

**Pee Dee River Basin Council (RBC) Meeting #16 Minutes**  
**September 26th, 2023**

**RBC Members Present:** Snipe Allen, Frances McClary, Megan Hyman, Walt Beard, Jeff Steinmetz, Cliff Chamblee, Michael Bankert, John Crutchfield, Bob Perry, Tim Brown, Hughes Page, Michael Hemingway, John Rivers, Cynthia Walters, Lindsay Privette, Cara Schildtknecht, Eric Krueger, Jason Gamble, & Jeff Parkey

**Absent:** Buddy Richardson, Doug Newton, & Cricket Adams

**Planning Team Present:** Brooke Czwartacki, JD Solomon, Matt Lindburg, Tom Walker, Scott Harder, Joe Koon, Leigh Anne Monroe, Hannah Hartley, Alexis Modzelesky, & Chikezie Isiguzo

**Total Attendance: 47**

**1. Call the Meeting to Order (J. D. Solomon - Facilitator)**

a. Review of Meeting Objectives

J. D. Solomon (the Facilitator) called the meeting to order at 9:10 AM and alongside Cara Schildtknecht (Assistant Chair Pee Dee RBC, online), welcomed members to the 16<sup>th</sup> Pee Dee RBC meeting. The main objectives of the meeting included learning more about the Coastal Plain Model and Surface water regulation. Also included in the main objectives were discussions on evaluating Potential Effectiveness of Demand-side Strategies in the Edisto and Broad River Basins and Surface Water Management Strategies. The agenda included an update on the draft Pee Dee River Planning Document and scheduling of dates for the November and December 2023 Pee Dee RBC meetings.

b. Approval of Agenda, August 22nd Minutes and Summary

The agenda was unanimously approved. The members of the Pee Dee RBC unanimously approved the motion to adopt the August 22<sup>nd</sup>, 2023, minutes and summary documents. Minutes and summary – Cliff Chamblee – 1<sup>st</sup> and Megan Hyman – 2<sup>nd</sup>

**2. Public Comment (JD Solomon)**

There were no public comments.

Sam Quinney, SCDA, introduced himself to the RBC and his new role with SCDA.

Jimmy Clark and other USGS personnel updated the RBC about the possibility of a government shutdown and the possible implications for the groundwater modeling work moving forward.

**3. Coastal Groundwater Model – Calibration run results (Brad Harken and Andrea Hughes, USGS)**

Brad Harken presented preliminary results of the Coastal Groundwater Model – Calibration run. Brad opened the presentation by reminding the members of the Pee Dee RBC about the background and objectives of the model. He discussed the details around the parameters, forecasts, and uncertainty. He also presented some initial draft results from the model.

Brad reminded the members of the Pee Dee RBC of the parent model, a regional scale model that extends from Georgia up almost to Virginia. The parent model captures regional scale behavior. However, the current objective is to capture smaller scale behavior inside the lower Pee Dee basin through an inset model. Therefore, the inset model of the lower Pee Dee Basin is informed by what is going on in the regional flows, allows for higher resolution (seasonality), and allows for a rapid iteration of model runs. The parameter estimation focuses on a smaller area to improve results and the rapid iteration enables ensemble-based methods.

Brad explained that ensemble is a collection of model runs using a range of model input values. The ensemble is run using historical values in a process called history matching, to compare simulated values to measured values. The process includes Iterative Ensemble Smoothing (IES), a method to iteratively improve model performance.

Brad presented the initial results from the IES. The first results looked at how data from simulated heads and hydraulic heads compare over time. The questions included how accurate are the simulated values? How does accuracy change over time? Does it capture seasonal variations? How does accuracy change throughout the domain – is there one area more accurate than the other? He proceeded to explain that from the initial run the model captured the observed values so perfect, 100% of the time, the variability close to 100%, and presents the average (most likely path) of all the model runs. Currently, the model is running parallel in the cloud, up to 500 model lines at a time. This process is expected to lead to improvement in the parameterization. The model is a work in progress with next steps being the estimation process and subsequently, forecasting.

Brad explained that the forecasting stage is important to water planning because it allows for evaluating scenarios with different recharge and pumping levels.

Q: What is the correlation between the baseflow and groundwater?

Brad used the illustration of a hillside next to a river and a well to explain the correlation between groundwater and baseflow.

Brad explained the model is designed to simulate flow of water through porous media and cannot simulate events like earthquakes. However, some black swan events, that have low probability but high impact may like be captured by the statistical approach adopted for the model design.

Other Discussion:

Q: Mathematically, I don't understand the peaks in the figure.

A: The mean so it is the average of all lines.

Q: How many runs?

A: 500 runs.

Q: Calibration methods – same as what Bruce Campbell did?

A: Doing something different and it worked well with MODFLOW 6.

Q: Any way to remove outliers?

A: Yes this is the first iteration and over time it will improve. The model itself will push back against aquifers going dry.

Q: Parameters roam but still have constraints?

A: Yes, it's not completely free.

Q: How did you measure conductivity?

A: We took baseline from the parent model and then used a multiplier.

Q: The observed is lower, those others didn't happen?

A: Yes, but it's a theoretical possibility.

Q: Y-axis is feet in elevation?

A: Yes.

Q: The topography of the land changes, so zero would be?

A: Zero would be sea-level.

A: Why we go through the calibration process is because uncertainty into the future is going to get wider.

Q: How many observation wells?

A: Several hundred wells.

Q: Are the gold lines from this well?

A: Yes.

Q: The spread will tighten to the observed line over time?

A: Yes.

Q: Insinuating – different model for each well?

A: Presenting results one at a time and going to specific wells to validate.

Q: Why is this one (figure and data) so far apart? Ideas?

A: It may be parameters being low in the parent model due to the regional approach (Coastal Plain model).

C: These runs were completed over the weekend and we haven't had a chance to dig into the issues just yet and it will be tweaked.

C: None of the wells seem to be dropping in water level.

Q: Screwed down too tight on the base model (baseflow result)?

A: Probably.

C: Blue simulated baseflow from groundwater gold baseflow separation.

C: Can we use CFS instead moving forward?

C: Black Creek is useful as a good baseflow example.

C: Iterative ensemble smoother – beginning the estimation process. We will begin the forecasting/ looking into the future as next steps.

Q: Correlation between baseflow and groundwater?

A: If groundwater drops too low it stops feeding the river baseflow.

Q: Can the model pick up black swan events like earthquakes?

A: Earthquakes have impacts this model doesn't capture.

C: Can we capture events like this and see impacts?

#### 4. **Capacity Use Area Groundwater Management Plans in Pee Dee Basin (Leigh Anne Monroe, SCDHEC)**

Leigh Anne Monroe laid a foundation for understanding Capacity Use Groundwater

Management Plans. She explained that Groundwater Use and Reporting has been in place since the 1970s, with registration and issue permit requirements. Permits issued in designated areas of the coastal plain for use over 3 million gallons in any month. Users outside of Capacity Use Areas are required to register wells or well system for use over 3 million gallons in any month. She noted that all registered and permitted groundwater withdrawers are required to report their annual use to SCDHEC.

Leigh Anne explained that Surface Water Withdrawal permitting and reporting started in June 2012. Issued permits and registrations are required statewide for withdrawal exceeding 3 million gallons in any month. Also, all registered and permitted surface water withdrawers.

She explained that Capacity Use Area by law is defined as “an area designated by the Board, where excessive groundwater withdrawal presents potential adverse effects to the natural resource or poses a threat to public health, safety, or economic welfare or where conditions pose a significant threat to the long-term integrity of a groundwater source, including saltwater intrusion.”

The aim of the Capacity Use program is to protect water as a resource, prevent wastage and maintain conditions for development and use. Capacity Use Areas include Waccamaw, Lowcountry, Trident, Pee Dee, Western, and the Santee-Lynches. She explained the mandate to develop a groundwater management plan by affected governing bodies and groundwater withdrawers and where the governing bodies and withdrawers are unable to develop a plan, SCDHEC is required to take action to develop a plan.

She described the Groundwater Management Plan process involves convening the Planning Workgroup, hosting Open House Forums, finalizing, and submitting the Plan to SCDHEC. During the convening of the planning workgroup, a full calendar of meetings and workgroup members is published, and written comments from the public shared with the workgroup. The Open House Forums present the opportunity to receive input from stakeholders on the draft Groundwater Management Plan. To finalize the Plan, an additional public hearing prior is held prior to the SCDHEC Board vote. Following the SCDHEC Board approval of the plan, SCDHEC reviews and issues permits consistent with the plan.

Capacity use evaluations are carried out periodically. Every 5 years, or length of the permitting cycle, total annual groundwater withdrawals are compiled and compared to available aquifer potentiometric maps. The report includes a listing of all permitted withdrawers, permitted withdrawal limits, and average groundwater withdrawal. It also includes evaluation of withdrawal by category and by aquifer and identification of areas of aquifer stress and all withdrawers utilizing the stressed aquifer(s).

Leigh Anne discussed the aspects of Water Use addressed in Groundwater Management Plans. They include the current groundwater sources used, the current water demand by type and amount, the current aquifer storage and recovery (ASR), and water reuse. Other aspects include the projected population and growth, the projected water demand, the projected opportunities for ASR, and water reuse, the projected groundwater and surface

water options, and water conservation measures.

She concluded with a presentation of Groundwater Management Plans across the Pee Dee Basin Waccamaw, Pee Dee, and Santee-Lynches Capacity Use Areas, detailing some groundwater management strategies. She also offered to provide some information on the types of recommendations that are included in evaluations.

Q: What is ASR?

A: A surface water intake treats water and then stores it into the well. Aquifer Storage and Recovery.

Q: Georgetown County is doing an ASR project.

A: How deep and what aquifer? May be McQueen Branch aquifer which is pretty deep.

C: Forever chemicals (PFAS) are they pumping that into the ground?

C: Could also be groundwater pumped into ASR may not be Waccamaw River water. Georgetown County got a permit recently.

Q: The controversy is that it ruins the aquifer if you were to put treated wastewater?

A: We don't allow wastewater for ASR.

C: Three categories: Ag, Industry, and Municipal?

C: These are examples we do many other types as well.

Q: Which other categories do you have apart from agriculture?

A: The process covers all categories of water users including aquaculture, golf course, industrial, irrigation, mining, power, and water supply. Agriculture category was used in the presentation for illustration purposes only.

Q: Which one is the largest user?

A: Municipal.

C: Municipal, that is the sector that conservation needs to be directed towards – educational opportunities exist.

C: The RBC can advise agencies and make it what you want it to be.

##### **5. Background on Surface Water Permits vs Registrations (Leigh Anne Monroe, SCDHEC)**

Leigh Anne Monroe presented a background on Surface Water Permits vs Registrations. There's the SC Water Resources Planning and Coordination Act which authorized water planning (SC Water Plan and SC State Water Planning Framework) and the institutions involved in water planning such as PPAC and RBCs. Other relevant regulations include the SC Surface Water Withdrawal, Permitting Use, and Reporting Act (Regulation 61-119), and the SC Groundwater Use and Reporting Act (Regulation 61-113).

She discussed water quantity programs such as the Surface Water Withdrawal Program which has been in existence since June 2012 and issues permits statewide for withdrawals over 3 million gallons in any month. Another program is the Capacity Use Program which has been in existence since the 1970s and implements the issue of permits in designated areas of the coastal plain for use exceeding 3 million gallons in any month (100,000 gallons per day).

Water Use Reporting requires that registered and permitted groundwater and surface

water withdrawers report their annual water use to the SCDHEC. which compiles this information and produces water use reports, published on SCDHEC website for public use.

She explained that surface water withdrawers are classified into Existing Water Withdrawer, New Surface Water Withdrawer, and Agricultural Withdrawer. She discussed the regulations guiding each class. Furthermore, she discussed users exempt from surface water withdrawal regulations. They include those withdrawing less than 3 million gallons per month, ponds that are completely contained with no inflow/outflow to tributaries (surficial or runoff fed), dewatering operations, wildlife management, hydro power (must still comply with being registered and reporting use), and emergency withdrawals.

Melanie Shull, Shull Ag, was asked to discuss the agricultural perspective on surface water allocations. Water is critical for agricultural users who need the water the most when dry conditions exist and persist.

Discussion:

C: Wildlife management areas, is that duck ponds?

A: Touchy subject – there’s a DNR wildlife impact area definition.

Q: If someone drills a well it has to be permitted right?

A: Yes and we talk to private well folks in DHEC and sometimes we get information on Capacity Use Wells.

Q: Well drillers require a plan right?

A: For Capacity Use wells they submit an as-built plan.

\*Melanie will put together/distribute a one-page summary for the Pee Dee RBC.

Q: Breakdown between registrations and permits?

A: For surface water registrations will use much less water.

Q: Is it a bad assumption – we are losing acreage of agricultural land to development.

A: Water use will never catch up for ag with so much land being converted.

C: Why irrigation is so important to maximize the land that is under production.

\*Melanie and Leigh Anne will put together 3-4 things regarding allocation mitigation strategies.

Q: Isn’t registration not being transferrable odd?

A: It is odd but they don’t expire either.

## **6. Progress of Plan on Chapter Writing (Matt Lindburg)**

Matt Lindburg explained the progress made on the first two chapters of the draft RBC Plan. Draft Chapter One was sent out to members of the Pee Dee RBC for review on September 19<sup>th</sup> and focuses on the background of the planning process. Comments are expected back on October 10<sup>th</sup>, 2023, on Chapter One. Chapter Two came out on September 26<sup>th</sup>, 2023, and emailed to the members of the Pee Dee RBC. The members have three weeks to review and send in their comments, by October 16<sup>th</sup>, 2023. Chapter Two focuses on a description of the basin.

The Chapter subcommittees and SCDNR had already provided initial feedback on Chapters One and Two. He invited the members of the Pee Dee RBC to review the drafts and identify

missing information or concepts, information or statements that would make RBC approval difficult. He informed the members of the Pee Dee RBC that there are two ways to provide feedback – Use Adobe PDF mark-up tools and email chapter back or type comments into an email.

## 7. **Summarize Surface Water Management Strategies (Matt Lindburg)**

Matt Lindburg discussed some Demand and Supply water management strategies. The first Demand strategy discussed was Municipal Conservation. Examples of Municipal Conservation include Water loss control programs, Low flow fixtures, toilets and appliances, Pricing structures (ex. increasing block rates), and Xeriscaping. The second Demand strategy was Ag/Irrigation Conservation. Examples of Ag/Irrigation are Water audits and Center pivot sprinkler retrofits, Dammer diker (specific to potato crops), cover cropping, conservation tillage, mulch, Soil Moisture sensors/smart irrigation, crop selection, Irrigation scheduling, and Drip/Trickle irrigation (for select crops). The third demand strategy was Industrial Conservation. Examples of Industrial Conservation include Water reuse and recycling, Water efficient processes, Water loss control, Low flow fixtures, toilets, and appliances. The fourth demand strategy presented was Thermoelectric Conservation. Example of thermoelectric conversion include Reclaimed water, Switch to combined-cycle natural gas, Energy saving appliances (which reduce thermoelectric generation needs)

The first Supply Strategy presented was New or Increased Storage. Some examples of new or increased storage include new impoundments, ponds, reservoirs, tanks, dredging (pond deepening), Reservoir expansion (raising dam height), and Aquifer storage and recovery. The second supply strategy was Water Reclamation. Examples of water reclamation include Water reuse systems (non-potable), Direct potable reuse, Stormwater capture and treatment. The third supply strategy was Conjunctive Use. An example of conjunctive use is the use of groundwater to augment surface water during low flow periods. The fourth supply strategy was Conveyance. Examples of conveyance practices include regional water systems, Utility interconnections, and Inter-basin transfers. The fifth supply strategy was Desalination. Desalination practices include the treatment of brackish groundwater and desalination of seawater.

Matt summarized the potential policy recommendations that were discussed in August Pee Dee RBC meeting. They include:

- i. A South Carolina/North Carolina water management group could be beneficial.
- ii. Additional monitoring and analysis of water issues in high-growth, coastal zones.
- iii. Regional planning and cooperation could help spread the workload for capacity limited local governments.
- iv. Should drought management plans be required or encouraged for agriculture and industry?
- v. Update current municipal drought management plans.

C: Municipal irrigation – lawn irrigation and the need to schedule it.

C: A whole lot of people set their irrigation and leave – snowbirds.  
 C: Land use zoning conversation as well.  
 C: Crop selection needs to be removed as well as dammer dikers which are potato crop specific and aren't grown here.  
 C: Composting should be included as you'll use less water.  
 C: Water reuse / recycling can we potentially couple that with ag?  
 C: With permitting we have to have drought management plans.  
 C: Ag's drought plan is to irrigate / use the water during drought conditions.  
 C: Evaluating effectiveness – are we there yet?  
 Q: Why are we taking things to 2070 – how can we have a clue about 50 years down the road?  
 A: It's the planning horizon.

**8. Evaluating Potential Effectiveness of Demand-side Strategies in the Edisto and Broad River Basins (John Boyer, CDM Smith)**

John Boyer presented a case example of the Edisto and Broad River Basins on how to evaluate potential effectiveness of demand side strategies. Both river basins primarily looked at Agricultural Portfolio of Water Efficiency Strategies and Municipal Portfolio of Water Conservation and Efficiency Strategies. They also considered thermoelectric and industrial strategies. They noted the conservation practices already in place and identified gaps and possible practices that could be implemented to improve flows and reduce shortages. John presented a detailed explanation of the various scenarios, compared to Minimum Instream Flows and potential effect of conservation strategies. This evaluation would guide the RBC in the choice of the potentially choice of strategies to propose in the planning process.

**9. Closing Comments and Upcoming (JD Solomon and Cara Schildtknecht)**

J. D. Solomon appreciated the members of the Pee Dee RBC for their participation and encouraged them to continue thinking through the strategies and submit their comments on the draft Chapters One and Two promptly. The members of the Pee Dee RBC decided to schedule the next meetings of the RBC as follows: October 24<sup>th</sup>, 2023, November 28<sup>th</sup>, 2023, and December 19<sup>th</sup>, 2023.

The next meeting will be held at the Clemson Pee Dee Research and Education Center,  
 Classroom #240 Darlington, SC 29532  
 The meeting concluded at 12:26 PM.

Minutes: Chikezie Isiguzo and Tom Walker

Approved: 10/24/23

RBC Chat:

08:57:21 From Thomas Walker To Everyone:

we are going to start around 9:05 as our first presenter is running a few mins late

10:33:00 From Thomas Walker To Everyone:

15 min break



11:30:26 From Cara Schildtknecht To Everyone:

Proposed Working Lands Bill: [https://www.scstatehouse.gov/sess125\\_2023-2024/bills/3951.htm](https://www.scstatehouse.gov/sess125_2023-2024/bills/3951.htm)

11:31:11 From Thomas Walker To Everyone:

do you want to comment on this cara?

11:31:12 From Cara Schildtknecht To Everyone:

From the proposed bill: "There is established in the State Treasury the Working Farmland Protection Fund for the purpose of providing permanent protection to working farmland properties whose continued availability to commercial agricultural businesses is essential to the long-term future of the economic sector."

11:31:15 From Cara Schildtknecht To Everyone:

Sure!

12:26:15 From Thomas Walker To Everyone:

meeting adjourned thanks all