Broad River Basin Council

November 10, 2022, Meeting Minutes

RBC Members present: Ken Tuck, Frank Eskridge, Jeff Walker, Angus Lafaye, Daniel Hanks, Bill Stangler, John Alexander, Amy Bresnahan, Karen Kustafik, Kristen Austin, Paul Pruitt, & Chip Few

RBC Members absent: Erika Hollis (Megan Chase, alternate, present), Jeff Lineberger (Phil Fragapane, alternate, present), James Kilgo (Devin Orr, alternate, present), Mark Boland, Jim Cook, Mike Daniel, Bryant Fleming, Steven Hilbert, Justin McGrady, Brison Taylor, & Jason Wright

Planning Team present: John Boyer, Kirk Westphal, Jeff Allen, Tom Walker, Kaleigh Sims, Scott Harder, Joe Gellici, Andy Wachob, Leigh Anne Monroe, & Pam Miller

Total Present: 39

1. Call the Meeting to Order (Ken Tuck, RBC Chair) 9:00–9:05
    a. Review of Meeting Objectives
    b. Approval of Agenda
        - Review of meeting objectives
        - Card for James Cooley to thank him for our field trip we will pass around
        - Jeff Walker made a motion to approve 1st, and Frank Eskridge made 2nd to approve, all in favor - unanimous

    c. Approval of September 8th Minutes and Summary
        - Frank Eskridge made a motion to approve 1st, and Karen Kustafik made 2nd to approve, all in favor - unanimous
    d. Housekeeping Items

2. Public Comment (John Boyer) 9:05–9:10
    a. Public Comment Period
        - No comments
    b. Agency Comment Period
        - No comments

3. September RBC Meeting Review and October Field Trip Highlights (John Boyer) 9:10-9:20
    a. Review and quiz questions on aquatic resources of Broad River
    b. Review and quiz questions on groundwater resources in Broad River Basin
    c. October field trip highlights
        - Kayaked Lake Blalock to Blalock dam and intake (intake is not currently active) Lake Blalock releases to South Pacolet River.
        - Ken provided overview of their water sources and plants.
        - Spartanburg water system advanced oxidation system
        - Visit to Cooley farms / Strawberry Hill, learned about how they use water and irrigate.

4. Phase 1 RBC Survey Results (John Boyer) 9:20-9:30

a. Overview of survey results – provided representative responses nearly everyone says yes generally understand how the data models and other tools will be used.
b. Suggestions on improving the process- provide more interaction to make sure everyone is clear on the subject matter, make sure everyone's questions are answered, provide reference material to support technical information.
c. Any other thoughts or feedback- concern that only focused on water quantity not quality, hear more about the completion of framework and how it will be implemented.

5. Recommendations for Assessing Flow-Ecological Health Relationships in the Broad Basin (Eric Krueger, TNC; Luke Bower and Brandon Peoples, Clemson) 9:30-10:15
    a. Providing overview of flow ecological health.
    b. Apply relationships to the SWAM model, provides estimates of biological response and define response limits.
    c. Mean daily flow predications.
        - Q: Explain the term richness.
        - A: Number of species.
        - Q: Are model results for recommendation?
        - A: Take results from SWAM model to make predication on biological impact, not a recommendation, up to RBC to say is this species richness change acceptable.
        - Q: Results based on sampling from different flow regimes?
        - A: No, a space and time approach, so the idea is if you can catch variation at different sites you can model – all data from SC (1,000 sites) since 2006 and still collecting data.
        - Q: How are you connecting flow regime?
        - A: Took metrics, flow, and regressed them so we are accounting for stream size.
    d. Providing Preliminary recommendation on how to apply these- Eric K.
        - Proposing to incorporate 5 flow ecology metrics as performance measures of Broad River water use scenarios (mean daily, duration of high flow, frequency of high flow, duration of low flow, and timing of low flow).
        - Why use these? Allows you to evaluate actual impact on the Basin's ecological health and compare multiple scenarios.
            - Q: Have flow ecology relationships been run under SWAM model to date?
            - A: No not for the Broad but they were run for the Edisto.
                - If the RBC agrees then we will use these metrics in the SWAM model scenarios.
            - Q: Are we going with same flow characteristics as Edisto?
            - A: They are a little different for Edisto, high flow was not used for Edisto.
            - Q: How far in front of the science are we, has this been done for decades or is this fairly new?
            - A: The foundational science of this goes all the way back to the 1970s, so it is very sound science, why you don't see this everywhere is because most places do not have the data to do it.

- Q: What we are being asked to do is to approve these metrics to produce risk boundaries?
- A: We are just recommending that the RBC approve using these boundaries to be able to run the model, if answer is yes then we can come up with recommendations to evaluate, then we can run the SWAM model and come back with results to discuss.
- If the group wants to move forward and apply these then we can later come back and decide where to draw the line for risk.
- Q: If we were applying these would they be applied between nodes like on the SWAM model or to longer stretches?
- A: Yeah, we would have to pick that out, like the Edisto we picked out strategic nodes, we would have to look for and suggest some places for it to be applied.
- This tool gives you a way to evaluate biological health of the system.
- Q: What benefits did you learn from Edisto that you applied, what benefits did you see from doing this?
- A: This is the tool to look at the biological health of the system.
- **Motion to move to proceed with using the instream flow performance recommendations and risk ranges that were included in our handout with SWAM modeling to develop additional information about the impacts of various flow levels. Frank Eskridge made the motion 1st and Karen Kustafik 2nd seconded the motion. Approved unanimously.**

Break 10:15–10:30

6. Surface Water Availability Modeling – Results of Planning Scenarios (John Boyer) 10:30–11:30
    - Presenting on surface water modeling results
    - Reminder where we are in the process
    - Just wrapped up phase 1
    - Starting phase 2- evaluating current and future water availability issues, next 6 meetings will be going over this
    - Phase 3 will be another 6 meetings to go over how to manage any water issues and we will be looking for your ideas
    - Overview of definitions outlined in framework
    - Overview of surface water modeling and water allocation modeling
    - Overview of main stem and tributaries in basin
    - Overview of surface water scenarios (current, permitted and registered rate (full allocation), moderate water demand, high water demand)
    - Not looking at any projected land use and no climate change
    - Overview of North Carolina demands and how we plan to handle these in the model
    - Overview of summary of average annual demands by scenario
    - Where do we see shortages in model scenario?
        - Current use, no shortages.
        - Moderate demand, two relatively small shortages (Greer and Golf course) - not simulating any dam reductions.

        - Q: Any probabilities assigned to the scenarios?
        - A: Each sector of water use have a different driver and source of information for projection that I cite and apply the driver- as far as likelihood the moderate demand is reasonable- for high demand use the maximum rate of withdrawal but how likely is it that everyone uses or pulls their maximum? I would say that is very unlikely (Alex P).
    - High demand scenario, a few surface water shortages from water suppliers and golf courses
    - Permitted and registered scenario, around 12 surface water shortages
        - Q: If someone applies for a new permit do they judge it on the amount of water being used or amount being permitted?
        - A: If new user comes in, look at reasonableness criteria so you would see what they are requesting, what type of user, it would be based on reasonable use not historical use – we do a safe yield analysis and minimum in stream flow. (Leigh Anne M)
        - Do grandfathered users have an expiration date?
        - A: Existing or grandfathered permit technically have an expiration issued for around 50 years however when they are renewed, they have to be renewed for the amount they originally applied for, unless they request a modification then we assess the increase as a new withdrawal. (Leigh Anne M)
    - Summary table provided for the water supply shortage scenarios
- Overview of strategic nodes and how flows change under each scenario
- Introduce the concept of reservoir storage plots for scenarios
    - Q: Is there a minimum release on all reservoirs?
    - A: Most do have it, but I am not sure if all of them do have rules that specify minimum release. (Tim C)
    - Q: How did Robinson impact Lake Cunningham?
    - A: Neither have operational rules programmed into the model, not sure its going dry when Cunningham is going dry – ultimately Robinson is not releasing water to fill up Cunningham in the model. (Tim C)
    - Q: Are the graphs showing a model of the past or what actually happened?
    - A: They are showing historical hydrology and saying that if the next 50 years in future it was the same this is what it would look like. (Tim C)

7. Discussion of Next Steps (RBC-requested Scenarios, Assessment of Drought Plans, Consideration of Surface Water Conditions; etc.) (John Boyer) 11:30–12:00
    - Any additional scenarios the RBC would like to see modeled, like the unpaired flow scenario?
    - Yes, RBC would like to see that modeled.
    - Anyone have information that suggest we pick a strategic node somewhere else in the basin?
        - I say we start with this and if we feel like we need more then we revisit.
        - I am going to suggest 2 or 3 additional nodes that break up the long runs between each node.
            - We can add some more.

        - Was impact of fish habitat used to choose those nodes?
            - No, we did not pick based on fish habitat but if someone has specific information on where to focus then we might be able to turn it into a strategic node.
            - One suggestion is the Carlisle gauge below Neal Shoals.
    - Would RBC like to see how often stimulated flows under each scenario drop below minimum recommend instead flow?
        - Yeah, I think we would want to know this.
    - Would RBC like to consider hydropower needs?
        - Power companies likely have already done this, and they are very clear on how we can and cannot operate and we follow those licenses to a T – do not feel like it is necessary.
    - Could we see duration of shortage?
        - Frequency is independent of whether it is back to back months or spaced out so the point is a good one that could be evaluated – we could add duration as a performance metric.
    - Does RBC want to evaluate safe yield for any reservoirs besides Lake Bowen and Blalock ?
        - No comments
    - Want to revisit the discussion of forming subcommittees for surface water to help get more into the modeling?
        - I think the subcommittee is good once we start getting more into the management strategy.
    - Consider thinking about one or more reaches of interest we need to pay close attention to
    - Also keep in mind that we might want to establish a surface water condition
    - Next steps
        - Continue to review preliminary model scenarios
        - Calculate safe yield of Lake Bowen and Blalock to present for next meeting
        - Select locations to apply flow ecology metrics then evaluate them using SWAM – we will come back with risk ranges and other relationships
        - Upcoming meeting is December 8th (continue evaluating and discussing surface water model scenarios)
        - Jan 12th- surface water model scenarios and review flow ecology results, etc.
        - Feb 9th- continue evaluating surface water model results – review flow ecology results, additional RBC requested analyses
        - Maybe bring high demand into a more reasonable area?

Minutes by: Kaleigh Sims and Tom Walker
Approved: 12/8/2022

RBC Chat:
08:59:53 From Thomas Walker To Everyone:
likely to start a few mins late while we get more folks coming in
09:00:22 From RMPRP2 To Everyone:

This is Paul Pruitt, just joined online
09:01:01 From Thomas Walker To Everyone:
ah thank you for letting me know Paul
09:01:20 From RMPRP2 To Everyone:
I show up as RMPRP2
09:01:52 From Kristen Austin To Everyone:
This is Kristen Austin with TNC, I am here and will be switching to my phone in a few minutes. If Eric Krueger is there I may sign off and have him be my proxy as I'm on my way to a doctor's appt in a few. Thanks!
09:02:06 From Thomas Walker To Everyone:
Eric is here
09:02:10 From Thomas Walker To Everyone:
thanks kristen
09:02:22 From Thomas Walker To Everyone:
doing an optional prayer and will record after
09:04:51 From Thomas Walker To Everyone:
rbc members approve agenda
09:06:27 From Thomas Walker To Everyone:
public comment
09:07:28 From Chip Few To Everyone:
C
09:51:13 From damatya To Everyone:
Good morning all! Nice presentation with great analyses, John. I thought this may be one recent related reference from an European study https://doi.org/10.1016/j.ecolind.2022.109308
09:52:49 From Thomas Walker To Everyone:
thanks Devendra, I'll include it in the mins. We appreciate it
10:33:46 From Chip Few To Everyone:
All models are wrong. Some models are useful.
10:34:58 From Tim Cox To Everyone:

10:44:46 From Thomas Walker To Everyone:
10 min break
11:14:54 From Chip Few To Everyone:
are we able to estimate length of a shortage?
11:15:45 From Kirk Westphal To Everyone:
Chip, yes, we can look at the detailed output to examine length (duration) of shortages.
11:16:37 From Thomas Walker To Everyone:
thanks Kirk
11:23:03 From Tim Cox To Everyone:
simulation period is 1000 months, not 10,000 months
11:28:56 From Thomas Walker To Everyone:
muted you temporarily alex
11:29:02 From Thomas Walker To Everyone:
getting a little feedback
11:29:48 From Alex Pellett To Everyone:
Ok, thanks. Hopefully things are mostly clear, but I'm on standby for any more questions.
11:30:52 From Thomas Walker To Everyone:
you're good, just needed to mute you while not speaking

11:32:53 From Chip Few To Everyone:
what's the prediction error?
11:34:38 From Thomas Walker To Everyone:
i'll get you in momentarily chip
11:34:44 From Chip Few To Everyone:
thanks
11:35:34 From Tim Cox To Everyone:
Hi Chip, we haven't quantified uncertainty (error) in model predictions at this stage. There are multiple potential sources of error in the inputs and assumptions in model, including the demand projections and the assumption of static underlying climate/hydrology.
11:38:37 From Kirk Westphal To Everyone:
Chip, we can also look back at the model calibration graphs to get a "feel" of model accuracy with regard to historic hydrology and recent uses. Those reports are available. That doesn't address future uses, but it's a good baseline for understanding model performance.
11:47:11 From Kirk Westphal To Everyone:
Interesting to note on this map is that (as pointed out earlier), most of the shortages are on small tributary streams with no upstream users, but a few (10, 11, for example) have upstream users who are also experiencing shortages, which suggests that downstream shortages are a function of upstream usage as well as water availability locally.
12:06:27 From Kirk Westphal To Everyone:
Another way to interpret the graphs and statistical output is an answer to the question: "If demands over the past 90 years had been higher/different, what would have happened to the system?"
12:12:42 From Bill S. - Congaree Riverkeeper To Everyone:
Yes!
12:14:38 From Chip Few To Everyone:
I think duration of shortage would also be important to look at.
12:30:12 From HarderS To Everyone:
Tom - let me comment
12:30:52 From Alex Pellett To Everyone:
What they are saying is correct - extremely unlikely for all users all the time, but reasonable to believe that some users will have high demand some times.
12:32:00 From Thomas Walker To Everyone:
thanks all
12:32:13 From Chip Few To Everyone:
thanks everyone