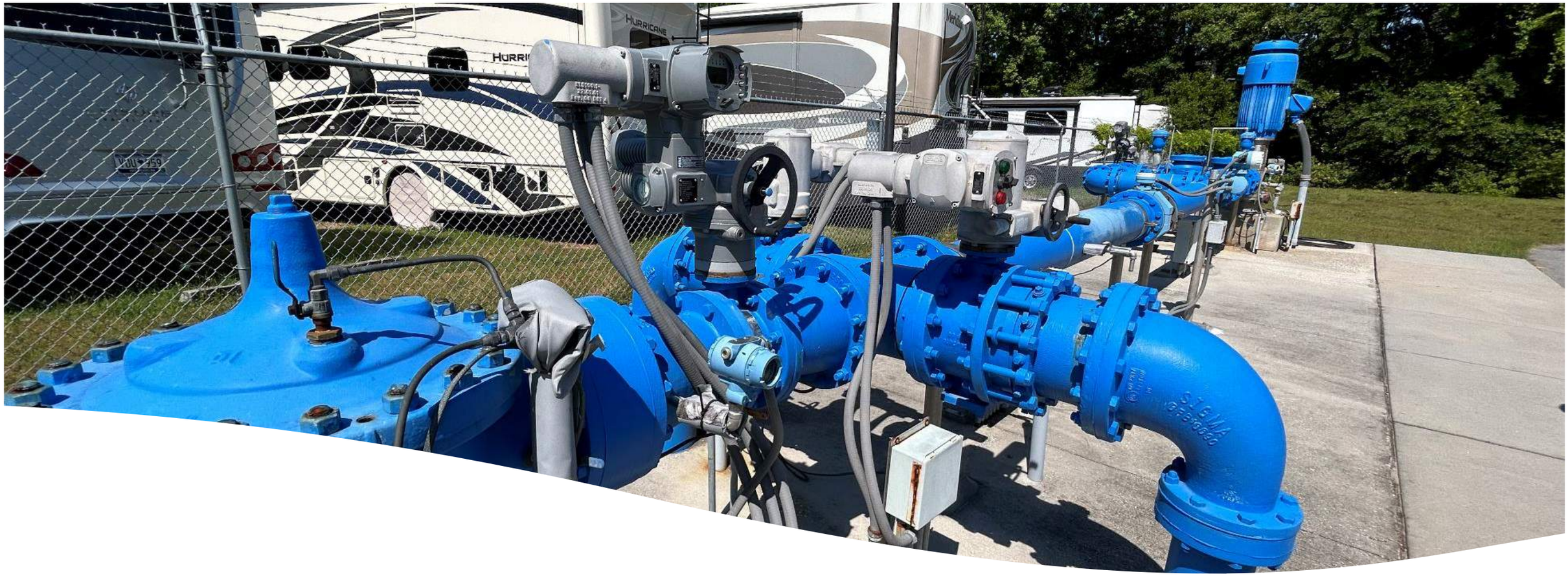


Introduction to Water Management Strategies

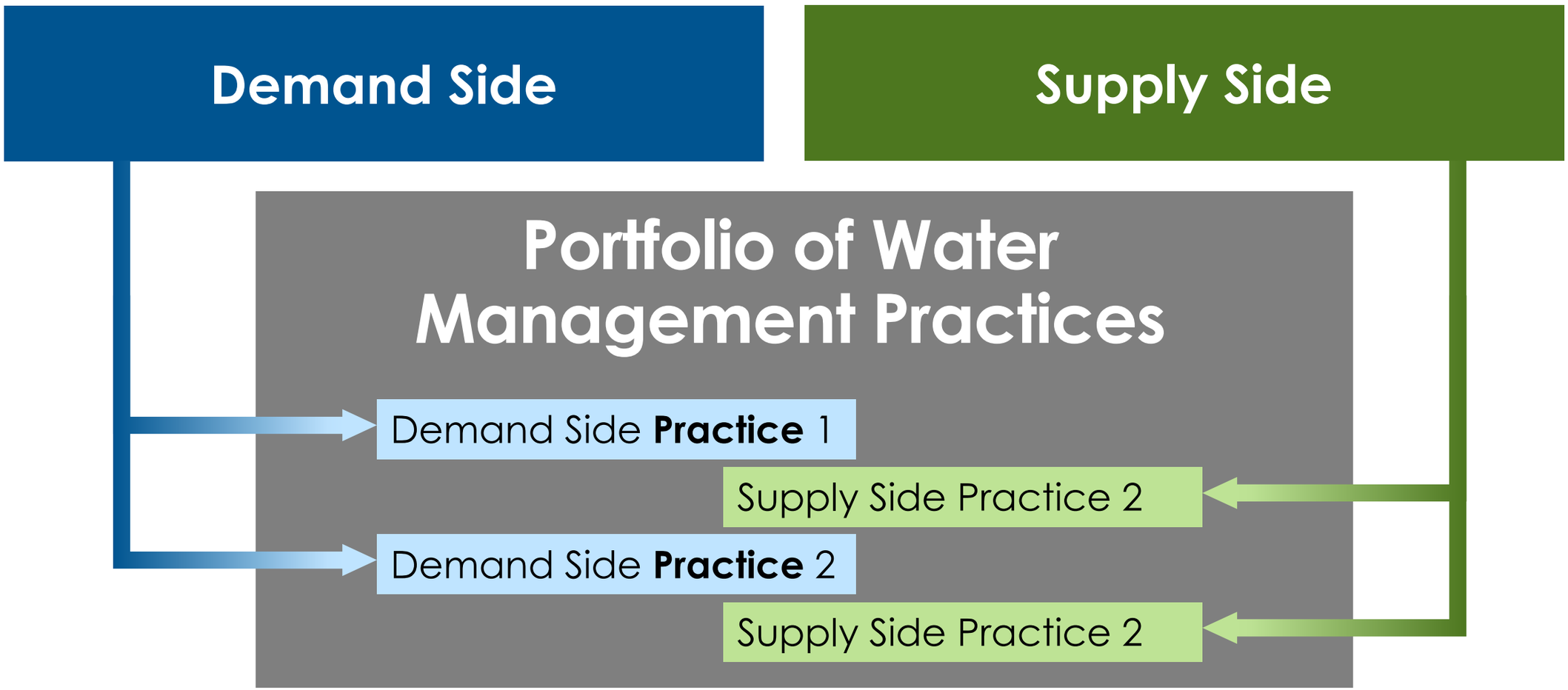
John Boyer

Agenda Item 6

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	Example Practices
Municipal conservation	Water loss control programs Low flow fixtures, toilets and appliances Pricing structures (ex. increasing block rates) Public education
Ag/Irrigation conservation	Water audits and center pivot sprinkler retrofits Dammer dikers 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	Example Practices
Industrial conservation	Water reuse and recycling Water efficient processes Water loss control Low flow fixtures, toilets and appliances
Thermoelectric conservation	Reclaimed water Switch to combined-cycle natural gas Energy saving appliances (which reduces thermoelectric generation needs)

Water Management Strategies

Supply Side Strategies	Example Practices
New or Increased Storage	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	Example Practices
Conveyance	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

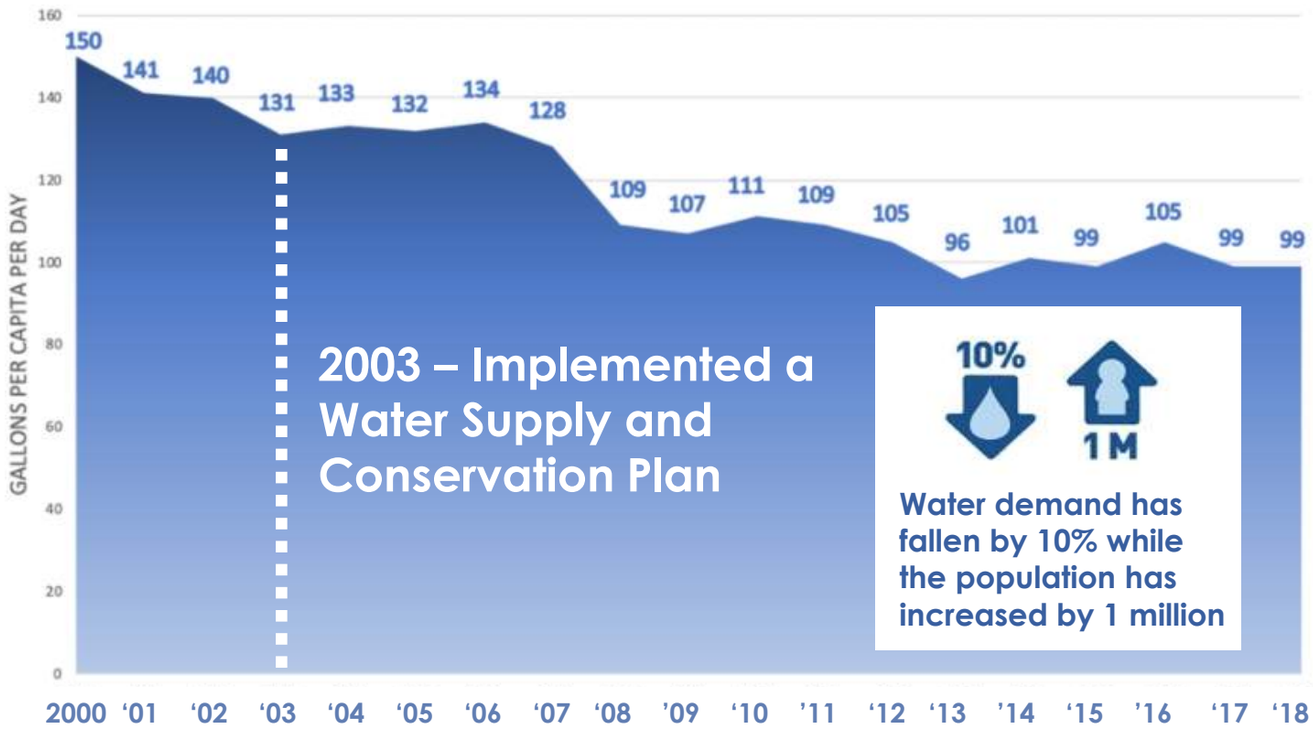
Metro North Georgia Water Planning District

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)**

Annual Per Capita Water Use

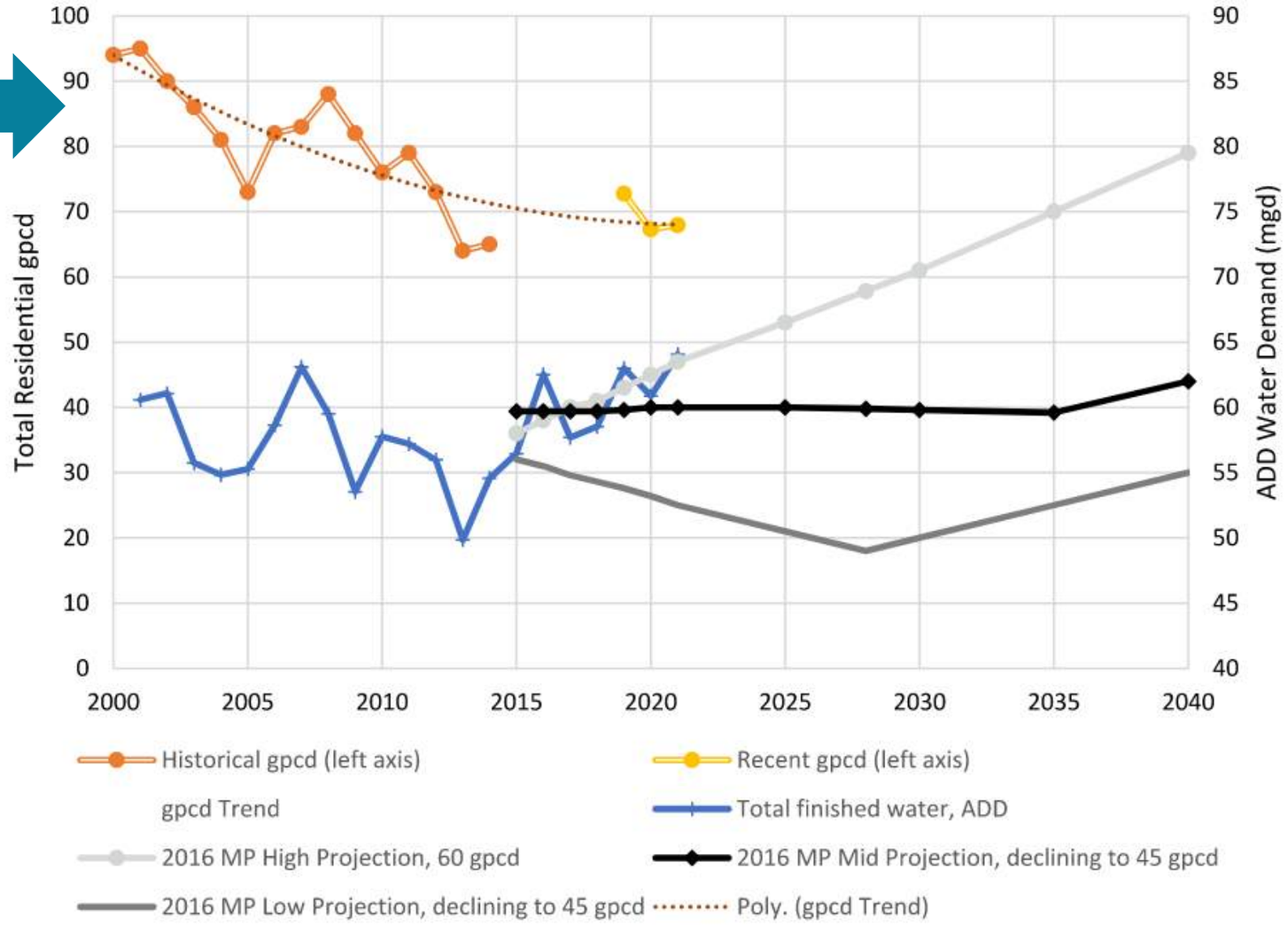


Sources: Metropolitan North Georgia Water Resource Management Plan, June 2017 and https://northgeorgiawater.org/current-water-stats/water-withdrawals-per-capita-remain-steady/

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

Assuming:

- The average person uses 82 gpd,
- US Population is 346,000,000

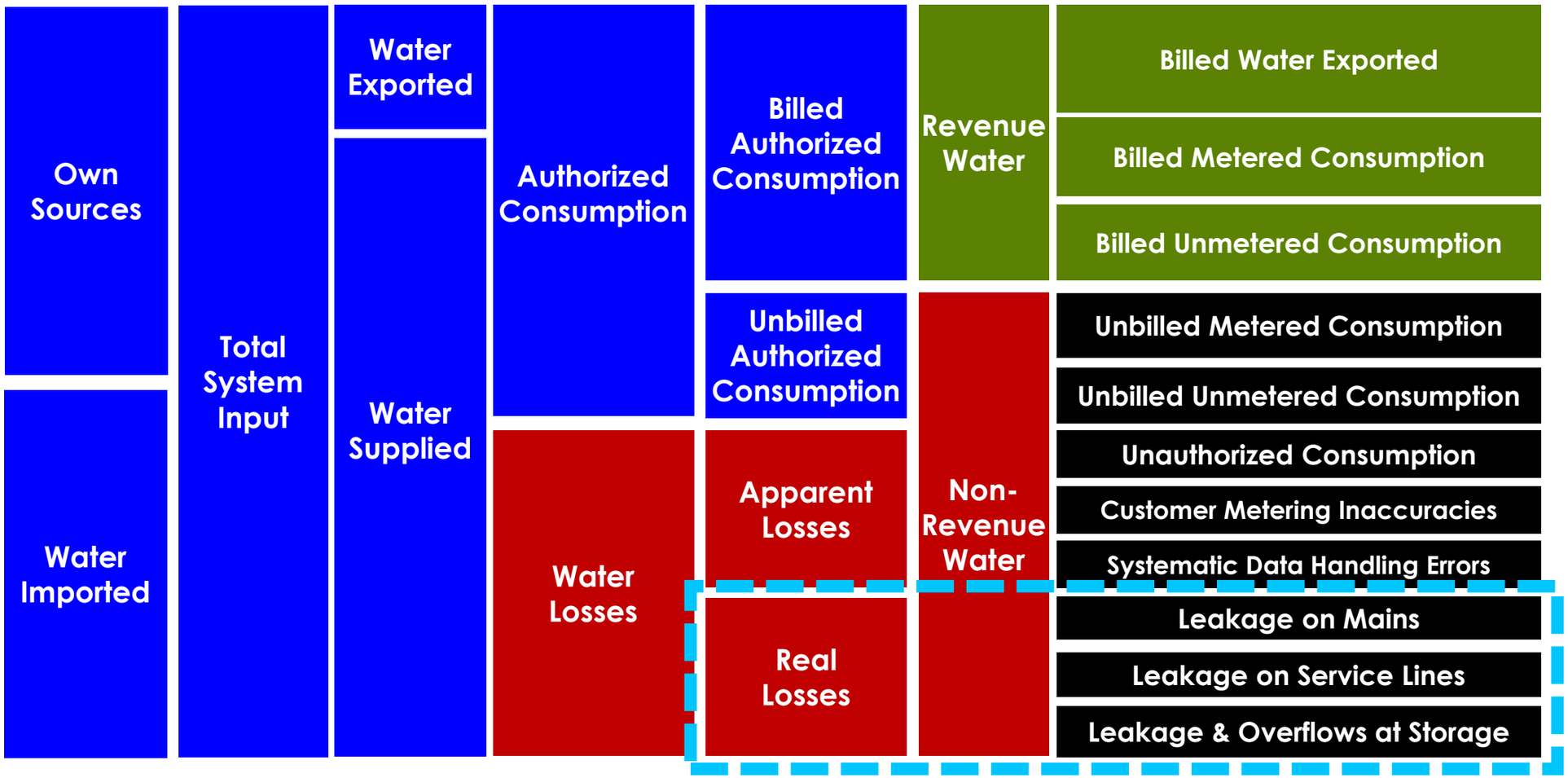
Then, 1.7T gallons is the same amount used by the average person over 60 days (4,900 gallons)

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



Source: *AWWA M36 Methodology from Demonstrating Progress Toward Improving Water Supply Efficiency (presentation slides), GA EPD, T. Cash, B. Frechette, J. Smith, and W. Zeng, May 2019*

Water Efficiency and Water Loss Programs

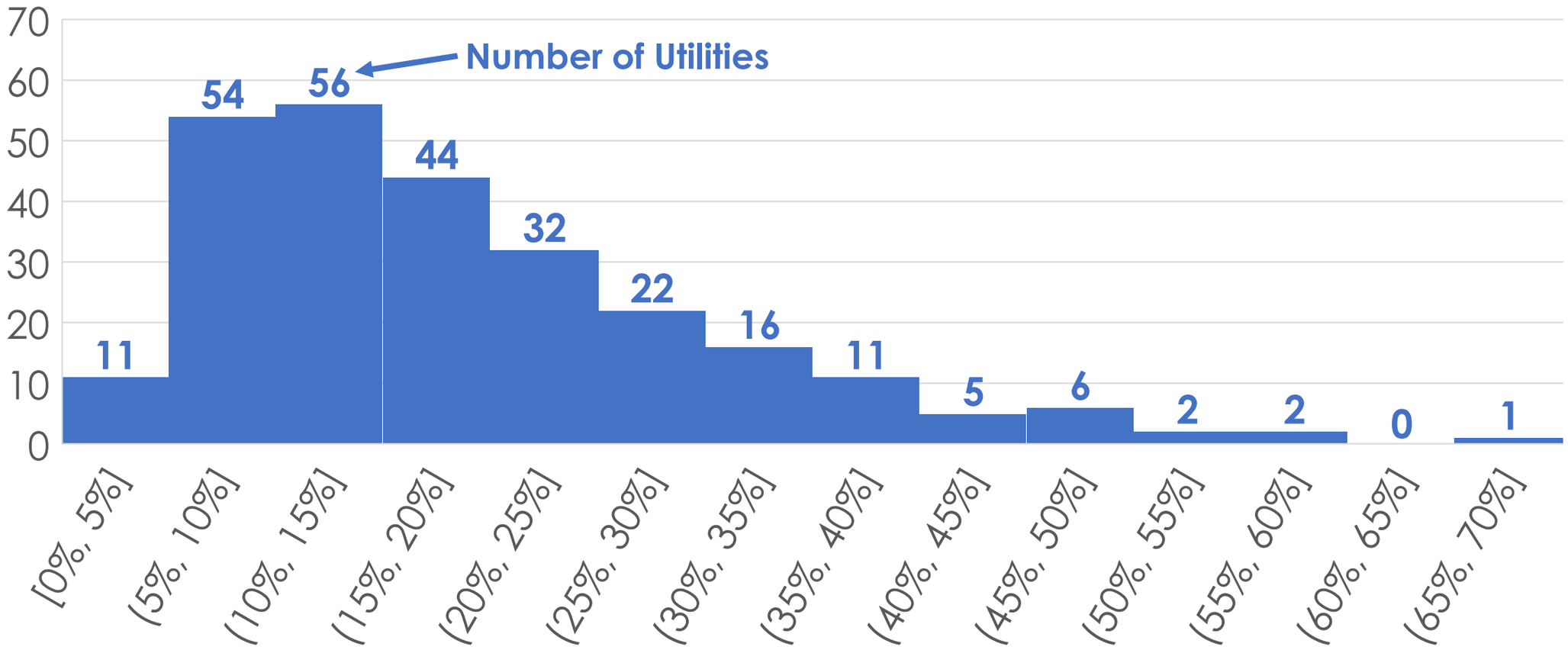
Real Losses

- 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
  - Service Line leakage up to customer meter
- **Reducing real losses *extends* the water resource**

Source: *Demonstrating Progress Toward Improving Water Supply Efficiency (presentation slides), GA EPD, T. Cash, B. Frechette, J. Smith, and W. Zeng, May 2019*

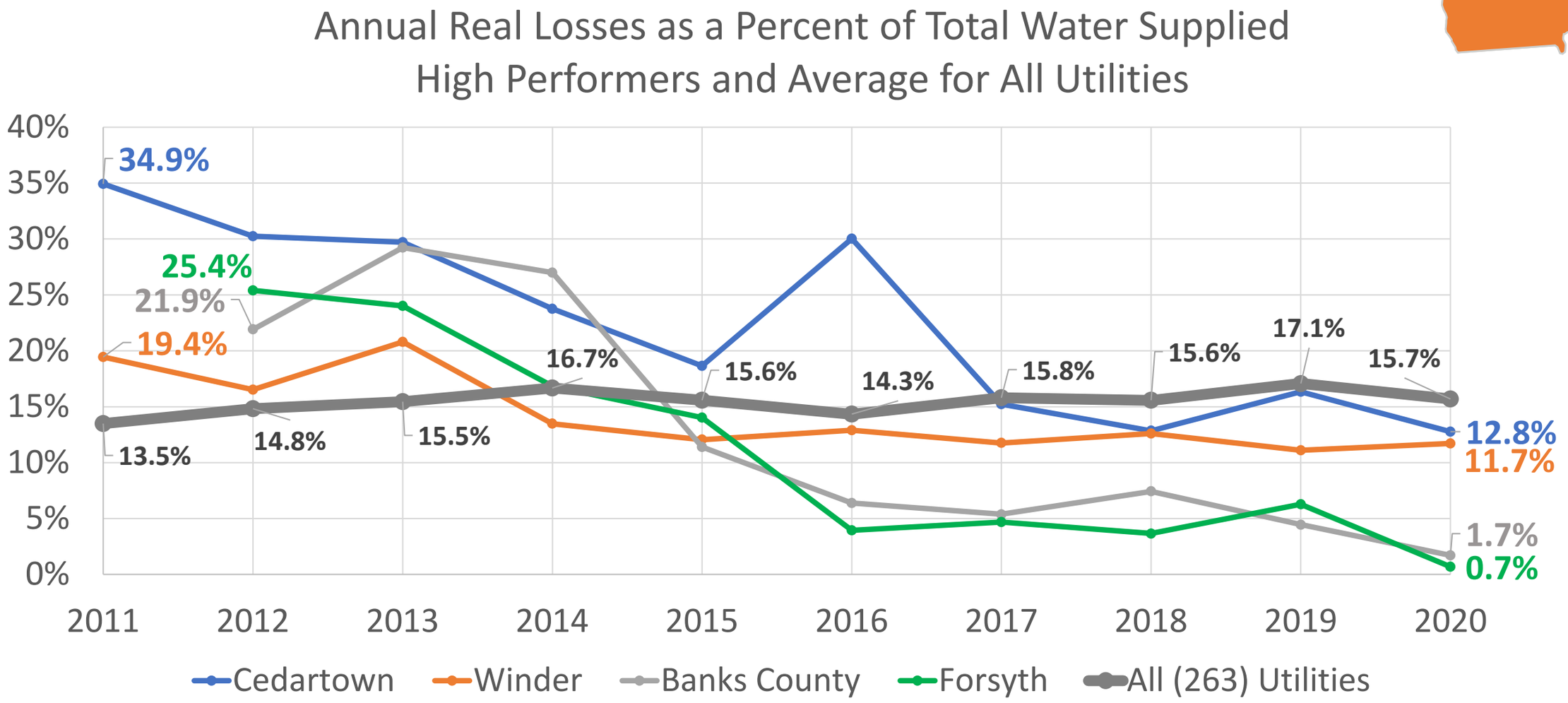
Water Efficiency and Water Loss Programs

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



Source: *GA EPD Validated Water Audits, 2011 through 2020 (https://epd.georgia.gov/watershed-protection-branch/water-efficiency-and-water-loss-audits)*

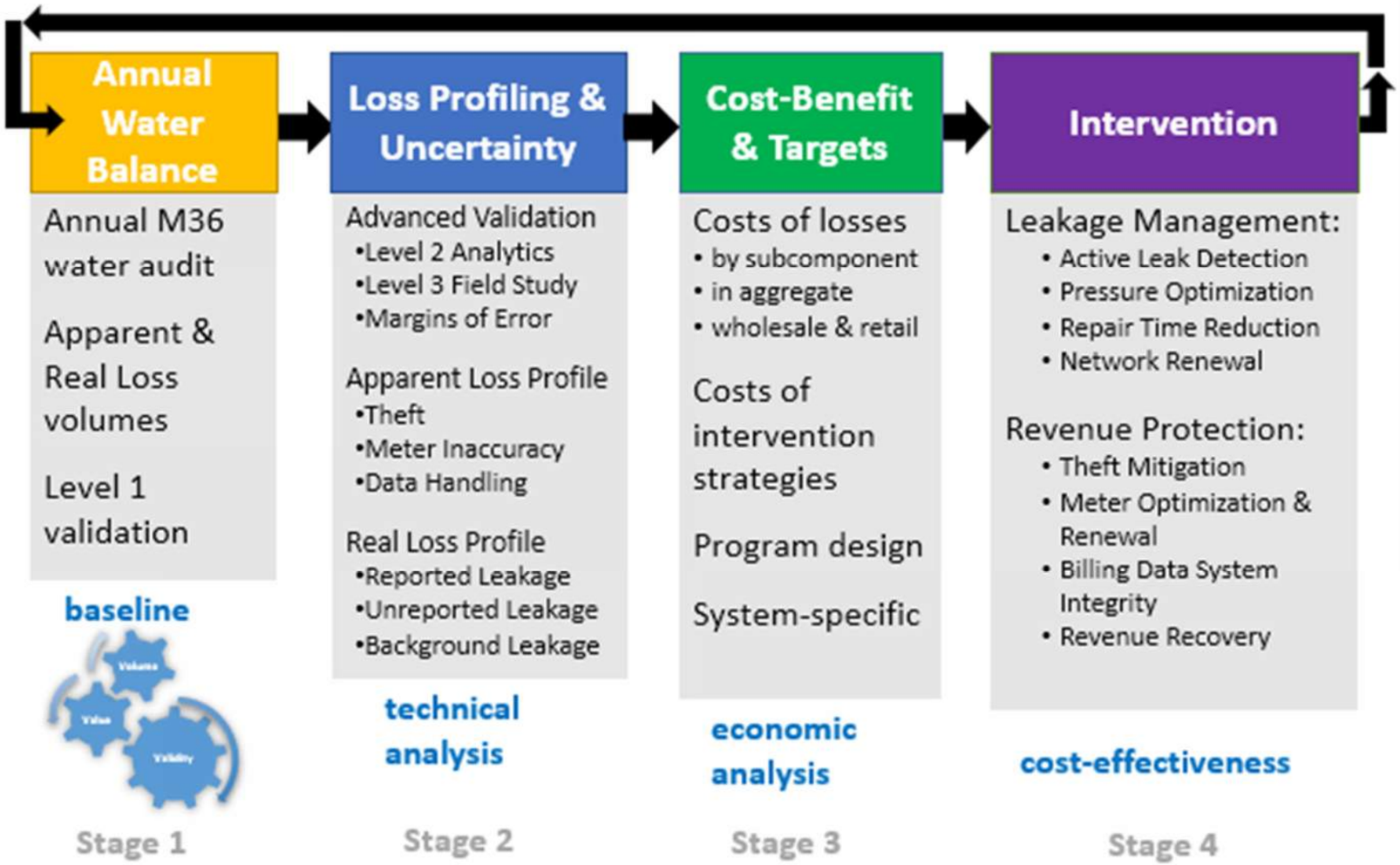
Water Efficiency and Water Loss Programs



Source: *GA EPD Validated Water Audits, 2011 through 2020 (https://epd.georgia.gov/watershed-protection-branch/water-efficiency-and-water-loss-audits)*

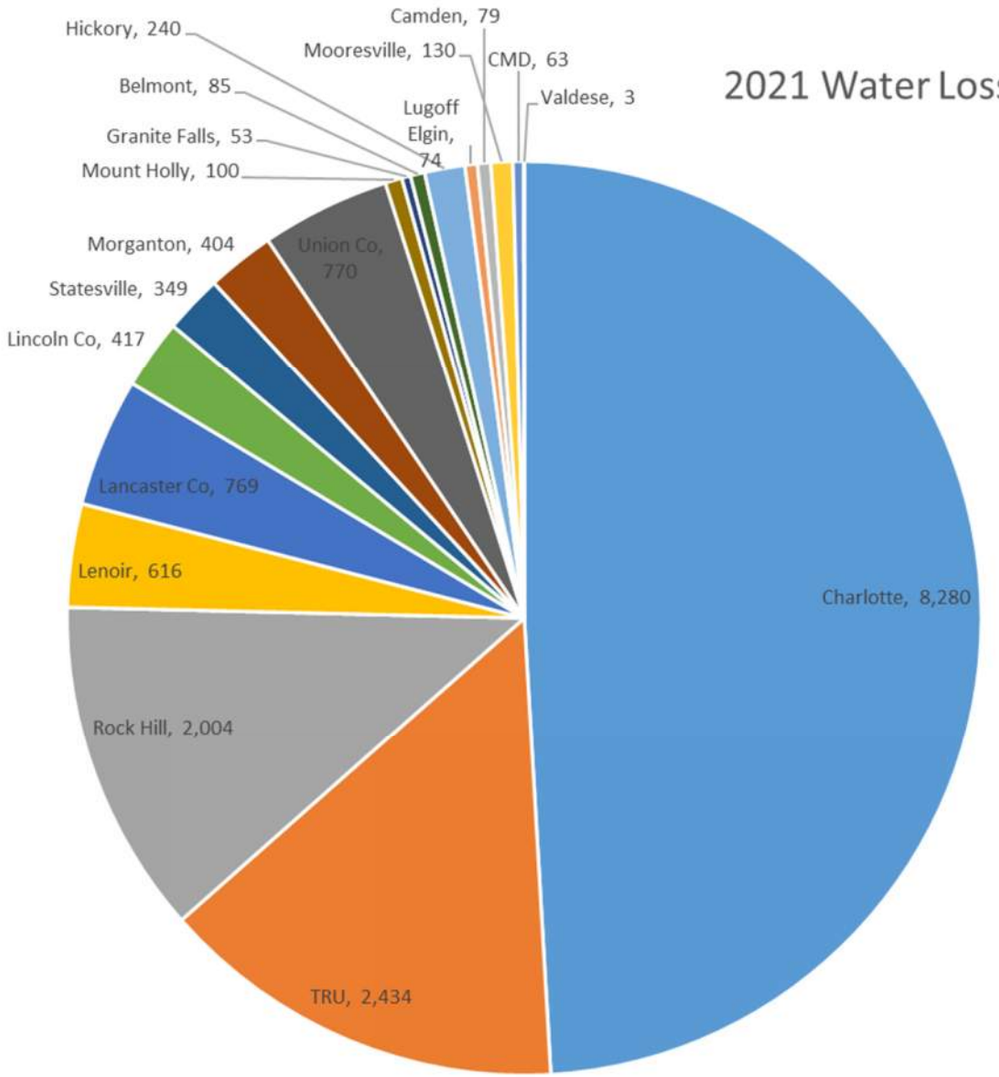
Catawba-Wateree Water Management Group (CWWMG)

Multi-phased Approach to Water Loss



Source: *Jeff Lineberger, Duke Energy and Broad RBC member*

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 Aiken

- **Masons Branch Reservoir**
  - 1,254 acre-feet (340 mgal) storage
  - Releases only during extreme drought to augment flow in Shaw Creek, above the City's intake
  - Provides approximately 30-day supply during average use

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

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 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 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

Existing Water Management Strategies in the Lower Savannah and Salkehatchie Basins

Hilton Head PSD's Vision for A "One-Water" Future

Membrane treatment enabling direct and indirect potable reuse

WateReuseSC and SCDES working together to expand reuse as part of our statewide toolbox (combat saltwater intrusion; augment surface water; agriculture; industry; energy)

Turning stormwater into more of a dedicated source for aquifer recharge