



# SWAM Model Evaluation of Drought Plans

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*Agenda Item 4*

# Updates to the Savannah Model

- Updated stage storage curves for Hartwell, Russell and Thurmond based on recent survey information provided in the ***Hartwell Lake Integrated Water Supply Storage and Reallocation Report*** (USACE March 2024).
  - Reported **Decrease** in Conservation Storage since construction due to sedimentation:
    - Lake Hartwell: 17%
    - Lake Russell: 19%
    - Lake Thurmond: 4%
- Lake Hartwell, Russell and Thurmond “rule sets” were updated to reflect the new stage-storage curves

# Updates to the Savannah Model

- Updated model code to allow Lake Thurmond to continue minimum releases if the lake dropped below the conservation pool. This was done by setting the Thurmond deadpool to 0 MG and applying an **inactive storage limit** to the lake Thurmond water users, which allows them to withdrawal water only when the lake is above 312 feet.

The screenshot displays the 'Water User' configuration window with the following details:

- Source Stream:** Mainstem
- Source Water Type:** Reservoir (selected)
- Diversion Location:** 131.4959869 (mi)
- Priority Date:** 2/25/1900
- Diversion Capacity:** 10000000 (CFS)
- Permit Limit:** 88.7 (MGM)
- Permit Options:**  Seasonal Permit,  Minimum Flow Requirements,  Storage Withdrawal Permit
- Storage Section:**
  - Reservoir Name:** Lake Thurmond
  - (MG) Inactive Storage:** 457299
  - (MG) Storage Capacity:** 1
  - (MGY) Storage Right:** 100000000000
  - Water Year Start Mo. (1 - 12):** 1
  - Carry Over Rule

Identifying Notes: permit limit of 88.7 MGM. Inactive storage volume set to 457299 MG to eliminate user withdrawals below 312 ft (bottom of Lake Thurmond conservation pool).

# Example Drought Plan Triggers

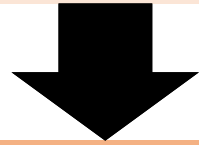
Water Supplier	Year	Water Source	Drought Indicator / Trigger Types
Abbeville Public Water System <sup>2</sup>	2003	Surface Water - Lake Russell	<p><b>Lake Russell is 4.5 feet, 7 feet, or 10 feet below full pool.</b></p> <p>The upper water intake screen at Raw Water Pump Station is only partially submerged, the upper raw water intake is completely out of the water, or the lower raw water intake is only partially submerged.</p> <p>Average daily flow is greater than 4.5 MGD for 3, 10, or 14 consecutive days.</p> <p>Reservoir is completely full.</p> <p>There are 3 days or 1 day of supply remaining.</p>
Anderson Regional Joint Water System (ARJWS)	2008	Surface Water - Lake Hartwell	<p><b>Reservoir at 652, 646, or 638 feet mean sea level (msl).</b></p> <p>Average daily demands greater than 80%, 90%, or 95% of rated treatment capacity for 3 consecutive days.</p> <p>Equipment failure that impacts 10%, 15%, or 25% of plant capacity.</p>
McCormick Commission of Public Works (CPW)	2003	Surface Water and Groundwater - Strom Thurmond Reservoir, 630-foot deep well	<p><b>Strom Thurmond Lake is 5, 10, or 15 feet below full pool.</b></p> <p>Average daily flow is greater than 2.0 MGD for 3, 10, or 14 consecutive days.</p> <p>Reservoir is completely full.</p> <p>Two feet of water above all raw water intakes at Lake Thurmond, one raw water intake inlet above lake level, or two raw water intake inlets above lake level.</p>
Seneca Light and Water <sup>3</sup>	2008	Surface Water - Lake Keowee	<p><b>Storage falls below 35 percentage of capacity.</b></p> <p>Average daily use greater than 12 MGD for 2 consecutive days.</p> <p>Reservoir at 15 feet or 20 feet below full.</p>

*Not shown are Greenville Water's Drought Plan triggers. Greenville Water updated their Plan in 2024.*

# Typical Drought Ordinance

## Moderate Drought Phase Goal of 15% Overall Reduction in Water Use

- ✓ Request voluntary conservation measures



## Severe Drought Phase Goal of 20% Overall Reduction in Water Use

- ✓ Request more stringent voluntary conservation measures enact some mandatory restrictions



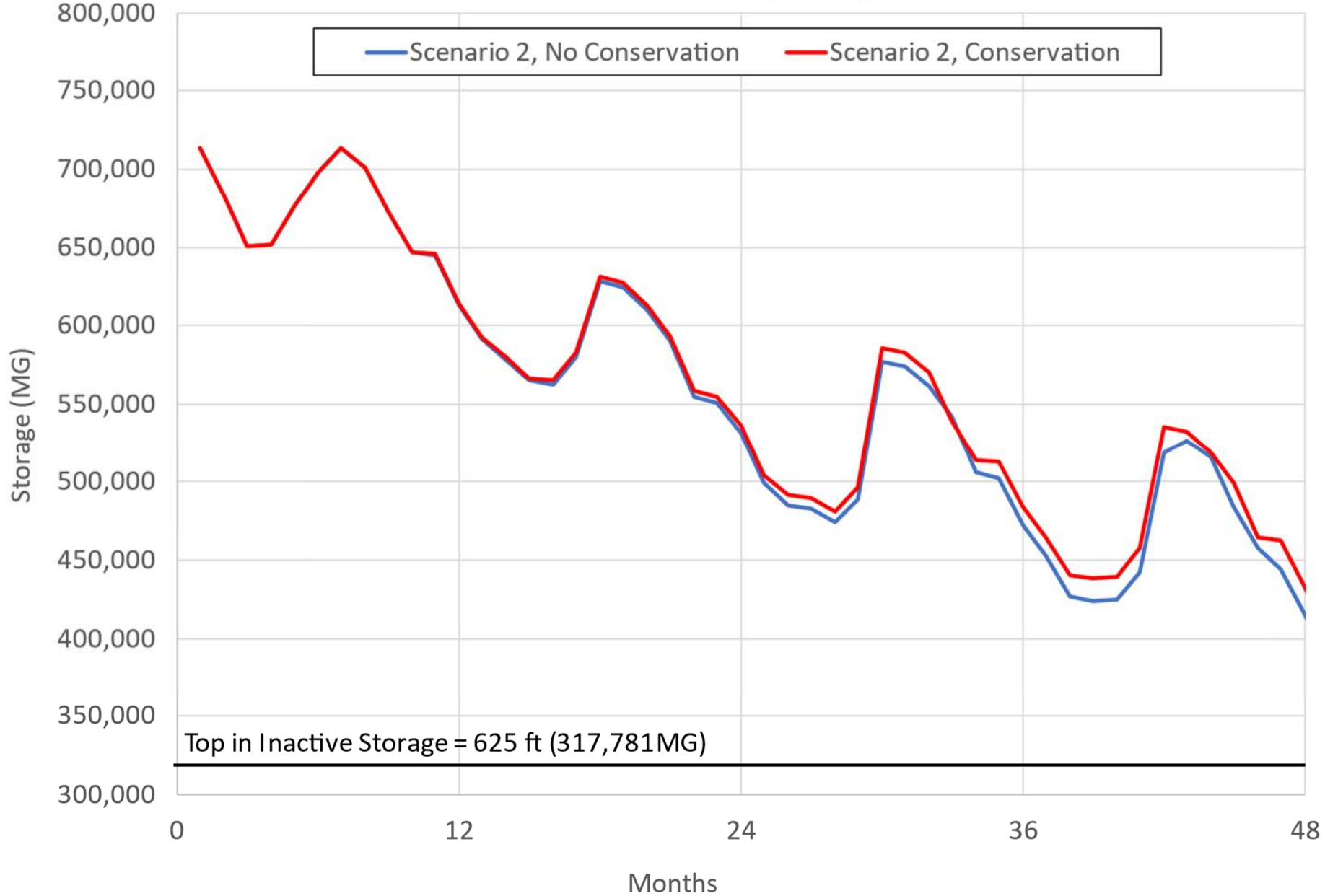
## Extreme Drought Phase Goal of 25% Overall Reduction in Water Use

- ✓ Enact additional mandatory restrictions, impose excessive use rate schedule

# Example: ARJWS Drought Plan

Scenario	Frequency of Time ARJWS Drought Plan Demand Reductions are Triggered
Current Use	0.7%
2070 High Demand	1.7%
Permitted and Registered	5.6%
First 4 years of Drought Scenario 2 (Repeating 2008 Drought)	64.6%

Lake Hartwell Storage (MG)



## Example: Lake Hartwell Storage

**Drought Plan Rules**  
**VS.**  
**No Drought Plan**  
**Rules**

# Comparison of Drought Plan Demand Reductions to Reservoir Storage

Water User	Source Water	Summer Conservation Pool Storage (MG)	Average Annual Demand in the 2070 High Demand Scenario (MGD)	Daily Demand as Percentage of Summer Conservation Pool Storage	Demand after a 25% Conservation Reduction (MGD)	Reduction in Daily Demand (MGD)	Reduction in Daily Demand as a Percentage of Conservation Pool Storage
Seneca	Lake Keowee	52,714	9.5	0.02%	7.1	2.4	0.005%
Greenville			104.1	0.20%	78.1	26.0	0.049%
ARJWS	Lake Hartwell	395,663	36.2	0.01%	27.2	9.1	0.002%
Abbeville	Lake Russell	34,714	3.8	0.01%	2.9	1.0	0.003%
McCormick	Lake Thurmond	345,328	1.9	0.00%	1.5	0.5	0.0001%
	<b>Total:</b>	<b>828,419</b>	<b>155.6</b>	<b>0.02%</b>	<b>116.7</b>	<b>38.9</b>	<b>0.005%</b>