

# ***The Gray Area of Graywater***



**Water Reuse Workshop  
August 14, 2014**

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# Overview

- **Background**
- **Graywater Issues**
  - **Water Rights**
  - **Graywater Vs. Conservation**
  - **Graywater Economics**
  - **Safety and Health**
- **Developing a Graywater Policy**
- **Summary**

# My Purpose Today

- **Water supply development and long term planning**
- **Statewide planning and policy**
- **Observations about the benefits and drawbacks of graywater**

## A Layman's Perspective

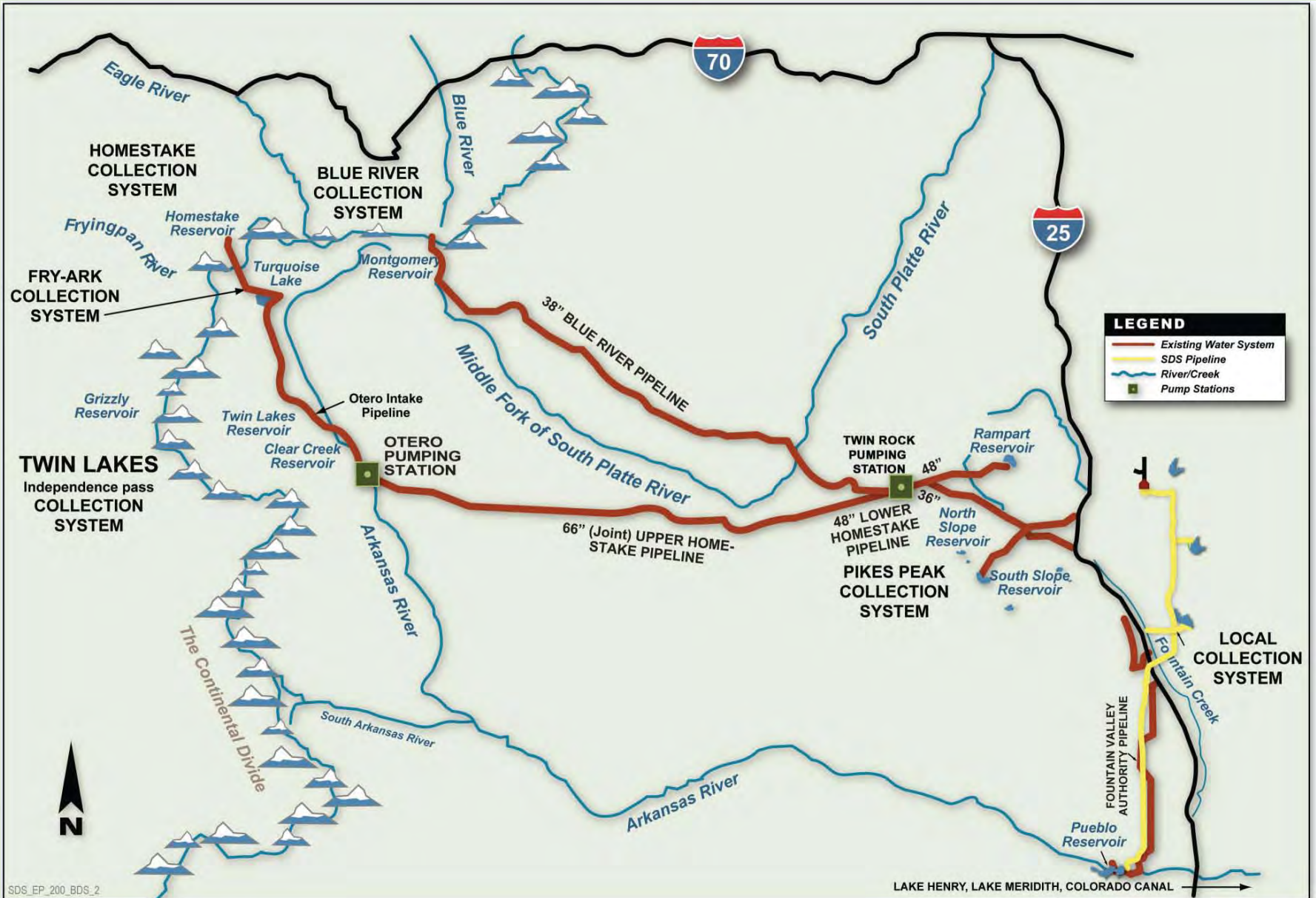


- **Serves roughly 450,000 people over 195 square miles**
  - About 81,000 ac-ft/year
  - 26.4 billion gallons/year
  - 4.6 hours at Niagara Falls
  - 1 cent per 2 gallons
- **Infrastructure crosses**
  - Three river basins
  - Nine counties
  - Over 150 Miles
- **Sources**
  - Local ~ 20%
  - Transbasin ~ 65%
  - Arkansas River ~ 15%



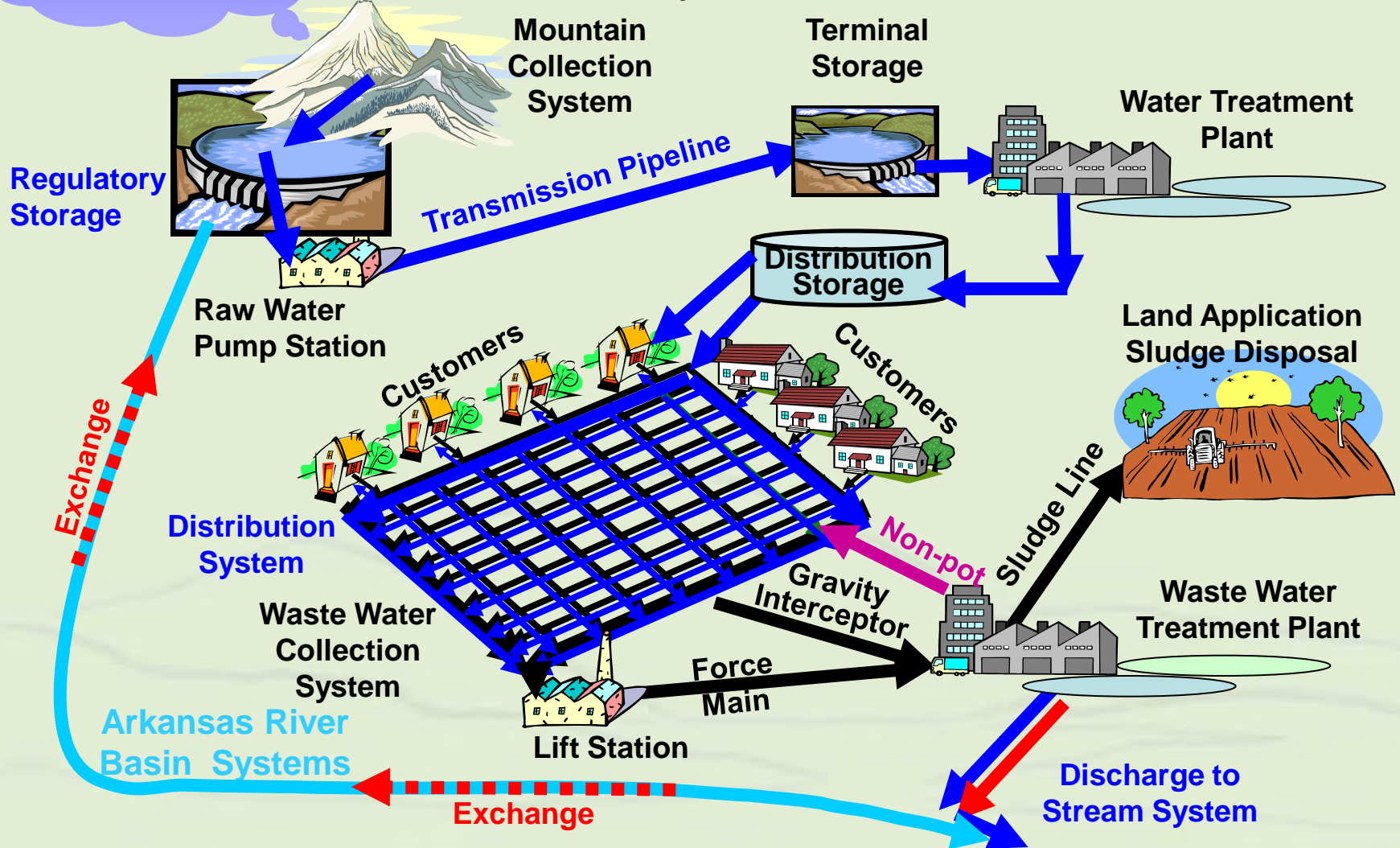


# Colorado Springs Water System



Pacific Storms  
& snow

# How The System Works



# Graywater

- **Definition of Graywater**
  - **“...wastewater from sources other than toilets, urinals, kitchen sinks, non-laundry utility sinks, and dishwashers collected within a residential, commercial, or industrial building that meets the requirements, prohibitions, and standards adopted by the State of Colorado and the El Paso County Board of Health for subsequent use.”**

# Graywater Issues

- **Water Rights**
- **Graywater vs. Conservation**
- **Graywater Economics**
- **Safety and Health**



# Water Rights

- **Allocation method - based on time and use**
- **All the water was spoken for 100 years ago**
  - **True for the East Slope - still some unclaimed water on the West Slope**
- **Now reallocating among competing uses**
- **Different water types have different rules**
- **Inter-connected river system**

# Water Rights

- **Graywater is small scale reuse**
  - Reuse of certain water rights is legal, others not
- **Graywater reuse may not be metered or tracked**
  - Conflicts with “dominion and control”
- **Graywater may change consumption pattern and return flow pattern**
  - Depends on characteristics of second use

# Water Rights

- **Some policy relief for Colorado municipalities**
  - State Engineer's policy statement defines graywater as a "municipal use"
  - Assumes de minimis impact
- **Recent Legislation - H.B. 13-1044**
  - Authorizes graywater reuse in Colorado
  - Sets out minimum statewide requirements, standards and prohibitions
  - Calls for the development of safety and health regulations



# Graywater vs. Conservation

- Graywater is often considered conservation
- Does graywater actually reduce water use?
  - Graywater does not necessarily reduce water use
  - *Graywater is simply an alternative way to route water*
- Challenge to shift thinking on water use
  - Stop thinking about reduced delivery, start thinking about reduced consumption
- Use Vs. Consumption
  - Use = delivery, diversions, or draw
  - Consumption = water removed (lost) from the system
  - Return flows a key component

# Graywater vs. Conservation

- **Shift to a system view - not user view**
- **User view**
  - Graywater reduces delivery (water bill) - apparent savings
- **System view**
  - Graywater reduces delivery to one user - demand
  - Graywater also reduces return flow from that user - supply
  - Simply reduces the amount of throughput
  - No change in amount of water consumed
  - No increase of water available overall

# Graywater vs. Supply

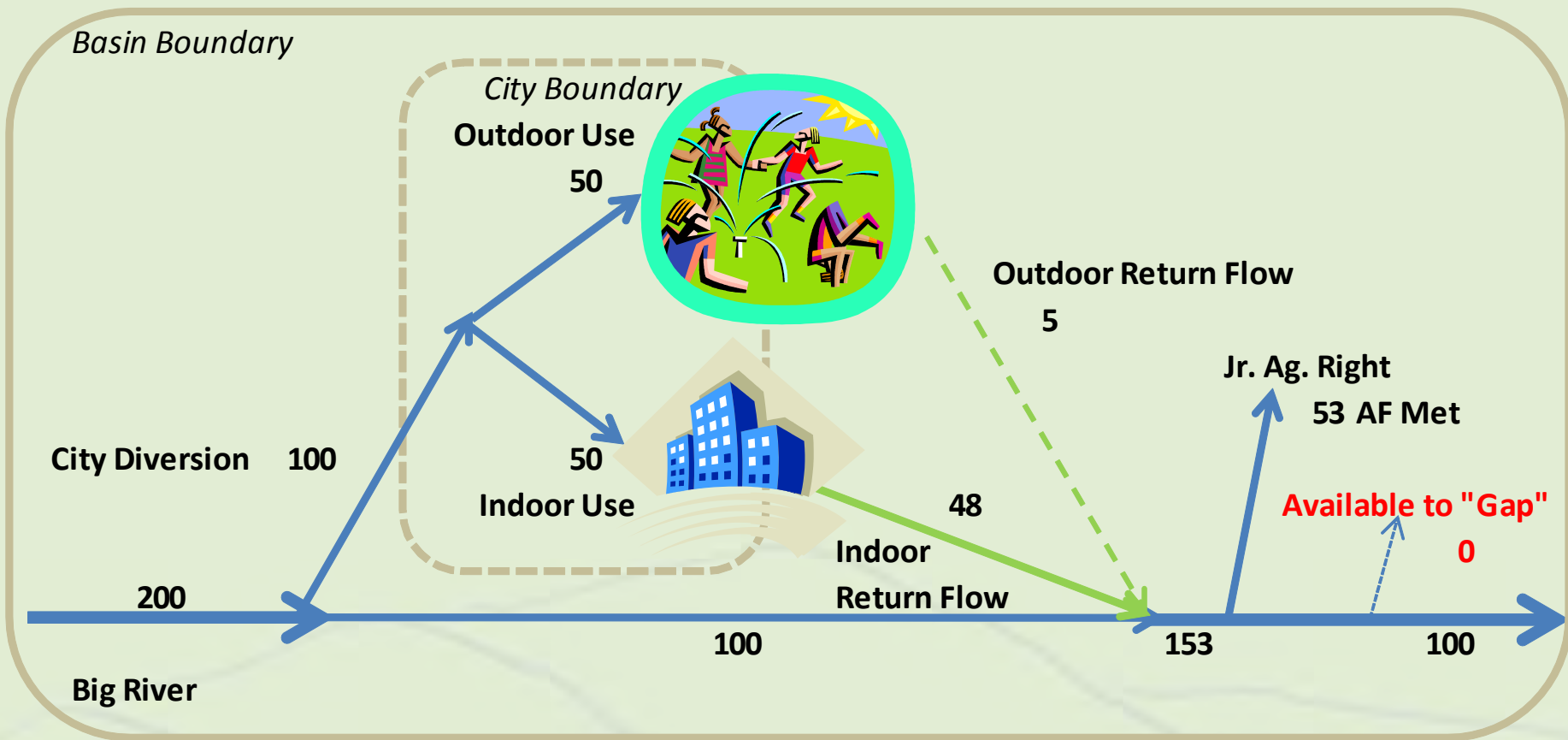
- **Conflict with Reuse Supply**
  - Potable and nonpotable reuse depends on return flows
  - Graywater use = lower return flow = less water to reuse
  - Net system effect negligible
    - Lower demand offset by lower supply from return flows
- **Perception that graywater directly translates to water available for others to use**
  - Statewide Roundtable discussions
  - Local Vs. Basin Scale
- ***Do you want to really save water - or just reduce your bill?***



# Local vs. Basin Scale

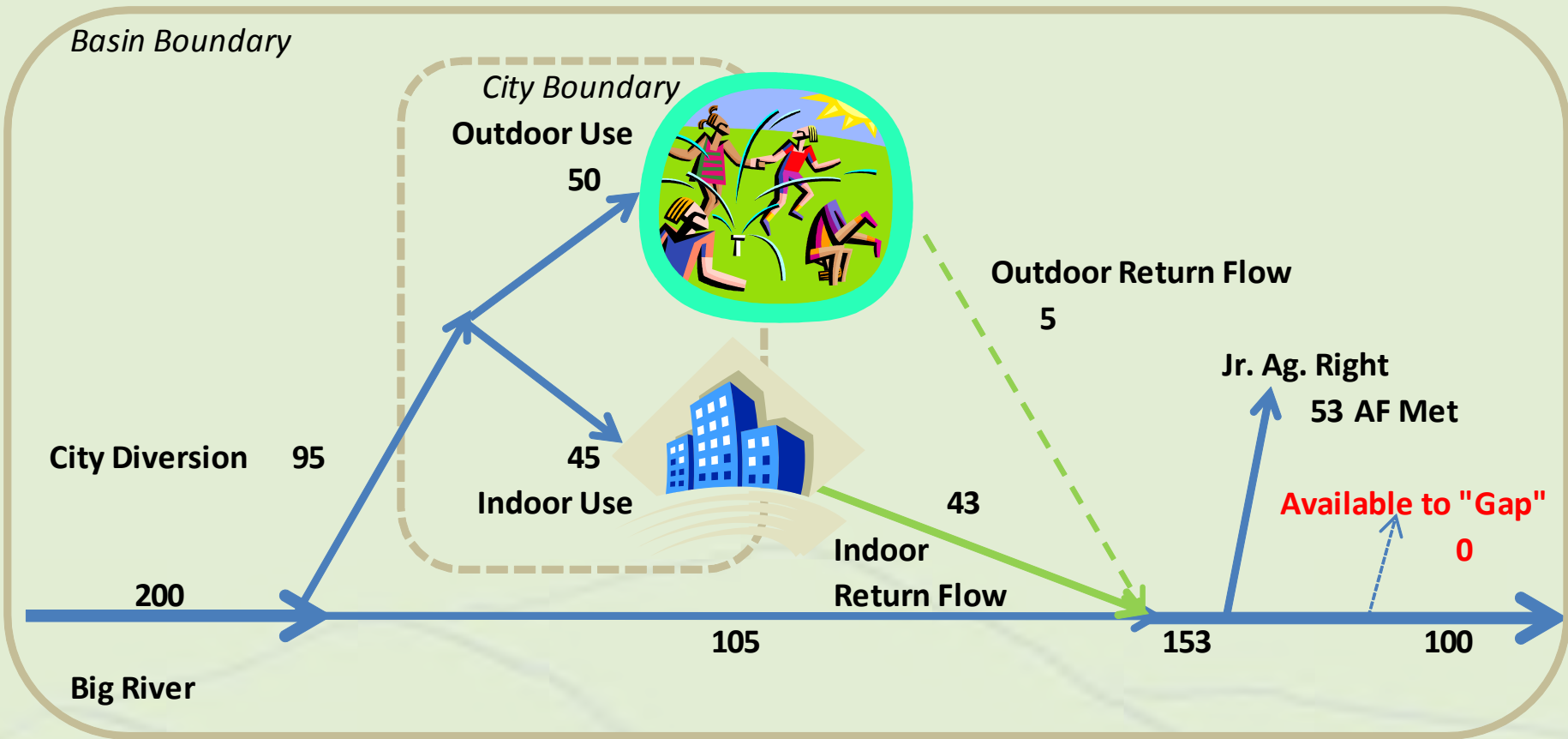
- **On the local level, graywater can increase the amount of demand met by a given supply**
- **However, on a larger scale ..... perhaps not**
  - **In an over appropriated system, downstream users rely on upstream return flows for their supply**
    - **Arkansas River – Estimated that water is used 7 times by state line**
- **Graywater reuse does not increase supply to the basin, just reallocates supply**

## Conservation Calculator



**Base Scenario**

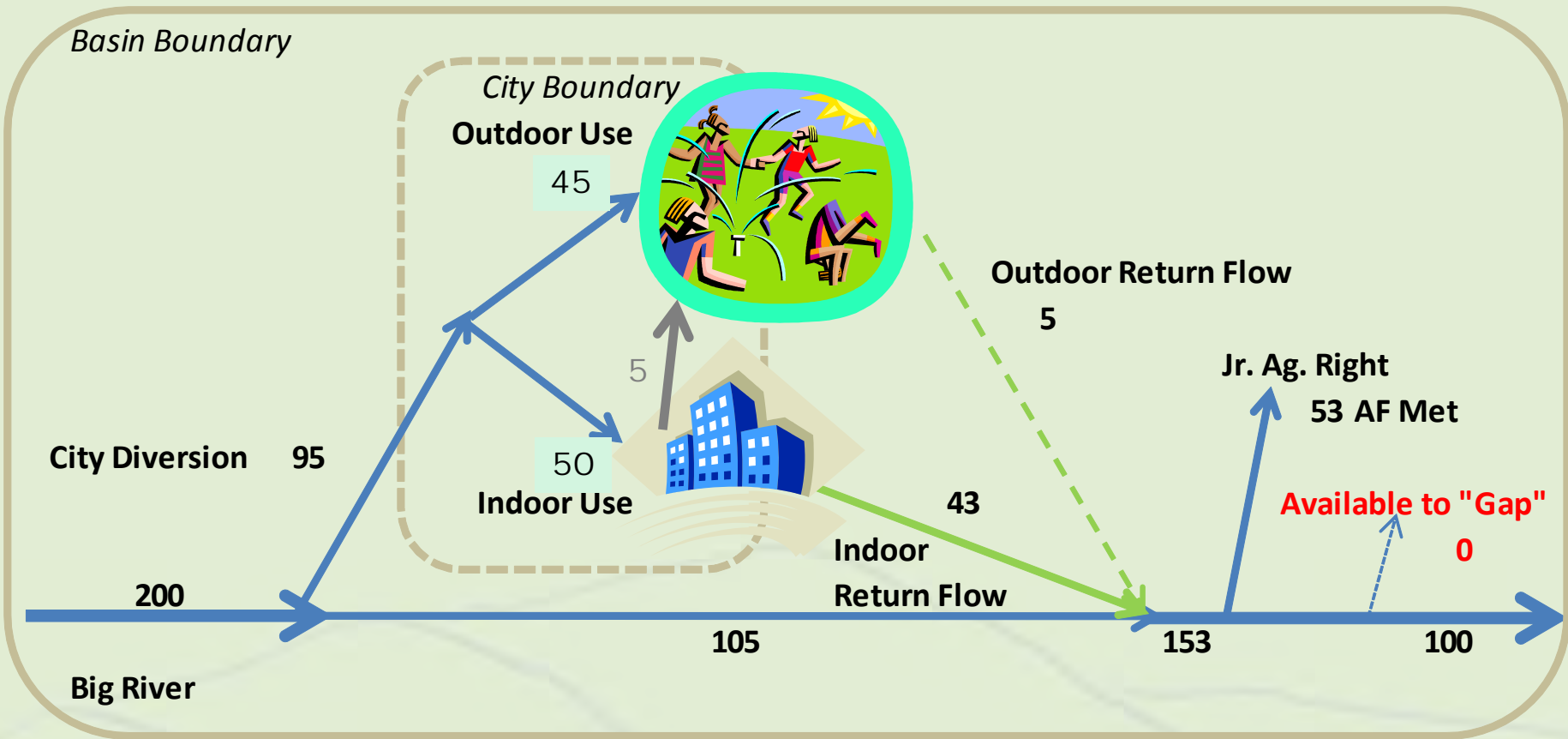
## Conservation Calculator



**10% Indoor Graywater Reuse**

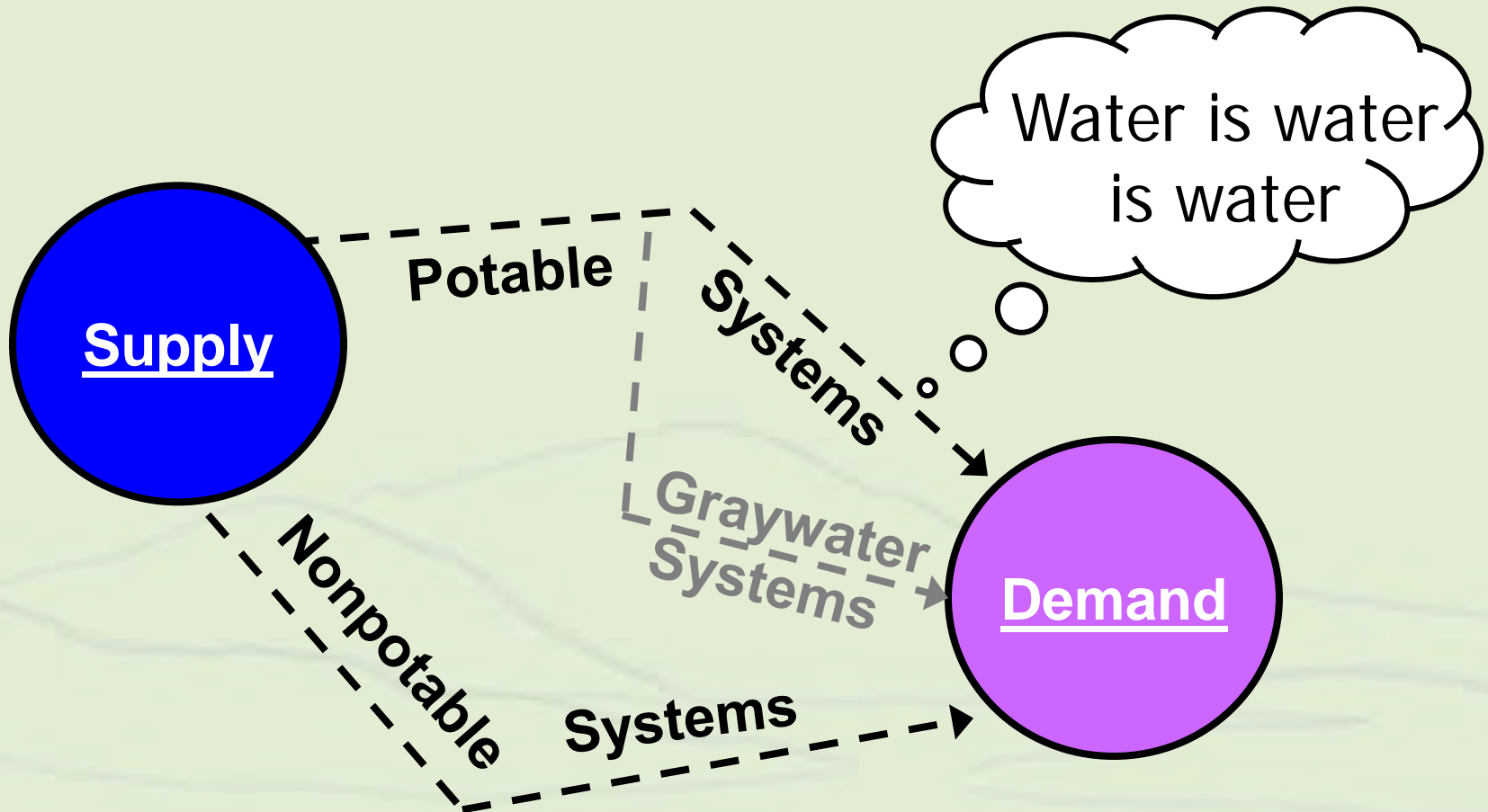


## Conservation Calculator



**10% Outdoor Graywater Reuse**

# Nonpotable Reuse Philosophy



# Graywater Economics

- **Individual user point of view**
  - Graywater reduces water delivery and water bill
  - May cost some money upfront to install and some for O&M
- **Utility point of view**
  - Water rates set to recover costs
  - Vast majority of costs are fixed - same regardless of amount of water delivered
    - Water is an infrastructure intensive industry
  - Graywater reduces throughput - and sales
  - Graywater will drive up water rates (per unit cost)
    - Fixed costs spread out over lower units sold
  - Some marginal savings on variable costs (pumping)
  - Some long term benefits from capacity life / delayed projects



# Safety and Health

- **Graywater - vigilante reuse, or responsible water management?**
- **Safety and health concerns and risks**
  - Individual user level - viruses, bacteria, etc.
  - System level - cross connection concerns
- **Need for some level of regulation**
  - State, county, and local regulations/jurisdictions
  - International Plumbing Code
  - Industry/product standards
  - BMPs
- **Need for education and acceptance by public**

# Developing a Graywater Policy

- **Why develop a policy?**
  - Demonstrates responsible water management
  - National trends
  - Customer driven
- **Challenges to policy development**
  - Water rights questions
  - City Code prohibitions
  - Measurement / billing / revenue issues
  - Lack of Utility standards
  - Lack of County regulations / permitting process
  - Lack of State regulatory guidance

# How we met the challenges

- **Water rights questions**
  - Colorado Springs has a portfolio of reusable water
  - State Engineer's Policy Statement issued in response to statewide questions
- **City Code prohibitions**
  - Code states water is sold on a license basis for one use only
    - Protect water supply for nonpotable reuse and reuse by exchange
  - Developed reuse guidelines defining what constitutes a single use, and what constitutes a second use
  - Process to charge minimal fee for "second use"
    - Use pre-existing "Augmentation Tariff Rate"
    - Based on selling water only, no recovery of infrastructure costs
    - Made graywater reuse a paid water service, thus honoring code

# How we met the challenges

- CSU's Draft Policy defined a three tier graywater reuse structure based on reuse guidelines and volume

- Tier I - de minimis graywater reuse
  - No permanent installation of plumbing
  - Hand carry, small volumes

***Latest Draft of  
Reg. 86 precludes  
this option!***

- Tier II - substantial graywater reuse defined as a single use
  - Larger, permanent installations
  - Reused for the same basic purpose as initial use, i.e. indoor sanitary use, industrial process water reused in the same process
  - No payment to Utility
- Tier III - substantial graywater reuse defined as a second use
  - Larger, permanent installations
  - Reused for a different purpose than the initial use, i.e. outdoor irrigation, cooling towers, etc.
  - Minimal payment to Utility (about 1/10 of potable rate)



# How we met the challenges

- **Measurement / billing / revenue issues**
  - Process established by reuse guidelines and tiered structure, incorporated into normal billing system
  - Offset a portion of “lost revenues” - absorb the rest
- **Lack of Utility standards**
  - TBD - will address at a future date, now handled ad hoc
  - Unclear where standards, plan review, and inspection roles will reside

# How we met the challenges

- **Lack of County regulations / permitting process and State regulatory guidance**
  - **Passage of H.B. 13-1044**
  - **In the middle of a Statewide Rulemaking Process**
    - **Draft Regulation 86 has been circulated**
    - **Comments have been submitted**
  - **Subsequent Development of County/Local rules and regs**
  - **We are actively involved in development of rules and regs**

# Implementation

- **Currently on the third major revision of the draft policy - continue to refine**
- **Adoption of Policy by ordinance or resolution**
  - Required by H.B. 13-1044
  - Colorado Springs City Council - 2015 ?
- **Development of Utility standards**
  - Revise standards to incorporate and guide installations
- **Incorporation of County regulations / permitting process and State regulatory guidance**
  - Regional Building Code
  - County permit process



# Summary

- **Graywater reuse is an important aspect of sustainable water development**
- **Sustainability conflicts and challenges exist**
- **An honest evaluation of the big picture is necessary**
- **Successful policy development must consider and address many issues**
- **In the end, community values will decide**