Preliminary 2070 Moderate and High Demand Scenario Results and Review of updated UIF, Current Use, and P&R Scenarios

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Agenda Item 5

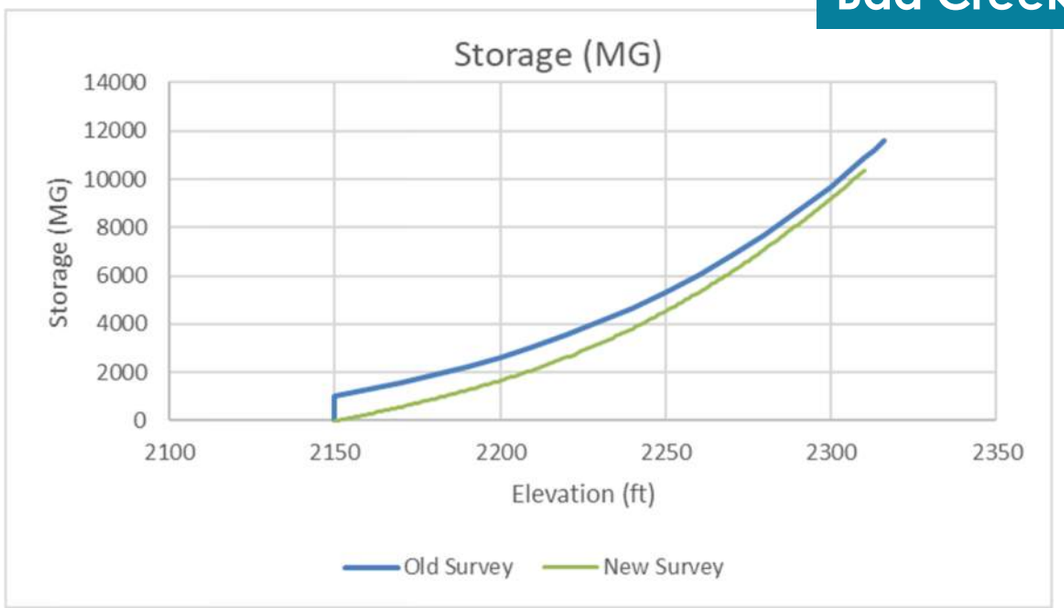
Surface Water Scenarios

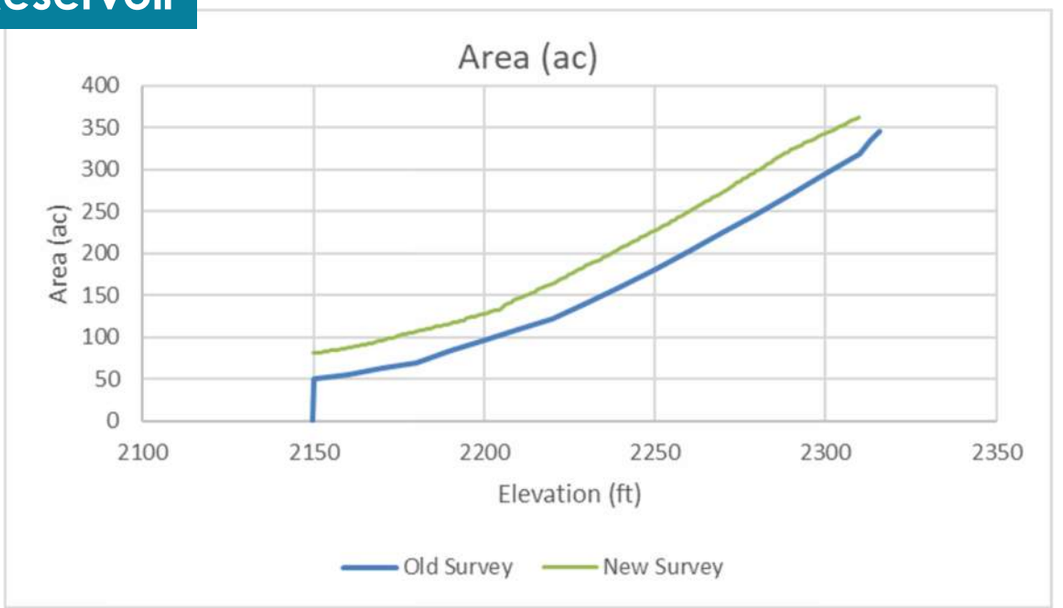
- Unimpaired Flow (UIF) Scenario
  - *Naturalized conditions (no surface water withdrawals, discharges, or reservoirs)*
- Current Surface Water Use Scenario
  - *Uses most recent 10-yr average withdrawals (as reported by month) in most cases*
- Permitted and Registered (P&R) Surface Water Use Scenario
  - *Uses current 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*

Model Updates (since January)

- Added stage-storage curves for **Lake Tugalo** and **Lake Yonah**
- Updated the stage-storage and stage-surface area curves for **Bad Creek Reservoir**

Bad Creek Reservoir





Model Updates (since January)

- Updated some water user object permit and registration amounts
- Made minor adjustments to current use demands for several objects
- Added back in several water user objects that have no recent withdrawals, but still maintain a permit or registration
- Removed one water user object that no longer has an active permit
- Adjusted confluence location of Golden Creek and Three and Twenty Creek.

Upper Savannah River Basin - Summary of Average Annual Surface Water Demands by Scenario

All values in million gallons per day

Surface Water Use Sector	Current Use	Permitted and Registered (P&R)	Current Use as a Percent of P&R
Thermoelectric/Nuclear Power[1]	2,589	3,139	82%
Public Water Supply	59	284	20%
Industrial	8.0	53	15%
Golf Courses	0.8	9.8	7%
Agricultural	0.21	13.0	12%
Mining	0.27	1.0	29%
GA-Side Water Users	22	65	34%
Total all Sectors	2,679	3,561	75%
Total without Thermoelectric/Nuclear Power*	90	422	21%

[1] *Approximately 99% of the thermoelectric/nuclear power withdrawals are returned.*

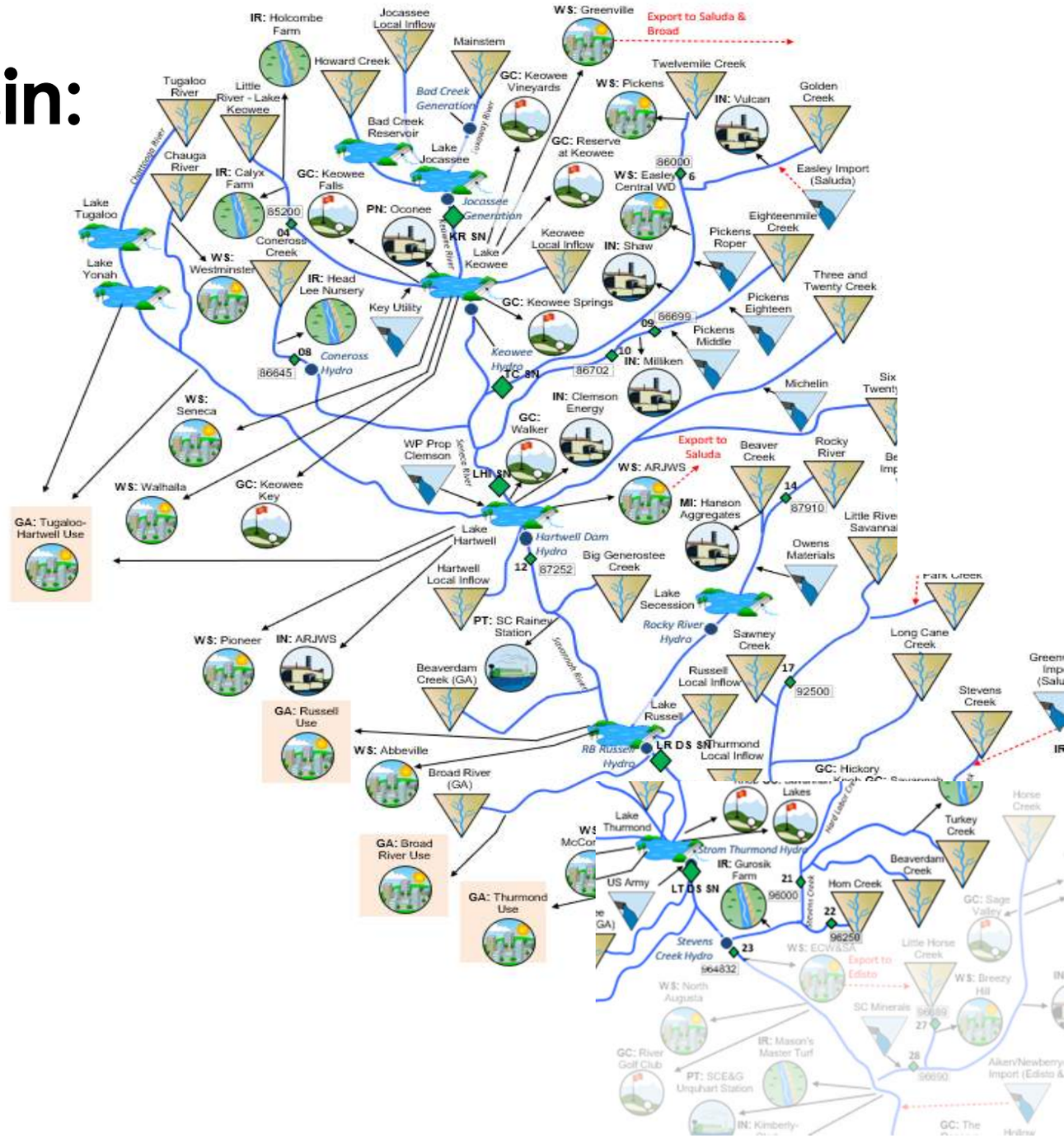
Upper Savannah River Basin:
Current Use Scenario

1 **Physical Shortage**

Surface Water Shortage Table

Map ID	Water User	Max Shortage (MGD)	Frequency of Shortage

No Shortages

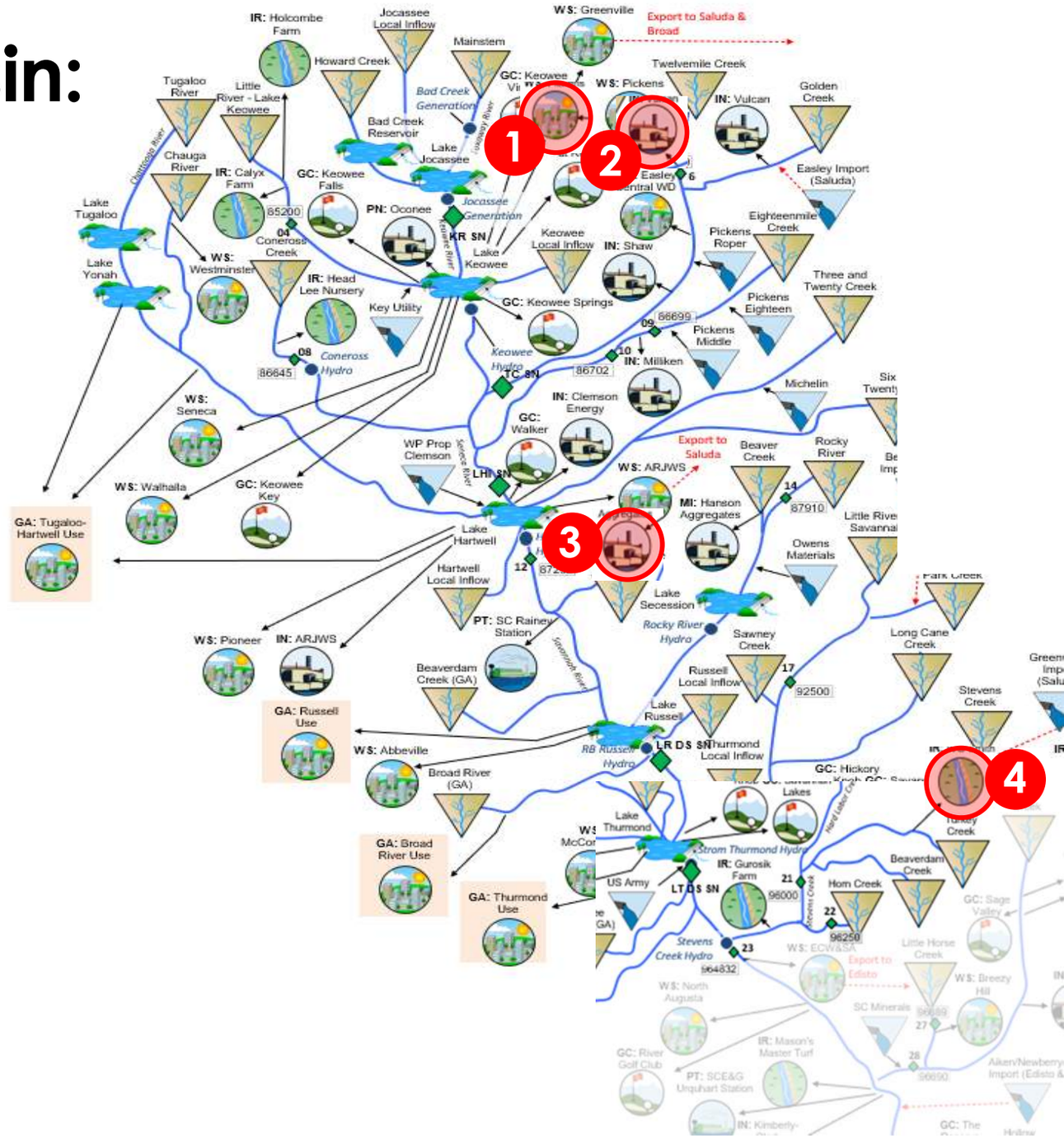


Upper Savannah River Basin: Permitted & Registered Scenario

1 **Physical Shortage**

Surface Water Shortage Table

Map ID	Water User	Max Shortage (MGD)	Frequency of Shortage
1	WS: Pickens	4.5	7%
2	IN: Vulcan	1.3	11%
3	MI: Hanson Aggregates	0.6	3%
4	IR: WG Smith	0.1	1%



2070 Moderate and High Demand Scenarios

Upper Savannah River Basin - Summary of Average Annual Surface Water Demands by Scenario

All values in million gallons per day

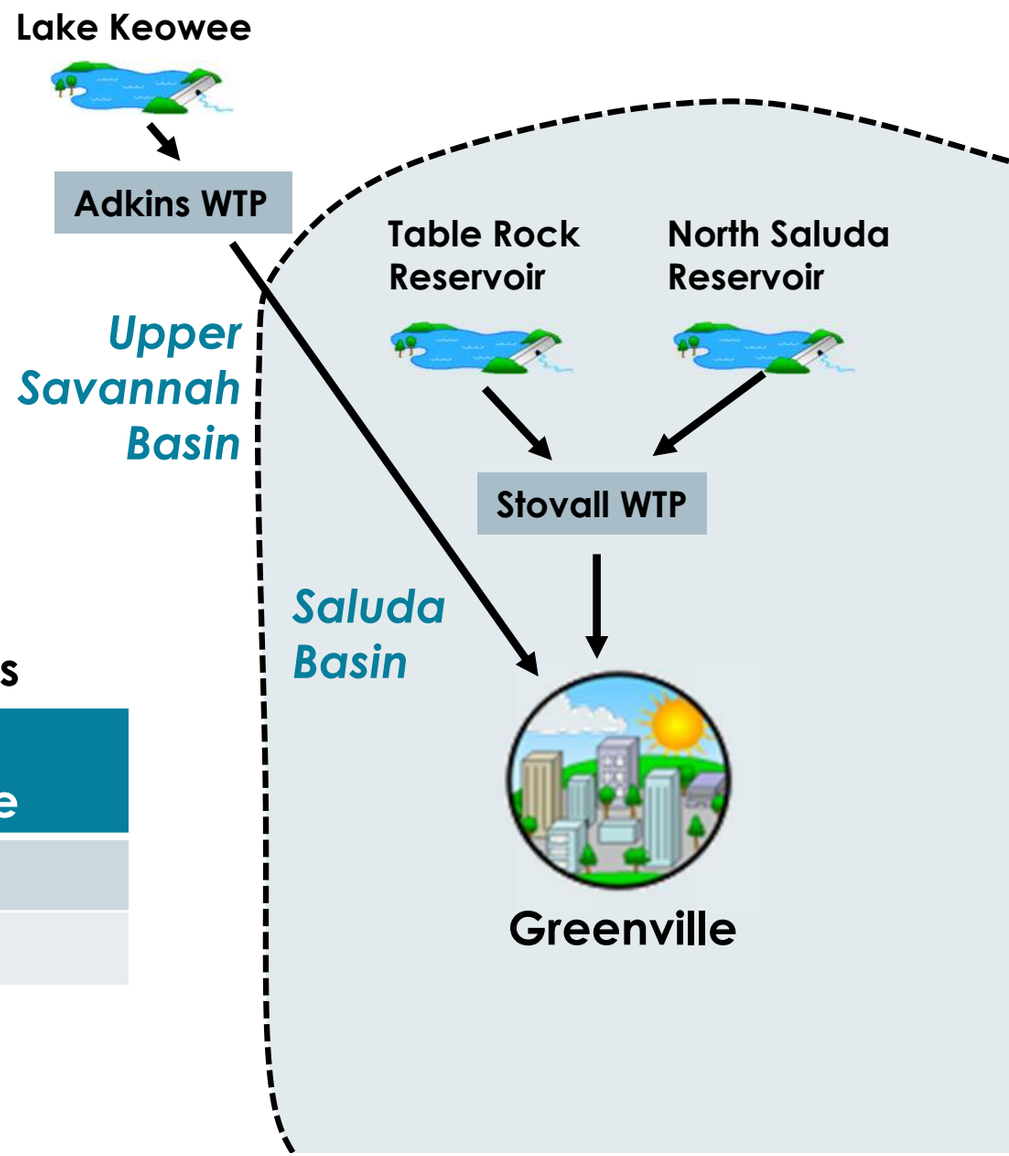
Surface Water Use Sector	Current Use	2070 Moderate Demand	2070 High Demand	Permitted and Registered (P&R)
Thermoelectric/ Nuclear Power[1]	28	28	31	48
Public Water Supply	59	118	168	284
Industrial	8.0	11	20	53
Golf Courses	0.8	0.7	1.5	9.8
Agricultural	0.21	0.24	0.45	13.0
Mining	0.27	0.16	0.51	1.0
GA-Side Water Users	22	30	30	65
Total all Sectors	118	187	252	470

[1] *In this table, demands for thermoelectric/nuclear power represent the NET consumptive amount.*

Notes on Greenville Water Demands

Reservoir or Water Treatment Plant	Permitted Withdrawal	Current Firm Capacity	Planned Firm Capacity by 2070
Table Rock Reservoir	67		
North Saluda Reservoir	60		
Total	127		
Stovall WTP		75	75
Lake Keowee	150		
Adkins WTP		60	150
Total		135	225

All values in MGD



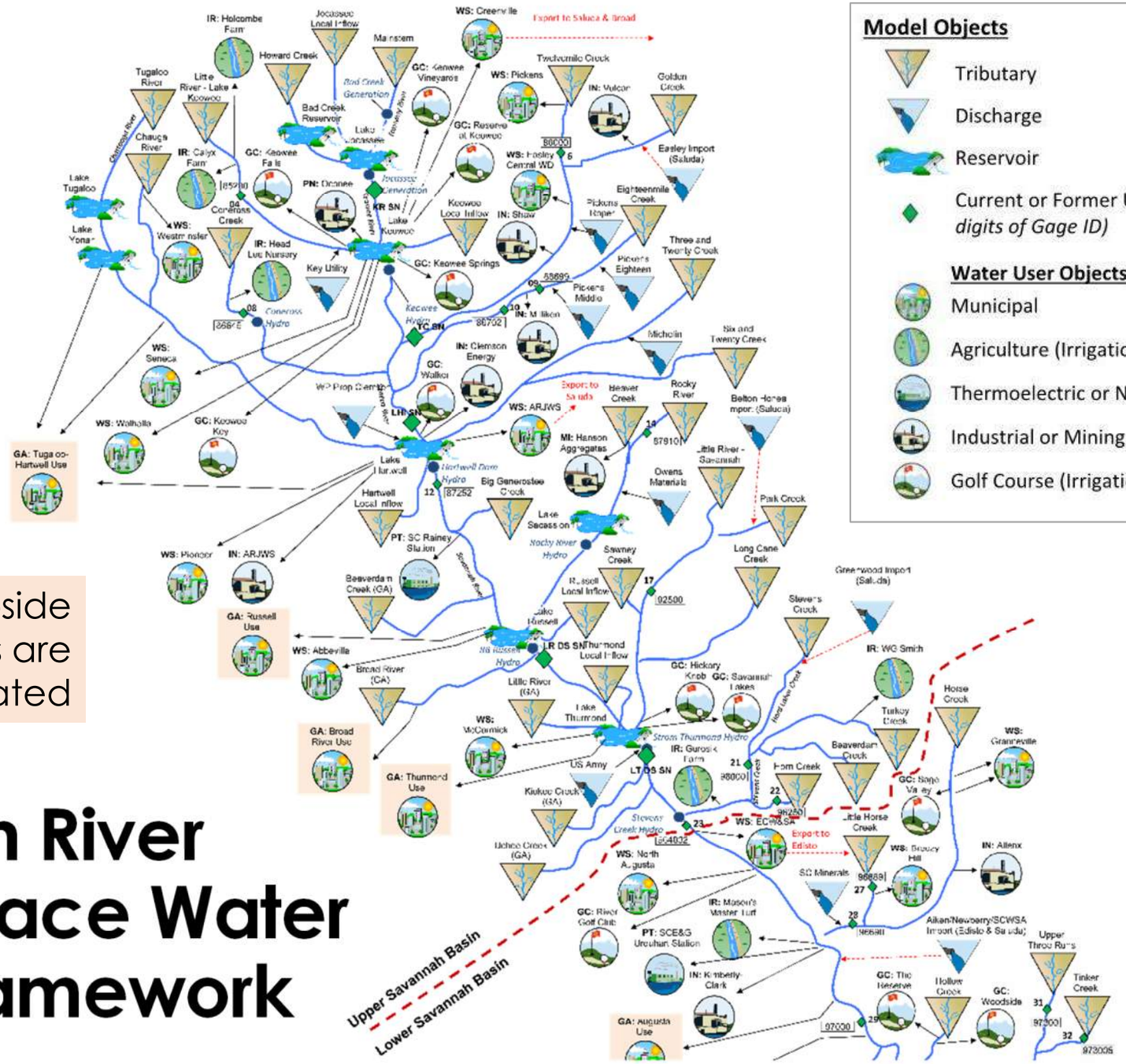
Average Annual Water Demand Projections

2070 Scenario	Total Greenville	Saluda Basin Reservoirs	Lake Keowee
Moderate	106.2	33.8	72.4
High	139.3	33.8	105.5

All values in MGD

Georgia-side withdrawals are Aggregated

Savannah River Basin Surface Water Model Framework



Model Objects

- Tributary
- Discharge
- Reservoir
- Current or Former USGS Stream Gage *(with last 5 to 6 digits of Gage ID)*

Water User Objects

- Municipal
- Agriculture (Irrigation)
- Thermoelectric or Nuclear
- Industrial or Mining
- Golf Course (Irrigation)

- Import or Export (Interbasin Transfer)
- Discharge from a Groundwater User*

** The associated Water User Object does not have a Surface Water Withdrawal.*

Upper Savannah River Basin: Future Demand Projections for GA-Side Water Users

- GA-side withdrawals are consolidated into 9 water user objects, 4 of which are in the Upper Savannah portion of the model.
- GA Regional Water Plans provide projected demands from 2020 through 2060 by county and sector (Municipal, Agricultural, Industrial, and Energy).
- The 2070 demand for each GA-side water user in the model was calculated as a weighted average of the projected growth for the facilities that make up that water user multiplied by the baseline scenario demands. This was applied to both the **Moderate** and **High Demand Scenarios**.
    - Annual growth was calculated based on demand change from 2020 to 2060, and the same annual growth was extended through 2070.

Upper Savannah River Basin: Future Demand Projections for GA-Side Water Users

- GA: Broad River Use is driven by municipal demand growth in Jackson County (City of Commerce) and Banks County.
- The City of Toccoa makes up nearly half (14% of 30%) of the growth projected for GA: Tugaloo-Hartwell Use.
- GA: Russell Use future demand reflects small demand growth by the City of Elberton.
- While GA: Thurmond Use growth is driven by the Columbia County Water System, less(even negative) demand growth is projected for other municipal facilities included in this water user.

GA-Side Water User 2070 Projected Demands

Model Water User *	Baseline Average Annual Demand (MGD)	Growth from 2021 to 2070 (%)	2070 Projected Average Annual Demand (MGD)
GA: Brier Creek Use	3.5	1%	3.5
GA: Broad River Use	3.1	122%	6.9
GA: Tugaloo-Hartwell Use	11.4	30%	14.8
GA: Augusta Use	56.5	3%	58.3
GA: S. Augusta Use	47.5	0%	47.5
GA: Plant Vogtle	43.4	95%	84.6
GA: Russell Use	1.5	1%	1.5
GA: Thurmond Use	5.8	15%	6.7
GA: Effingham Use	20.1	24%	25.0

*** Water Users shown in Gray are located within the Lower Savannah portion of the model.**

Upper Savannah River Basin: Future Demand Projections for GA-Side Water Users

Example:

GA: Broad River 2070 Projected Demand Calculations

Facility Name	County	Sector	% Growth from 2021 to 2070	% of Model Object Baseline Demand
Banks County Board of Commissioners	Banks	Municipal	105%	24%
Commerce, City of	Jackson	Municipal	138%	58%
Crawford, City of	Oglethorpe	Municipal	333%	4%
Royston, City of	Franklin	Municipal	39%	10%
Turner Concrete Company	Madison	Industrial	0%	5%
GA: Broad River Water User Object Growth			122%	
Average Annual Baseline Demand (MGD)			3.1 MGD	
Average Annual 2070 Demand (MGD)			6.9 MGD	

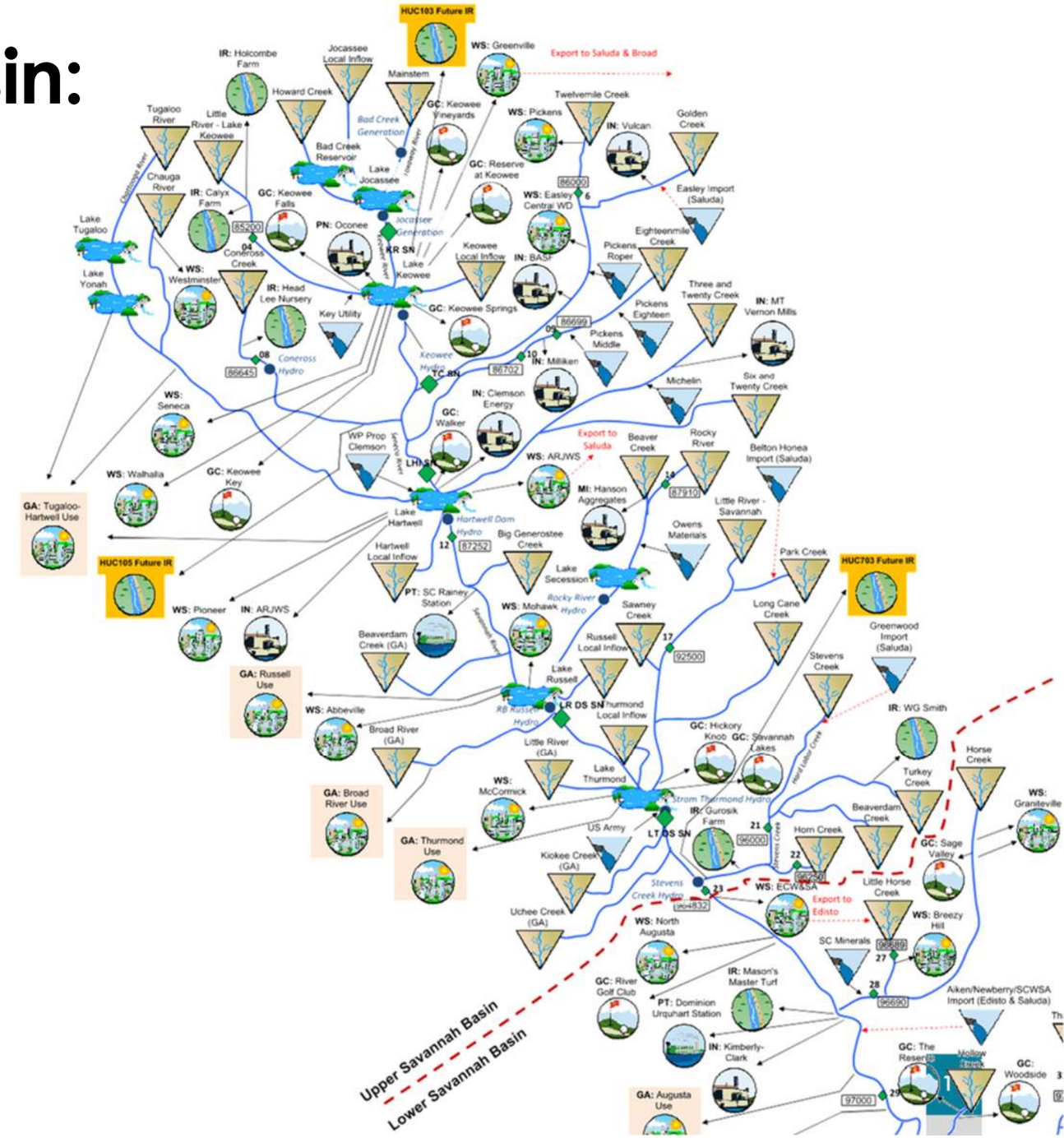
Upper Savannah River Basin:
2070 Moderate Demand Scenario

1 **Physical Shortage**

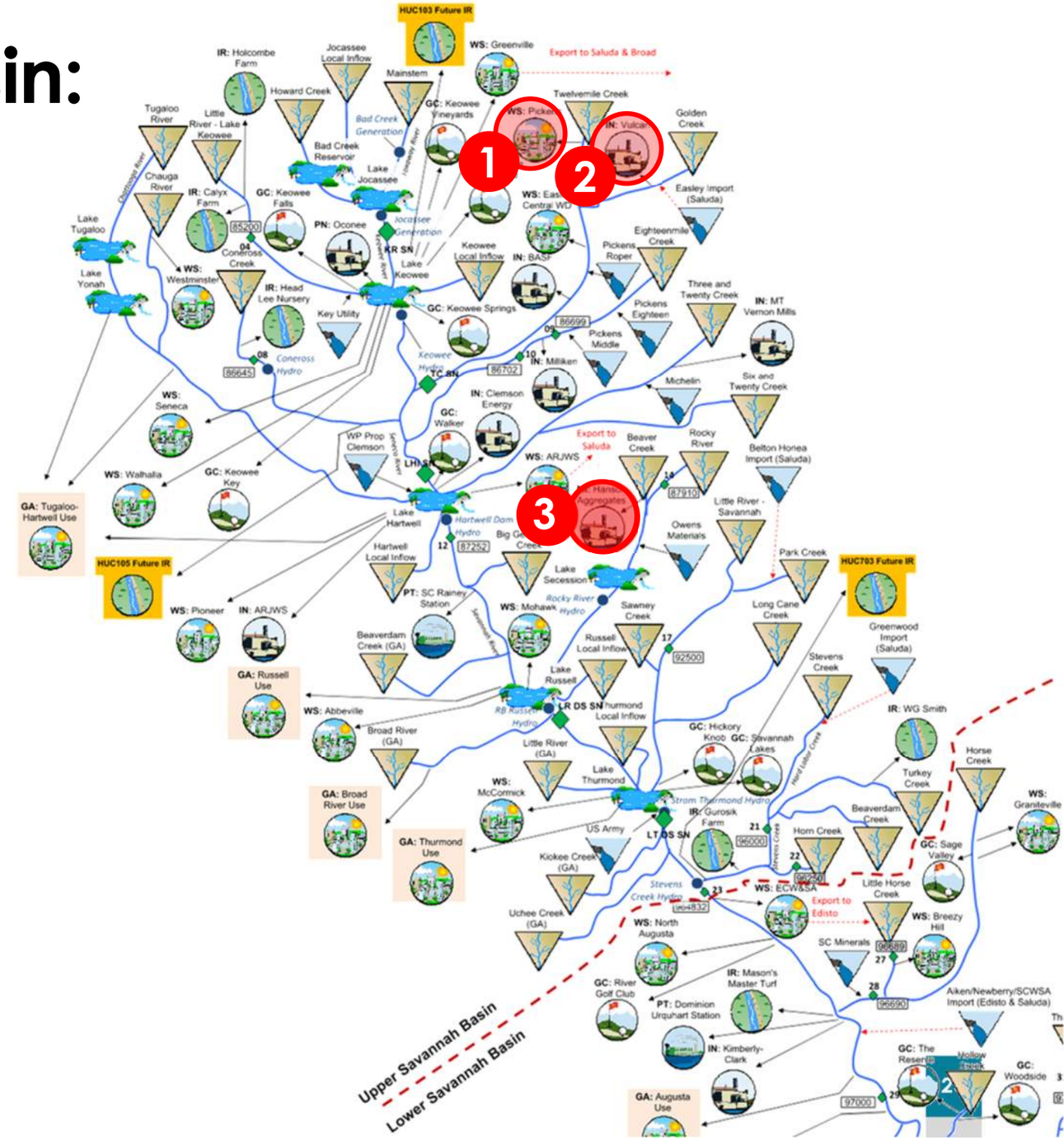
Surface Water Shortage Table

Map ID	Water User	Max Shortage (MGD)	Frequency of Shortage

No Shortages



Upper Savannah River Basin:
2070 High Demand Scenario

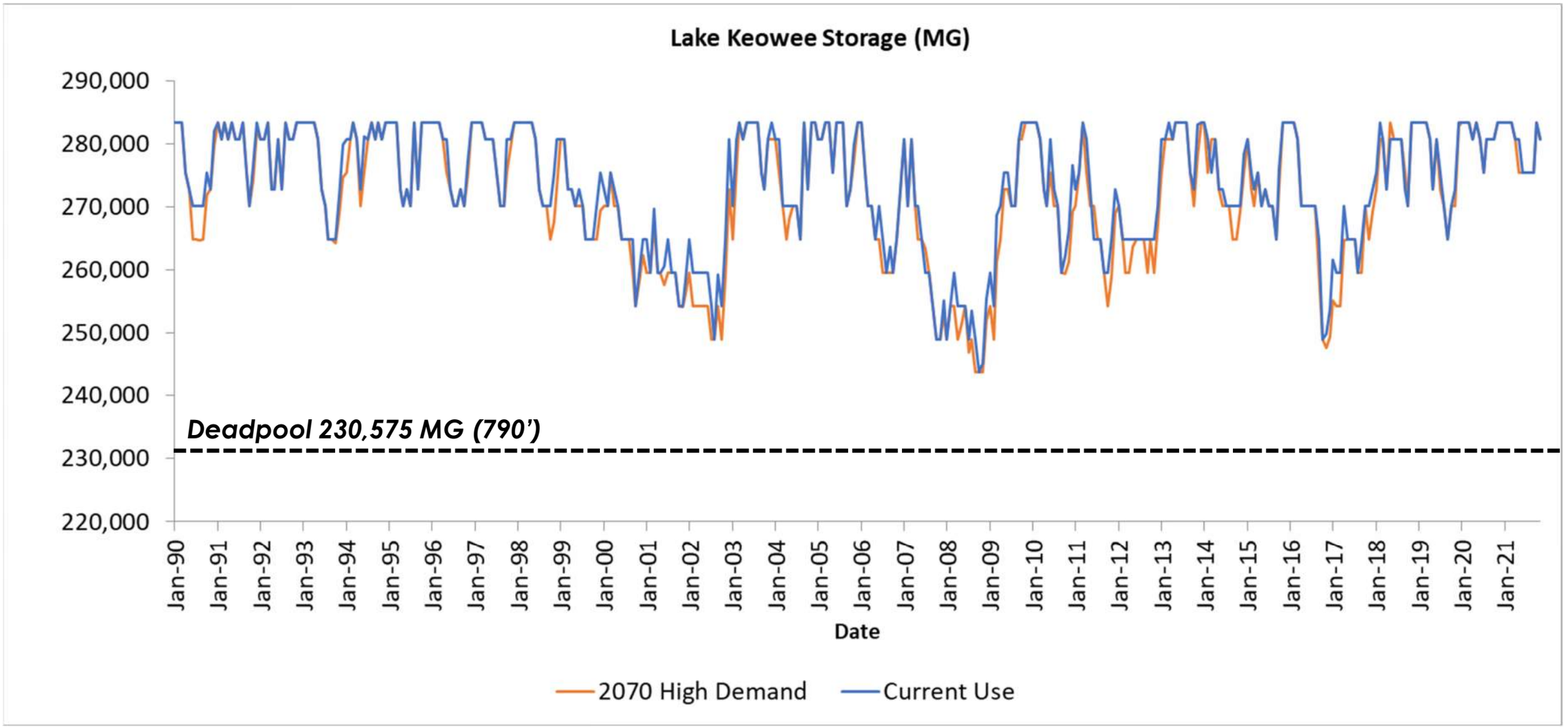


1 **Physical Shortage**

Surface Water Shortage Table

Map ID	Water User	Max Shortage (MGD)	Frequency of Shortage
1	WS: Pickens	1.0	0.4%
2	IN: Vulcan	2.5	12%
3	MI: Hanson Aggregates	0.3	1%

Reservoir Storage Plots (recent drought periods)
Lake Keowee



Reservoir Storage Plots (recent drought periods)
Lake Hartwell