

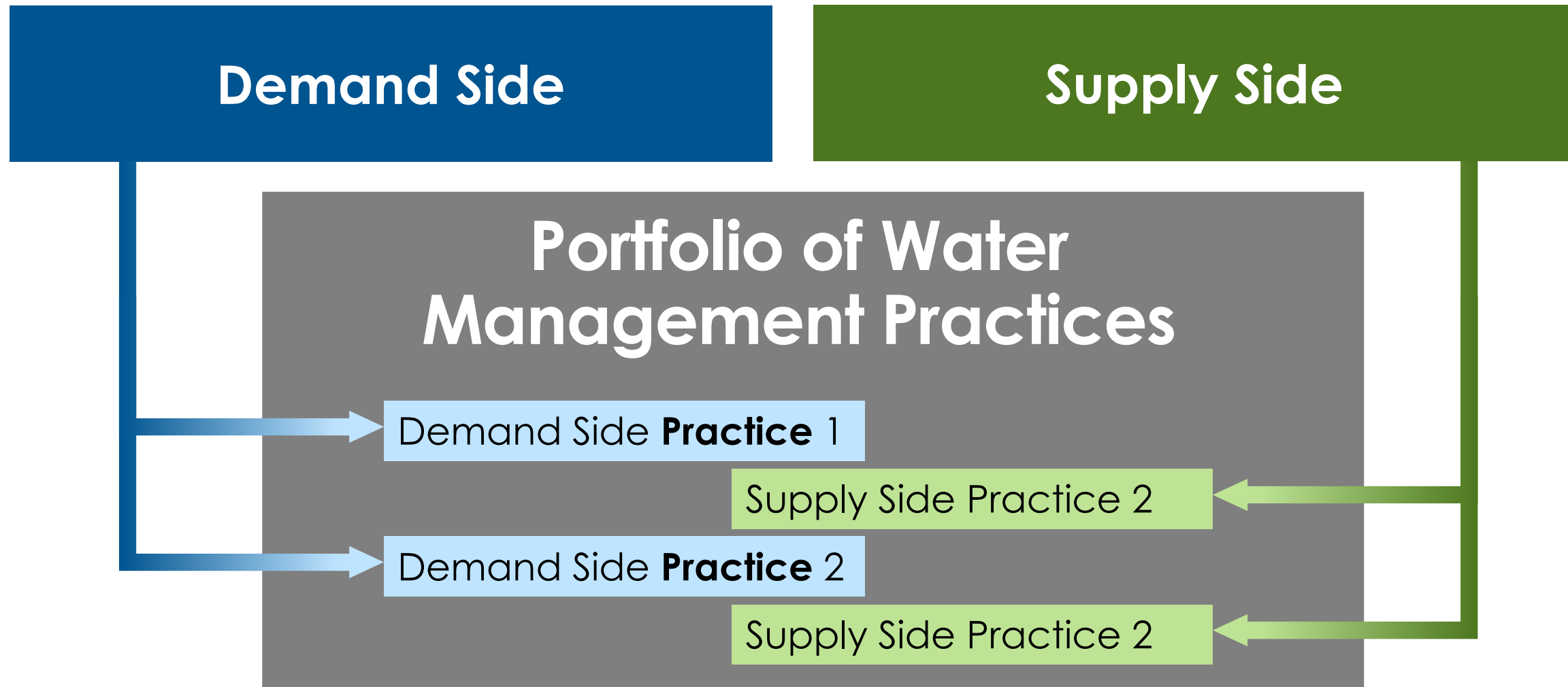
Introduction to Water Management Strategies

John Boyer

Planning Framework Definitions

- **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.
- **Groundwater Management Strategy** – a water management strategy proposed to address a Groundwater Area of Concern or Groundwater Shortage.
- **Groundwater Area of Concern** – an area in the Coastal Plain, designated by an RBC, where groundwater withdrawals from a specified aquifer are causing or are expected to cause unacceptable impacts to the resource or to the public health and well-being.

Water Management Strategies



Water Management Strategies

Demand Side Strategies

Municipal conservation

Ag/Irrigation conservation

Example Practices

Water loss control programs
Low flow fixtures, toilets and appliances
Pricing structures (ex. increasing block rates)
Recycled water programs
Public education

Water audits and center pivot sprinkler retrofits
Cover cropping, conservation tillage, mulch
Soil Moisture sensors/smart irrigation
Crop selection
Irrigation scheduling
Drip/Trickle irrigation (for select crops)

Water Management Strategies

Demand Side Strategies

Industrial conservation

Thermoelectric
conservation

Example Practices

Water reuse and recycling
Water efficient processes
Water loss control
Low flow fixtures, toilets and appliances

Water reuse and recycling
Switch to combined-cycle natural gas
Energy saving appliances (which reduces thermoelectric generation needs)

Water Management Strategies

Supply Side Strategies

New or Increased Storage

Example Practices

New impoundments, ponds, reservoirs, tanks
Dredging (pond deepening)
Reservoir expansion (raising dam height)
Aquifer storage and recovery (ASR)

Water Reclamation

Water reuse systems (non-potable)
Direct potable reuse
Stormwater capture and treatment

Conjunctive Use

Using groundwater to augment surface water during low flow periods

Water Management Strategies

Supply Side Strategies

Conveyance

Example Practices

Regional water systems
Utility interconnections
Interbasin transfers

Water Management Strategies

Examples from SC, NC and GA



Water Conservation Strategies

Town of Cary, NC (pop. 175,000)



- **Since 1999, the Town has implemented:**
 - 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
 - Reclaimed water program
- Conservation strategies have helped reduce per capita water demand from **114 gpcd in 2001** to **81 gpcd in 2016 (a 29% reduction in per capita demand)**

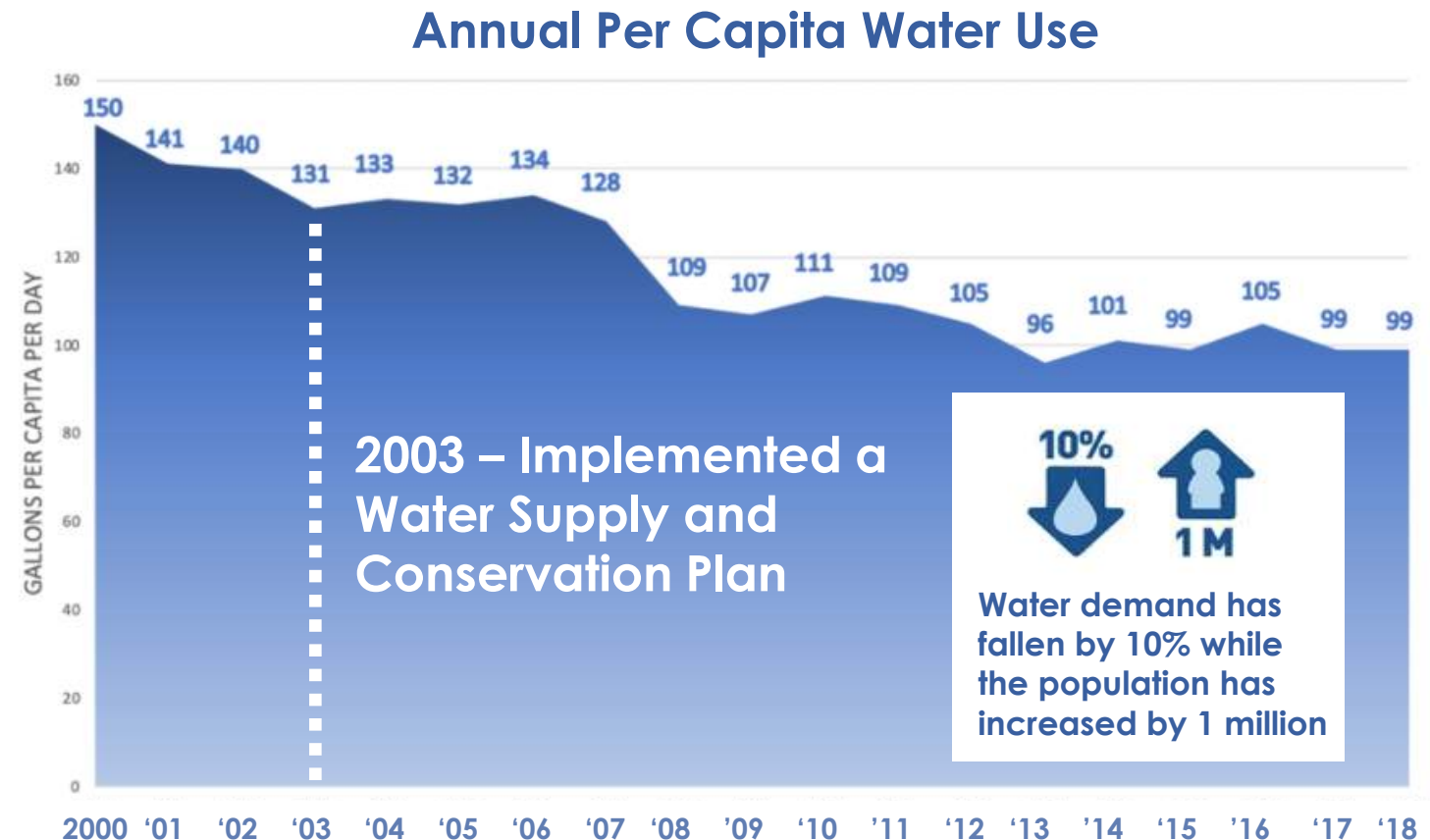
Water Conservation Strategies

Metro North Georgia Water Planning District

Example Water Conservation & Efficiency measures implemented:

- Conservation pricing structures
- Toilet rebate program
- Landscape irrigation program
- Leak detection and water loss control programs
- Car wash recycling ordinances
- Public education

Conservation strategies have helped reduce per capita water demand from 131 gpcd in 2003 to 99 gpcd in 2018 (**a 24% reduction in per capita demand**)

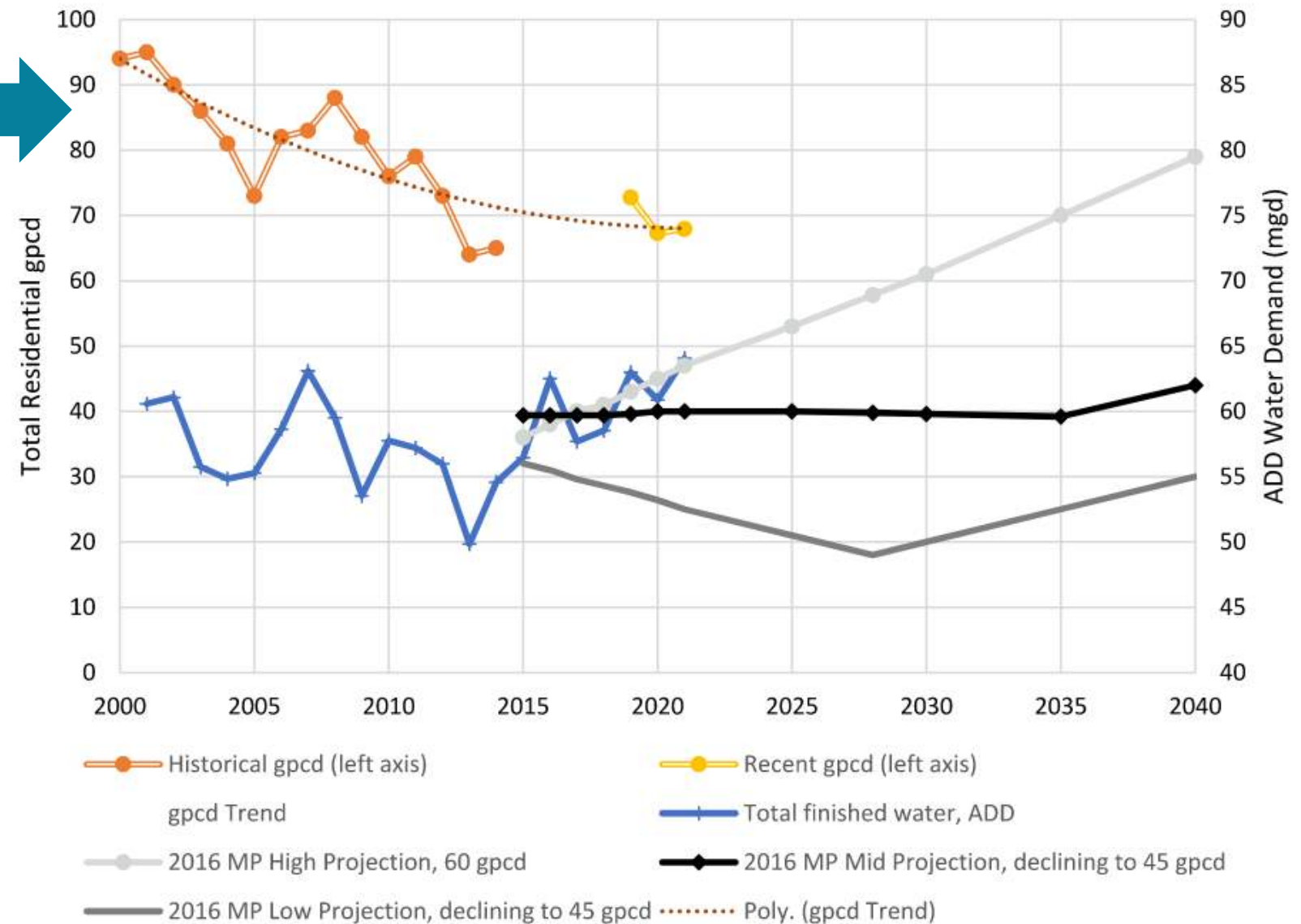


Sources: Metropolitan North Georgia Water Resource Management Plan, June 2017 and <https://northgeorgiawater.org/current-water-stats/water-withdrawals-per-capita-remain-steady/>

Greenville Water – Declining per Capita Demand

2001: 95 gpcd
2021: 68 gpcd

A 28% decrease in
residential per
capita demand



Source: Greenville Water Facility Master Plan 2022 Update, Brown & Caldwell

Water Efficiency and Water Loss Programs

How many gallons of drinking water are estimated to be lost each year in the U.S. to faulty, aging, and leaking pipes?

- A. 1.7 Billion gallons
- B. 17 Billion gallons
- C. 170 Billion gallons
- D. 1.7 Trillion gallons

Water Efficiency and Water Loss Programs

Georgia Water Stewardship Act of 2010

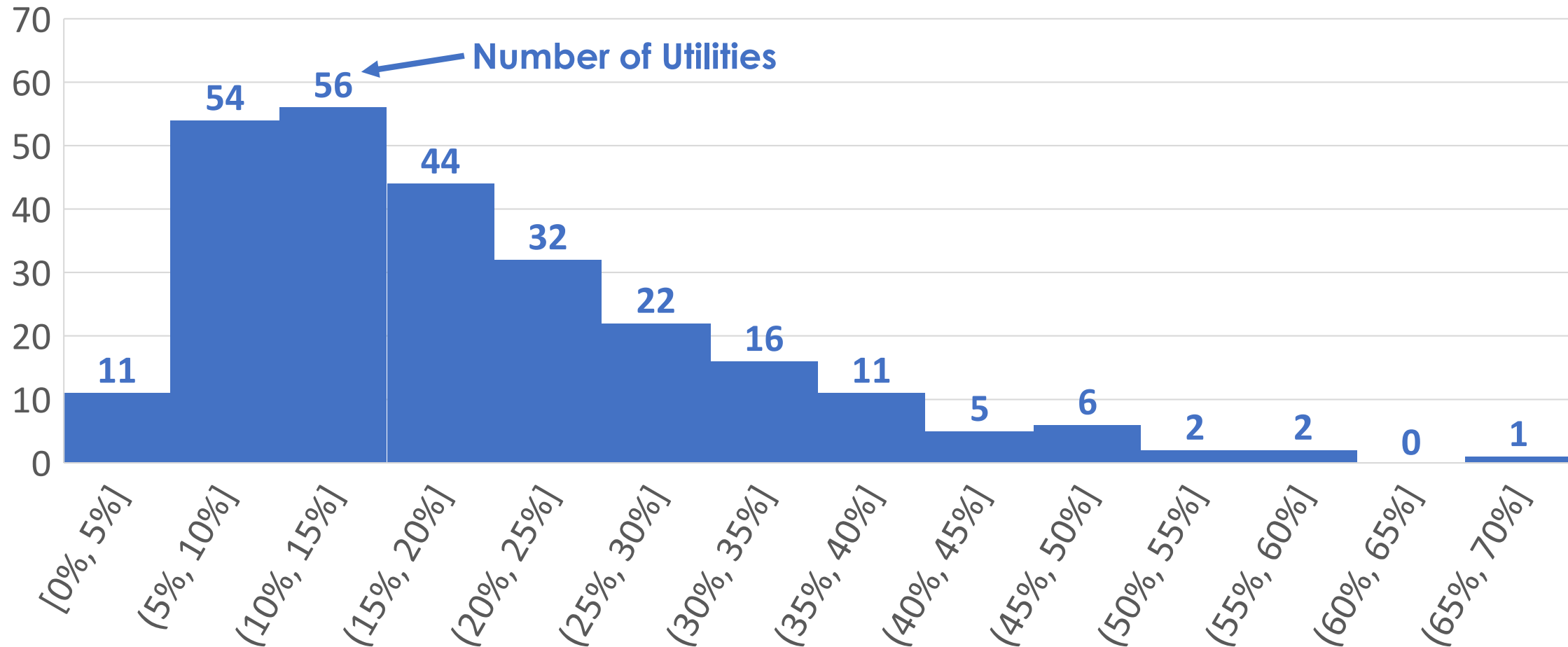
- The Act set water loss control requirements that include:
 - Completion of an Annual Water Loss Audit using AWWA M36 Methodology
 - Development and implementation of a Water Loss Control Program
 - Development of individual goals to set measures of water supply efficiency
 - Demonstration of progress 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

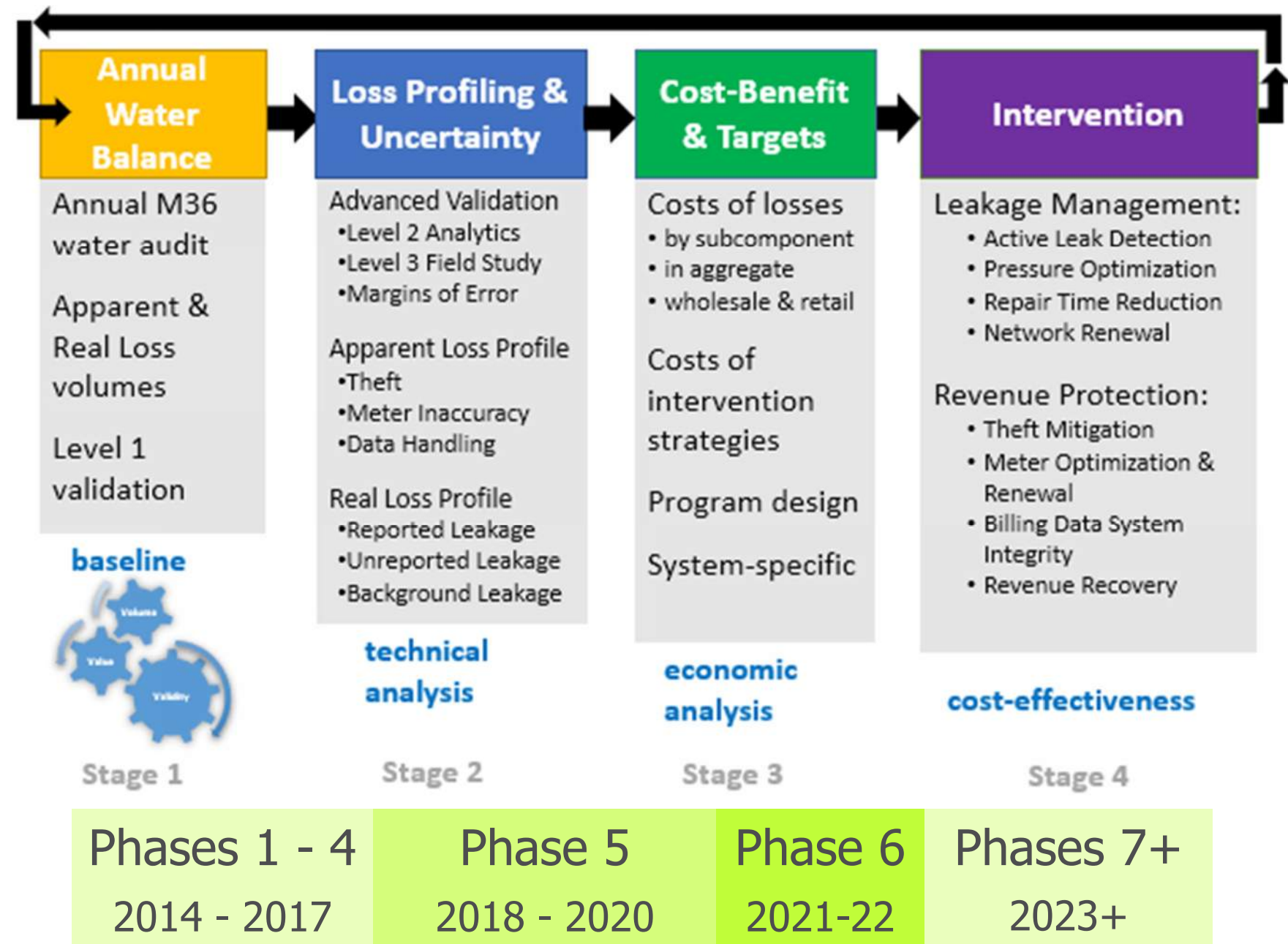


Histogram of Real Losses as a Percent of Total Water Supplied
10 Year Average for 263 Georgia Utilities

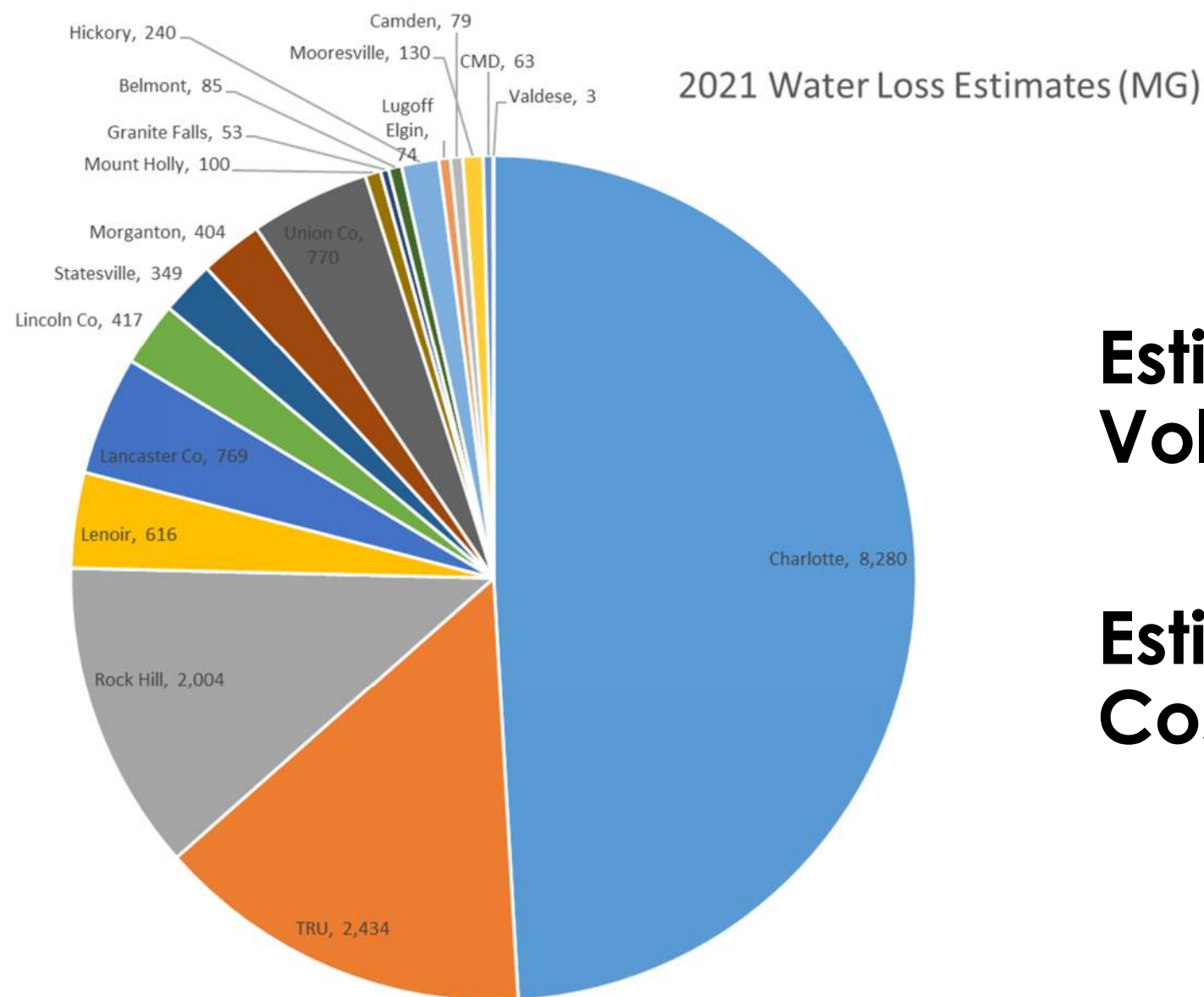


Catawba-Wateree Water Management Group (CWWMG)

Multi-phased Approach to Water Loss



CWWMG Water Loss Program PHASE 6



**Estimated Water Loss
Volume (2021): 17 BG**

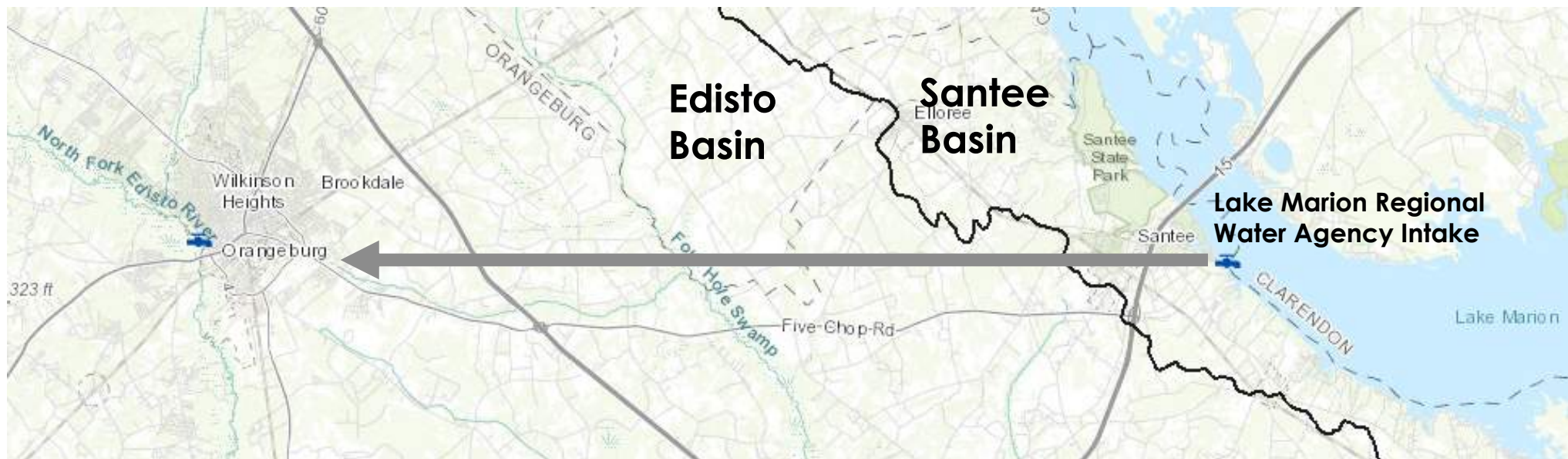
**Estimated Water Loss
Cost (2021): \$23M**

Source: Jeff Lineberger, Duke Energy and Broad RBC member

Existing Water Management Strategies in the Edisto Basin

City of Orangeburg

- Two Aquifer Storage and Recover (ASR) wells
- Interconnection with Lake Marion Regional Water System



Existing Water Management Strategies in the Edisto Basin

Walther Farms

- **Supply side** - Installed groundwater well to provide up to 20% of peak demand (conjunctive use)
- **Demand side** - Water audit/sprinkler head retrofits, eliminate end spray guns, cover cropping, dammer dikers



Existing Water Management Strategies in the Edisto Basin

Dominion Energy Cope Station Conjunctive Use of Surface and Groundwater

- Moving from 100% groundwater to a combination of surface and groundwater by 2028
- Eventually will withdrawal ~90% from surface water and ~10% from groundwater when river conditions allow
- During low flow conditions, all water use at the station will be groundwater



Existing Water Management Strategies in the Lower Savannah and Salkehatchie Basins

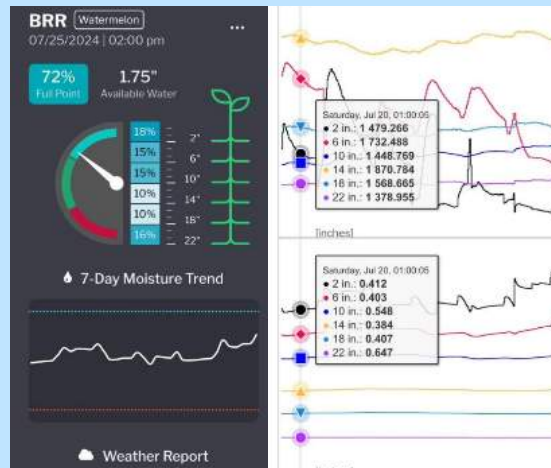
Coosaw Farms

- **Supply side** - conjunctive use of groundwater and surface water, capture excess runoff, filter stations for reuse of water
- **Demand side** – Moisture sensors for using water efficiently, micro emitters to apply water where it's needed.

Filter Stations for Water Reuse



Soil Moisture Sensors



Capture Excess Runoff



Micro Emitters

