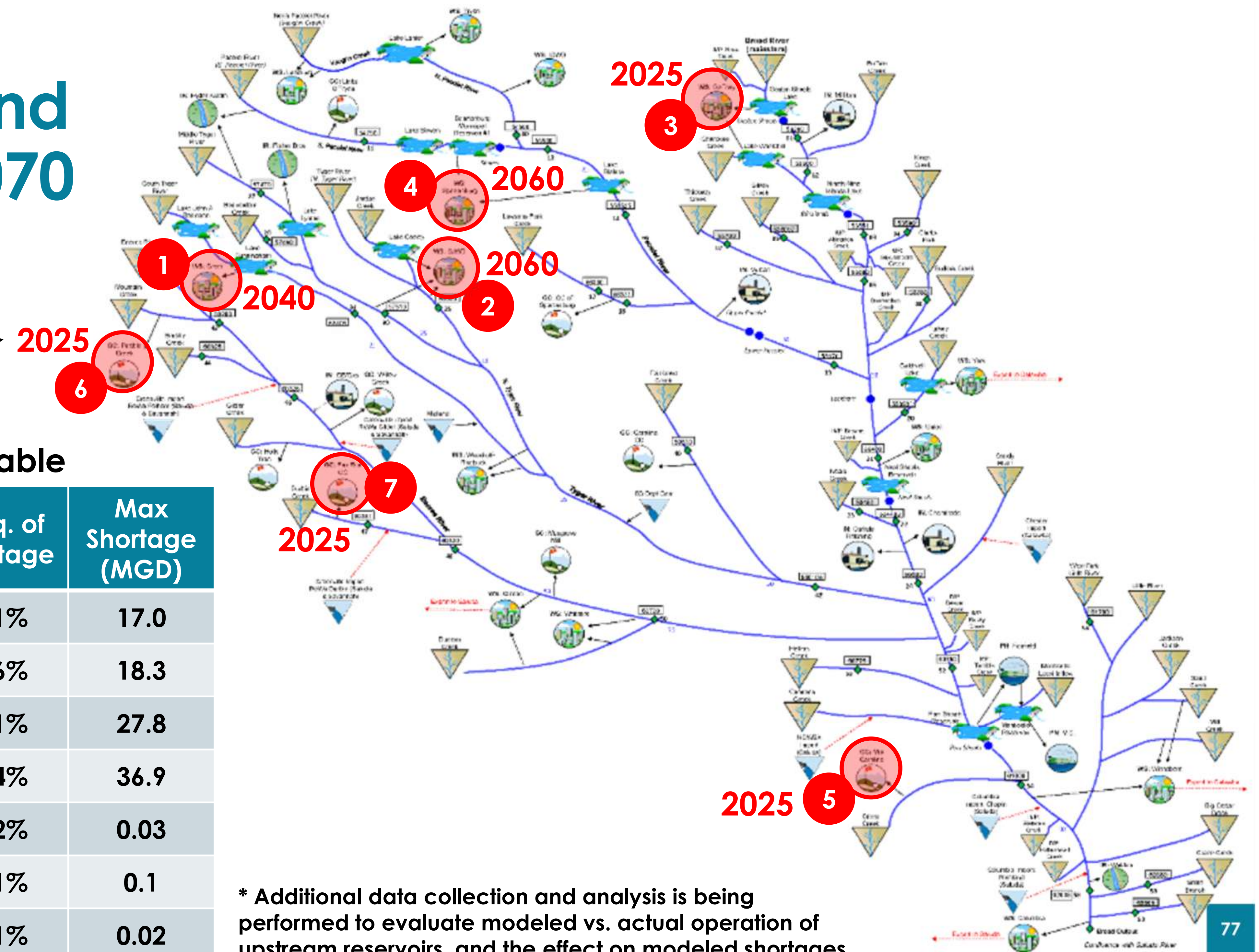
Timing of High Demand Scenario Shortages and Discussion of Demand-Side Water Management Strategies to Evaluate

Agenda Item 7

High Demand Scenario 2070

High Demand Scenario Year when shortage first appears



Surface Water Shortage Table

Map ID	Water User	Freq. of Shortage	Max Shortage (MGD)
1	WS: Greer*	7.1%	17.0
2	WS: SJWD*	0.6%	18.3
3	WS: Gaffney	1.1%	27.8
4	WS: Spartanburg	0.4%	36.9
5	GC Mid Carolina	0.2%	0.03
6	GC: Pebble Crk.	0.1%	0.1
7	GC: Fox Run	0.1%	0.02

* Additional data collection and analysis is being performed to evaluate modeled vs. actual operation of upstream reservoirs, and the effect on modeled shortages.

Timing of High Demand Scenario Shortages

	Maximum Shortage (MGD) for Each High Demand Scenario						Frequency of Shortage for Each High Demand Scenario					
Water User Name	2025	2030	2040	2050	2060	2070	2025	2030	2040	2050	2060	2070
WS: Gaffney	6.2	10.0	12.9	18.9	23.3	27.8	0.3%	0.3%	0.5%	0.7%	1.0%	1.1%
WS: Spartanburg	No shortage				15.0	36.9	No shortage				0.1%	0.4%
WS: SJWD*	No shortage				6.9	18.3	No shortage				0.1%	0.6%
WS: Greer*	No shortage		4.2	9.3	13.3	17.0	No shortage		0.8%	2.6%	4.4%	7.1%
GC: Pebble Creek	0.1	0.1	0.1	0.1	0.1	0.1	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
GC: Fox Run CC	0.02	0.02	0.02	0.02	0.02	0.02	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
GC: Mid Carolina	0.03	0.03	0.03	0.03	0.03	0.03	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%

* Additional data collection and analysis is being performed to evaluate modeled vs. actual operation of upstream reservoirs, and the effect on modeled shortages.

Guiding Principle #4: River Basin Plans should utilize effective supply and demand strategies

- River Basin Plans should utilize **sound science** and recommend suitable but **cost-effective management strategies** which embrace new, proven technologies, procedures, and practices to enable more efficient use of water and to maximize water availability.
- Management strategies should be **flexible**; should be responsive to trial, monitoring, and feedback; and should change in response to new scientific information and technical knowledge.
- Water planning should include both surface and groundwater resource management.
- River Basin Plans should consider the **conjunctive use** of surface and groundwater as a potential water management strategy.
- River Basin Plans should support a **water-conservation** and **water-efficiency ethic**.

Guiding Principle #4: River Basin Plans should utilize effective supply and demand strategies

- **Water conservation** should become an integral component of water resources management and be one of the first approaches for extending or augmenting available supplies.

- River Basin Plans should consider both **water-demand management strategies** and **water-supply strategies**, such as: water conservation, improved efficiency, pricing structures, reclaimed/recycled water, new wells, new reservoirs, expansion of reservoirs, lowering of intakes in reservoirs or rivers, aquifer storage and recovery, reverse osmosis/desalination, interbasin transfers, and conjunctive use of surface and groundwater.

- River Basin Plans should **promote the efficient use of existing water supplies** and consider opportunities for and the benefits of developing **regional water-supply facilities** or providing regional management of water facilities.

Water Management Strategies

Per the Planning Framework (page 59):

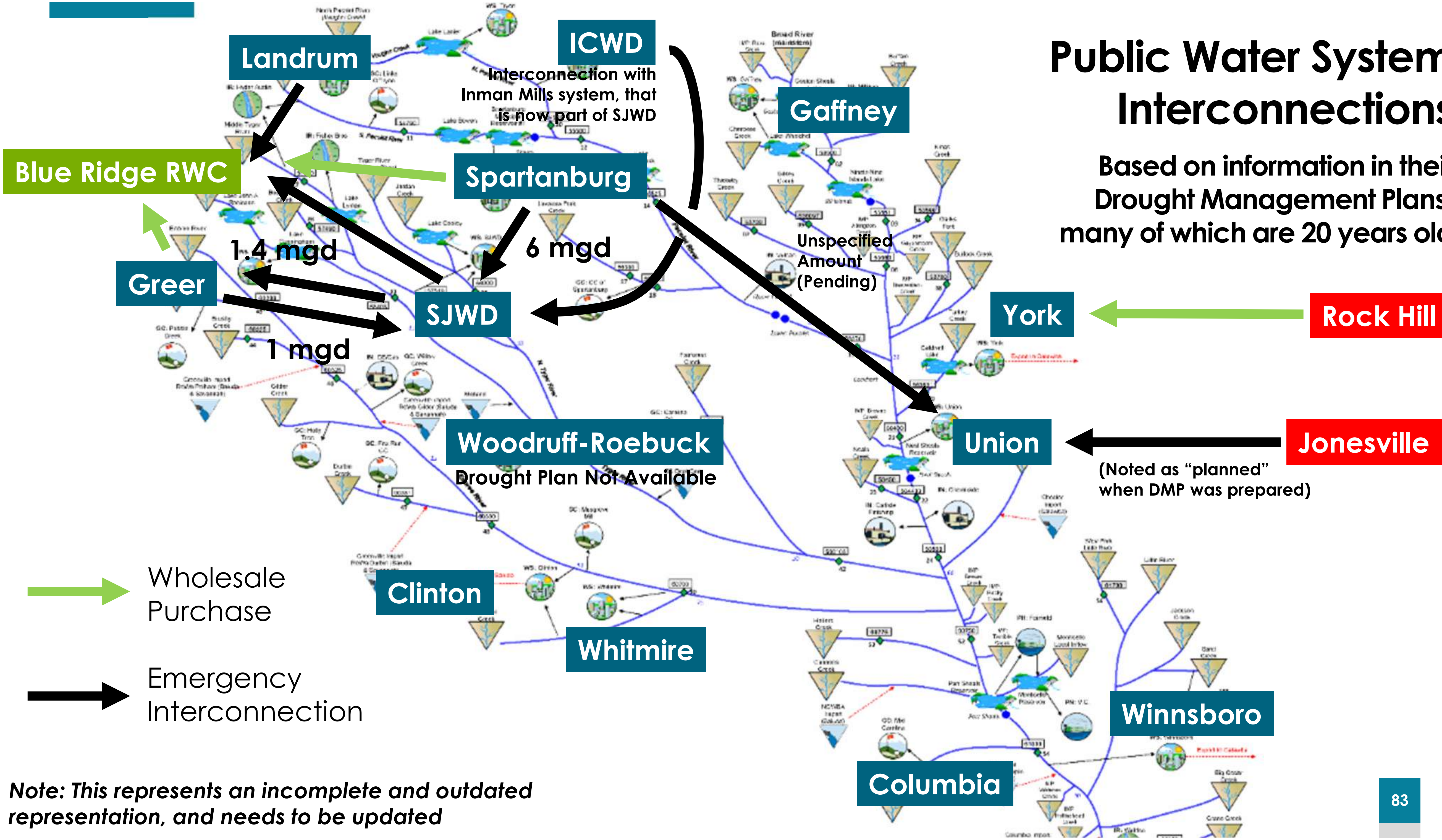
- When evaluating current and future water availability, each RBC should take an **adaptive management approach** and **recognize the potential for changing hydrologic or socioeconomic conditions**, which may lead to new recommendations for water management. The two water demand projection scenarios [**Moderate** and **High Demand**] are designed, in part, to address this potential for varying conditions in a basin. **Changing conditions on the water supply side could include the occurrence of a more severe drought during the planning process, as compared to recent historic droughts included in the simulated period of record.**

Existing Supply-Side Strategies in the Broad Basin

- Interconnections between systems, including for emergency
- Raise dams/increase existing reservoir storage – example in Gaffney
- Maintenance of existing reservoir infrastructure – gates, dams
- Reservoir optimization – maintain water in upper reservoirs for flexibility, consider timing of maintenance
- Conjunctive use (for farmers)

Public Water System Interconnections

Based on information in their Drought Management Plans, many of which are 20 years old



Note: This represents an incomplete and outdated representation, and needs to be updated

Existing Demand-Side Strategies in the Broad Basin

Agriculture

- Cover crops, intercropping, drip irrigation
- Seed coating of herbicide/insecticide to reduce irrigation
- Water audits

Energy/Industrial

- Onsite power generation – more efficient energy uses lead to reduce water demand

Public Water Supply

- Water Loss Audits/Leak detection
- Public outreach – conservation, citizen academies, social media, smart irrigation,
- Conservation-based pricing structures
- Install second meter for irrigation water
  - Utility can manage irrigation separately in drought
  - Easier identification of leak sources

Can Existing Demand-side Strategies be Expanded?

- Update drought management plans
- Improve funding for agricultural conservation measures
- Review utility ordinances to ensure they have authority to restrict usage when necessary (in Catawba this was an issue)
- Regionalized public education
- Improve consistency with public messaging (potential discrepancy in conservation requirements between neighboring areas)
- Increased water audits (for PWS and Ag) and identification of funding sources to address results

What Demand-side Strategies are Relevant in the Broad and Should be Considered for Evaluation?

- Adjustment of rate structure to promote conservation (many are currently flat)
- Expansion of water audits and follow up investments
- Requirement of smart irrigation (or other irrigation ordinances)
- Agricultural conservation strategies supported by increased funding

Edisto Basin Example

Water Conservation and Efficiency Strategies Considered by the Edisto RBC

Agricultural Portfolio of Water Efficiency Strategies
Water Audits and Nozzle Retrofits
Irrigation Scheduling
Soil Management
Crop Variety, Crop Type, and Crop Conversions
Irrigation Equipment Changes

Municipal Portfolio of Water Conservation and Efficiency Strategies	
Conservation Pricing Structures	Public Education of Water Conservation
Toilet Rebate Program	Residential Water Audits
Landscape Irrigation Program and Codes	Water Efficiency Standards for New Construction
Leak Detection and Water Loss Control Program	Reclaimed Water Programs
Car Wash Recycling Ordinances	Time-of-Day Watering Limits
Water Waste Ordinance	

Edisto Basin Example
Demand-side Assumptions Made to Support Modeling

- 70% of existing and future **Agricultural Users** (irrigators) achieve **15% reduction** in projected demand via water audits followed by nozzle retrofits and/or other measures, such as deployment of smart irrigation technologies, use of cover crops, and crop selection.
- **Municipal Water Suppliers** achieve a **15% reduction** in demand by implementing a portfolio of water conservation and water efficiency/loss strategies.

What Demand-side strategies does the Broad RBC want to consider, and what assumptions are reasonable to make regarding their effectiveness in reducing demands (for modeling purposes)?