

HILTON HEAD PUBLIC SERVICE DISTRICT
21 OAK PARK DRIVE– POST OFFICE BOX 21264
HILTON HEAD ISLAND, SOUTH CAROLINA 29925
TELEPHONE 843-681-5525 – FAX 843-681-5052

MARCH 2024 AGENDA PACKET CONTENTS

1. Agenda for the March 27, 2024, Regular Commission Meeting
2. Draft Minutes of the February 28, 2024, Board Meeting
3. GM Eval Process
4. Memo from the Vice-chair Regarding the FY'24 GM Eval Process
5. FY'24 GM Eval Timetable
6. General Manager's Monthly Report
7. Press Release – Hickman Earns Statewide Honors
8. Lower Savannah-Salkehatchie River Basin Council Water Use PowerPoint
9. Lower Savannah-Salkehatchie River Basin Council Water Demand Projections PowerPoint
10. Lower Savannah-Salkehatchie River Basin Council Agriculture Overview PowerPoint
11. Editorial from Post and Courier Entitled DHEC must act decisively on septic tanks along SC Coast – FYI
12. Charts, Graphs and Water Quality Report



Agenda

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www.hhpsd.com

AGENDA

Hilton Head Public Service District Commission

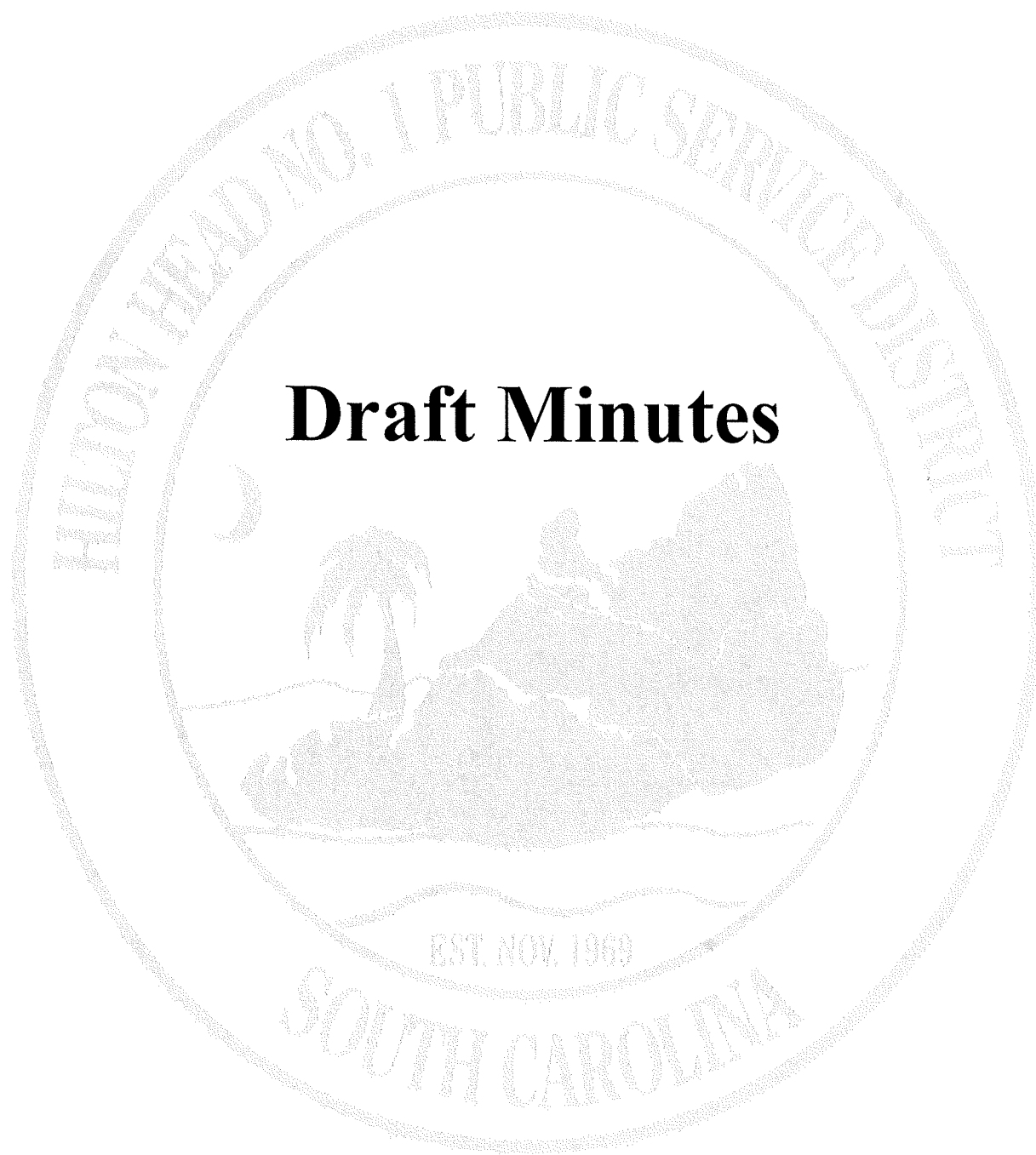
9 a.m.

March 27, 2024

PSD Community Room

21 Oak Park Drive, Hilton Head Island, SC 29926

- I. Call to Order & Freedom of Information Act Announcement
- II. Pledge of Allegiance
- III. Roll Call of Commissioners
- IV. Public Comment on Non-Agenda Items
- V. Adoption of Draft Minutes of the February 28, 2024, Regular Meeting
- VI. S.C. DHEC & Water Environment Association of S.C. Awards Recognition
- VII. Annual GM Performance Evaluation Process
- VIII. General Manager's Monthly Report
- IX. Adjournment



Draft Minutes

HILTON HEAD NO.1 PUBLIC SERVICE DISTRICT

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HILTON HEAD ISLAND, SOUTH CAROLINA 29925
TELEPHONE 843-681-5525 – FAX 843-681-5052

MINUTES COMMISSION MEETING FEBRUARY 28, 2024

I. The meeting was called to order by Chairman Frank Turano at 9:02 a.m.

II. Those in attendance were:

Mr. Frank Turano	Chair
Mr. Jerry Cutrer	Vice Chair
Mr. Stuart Bell	Treasurer
Mr. Andy Paterno	Commissioner
Mr. Ibrahim Abdul-Malik	Commissioner
Mr. Michael Marks	Commissioner

Present by request:

Mr. Pete Nardi	General Manager
Mr. Bill Davis	Operations Manager
Ms. Amy Graybill	Finance Manager
Ms. Connie Whitehead	Commission Recording Secretary

Absent:

Mrs. Patti Soltys	Secretary
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Visitors

None

III. Pledge of Allegiance

The Pledge of Allegiance was led by Mr. Frank Turano

IV. Public Comment on Non-Agenda Items

None

V. Adoption of Draft Minutes of the January 28, 2024, Commission Meeting

Action

- Mr. Bell moved to adopt the minutes as presented. Mr. Abdul-Malik seconded. The motion passed unanimously.

VI. 2024 SRF Loan Application

Key Discussion Points

- During fall of 2023, the District submitted a Project Questionnaire to the State Revolving Fund (SRF) and SC DHEC to request loan funding for the local match portion of the SCIP grant RO Plant Expansion & ASR projects and the Beaufort County ARPA allocation Leg-o-mutton Booster Pump replacement project. The SRF & SCDHEC has placed the engineering only portion of these projects on their intended use list for an amount up to \$2,589,929. The next step to obtain this loan is to submit a loan application.
- Staff presented a resolution for board consideration authorizing the Hilton Head PSD General Manager and/or Finance Manager to complete, execute, and submit to the State Authority the loan application to the SC Water Quality Revolving Fund Authority.

Action

- Mr. Bell moved to adopt the resolution authorizing the application to the SRF. Mr. Cutrer seconded. The motion passed unanimously.

VII. FY'24 Second Quarter Financial Report

Key Discussion Points

- Ms. Graybill presented the FY'24 Second Quarter Financial Report. A copy is included in the agenda packet.

VIII. General Manager's Monthly Report

Key Discussion Points

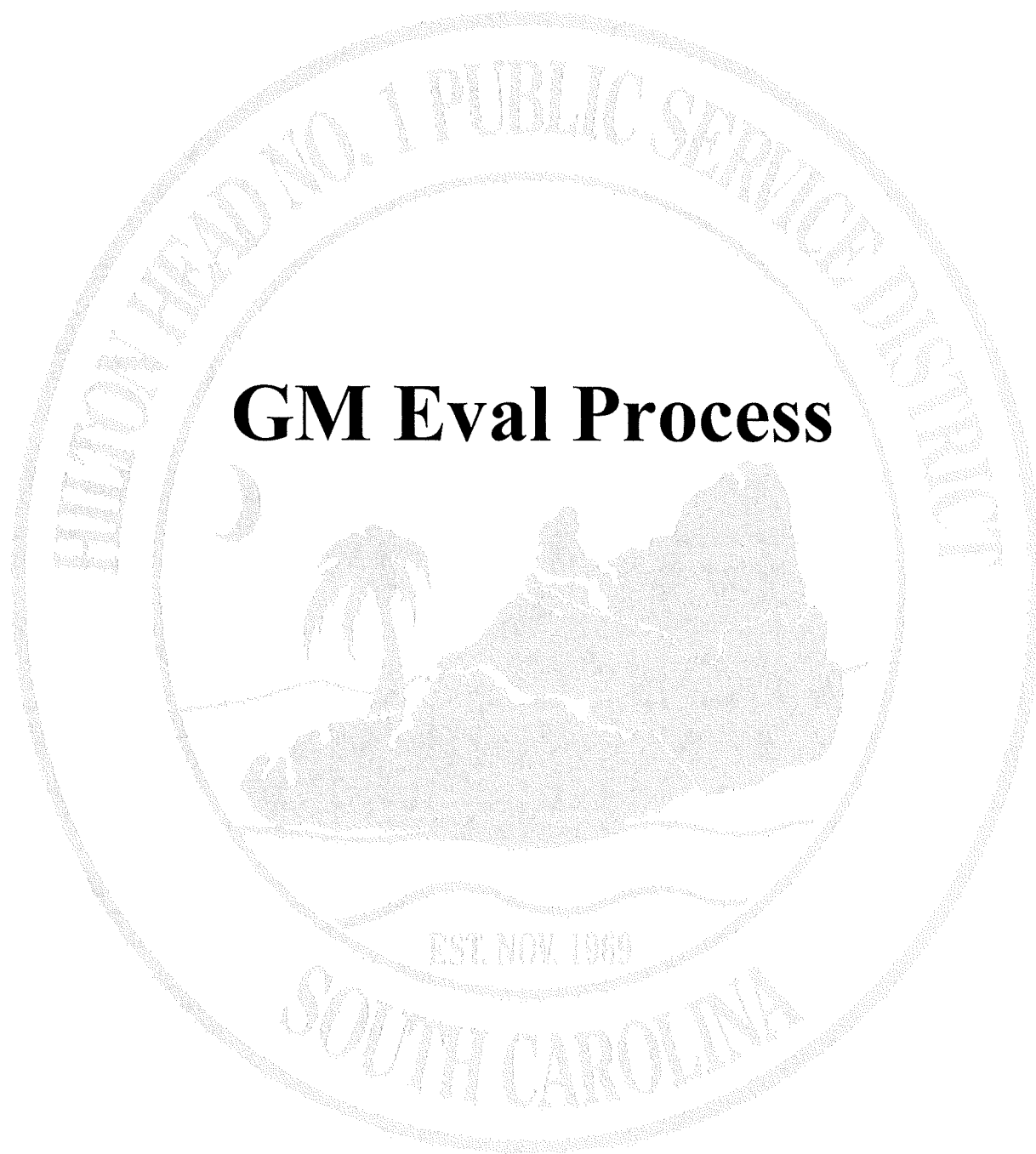
- Mr. Nardi presented the General Manager's Monthly Report. A copy is included in the agenda packet.
- The Leg-o-mutton booster station project went out for bid yesterday and will close March 28.
- The S.C. General Assembly has declared the first Monday of March every year as Water Professionals Day.

IX. Adjournment

Action

- Mr. Paterno moved to adjourn the meeting. Mr. Cutrer seconded. The meeting adjourned at 9:50 a.m.

GM Eval Process





TO: Hilton Head PSD Commissioners
FROM: Jerry Cutrer
SUBJECT: GM Evaluation FY 2024
DATE: March 13, 2024

At its August 23, 2023 meeting, the Board of Commissioners reviewed the process followed for the FY 2023 GM Review and the proposed Evaluation Timetable for FY 2024. The Board voted to (i) continue the prior year's process for FY 2024 using the PSD's Strategic Goals & Objectives as the basis for evaluation, (ii) discontinue use of the Scoring Matrix, and (iii) adopt a Revised Timetable to omit the Matrix. At its November 15, 2023 meeting, the Board of Commissioners voted to adopt an updated set of Strategic Goals & Objectives.

Attached is the Revised GM Evaluation Timetable for FY 2024. The remaining steps to be followed in the GM Evaluation process are outlined in the Timetable.

**HILTON HEAD PUBLIC SERVICE DISTRICT
GM EVALUATION TIMETABLE
FY 2024
REVISED AUGUST 23, 2023**

Step	Event	Date
1	Review FY 2023 evaluation process and confirm continued use of Strategic Goals and Objectives as basis for GM evaluation	8/23/2023
2	Review and adopt updated Strategic Goals & Objectives	TBD *
3	Distribute GM's 3rd Quarter Management Report, GM's Annual Performance Highlights Report and Strategic Goals & Objectives	4/24/2024
4	Due date for Commissioner submission of GM evaluation comments	5/8/2024
5	Executive Committee reviews Commissioner comments, GM's 3rd Quarter Management Report, and GM's Annual Performance Highlights Report, then develops recommendation for GM evaluation and range of compensation package with draft GM evaluation letter	5/15/2024
6	Commission Executive Session to consider Executive Committee recommendations and vote on evaluation letter and compensation package	5/22/2024
7	Chairman meets with GM to review evaluation	6/5/2024
*	Completed 11/15/23	
Dates in BOLD (8/23/23, 11/15/23, 4/24/24 and 5/22/24) are Board meeting dates.		



GM Monthly Report



HILTON HEAD PUBLIC SERVICE DISTRICT

To: Hilton Head PSD Commission
From: Pete Nardi, General Manager
Re: PSD Updates

March 18, 2024

Dear Commissioners, please see below the following updates:

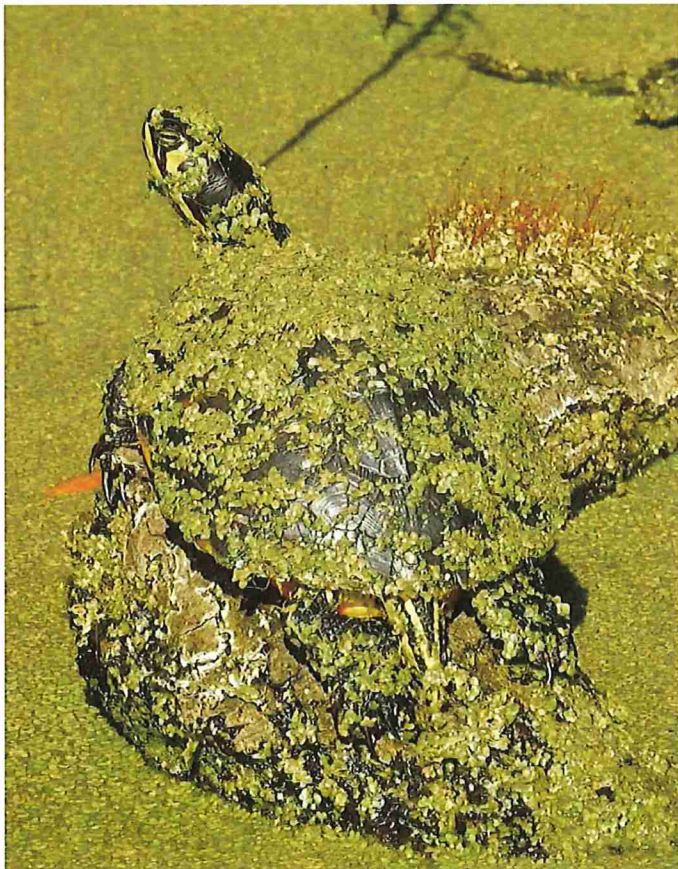
- We are experiencing demand of approx. 6 million gallons a day (mgd), which is normal for the prevailing weather conditions. We completed Aquifer Storage & Recovery recharge on March 11 with a total recharge amount of 263 million gallons.
- SCIIP and ARPA Grant Projects Update:
 - The Leg O'Mutton Booster Station project, funded by a direct allocation of ARPA monies from Beaufort County, has been put out for bid. Bids are due back March 28. We held an information meeting for bidders on March 14 with one potential bidder and one potential supplier attending.
 - The RO Plant Expansion, RO Well #4, ASR Well #2, and associated pipeline work, remains estimated for bidding in May 2024, with construction completion estimated for April 2026. We have made a design modification related to siting of the liquid chlorine tank for the plant, which will necessitate revised Town of HHI approval.
 - We have prepared a loan application from the S.C. State Revolving Fund, which we have been approved to use for our SCIIP engineering expenses. The Commission has approved staff preparing the loan application.
- PSD participated this month in a statewide earthquake disaster response exercise in conjunction with the Town of HHI Emergency Management. The tabletop scenario was based on a 7.1-magnitude earthquake centered north of Charleston and included collapse of the bridges to Hilton Head Island.
- Our annual free worksite health screening for employees and spouses was held this month with 34 participants. The screening constitutes the lab portion of an annual physical and is a \$250 value.
- We held a meeting this month for staff with Empower, our 401k/457b provider, which featured a plan overview as well as the opportunity for one-on-one appointments with our Empower representative.
- We will be holding our annual Team-Building sessions beginning this month. This year, we have partnered with Warrior Enterprises, which is a local firm that provides corporate training using site-based historical leadership scenarios. The sessions will be at Historic Mitchelville Freedom Park and the Battle of Port Royal Sound will be used as the training basis. A big thanks to Connie for helping organize the sessions!
- Amy Graybill this month attended the AWWA Non-Revenue Water Seminar, which guided participants through the use of the AWWA's non-revenue water computerized model.

- Pete Nardi, Water Treatment Technician Tim Ryan, Water Quality Supervisor Sarah Hickman, and Project Manager Pete Schuelke attended the S.C. Environmental Conference. A news release about PSD awards received at the conference is attached. Sessions/meetings attended included S.C. Water Quality Association update meeting, S.C. Water Utility Council update meeting, WaterReuseSC meeting, Joint Asset Management Committee meeting, U.S. EPA Region 4 update meeting, Utility Relocation Funding, Directional Bore Projects, PFAS Evaluations/Case Studies, Alternate Project Delivery Methods, Smart Tanks, Lead & Copper Rule, S.C. Utility Rates Update, among others.
- Pete Nardi this month attended a meeting of the Joint Upper and Lower Savannah River Basin Councils. Clemson University and S.C. Dept. of Natural Resources presented reports on Agribusiness in the basin, Ecological Flow Relationships, and Current Water Use and Demand Projection Methodology. See attached slides.
- Pete Nardi was interviewed this month by a consortium of partners, including McKinsey & Co., AWWA, Water Environment Association (WEF), Xylem, and the National Association of Clean Water Agencies, regarding utility resiliency and needed investments to support water resiliency.
- WHHI-TV's "Talk of the Town" interviewed Pete Nardi about our SCIIP projects and watering wisely this spring. Link: <https://www.youtube.com/watch?v=eUi7rdbqDSg>
- Pete Nardi attended a community meeting this month led by the Town's Gullah-Geechee Historic Neighborhoods Development Corporation to garner public input on the pending U.S. 278 Corridor Project.
- Our very own Connie Whitehead snapped this photo of a bald eagle that has been frequently spotted on our 21 Oak Park Drive site. It is speculated that the eagle might be occupying a former osprey nest on the property.



- HHP resident Jack Alderman continues to share excellent photos of our recycled water wetlands for our use in customer communications. See below:







As always, please do not hesitate to contact me if you have any questions.

All my best,

P. Nardi

Pete Nardi
General Manager

HILTON HEAD PUBLIC SERVICE DISTRICT

www.hhpsd.com

Contact: Pete Nardi
Hilton Head PSD
(843) 681-0525
pnardi@hhpsd.com

FOR IMMEDIATE RELEASE:

Hilton Head PSD and Hickman earn statewide honors

HILTON HEAD ISLAND, S.C. (March 14, 2024) – Hilton Head Public Service District (PSD) earned the Facility of Excellence Award from the S.C. Department of Health and Environmental Control (DHEC), its Water Quality Supervisor, Sarah Hickman, was recognized with the Crystal Crucible Award, and a statewide asset management workshop hosted by the PSD earned recognition. The awards were presented by the Water Environment Association of South Carolina (WEASC) at this month's South Carolina Environmental Conference.

DHEC's Facility of Excellence Award recognizes environmental protection and regulatory compliance at the PSD's Recycled Water Plant on Oak Park Drive. The plant annually recycles about 1 billion gallons of treated wastewater, producing beneficial recycled water that is then used for golf course irrigation and wetlands nourishment, with zero discharge to area waterways.

"The PSD's Recycled Water Plant plays a vital role in the sustainability of our delicate island environment," said PSD General Manager Pete Nardi. "The professionals at the PSD are ensuring that our interior wetland habitats continue to help wildlife and plant and tree species flourish, while also helping to preserve our water resources by providing our golf industry with high-quality recycled water for course irrigation."

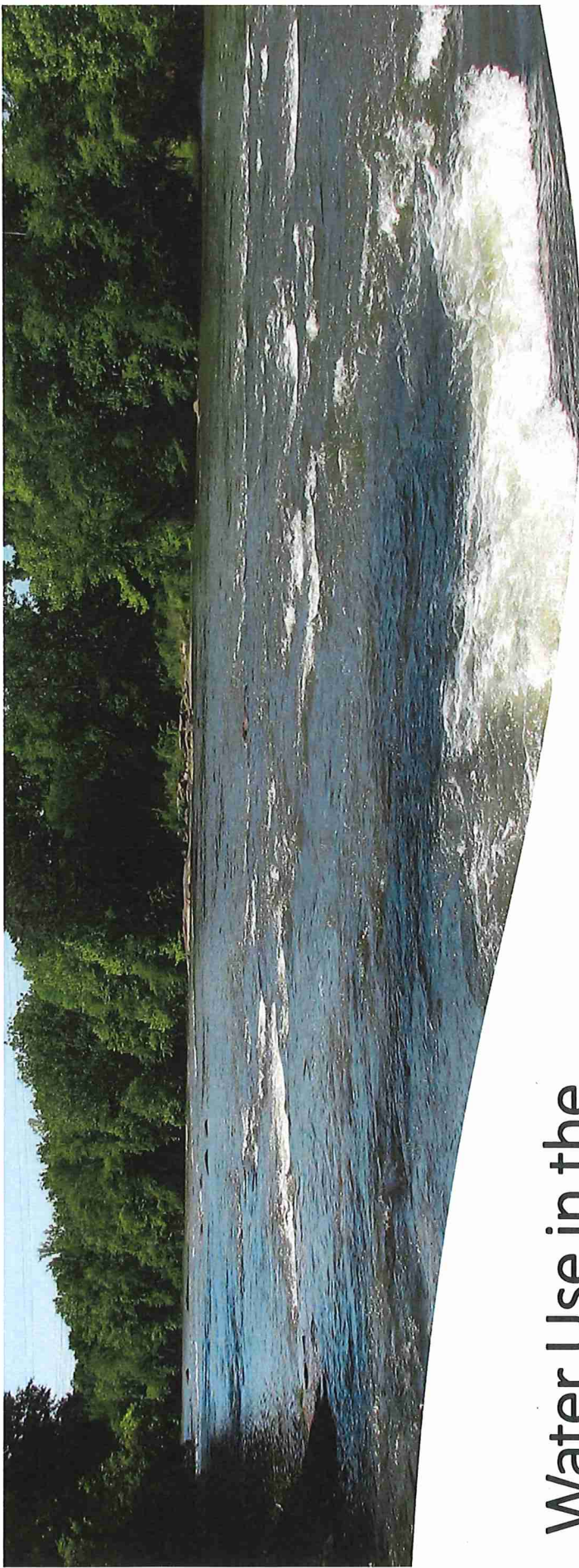
The Crystal Crucible Award recognizes individuals for significant contributions which promotes professionalism, pride, and distinguished ideals among those working in water and wastewater analysis. Hickman supervises the PSD's Water Quality Laboratory. She has volunteered for many years to compete in, organize, and judge the WEASC's Operations Challenge competitions, where wastewater professionals compete as teams in various industry-related categories, including pipe repair, treatment process controls, confined space rescue, laboratory, and pump maintenance.

Hickman and Lindie Aragon of City of Westminster (CO) will form a two-person team to compete this May in the operations challenge at IFAT Munich, the world's leading trade fair for wastewater and environmental technologies. Hickman was selected to compete by the Water Environment Federation, the leading wastewater trade association for North America, and the team is sponsored by Empowering Brands, a communications consultant company for non-profit organizations around the world.

"Sarah Hickman is a leading example for all water professionals here in South Carolina and our nation," said Nardi. "She embodies a volunteerism spirit that helps her colleagues thrive in our industry and has a tremendous ripple effect for Hilton Head PSD and utilities around our state. We congratulate her on this well-deserved recognition."

The PSD hosted the WEASC's statewide Asset Management Workshop in 2023 and its success earned the WEASC's Joint Asset Management Committee the annual Education Award. The PSD's Pete Nardi is a member of the committee and has served as its secretary. PSD Administrative Assistant Connie Whitehead helped organize the workshop, which brought water and wastewater professionals from around South Carolina to the island to learn best practices in utility asset management.

--END--



Water Use in the

Lower Savannah-Salkehatchie River Basin

Lower Savannah-Salkehatchie River Basin Council – Meeting #5, March 07, 2024

Alexis Modzelesky

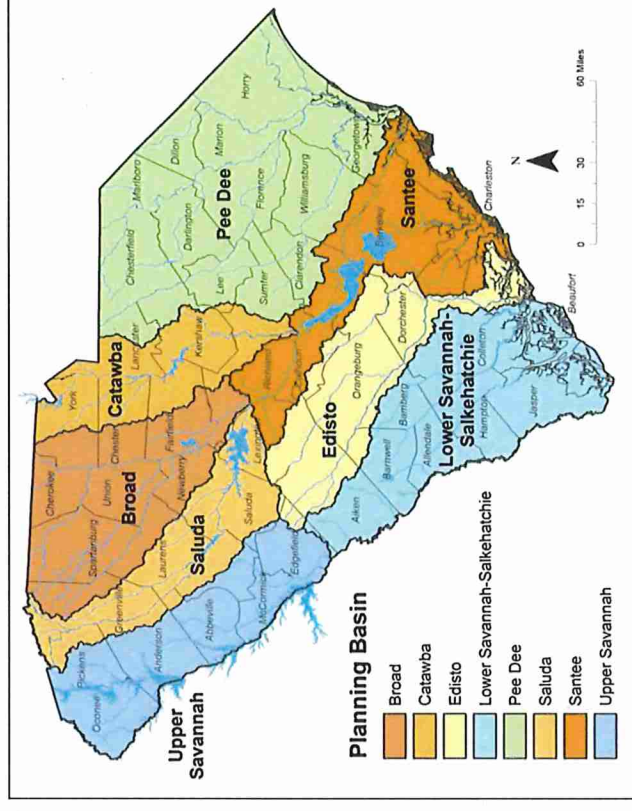
Hydrologist

SC Department of Natural Resources



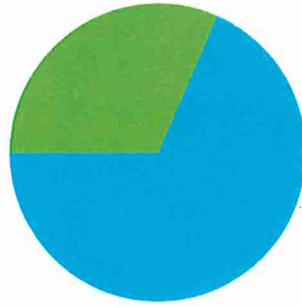
SC Water Withdrawal Reporting

- The South Carolina Department of Health and Environmental Control (SCDHEC) records water use through the South Carolina Surface Water Withdrawal and Reporting Act and the South Carolina Groundwater Use and Reporting Act.
- Regulations require water users that withdraw three (3) million gallons or greater in any month to register with and report their use annually to the Water Use Program at SCDHEC.
 - Exemptions include farm ponds, ponds filled only with surface water runoff, and wildlife habitat management (typically duck ponds).



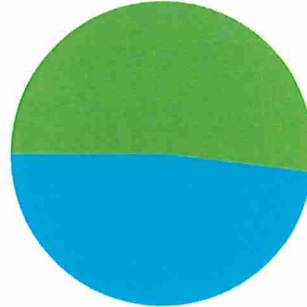
2022 Reported SC Water Withdrawals

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



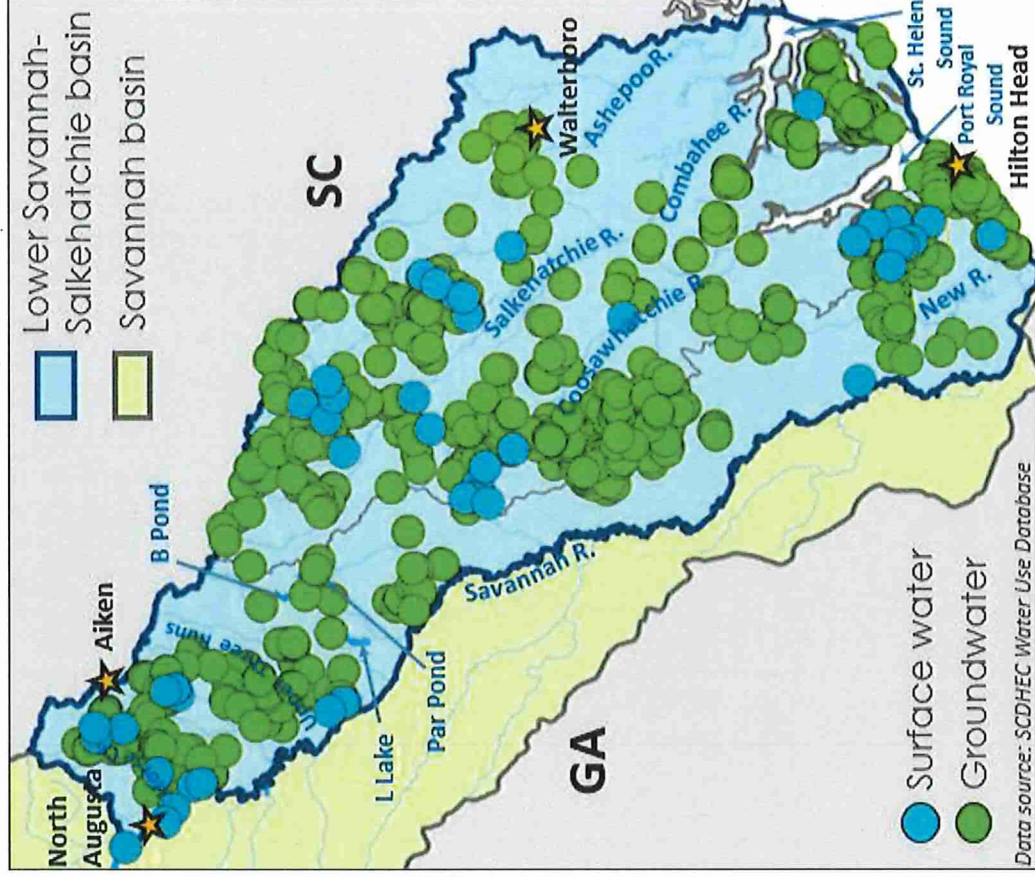
Including Energy

SW: 68% 155 MGD
GW: 32% 74 MGD



Excluding Energy

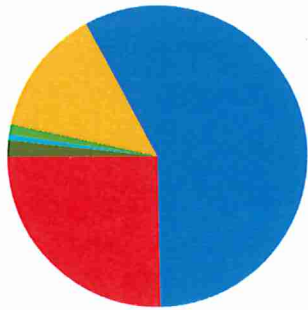
SW: 47% 66 MGD
GW: 53% 73 MGD



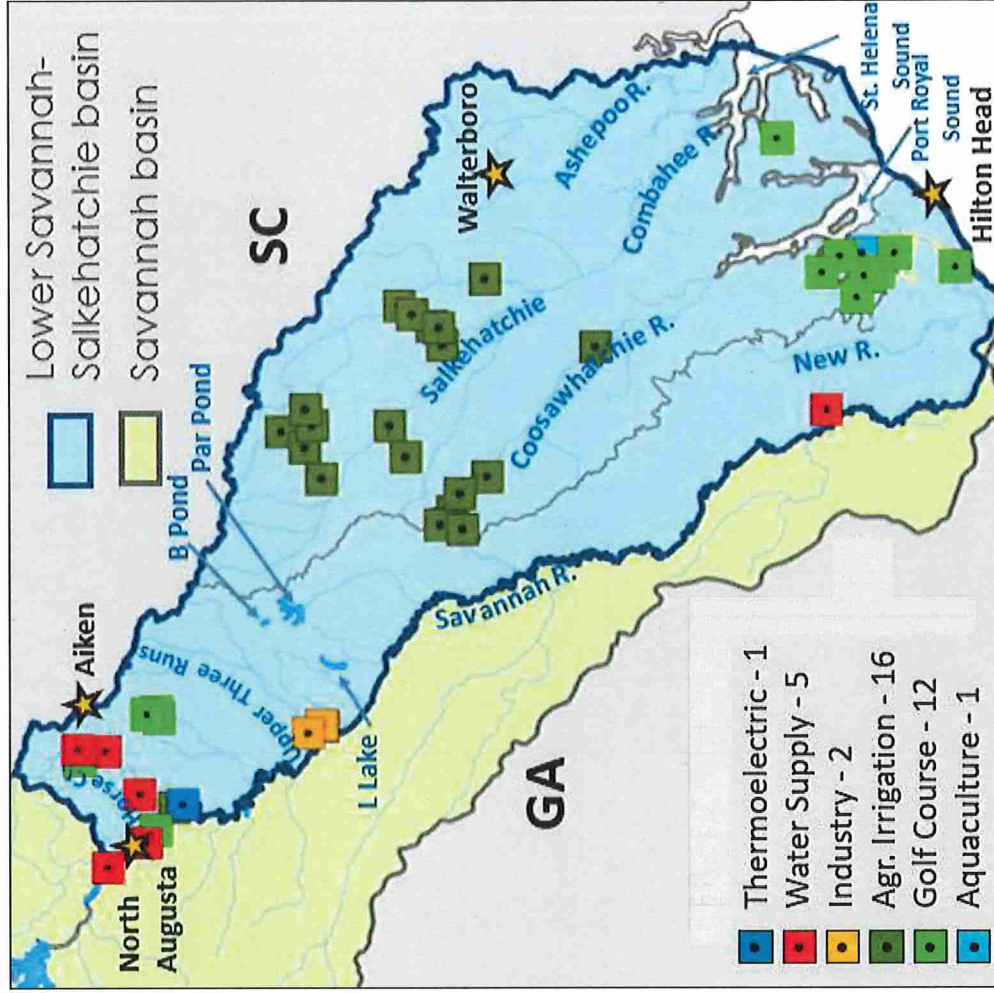
2022 Reported SC Surface Water Withdrawals

Including Energy

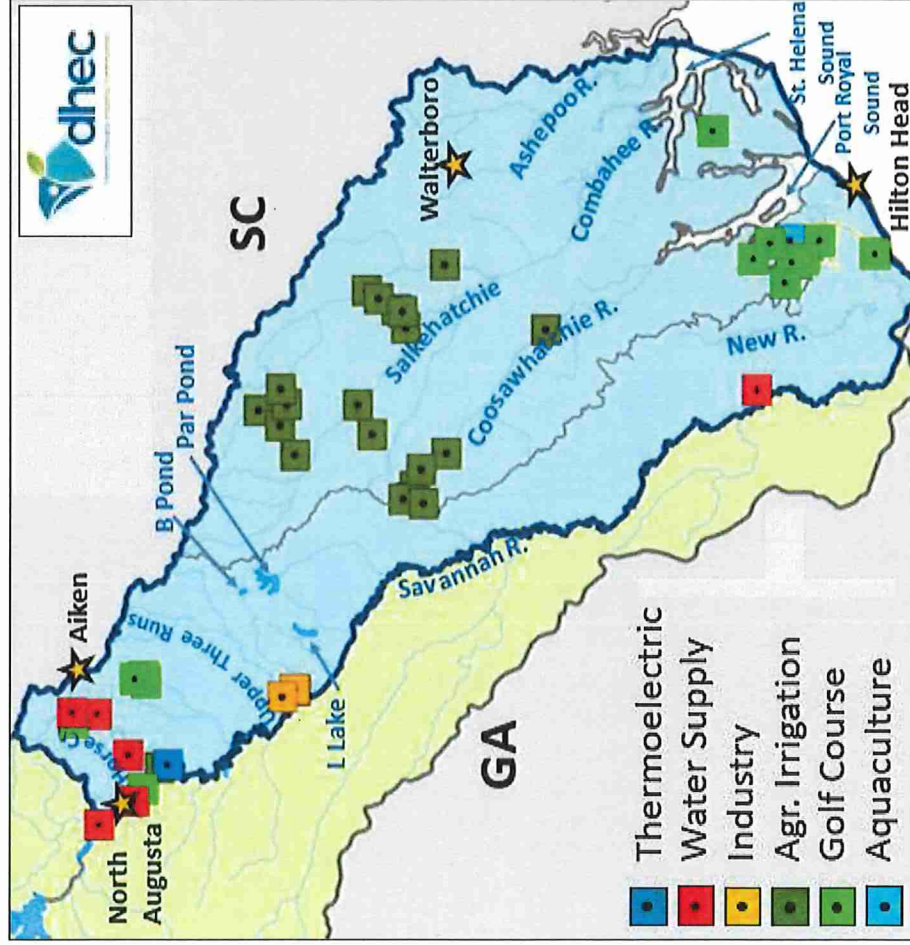
- Thermoelectric (57%)
- Water Supply (25%)
- Industry (14%)
- Agr. Irrigation (2%)
- Golf Course (1%)
- Aquaculture (1%)



Category	SW Withdrawals (MGD)
Thermoelectric – Fossil	89
Water Supply	39
Industry	21
Agr. Irrigation	3
Golf Course	2
Aquaculture	1
Total	155

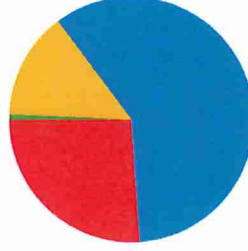


2022 Reported SC Surface Water Withdrawals by Subbasin

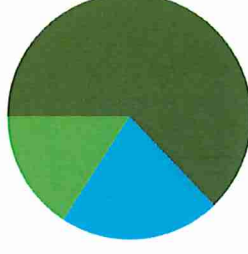


Category	Lower Savannah	Salkehatchie
Thermoelectric	89.3	--
Water Supply	39.2	--
Industry	21.2	--
Agr. Irrigation	--	2.7
Golf Course	1.0	0.7
Aquaculture	--	0.9
Total	150.7	4.3
Percent (%)	97	3

Lower Savannah

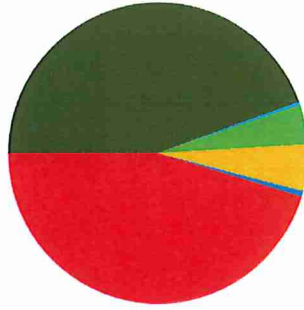


Salkehatchie

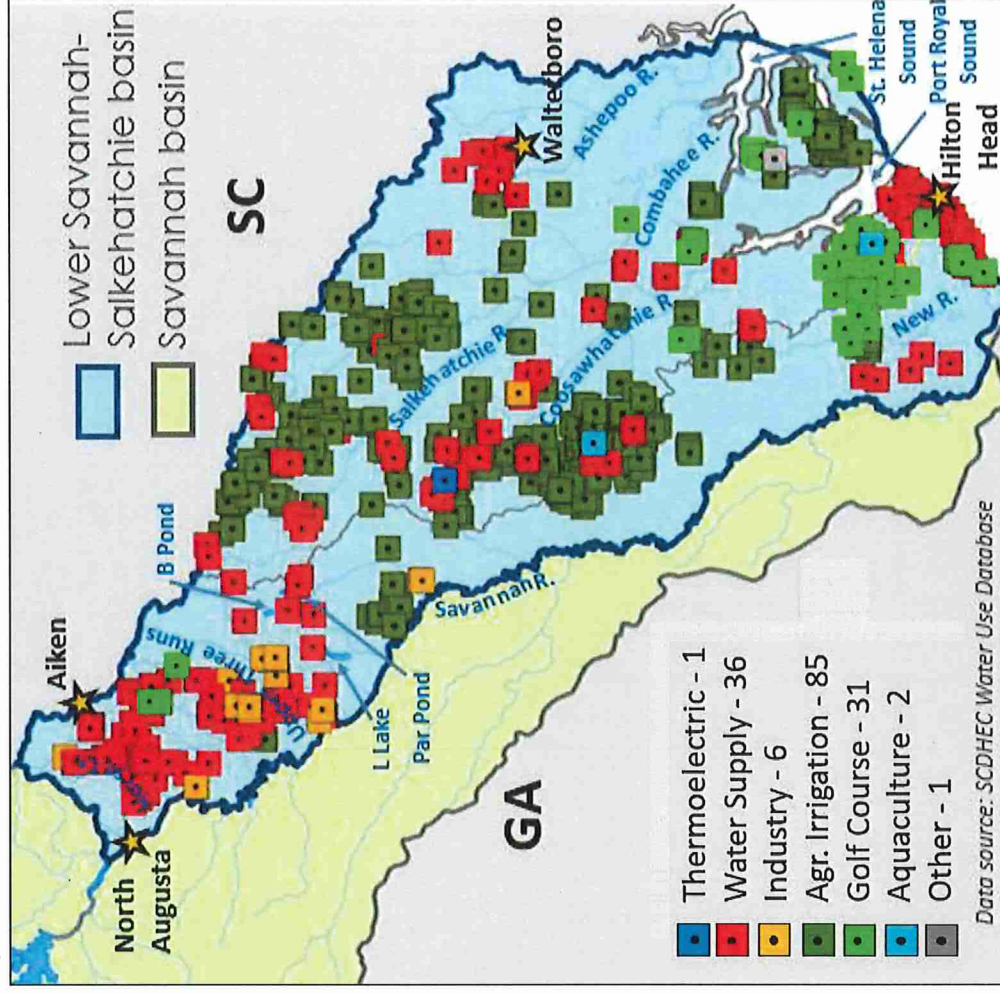


2022 Reported SC Groundwater Withdrawals

Including Energy



- Water Supply (46%)
- Agr. Irrigation (44%)
- Industry (5%)
- Golf Course (4%)
- Thermoelectric Power (1%)
- Aquaculture (<1%)
- Other (<1%)



- Thermoelectric - 1
- Water Supply - 36
- Industry - 6
- Agr. Irrigation - 85
- Golf Course - 31
- Aquaculture - 2
- Other - 1

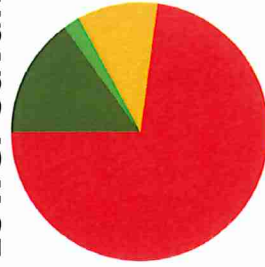
Data source: SCDHEC Water Use Database

Category	GW Withdrawals (MGD)
Water Supply	34
Agr. Irrigation	32
Industry	4
Golf Course	3
Thermoelectric Power	0.4
Aquaculture	0.3
Other	0.1
Total	74

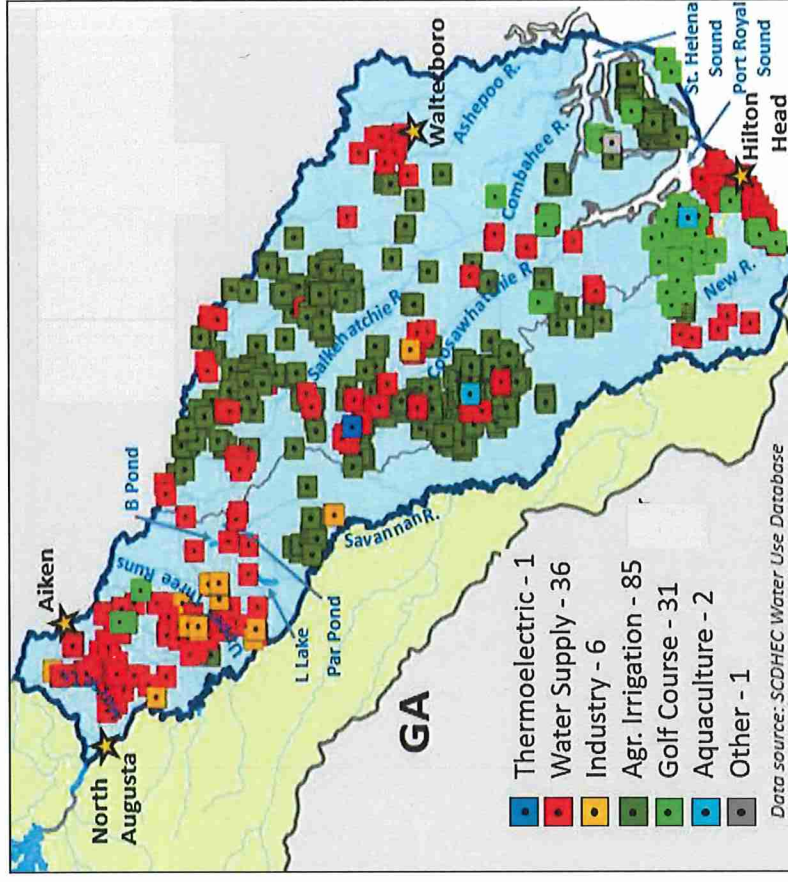
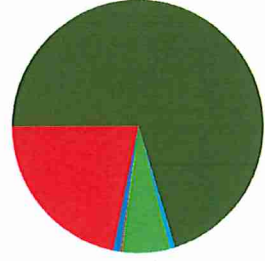
2022 Reported SC Groundwater Withdrawals by Subbasin

Category	Lower Savannah	Salkehatchie
Thermoelectric	--	0.4
Water Supply	25.7	8.3
Industry	3.6	--
Agr.Irrigation	5.3	26.9
Golf Course	0.8	2.3
Aquaculture	--	0.3
Other	--	0.1
Total	35.4	38.3
Percent (%)	48	52

Lower Savannah



Salkehatchie



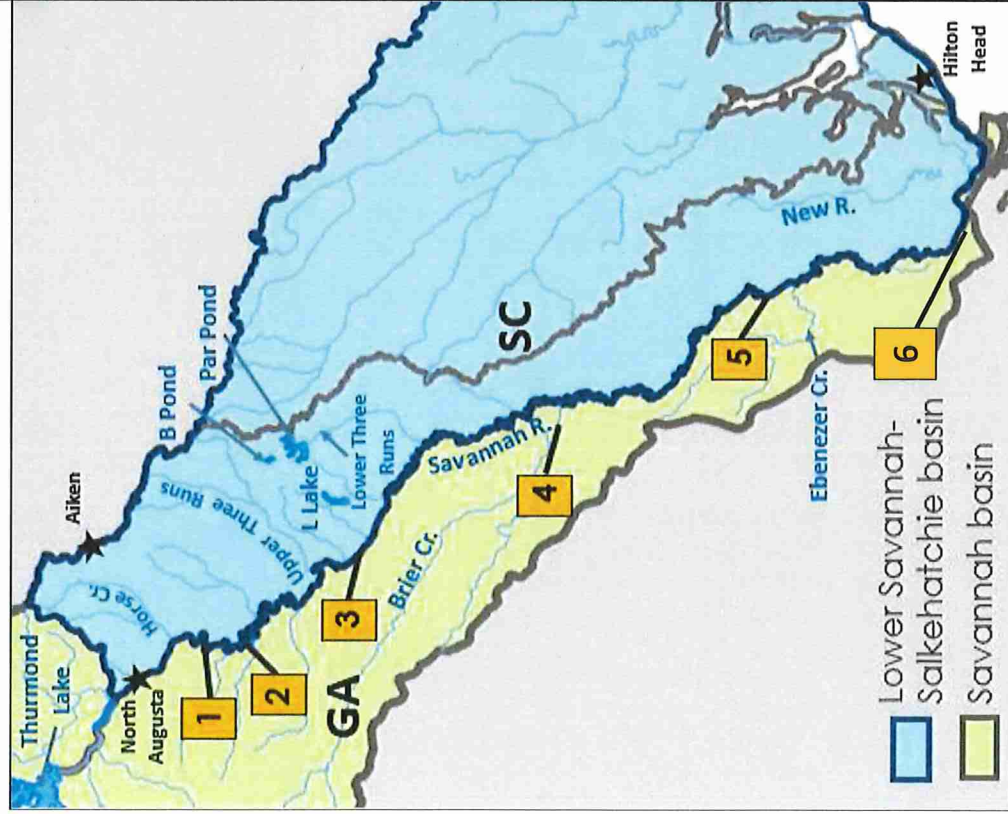
- Agr. Irrigation (70%)
- Water Supply (22%)
- Golf Course (6%)
- Thermoelectric (1%)
- Aquaculture (<1%)
- Other (<1%)

Consumptive Use by Categories

- Consumptive use is the amount of water withdrawn but not returned to the original source.
- Consumptive use estimates within the Simplified Water Allocation Model (SWAM) were developed using the SCDHEC reported water withdrawal and discharge data.

Water Use Category	SWAM-Average Annual Consumptive Use Percent Range (%)
Thermoelectric	2.5
Water Supply	44 - 84
Industry	10 - 11
Golf Course	100
Ag.Irrigation	100

2021 GA Surface Water Withdrawals

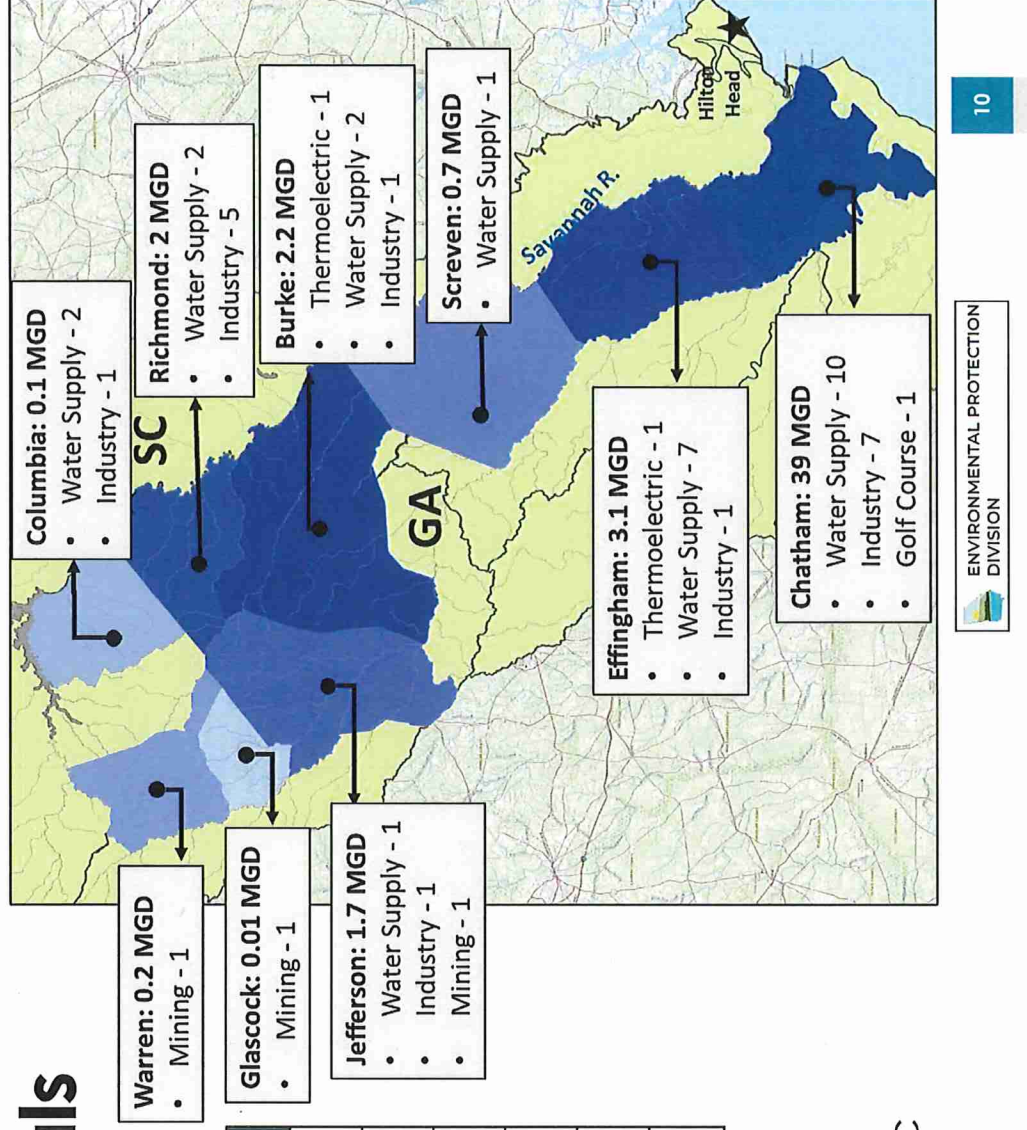


Users included in SWAM Model				
ID	Facility Name	Withdrawal Tributary	2021 Withdrawal (MGD)	Total (MGD)
1	Augusta-Richmond County	Mainstem	35.9	56.2
	Columbia County Water System		15.8	
	PCS Nitrogen Fertilizer, L.P		4.5	
	DSM Chemicals Augusta, Inc		--	
2	International Paper Corporation- Augusta Mill	Mainstem	1.9	1.9
3	Georgia Power Co- Plant Vogtle	Mainstem	43.5	43.5
4	JM Huber Corp	Brier Cr./Reedy Cr.	2.8	5.0
	Thompson-McDuffie County W/S Commission	Brier Creek	2.2	
5	Georgia Power Co- Plant McIntosh	Mainstem	6.3	21.1
	Georgia-Pacific Consumer Operations		14.8	
Outside SWAM Model				
6	Savannah Industrial & Domestic Water System	Abercorn Cr./ Mainstem	39.4	39.4
	Sulfco, LLC		7.1	7.1
	Weyerhaeuser NR Port Wentworth Mill		0.1	0.1
Total Surface Water Withdrawal in Lower Savannah basin-GA				174.3

2021 GA Savannah-Ogeechee Groundwater Withdrawals (excluding Agriculture)

Category	GW Withdrawals (MGD)
Water Supply	28.8
Thermoelectric Power	1.4
Mining	1.6
Industry	16.9
Golf Course	0.2
Total	48.9

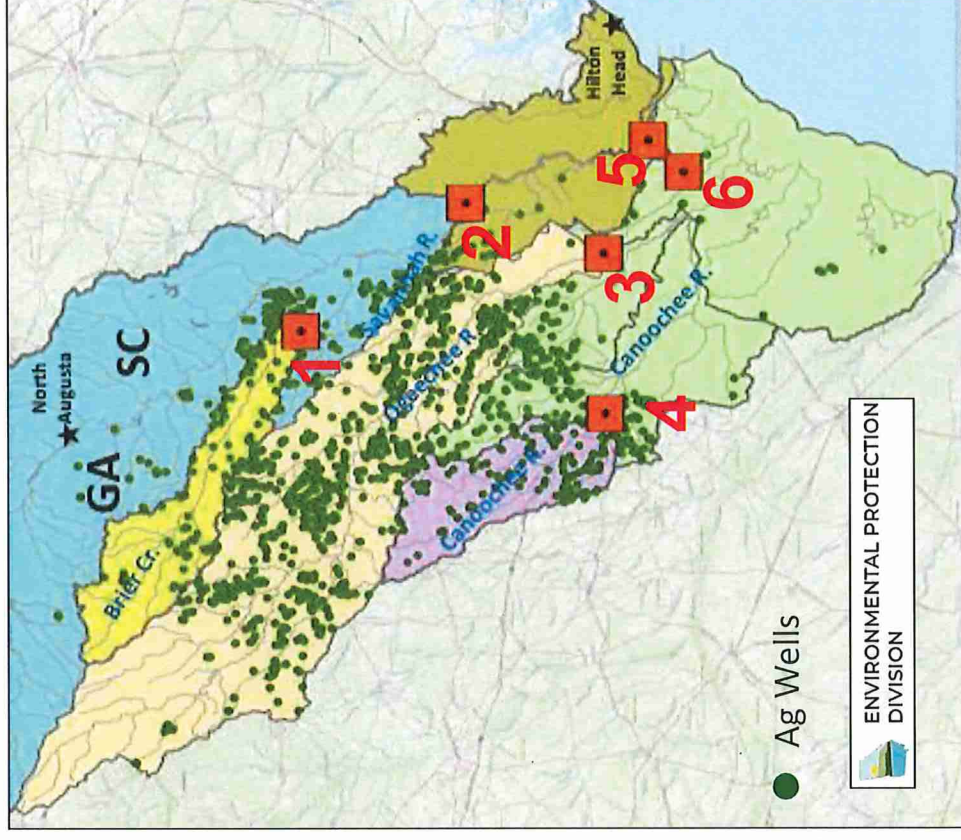
- Intake locations were not provided by GA EPD.
 - Locations are exempt from public disclosure for security reasons.



2021 GA Savannah-Ogeechee Groundwater Withdrawals for Agriculture

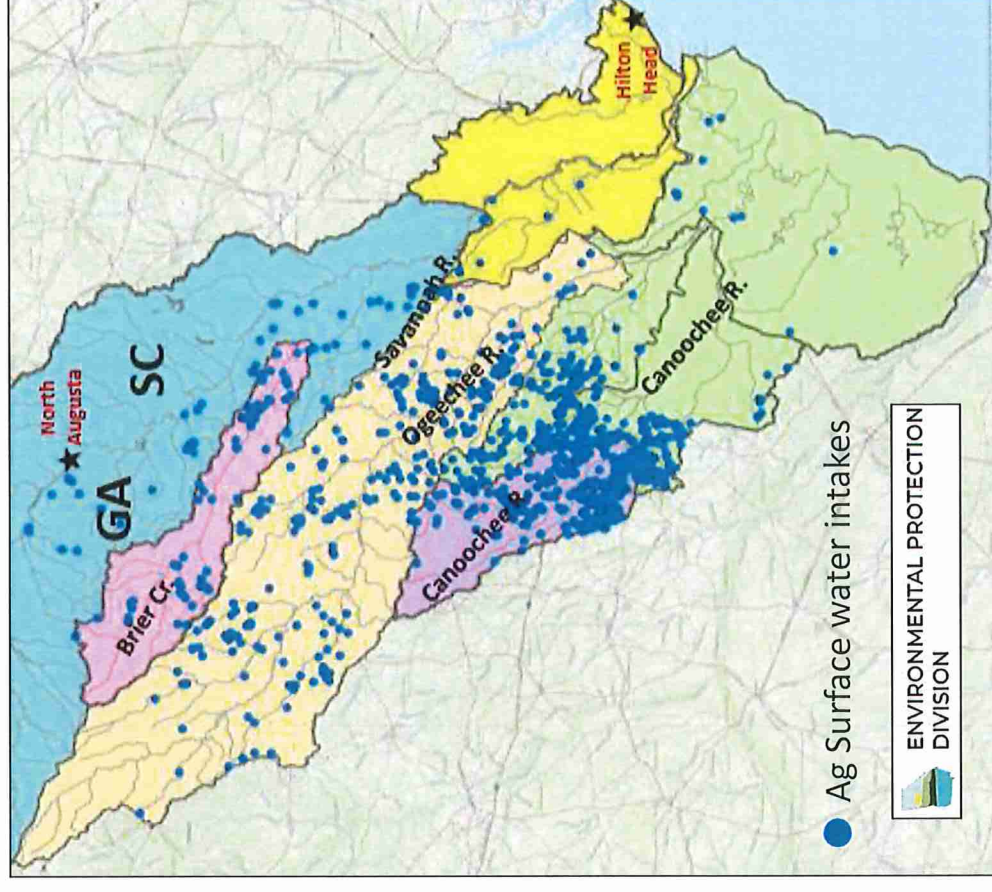
- Groundwater withdrawals are aggregated by drainage area in the table and map.
- Most of the withdrawals are from the Floridan aquifer.

	GW Avg Withdrawal (MGD)
1	6.9
2	10.6
3	44.2
4	4.4
5	0.9
6	5.8



GA Savannah-Ogeechee Surface Water Withdrawals for Agriculture

- Most of the surface water withdrawals in Lower Savannah are from farm ponds.
- SCDNR does not currently have data to calculate withdrawals per intake or per node.
- More information may be provided later.

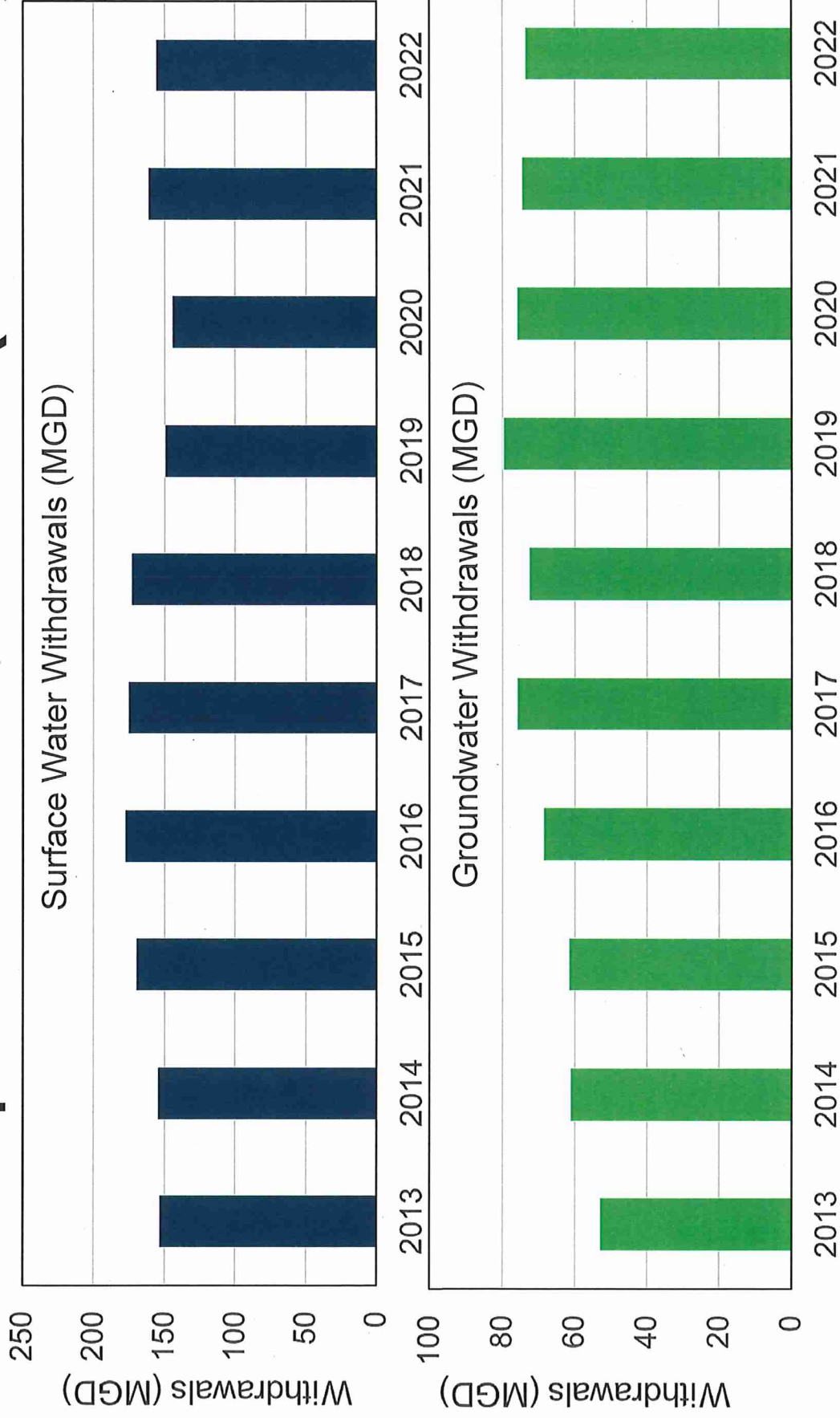


Historical Water Withdrawals

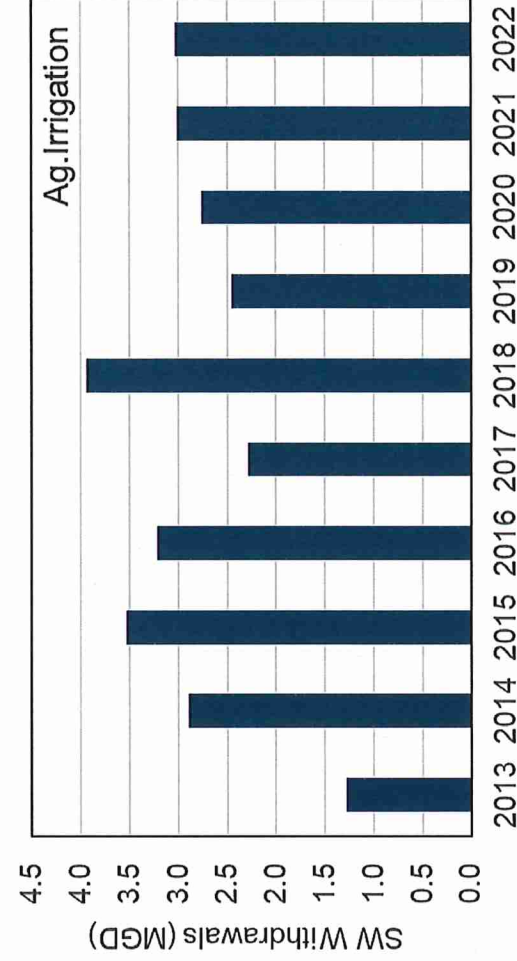
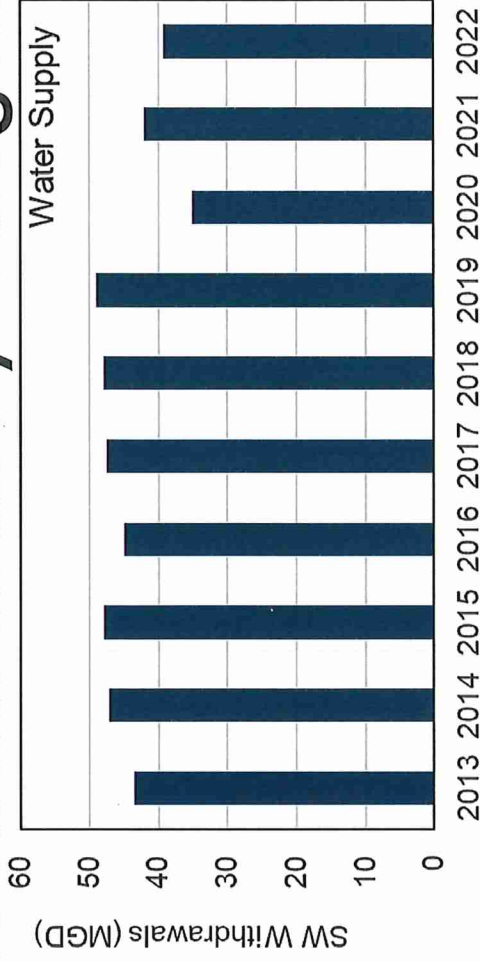
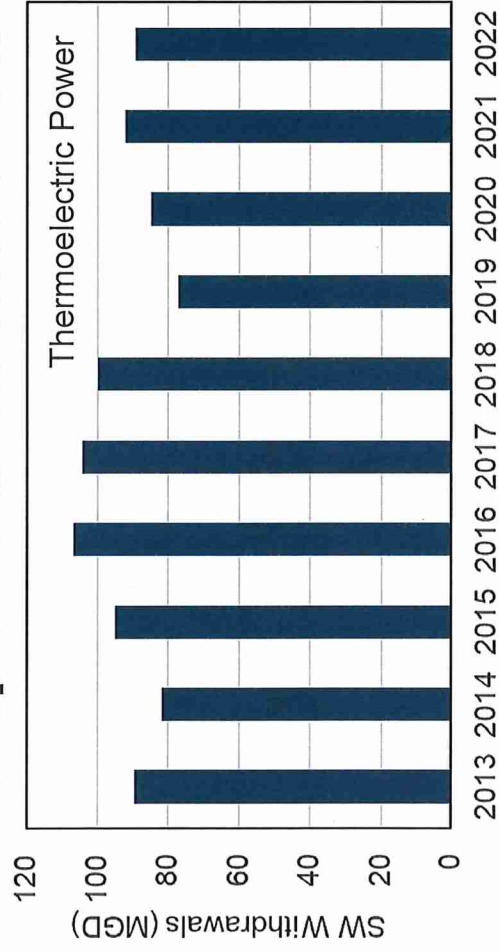
Data Limitations

- Withdrawals from private domestic wells, small surface water irrigation ponds, and any other water withdrawals less than the reporting threshold of 3 MGM are excluded from the SCDHEC's water withdrawal database.
- After passing of the South Carolina Surface Water Withdrawal, Permitting, Use, and Reporting Act in 2011, several facilities that met exemption criteria (withdrawal threshold or water source) were not required to report their withdrawals to SCDHEC (Golf Course, for example).
- Increasing trends in reported water withdrawals for some categories (Agriculture, for example) may in part be due to increased reporting compliance over the analysis period.
- Errors in reported water withdrawals or errors introduced during data input.
- Some users fail to add metadata such as longitude, latitude, county, and basin information for a surface water intake or groundwater well withdrawal. This can lead to some inaccuracies in the dataset.

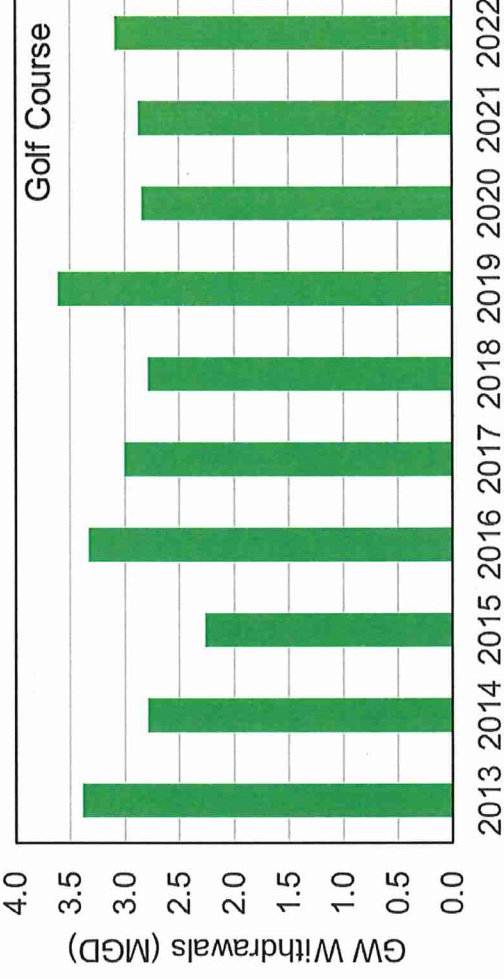
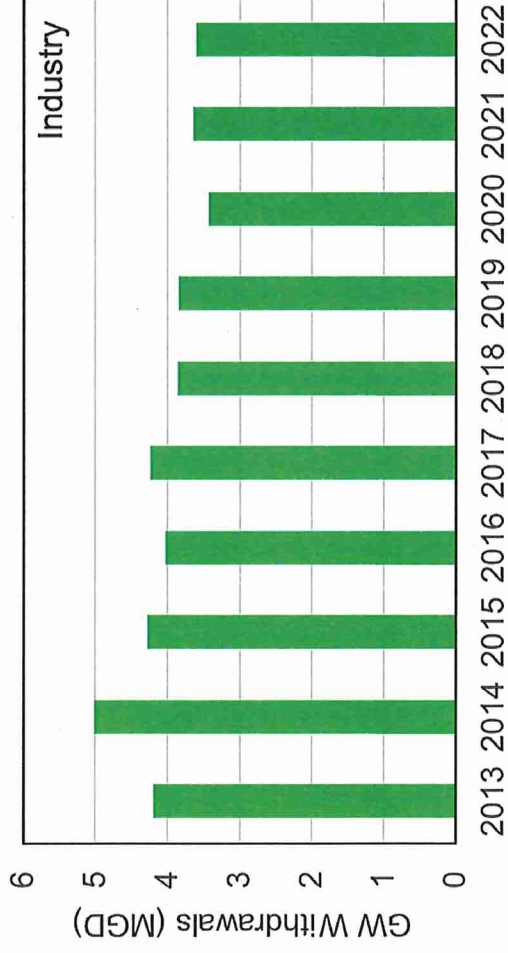
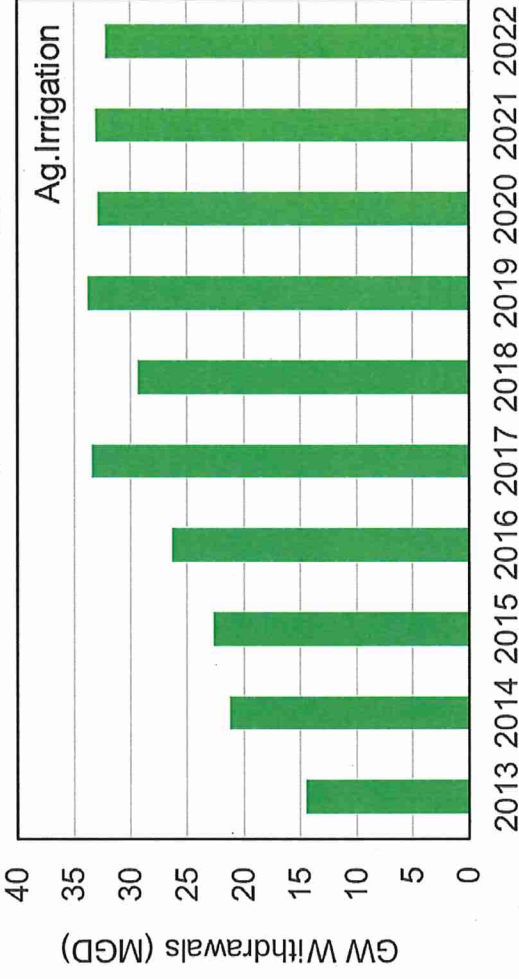
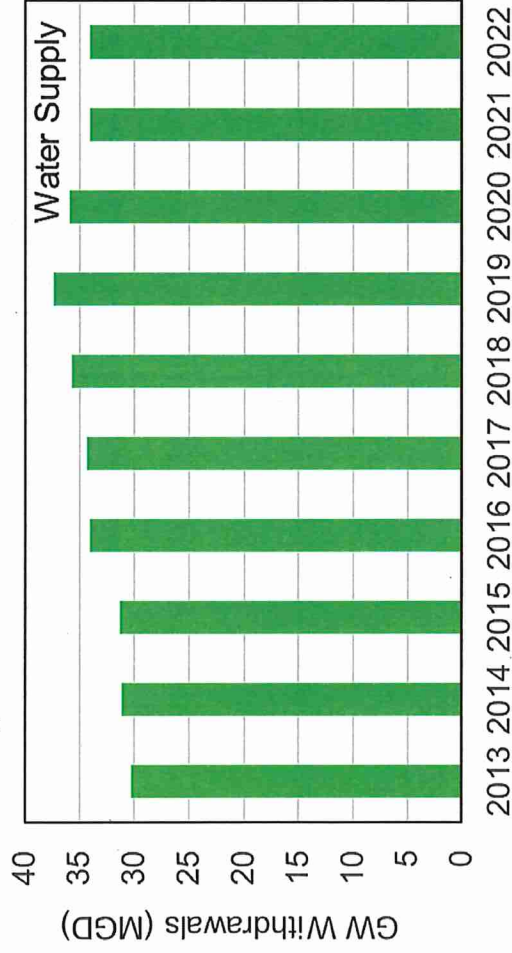
LSS SC Reported Water Withdrawals (2013 – 2022)



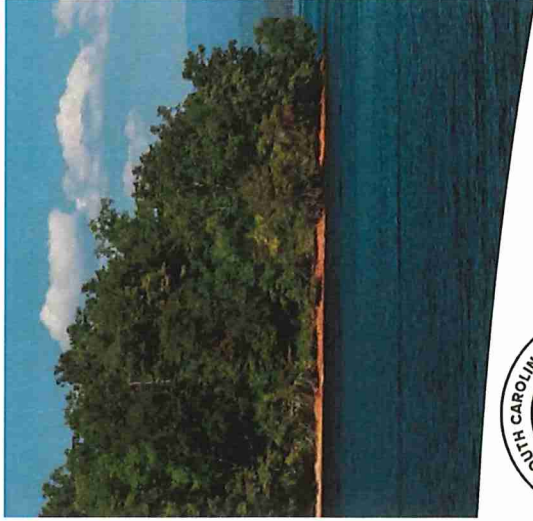
Reported Surface Water Withdrawals by Categories



Reported Groundwater Withdrawals by Categories



Summary



Data questions can be sent to Priyanka More
MoreP@dnr.sc.gov

- Both surface water and groundwater are important resources in the basin.
- Surface Water:
 - Top three categories: Thermoelectric (57%), Water Supply (25%), and Industry (14%).
 - Consumptive use of Thermoelectric power is 2.5%.
 - No strong trends observed in reported withdrawals (2013-2022).
- Groundwater:
 - Top three categories: Water Supply (46%), Ag.Irrigation (44%), and Industry (5%).
 - Slight increasing trend observed in reported data for Water Supply and Ag. Irrigation and decreasing trend in Industry.

Lower Savannah-Salkehatchie Water-Demand Projections

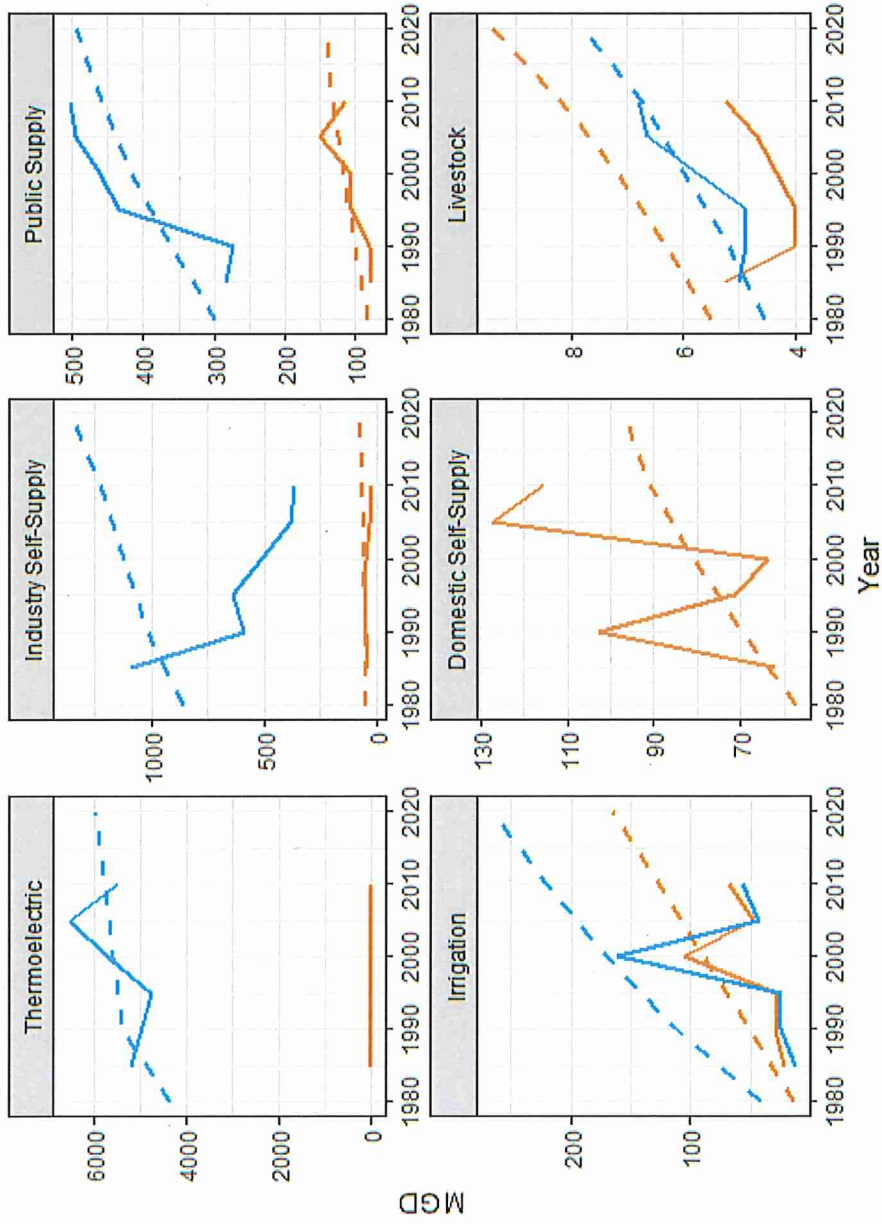


Lower Savannah-Salkehatchie RBC meeting
March 7th, 2024

Laljeet Sangha
Postdoctoral Researcher
South Carolina Water Resources Center
Clemson, SC



Is It Possible to Predict the Future?



A 1970's edition of water demand projections can be compared with historical water use.

Can we expect to perform any better?



Projections are not forecasts

Forecast

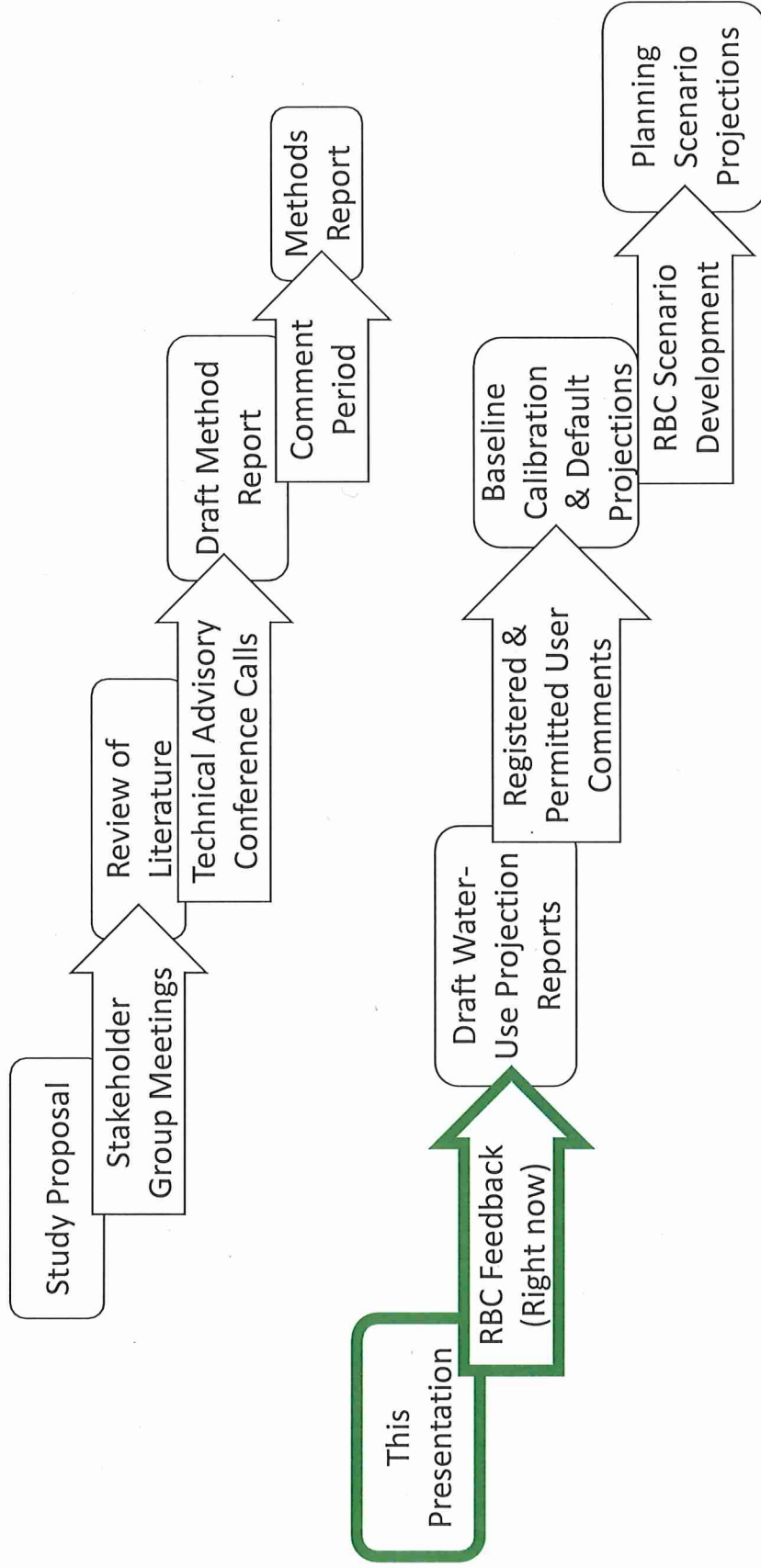
- Educated guess.
- Based on expected conditions and actions.
- Timeframe limited by predictability of future conditions.
- Aim to be accurate.

Projection

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



Stakeholder Input Throughout the Process





Development of the Methods

2016 -2017 - meetings with stakeholder interest groups for input on water-demand and projection methods and data sources.

- SCAWWA Water Utility Council
- SC Water Quality Association
- SC Farm Bureau Water Committee
- Chamber of Commerce Environmental Technical Committee
- SC Water Planning Process Advisory Committee (PPAC)



Stakeholder Feedback

- Water Works Association, Utility Council
 - Use weather and demographic variables for long term forecasts.
 - Consider impacts of outdoor use restrictions.
- Chamber of Commerce, Environmental Committee
 - Provide information on a reach scale for real-world application.
 - Guarantee privacy of survey responses.
- Farm Bureau, Water Committee
 - Agricultural return flows can be significant.
 - Not all cropland can be profitably irrigated.
 - Vegetables and hemp production could increase.
- Water Quality Association
 - Some systems are highly interconnected.
 - Inflow and Infiltration can be significant.



Development of the Methods

2018 - technical advisory conference calls with representation from a variety of fields of experience.

- Public water supply (17)
- Thermo-electric power (5)
- Manufacturing (5)
- Government (22)
- Consultants (4)
- Legal (2)
- Golf (2)
- Agriculture (5)
- Environment (4)
- Research & education (11)

Acknowledgements to Chrissa Waite and Stuart Norvell of USACE and Dr. Jeff Allen and Dr. Tom Walker of the SCWRC for their collaboration on developing the water demand projection methods.



Technical Advisory Committee Feedback

- General recommendations:
 - provide draft projections to local stakeholders.
 - provide an opportunity for feedback.
 - do not rely on overly complex methods.
- Sector specific recommendations:
 - **Thermo-electric:** Contact the utilities directly
 - **Public supply:** Do not rely on complex statistical methods which may underestimate demand.
 - **Industry:** Use economic output, not employment as the driver variable.
 - **Agricultural Irrigation:** A more technical method may be appropriate for projecting irrigated acreage.
 - **Golf:** A simpler projection method was recommended due to the relatively low volume of water use.



Development of the Methods

2018 – Publication of “Water Users’ Perspectives: Summary of Withdrawal Survey Responses and Commentary” in *Journal of South Carolina Water Resources*.

2019 – Projection Methods for Off-stream Water Demand in South Carolina published online by SCDNR following reviews by an editorial board, the PPAC, and technical advisory conference call participants.

Pellett, C. Alex (2020) "Mapping Center Pivot Irrigation Fields in South Carolina with Google Earth Engine and the National Agricultural Imagery Program," *Journal of South Carolina Water Resources*: Vol. 7 : Iss. 1 , Article 4. Available at: <https://tigerprints.clemson.edu/jscwr/vol7/iss1/4>

Pellett, C. Alex (2024) “Review of Agricultural Water Use in South Carolina,” *Journal of South Carolina Water Resources* (In Review)



Equations to Define the Terms

Equation 1: Water Demand Mass Balance

$$Demand = Withdrawal + Purchase + Reuse - Sales - Loss - \Delta Storage + Shortage$$

Where:

<i>Demand</i>	:	Off-stream water demand
<i>Withdrawal</i>	:	Total water withdrawal from source water bodies
<i>Purchase</i>	:	Total purchases of water from distributors
<i>Reuse</i>	:	Total reuse of water previously used for another purpose
<i>Sales</i>	:	Total wholesale transfers of water to another user or distributor
<i>Loss</i>	:	Total losses of water preventing it from being put to use
$\Delta Storage$	:	Net change in off-stream storage
<i>Shortage</i>	:	Water not available to meet the objectives of water users

Equation 2: Return Flow Mass Balance

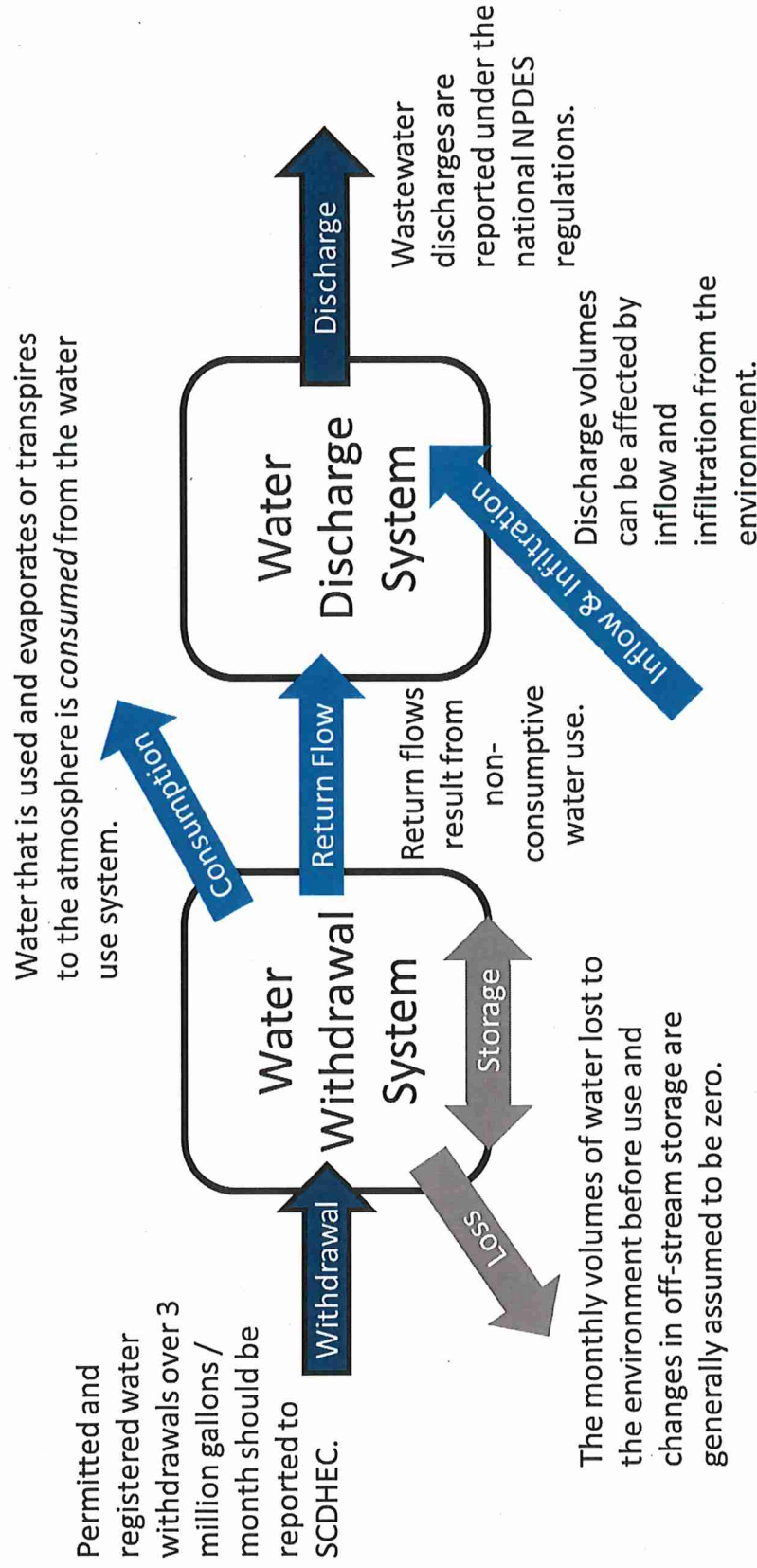
$$Return\ Flow = Discharge - Inflow \ \& \ Infiltration$$

Where:

<i>Return Flow</i>	:	Water returned to the environment after non-consumptive uses
<i>Discharge</i>	:	Concentrated discharges to surface water bodies (NPDES data)
<i>Inflow & Infiltration</i>	:	Waste-water resulting from inflow and infiltration (I/I)



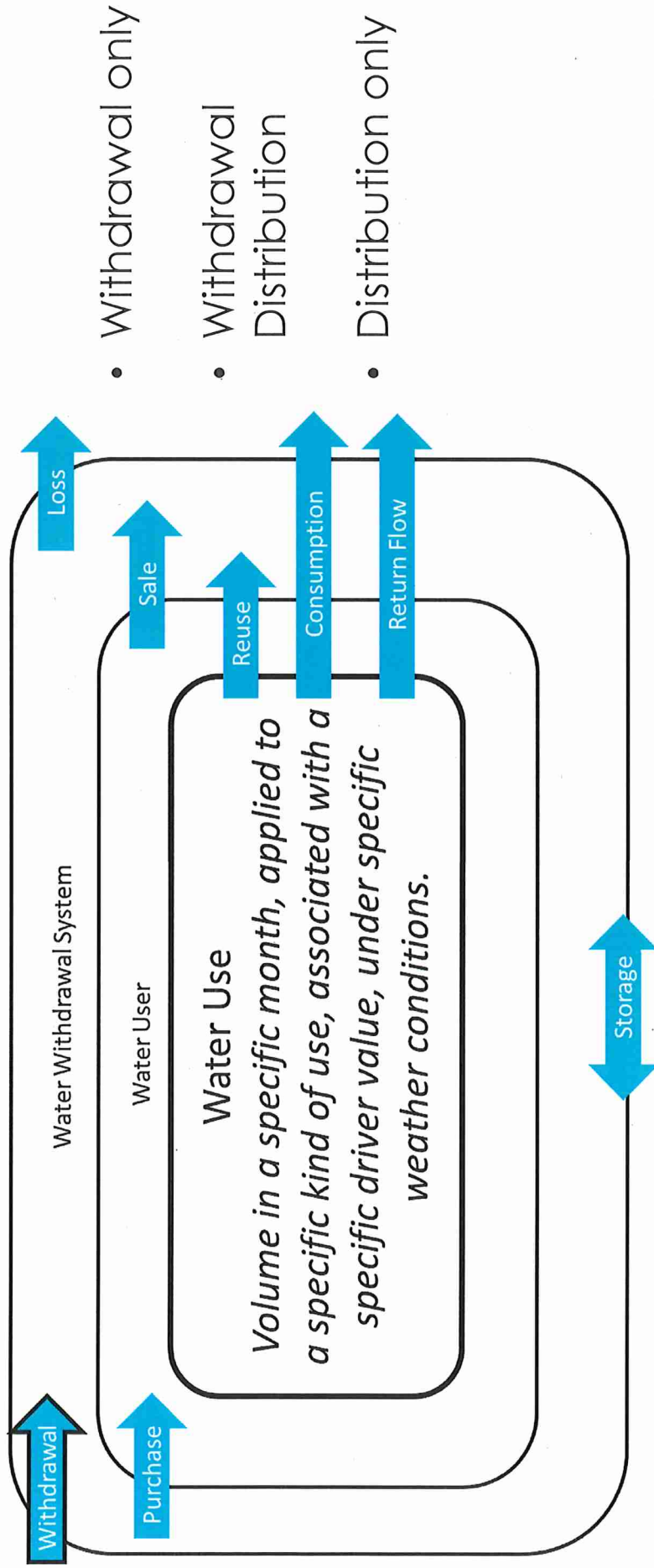
Mass Balance Illustration



Consumption, return flow, and inflow & infiltration are estimated over the baseline period to project future non-consumptive use.



A More Detailed Model





Projections

- Water demand models are calibrated for each water user, with water withdrawal data from 2012-2021.
- Moderate calibration is based on the median water demand for each month.
- High calibration is based on the maximum water demand for each month.
- Projections of county population and industrial sector economic growth drive long-term projections of water demand.

Table 1.1: Drivers of Water Demand

Category	Primary driver
Thermo-electric power	Electricity production
Public and domestic supply	Population
Manufacturing	Economic production
Agriculture and Golf Courses	Irrigated acres

From the projection methodology report.



Draft Water Demand Projections

- Preliminary draft results, not yet vetted.
- For demonstration purposes only.
- Modifications to these draft projections will be made based on continued stakeholder feedback.
- All values are plotted as Million Gallons per Month



Draft Water Demand Projections

Thermoelectric Water Demand

Calibration

Moderate Scenario is Monthly

Median

High Scenario is Monthly Maximum

Projections

According to utility company
Integrated Resource Plans and
feedback.

Golf, Mining, Other

Calibration

Moderate Scenario is Monthly Median

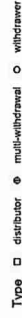
High Scenario is Monthly Maximum

Projections

No change.

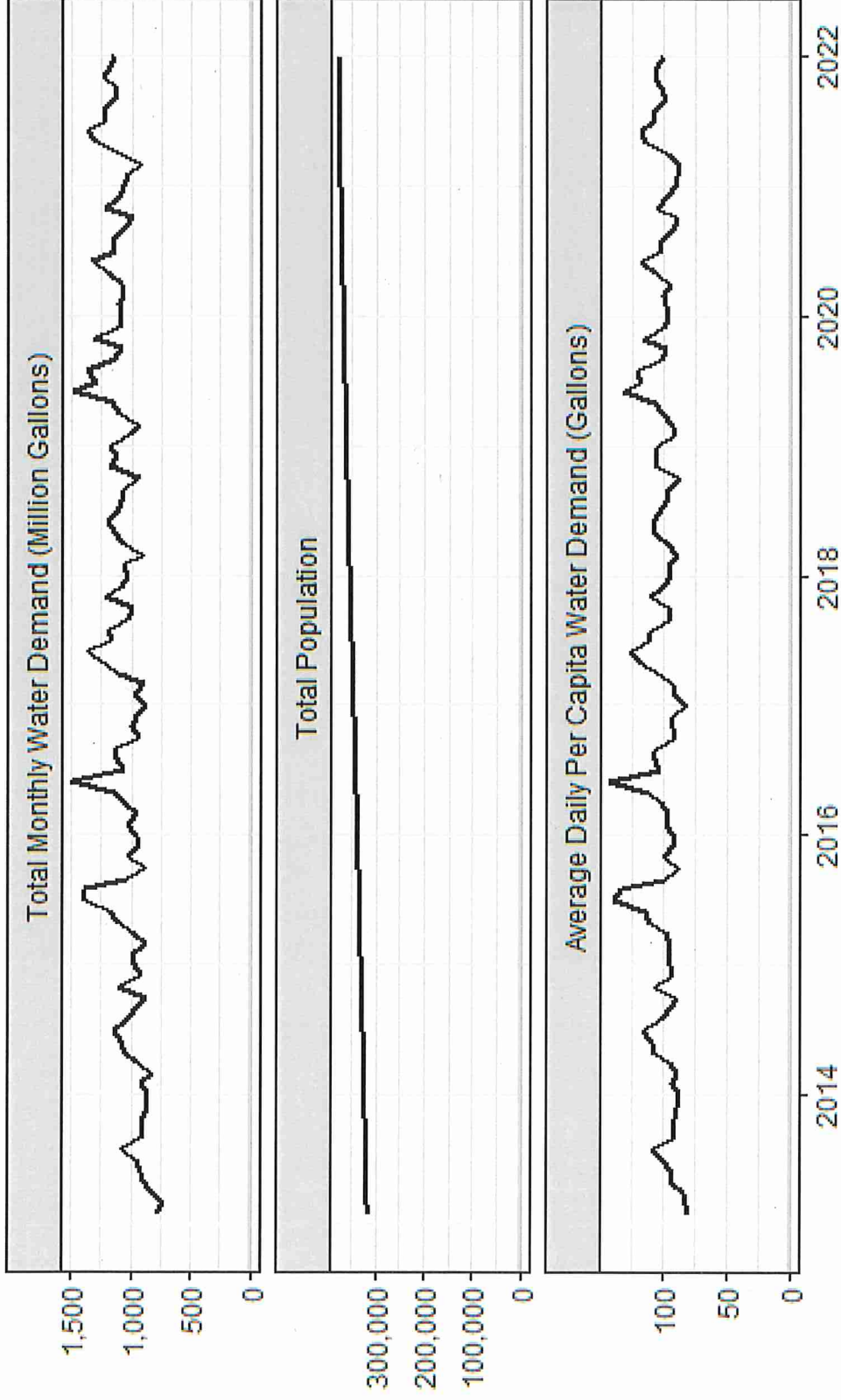


- Not all distribution systems or systems in neighboring basins are explicitly modeled at this point.



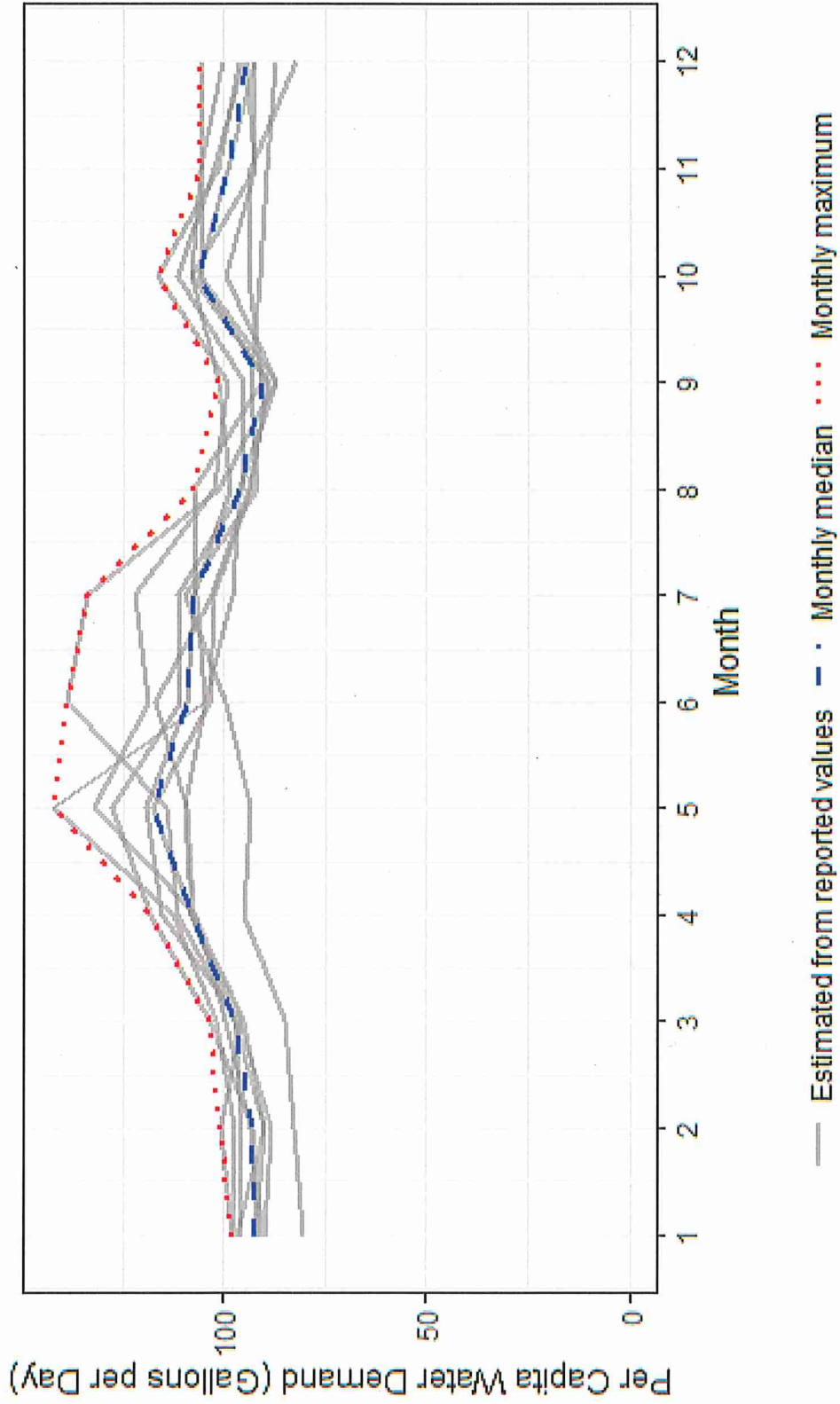


Public Supply - EXAMPLE



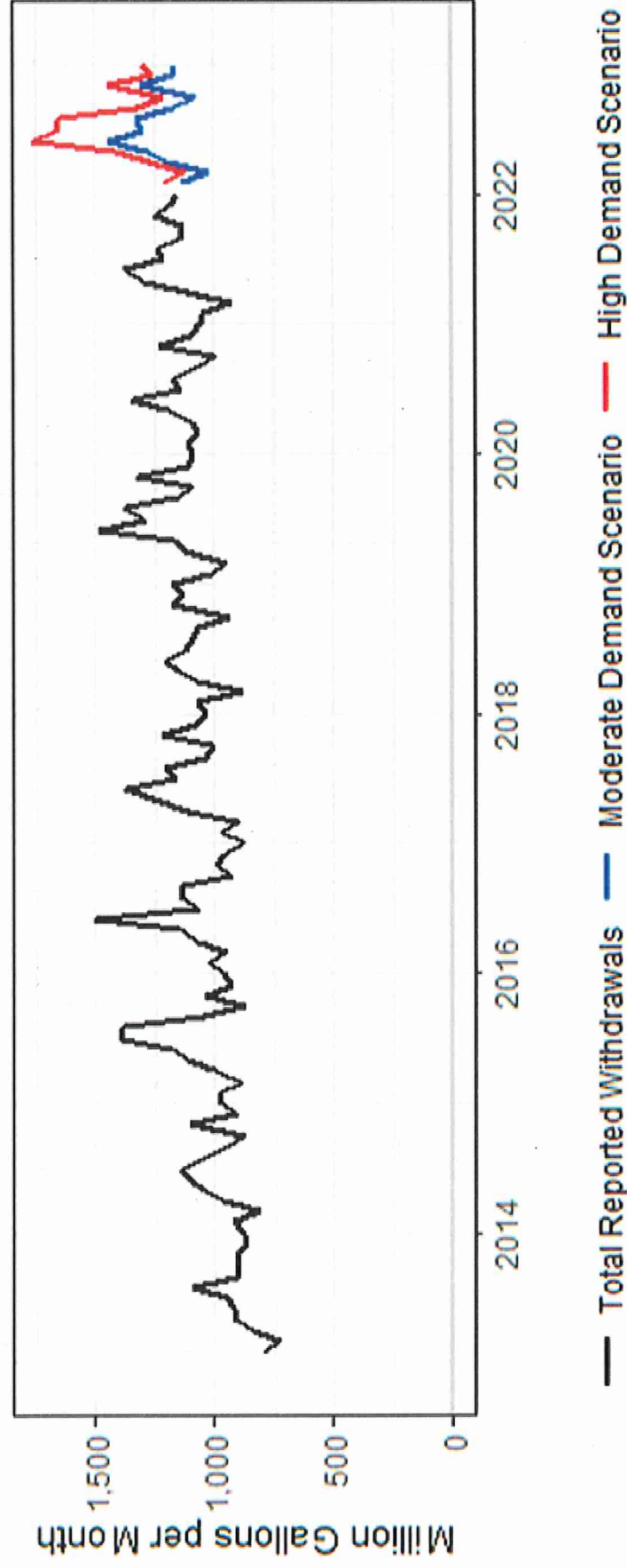


Public Supply – EXAMPLE



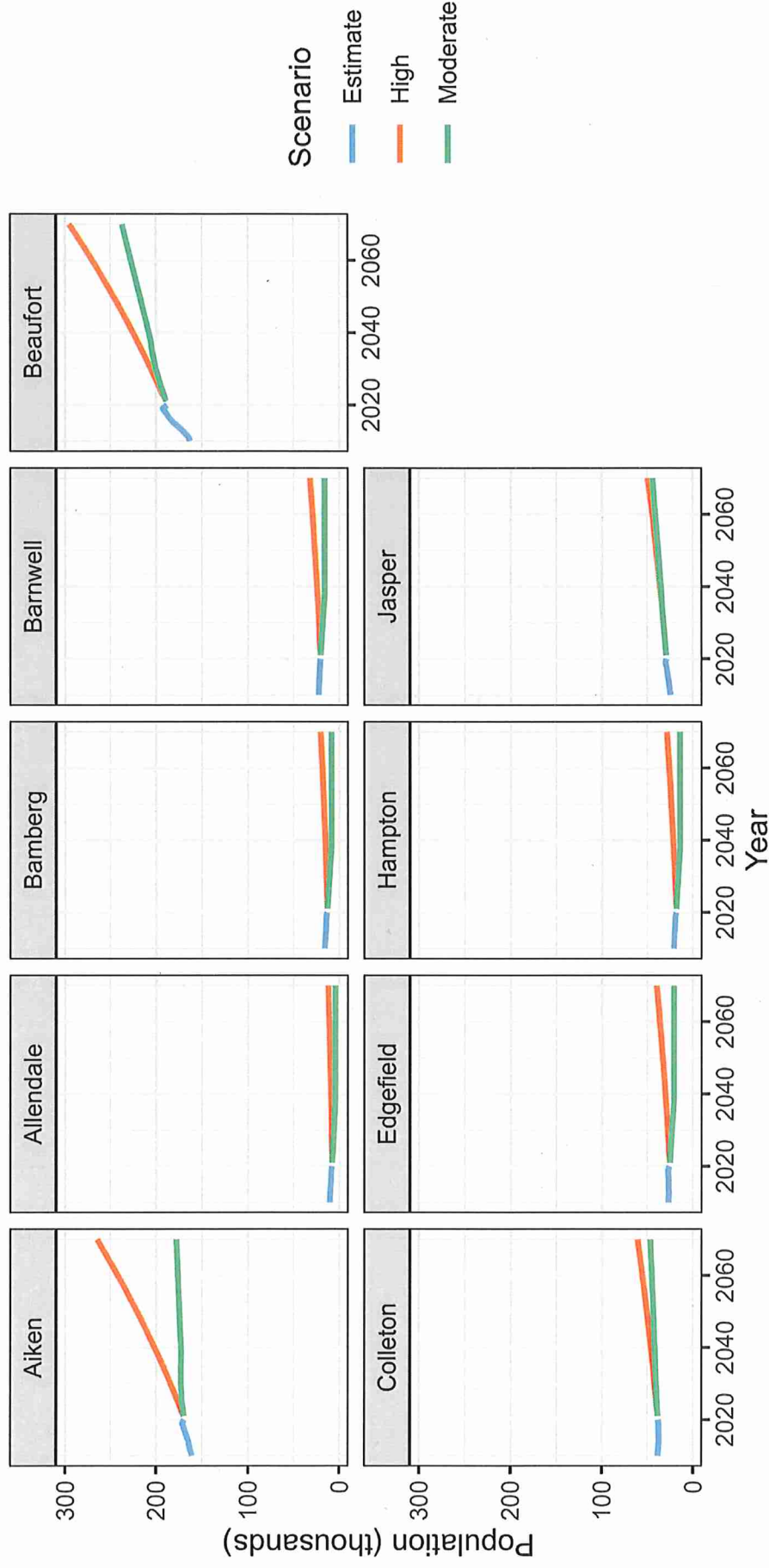


Public Supply - EXAMPLE



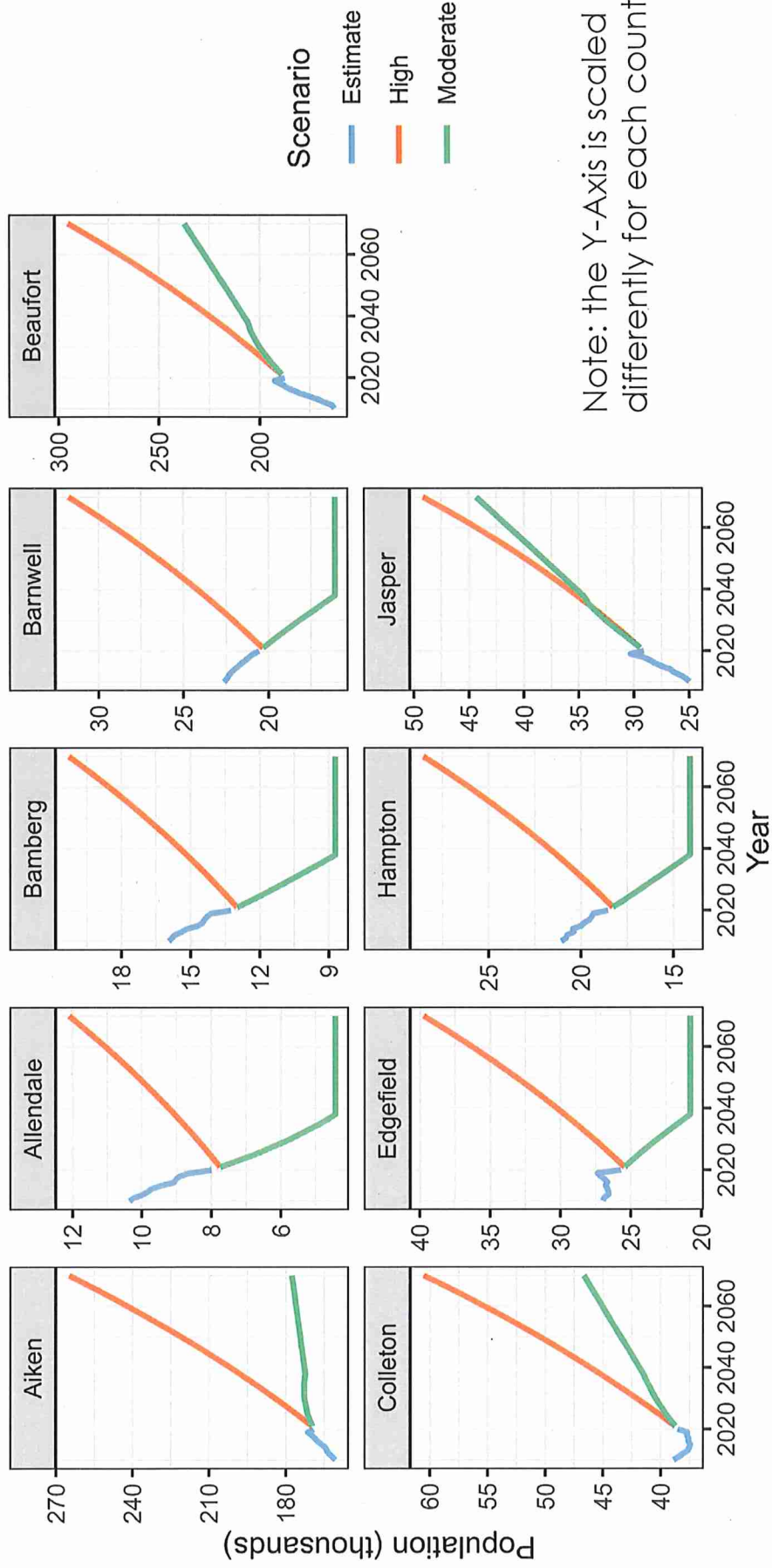


Population Drives Water Demand for Public Supply





Population Drives Water Demand for Public Supply





Manufacturing

Projected Annual Economic Growth Rates from the US Energy Information Agency

Food Products	0.9%	Plastics and Rubber Products	1.7%
Beverages and Tobacco Products	0.2%	Stone, Clay, and Glass Products	1.1%
Textile Mills and Products	-0.2%	Glass and Glass Products	1.0%
Wood Products	0.0%	Cement and Lime	1.4%
Furniture and Related Products	1.3%	Other Nonmetallic Mineral Products	1.1%
Paper Products	0.5%	Primary Metals Industry	0.9%
Printing	0.2%	Iron and Steel Mills and Products	0.1%
Chemical Manufacturing	1.6%	Alumina and Aluminum Products	1.3%
Bulk Chemicals	1.5%	Other Primary Metal Products	1.6%
Inorganic	0.3%	Fabricated Metal Products	1.5%
Organic	1.6%	Machinery	1.8%
Resin, Synthetic Rubber, and Fibers	1.7%	Computers and Electronics	2.5%
Agricultural Chemicals	1.0%	Transportation Equipment	1.7%
Other Chemical Products	1.6%	Electrical Equipment	2.5%
Petroleum and Coal Products	0.8%	Miscellaneous Manufacturing	2.8%
Petroleum Refineries	0.8%		
Other Petroleum and Coal Products	1.1%		



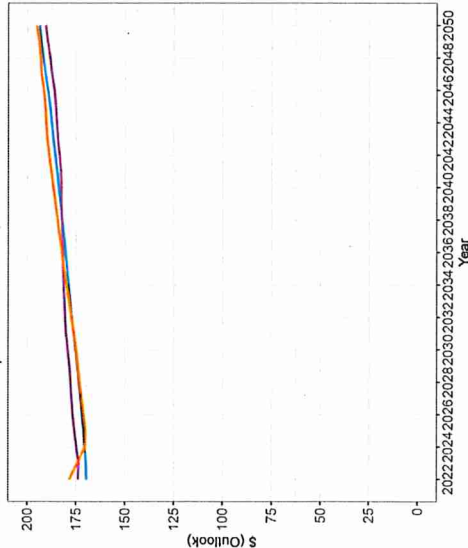
Basin specific manufacturing

Industry	Name	Projected Annual Economic Growth Rates
Paper Products	Kimberly Clark	0.5%
Chemical Manufacturing	Archroma Us Inc	0.3% (inorganic)
Miscellaneous Manufacturing	Resort, Recycled Group	2.8%
Plastics and Rubber Products	Bridgestone	1.7%
Wood Products	Georgia-pacific Wood Products LLC	0%

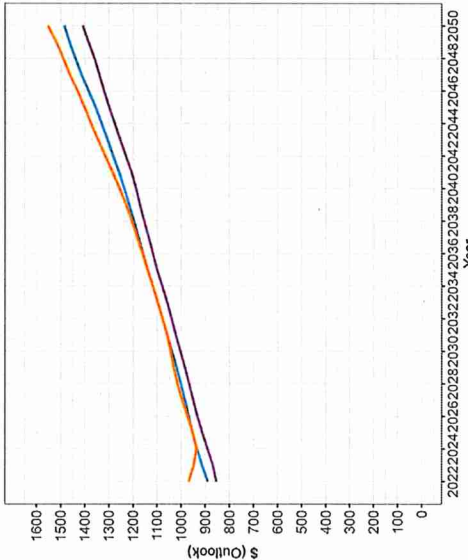


Basin specific manufacturing

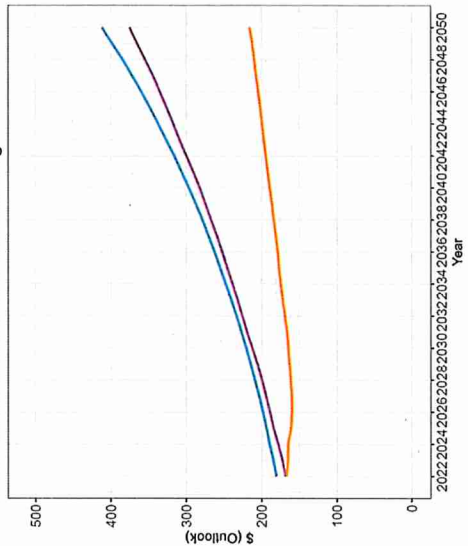
AEO outlook: Paper Products



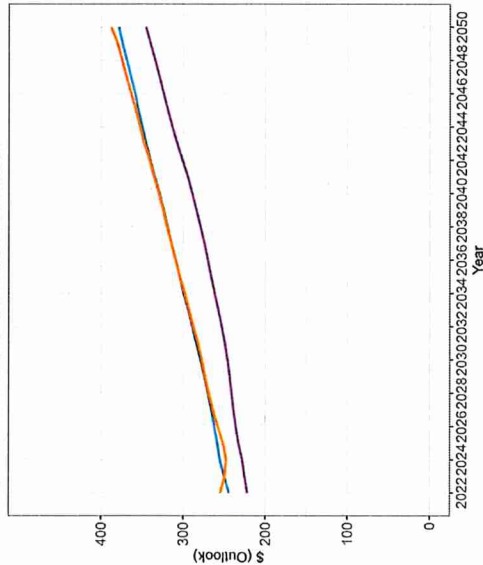
AEO outlook: Chemical Manufacturing



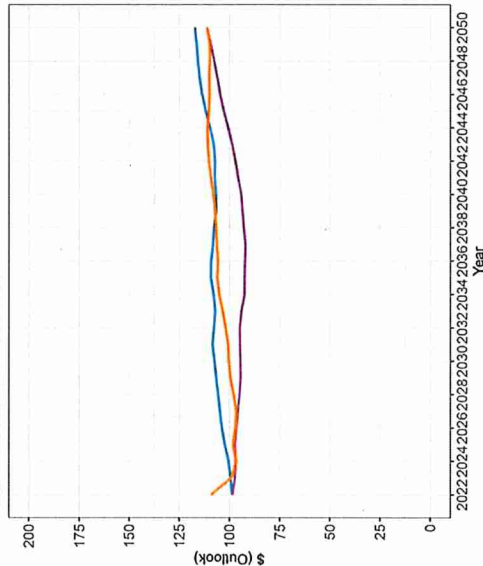
AEO outlook: Miscellaneous Manufacturing



AEO outlook: Plastics and Rubber Products



AEO outlook: Wood Products



2020 data
2021 data
2023 data



Manufacturing

- Projected annual growth rates range from 0.3% to 2.8%, depending on the economic sector.
- Over 50 years, that leads to a total increase from 5% to over 267%.
- In reality, water demand for manufacturing has declined as industrial processes become more efficient and manufacturers develop higher-value products.



Agricultural Irrigation

- Projected to grow from 38% (Moderate Scenario) to 44% (High Scenario) over the 50-year planning horizon (roughly 0.7% annual growth rate)
- Data indicated the recent growth of about 7% annually.
- The projected surface water growth is assigned to placeholder irrigators at HUC10 confluence nodes.
- The projected groundwater growth will be distributed regionally according to available land and proximity to existing irrigation



Possible Research

Industrial Water Purchases from Public Suppliers:

- *Per-capita modeling:* Acknowledge that while residential and commercial use can scale per capita, industrial purchases typically do not follow this trend.
- *Inclusion of new industrial users:* Currently overlooked in projections is the need for scenario-based modeling to account for new industrial water users.

Breakdown of Water Systems: Indoor vs Outdoor and Residential vs Commercial Use:

- *Availability of relevant data:* Explore what relevant data is currently available that could be leveraged.
- *Data limitations:* Address the current insufficiency of data for detailed breakdowns of water systems and propose an investigation into the volume and type of data required for robust analysis.

Agricultural Demand:

- Examining shifts in agricultural practices and the resulting changes in water demand.
- Integrating precision agriculture data into demand projections to account for more efficient irrigation techniques.

Socioeconomic Factors:

- Understanding the impact of changing lifestyles and consumer behavior on water demand.
- More diverse set of socio-economic water productivity measures to ensure that a broader set of values are represented in water allocation policies.

Discussion Questions

What trends are currently happening or on the horizon?

What magnitude of impact can we expect?



CLEMSON

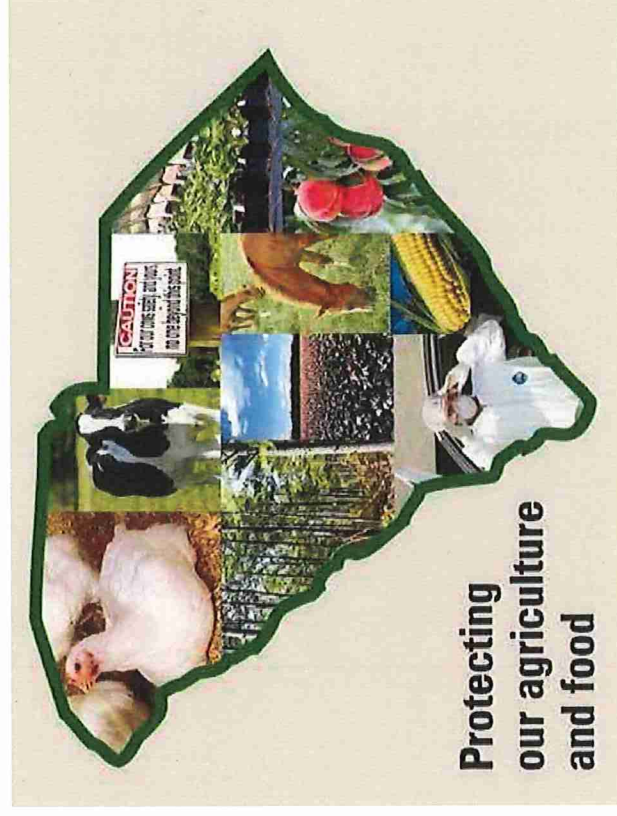
Laljeet Sangha
315-975-3413
lsangha@clemson.edu

LOWER SAVANNAH - SALKEHATCHIE RIVER BASIN AGRICULTURE OVERVIEW

Dr. Nathan Smith & Trey Buckelew



COOPERATIVE EXTENSION
College of Agriculture, Forestry and Life Sciences

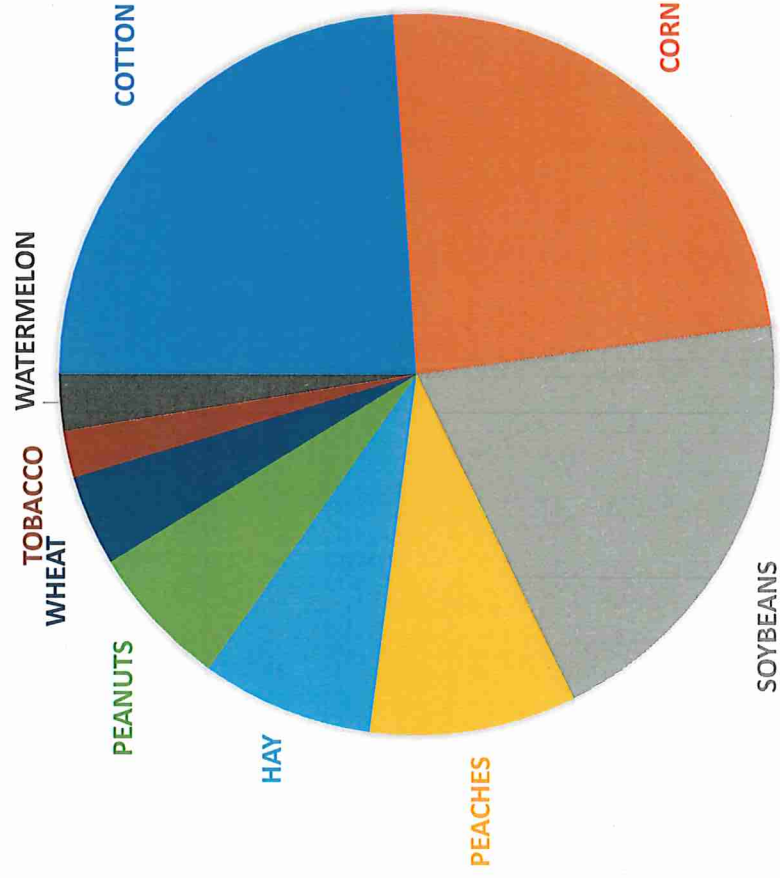




South Carolina Agriculture

- 2022 Ag Census counted 22,633 farms (down 8.7% from 2017) on 4.55 million acres of farmland (down 4.0% from 2017).
- Poultry is the top commodity in cash value, chickens, eggs and turkey totaling over a billion in production value. Beef, dairy, swine, horses, aquaculture, goats, bees, and specialty animals are vitally important to South Carolina agriculture.
- The state's fruits and vegetables are a big part of the state's agricultural production with peaches, leafy greens, tomatoes and watermelon leading state rankings. South Carolina peaches ranked 2nd nationally.
- Field crops including corn, cotton, soybeans, peanuts, tobacco and wheat are grown on over 1.3 million acres.
- The state's green industry including ornamental horticulture, floriculture, nursery, and turf grass ranks as South Carolina's second largest agricultural industry cluster in cash value.

SC MAJOR CROPS BY VALUE OF PRODUCTION, 2022



Source: USDA National Agricultural Statistics Service, (Peaches Value estimated using previous 2 years price)



SC FARM & LIVESTOCK OVERVIEW

Farms Operations†

Farm Operations - Area Operated, Measured in Acres / Operation	204
Farm Operations - Number of Operations	22,600
Farm Operations - Acres Operated	4,600,000

Livestock Inventory †

Cattle, Cows, Beef - Inventory (First of Jan. 2024)	148,000
Cattle, Cows, Milk - Inventory (First of Jan. 2024)	8,000
Cattle, Incl Calves - Inventory (First of Jan. 2024)	290,000
Goats, Meat & Other - Inventory (First of Jan. 2024)	31,000
Goats, Milk - Inventory (First of Jan. 2024)	2,900
Hogs - Inventory (First of Dec. 2023)	122,000
Chickens, Broilers - Production, Measured in Head (2020)	243,600,000
Turkeys - Production, Measured in Head* (2024)	9,000,000

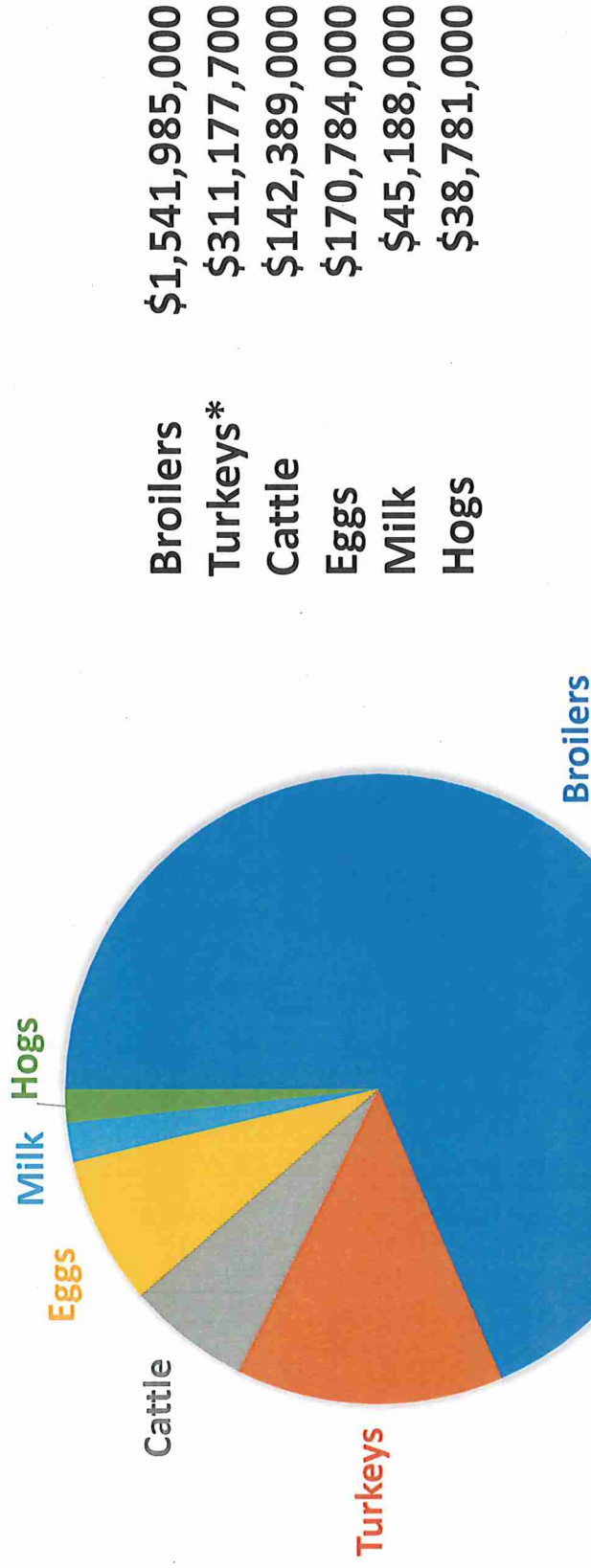
Milk Production †

Milk - Production, Measured in Lb / Head (2023)	18,500
Milk - Production, Measured in Lb (2023)	148,000,000

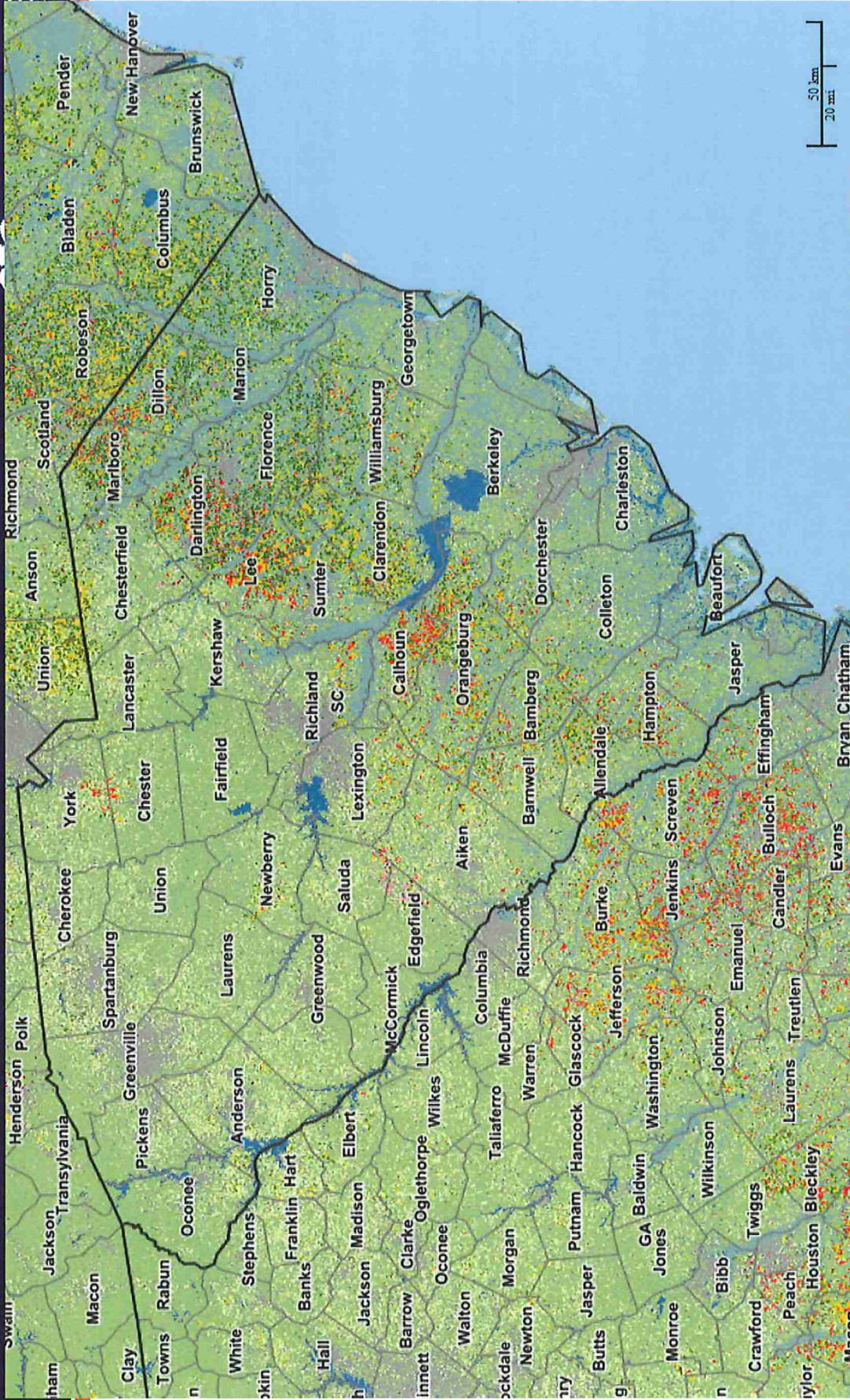
NASS estimates, *Non-NASS estimate



SC LIVESTOCK & POULTRY BY VALUE, 2023



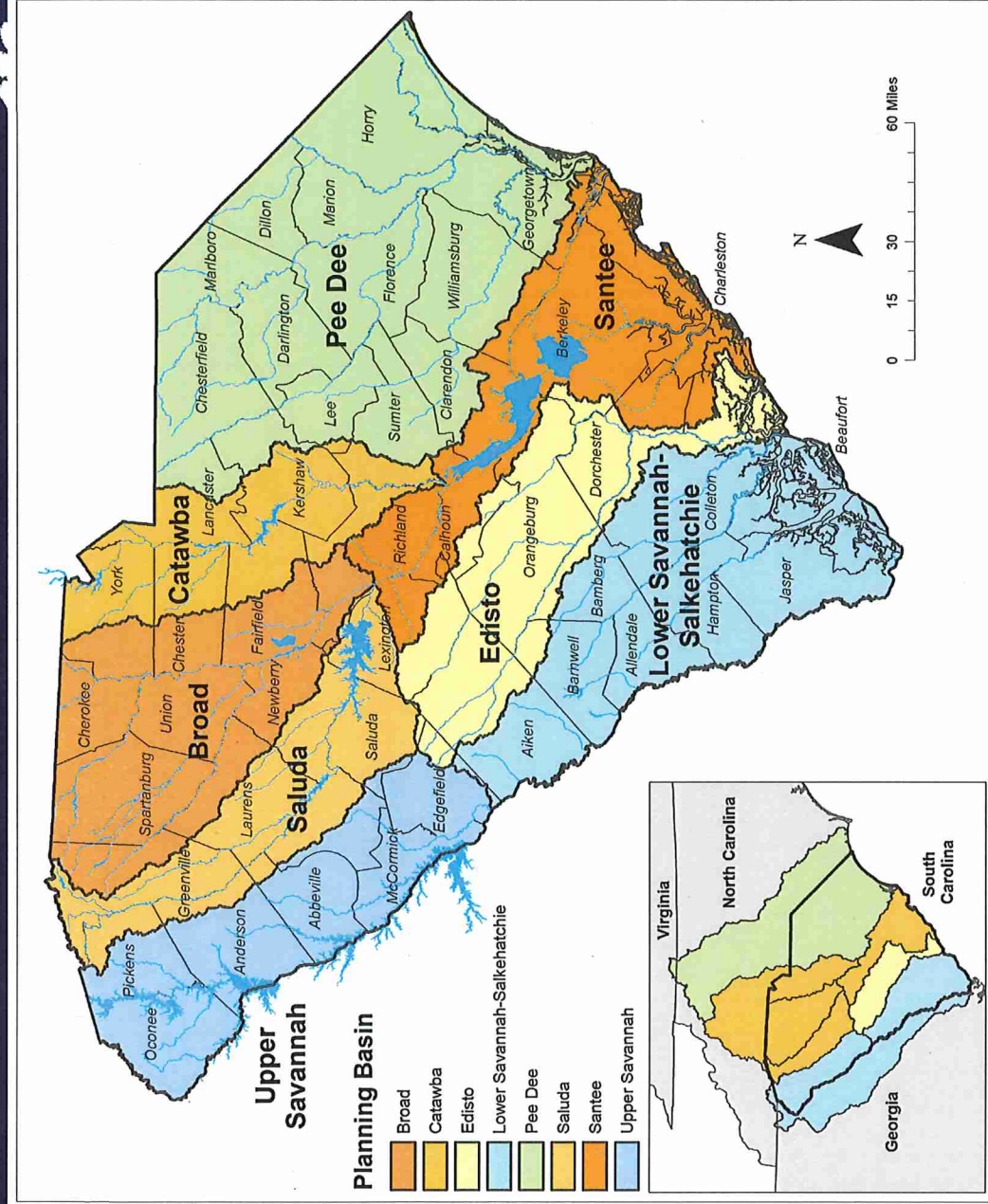
Source: USDA National Agricultural Statistics Service, (*Turkeys estimated by Clemson Extension*)





Forestry

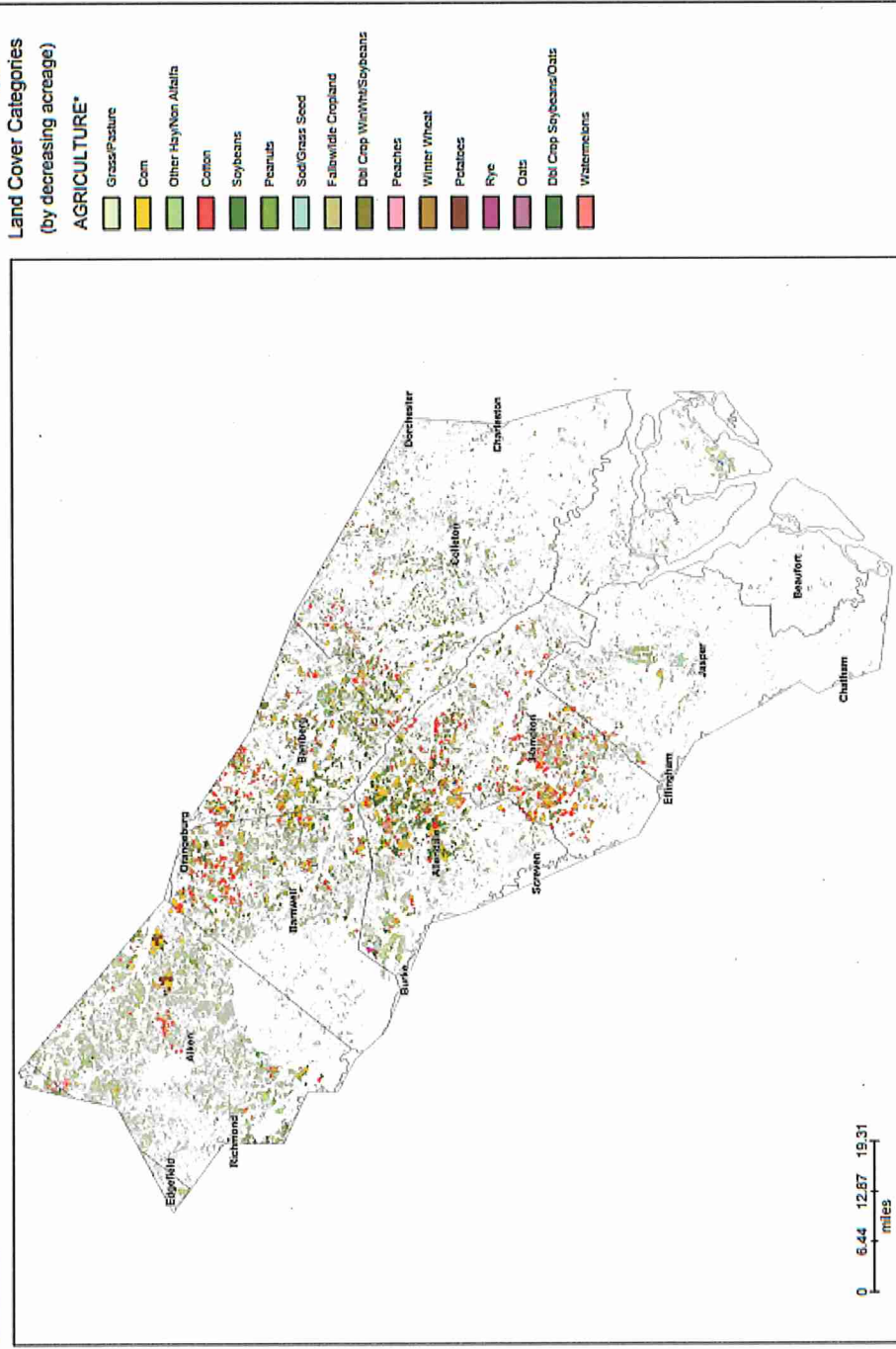
- Forestland makes up nearly 70% of the state's total land area.
- Private owners hold a combined 88% of the state's timberland area with private individuals controlling over half of those acres.
- Forestry is #1 among manufacturing industries in the state with a total economic impact of around \$17 billion annually.
- South Carolina exports \$1.4 billion in forest products each year. Timber is the state's #1 renewable commodity at \$759 million annually.





ERATIVE EXTENSION
griculture, Forestry and Life Sciences

2023 Lower Savannah-Salkehatchie Area of Interest



* Only top 15 agriculture categories are listed

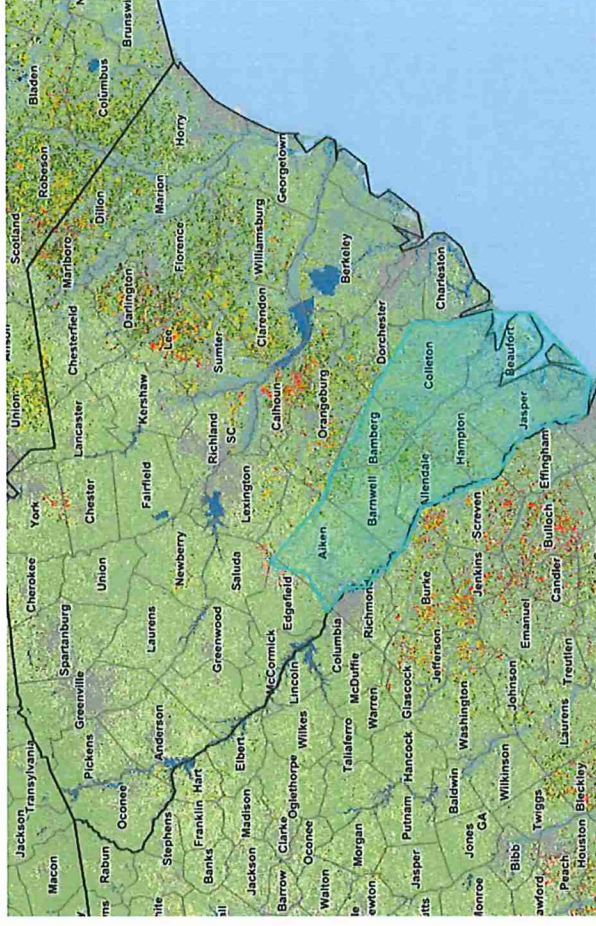
Rebecca M. Crooks - <http://www.usda.gov/data/CropScape>

Source: 2023 CropScape, USDA NASS

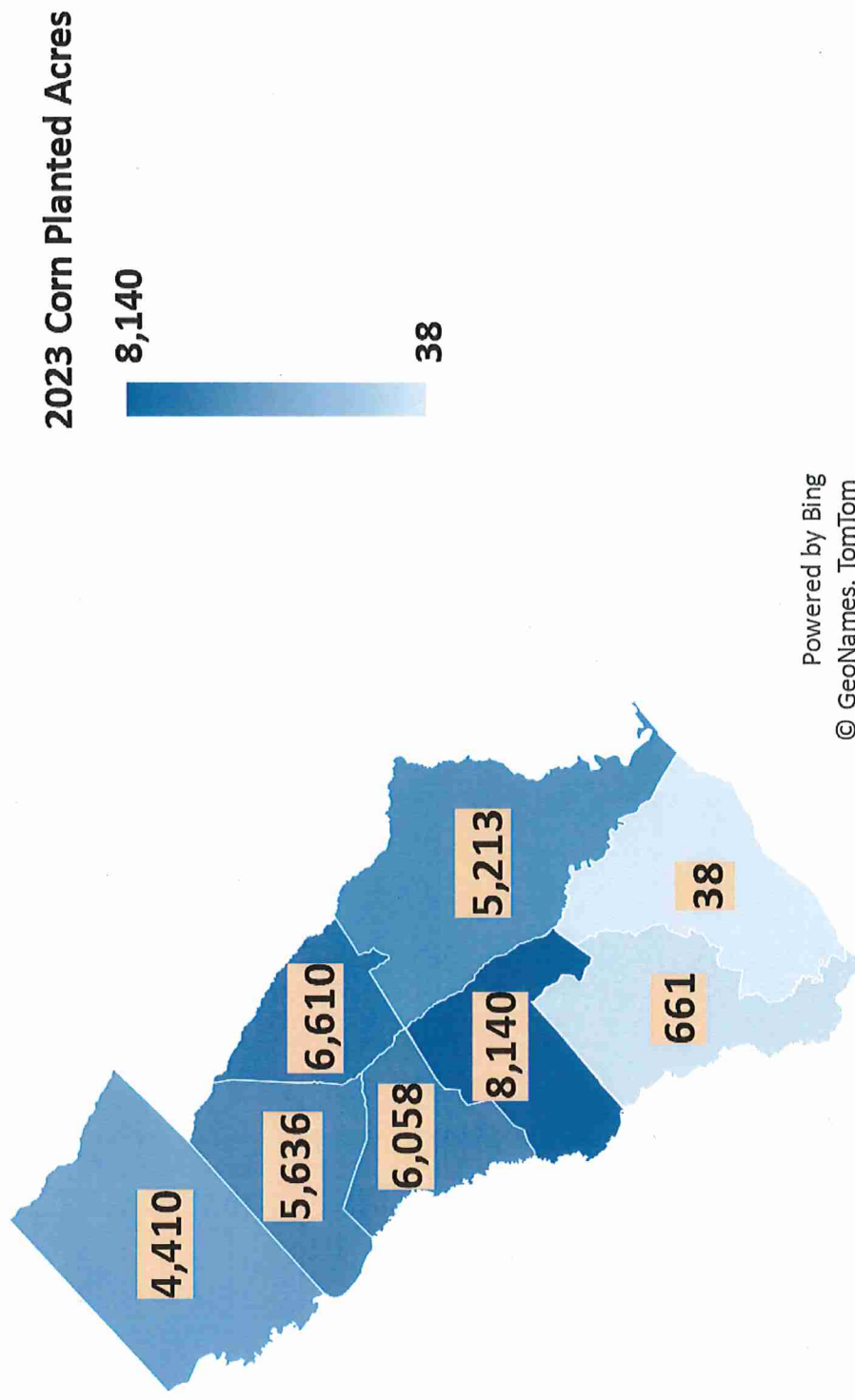


USDA NASS CropScape – Rough Map of Lower Savannah- Salkehatchie River Basin

Crop	2022 Ag Census	2022 NASS Survey	2023 CropScape Acreage
Corn	34,623	25,720	60,465.5
Grass/Pasture	14,990		151,618.7
Other Hay/Non Alfalfa	30,512		51,950.3
Cotton	46,295	35,950	43,708.8
Soybeans	24,251	22,280	34,531.4
Peanuts	16,795	19,120	22,690.5
Fallow/Idle Cropland			11,316.6
Sod/Grass Seed	339		12,785.5
Dbl Crop Wht/Soybeans			4,151.9
Sorghum	90		174.8
Peaches	1,877		2,612.7
Potatoes	6		1,785.8
Winter Wheat	5,679		1,792.5

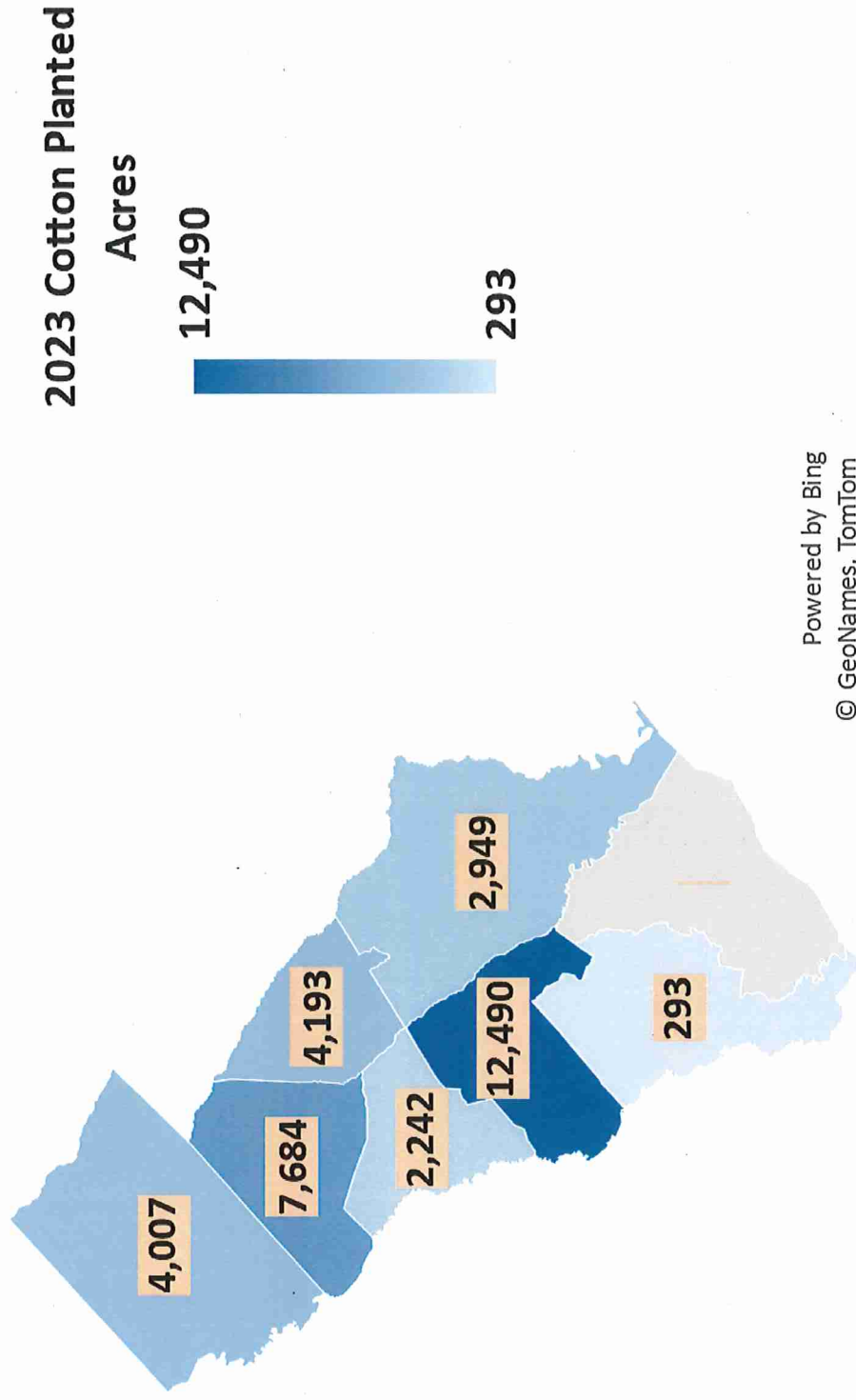


2023 Corn Planted Acres from FSA



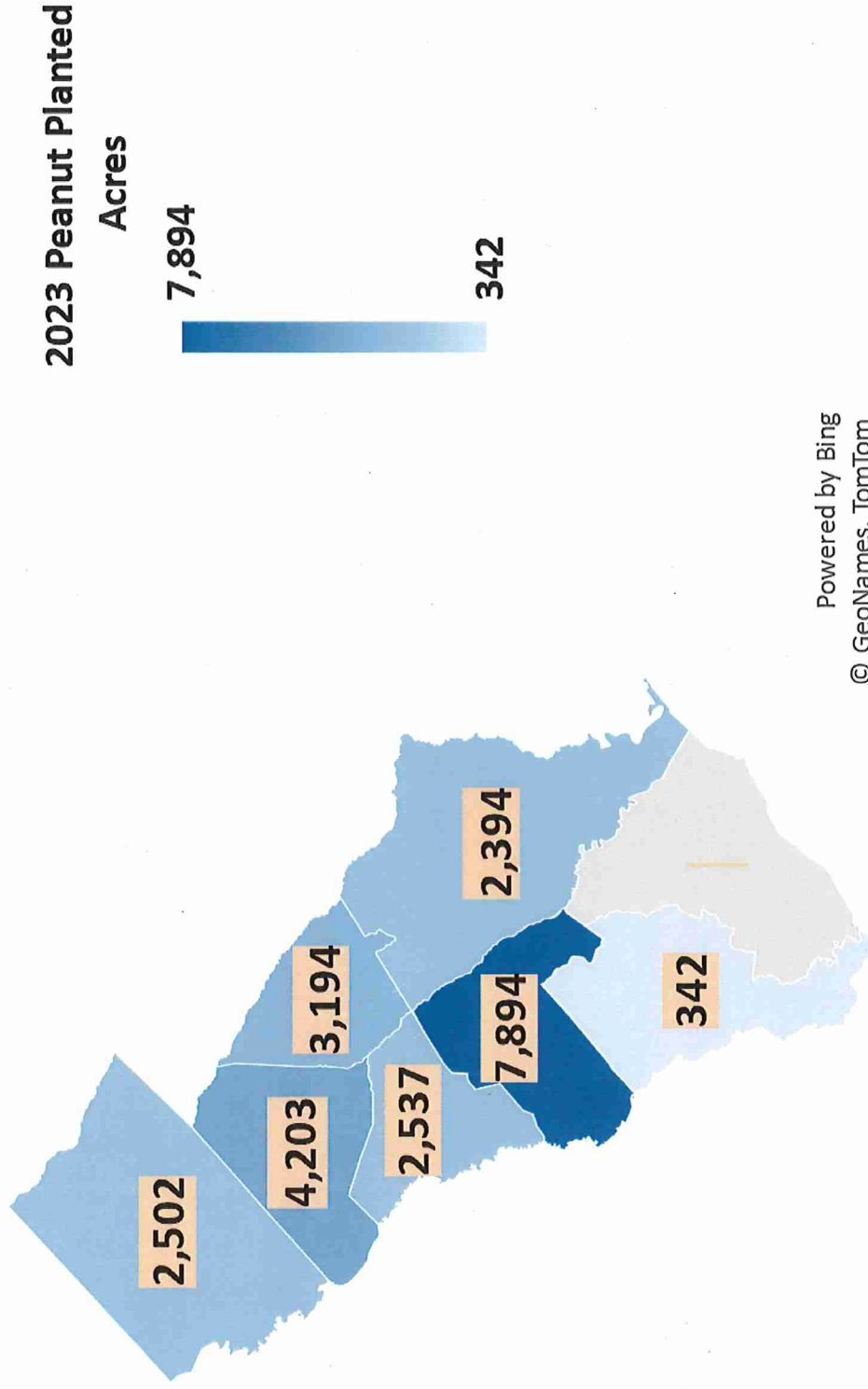
Source: 2023 Certified Crop Acreage, USDA FSA

2023 Cotton Planted Acres from FSA



Source: 2023 Certified Crop Acreage, USDA FSA

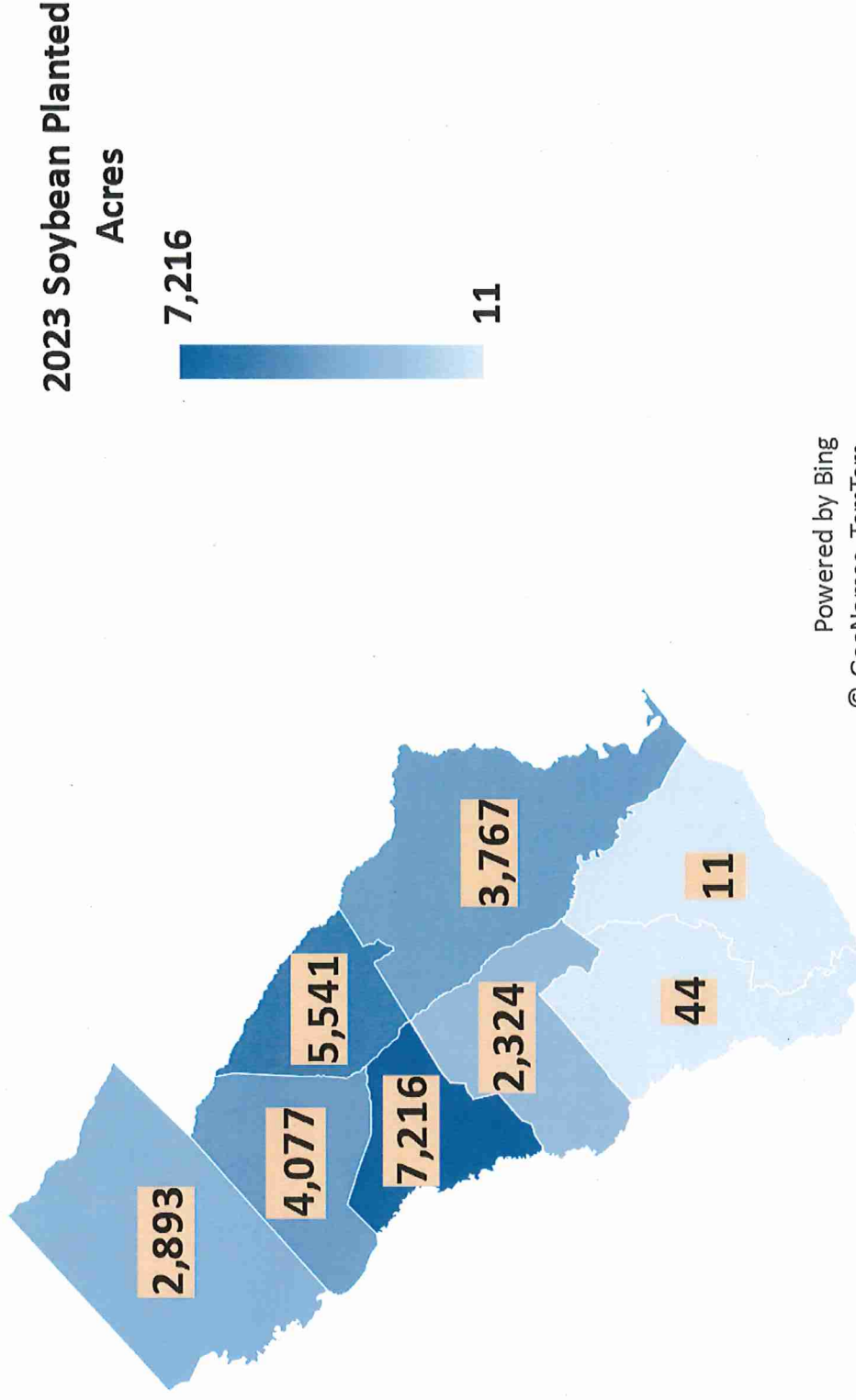
2023 Peanut Planted Acres from FSA



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Source: 2023 Certified Crop Acreage, USDA FSA

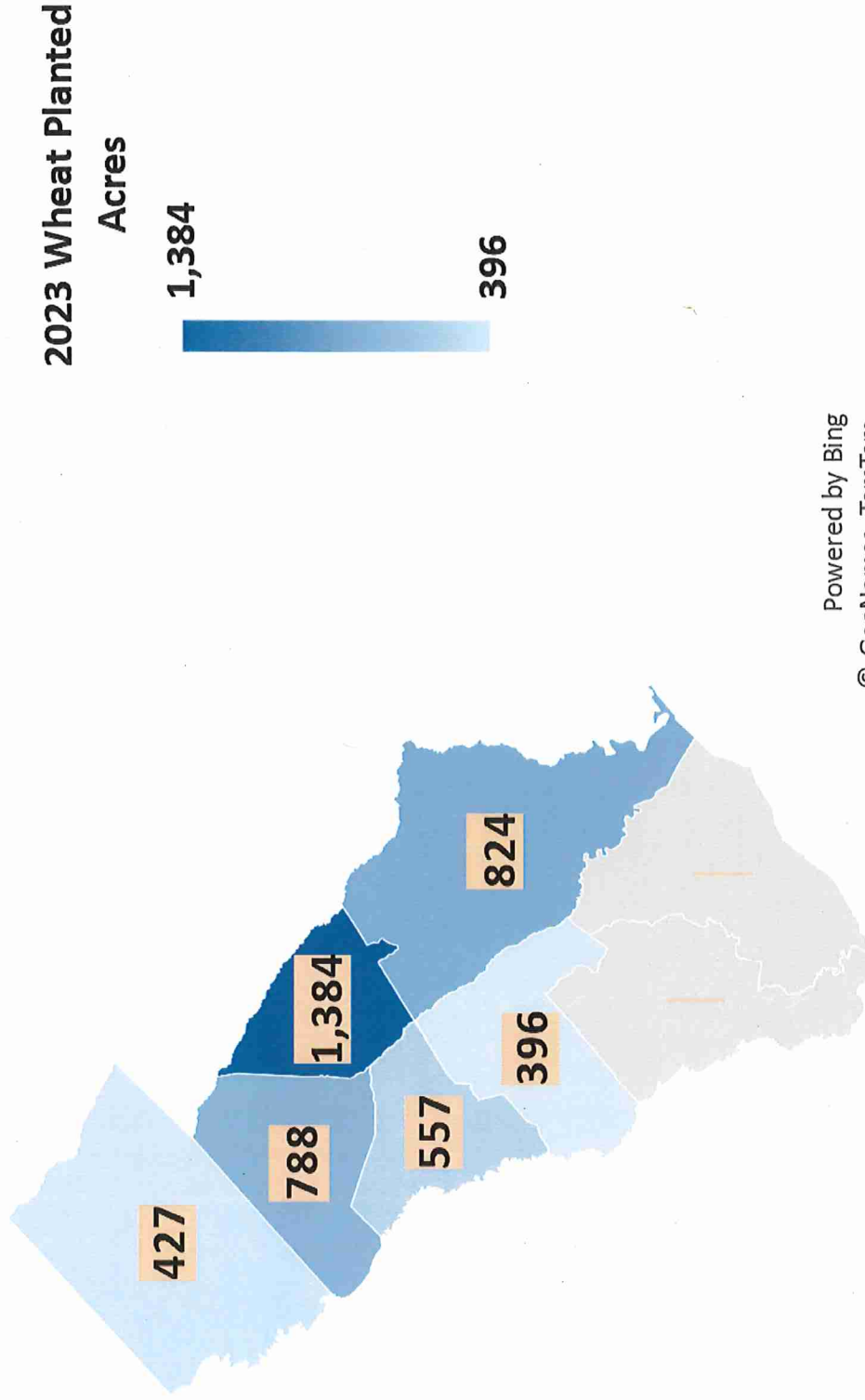
2023 Soybean Planted Acres from FSA



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Source: 2023 Certified Crop Acreage, USDA FSA

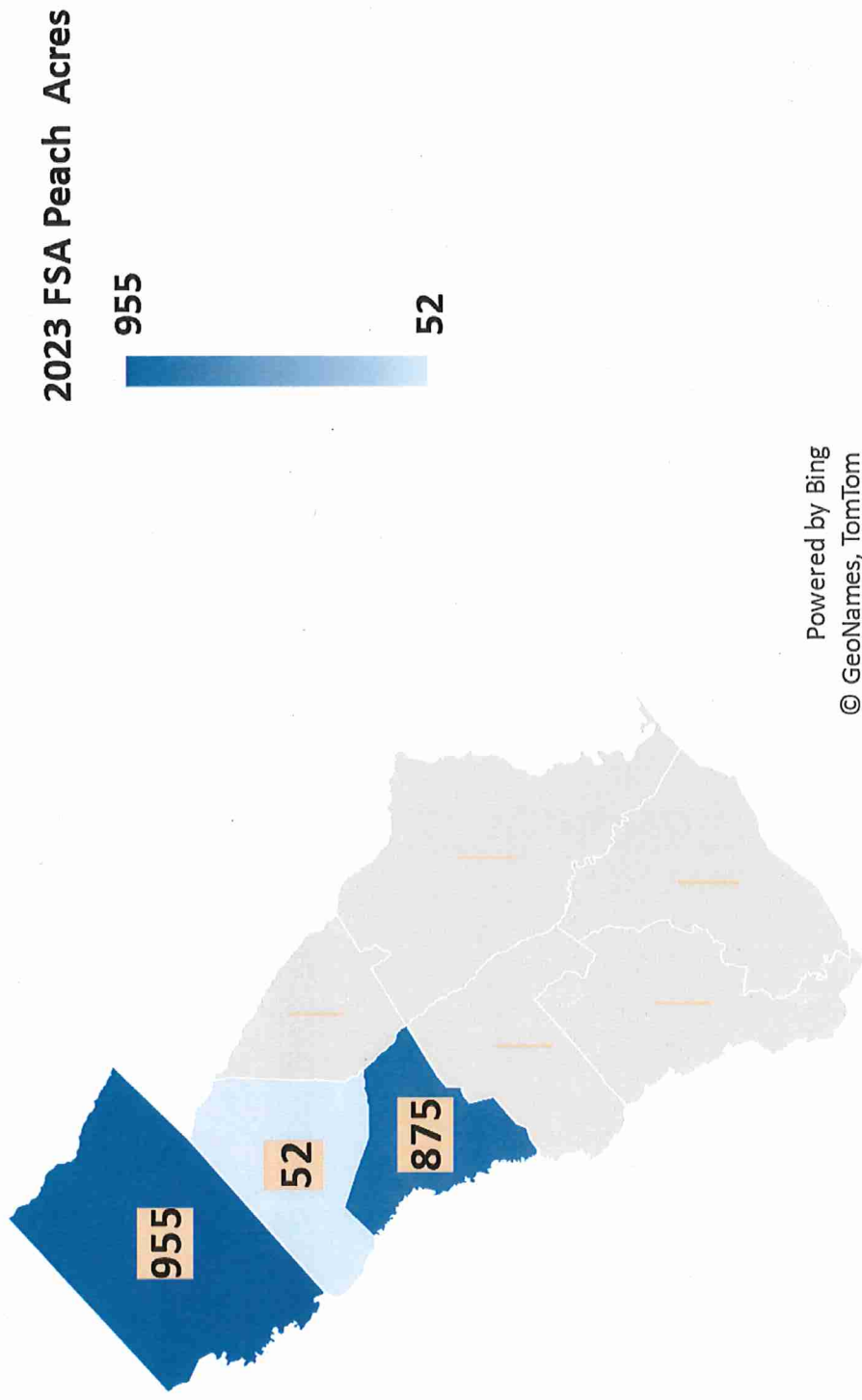
2023 Wheat Planted Acres from FSA



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Source: 2023 Certified Crop Acreage, USDA FSA

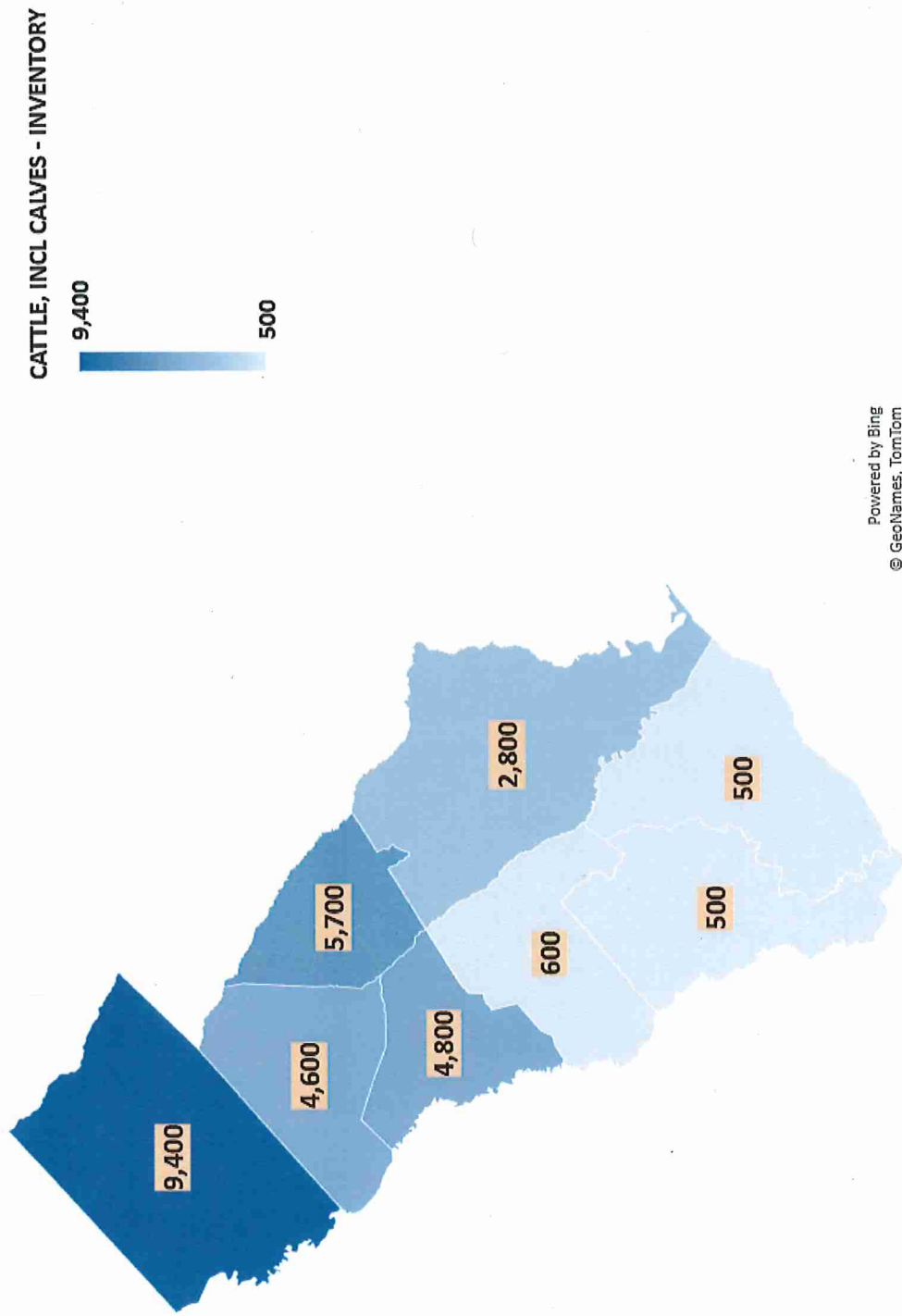
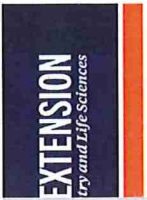
2023 Peach Acres from FSA



Source: 2023 Certified Crop Acreage, USDA FSA



2023 Cattle Inventory (Including Calves) from NASS



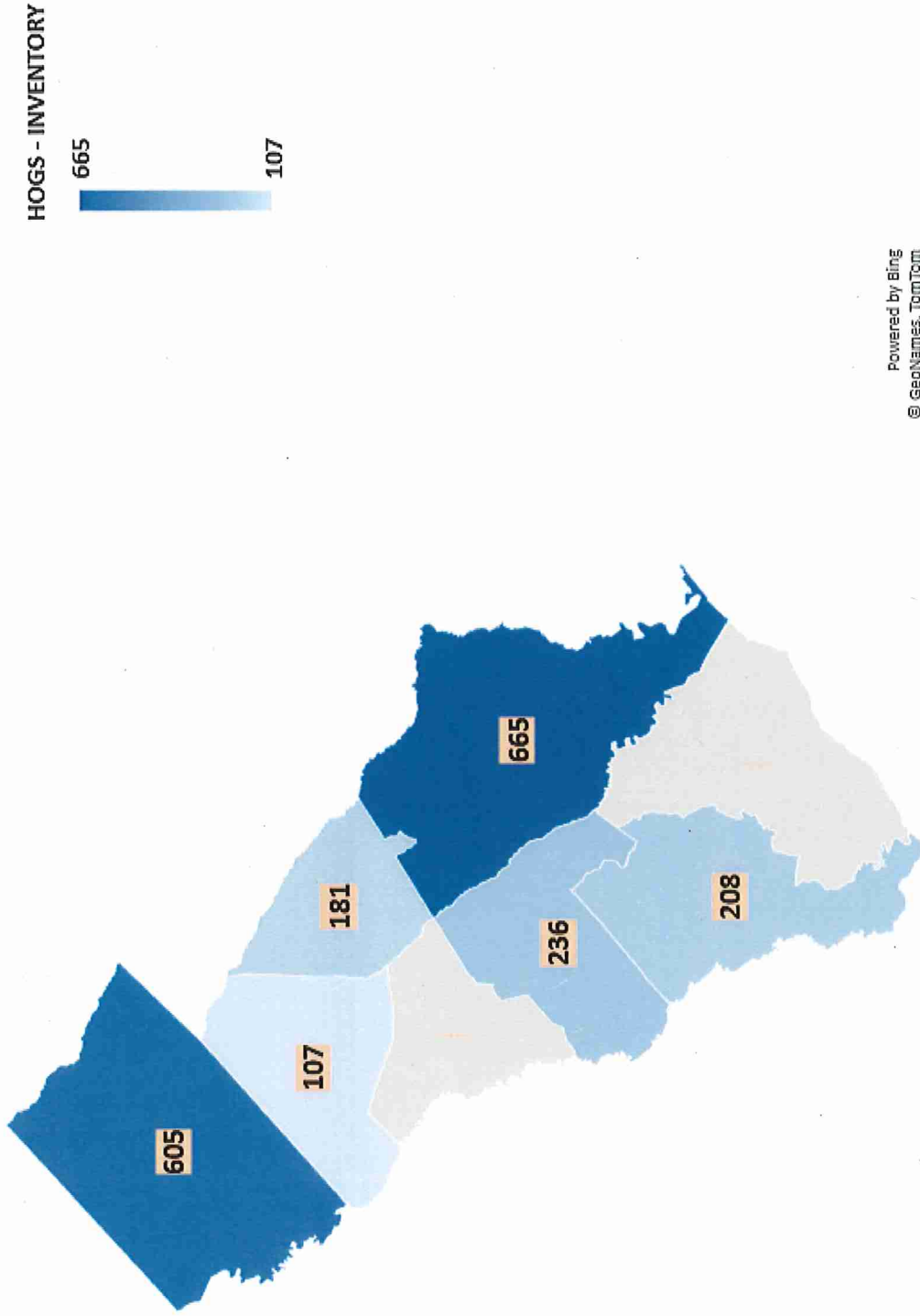
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Source: USDA National Agricultural Statistics Service





2022 Hog Inventory from NASS

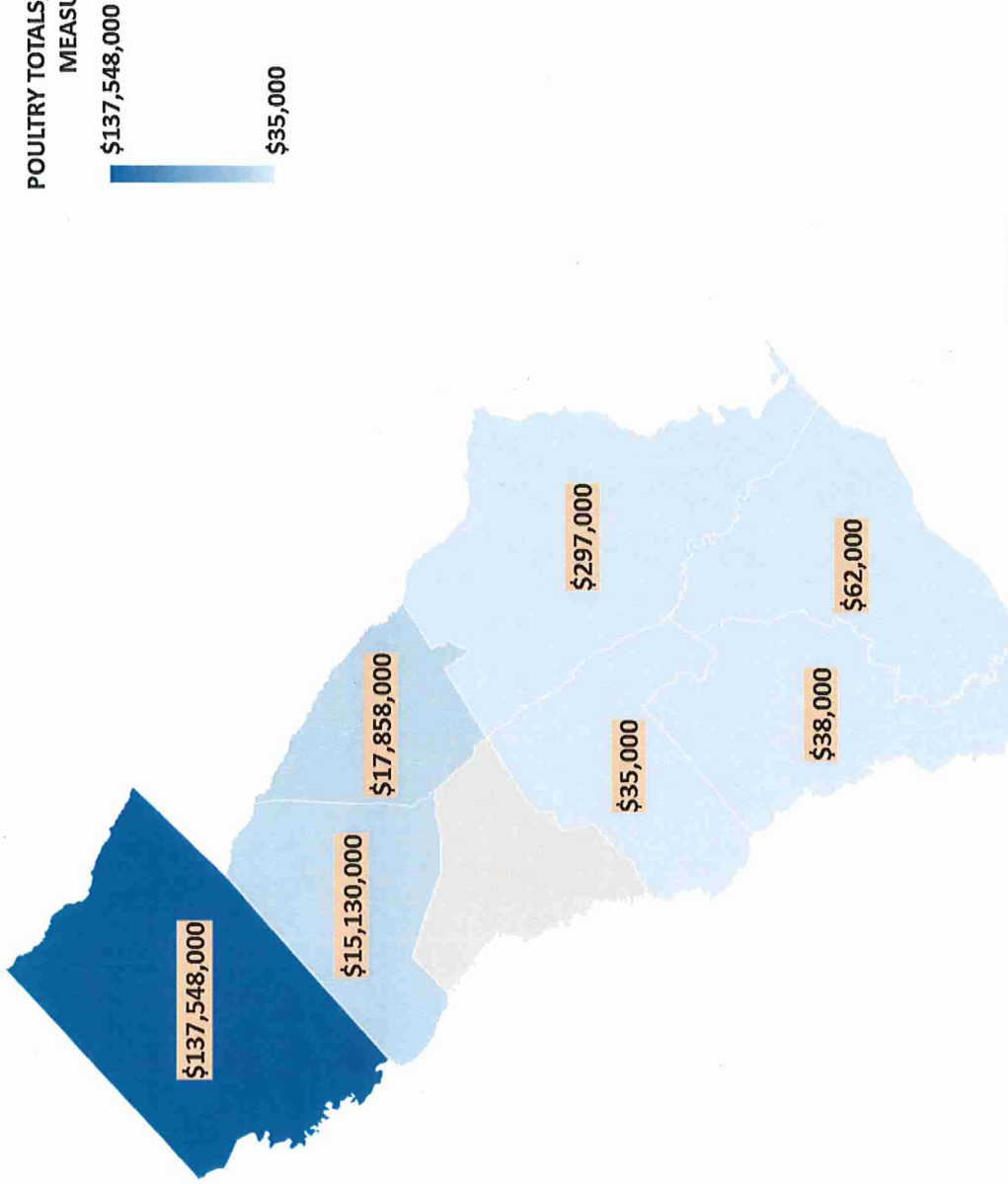


Source: USDA National Agricultural Statistics Service



2022 Poultry Total Sales (Including Eggs) Measured in \$ from NASS

POULTRY TOTALS, INCL EGGS - SALES,
MEASURED IN \$



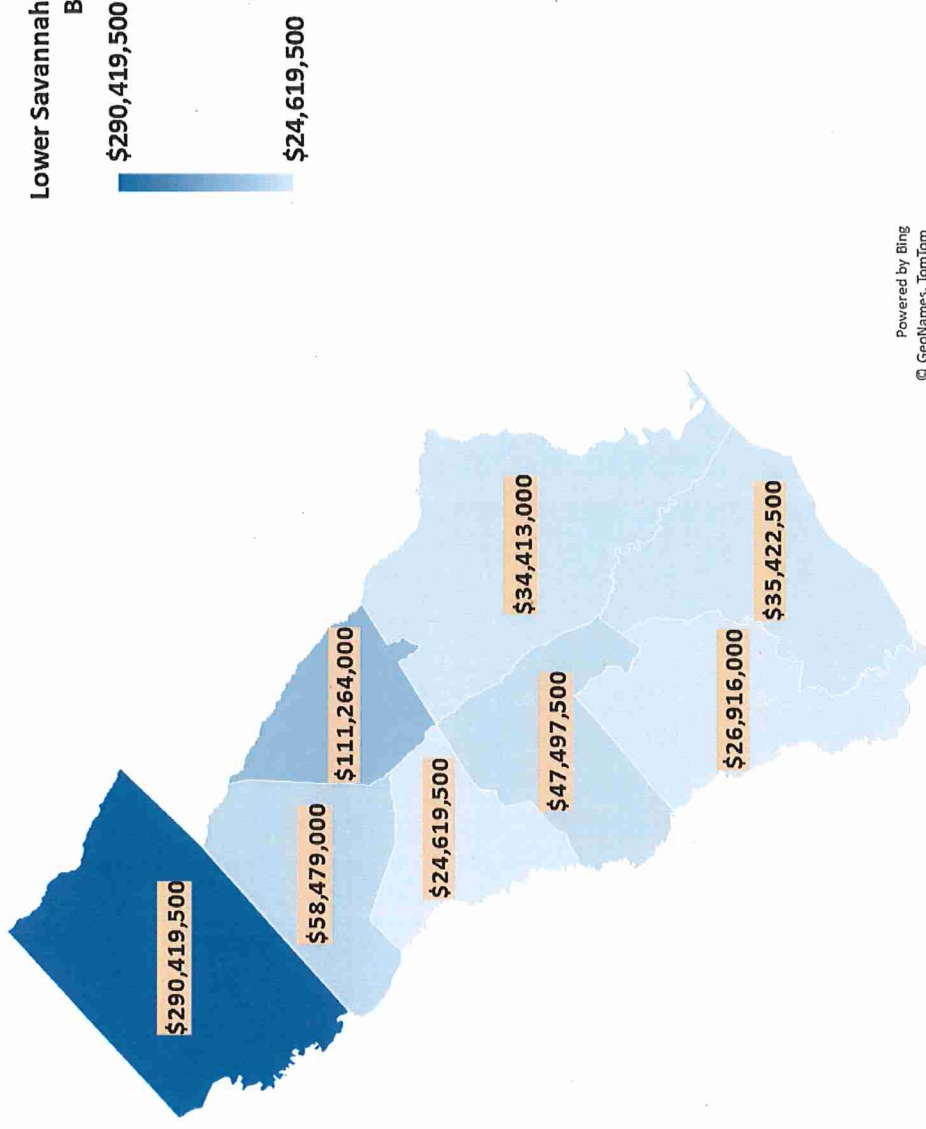
Source: USDA National Agricultural Statistics Service

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Lower Savannah - Salkehatchie River Basin 2022 Market Value of Products Sold by
County Total Value X 1.5 Multiplier: \$629,031,000

Lower Savannah - Salkehatchie River
Basin

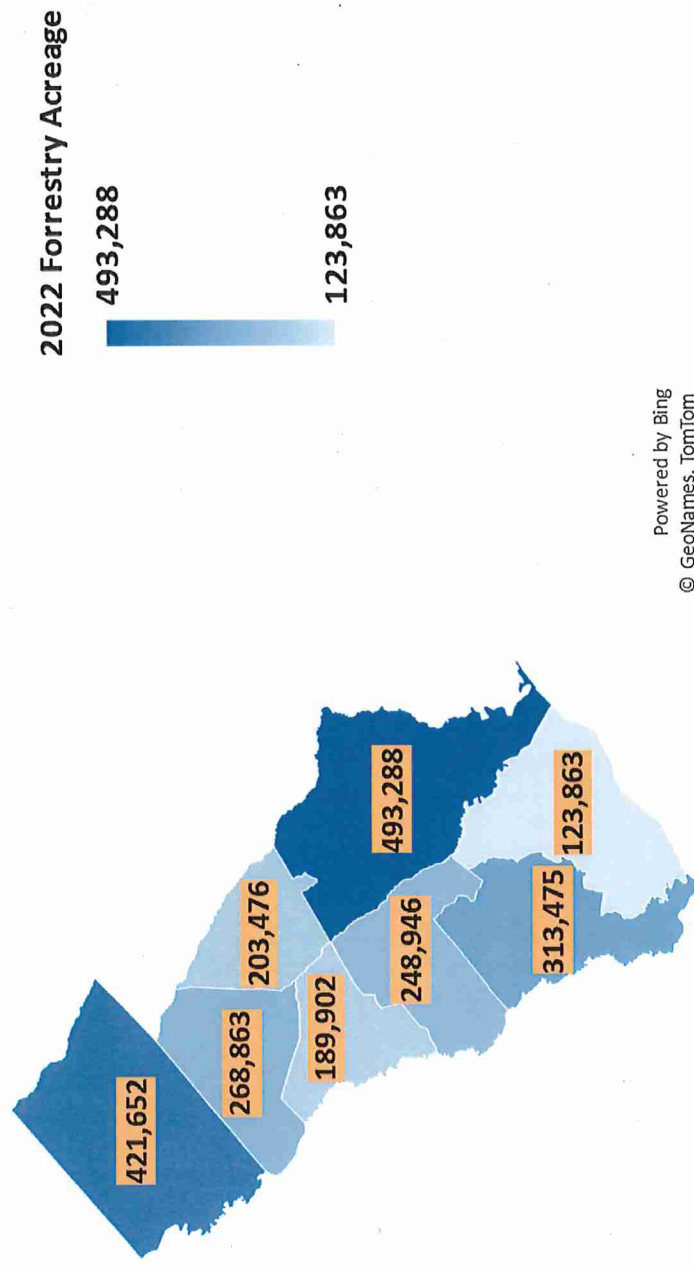


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Source: 2022 Ag Census, USDA NASS

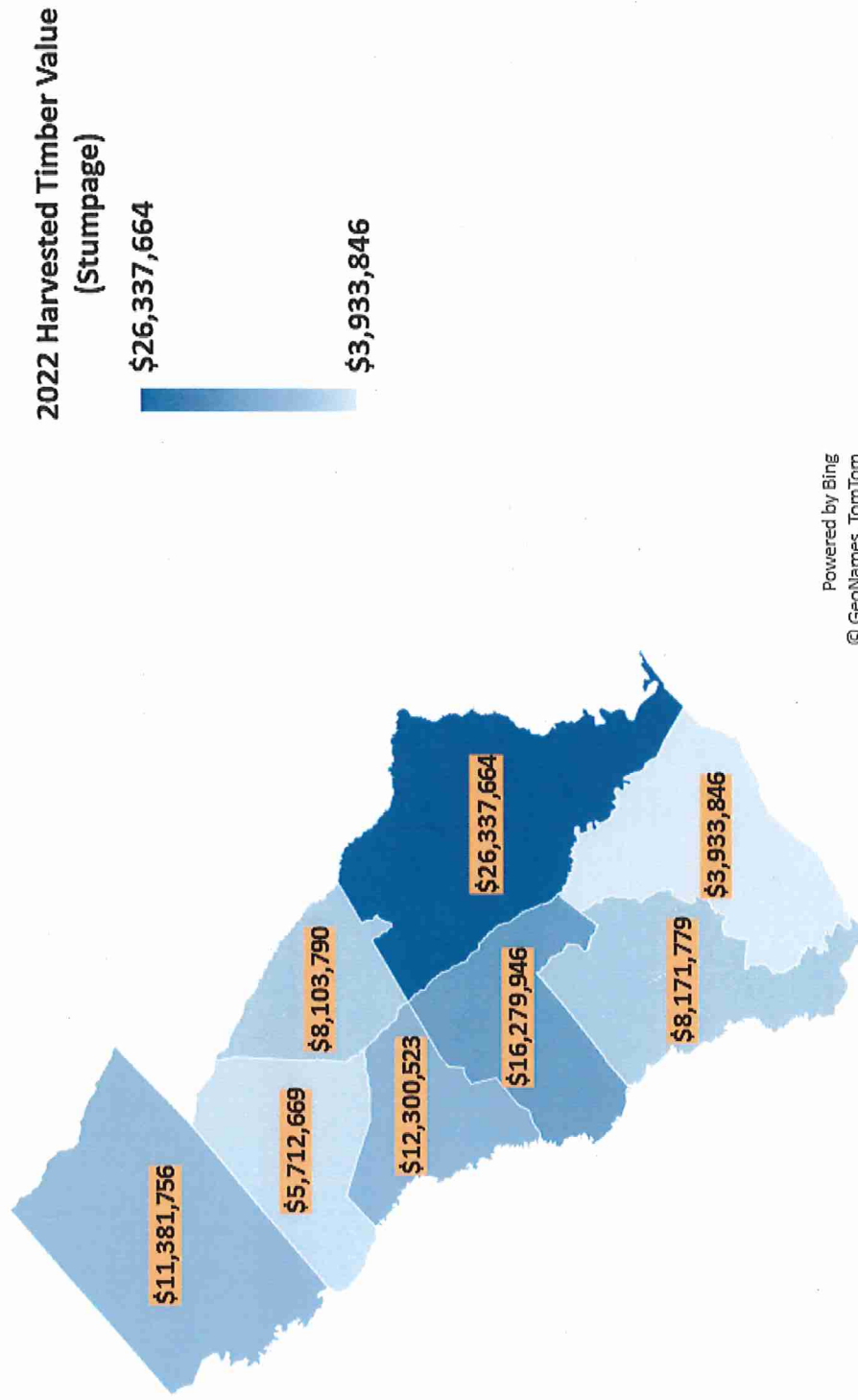


2022 Forestry Acreage in the Lower Savannah -Salkehatchie River Basin



Source: 2023 SC Forestry Commission

2022 Harvested Timber Value (Stumpage) in the Lower Savannah-Salkehatchie River Basin



Source: 2023 Forestry Commission



Lower Savannah - Salkehatchie River Basin Counties FSA Certified Crop Acres

	Non-Irr Acres	Irr Acres	Total Acres	Non-Irr %	Irr %	SC Non- Irr %	SC Irr %
Corn	17,344	10,983	36,766	53%	47%	75%	25%
Cotton	26,277	7,580	33,858	69%	31%	83%	17%
Peanuts	15,994	7,072	23,066	69%	31%	71%	29%
Soybeans	20,832	5,041	25,872	81%	19%	93%	7%
Wheat	10,842	683	11,525	94%	6%	92%	8%

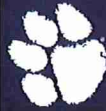
THANK YOU



COOPERATIVE EXTENSION
College of Agriculture, Forestry and Life Sciences

Clemson University Extension Agribusiness Team
<http://www.clemson.edu/extension/agribusiness>

Nathan Smith, PhD.
Extension Economist, Assistant Director CU-CAT
Sandhill Research and Education Center
229-392-3948 (m)
nathan5@clemson.edu



THANK YOU

SOUTHERN AG TODAY DAILY

**SC AgriWellness - Giving You a
Hand When You Need it Most**



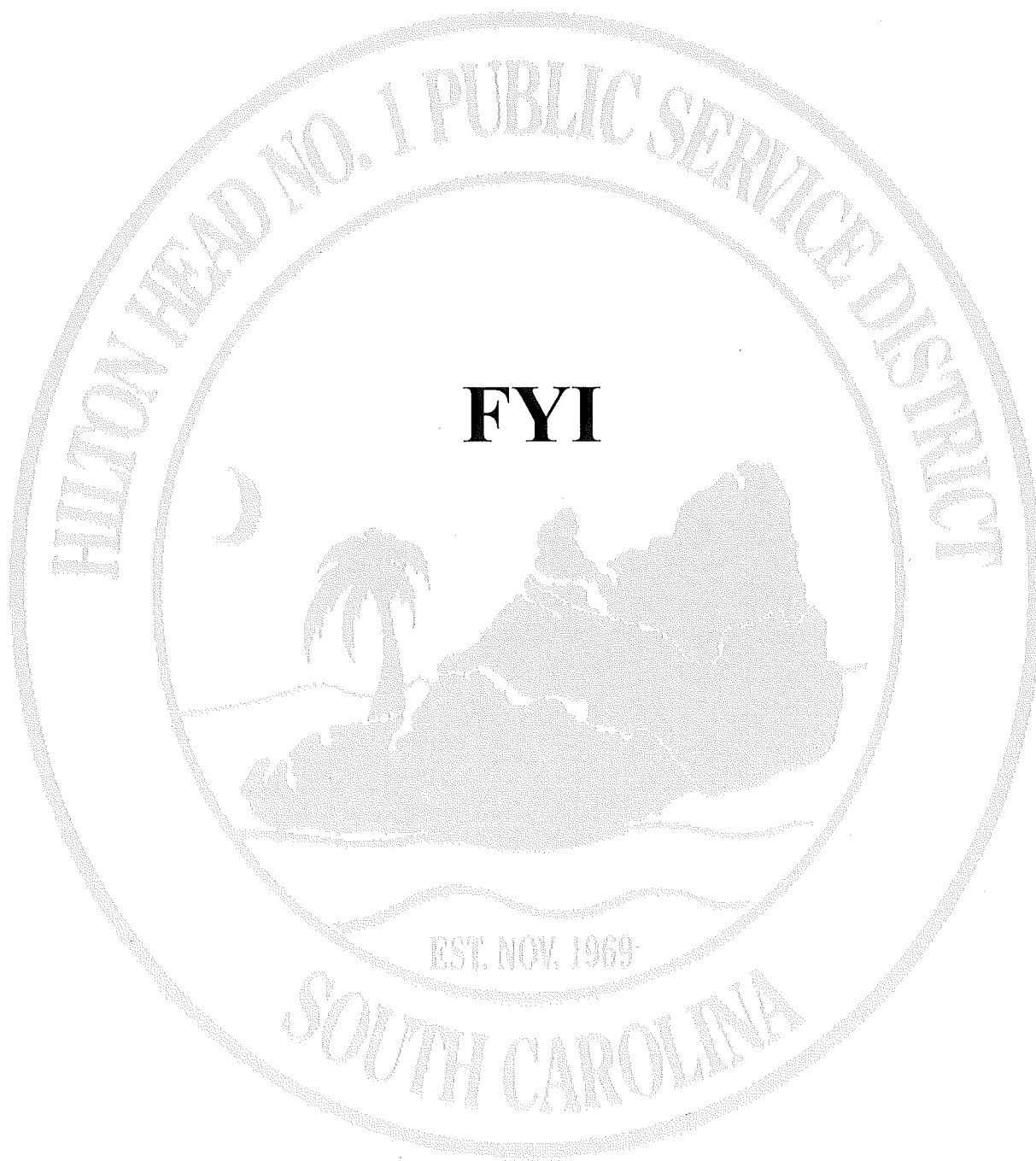
Free counseling services for farmers and farm families

Call 1-800-968-8143 to be connected with a trained professional

<https://www.scfb.org/farmstress>



<https://southernagtoday.org/>



https://www.postandcourier.com/opinion/editorials/failing-septic-tanks-hurt-sc-coast-awendaw/article_2a84a30c-dfcc-11ee-a40e-578b94e1dcoc.html

Editorial: DHEC must act decisively on septic tanks along SC coast

BY THE EDITORIAL STAFF

MAR 15, 2024



The Bridges at Seven Lakes had several septic tank failures over the years. Similar problems have plagued other septic tanks, especially those going in big developments in coastal counties.

ANDREW J. WHITAKER/STAFF

If insanity is doing the same thing over and over and expecting a different result, South Carolina's policy of permitting more septic tanks along its coast is indeed insane.

We recognize there must be nuance in this debate over septic tanks: When they are properly sited and well-maintained over the years, these systems do not pose any

significant environmental threat. The problem — which has **become increasingly clear in recent years** — is the mounting evidence that too many new ones are being allowed in the wrong places, and both state law and policies are virtually silent on what should happen when a septic tank begins to fail.

It's time for South Carolina lawmakers to protect our fragile coastal environment, before it gets further contaminated by human filth, as it most notably is in Shem and James Island creeks.

The Post and Courier's John Ramsey provided a **thorough overview of the scope of our problem** this week, and we urge state regulators and legislators to act decisively. That's what Awendaw Town Council recently did, **placing a moratorium on new subdivisions** until it adopts further restrictions on them.

Developers have eyed Awendaw for large new subdivisions with hundreds of new homes on septic tanks, even though the homesites are near the pristine waterways of the Cape Romain National Wildlife Refuge.

Awendaw is a particularly fragile and sensitive place along our coast, but the problem extends well beyond its town limits. Since 2020, the state has received more than 10,000 applications for new septic tanks in its eight coastal counties and has approved most of them.

Environmental groups have filed a lawsuit to prevent new septic tanks for subdivisions near the coast, arguing the state's handling of permit requests doesn't consider their cumulative effects and makes it difficult for anyone to challenge them. Unfortunately but perhaps understandably, a judge has declined to grant a stay on new tanks, noting that lawmakers should act.

Lowcountry Reps. Joe Bustos and Tom Hartnett filed **H.4685** to prohibit new septic tanks within two miles of a creek, river or waterway in South Carolina. The bill is languishing in the House Labor, Commerce and Industry Committee, and we urge lawmakers to debate and pass it soon.

Meanwhile, local governments ought to find ways to do more to prevent future pollution from septic tanks. Ironically, a county far from the coast might provide an excellent example: Greenville County recently passed rules to require new homes using septic tanks to be built on at least 1½ acres; that's a far larger lot than many coastal counties and towns require. Leslie Lenhardt, a lawyer for the S.C. Environmental Law Project, said coastal governments adopting larger lot requirements for septic like Greenville's would make "a huge difference in the risk."

But still more could and should be done, particularly to require some sort of testing and monitoring over time to make sure septic systems are properly maintained and operating as they should. We already have seen neglected, failing septic tanks compromise the water quality of Shem and James Island creeks, requiring a multimillion-dollar expenditure of public money to try to clean it up.

State and local governments, particularly along South Carolina's coast, must do more to recognize the threat posed by their current septic tank policies, particularly as our climate changes, water levels rise and these systems become less effective. Ignoring this problem or just hoping it solves itself would be nothing short of crazy.

Click here for **more opinion content** from The Post and Courier.

MORE INFORMATION

Failing septic tanks are polluting the SC coast. Thousands more are going in the ground.

Editorial: SC must rethink its lax approach to septic tanks before it's too late

Awendaw, afraid of becoming Mount Pleasant, halts most new subdivisions

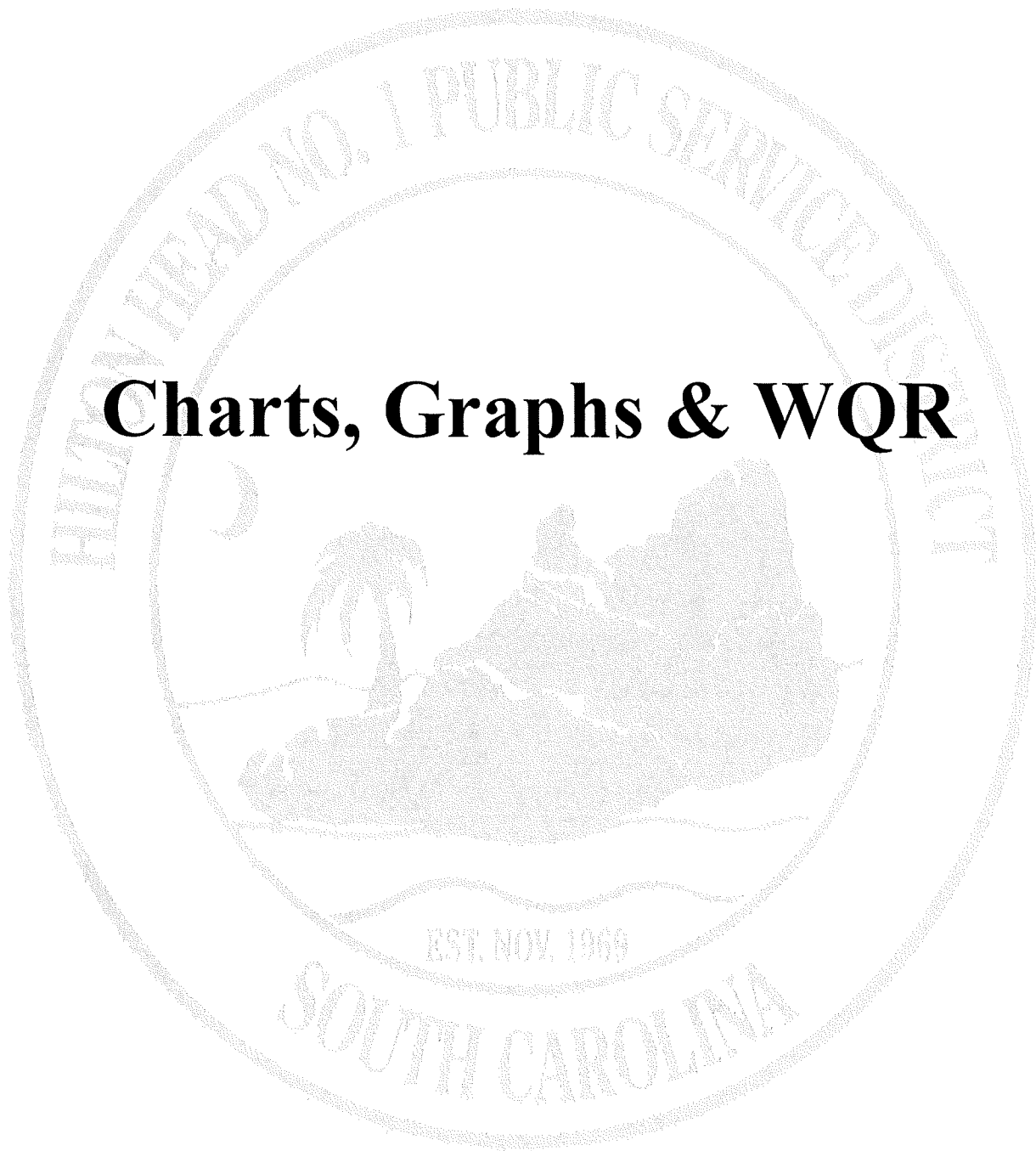
Awendaw passes subdivision moratorium, plans more restrictions on residential development

Commentary: DHEC must pause septic tank permitting in SC coastal counties

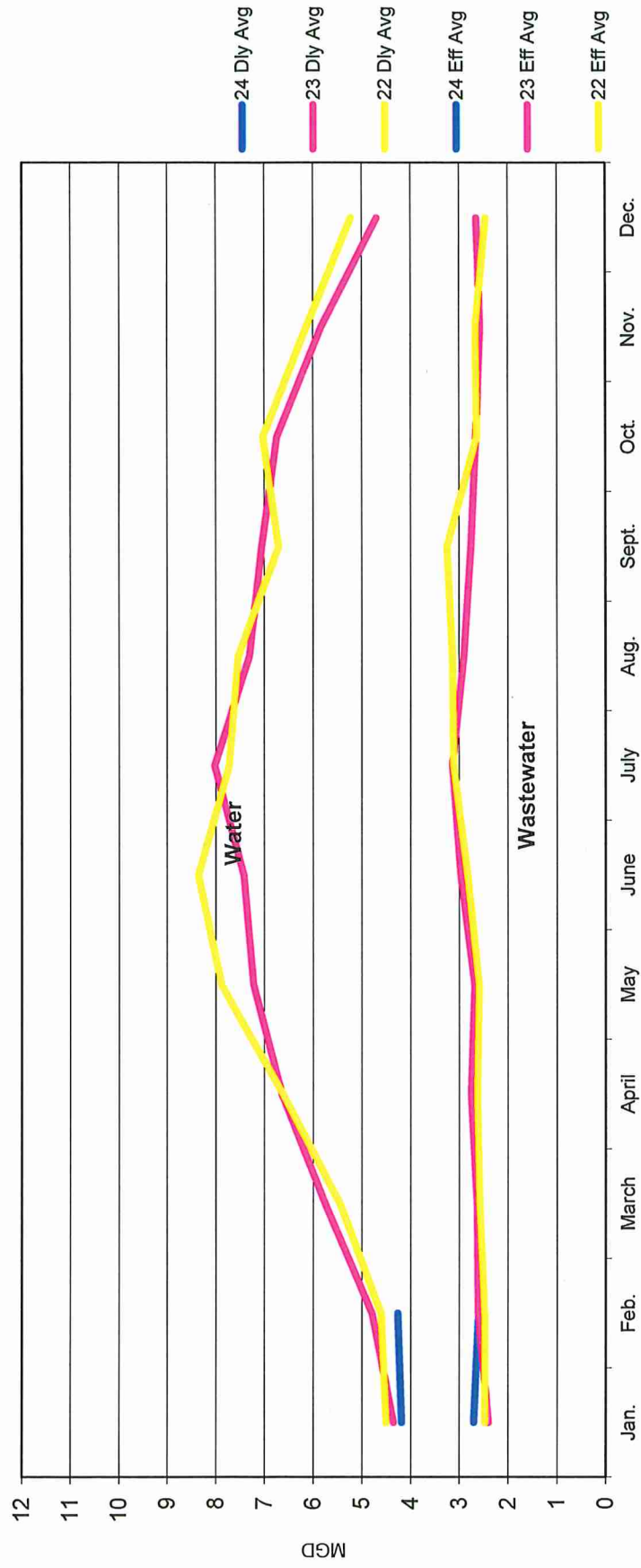
Editorial: Awendaw must rise to challenge of new development

Sapakoff: From sports writer to volunteer work on IDF bases in Israel

Charts, Graphs & WQR



Water and Wastewater Average Flows



Water and Wastewater Peak Flow





Feb-24
Monthly Water Quality Report

Water Supply		MG Per Month												% of Supply YTD	
Source		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YTD	% of Supply YTD
Purchased		0.00	7.75											7.75	3.0%
RO Plant		107.87	95.01											202.88	80.0%
UFA Wells		20.12	21.59											41.71	17.0%
ASR Recovery		0.00	0.00											0.00	0.0%
Total		127.99	124.35											252.34	100.0%

System-wide Water Quality Testing Type of Test	Results by Month											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bacteriological	PASS	PASS										
Chlorine (avg)	1.92	1.96										
Ph (avg)	N/A	N/A										
Disinfection By-products (DBPs) (qtrly.)	In Compliance			In Compliance			In Compliance			In Compliance		
Hardness (range)	11 - 121 (WINTER - NO WELLS)			14 - 260 (SUMMER - WELLS/ASR ON)			(WINTER)					

Supply-specific Water Quality Ranges for This Month					
Supply	Average Chlorine Residual	Within Acceptable Range? (Y/N)	Average Chloride Level (ppm)	Average Hardness (ppm)	
BJWSA (supply)	2.08	Y			
RO Raw Water MFA Wells (range)	n/a	Y	153 - 450	104 - 212	
Finished RO Water	2.92	Y			
Fire Station UFA	2.28	Y	60	144	
Leg O' Mutton UFA	2.29	Y	86	204	
Wild Horse UFA	2.26	Y	62	180	
Seabrook UFA	2.15	Y	121	256	
Union Cemetery UFA	1.14	Y			
ASR (recharge)	1.94	Y	29	15	

Customer Inquiries

Type of Inquiry	Number of Inquiries	Resolved?	Comments
Low Pressure	9	y	
Customer break/leak	24	y	
PSD break/leak	15	y	
Water Outage	8	y	
Odor/Taste/Color	2	y	
Miscellaneous	109	y	
Sewer issues & Inspections	63	y	
Total	230		

Other Water Quality Notes for This Month
2/09/2024 - Changed cartridge filters