Saluda River Basin Council Meeting Minutes

January 17, 2024

RBC Members Present: Brandon Grooms, Tate Davis, Justin McGrady, Patrick Jackson, Rick Huffman, KC Price, Kevin Miller, Paul Lewis, Katherine Amidon, Jeff Boss, Jason Davis, Rebecca Wade, Josie Newton, Larry Nates, Robert Hanley, Thompson Smith, Michael Waddell, David Coggins, Rett Templeton, Jay Nicholson, Phil Fragapane, and Melanie Ruhlman

RBC Members Absent: Kaleigh Sims (Haley Denison, alternate, present), David Lawrence, Eddie Owen, Charlie Timmons, and Devin Orr

Planning Team Present: John Boyer, Tom Walker, Joe Koon, Scott Harder, Leigh Anne Monroe, Hannah Hartley, Amy Shaw, Kirk Westphal, Andy Wachob, Alexis Modzelesky, and Jeff Allen

Total Present: 39

K.C. Price called to order the January 17th, 2024, meeting of the Saluda RBC at 10:00 a.m. He introduced the meeting structure and reviewed the meeting objectives which included: receiving the preliminary Moderate and High Demand Scenario and reservoir yield results, discussing need for additional analyses, scenarios, and model runs, learning about South Carolina's Resilience and Risk Reduction Plan, and learning about water management strategies and brainstorming strategies for the Saluda River basin.

Agenda approved unanimously – 1st – Michael Waddell and 2nd – Kevin Miller

The November minutes and summary approval were tabled until the February meeting to allow for any corrections or edits from RBC members and to make sure everyone is comfortable with the minutes.

The housekeeping items: For the parking lot items are; update and revise use projections with utilities, engagement of the public with this process, when, how, who, engagement of public officials, to promote the plan when we get to the public comment period and beyond, identify

and engage stakeholders that are not involved in the basin council, but have an overlapping or adjacent connection to our efforts, development and maintenance of a public-facing data clearinghouse for all things water with the Saluda Basin, hydrological impairment on the Saluda, acknowledge of this within the final report and within our recommendations, funding for implementation, report on which watersheds have plans and the status of those plans, we have discussed some data gaps-making sure we acknowledge those in our final report and determine how to mitigate those in the future, if we want to request additional surface water demand scenarios we need to decide when, and determine how and when we will coordinate with other basin councils.

C: Ongoing conversation with DNR – eco-region of the Blue Ridge Mountains.

C: January 2 in Greenville a new buffer ordinance was passed. (Will be distributed to the RBC)

New Alternate introduced: Haley Denison (alternate for Kaleigh Sims with ReWa)

There were no public and agency comments.

Review of November Meeting Highlights.

John Boyer facilitated this session by highlighting the November meeting, which included;

- Reviewed and discussed "safe yield" and surface water law and regulations,
- Previous stakeholder efforts that re-examined the law and regulation included the Safe Yield Workshop, SW Regulation Workshop, and most recently,
- the PPAC, the SW Regulation Workshop identified three unintended consequences (overallocation limits availability, flow standards do not apply to majority of permits and registrations, and basin planning activities and regulatory framework not working together for effective implementation),
- PPAC developed a summary of concepts, which helped inform potential changes to the Surface Water Withdrawal, Permitting Use, and Reporting Act.
- Reviewed the Broad RBC recommendations pertaining to laws and regulation, which included: when considering permit applications, reasonable use criteria should be applied to surface water withdrawals, law that allows for regulation of water use need to be enforceable to be effective, water law and implementing regulations should not

distinguish between registrations and permits, and the water withdrawal permitting process should specifically assess the permit application's alignment with the current River Basin Plan.

- Reviewed the Draft Broad River Basin Plan

Preliminary Moderate and High Demand Scenarios Results:

Amy Shaw, John Boyer, and Kirk Westphal facilitated this session about the Surface Water Scenarios:

Base Scenarios:

- Current Surface Water Use Scenarios: uses most recent 10-year average as reported by month in most cases.
- Permitted and Registered (P&R) Surface Water Use Scenario: uses currently fully permitted and registered amounts.
- Moderate Water Demand Projection Scenario: future water demand projection based on moderate growth and normal climate.
- High Water Demand Projection Scenario: future water demand projection based on high growth and hot/dry climate.
- Additional Scenarios: Unimpaired Flow (UIF) Scenario (naturalized conditions, no surface water withdrawal, discharges, or reservoirs).

We are currently in phase 2 of the River Basin Planning process, where we look at how to evaluate current and future water availability issues. Amy Shaw discussed what we looked at before, that is;

Summary of Average Annual Surface Water Demand by Scenario (in MGD): We looked at the table summary of surface change in water demand by different sectors, including their current use, 2070 moderate demand and high demand, and permitted and registered sectors. We noticed that we still have 40% water availability even in the high water demand scenarios.

Preliminary Planning Scenarios Model Results: where do we see simulated shortages, and at what frequency and magnitude?

Current Scenario: Physical shortage- we have only four water users (Overbridge, Leslea, Watson, and Titan farms) that have projected shortage. The surface water user with storage is not included in the model. The shortages in this scenario are less potentially preplanned water demand.

Permitted & Registered Scenario: A lot more shortages are reported here, which are associated with agriculture and tributaries.

2070 Moderate Demand scenario: it looks pretty similar to the current demand scenario, such that the amount of projected growth in the county will be in the moderate demand scenario (Greenville is substantially larger).

2070 High Demand Scenario: an additional tributary was added to the water region; Greenville moved from a moderate 61MGD to a 69MGD high-demand scenario. We are not just looking for shortages but also to know increased water availability.

However, the minimum releases used in all Scenarios include N. Saluda Reservoir, 3 mgd (6.65 cfs), and Table Rock Reservoir, 3 mgd (6.65 cfs).

Summary of Water Supply Shortages: we looked at the supply shortage metric, which includes total basin annual mean shortage (MGD), maximum water user shortage (MGD), total basin annual mean shortage as a percentage of total water demand, percentage of surface water users experiencing a shortage and average frequency of shortage (%) for the four scenarios.

Percent Change in Minimum Flow between Current Use and 2070 Moderate and High Demand Scenarios: we looked at the percent change of water users by various streams. In other words, this shows us the percentage change by users from current use to moderate and high-demand water scenarios. For example, we see in Murray Dam 2070 Mod and HD is 0%; this is because the release from Murray is controlled by the operating place.

Reservoir Storage-Table Rock Lake: We see what the model simulates as the storage and reservoir for current use, including a Deadpool of (3,577 MG) and Deadpool (3,577MG) for the 2070 High Demand Scenario.

Reservoir Storage-North Saluda Reservoir: For the Saluda, we saw it even more extreme for the majority of the simulation period, with pretty much riding a Deadpool of (10,836 MG) for

the current use scenario and a Deadpool of (10,836 MG) for the 2070 High Demand Scenario. (We see a good number of fluctuations during the storage period.)

Reservoir Storage-Saluda Lake: This shows a consistent maintenance level of storage with regard to the period of simulation.

Reservoir Storage-Rabon Lake: This looks similar to a Deadpool of (1,840 MG) for the Current Use scenario and Deadpool (1,840 MG) for the 2070 High Demand Scenario.

Reservoir Storage-Lake Greenwood: the Lake Greenwood reservoir storage is heavily controlled, with no discernable impacts. We have a Deadpool (10,000 MG) for the Current Use Scenario and a Deadpool (10,000 Mg) for the 2070 High Demand Scenario.

Reservoir Storage-Lake Murray: we see a very small change and generally have light operating rules. A Deadpool (447,354 Mg) for the Current Use Scenario and a Deadpool (44,354 MG) for the 2070 High Demand Scenario.

Discussion throughout this part of the meeting:

Q: Can you explain why at the moderate we're at 61 mgd but high demand is 67 mgd?

A: we look at the specific month-to-month, and the reservoir storage system and dead pool level primarily drives the shortage.

Q: Is this good for Greenville? Not going to impact the reservoirs? From conversations in house those situations will never happen?

A: From your master plan we pulled this info. Through 2050 never try and hit 75 mgd so we capped them @ 75 mgd. Adkins is currently at 75mgd not 60. For now we just told the model to get to 75 mgd from Table Rock and North Saluda reservoirs. Greenville Water would likely not draw down both reservoirs to dead pool, as was done in the moderate and high Demand Scenarios but rely more on Lake Keowee. Additional water to meet Greenville's demand would come from Lake Keowee in the Upper Savannah basin.

C: Keowee is 30 cents per million gallon cost difference.

C: Keowee runs 32mgd in summer – Table Rock and N. Saluda feed the watershed.

C: What demands look like moving forward in reality would be ideal for the modeling.

C: We ran 75 on Christmas Eve last year for 2 days – Keowee up to 30mgd during winter.

Q: What happens in a disaster situation?

A: In our capital improvement plan we are going to install a pump station so for the next 50 years there will be redundancy.

C: Enough reserve in reservoirs to cover during a situation.

C: We try to keep those two full – Table Rock and N. Saluda reservoirs.

A: We'll re-run it with this info.

C: We can give you a time series.

C: 2008 drought pulled from Table Rock and N. Saluda and it ran down Table Rock 21 feet. In an emergency we can run down N. Saluda below dead pool and can take it down much further below dead pool.

A: We can do that several ways in the model.

C: Keowee demand is usually in Summer.

Q: From Chat: percentage represents – is it percentage of Permitted and Registered or of Safe Yield?

A: Percentage of P & R.

C: High Demand is one big piece of what we'll base our water management strategies on.

C: Big picture is pretty positive there are some shortages on headwaters which may not be actual shortages. Are there places in the basin we could encourage growth?

Q: I know we have to focus on withdrawal. At what point or when do we discuss what's put back into the system?

A: We are considering that now, not always explicitly shown in the model. We make assumptions on what is consumptive now and into the future.

Q: How can local municipalities or counties encourage new users/ industries to come in? How can they use the data?

A: Several ways – don't have shortages in place. Can look at nodes and low flow statistics. We will hear about ecological flow relationships as well. I do know DHEC gets questions and can pull the model up to assess water availability.

C: They'll come in with few spots for us to look at.

C: We might be able to create a map that might help with that and provide data.

Q: Question about 2070 on a monthly basis over 90 years 34% of months had less than average flow?

A: Sort of but Greenville pulls from reservoirs and Greenville can pull from another source outside the basin.

C: Site 6 12% of months max shortage would be 0.8 mgd but there could be a pond.

C: Based on how we modeled Clouds Creek. Needed to use a nearby gage as a reference and it is an estimate of flow.

C: If USGS had a gage it would be based on that data.

C: Ours is based on USGS gage data but we have to estimate in the model.

C: A little more uncertainty for these ungaged results.

C: We also need to think about how we can present it to industry /Economic Development groups – create a 2-pager to where development could go.

C: The software is available so I can draw polygons for development.

Q: From Chat: Do the frequency of shortage percentages take into account minimum flow requirements?

A: No, not frequency of shortages just availability of water. We have incorporated minimum releases like from Greenville reservoirs.

Q: This assumes a shortage would run the stream dry? No surface water condition?

A: We'll talk about that in the next steps.

C: Shortage here is zero flow.

Q: N. Saluda and S. Saluda I thought you put in at least 3 mgd?

A: We did but sometimes it is more – can look back and check it out.

C: A lot more complicated than that.

C: We can drill down to daily if needed.

C: Ecological flow will be helpful to help interpret.

Q: How often will a stream go to zero?

A: We can add a node anywhere as needed.

C: We heard about Lockhart dam when they generate energy there – difficult to model.

C: They are trying to keep it above to get off the that list. Could be a recommendation.

C: For 6-7 years there was no running of the dam. They have done better the last 3-4 years.

C: I monitor it closely and my observation 120 cfs and I don't see it below that anymore.

C: I can find out /ask the question.

C: Is there a criteria we could recommend? Guidance is coming through the EPA – trying to make one from a recreational perspective.

Q: Is this the revised one?

A: Yes, the model has strategic assumptions – not unrealistic.

C: Brought Saluda Lake down 5 feet to prepare for a recent storm. I'd like to know what storage #'s are with sediment issues.

Q: Dates on bottom are off?

A: We use past hydrology so no. What would have happened.

Q: What would it look like for backup dam when they drew it down close to dead pool?

A: Could be interesting for a scenario like this.

C: Model did have a dip during that period.

C: Could be important if they have to drain it down again.

C: For reservoirs – drill down into these droughts – would like to see elevation for Lake Murray.

A: Can add a second axis.

A: For each reservoir we have model accounts with water budget.

Preliminary Reservoir Safe Yield Results:

Kirk Westphal facilitated this session by discussing the difference between the Reservoir-Safe Yield and the Safe Yield of a Basin. Some of the definitions of Reservoir Safe Yield include: Reservoir-Safe Yield is the Surface Water Supply for a reservoir or system of reservoirs over the simulated hydrologic period of record.

- Based on the shallowest intake for an essential water use in a reservoir.
- Uses current reservoir operating rules
- Based on Current Scenario demands
- Planning Framework also calls for calculation of the unallocated reservoir save yield (Permitted & Registered Scenario)

- Safe Yield determined for Lake Greenwood and Lake Murray

We looked at this 90-year period of record and asked how much water could have been taken from one reservoir at a consistent rate without going down. This is based basically on the shallowest intake, which means we are only looking at the available water above the dead pool. We applied the current operating rules to some extent and followed them based on the analysis of any required rules that reservoirs have. We noticed that the downstream impacts are not affected by these rules. However, some reservoirs have target elevation rules that we try to follow during the course of the year. And when we tried to apply those rules, we would not be testing the yield of the reservoir hydrologic one. We suspended those target elevations over the course of the year; the reservoir was brought down to the maximum level.

Concepts and Purpose:

- Safe Yield: Maximum annual average demand that can be sustained through the period of record without depleting available storage
- Reservoir Balancing: in some cases, we can adjust rules so that reservoirs in a system draw down together at the same relative rate to avoid water in one but not others (for example).
- Demand Assumptions: Current/Permitted and Registered/ 2070 High Demand
- Purpose: determine the amount of water that is physically/hydrologically available at a reservoir.

The difference between the Reservoir Safe Yield and basin safe yield used by SCDHEC for withdrawal permitting. Reservoir-safe yield is the hypothetical maximum withdrawal volume used for planning, while basin-safe yield is the statistical availability of free-flowing water in a river used for permit evaluation.

Method:

- Remove permit/intake/treatment constraints at the reservoir.
- Suspend target elevation rules
- Maintain downstream release rules
- Apply appropriate demand scenarios upstream
- Consolidate withdrawal from the reservoir to a single hypothetical user at the reservoir.

- Gradually increase continuous annual withdrawal (with seasonality) until: (lowest storage over period of record=dead pool/lowest allowable level and no shortages)

Lake Greenwood Safe Yield: summary of Scenario Demands and Safe Yield on Lake Greenwood (MGD) include 12MGD current with Safe Yield 293MGD, 2070 High Demands 20 MGD with Safe Yield 277 MGD and Permitted and Registered Demands 74 MGD with Safe Yield 153 MGD.

Lake Murray Safe Yield: summary of Scenario Demands and Safe Yield on Lake Murray (MGD) include; 77 MGD Current Demands with a Safe Yield of 370 MGD, 2070 High Demands of 140 MGD with a Safe Yield of 359 MGD, and Permitted and Registered Demands of 187 MGD with Safe Yield 173MGD.

Demand from Dominion's McMeekin Station is the net withdrawal from the lake.

Discussion from this portion of the meeting:

Q: If you have multiple users do you assume all users pull at the same elevation?

A: We do and can zoom into a unique user but this is aggregated – more hypothetical.

C: Intent in framework was to use the highest elevation.

C: In the model, highest elevation is set as dead pool usually.

C: We can go look at that and adjust if necessary.

Q: Has this been updated since you sent these out?

A: Yes.

Q: Model from Columbia import to Broad – how come you don't turn that off?

A: We do turn that off for this – coming out of Lake Murray aggregation of users – hydrologically what is flowing in and out.

Q: It doesn't link the lakes together?

A: We could and have done that before – can adjust operating rules.

Q: On Lake Greenwood who determines elevation?

A: Rule curve by FERC – Buzzards Roost – use sea level.

Q: Why aren't we doing our lakes by sea level?

A: Just a different graphical representation.

Q: What is the dead pool for Lake Murray (elevation)?

A: We can look it up.

Q: What is dead pool here?

A: Highest intake in the Lake – we'll look into it – clarify in report.

C: Interested in seeing this in other lakes? Reservoirs?

A: Yes, Rabon, Saluda, Table Rock, and N. Saluda.

C: Any rules or constraints?

A: Need time to think about it.

C: We probably need to know what the constraint is for each lake.

Discussion of Next Steps:

John Boyer facilitated this session by highlighting some of the next steps' actions, including reviewing the preliminary modeling scenario results and evaluating flow-ecological metrics using SWAM model daily timestep results for each planning scenario. In other words, looking at the possibility of getting feedback from individual water users about their demand projections could result in some modification to the high-demand scenario. We are more likely to resolve all that before proceeding with the analysis.

Other Analyses that Can be Performed at RBC Discretion:

- Determine how often simulated flows under each scenario drop below the Minimum Instream Flows (MIFs) (even though water users in the basin are not subject to them).
- Evaluate additional demand scenarios.
- Evaluate impacts to reservoir levels if historical droughts were longer.
- Evaluate safe yield for other reservoirs.

Reaches of Interest:

Specific stream reaches that may have no identified Surface Water Shortage but experience undesired impacts, environmental or otherwise, determined from current or future water demand scenarios or proposed water management strategies. And could be related to:

- Recreational flows
- Ecological/ in-stream flows
- Designation as a Scenic River
- Other factors.

Surface Water Condition:

According to the RBC, a limitation is the amount of water that can be withdrawn from a surface water source and which can be applied to evaluate surface water supply for planning purposes. Current Surface Water use Scenario including Period of Record Low Flow (83 cfs), surface water condition (60 cfs) and surface water supply (23 cfs)

Discussion during this portion of the meeting:

Q: What does naturalized mean?

A: No development – withdraws – discharges UIF model run.

Q: Does HD cover what Greenville thinks is possible?

A: Yes.

C: Concern is extreme weather events more often and longer.

C: Also change demands too? More or less demands.

C: Bad droughts get a good response.

C: Once they cut back it takes while to come back or people don't come back at times. More than 2 year drought is not out of reach of possibility.

Q: Will model reflect triggers/conservation?

A: We can add the rule to the model and test triggers.

Q: When you look at Columbia Water – how to divvy up water for Saluda and Broad?

A: We put assumptions – Columbia Water pulls from Lake Murray and the Broad River Canal as a secondary source.

C: If they expand production it would likely be from Lake Murray.

A: Surface water condition might not impact Columbia Water.

C: Maybe if we want 5 mg/L of dissolved oxygen below Lake Murray.

C: It could constrain upstream withdrawals – can look into it. *Pick a spot as an example* Surface water condition example.

C: What is the ecological impact of surface water you have and protecting aquatic life. Volume impacts quality as well.

A: Better idea once we hear from eco-flow model results. May not be available for this planning process.

C: Photo compendium – 5 cfs vs 50 cfs what does it look like.

South Carolina Resilience and Risk Reduction Plan:

Hope Warren handled this session where she started with the history, which includes South Carolina Disaster Recovery Office, which was created following the historic floods of 2015, Hurricane Joaquin, 2016 Hurricane Mathew, 2018 Hurricane Florence, 2018 Floodwater Commission, 2020 Disaster Relief and Resilience Act was signed creating the office of Resilience and 2021 Officially operation at the start of 2022.

Resilience is the ability of communities, economies, and ecosystems to anticipate, absorb, recover, and thrive when presented with environmental change and natural hazards.

What We Do: The office is set up to perform the following duties: resilience, mitigation, and disaster recovery.

Disaster Recovery Program: Using HUD funds through a Community Development Block Grant-Disaster Recovery (CDBG-DR) grant, SCOR repairs, replaces or rebuilds homes impacted by hurricanes.

Mitigation: HUD CDBG-MIT: this program aims to move citizens out of harm's way and return the land to green space so that the natural function of the floodplain is restored. In other words, the mitigation programs comprise Infrastructure, Plans and Studies, Buyouts, and Matching Grants.

Mitigation-American Rescue Plan Act Programs (ARPA): The ARPA is the first opportunity project statewide where we created a stormwater infrastructure program and carried out our projects across the states.

Strategic Statewide Resilience and Risk Reduction Plan

Resilience Planning: South Carolina is responsible for developing and implementing a strategic Statewide Resilience and Risk Plan. The plan identifies major flood risks around the state and potential losses that could occur as a result of extreme events. The plan provides strategies for local governments to implement resilience into communities to mitigate potential flood risks.

Legislative Guidance:

- The Act stated that the plan should be developed with the principles recommended in the South Carolina Floodwater Commission Report.
- Intended to serve as a framework to guide state investment in flood mitigation projects. Adopts programs and policies to protect the people and property of South Carolina from damage and destruction of extreme weather events.
- The Act directed that the initial version of the plan be completed by July 1, 2022. (Extended to July 1, 2023).

Floodwater Commission Principles

- Flood management plans and actions should be based on watershed boundaries, recognizing that water flows and floods do not follow jurisdictional or political lines.
- Decisions and actions should be based on high-quality, shared and integrated hydrologic and hydrographic models derived from increased data collection; the data and models should be transparent and freely accessible to all stakeholders.
- Building the capacity of local governments to develop science-based and actionable flood management plans and hazard mitigation plans should be a priority, especially for under-resourced communities. It does little good for one local jurisdiction to have high-quality plans if the upstream jurisdiction does not.
- Success will depend on collaboration. Collaboration must take place between state agencies to bridge boundaries, as well as between the state and local governments. Collaboration is essential to build trust among all stakeholders, which leads to partnerships, coordination and more effective programs. Collaboration should also be explicitly encouraged with key federal agencies (i.e. US Army Corps of Engineers, US Geological Survey, NOAA).
- Ongoing opportunities for public participation and education should be developed to encourage collaboration and build trust.

- Flood management programs should recognize the beneficial functions of natural floodplains, salt marshes, beach dunes, forests, living shorelines and other natural features to reduce flood risk, as well as the co-benefits they deliver for recreation, forestry, tourism, fisheries, and wildlife. “Nature-based solutions” should be considered included in the design of flood control projects whenever possible in order to increase resilience and be cost-effectiveness.
- Post-disaster funding coming to South Carolina from congressional appropriations should be managed in a unified state plan as much as federal rules and guidelines will permit, and coordinated across the multiple sources (i.e. FEMA, HUD).

Resilience Planning Assumptions

- The plan will not try to provide solutions to prevent changes to the climate but will offer recommendations for how the state may minimize the impacts that are expected to occur.
- Resilience Planning utilizes an adaptive management approach so that it can adjust to changing conditions and integrate new data sources as they become available.
- Initial Plan recommendations focuses flooding.
- Other extreme weather events /disasters to be addressed in more detail in subsequent versions of the plan.

Planning Conditions

Planning Scale – we understand that water doesn’t follow political boundaries. The population growth is inconsistent across the state, and we are losing population in some areas.

Climate Trends: SC Precipitation Projections: we looked at the relationship between population growth and environmental impacts. We do this by factoring in the Sea Level projections.

Flood Risk and Vulnerability Assessment:

Flood Frequency: We categorized flood frequencies into three categories: House 1(500-year floodplain), with a 0.2% chance of flooding in a single year and a 6% chance of flooding over a 30-year mortgage. House 2 is in the (100-year floodplain) with a 1% chance of flooding in a single year and a 26% chance of flooding over a 30-year mortgage. House 3 is in the (10-year

floodplain) with a 95% chance of flooding in a single year and a 95% chance of flooding over a 30-year Mortgage.

Surface Water and Flash Flooding: (Type of Flooding);

Pluvial Flooding: occurs when an extreme rainfall event takes place in an area where there is inadequate drainage for that particular amount of rainfall.

Fluvial Flooding: occurs when the water level of the river overtops its banks or natural levees due to excess precipitation.: This type of flooding can be devastating because it can occur in a different location than where the precipitation occurred.

Coastal Flooding: This is caused by storm surges, high tides, and rising sea levels.

The First Street Flood Model 2022 has a 1% annual chance of a Flood event (100 years), and the First Street Foundation Flood Model 2022 has a 0.2% annual chance of a flood event (500 years).

Vulnerable Properties-Inundation greater than 6 feet- 2052 has a 1% annual chance of flood event. And, Solid Waste Facilities-2022 has a 1% chance of flooding event.

Flood Exposure and Social Vulnerability: flood exposure is calculated as the percentage of the Census Tract flooded at a depth greater than 6 inches during a 1% Annual Chance Flood according to the First Street Foundation Model.

Other Hazards discussed include South Carolina Wildfire Burn Probability, FEMA National Risk Index-Heat Wave Risk Index rating, and Drought Risk Index Rating.

Current Process Contents :

Anticipate: Land Use Planning & Regulations, Hazard Mitigation Planning, State Water Planning, Other Statewide Planning Efforts Related to Resilience, Floodplain Management Regulations, Community Rating System Real Estate Disclosure, and Data.

Absorb Stormwater Management Regulations, Stormwater Infrastructure Design, Green Stormwater Infrastructure Design, Building Codes, Coastal Zone Management, and Protection of Wetlands.

Recover: National Disaster Response & Recovery Framework, State Coordination of Recovery, Complicating Factors for Recovery, and Non-Profit Partners in Recovery.

Thrive Community Co-Benefits, Economic Co-Benefits, and Ecosystem Co-Benefits.

Funding: Federal Funding includes FEMA, Department of Housing and Urban Development (HUD), and State funding includes SC Emergency Division, SC Department of Natural Resources, and SC Office of Resilience.

Recommendation Themes: Improve Data Collection and Coordination, Increase Education, Outreach, and Disclosure, Coordinate Watershed-Based Resilience Planning and Projects, Incorporate Resilience into Planning, Land Use and Other Regulatory Processes, Maintain and Strengthen Building Codes, Incorporate Resilience into Infrastructure Design, Maintain Natural Flood Protection Through Conservation, Incorporate Resilience into Housing Recovery, Establish a Voluntary Pre-Disaster Buyout Program and Identify and Maximize All Available Funding Sources For Resilience Activities.

Watershed-Based Resilience Planning: Coordinate with communities at the watershed level to identify risk & vulnerability, develop actionable flood mitigation and resilience solutions and build community capacity by leveraging local, regional and state partnerships.

South Carolina Resilient Coastal Communities Collaborative Program: Watershed-based planning process in the Salkehatchie River basin, as a pilot program for future watershed-based resilience planning efforts, Working with partners at S.C. Sea Grant Consortium and S.C. Beach Advocates, Will provide technical assistance to 10 underserved communities to complete community risk assessments, grounded in local engagement, leading to a portfolio of resilience projects, Creation of a comprehensive Salkehatchie Watershed Resilience Plan, and Continued coordination between other proposals/projects.

Grant Administration

Awarded Grants with SCOR involvement

- EPA- Climate Pollution Reduction Grant -$3M (DHEC/SC Ports Authority)
- National Fish & Wildlife Foundation- National Coastal Resilience Fund $896,675 (S.C. Sea Grant, S.C. Beach Advocates)
- EPA Office of Community Revitalization- $100,000
- SC Commission on National & Community Service (AmeriCorps Planning Grant) - $83,000
- NOAA- Coastal Resilience-$6.2M (The Nature Conservancy, lead)

• Robert Wood Johnson Foundation- $250,000 (Department of Insurance, lead).

Grant Applications Submitted/In Development

• FHWA PROTECT Grant $60M

• EPA Solar For All $200M

• HUD PRO Housing $6.5M

• FEMA BRIC

Discussion from this portion of the meeting:

Q: Any opportunities in the Saluda river basin we should think about?

A: Not at the moment but once we start our basin planning maybe.

Q: Watershed resilience planning – what does that look like?

A: Focused more on flooding – we are going to analyze what's already been done. Filling gaps.

C: BMPs – guide book for municipalities?

A: Yes, also going through the basin planning process and pick out examples.

C: Similar to the blue book in Georgia – copy and paste sectors into plans.

Recommendations discussion with John Boyer and Hope:

Q: Are any in SCOR suitable for our plan? Phase 4 look at Executive Summary. More powerful if in multiple plans. Money from SCOR is all flood resiliency?

A: Yes.

Q: If an RBC has a strategy could there be funding from SCOR?

A: Possibly, we are looking for partnerships.

Q: Monitoring stations on our rivers for more flood data.

A: Yes, need to identify where.

C: Legislature has given funding for gages and we've put lots in in the last few years. DNR is funding 60 gages now. We're working on it.

Q: How does the public get into the process?

A: (DNR) We've done workshops but don't take direct recommendations for gage locations.

Q: Cost?

A: $16,000 per year.

A: USGS doesn't have much $ to put them in.

Q: IF someone wants to fund one?

A: We cost share with some entities.

C: All USGS gages are in the model.

Q: Is part of our role to focus on high water events?

A: We are focused on drought.

C: Charlotte – Mecklenburg has low cost flood sensors – York has discussed using those.

C: Clemson trying to use low cost sensors for flooding.

Introduction To Water Management Strategies:

John Boyer facilitated this session with Planning Framework Definition, which includes;

- Surface Water Management Strategy – a water management strategy proposed to eliminate a Surface Water Shortage, reduce a Surface Water Shortage, or generally increase Surface Water.
- A River Basin Plan is a collection of water management strategies supported by a summary of data and analyses designed to ensure the surface water and groundwater resources of a river basin will be available for all uses for years to come, even under drought conditions.

Water Management Strategies:

Demand Side Strategies: this means ways in which we can reduce demand on water resources.

Municipal conservation: The practices include Water loss control programs, Low flow fixtures, toilets and appliances, Pricing structures (ex. increasing block rates), and Public education.

Ag/Irrigation conservation: the practices include; water audits and center pivot sprinkler retrofits, demand dikers, cover cropping, conservation tillage, mulch, soil moisture sensors/smart irrigation, crop selection, irrigation scheduling and drip/trickle irrigation (for select crops).

Industrial Conservation: the practices include water reuse and recycling, water-efficient processes, water loss control, and low-flow fixtures, toilets, and appliances.

Thermoelectric Conservation: The Practices include; reclaimed water, switch to combined-cycle natural gas, and energy saving appliances (which reduces thermoelectric generation needs).

Supply Side Strategies:

New or Increased Storage: the practices include new impoundments, ponds, reservoirs, tanks, dredging (pond deepening), reservoir expansion (raising dam height), and aquifer storage and recovery.

Water Reclamation: Practices include water reuse systems (non-potable), direct potable reuse, and stormwater capture and treatment.

Conjunctive Use: practices include using groundwater to augment surface water during low flow periods.

Conveyance: practices include regional water systems, utility interconnections, and interbasin transfer.

Criteria to Evaluate Water Management Strategies

• Effectiveness : Analyze Performance Measures (via modeling) and Cost/benefit incl. capital and annual costs ($/MGD)

• Reliability (especially during drought)

• Permitting/regulatory, including potential interbasin impacts

• Environmental impacts •Socioeconomic impacts

• Water quality impacts and considerations

Water Conservation Strategies: since 1999, Town of Cary has implemented the following; Three-tiered water rate structure, Landscape and irrigation codes, Toilet flapper rebates, Residential water audits, Points program for new construction with water efficient measures, Monthly water budgets for large irrigators, Public education, and Reclaimed water program. Conservation strategies reduced per capita water demand from 114 gpcd in 2001 to 81 gpcd in 2016 (29% reduction in per capita demand).

Metro-North Georgia Water Planning District: Conservation strategies reduced per capita water demand from 131 gpcd in 2003 to 99 gpcd in 2018 (24% reduction in per capita demand. Also, in 2003, a Water Supply and Conservation Plan was implemented, and water demand has fallen by 10% while the population has increased by 1 million. Some examples of water conservation efficiency measures implemented include conservation pricing structures, toilet

rebate programs, landscape irrigation programs, leak detection and water loss control programs, car wash recycling ordinances, and public education.

Greenville Water-Declining per Capita Demand: in 2001, it declined from 95 gpcd to 68 gpcd in 2021. In other words, a 28% decrease in residential per capita demand.

Water Efficiency and Water Loss Programs: Georgia Water Stewardship Act of 2010
The Act set water loss control requirements that include:
• Completion of an Annual Water Loss Audit using AWWA M36 Methodology.
• Development and implementation of a Water Loss Control Program.
• Development of individual goals to set measures of water supply efficiency.
• Demonstration of progress toward improving water supply efficiency.
Requirements apply to public water systems serving populations over 3,300 (about 250 utilities).
Water Efficiency and Water Loss Programs: We are looking at all the withdrawn water being used effectively and not lost to the system (focusing on the real losses and leakage of main service lines).
Real Losses:

- Also called Physical Losses-Water that enters the distribution system but never reaches a user. Examples include leakage on transmission and distribution mains, storage tank overflows, and service line leakage up to the customer meter.
- Reducing real losses extends the water resource.

Catawba Wateree Water Management Group (CWWMG): Multi-phased Approach to Water Loss- they started doing actual water balances and looking at the lost profiling, trying to figure out where they are losing water. So, they created an intervention phase and tried to figure out the cost of the water loss and how to prevent this water loss and protect their revenues. In 2021, the volume of estimated water loss was 17BG, and the estimated cost was $23m. Their strategies include annual water balance, loss profiling uncertainty, cost-benefits and targets, and intervention.

Discussion from this portion of the meeting:

C: Greenville has seen a 28% reduction since 2000.

C: Building up instead of family homes (smaller families and smaller units) – not actively pursued.

C: We give out free irrigation meters – without irrigation it would be lower.

Shooting for getting it down to 50 gpcd.

C: LCWSC – mid – 70's gpcd.

C: Water loss Easley – 9%.

C: Greenville loss is 11%.

C: LCWSC is around 15%.

C: Got better meters/better accounting.

C: Aren't real losses.

Discussion Guide

1. What existing water management strategies are already used in the Saluda basin? Consider and group these strategies by water use sector and whether they are:

a. Supply-side strategies

b. Demand-side strategies

c. Low flow management strategies

2. How effective are the existing strategies? Think in terms of their ability to reduce demands, increase supply availability, and prevent shortages.

3. Do you think strategies that are already in place can be expanded or improved?

4. What types of strategies are likely to be relevant in the Saluda Basin to reduce or eliminate projected shortages, increase available supply, minimize low flows, and help improve the flow regime for aquatic organisms and recreation? Which strategies should we evaluate using the surface water model?

Group Report-Q1 Strategies in the Basin:

- Leak management (smart meters AMI and AMR).
- Impoundments and reservoirs

- Tiered rates
- Public education (on bills)
- Drought management plan.

Group Report -Q2: Effectiveness of Existing Strategies:

- Drought plans don't have authority until level 4 (Governor)
- Bill inserts could be more effective.
- Small impoundments.
- Major reservoirs in the Saluda are effective water supply strategies.

Group Report-Q3: can Existing Strategies be Expanded:

- Prioritizing maintenance and repairing aging infrastructure.
- More difficult to permit and build small impoundments.
- Watershed protection; increasing buffers.

Group Report-Q4: What Strategies and Relevant in the Saluda Basin and should be further Evaluated:

- Possibly reclaimed water where it makes sense
- Saluda basin water is returned to the system – indirect potable reuse.

Next Meeting: Wed., February 21, 2024:

Informational topics include;

- Additional surface water analyses;
    1) Eco-flow relationship (tentative)
    2) Results of other analyses, per RBC request
- Discussion and selection of water management strategies for evaluation.

Discussion during this portion of the meeting:

Q: Is there anybody – drought situations - implementation in their basin that could talk to us? What works for them?

A: Georgia, Connecticut, Missouri plans we've written what was implemented what works and what didn't.

A: SC is fairly water rich try to find examples similar to SC.

Meeting adjourned: 2:08 PM – unanimous

Minutes: Iffy Ogbekene and Tom Walker

Approved: 2/21/24

RBC Chat:

10:00:25 From Thomas Walker to Everyone:

we'll get started here in a minute

10:29:05 From Melanie to Everyone:

Can you please clarify what the percentage represents? Is it percentage of P&R?

10:29:24 From Melanie to Everyone:

Or is it percentage of SY?

10:35:22 From Thomas Walker to Everyone:

yes one second

10:49:44 From Melanie to Everyone:

Do the frequency of shortage percentages take into account minimum flow requirements?

11:12:19 From Thomas Walker to Everyone:

break until 11:20

11:23:38 From Thomas Walker to Everyone:

they're setting up lunch so we'll get started in a minute or so

12:03:56 From Thomas Walker to Everyone:

12:20 we will start with Hope's resilience PPT

12:04:02 From Thomas Walker to Everyone:

start back up in 15-17 mins

12:52:33 From Melanie to Everyone:

(Hydrologic) Reconnection of streams and rivers to floodplains is a recommendation.

13:40:58 From Thomas Walker to Everyone:

Larry did you need something? We are getting back to the meeting in about 5 minutes or so after breakouts end