

Upper Savannah River Basin Council

May 8, 2024 Meeting Minutes

RBC Members Present: Harry Shelley, Mark Warner, Mack Beaty, Jill Miller, Daniel Milam, Reagan Osbon, John Hains, Melisa Ramey, Katie Hottel, Jon Batson, Dan Murph, Tonya Bonitatibus, Jeff Phillips, & Cole Rogers

RBC Members Absent: Scott Willett (Jeff Caldwell, alternate, present), Billy Owens (Don Todd, alternate, present), Tonya Winbush, Will Williams, Carl Price, Tim Hall, Cheryl Daniels, & Chuck Connolly

Planning Team Present: Ashley Reid, John Boyer, Kirk Westphal, Tom Walker, Joe Koon, Scott Harder, Leigh Anne Monroe, Hannah Hartley, & Alexis Modzelesky

Total Present: 33

1. Call the Meeting to Order (Jill Miller, RBC Chair) 10:00–10:10
 - a. Review of Meeting Objectives
 - b. Approval of Agenda
 - i. Agenda approved
 - ii. Mark Warner – 1st and Mack Beaty – 2nd
 - c. Approval of April 10th Minutes and Summary
 - i. Minutes approved
 - ii. Harry Shelley – 1st and Reagan Osbon – 2nd
 - d. Announcements and Housekeeping Items

2. Public Comment (Ashley Reid) 10:10–10:15
 - a. Public Comment Period
 - i. None
 - b. Agency Comment Period
 - i. Hay season so please be careful on the roads. Remind everyone that tractors can be on the road too, don't overtake them

3. April RBC Meeting Review (Ashley Reid and John Boyer) 10:15–10:20
 - a. US high demand scenario daily time step
 - b. LS river basin current use
 - i. Field trip summary
 - c. Hope Warren of SC Office of Resilience
 - d. Water management strategies

4. Additional Surface Water Analyses (Kirk Westphal and John Boyer) 10:20-10:50
 - a. Extended Drought Analysis
 - i. Resequencing historical flows to investigate potential future droughts
 1. Methods
 - a. 3 constructed scenarios- repeating 5-year drought, repeating single-year drought, repeating synthetic drought year
 2. Results
 - a. Normal model
 - b. Lake Thurmond
 - i. Repeating 5-year drought scenario - shortages appear in month 49

- ii. C: when you look past 49 months, it looks very dire, doesn't recover. Double stressor
 - iii. Q: Why does it level off?
A: Levels off at steady state with only so much input. Ends up in a steady state. If you could go below Deadpool it would
 - iv. C: Water quality would be suspect as well
 - v. Q: if this reservoir is emptied, is there stress on the other reservoirs?
A: Look at Hartwell next
- c. Lake Hartwell
- i. Scenario 1: drops from 800 billion to 400 billion in storage, doesn't hit dead pool
 - ii. Scenario 2: worse, hits low level a year earlier
 - iii. Scenario 3: hits low level at 15 months
 - iv. Q: Duke Energy's agreement with the Corps?
A: Yes, have agreement with Duke LIP rules
 - v. Q: Are there nonlinearities in water needs? Rules Duke Power have, are there other x-y interactions?
A: I don't know, we haven't built those in power demands
A: We have to maintain low flow requirement. Keowee – Jocassee – Bad Creek cycles the water
 - vi. C: Lost all of the recreational value of the lake once you're that low.
C: Down that low – some will have to buy power on open market
 - vii. Q: What are the deadpool elevations for Hartwell and Thurmond?
A: don't know, showing volumes
C: Once Thurmond is gone almost all flow will come from Hartwell
 - viii. C: model shows how low can we go? How long could a drought last?
A: completely different model. Droughts are not events in the same way floods are. Models not trained to look at extended cumulative drying conditions. CDM Smith is using some funds as an organization to try and project durations of droughts
C: Difficult to model. Some work done on tree ring studies (paleoclimatology/dendroclimatology). In past, 3-5-7 year droughts occurred more frequently
 - ix. Q: Am I trusting the model that the watershed can support these rules? When are the rules not working (if inflow isn't there)?
A: Duke LIP and Army Corps drought contingency rules are complicated. Depends on the systems. using historical hydrology, running through simulations, and trying to identify potential vulnerabilities

Q: 1000 people with boats. How should we be representing the viewpoint of the recreational users? As a rec rep should I be asking more about rec users and asking for other model runs?

A: We can do that if the RBC wants us to do it. Easy to do. Look @ rec level as intake (at elevation)

iv. Upper reservoirs

1. Bad Creek, Lake Jocassee, Lake Keowee
2. Profound difference between using 790 ft and 794 feet
3. Intake elevation and prior results
4. Lake Keowee- Baseline
 - a. Safe yield: 276 MGD
 - b. Numbers sensitive to monthly vs daily analysis
5. Lake Keowee- baseline/ rule change
 - a. Restrict Keowee to max elevation of 800 ft- Safe yield: 410 MGD
 - b. Allow Jocassee to reach dead pool- Safe yield: 484 MGD
6. Lake Keowee- 2070 high demand
 - a. Safe yield 479 mgd
 - b. Q: is Greenville water going to return water to the basin?
Currently goes into Saluda. Is it coming back?
Just what we sell in Pickens County
C: What's not coming back – 20 million? That's a lot/significant
C: We could pull 150 but the plant isn't at that capacity
C: Can't build reliability into the model with 140 million missing
 - c. C: Long term goal - putting in a transfer pumping station to move water from Stovall WTP to Pickens in an emergency at Adkins (unlikely)
Q: How much water would that be?
A: I think 25 million is what we're looking at. There would be customer restrictions at that point

v. Lower USACE Reservoirs

1. Hartwell, Russell, Thurmond. Evaluated individually
2. Lake Hartwell- intake based on hydro ops
 - a. Baseline- 1060 MGD, 2070 HD- 1002 MGD, Permitted and Registered: 899 MGD
 - b. Q: did you factor in GA power project?
A: yes, we consolidated to one withdrawal
 - c. Q: Table on the left - what does the highlight mean?
A: highlight is from a speech; they were highlighting something different
3. Lake Russell- intake based on hydro ops
 - a. Baseline-1750 mgd, 2070 HD/ permitted and registered- TBD
Q: Factor in the pump factor?
A: No
C: Essentially a pass through
4. Lake Thurmond- intake based on hydro ops
 - a. Baseline- 186 MGD, 2070 HD/ permitted and registered- TBD
 - b. Daily rules affect intake
 - c. Q: You have the USACE's stair stepping in there?
A: Yes, hard to see here
Q: Trying to understand the results – Hartwell and Thurmond

share water lock and step go down. At some point not based on elevation but storage

A: There are 5 layers of rules

C: Hartwell has 6 ft of pool before rec is impacted. Thurmond does go down faster eventually

C: This is a monthly timestep, daily timestep will be different

C: Safe yield analysis may not be providing us very useful results with all of the rules

C: There are some hydrologic vulnerabilities. From a yield point of view there is plenty

C: Bad Creek is not useful for rec. Thurmond may not be either. Is that what we're talking about? These are extreme demand numbers. Risk exists for reservoirs

C: Elevation is something I'd like to see in model results

C: 1986 permit w/ Duke max 150 projected by 2024-2025. We average 40-45-46 in 2024. We calculate 100-120 years until we hit 150.

5. Takeaway is that there's not a lot of risk of the reservoirs running out of water based on the projected demand patterns. If future hydrology changes/ longer droughts, then there will be risk

Break

10:50–11:00

5. Results of Flow-Ecology Relationships (Dr. Brandon Peoples and Dr. Luke Bower) 11:00–11:25
 - a. Flow ecology relationships
 - i. Critical for aquatic communities
 - ii. "Master variable"
 - b. Goal: to provide insights on the potential response of organisms to the alternate water withdrawal scenarios produced by SWAM
 - c. How will this work?
 - i. Identify important relationships using random forest
 1. All flow regime components affect aquatic organisms
 2. Relationships differ across stream classes
 - ii. Filter relationships
 - iii. Take relationships and put them in context of SWAM results
 - iv. Biological data
 1. 492 fish sites
 2. 530 aquatic insect sites
 - v. Characterizing aquatic diversity
 1. Species richness: # of species
 2. Shannon's diversity: accounts for percentages
 - vi. How we can use these relationships
 1. Define biological response limits
 2. Predict responses
 - vii. Results
 1. Mean daily flow: biological response limits
 2. Mean daily flow predictions
 - viii. Key to understanding results
 1. Unimpeded flow, 2070 medium demand, 2070 high demand, permitted and regulated
 2. Comparing current use mean daily flow to scenario mean daily flow

3. How much biodiversity change do we expect to see based on those water withdrawals?
- ix. Ecoregions
 1. Can only build models where we have enough data
 2. Don't have enough sites for Blue Ridge or southeastern plains
 3. Just Piedmont
- x. Stream classes
 1. Yes, for perennial runoff and perennial flashy
 2. Not enough data for stable baseflow
- xi. Strategic nodes
- xii. Selected metrics
 1. Mean daily flow- fish species richness and mean daily flow- Shannon's diversity
 2. Low/ medium/ high
- xiii. SAV04 Little River: MA1- Richness
 1. Very little predicted future change. Don't withdraw more water, don't expect the flow or fish to change
 2. C: We struggled to find spots in the basin to place these nodes. Most withdrawals are on the reservoir. Analysis only on wadable streams. This basin is unique, other regions saw a lot more change
- xiv. Other areas
 1. Very little change expected
- xv. SWAP-listed fishes in Savannah River Basin
 1. Species that we're losing
- xvi. What this info is and is not
 1. Is: guidance, based on models, representative of overall flow regime characteristics, applicable to streams and small rivers, relationships between organisms and flow
 2. Is not: arbitrary recommendations, perfect, one-time withdrawal thresholds, applicable to large rivers and reservoirs, parsing out other factors that affect organisms
 3. Flow chart
- xvii. Results summary
 1. All scenarios showed little to no change for fish richness and Shannon's diversity
 2. Report to follow
 3. Q: mine proposed at the top of Stevens Creek. Estimated to withdraw 3 mgd groundwater. 450 feet deep 150 ft off the creek. Will affect Stevens Creek
A: if there's a way to get that predicted change to SWAM, will run that scenario. Stevens Creek is vulnerable
 4. Q: Other vertebrates?
A: No, there is occurrence data but no community based sampling at this scale
 5. Q: Will the macroinvertebrates be included in a report?
A: yes, typically what comes out megalodon metrics. Long lived species indicate in-stream flow is good. Mayflies and stone flies
 6. Q: what about flora?

7. A: that's the dream working to bring in all freshwater data: birds, plants, etc. Right now, data is mainly fish but could do this for other organism groups
6. Drought Management and Response Discussion – Part 1 (Ashley Reid, John Boyer, and Elliot Wickham) 11:25–12:00
 - a. specific drought response-related obligations of the RBC are
 - i. collecting and evaluating local hydrologic info for drought assessment
 - ii. providing local drought info and recommendations to DRC regarding drought declarations
 - iii. communicating drought conditions and declarations to the rest of the RBC, stakeholders, and the public
 - iv. advocating for a coordinated, basin-wide, response by entities with drought management responsibilities
 - v. coordinating with other drought management groups in the basin as needed
 1. planning framework says RBCs should meet monthly in droughts
 - b. planning framework outline for Chapter 8 drought response
 - i. summarize existing drought plans and drought advisory groups
 - ii. summarize any drought response initiatives developed by the RBC
 - iii. list recommendations on drought management or drought management strategies
 - iv. include a communication plan to inform stakeholders and the public on current drought conditions and activities regarding drought response
 - c. Drought Impacts to SC Upstate Agriculture (article)
 - i. C: article rang true. Diversity of types of agricultural operations. We are at Mother Nature's mercy. Some people don't have the land or ability to do some of the things larger operations can do to mitigate it
 - ii. C: in agriculture, there's no cut and dry. Need to focus on best management practices for your operation
 - iii. C: We had two extremes – really good spring (lot of hay) stockpile some of that hay for livestock. Larger folks weren't impacted as much. Across agriculture, small and big folks - they will make sure their operation survives.
 - iv. C: What's normal one year or two or three we have to adapt. Some think its been a wet year so far but at my operation it isn't.
 - v. C: Cattle farmers in McCormick, Fall rain we got last October made it too late to start the fescue cover crop to be grazeable in Jan - Feb. Affected the cattle
 - vi. Q: is there anything fruitful or actionable about changes that are going on?
 - vii. Other takeaways from the article
 1. Farmers often see the effects of drought well before the state officially declares one
 2. Warmer temperatures in the Upstate could mean more agricultural droughts and/or greater impacts
 3. Some farmers are practicing climate-smart agriculture. They are basing decisions around weather patterns rather than traditional planting seasons
 - d. Differences Between Drought Response Committee and US Drought Monitor Processes and Outcomes
 - i. SC Climate office leads drought monitoring effort through SC Drought Response Committee and US Drought Monitor

- ii. SCDRC
 - 1. A committee to carefully enclose and monitor, conserve, manage the state's water resources and best interests for all state constituents
 - 2. DRC and DNR
 - a. Statewide and local members
 - 3. Meets as needed
 - 4. Makes county-level designation for drought severity- 5 levels
 - 5. At severe/ extreme levels, make recommendations for nonessential water curtailment for only public water suppliers
 - 6. Public water suppliers are required to have local drought management plans and response ordinances for water conservations and may enact plans based on DRC drought designations
- iii. DRC indicators
 - 1. One of the indicators is the drought monitor
 - 2. DRC indicators and severity levels
- iv. US Drought Monitor
 - 1. National product to map drought severity and extent
 - 2. Aims to capture/ depict all types of drought
 - 3. Some programs use this product for agricultural aid
 - 4. Map is updated each week
 - 5. All authors are part of federal entities
 - 6. USDM categories are based on convergence of evidence
 - 7. Most states provide input to help the author accurately depict local conditions
 - 8. The map author gets final say
 - 9. USDM data indicators
 - 10. Categories
 - 11. SC and USDM weekly data review
 - a. Q: how are different data points weighted in terms of importance?
A: it depends, no one indicator is more important than another. Each state knows what's best for them. Some get updated every day
 - Q: How does it compare to the national approach?
A: Each state has their own way of doing it
 - C: 50 variations in this model (50 states)
 - C: Incipient conditions in Fall – look at all rain gages. Ex: Northern Anderson dry vs Southern Anderson wet – look at it to determine recommendations
- v. USDM vs SCDRC
 - 1. Agency leads- federal vs state
 - 2. Participants federal and state agencies vs local stakeholders
 - 3. Frequency- weekly vs as needed
 - 4. Severity levels
 - 5. Allows for
 - 6. Why do maps look different? Time and indicators
 - 7. Process outcomes: DRC relates to public water suppliers, USDM relates to agriculture
 - 8. Q: do you have people out there with the rain gauges like we used to?
A: yes, look at that every week (Cocorahs). Some places in the state

have some more than others. Some pockets w/o enough monitoring.

C: Portable weather station for \$160

C: Cocorahs wants you to buy theirs to standardize measurements

9. Q: do drought management plans have their own triggers?

A: yes and no, would prefer they recognize what the DRC is saying so there's communication between state and local level but don't want plans to say you should do something only because DRC recommends it.
Kind of both

vi. Updated guidance manual

1. Come up with best practices guidebook- successful drought management practices from across the state that are hopefully transferable to other water systems

2. Upstate meeting on August 15th in Williamston. Recommendation – providing workshops to get water systems to update plan

3. Greenville Water recently updated its drought management plan

a. Plan Summary

b. C: 1st reading down and 2nd reading and vote soon. Original plan had us look at Palmer Severity Index which didn't make sense based on reservoir levels and other triggers/factors. 4 level tiered rate structure. 5000 gall/month average for 40+% of homes. Wouldn't hurt vulnerable population. Commercial /industrial customers put items on there with increasing penalties for non-compliance. We had lowest rates, we had to increase rates to make it meaningful. Stiff penalties but not for lower income folks

Q: Will this include education and outreach?

A: We do that all the time. Yes, already our per capita usage per individual – 60-65 gall/person now – in 2000 it was 90 gall/person. Seeing increase based on population

C: "Demand hardening"

C: Correct, not much else we can do to increase efficiency. Seeing vertical development, multi-family units in GVL

C: When demand flattens what does that do for revenue?

C: Goes down, need to increase rates

C: Over 10 years raise rates 5% per year. A lot of capital investments for infrastructure

c. Q: is climatology looking at emergency response to heat/ heat adaptation?

A: yes, just had heat awareness week. Public health as opposed to water resource perspective. 1 degree Celsius change there is temp component harder to model in how that changes precipitation and dew point

C: Hotter and more humid sounds horrible

C: GVL has upgraded all their sites with gages and weather gages. 250k per year for USGS to maintain

d. C: Broad RBC did what-ifs models to see what would happen if the temperature rises a degree or 2 in the future looking at evaporation

e. C: DNR, ACE, we all have what we consider a drought. Sometimes, it's a conflicting message, muddy message, leading

to no action. A: we should do a standardization of collaboration so there's not different triggers that come on at different times. Will discuss next meeting

Lunch

12:00–12:30

(Continued on page 2 and see page 2 for virtual meeting information)

7. Drought Management and Response Discussion – Part 2 12:30–1:55
(Ashley Reid, John Boyer, and Elliot Wickham)
- a. Drought in Urban Water Systems – Lessons Learned (article)
 - i. Interviewed 19 different water utility managers and got their feedback
 - 1. What were short and long-term actions taken in response to drought?
 - 2. What constitutes an effective drought response and how was this measured?
 - 3. What are the limitations of drought response?
 - ii. Saluda RBC wanted to know how other areas have dealt with drought
 - iii. Table of most commonly mentioned responses
 - 1. Demand/ supply side strategies
 - iv. What constitutes an effective drought response, and how was this measured?
 - 1. Reduction in per capita or overall water use
 - 2. Ability to avoid mandatory restrictions
 - 3. How supportive the public was in implementing response strategies
 - 4. Ability to discontinue policies that limit use
 - 5. Positive response to communication efforts
 - v. Gauged effectiveness of drought response in terms of
 - 1. Robustness
 - 2. Flexibility
 - 3. Uncertainty
 - 4. Efficiency, equity, and legitimacy
 - vi. What are some lessons learned and limitations to drought response?
 - 1. Voluntary measures preferred to mandatory restrictions
 - 2. Neither supply nor demand side responses were immune from public criticism
 - a. C: yes, you have to be very conscientious. First call is to the city to make sure they shut down everything. Even shut down the fountains, it's important for perception. Sometimes, people still conserve even when drought is over
 - 3. Drought surcharges rarely utilized as they were seen to be unpopular
 - a. C: rarely implemented but you have them in case you need them
 - 4. Being a part of a regional plan provided a sense of solidarity
 - 5. Permanent reductions in demand allowed for a cushion between water supply and demand that could allow for banking water but made it difficult to achieve additional reductions in highly urban, low outdoor use contexts
 - 6. Most utilities are not yet weighing the tradeoffs that may be present in dealing with drought risk in the near term and climate change in the long term

- a. C: see the opposite rainfall rate for the Upstate in Northern GVL Co – rain #s are going up and more intense rain. Reservoir restores water when needed.
 - b. C: Hard to deal with climate change, can't do much with it
C: Dry conditions South in downtown GVL we are full in the reservoirs and have no restrictions. Diversity in Upstate escarpment.
 - 7. Restrictions are more efficient and equitable than pricing policies
 - a. C: City councils don't like mandatory restrictions
C: With LIP w/ Duke it gives us solidarity. Powdersville might follow that "3rd drought group"
 - 8. A drought event may galvanize political will to implement policies that in normal years may not be publicly acceptable
 - 9. Nearly every manager interviewed considered demand management to be an integral part of their practices
 - a. C: electric is doing some of this already
 - 10. Certainty in supply no longer exists, don't know how different it's going to be in the future
 - vii. "Drought in the Southeast: Lessons for Water Management" article. More specific to this area
 - b. Drought Response Strategies and Recommendations
 - i. Moved to next meeting
 - ii. Talk about communication plan, drought management and response
 - iii. Example drought response recommendations
- 8. Upcoming Meeting Schedule and Topics (Ashley Reid) 1:55–2:00
 - a. Vote to see if people won't be able to make June meeting
 - b. Finish up discussion and identification of drought response strategies
 - c. Discuss recommendations
 - d. Review and discuss draft river basin chapters

Meeting adjourned: 2:20 pm

Minutes: Taylor Le Moal and Tom Walker

Approved: 6/12/24

RBC Chat:

10:00:35 From Thomas Walker to Everyone:

will get started shortly

10:01:43 From Alan Stuart to Everyone:

Approve

10:02:02 From Alan Stuart to Everyone:

Approve Minutes

10:02:26 From Katie Hottel to Everyone:

Approve minutes

10:04:17 From Thomas Walker to Everyone:

thanks all

10:35:58 From Amy Shaw, CDM Smith to Everyone:

I believe the Deadpool elevations shown here are equivalent to the bottom of the conservation pool. Let me pull up a figure...

10:37:42 From Thomas Walker to Everyone:

just let me know if you want to share that figure

10:37:46 From Thomas Walker to Everyone:

*figure

10:38:58 From Alan Stuart to Everyone:

Yes

10:39:40 From Thomas Walker to Everyone:

thanks!

10:47:45 From Alan Stuart to Everyone:

Tom, just FYI...the connection keeps dropping every couple of minutes. Not suggesting anything you can do just letting you know, if you ask a question to online folks and get no reply, this may be the cause.

10:48:22 From Thomas Walker to Everyone:

ok, sorry to hear that. wifi here is good but i'll let john know. thank you

10:49:20 From Alan Stuart to Everyone:

could be on my end

10:49:37 From Thomas Walker to Everyone:

zoom has been acting up a bit lately

10:50:02 From Amy Shaw, CDM Smith to Everyone:

I've had a good connection so far (knock on wood).

10:50:16 From Thomas Walker to Everyone:

Reacted to "I've had a good conn..." with 👍

10:50:24 From Jon Batson to Everyone:

no issues for me.

10:50:25 From Katie Hottel to Everyone:

It has sounded okay on my end!

10:50:34 From Thomas Walker to Everyone:

Reacted to "no issues for me." with 👍

10:50:37 From Thomas Walker to Everyone:

Reacted to "It has sounded okay ..." with 👍

11:01:56 From Alan Stuart to Everyone:

yes, el. 790 msl is the new normal minimum after 2019 modifications at ONS

11:02:20 From Amy Shaw, CDM Smith to Everyone:

In 2019, Duke modified the ONS intakes, reducing the critical minimal level from 794.6 ft to 790 ft.

11:02:41 From Amy Shaw, CDM Smith to Everyone:

(Alan beat me to it!)

11:03:24 From Thomas Walker to Everyone:

thank you both

11:25:00 From Amy Shaw, CDM Smith to Everyone:

Acknowledging Kirk's question - the rules in the model are complicated and all in terms of storage (MG), so it's difficult to get a quick assessment of how Thurmond and Hartwell's drawdown relate to each other. That will take a bit of time to assess.

11:28:16 From Amy Shaw, CDM Smith to Everyone:

Clemson has multiple intakes. The 2014 report used their middle intake (638 ft) but reported they have a lower intake at 625 ft (same as the limit on hydro operations).

11:32:00 From Thomas Walker to Everyone:

10 minute break

12:31:00 From Thomas Walker to Everyone:

20 min break. 12:50

14:02:35 From Thomas Walker to Everyone:

meeting adjourned