South Carolina Department of Environmental Services

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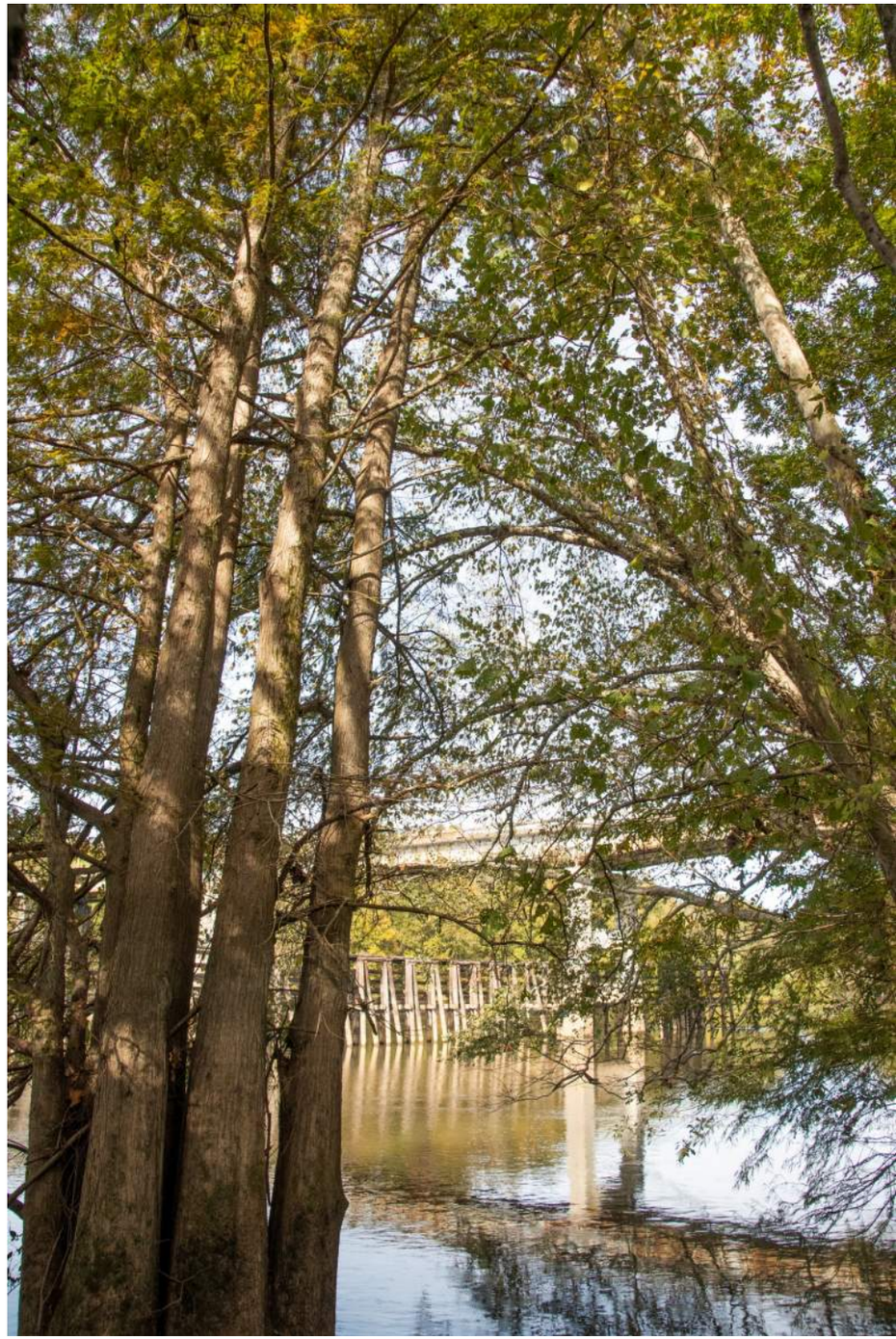
Santee River Basin Council

Meeting #5, Moncks Corner, SC



Forecasts vs Projections

Forecast

- Educated guess.
- Based on expected conditions and actions.
- Timeframe limited by predictability of future conditions.
- Aim to be accurate.

Projection

- Extrapolation of trend.
- Based on hypothetical scenarios.
- Timeframe can extend beyond the limits of effective forecasting.
- Aim to be informative.

Projection Methodologies

- Methods described in the following report:
  - **Pellet, A. *Projection Methods for Off-stream Water Demand in South Carolina*. SC Department of Natural Resources. 2019. 61 pages.**
  - Minor revisions to methods have been made for some basins.
- General equation:

Projected Demand = (Baseline Demand) X (Driver Variable)

- Three projection scenarios based on different combinations of Baseline Demand estimates and Driver Variable growth rates.
- **Baseline Demand**: based on either *monthly median* water demands or *monthly maximum* water demands as determined from 2013-2023 reported water use.

Driver Variables

Water Use Category	Driver Variable
Public Water Supply	Population
Manufacturing/Industry	Economic Growth
Thermoelectric Power	Electricity Production
Agriculture/Golf Courses	Irrigated Acres

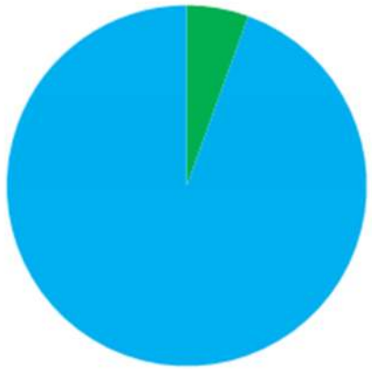
Projection Scenarios

- **Moderate Projection Scenario**: Baseline Demand is based on *monthly median* withdrawal volumes and a "moderate" (business-as-usual) growth rate for the Driver Variable.
- **High Demand Projection Scenario**: Baseline Demand is based on *monthly maximum* withdrawal volumes and an "aggressive" growth rate for the Driver Variable.
- **High Growth Projection Scenario** (*for comparison purposes only*): Baseline Demand is based on *monthly median* withdrawal volumes and an "aggressive" growth rate for the Driver Variable (*not* used in surface water simulations).

Assumptions behind "moderate" and "aggressive" growth rates for each Driver Variable were presented last meeting.

2023 Lower Santee Water Use

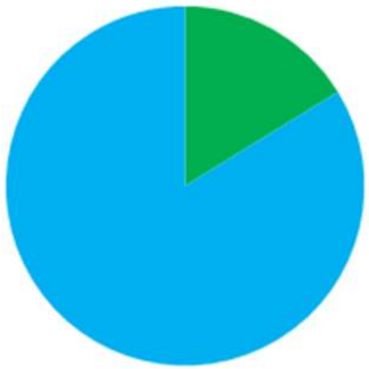
- Both surface water and groundwater are important resources in the basin.



Including Energy

SW : 94% (438 MGD)

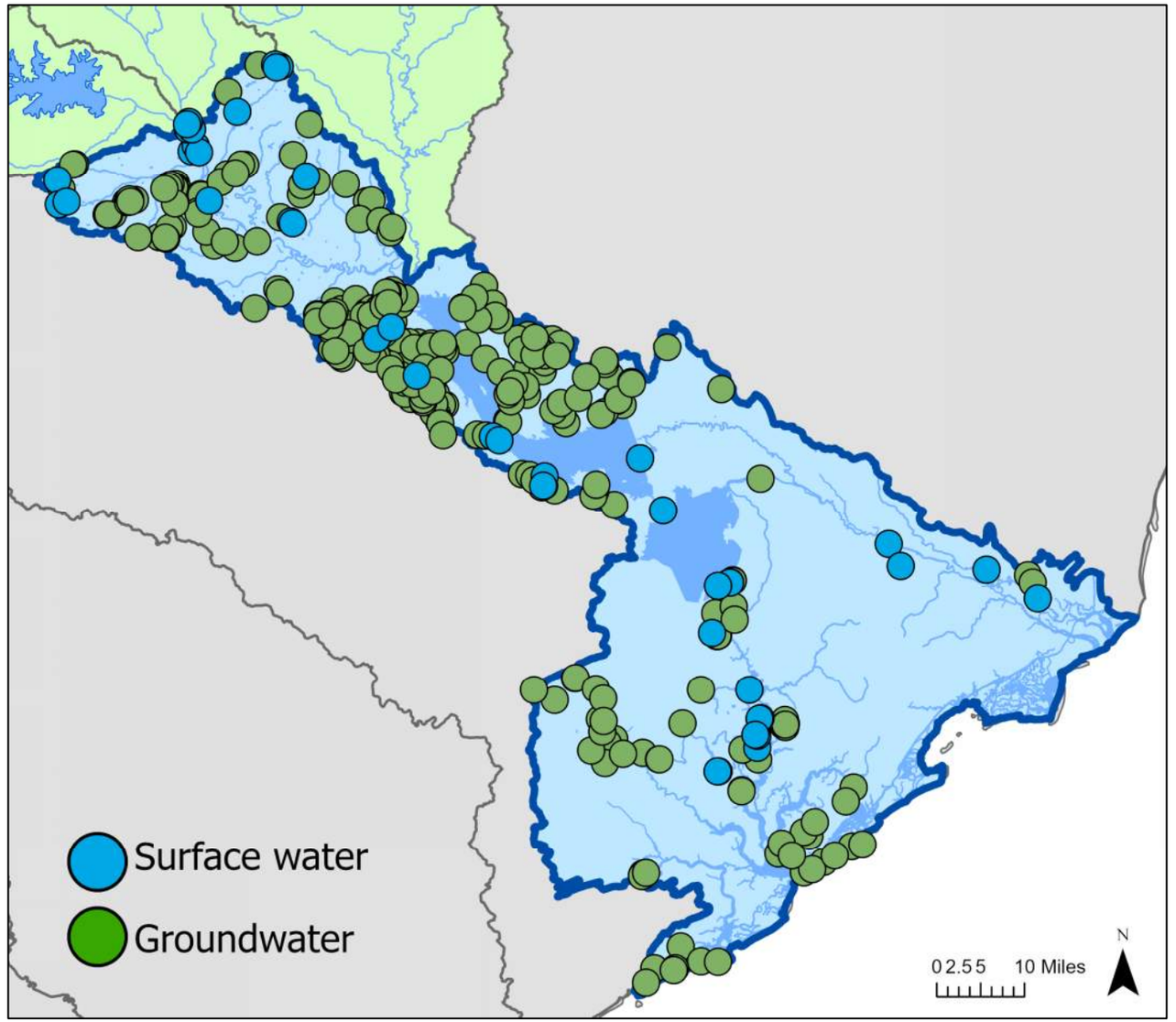
GW: 6% (27 MGD)



Excluding Energy

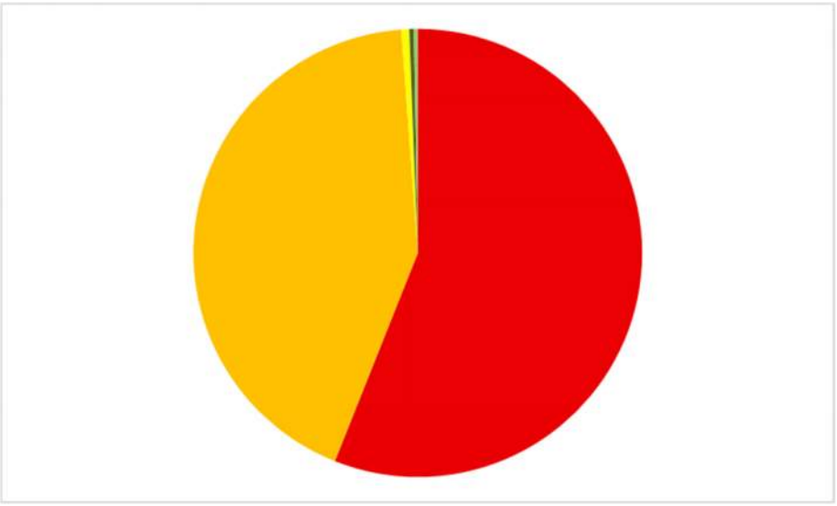
SW : 83% (133 MGD)

GW: 17% (27 MGD)

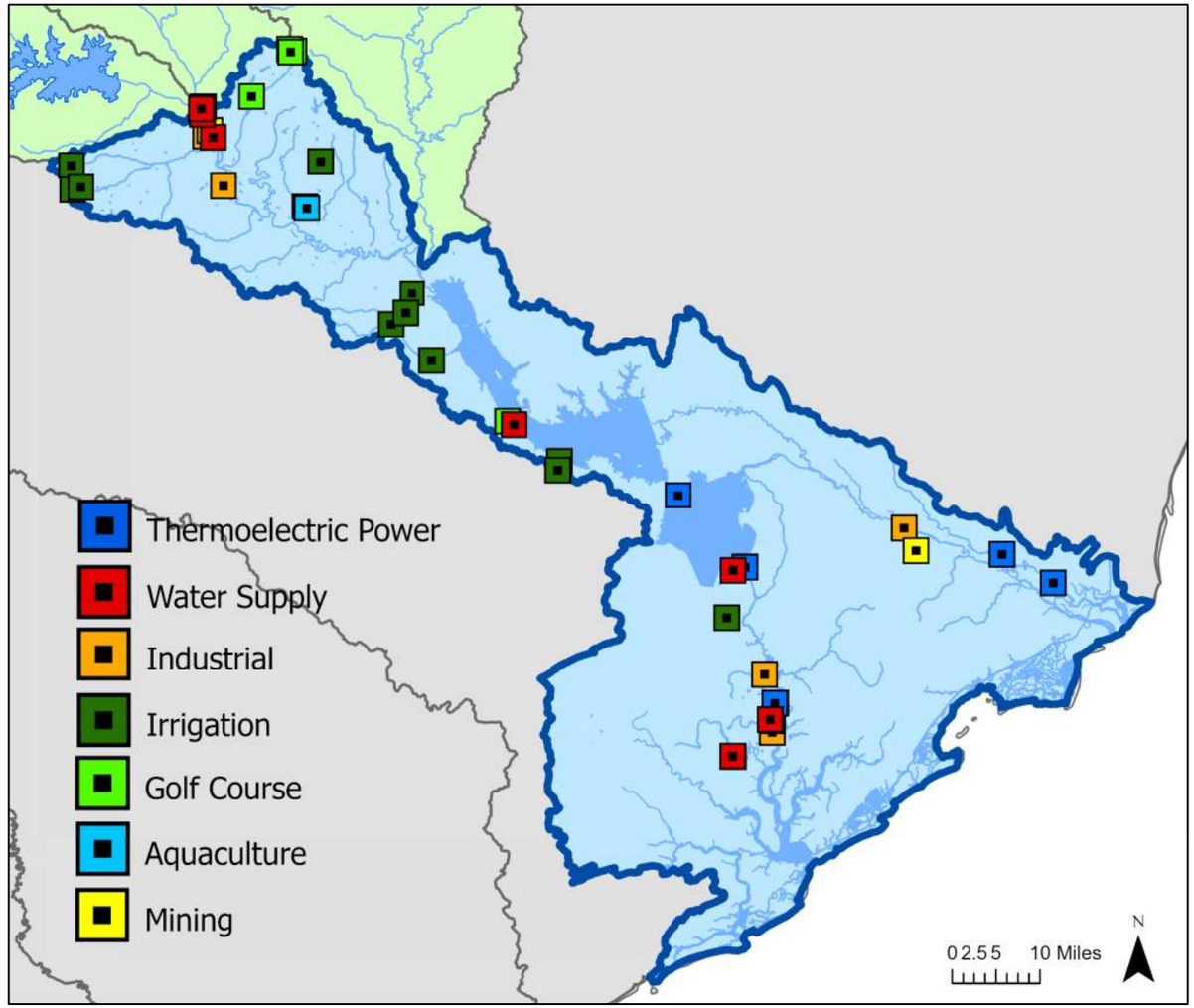


2023 Reported Santee Surface Water Withdrawals

- Water Supply, 56% (74 MGD)
- Industry, 43% (57 MGD)
- Mining, < 1% (1.0 MGD)
- Agr. Irrigation, < 1% (0.4 MGD)
- Golf Course, < 1% (0.3 MGD)
- Aquaculture, < 1% (0.1 MGD)

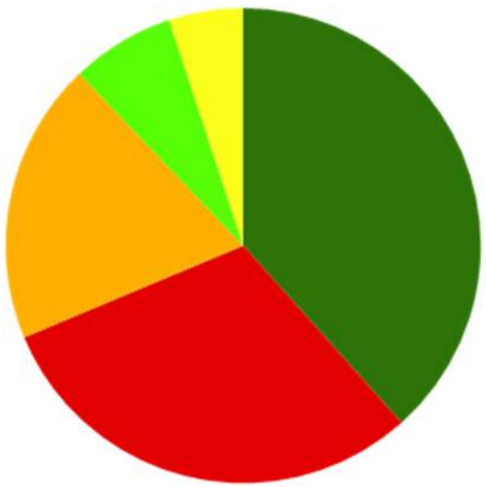


Total reported SW withdrawals – 133 MGD

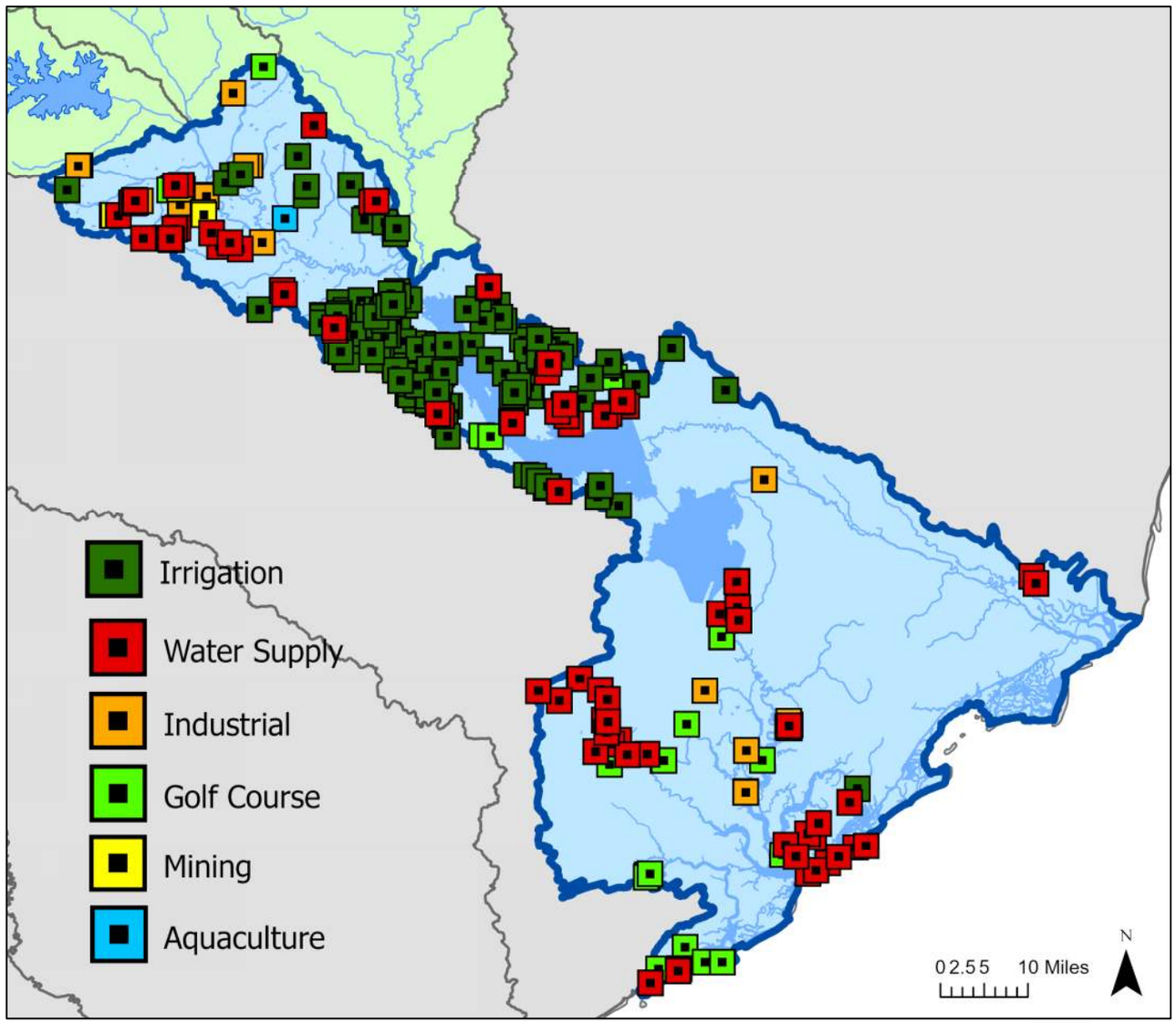


2023 Reported Santee Groundwater Withdrawals

- Agr. Irrigation, 41% (11 MGD)
- Water Supply, 29% (8 MGD)
- Industry, 18% (5 MGD)
- Golf Course, 7% (2 MGD)
- Mining, 5% (1.3 MGD)
- Aquaculture, < 1% (0.02 MGD)



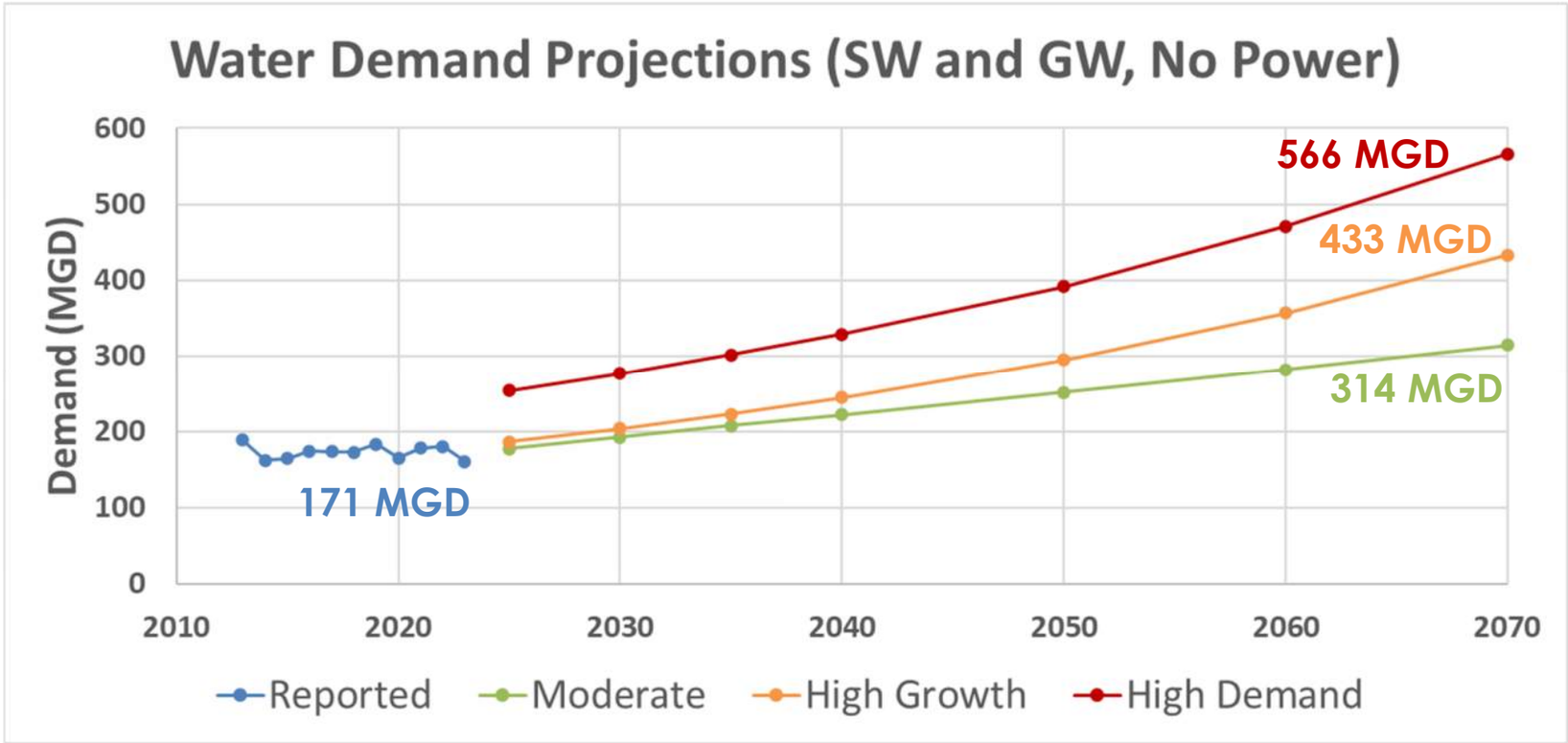
Total reported GW withdrawals – 27 MGD



Santee Total Water Demand Projections (No Power)

Excluding Power Generation

- Moderate Demand Scenario: 84% Increase
- High Growth Scenario: 153% Increase
- **High Demand Scenario: 231% Increase**

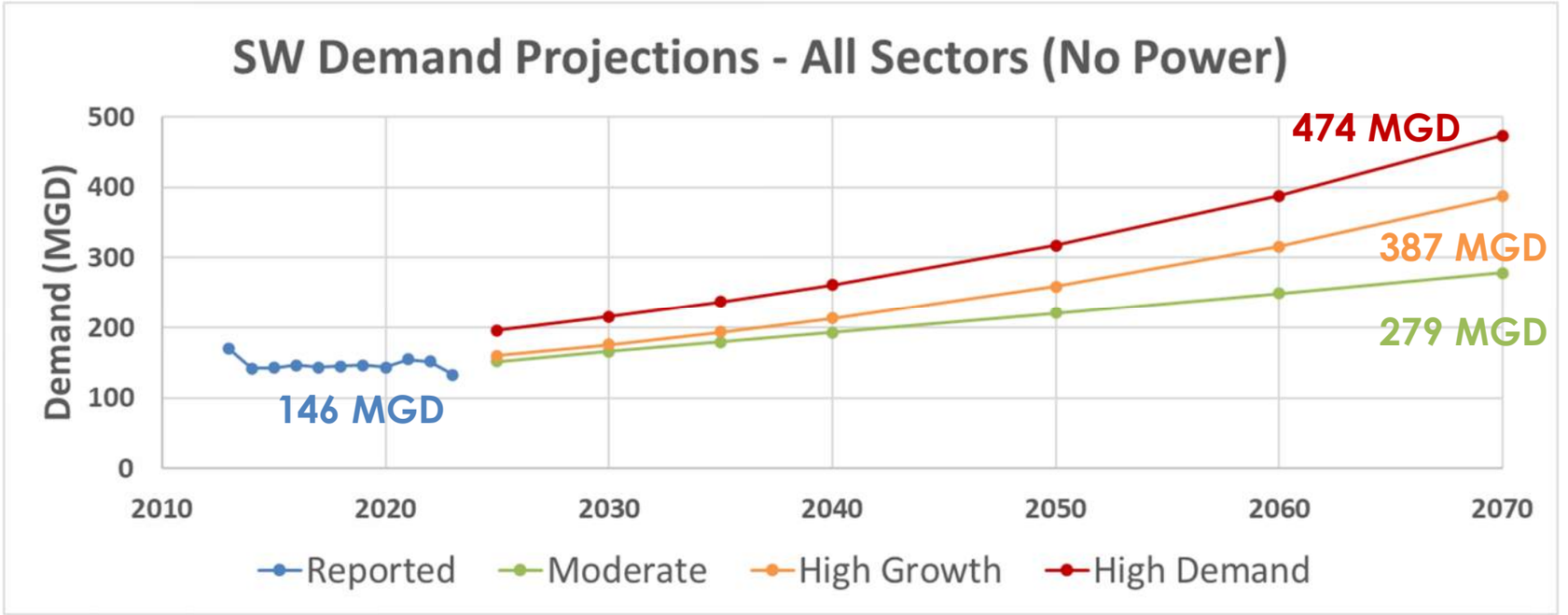


	Baseline	Moderate		High Demand	
Source	**2013-2023**	**2035**	**2070**	**2035**	**2070**
Surface Water	146.3	179.7	278.7	237	473.8
Groundwater	25	27.4	35.4	64	92.5
Total	171.3	207.1	314.1	301	566.3

Santee Surface Water Demand Projections

Surface Water

- Moderate Demand Scenario: 91% Increase
- High Growth Scenario: 165% Increase
- **High Demand Scenario: 225% Increase**

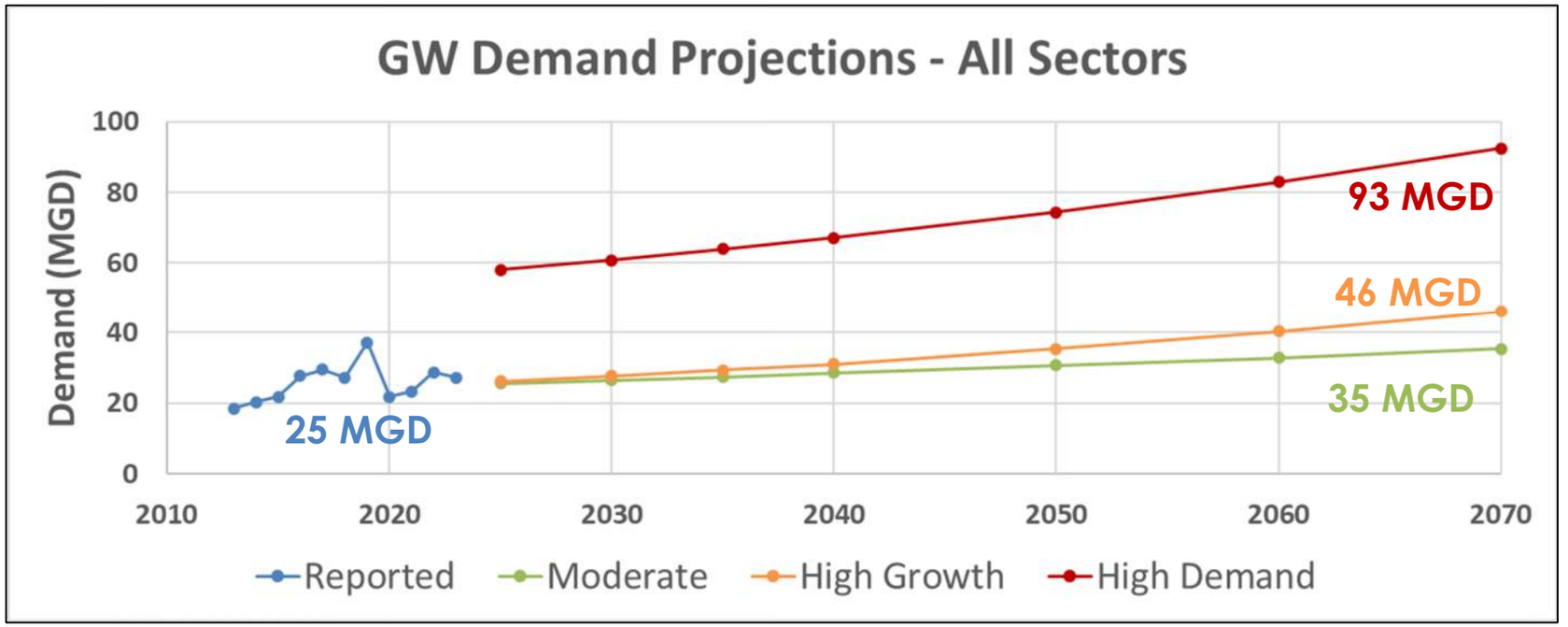


	Baseline	Moderate		High Demand	
Sector	**2013-2023**	**2035**	**2070**	**2035**	**2070**
Water Supply	79.1	101.5	151.7	123.5	241.7
Industry	65.8	76.8	125.6	110.9	229.5
Mining	0.7	0.7	0.7	0.8	0.8
Agriculture	0.4	0.4	0.4	0.9	0.9
Golf Course	0.2	0.2	0.2	0.7	0.7
Aquaculture	0.1	0.1	0.1	0.2	0.2
Total	146.3	179.7	278.7	237	473.8

Santee Groundwater Demand Projections

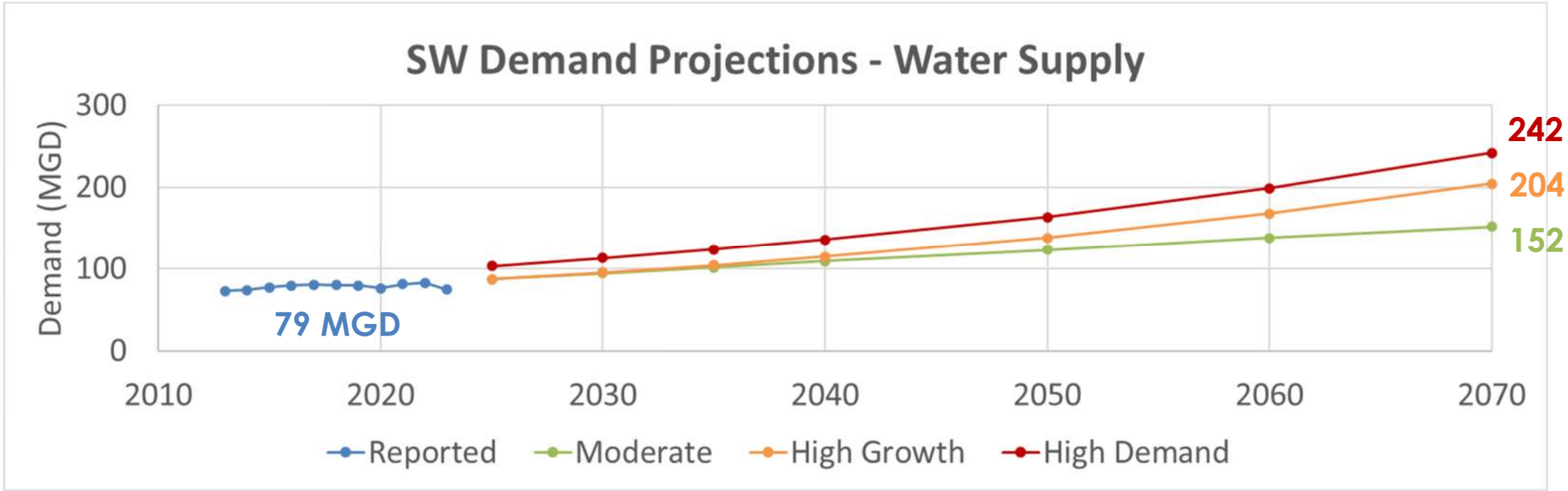
Groundwater

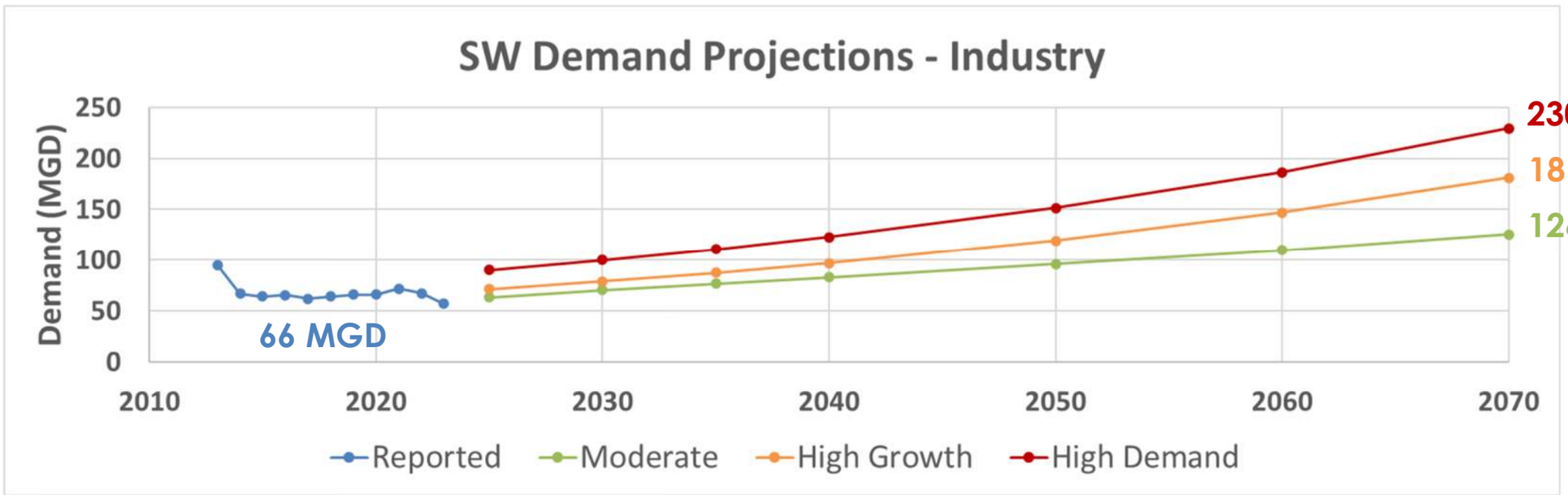
- Moderate Demand Scenario: 40% Increase
- High Growth Scenario: 84% Increase
- **High Demand Scenario: 276% Increase**



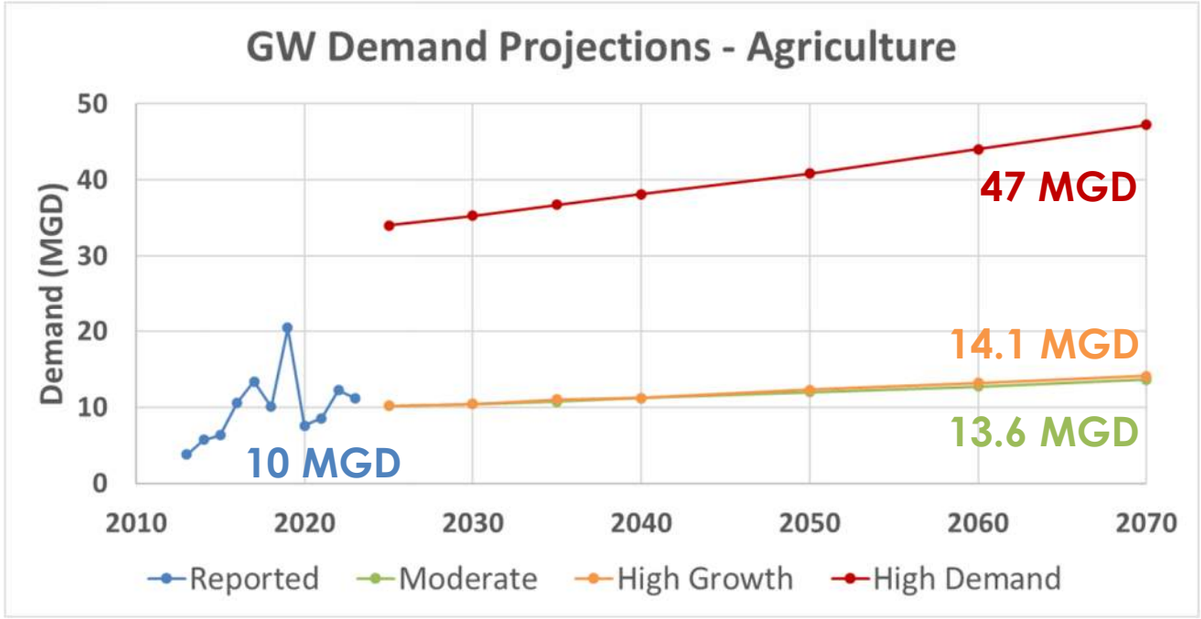
	Baseline	Moderate		High Demand	
Sector	**2013-2023**	**2035**	**2070**	**2035**	**2070**
Agriculture	10.1	10.7	13.6	36.7	47.2
Water Supply	7.8	9.7	13.9	13	23.8
Industry	4.6	4.5	5.4	8.4	15.6
Golf Course	1.3	1.3	1.3	3.6	3.6
Mining	1.2	1.2	1.2	2.2	2.2
Aquaculture	0	0	0	0.1	0.1
Total	25	27.4	35.4	64	92.5

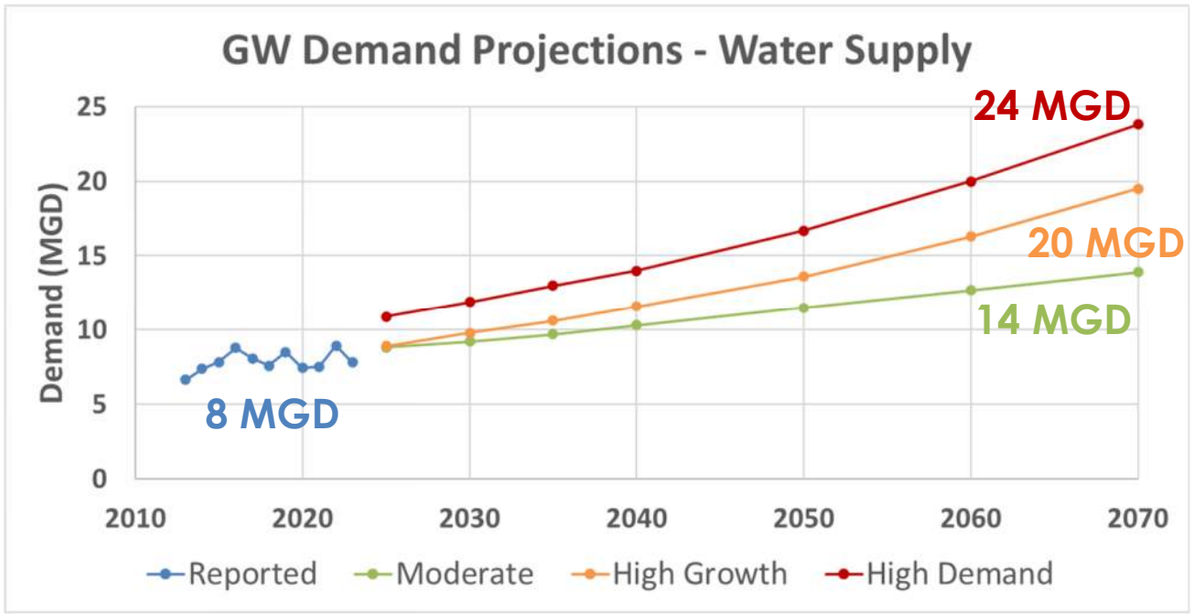
Santee Surface Water Demand Projections by Sector

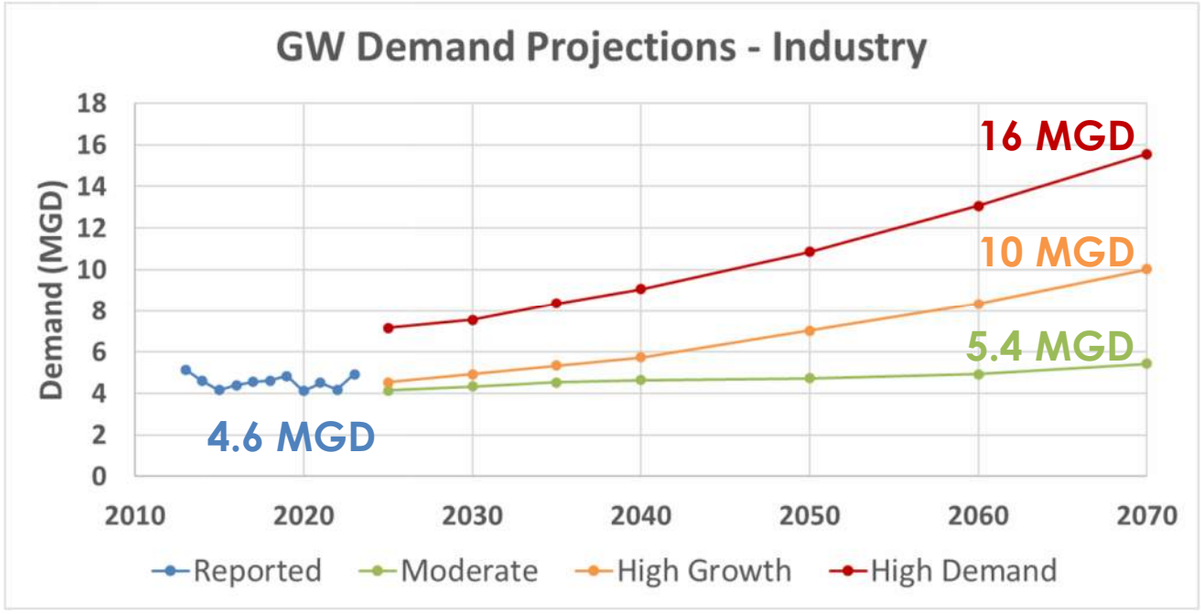




Santee Groundwater Demand Projections by Sector

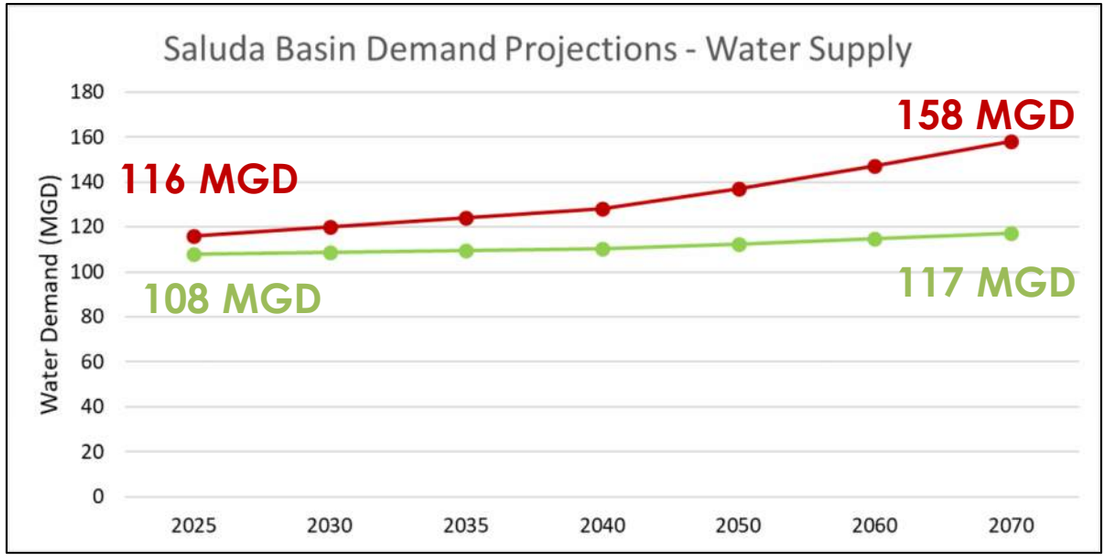


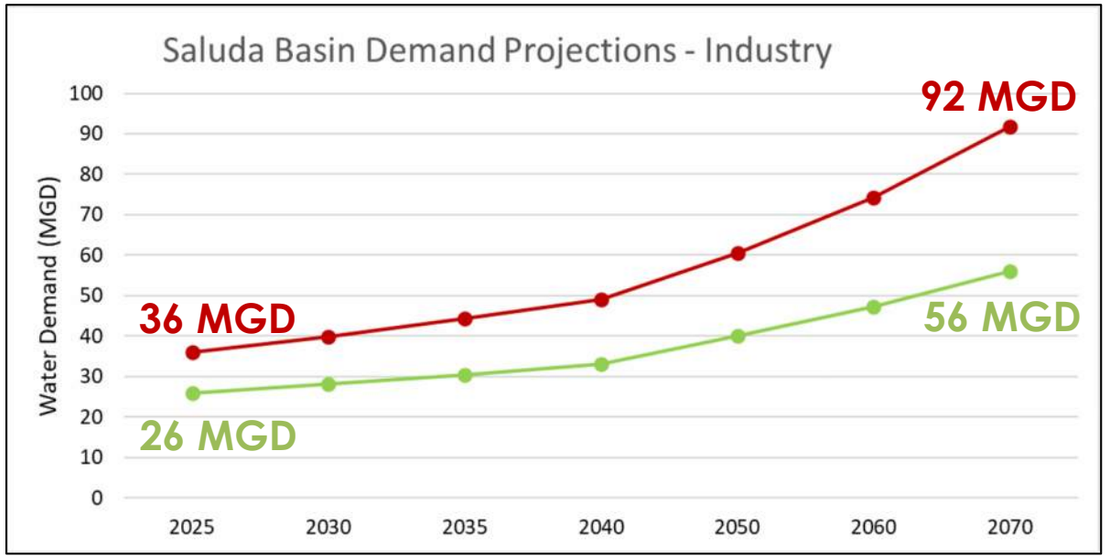


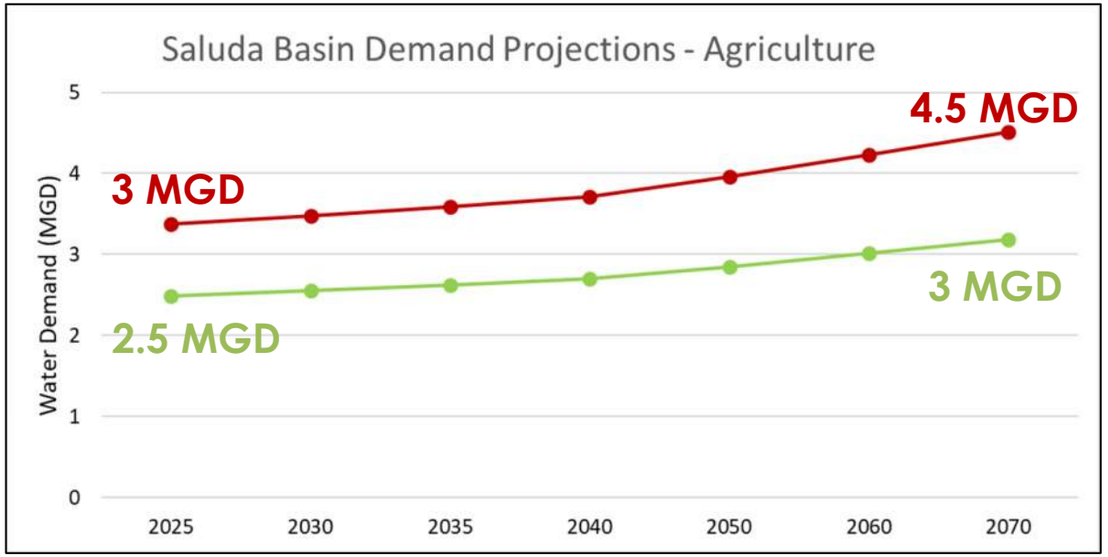


Water Demand Projections for the Broad and Saluda Basins

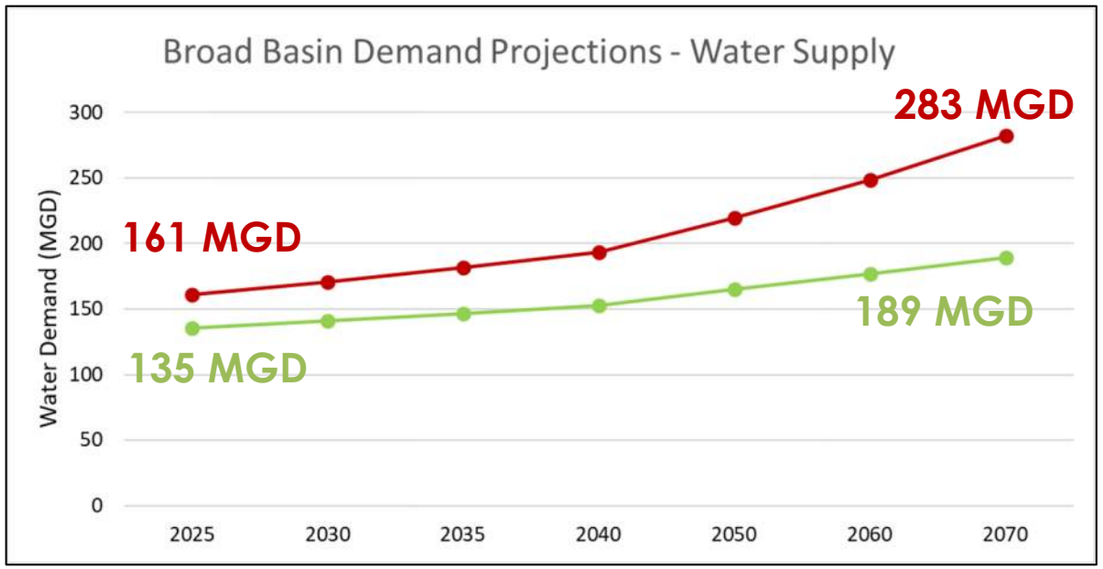
Saluda Basin Projections by Sector

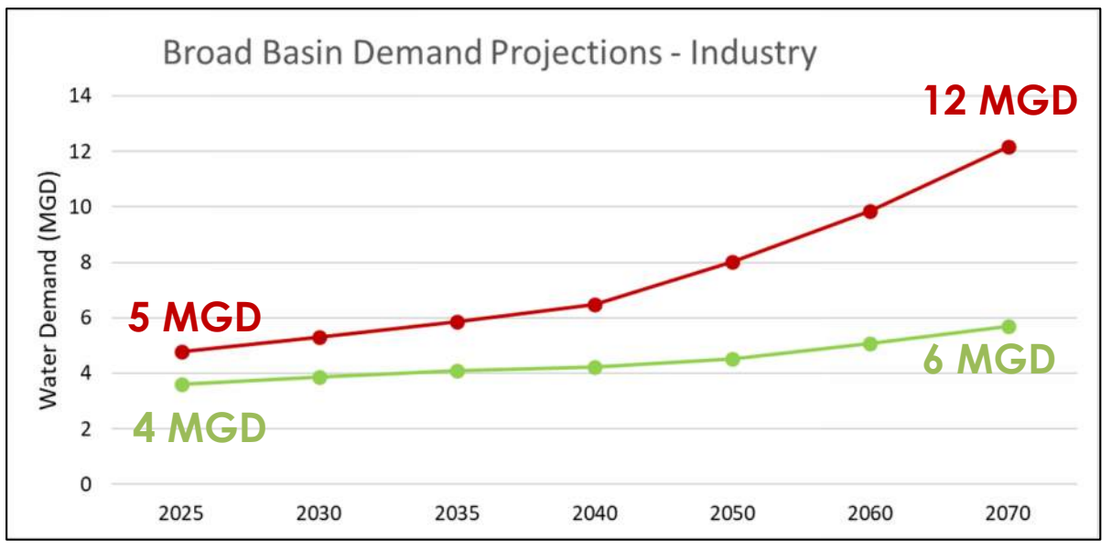


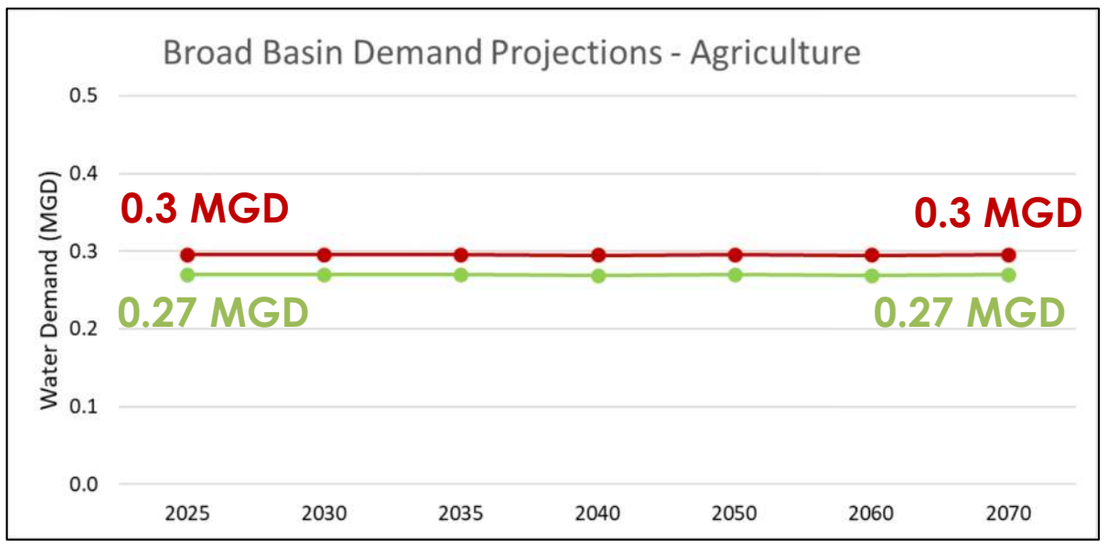




Broad Basin Projections by Sector



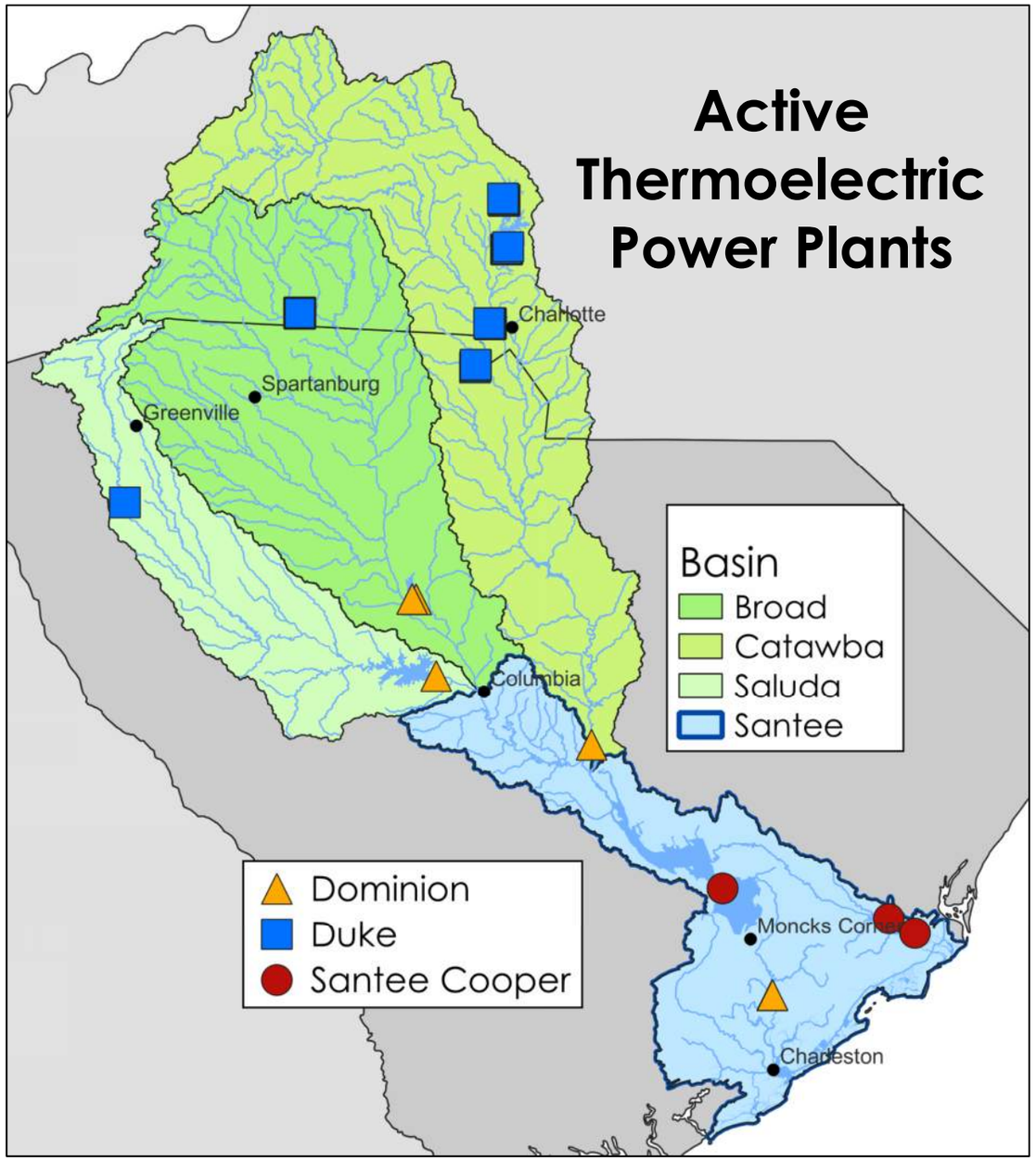




Water Demand Projections – Thermoelectric Power

Current Water Demand for Thermoelectric Power

- Currently 12 thermoelectric power Plants in the Santee basin:
  - Dominion Energy – 4 plants in the Broad, Saluda, and lower Santee basins.
  - Duke Energy – 6 plants in the Broad and Catawba basins.
  - Santee Cooper – 2 plants in the lower Santee basin.
- Estimated net withdrawals are approximately **238 MGD**.

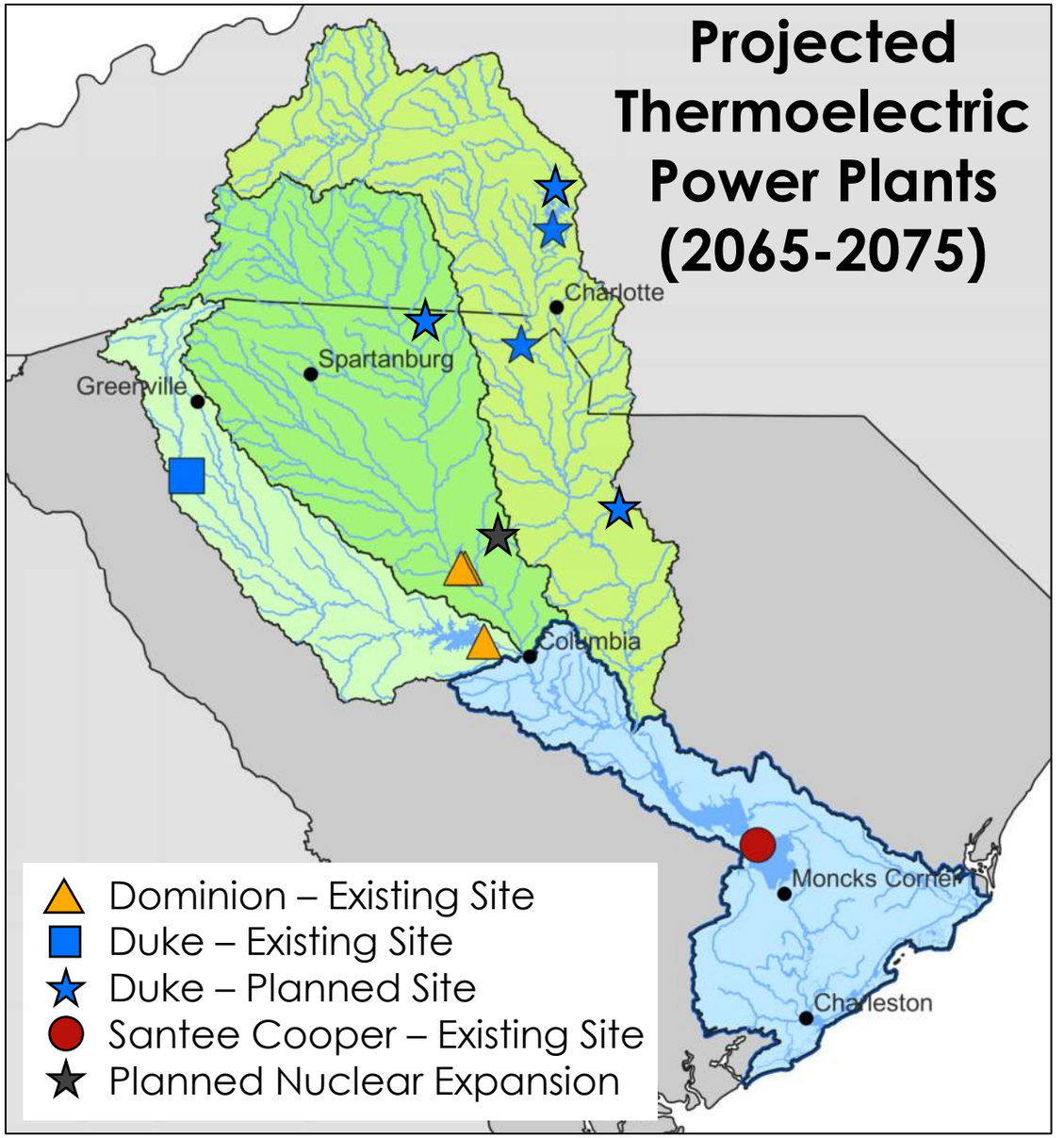


Water Demand Projections for Thermoelectric Power – Initial Assumptions

- All power plants slated for decommissioning will be on schedule and their water withdrawals will be removed from future projections.
- VC Summer will expand its nuclear energy capacity – used consumptive use rates listed in original design plans documented in Environmental Impact Statement.
- Duke will add a new power plant in the Broad basin at their Cherokee site near Gaffney (consumptive use estimates already provided for the Broad basin planning effort and included in their surface water assessment).
- By 2065-2075, Duke will be operating 4 nuclear stations in the Catawba basin.
- No new thermoelectric power plants in the lower Santee basin.

Water Demand Projections for Thermoelectric Power

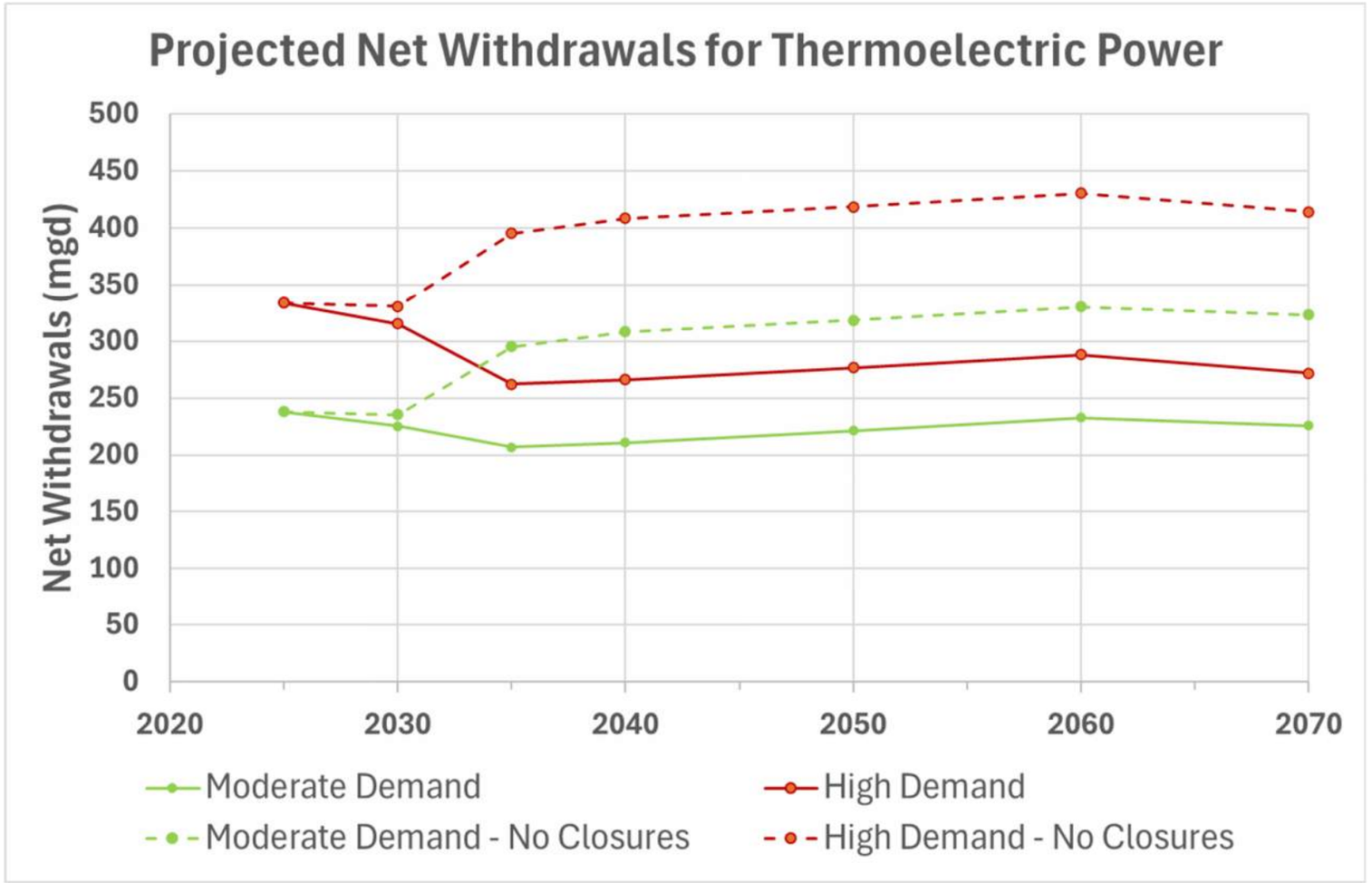
- By 2065-2075, 10 thermoelectric power plants are projected in the Santee basin:
  - Dominion Energy – 2 plants in the Broad and Saluda basin.
  - Duke Energy – 6 plants in the Broad and Catawba basins (5 nuclear).
  - Santee Cooper – 1 plant in the lower Santee basin.
  - Nuclear power plant expansion at V.C. Summer site – operator unknown.
- Estimated net withdrawals will be approximately **225 – 272 MGD**.



Water Demand Projections for Thermoelectric Power

Scenario Development Considerations:

- Assume no SC plant closures.
- Assume delays in the schedule for decommissioning.
- Consider a new plant(s) in the lower Santee basin.



* High Demand estimates include SC plants only.

Questions?

Scott Harder – scott.harder@des.sc.gov

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