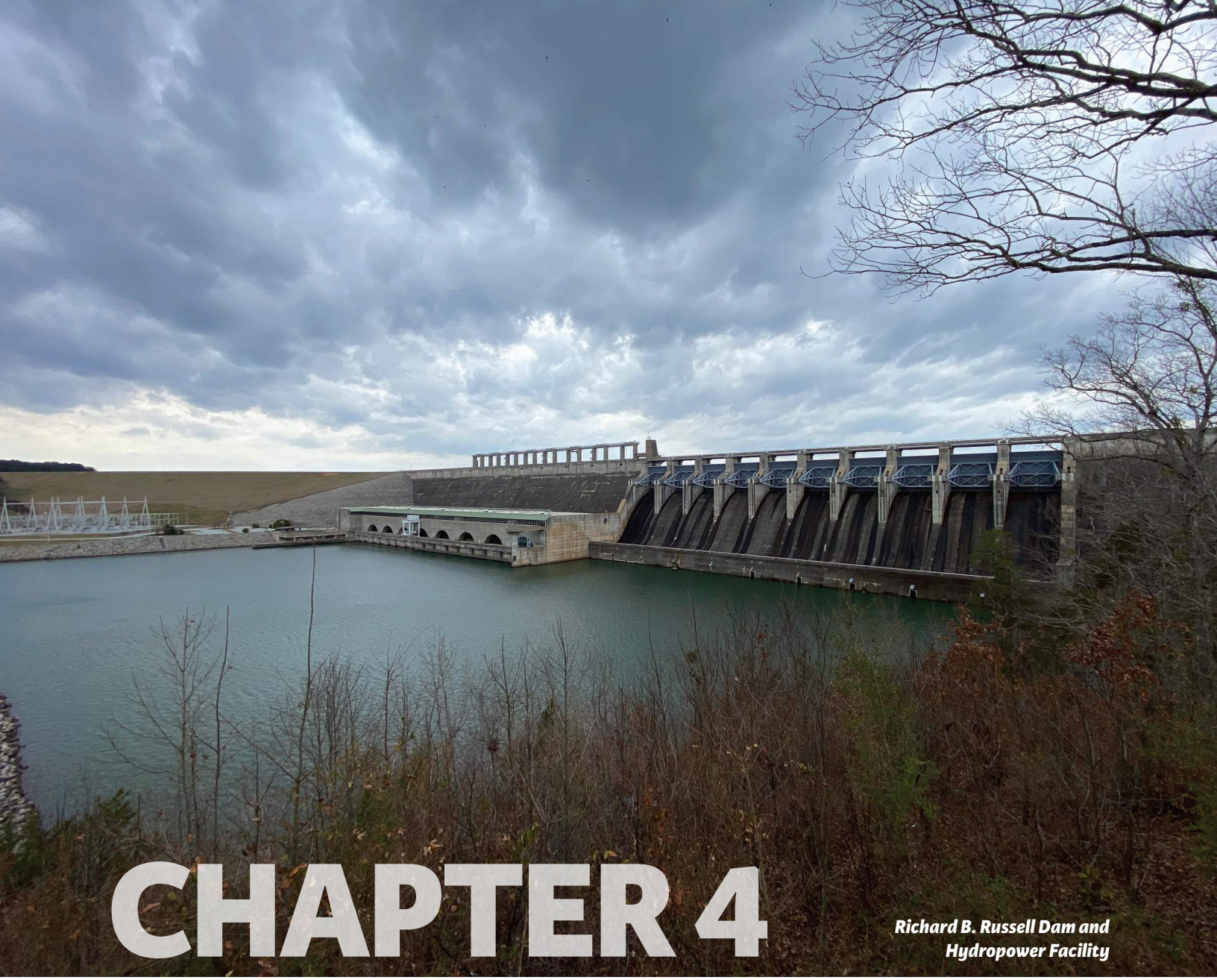


CHAPTER 4

Richard B. Russell Dam and Hydropower Facility

Current and Future Water Demand

To properly manage and develop a plan for South Carolina's water resources, it is critical to quantify how much and for what purposes water is being withdrawn and consumed. It is equally important to estimate how much water may be needed in the future to support a growing population and economy. Quantifying current water use and developing sector-specific water demand projections provides the groundwork for understanding how and where water is used and helps identify areas of the state where potential future water use could exceed available water supplies.

This chapter:

- Summarizes current water demands in each planning basin.
- Compares current demands to the amount of water that has been permitted and registered for withdrawal.
- Provides an overview of population projections by county.
- Describes the methodology used to develop the water demand projections.
- Summarizes projected water demands for two water use scenarios that formed the basis for the water availability assessment.

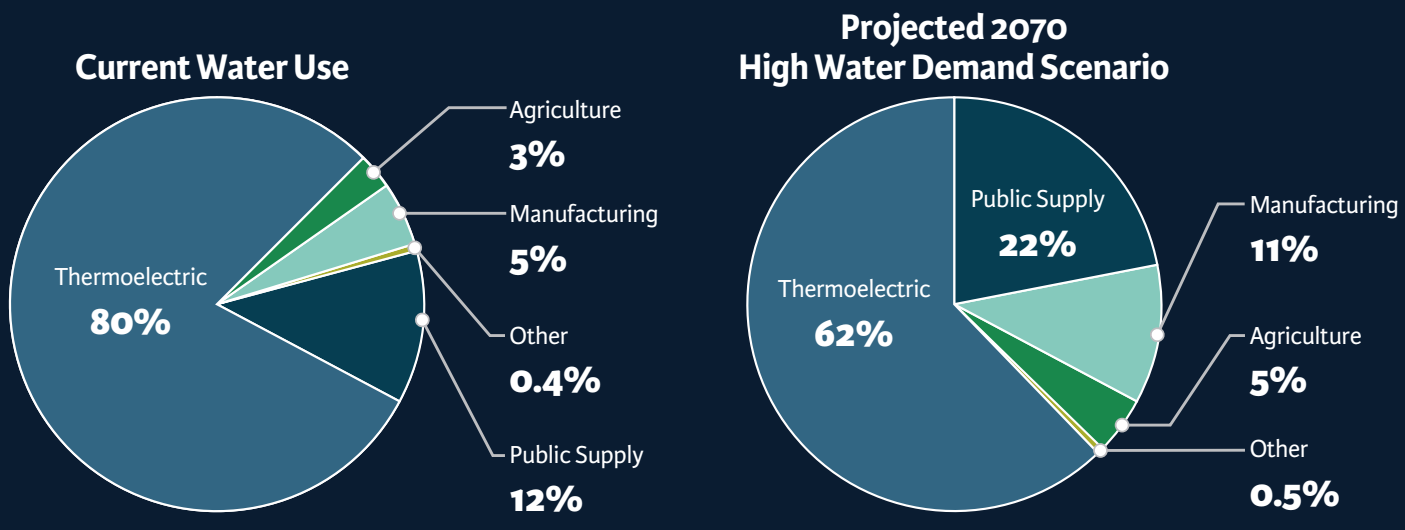
SUMMARY

Throughout South Carolina, water is withdrawn from rivers, streams, reservoirs, and groundwater aquifers to meet off-stream needs for drinking and sanitation, food production, manufacturing, energy generation, and other uses that are important in maintaining a high quality of life and a strong economy. The water that remains in streams and reservoirs is also important to provide habitat and sustain ecological functions, enhance recreational opportunities, and support navigation.

SCDES requires all users withdrawing more than 3 million gallons per month (MGM), approximately the amount of water needed to serve the residential needs of 1,000 people, to either permit or register their use with the state. This reported water use provides the data necessary to characterize current water use and to help project future water demands.

Statewide, the largest category of water use is for energy production, followed by public supply, manufacturing and industrial use, agriculture, and other minor uses including golf course irrigation, mining, and aquaculture. Nearly 95 percent of total demand is met by surface water, which includes rivers, streams, and reservoirs. The remaining demand is met by groundwater. The left side of the summary figure below shows the percentage of total demand by water use category under current conditions.

To support the assessment of water availability, two water demand projections through 2070 were developed. The Moderate Demand Scenario represents a reasonable estimate of future water demand, and the High Demand Scenario represents a high-end (conservative) projection of future water demand for planning purposes. These scenarios both project the largest growth in water demand to occur within the public supply and manufacturing sectors, where demands are projected to grow by over 50 percent in the Moderate Demand Scenario and more than double in the High Demand Scenario. Agricultural water demands are projected to increase by about one-third. Although water demand from thermoelectric power plants is projected to decrease with the planned closure of several coal-fired plants by 2070, there is considerable uncertainty in projected water demands for energy production, given the growing need for electricity. The right side of the summary figure shows the percentage of total water demand by water use category projected for 2070 in the High Demand Scenario.



Summary Figure. Statewide water demand by water use category for current water use (left) and projected 2070 demand from the High Demand Scenario (right).

4.1 Types of Water Use

Throughout South Carolina, water is withdrawn from rivers, streams, reservoirs, and aquifers and is vital to many sectors:

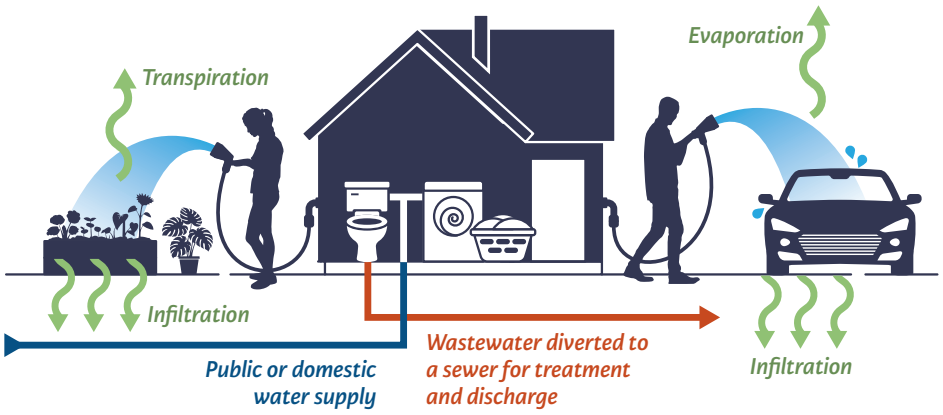
- Water is used for drinking, cooking, sanitation, and to support other critical **public health** needs.
- In **agriculture**, water is used for irrigating crops and sustaining livestock.
- **Industrially**, water is used in manufacturing processes, in cooling systems, and as a solvent.
- For **energy production**, water is heated to produce steam to drive turbines, and for cooling purposes, to condense steam back into liquid form.
- Water is also used in a myriad of other ways, including for turf and landscape irrigation (**golf courses**), for dust suppression (**mining**), and to grow fish (**aquaculture**).

In addition to these off-stream demands for water, maintaining enough water to support instream demands is also important. Instream demands refer to the amount of water needed to sustain ecological function, provide habitat, support navigation, afford recreational opportunities, assimilate treated wastewater discharges, and generate electricity at hydroelectric power plants. The assessment of water demands presented in this chapter focuses on off-stream demands. Instream demands, and the ability to meet both instream and off-stream demands now and into the future, is further evaluated in Chapter 5.

Lake Monticello Park

The off-stream demands presented in this chapter can be further broken down into consumptive use and nonconsumptive use. When water is withdrawn from a stream, river, reservoir, or aquifer, a portion of that may be used and not returned to the system (i.e., used consumptively), for example, if water evaporates from cooling towers during the energy production process at thermoelectric power plants. Another portion of water demand may be used, collected, potentially treated, then returned to the system (i.e., used nonconsumptively), such as treated wastewater discharges that are assimilated into streamflow. **Figure 4-1** shows examples of consumptive and nonconsumptive uses. The portion of water use that is consumptive varies by the type of water use and by the facility using the water. Unless noted otherwise, all water use and demand figures presented in this chapter represent the total withdrawal, not just the amount used consumptively.

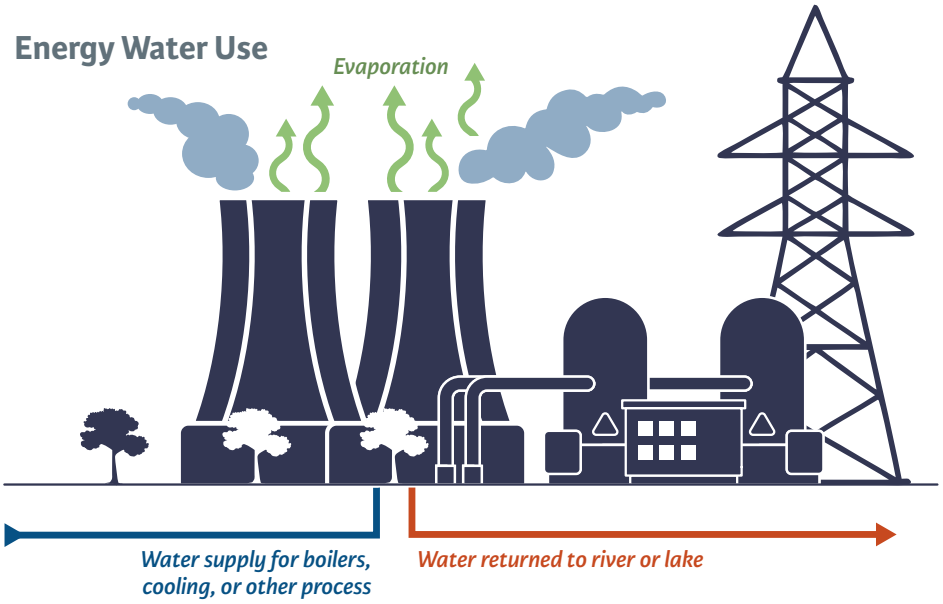
Household Water Use



*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 discharged to a river or lake.*

Energy Water Use



*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**.*

Figure 4-1. Examples of consumptive and nonconsumptive water use.

The vast majority of energy production in South Carolina comes from hydroelectric and thermoelectric facilities. Thermoelectric facilities use coal, gas, or nuclear fuel to generate electricity. Statewide, hydroelectric facilities have by far the largest water demands of any use category, as shown in **Figure 4-2**. Appendix A provides tables detailing the demands shown in this figure and the remaining bar charts in this chapter. However, hydroelectric facilities generate power using the flow of water, rather than through the removal and off-stream use of water. Since the water is used in place, hydroelectric water demands are nearly all nonconsumptive, with potentially only minor losses associated with evaporation from reservoirs associated with pumped storage facilities. Hydroelectric use occurs in the Upper Savannah, Saluda, Broad, Catawba, and Santee River basins. Water used by hydroelectric facilities is not included in the demand totals presented in this chapter because the analysis focuses on off-stream use.

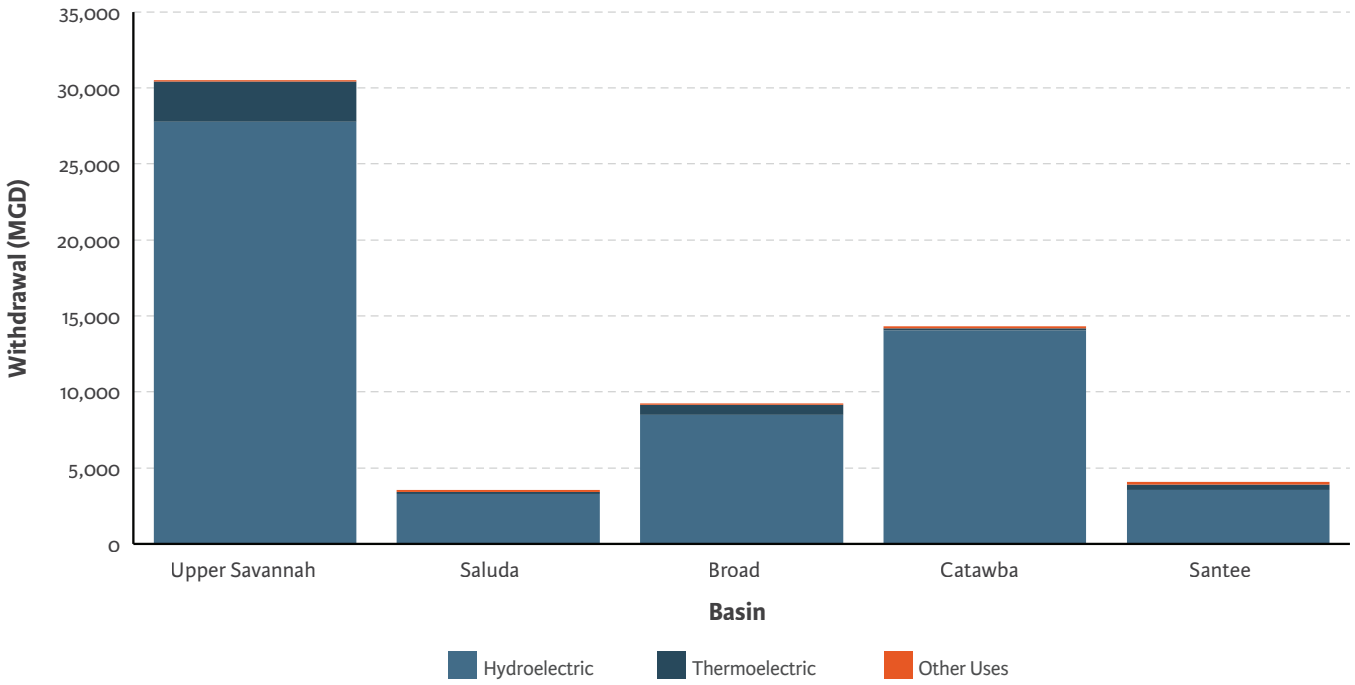
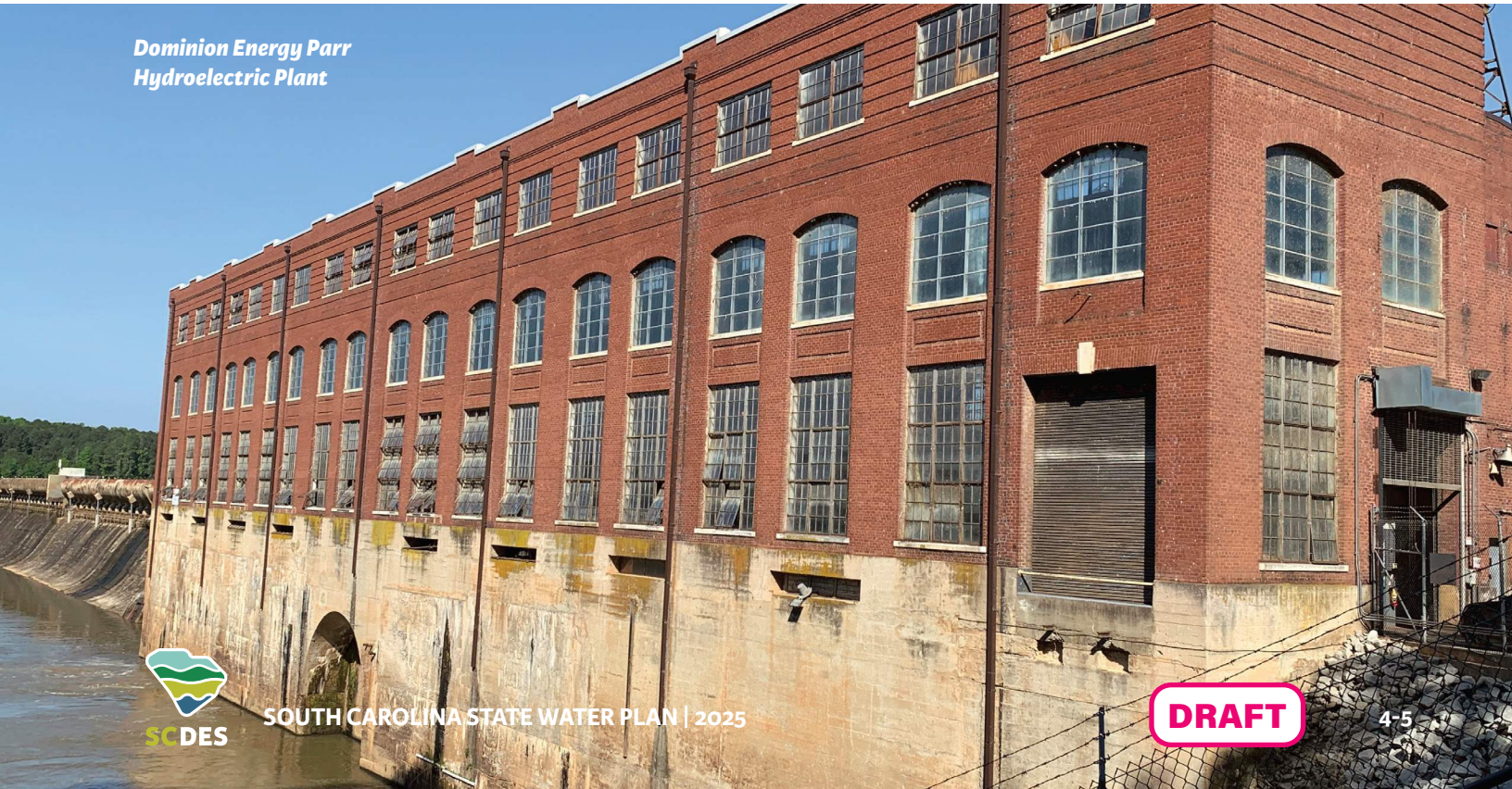


Figure 4-2. Water use, including hydroelectric power, for basins with hydroelectric use.



4.2 CURRENT WATER USE

Current statewide off-stream water use totals 5,913 million gallons per day (MGD), with 5,612 MGD withdrawn from surface water sources and 301 MGD withdrawn from groundwater. Current water use was calculated as the average water use reported to SCDES from 2014 through 2023 in accordance with the South Carolina Surface Water Withdrawal, Permitting, Use and Reporting Act and the Groundwater Use and Reporting Act. **Table 4-1** shows the current total and net water use for each planning basin. All demands presented in this chapter by planning basin represent only withdrawals for South Carolina users. The net withdrawals reflect the amount that is used consumptively. To put these numbers in perspective, the Cherokee County Board of Public Work's elevated water storage tank on Interstate 85, sometimes called the "Peachoid" (see photo on this page), holds approximately 1 million gallons of water. The daily net (consumptive use) across the entire state amounts to just under 1,000 Peachoids.

Table 4-1. Total and net water use by basin.

Basin	Groundwater (MGD)	Surface Water (MGD)	Total Use (MGD)	Net Use (MGD)
Upper Savannah	0.4	2,718	2,719	62
Saluda	0.2	271	272	52
Broad	0.6	766	766	174
Catawba	7	258	265	95
Lower Savannah-Salkehatchie	75	163	238	115
Edisto	69	70	139	112
Santee	30	518	548	156
Pee Dee	118	848	966	191
Total	**301**	**5,612**	**5,913**	**955**

Notes: If a water user reported zero water use for the last 3 years of data (2021 to 2023) the user's historical water use was excluded from the calculations.

Net use assumed groundwater users without discharge permits have 100 percent consumptive use.

Peachoid Water Tank (which holds 1 million gallons of drinking water) (courtesy Cherokee County BPW)

The largest water use category is thermoelectric, which represents 80 percent of total use. Statewide, thermoelectric use is approximately 6 percent consumptive, with 94 percent of the withdrawals returned to surface water. Because of its high total withdrawal but low consumptive use, thermoelectric use is excluded from some of the summaries in the remainder of the chapter, as noted, to make the remaining use categories more apparent and comparable. **Figure 4-3** shows the comparison of the total use by category, with thermoelectric use included (left) and thermoelectric use excluded (right). The "Other" category includes minor uses associated mostly with golf course irrigation, mining, and aquaculture.

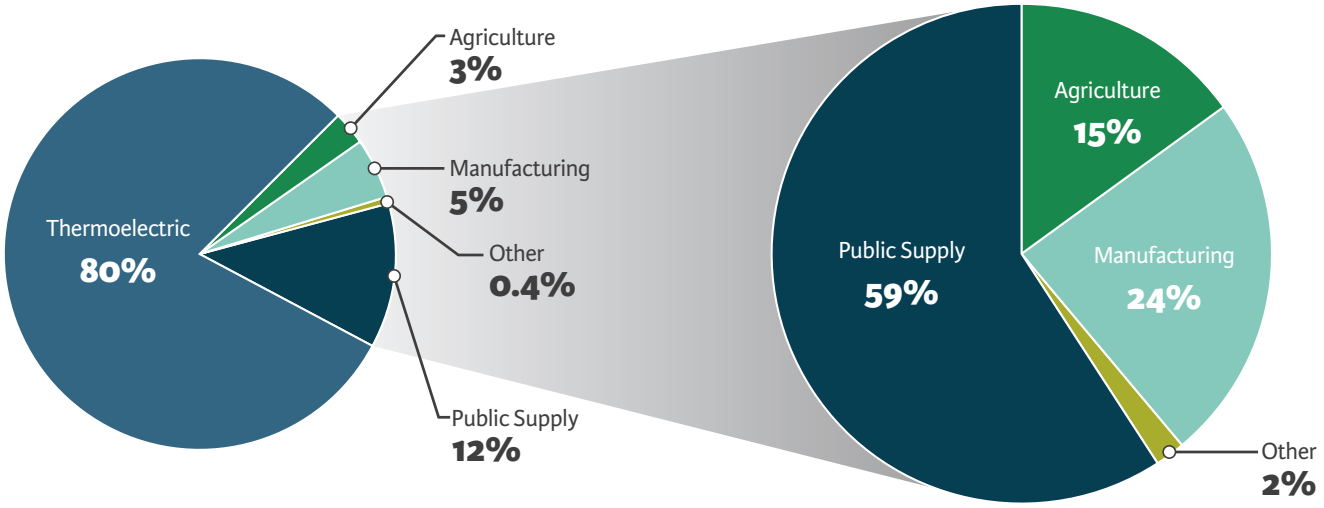


Figure 4-3. Statewide current demand by water use category, with thermoelectric use (left) and without thermoelectric use (right).

Cherry Point Water Reclamation Facility (courtesy Beaufort-Jasper Water & Sewer Authority)

Figure 4-4 shows the breakdown of current demand by water use category for each planning basin. Thermoelectric is the highest use category for all basins except the Edisto River basin. **Figure 4-5** shows the same breakdown, excluding thermoelectric use. After thermoelectric, public supply is the largest water use category for all basins except the Edisto, where agricultural water use is highest, and the Catawba, where manufacturing water use is highest.

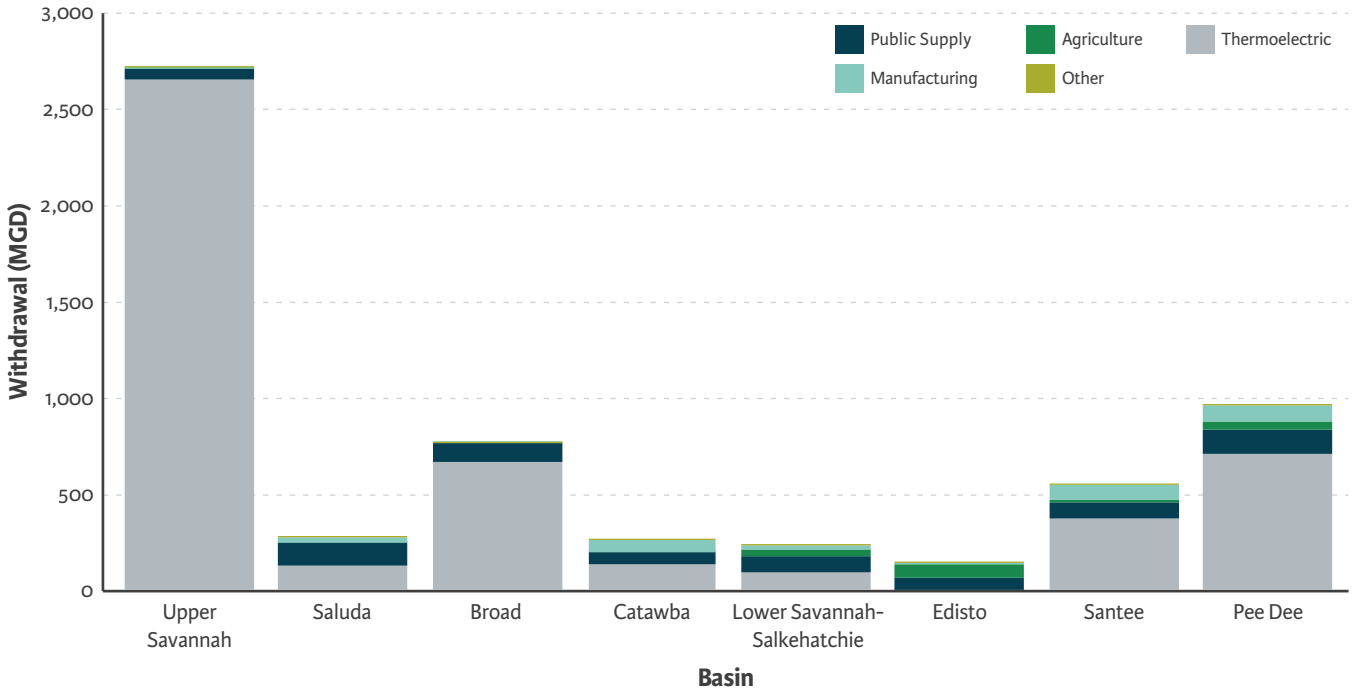


Figure 4-4. Current demand by water use category and by basin, including thermoelectric demand.

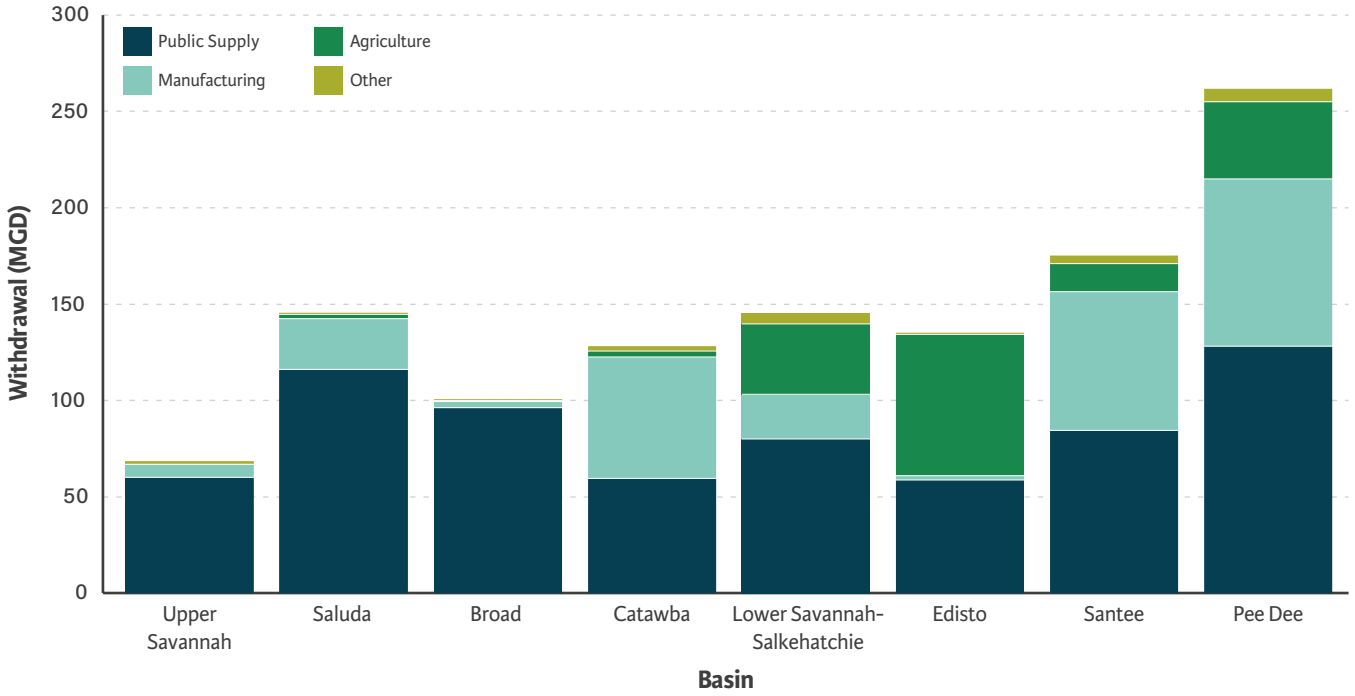


Figure 4-5. Current demand by water use category and by basin, excluding thermoelectric demand.

Figure 4-6 shows current demand from surface water and groundwater in each planning basin. Demands for thermoelectric energy production are excluded. The four upstate basins withdraw nearly all water from surface water. Groundwater use is more prevalent in the basins in the Coastal Plain, where groundwater aquifers are productive and more readily accessible. Groundwater withdrawals are the highest in the Pee Dee, Lower Savannah-Salkehatchie, and Edisto River basins, at 117 MGD, 75 MGD, and 65 MGD, respectively. Comparatively, the Saluda and Upper Savannah River basins have the smallest groundwater withdrawals, at 0.2 MGD and 0.4 MGD, respectively. The Saluda, Santee, and Pee Dee River basins have the largest withdrawals of surface water, at approximately 145 MGD each, while the Edisto, Upper Savannah, and Lower Savannah-Salkehatchie River basins have the smallest withdrawals of surface water, at approximately 70 MGD each.

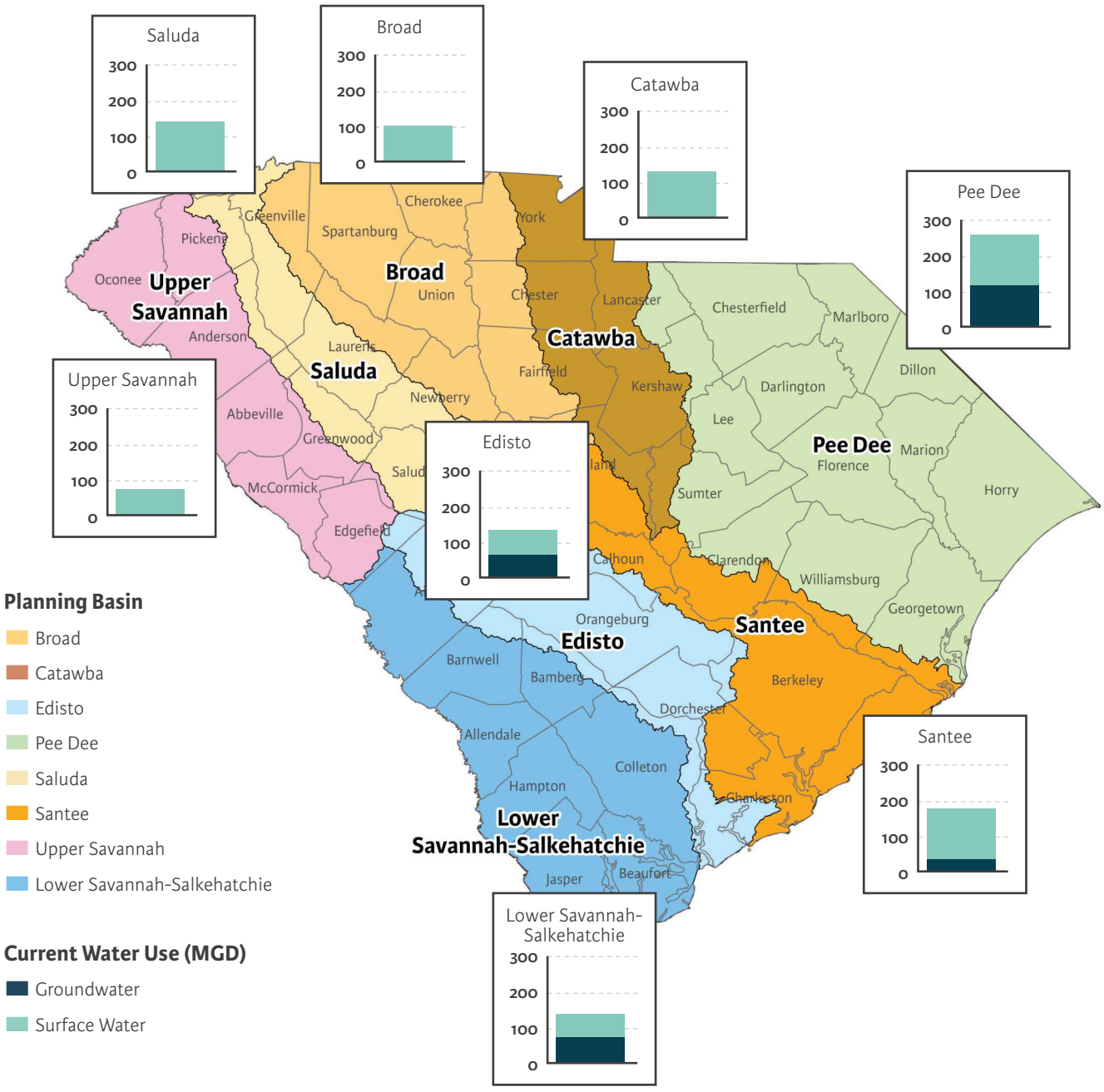


Figure 4-6. Current demand by basin (in MGD) and by source, excluding thermoelectric demand.

4.3 TRENDS IN WATER USE

As described in Chapter 2, since 2000, the state of South Carolina has required that permitted and registered (P&R) water users who withdraw more than 3 MGM report their monthly surface and groundwater withdrawals. Collection of these data promotes the effective management of the state's water resources, allows for the assessment of trends in water use, and supports the development of water demand projections. **Figure 4-7** shows the trend in statewide surface water, groundwater, and total withdrawals for the 10-year period ending in 2023.

Although water use varies based on factors such as weather or disruptions from the COVID–19 pandemic in 2020, an overall increasing trend in both surface water and groundwater withdrawals is observed. Without thermoelectric use (as shown in **Figure 4-7**), total withdrawal from 2014 to 2023 increased 12 percent. Withdrawals from groundwater increased by 31 percent and surface water increased by 7 percent. Some of the increase in groundwater withdrawal is from improvements in groundwater use reporting over this period. If thermoelectric use is included, the total withdrawal increased by only 3 percent.

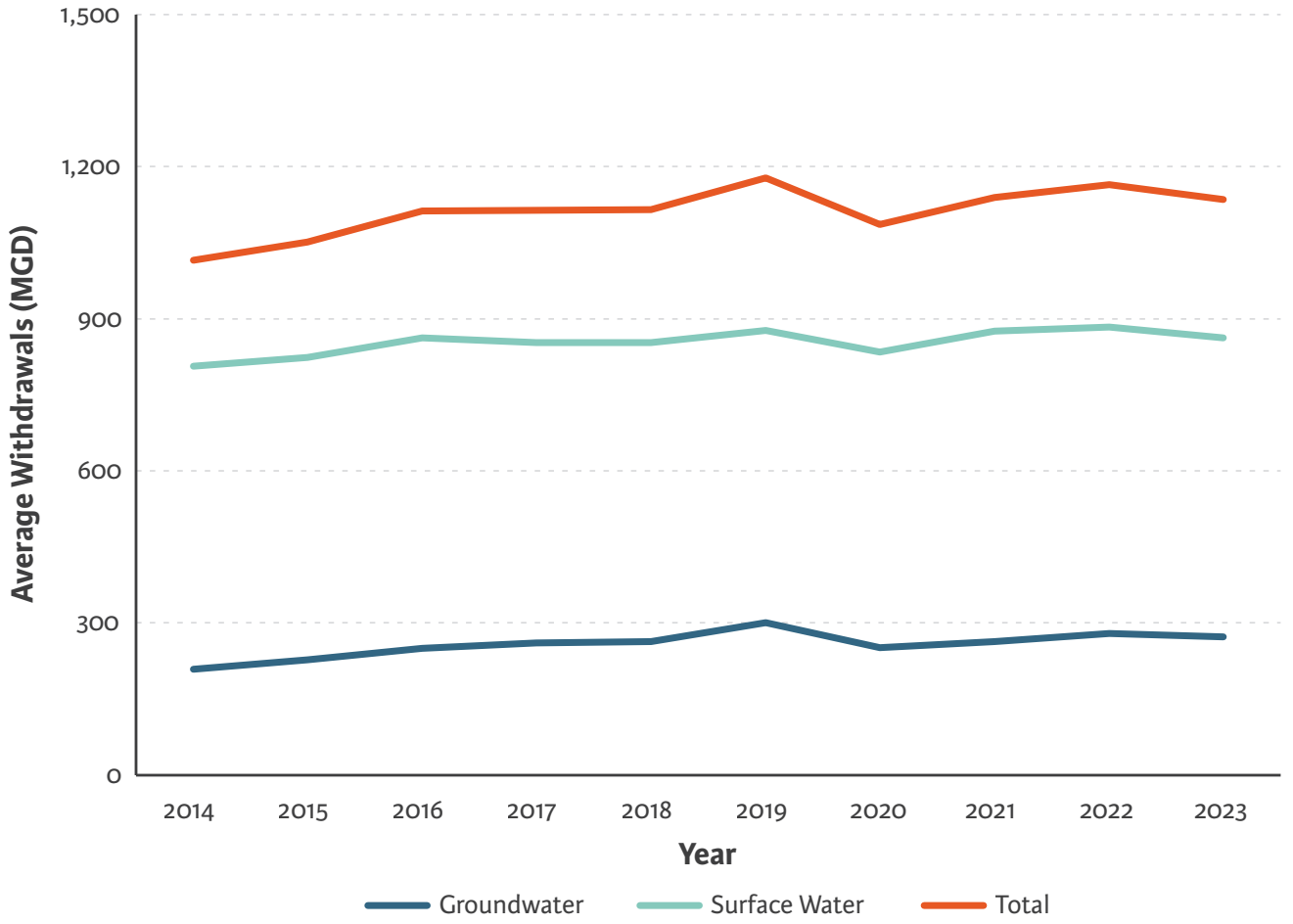


Figure 4-7. Statewide withdrawals by source for 2014 to 2023, excluding thermoelectric demand.

Figure 4-8 shows the trend in demands by water use category for the 10-year period ending in 2023. Public supply increased the most, by 81 MGD (13 percent), with a peak in 2022 at 704 MGD. Public supply growth is occurring to the greatest degree in the Broad (from 84 MGD to 101 MGD), Catawba (from 45 MGD to 61 MGD), and the Upper Savannah (from 50 MGD to 66 MGD) River basins. Nearly all of the growth in water use for public supply in these basins is from surface water.

Water use for agriculture also has an increasing trend, which may be partly driven by increases in reporting and the establishment of two new CUAs: the Western CUA in 2018, and the Santee-Lynches CUA in 2021. Reported agricultural water use has increased 51 MGD (53 percent) between 2014 and 2023, with the largest increases reported in the Pee Dee (from 17 MGD to 38 MGD) and Edisto (from 46 MGD to 61 MGD) River basins. Water use for manufacturing has generally remained steady with a high of 293 MGD in 2016 and a low of 270 MGD in 2023. Water use for the "other" category, consisting of golf courses, mining, and aquaculture, has generally remained steady. Thermoelectric use is not shown in this figure, as its magnitude would mask the trends in the other use categories; however, it has increased an average of 2 percent, from 4,707 MGD in 2014 to 4,778 MGD in 2023. The largest growth in thermoelectric use has occurred in the Upper Savannah River basin (from a low of 2,514 MGD in 2014 to a high of 2,787 MGD in 2023), while thermoelectric use has declined in the Santee River basin (from a high of 486 MGD in 2014 to a low of 305 MGD in 2023).

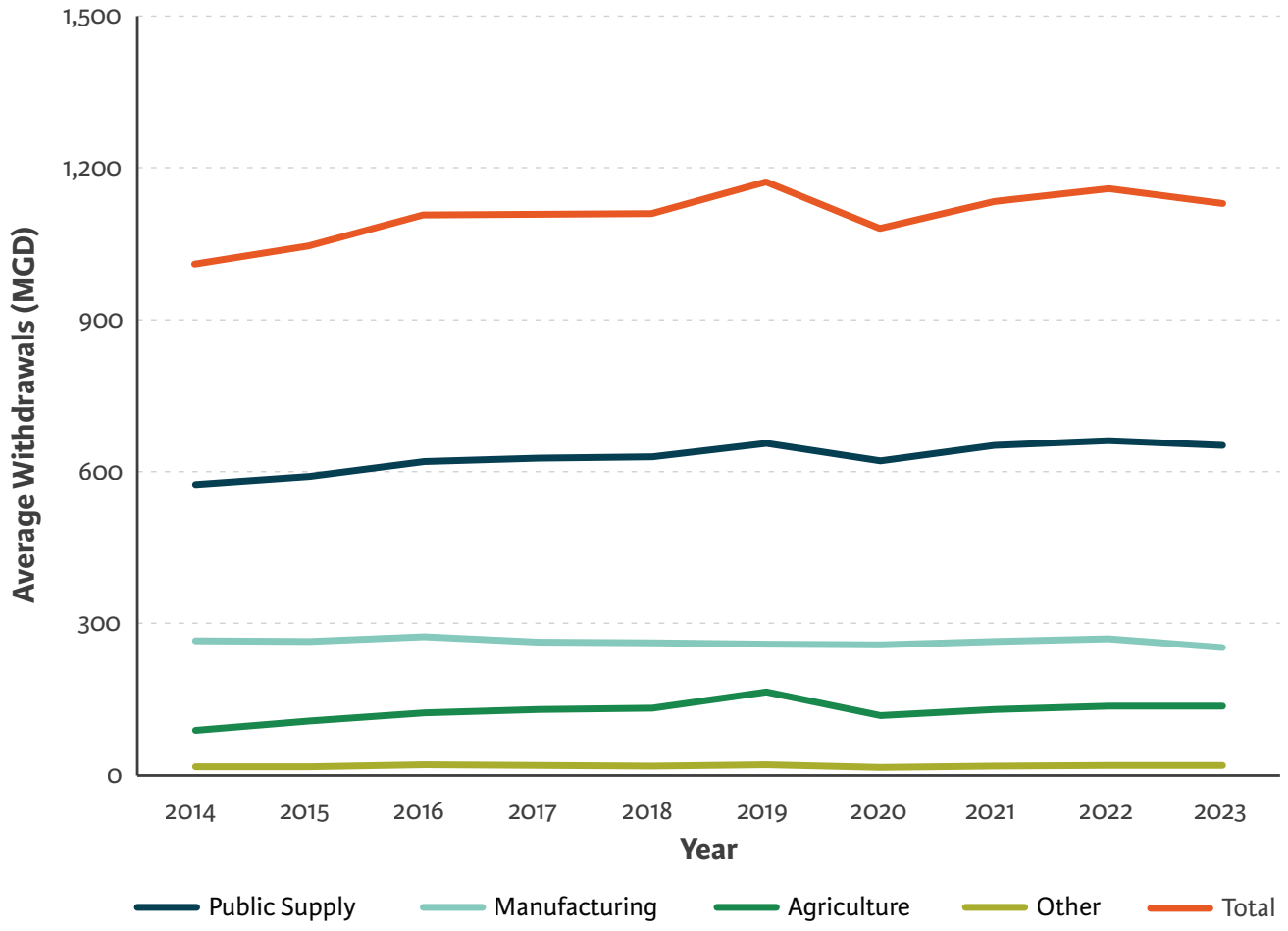


Figure 4-8. Statewide withdrawals by water use category for 2014 to 2023, excluding thermoelectric demand.

4.4 PERMITTED AND REGISTERED AMOUNT

As of April 2025, a total of 12,866 MGD of water has been permitted and registered. Of this amount, 5,913 MGD, or 46 percent, is currently withdrawn on average. Current water use is lower than the full P&R amount because most users have permits that account for estimated future demand. Also, when permits and registrations were originally issued, they were based on the maximum intake capacity. In some instances, the maximum intake capacity is well above the estimated future demand. **Table 4-2** shows the P&R amount compared to current use by water use category.

Hydroelectric use is not regulated with the same permitting process as other uses. Instead, it is mostly governed by permits issued by the Federal Energy Regulatory Commission (FERC) or governed by other federal use agreements. Because of this, current hydroelectric use is not included in Figures 4-9 or 4-10.

Table 4-2. Total P&R amounts by water use category, with portion currently withdrawn.

Water Use Category	P&R Amount (MGD)	Current Use (MGD)	Current Use (%)
Thermoelectric	7,019	4,753	68%
Public Supply	3,126	683	22%
Manufacturing	1,732	284	16%
Agriculture	829	171	21%
Other	160	23	14%
Total	**12,866**	**5,913**	**46%**

Figures 4-9 and **4-10** show the total P&R amounts of water by planning basin (the overall height of each bar) and the current average withdrawal (the dark portion of each bar) for surface water and groundwater, respectively.

P&R amounts are not reflective of water availability in the basin, as sufficient flows to satisfy such withdrawal rates cannot be guaranteed now or into the future. Chapter 3 of this report identifies river reaches that are, or may be, at risk of not being able to provide the full P&R water volumes all the time. Chapter 2 provides a map that shows the location of P&R users.

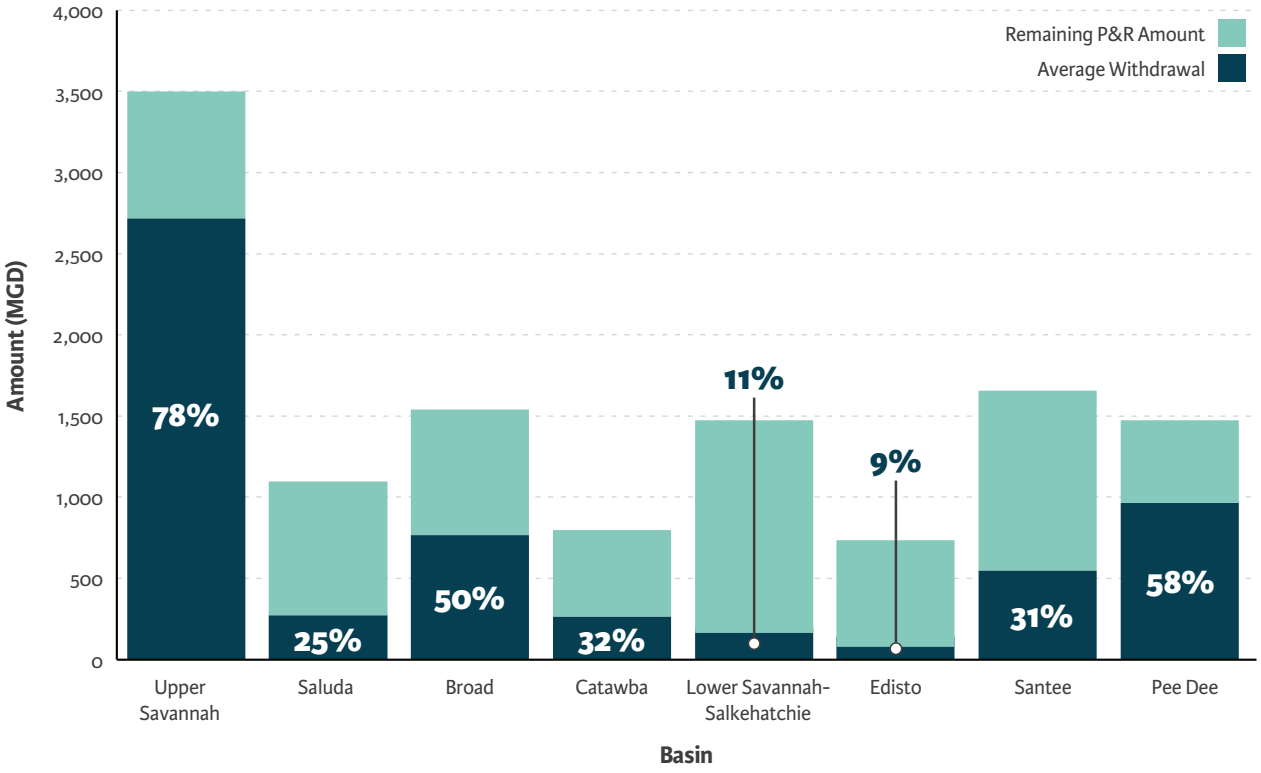


Figure 4-9. Surface water P&R amounts by basin, with the portion currently withdrawn.

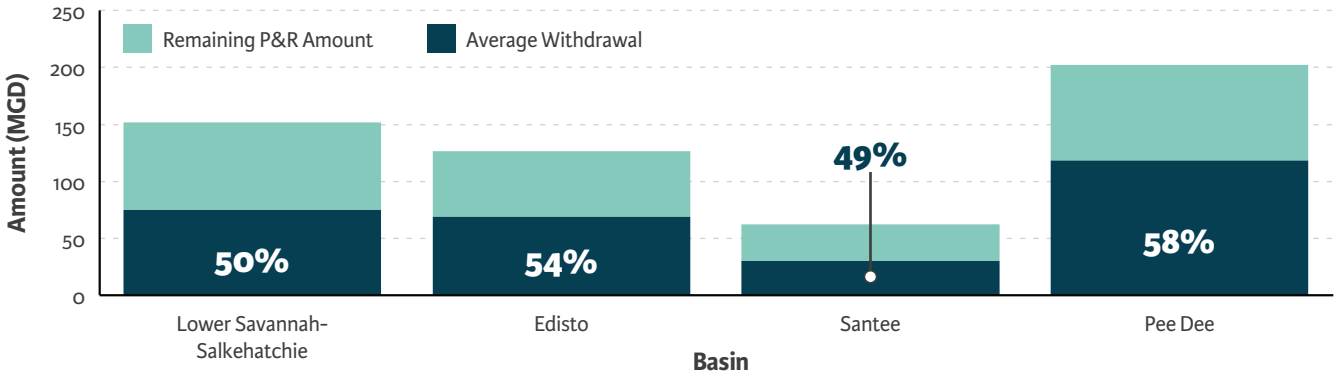


Figure 4-10. Groundwater P&R[1] amounts by basin, with the portion currently withdrawn.

[1]Only the planning basins in the Coastal Plain are shown since nearly all groundwater use in the Upstate basins is registered, not permitted, and groundwater registrations, unlike surface water registrations, do not include an amount.

4.5 WATER DEMAND PROJECTION METHODOLOGY

To assess the availability of South Carolina's water resources to meet future water demands, SCDES developed two water demand projections: the Moderate Demand Scenario and the High Demand Scenario. These demand projections are hypothetical planning scenarios of water use by sector through 2070 and support the analysis of water availability presented in Chapter 5. Water demand projection methodologies generally followed the guidance documented in the SCDNR report, *Projection Methods for Off-stream Water Demand in South Carolina* (SCDNR 2019b). Several RBCs made slight adjustments to certain projection methods to better reflect the conditions in their specific basin; however, these changes were generally minor, and all results are directly comparable.

Projections are not the same as forecasts. Forecasts aim to be accurate estimates based on expected conditions and actions, and they may be limited by the predictability of future conditions beyond a certain time frame. Projections aim to be informative rather than predictive. They help explore "what if" scenarios. For example, if water users withdraw on the high end of their historical use and growth continues at a higher-than-anticipated rate, would there be enough water to meet all of the demand?

The Moderate Demand Scenario is based on the assumptions of a normal climate (requiring average irrigation) and moderate population and economic growth. The High Demand Scenario is based on the assumptions of a hot and dry climate (requiring increased irrigation) and high population and economic growth. Assumptions about water use in different climate conditions are made by calculating users' median and maximum rates of monthly water use from the most recent 10-year period of water withdrawal reporting. Assumptions of normal climate conditions, requiring average irrigation, are incorporated by using median monthly rates of water use, while assumptions of hotter and drier conditions are represented by using the maximum monthly rates of water use. The High Demand Scenario is considered an extreme, upper limit, while the Moderate Demand Scenario represents a more reasonable expectation of future use.

Demand projections are calculated by multiplying either the median monthly rates of water use (Moderate Demand Scenario) or maximum monthly rates of water use (High Demand Scenario) by a driver variable applied for each major water use sector. **Table 4-3** lists the driver variable applied to each sector, data sources, and other assumptions included in the projection methods for each sector and scenario. Driver variable data were typically updated as new datasets became available; the River Basin Plans used the latest data available at the time they were written. The River Basin Plans provide additional details on the demand projection methodology. Projections were not developed for hydroelectric use.

Water demands are assigned to planning basins based on the point of withdrawal. There are some instances where water withdrawn in one basin is used to meet demand in a different basin (interbasin transfer). In that case, the water demand is assigned to the basin where water was withdrawn, not the basin where it is used. Water withdrawers were also assumed to meet their additional demand using the same source (surface water or groundwater) or using the same proportion of surface water to groundwater if the user had recent withdrawals from both sources.

Table 4-3. Driver variables and associated assumptions for each water use category.[1]

Water Use Category	Driver Variable	Driver Variable Data Source	Moderate Demand Scenario	High Demand Scenario
Public Supply	County Population	County-level population projections from SC ORFA	SC ORFA projection to 2038; extend linearly or assume constant population at 2038 levels if the population projection is negative from 2039 to 2070	Assumes exponential growth, with projected county growth rates set to 10% above the county rate or the state average rate, whichever is higher
Manufacturing	Economic Production	Subsector growth rates from EIA	Subsector growth rate, with the minimum adjusted to 0% to 2050 and then 0.3% from 2051 to 2070	Subsectors with growth rates above EIA national average are increased by 10%, otherwise, growth is set to EIA national average
Agriculture	Irrigated Acreage	National-scale studies[2]	Annual growth rate of 0.65%	Annual growth rate of 0.73%
Thermoelectric	Energy Demand	IRP information and communication with facility representatives	Varies by facility	Varies by facility
Other (Golf Course, Mining, Aquaculture)	NA	NA	Assumed constant	Assumed constant

Key: % – percent, EIA – U.S. Energy Information Agency, IRP – Integrated Resources Plan, NA – not applicable, SC ORFA – South Carolina Office of Revenue and Fiscal Affairs

[1] *This table represents the methodology applied to all basins except the Catawba, as further explained later in this chapter.*

[2] *Based on national studies from Brown et al. (2013) and Crane-Droesch et al. (2019).*

Demand projections for the Catawba River basin were developed for the Catawba-Wateree Water Management Group's (CWWMG's) Integrated Water Resources Plan (IWRP). The CWWMG's IWRP included a single deterministic projection based on best estimates of future demand and a range of probabilistic projections to represent lower and higher ranges of possible future use. The IWRP's 50th percentile projection is used as the Moderate Demand Scenario projection, and the IWRP's 95th percentile projection is used as the High Demand Scenario projection. *The Integrated Water Resources Plan: Water Demand Projection Updates* report summarizes additional information for water demand projections for the Catawba River basin (HDR 2023).

SC ORFA regularly updates their county-level projections. Each River Basin Plan used the most recent population projection available at the time. ***Figure 4-11*** *presents SC ORFA's 2022 historical population projections, which were used for all River Basin Plans except for the Edisto and Broad.*

Demand projections for the public supply sector were developed based on county-level population projections from SC ORFA, which do not extend to the end of the planning horizon in 2070. For the Moderate Demand Scenario, SC ORFA projections are extended linearly to 2070. If SC ORFA projections indicate a decline in population, then the extension to 2070 is held steady at the last year of projected data. For the High Demand Scenario, populations are projected to grow exponentially. If SC ORFA projected growth, then the fitted exponential growth rate was increased by 10 percent. If the SC ORFA projection for a county was less than the state average, then the exponential growth rate was set at 10 percent above the state average. This approach results in estimates of population growth that are likely to be conservatively high for both demand scenarios. Using this approach, population is projected to increase from 5.13 million in 2020 to 7.73 million in 2070 in the Moderate Demand Scenario, and to 10.6 million in the High Demand Scenario.

Figure 4-11 shows the projected percent change in population from 2025 to 2038, based on the SC ORFA population projections. Some counties are projected to experience population declines, while others may experience substantial growth. Some areas of higher population growth are projected in coastal and northwestern counties. Populations are multiplied by a systemwide per capita usage to calculate public supply demand projections.

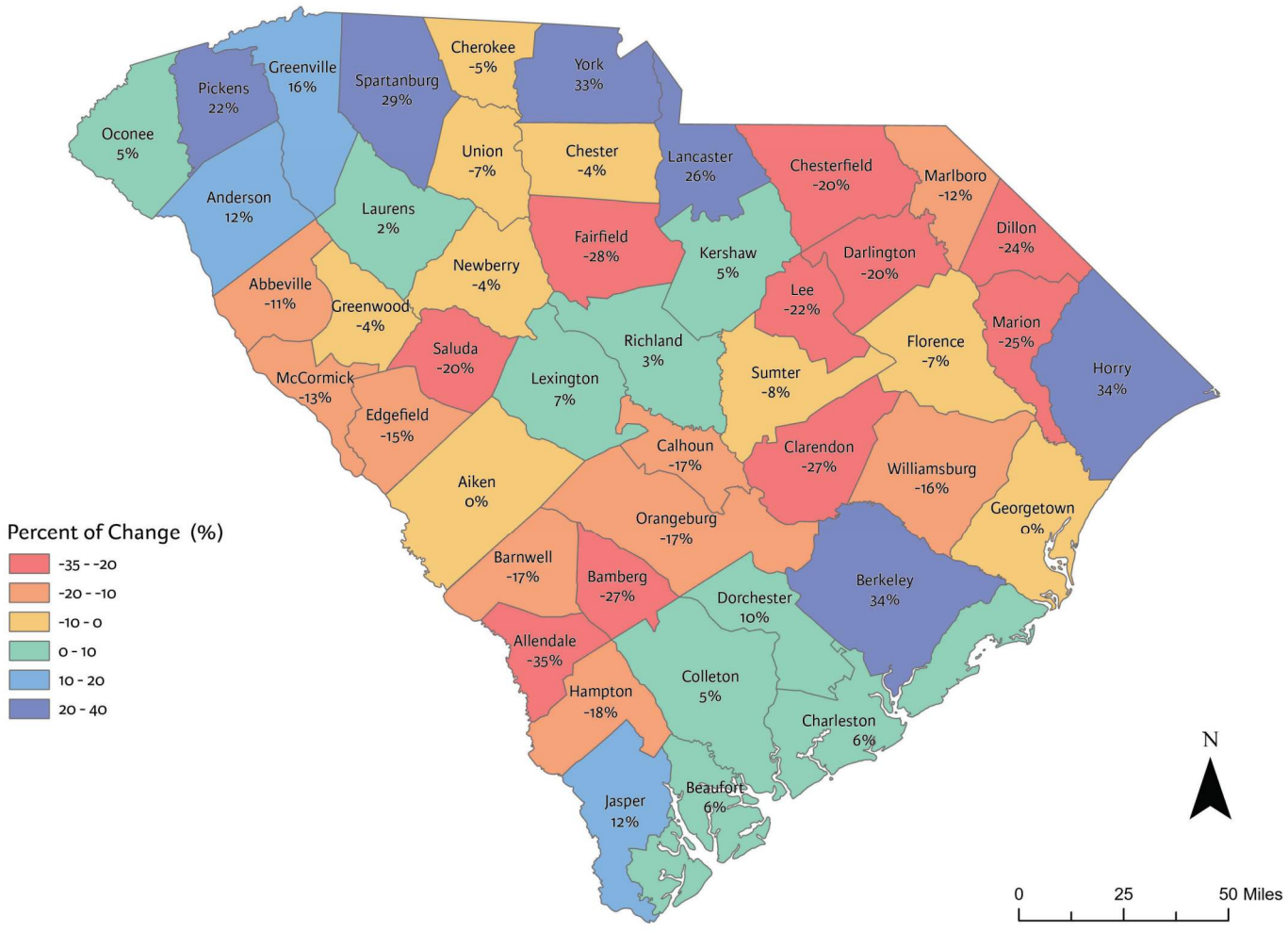


Figure 4-11. SC ORFA 2025 to 2038 projected population growth from 2022 historical projections.

4.6 WATER DEMAND PROJECTIONS

4.6.1 Demand Projections Statewide

*This chapter discusses projected changes in demand by comparing the projected 2025 demand to the projected 2070 demand (the beginning and the end of the dashed lines shown in **Figure 4-12**), rather than comparing the current water use (the average of the solid lines shown in **Figure 4-12**) to projected 2070 demand. The Moderate Demand Scenario and High Demand Scenario have different starting points in 2025 because, while they have the same number of starting users, the rates of water use for those users differ. The Moderate Demand Scenario uses the median rate of recent historical use and the High Demand Scenario uses the maximum rate of recent historical use.*

For planning purposes, statewide total water demands, including thermoelectric but excluding hydroelectric, are projected to reach 6,190 MGD in the Moderate Demand Scenario and 7,919 MGD in the High Demand Scenario by 2070. Thermoelectric water demand, which is almost entirely returned to the surface water system after use, is projected to decrease by 2070 because of two coal-fired power plant closures in the Santee River basin in 2030 and 2035, and one nuclear power plant closure in the Catawba River basin in 2065. However, there is considerable uncertainty in projected water demands for energy production, given the growing need for electricity and the federal government's recent phasing out of subsidies for renewable sources such as solar and wind, which do not require water. Excluding thermoelectric use, water demands for the remaining use categories are projected to increase between 2025 and 2070 by 51 percent, from 1,177 to 1,777 MGD, in the Moderate Demand Scenario, and by 95 percent, from 1,542 to 3,008 MGD, in the High Demand Scenario. **Figure 4-12** shows the projected demand scenarios with recent historical use.

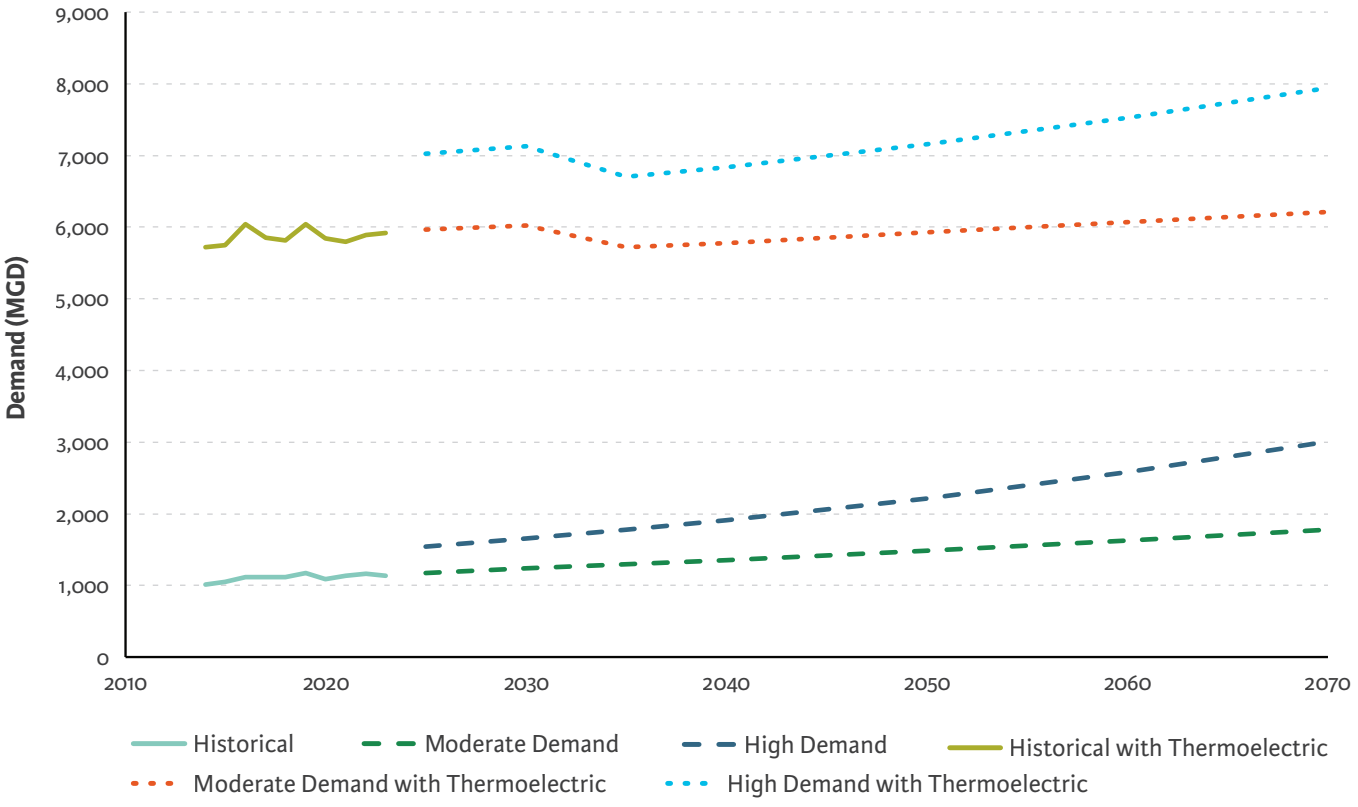


Figure 4-12. Historical and projected statewide water demands.

Even though thermoelectric demands are projected to decrease by 2070, thermoelectric is still projected to be the largest use category statewide. However, the percentage of total statewide demand coming from thermoelectric use is projected to drop from 80 percent under current conditions to 62 percent by 2070 (in the High Demand Scenario), while demands from public supply, agriculture, and manufacturing increase. Similar trends are observed in the Moderate Demand Scenario. **Figure 4-13** shows the percentage of total demand for each water use category in 2070 under the High Demand Scenario.

Water resources do not follow political boundaries, meaning South Carolina's water resources are shared with and impacted by use from adjacent states. The Savannah River flows between Georgia and South Carolina, with both states withdrawing for their needs and returning the nonconsumptive portion. The Broad, Catawba, and Pee Dee River basins have their headwaters in North Carolina, with withdrawals from North Carolina users impacting the availability of flow for South Carolina users. Similarly, declines in groundwater levels associated with withdrawals may extend across state boundaries. The surface water modeling effort associated with the River Basin Plans accounted for current and future demands projected in these states.

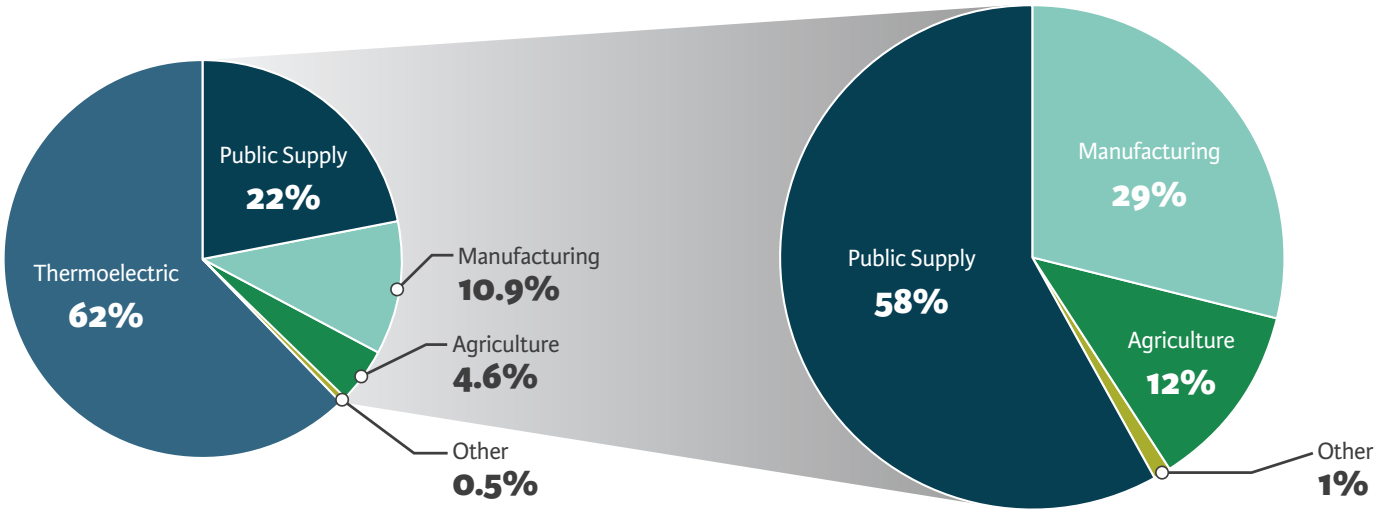


Figure 4-13. Percentage of demand by water use category in 2070 under the High Demand Scenario, with thermoelectric use (left) and without thermoelectric use (right).

Columbia Canal Water Treatment Plant

The total withdrawal statewide is projected to increase 2 percent in the Moderate Demand Scenario and 11 percent in the High Demand Scenario. The net withdrawal of water (water that is withdrawn from surface water or groundwater, used, and not returned to the system after use) is projected to increase by 18 percent in the Moderate Demand Scenario and 43 percent in the High Demand Scenario in 2070. **Table 4-4** summarizes the projected change in withdrawal. All demands presented after this point are the total demand rather than just the consumptive or net use.

Table 4-4. Projected total and net water demand.

	MODERATE DEMAND SCENARIO				HIGH DEMAND SCENARIO			
Water Use	Projected 2025	Projected 2040	Projected 2070	Percent Change 2025 to 2070	Projected 2025	Projected 2040	Projected 2070	Percent Change 2025 to 2070
Total Use	6,058	5,869	6,190	2%	7,142	6,957	7,919	11%
Net Use	984	979	1,163	18%	1,310	1,362	1,879	43%

4.6.2 Demand Projections by Water Use Category

The magnitude of projected increases (or decreases) in water demand vary by sector, as shown in **Figure 4-14**. Most of the growth in both scenarios is projected to occur in the public supply sector, followed by the manufacturing sector. Most of the withdrawals for both public supply and manufacturing are expected to come from surface water. Approximately 10 percent of total growth is projected to occur in the agricultural sector. Most of the projected agricultural withdrawal will be from groundwater. Other uses, including golf course irrigation, mining, and aquaculture, are projected to remain stable through 2070. The percentage of water demand met by surface water or groundwater is projected to stay nearly constant as demands increase since each user's current proportion of demand met by surface water to groundwater was assumed to remain constant.

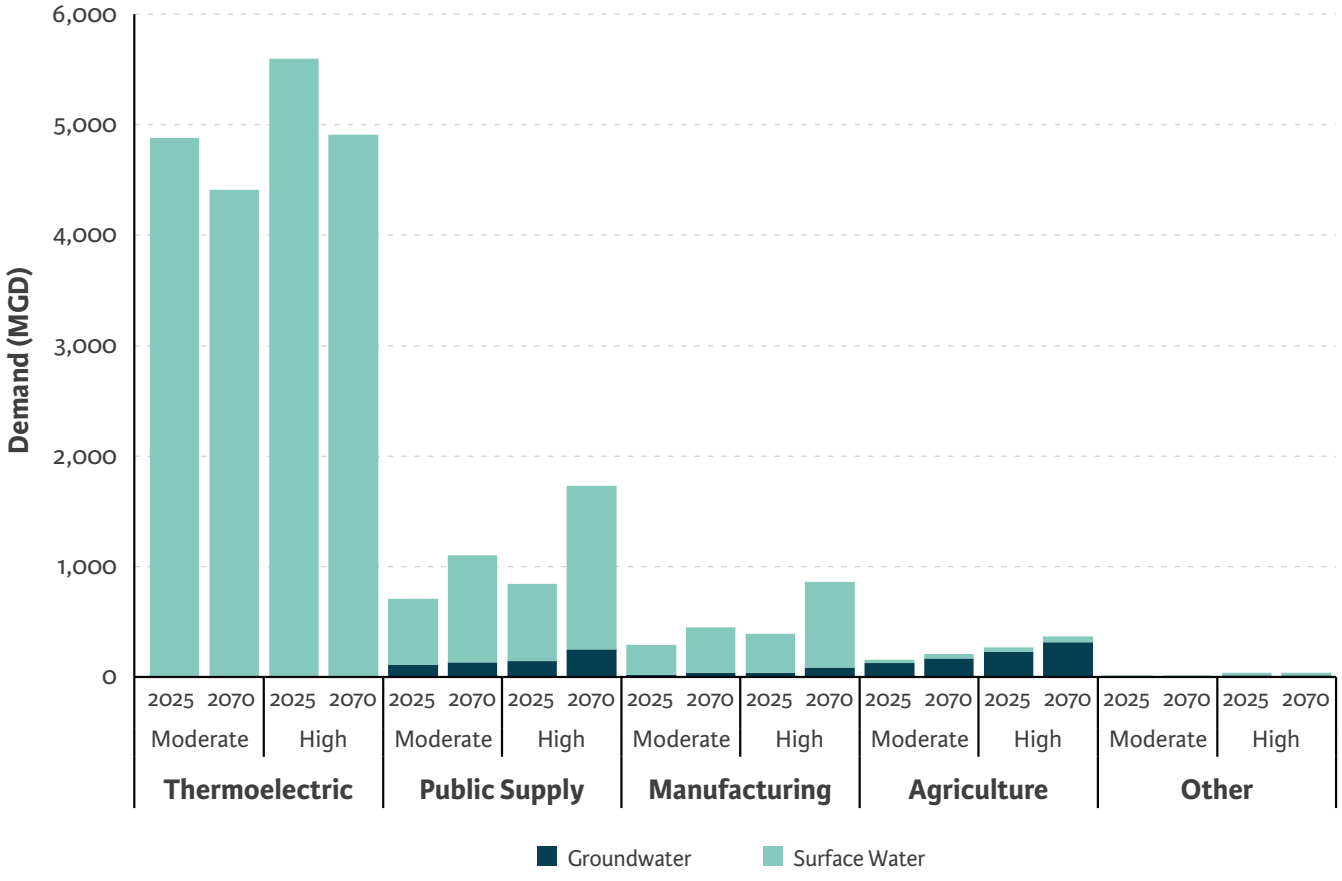


Figure 4-14. Statewide demand projections by water use category and source.

4.6.2 Demand Projections by Planning Basin

Demand projections by planning basin and water source are shown for the Moderate Demand Scenario in **Figure 4-15** and for the High Demand Scenario in **Figure 4-16**. The largest demand growth by volume is projected in the Pee Dee River basin, where demand is projected to increase by 118 MGD (12 percent) and 417 MGD (34 percent) over 2025 demands for the Moderate and High Demand Scenarios, respectively. The largest levels of growth by percentage are projected in the Edisto River basin. Overall demands are projected to decrease in the Santee River basin for both demand scenarios and in the Catawba basin for the Moderate Demand Scenario because of the closure of thermoelectric facilities. The lowest levels of positive growth by volume are in the Lower Savannah-Salkehatchie and Saluda planning basins. In each basin, the percentage of withdrawal coming from groundwater or surface water is projected to remain nearly constant as demands increase.

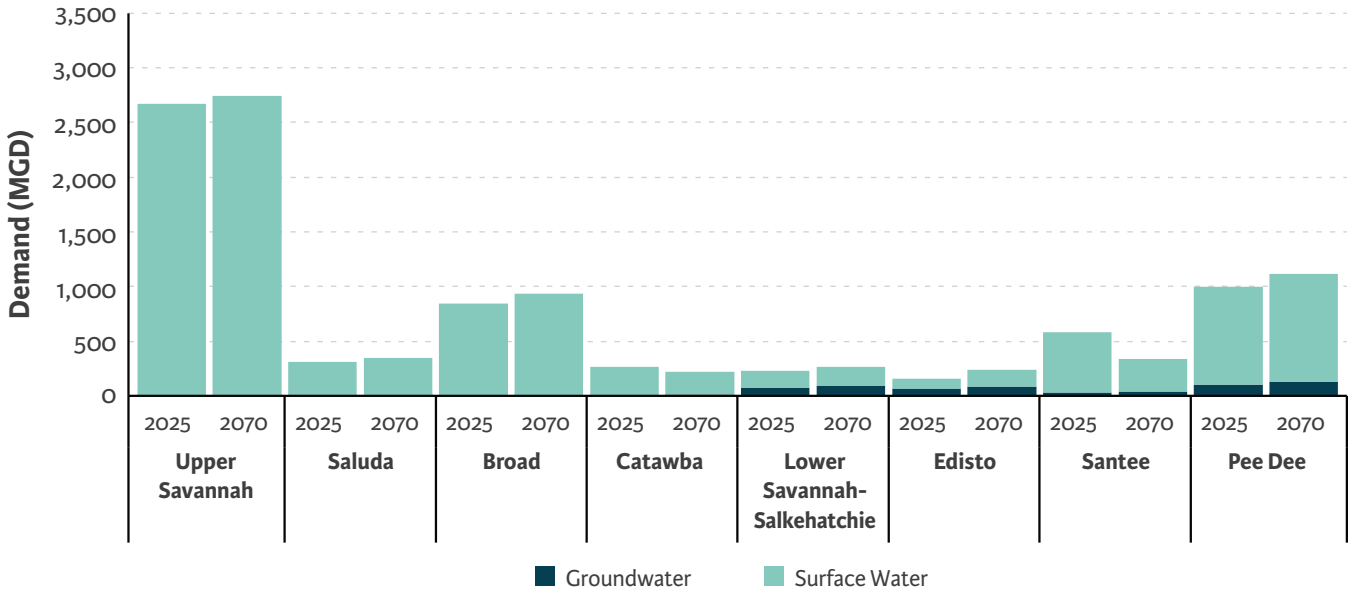


Figure 4-15. Moderate Demand Scenario projections by source and by basin.

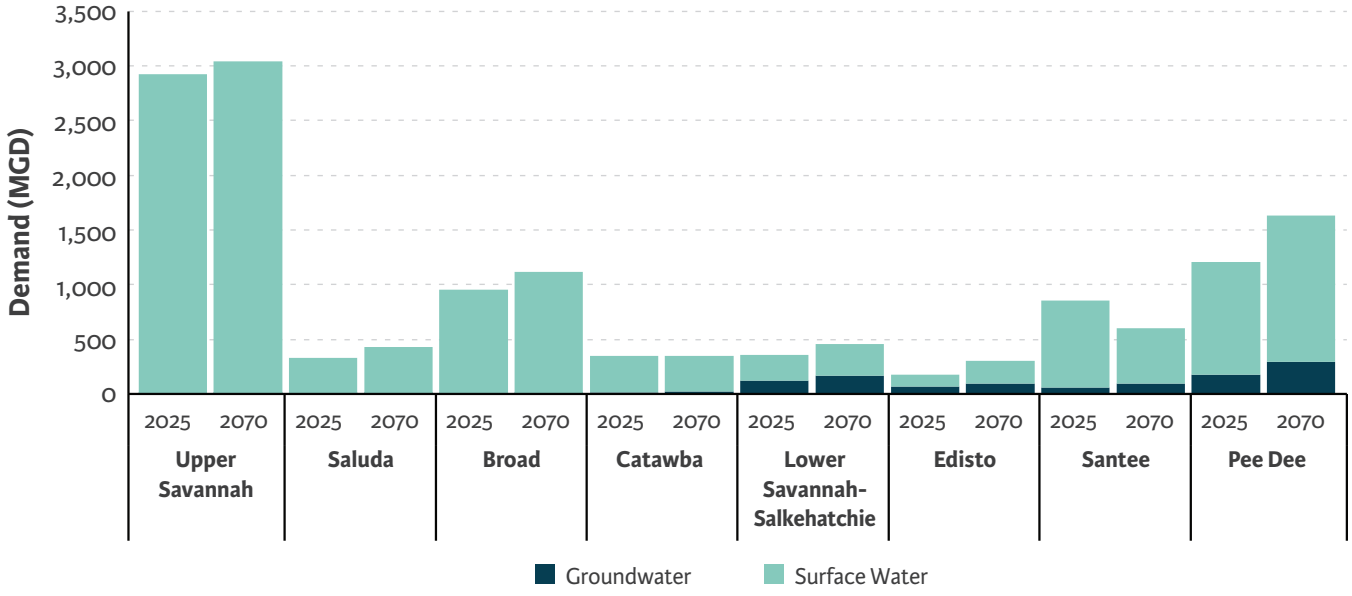


Figure 4-16. High Demand Scenario projections by source and by basin.

Figures 4-17 and **4-18** present demand projections by planning basin and for each water use category. Thermoelectric use is projected to be the largest use category in 2070 for the Upper Savannah, Saluda, Broad, and Pee Dee planning basins; however, demand levels are projected to decrease, be steady, or grow minimally between 2025 and 2070. The remaining basins have public supply as the largest projected 2070 use category.

Demand growth may not be as high as expected in some planning basins based on the communities located within them. For example, Greenville, while located in the Saluda basin, sources water from both the Saluda and Upper Savannah basins. Based on discussions with Greenville Water, future growth will be met from Lake Keowee in the Upper Savannah River basin. Demand projections are shown based on the location of withdrawal, so all projected increases in demand for Greenville are included in the Upper Savannah basin, and Greenville's demand from the Saluda basin will remain at current levels.

Public supply is the category of use with the largest projected increase in demand by volume for all basins except the Santee and Saluda River basins, where manufacturing is projected to increase at similar or slightly higher levels. The Edisto, Lower Savannah-Salkehatchie, and Pee Dee River basins, which are almost entirely within the Coastal Plain, also have significant agricultural water use, which is projected to increase by approximately 30 percent in the Moderate Demand Scenario and 40 percent in the High Demand Scenario, compared to 2025 agricultural water demands.

The recent demand trends described in Section 4.3 showed the largest growth in water demands for public supply and agriculture over the last 10 years. The projected demands also show the largest growth by volume in the public supply water use sector; however, where manufacturing demands have been relatively constant in recent years, they are projected to increase in both the Moderate and High Demand Scenarios by 2070, with a significant portion of the growth occurring in the Pee Dee and Santee River basins.

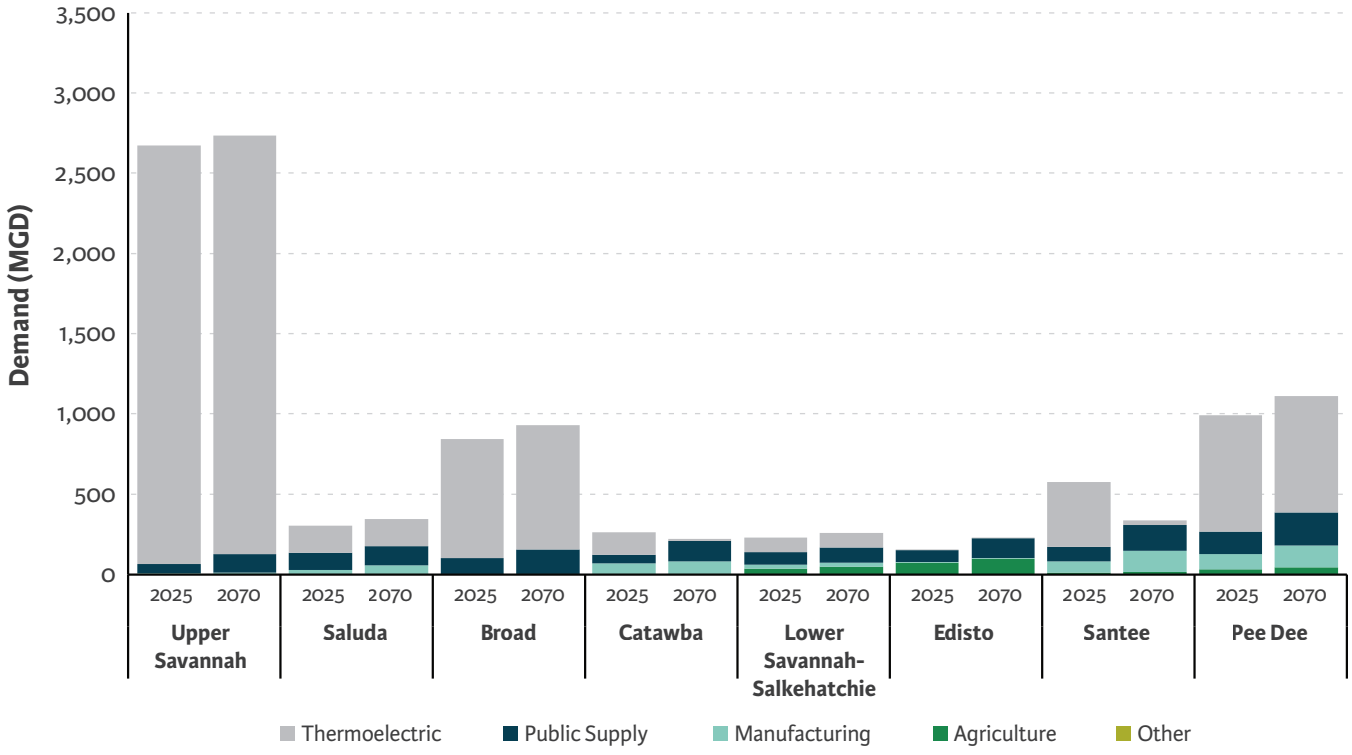


Figure 4-17. Moderate Demand Scenario projections by water use category and by basin.

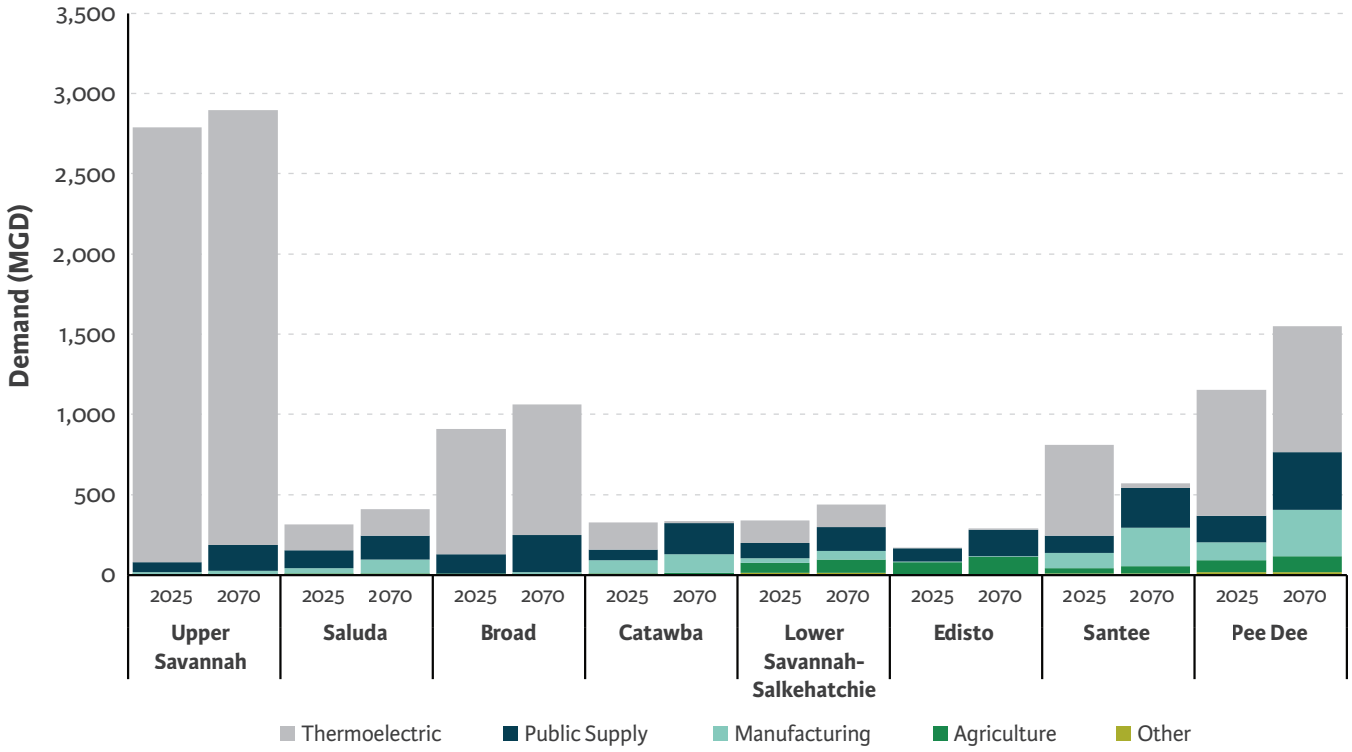


Figure 4-18. High Demand Scenario projections by water use category and by basin.

ReWa Mauldin Road Water Resource Recovery Facility

4.6.3 Comparison to P&R Amount

Excluding hydroelectric use, which is not governed by state permits and is generally regulated by FERC, the total projected water demand in 2070 in the High Demand Scenario is 7,919 MGD, which is still below the current total P&R surface water amount of 12,866 MGD. The 2070 demand projections reach 62 percent of current P&R amounts statewide, with basin-specific amounts ranging from 28 percent in the Lower Savannah-Salkehatchie River basin to 98 percent in the Pee Dee planning basin (**Figure 4-19**).

This comparison of projected demands to current P&R amounts highlights how some planning basins have P&R amounts far above current water demand and even above the projected 2070 demand of the High Demand Scenario. The high P&R amounts may lead to difficulty obtaining new registrations or permits in some basins as the safe yield is neared, even though actual demands are much lower.

As previously noted, P&R amounts are not reflective of water availability, and the amount permitted or registered to users cannot be guaranteed at all times. Additionally, the current P&R amount does not account for any new users in the basin between now and 2070. Some of the projected water demand growth will be from increased use by existing users, as is likely the case for most public supply users, while some of the growth may be from new users, such as new manufacturing or agricultural operations. New users would require new permits or registrations and would increase the P&R amount.

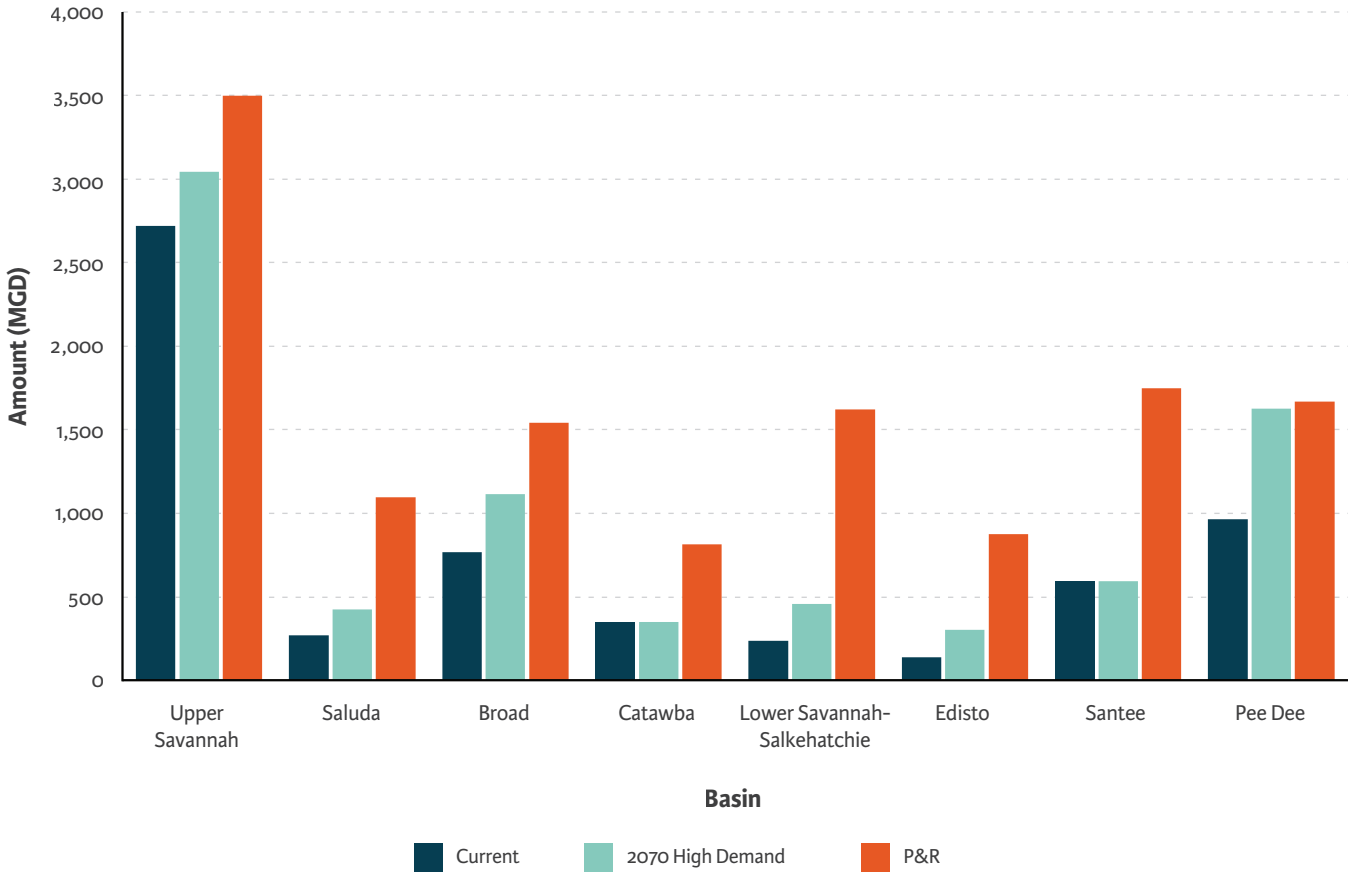


Figure 4-19. Permitted and registered amounts by basin compared to the projected 2070 withdrawal in the High Demand Scenario and current water use. *P&R amounts do not represent water availability.*

4.6.4 Energy Projection Uncertainties

The water demands associated with energy production presented herein were based on the U.S. Energy Information Agency (EIA) reports available at the time of River Basin Plan development, and on direct communication with representatives from the energy-producing facilities. Since the River Basin Plans were published, changes have been forthcoming for energy-producing facilities in South Carolina. For example, as of August 2025, there are plans to potentially restart construction of the V.C. Summer facility in Jenkinsville, and transform a retired coal plant in Canadys into a natural gas plant. Also, Duke Energy recently announced plans for a new natural-gas-fired power plant in Anderson County. Future iterations of River Basin Plans and the State Water Plan will assess the total and consumptive water use of these and any other newly proposed facilities.

Considerations related to energy and data center demands: The demand projections presented in this chapter followed the methodology of the Planning Framework and were based on best available information at the time each River Basin Plan was developed. Changes to water demands from energy production facilities and from the growing industry associated with data centers represent an uncertainty with the current projections. Future updates to River Basin Plans and the State Water Plan will include revisions to these projections based on the ever-changing state of development.

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. Data centers are large warehouses filled with internet-connected devices that perform computing tasks. As of March 2025, there are 5,426 data centers nationally (Taylor 2025). One estimate places the current number of data centers in South Carolina at 39 (Baxtel 2025). Data centers are energy intensive, generating heat from completing computations. Water withdrawn for data centers is typically used for cooling the equipment, with rates of water usage dependent on the facility's location, size, and equipment density, and the local climate and water availability. Google reports that across its data centers, approximately 80 percent of the water that was withdrawn in 2024 was used consumptively by evaporation, and the remaining 20 percent was returned (Google 2025). The annual usage by facility varied from 0.1 million gallons per year (36.5 MGD) to 1.4 billion gallons per year (511,000 MGD) (Google 2025). In addition to the water use required directly by the data centers for cooling purposes, there is also water demand for the power plants that provide electricity to the data centers. Water use parallels energy use in that as data centers consume more energy, they also withdraw larger amounts of water (Shehabi 2024). Future planning cycles will continue to revisit and address how data centers impact water use in South Carolina.

Canoeing the Edisto River