

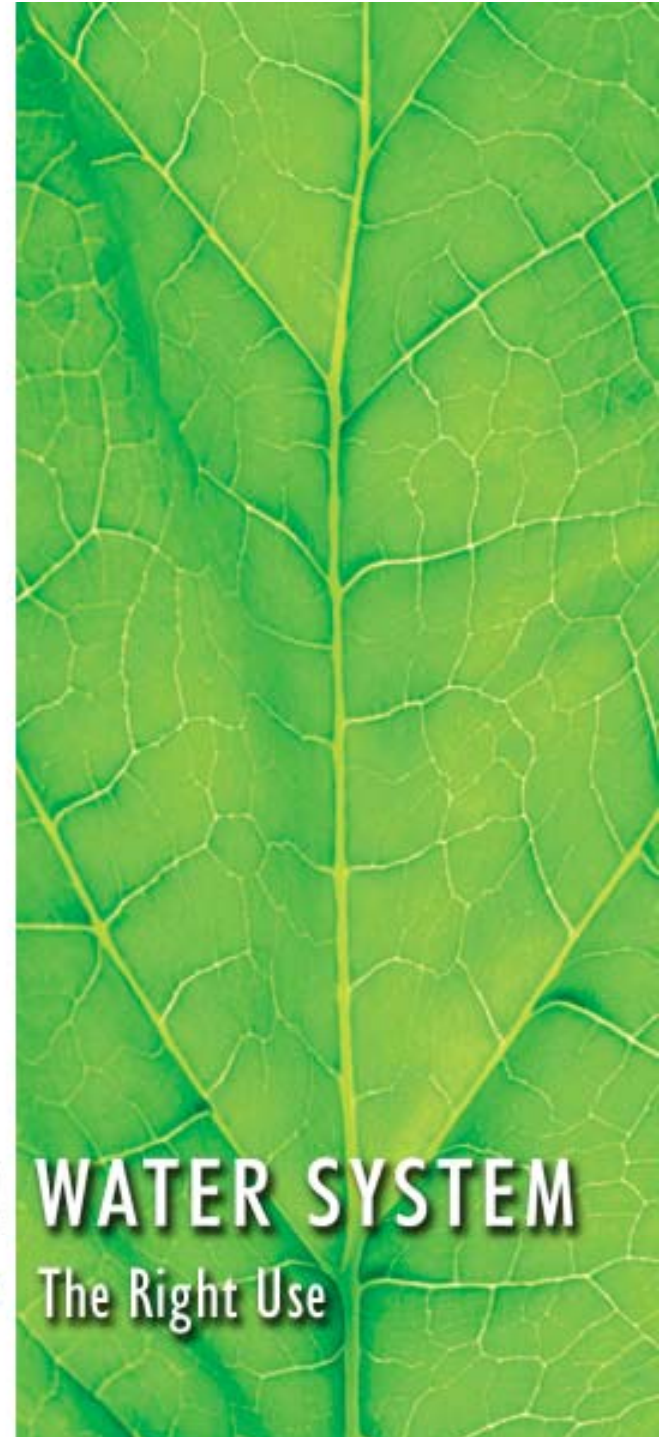
# Recycled Water Customer Training

DENVER WATER



RECYCLED  
The Right Water

WATER SYSTEM  
The Right Use





## Training Objectives

- 1. What is recycled water and why use it?**
- 2. How is it treated and distributed?**
- 3. How is it regulated?**
- 4. How is its use managed?**



# 1. Recycled Water

## What is it?

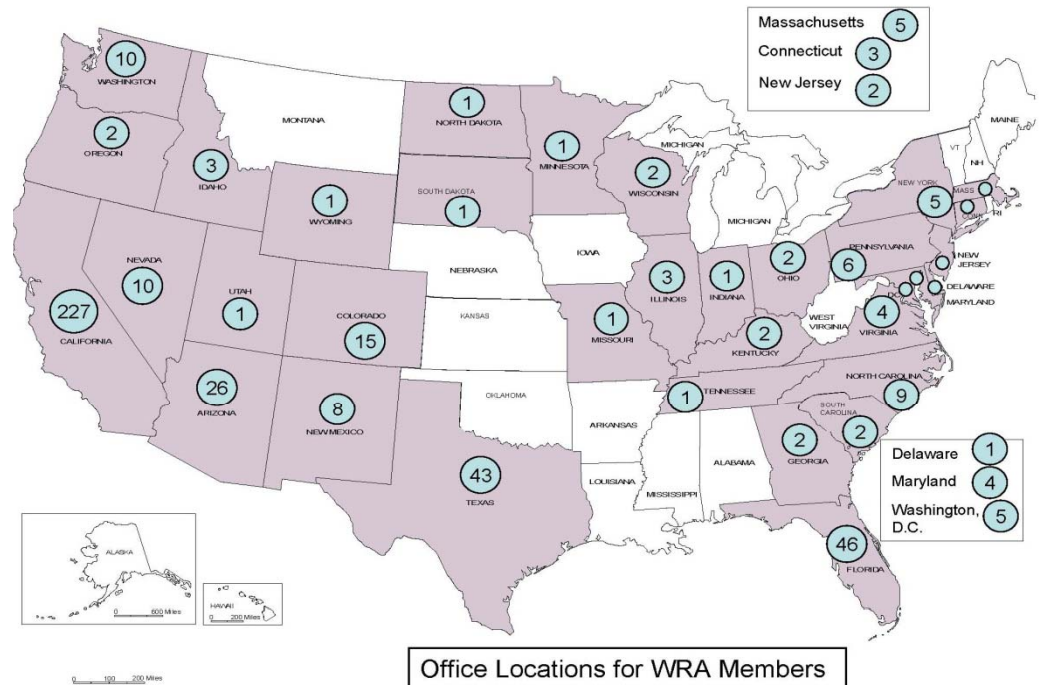
- **Treated wastewater for irrigation and some industrial & commercial uses. Interchangeable with ‘reclaimed water.’**

## What is it not?

- **Graywater: Untreated water from showers, clothes washers, and faucet uses. Kitchen sink and toilet water are excluded.**



# 1. Historical Usage



## Locally

- More than a dozen communities
- > 40 years in Colorado Springs
- 5 years in Denver

## Nationally

- > 100 years for crop irrigation
- > 70 years for landscape irrigation
- > 40 years for drinking water augmentation

DENVER WATER  RECYCLED WATER SYSTEM





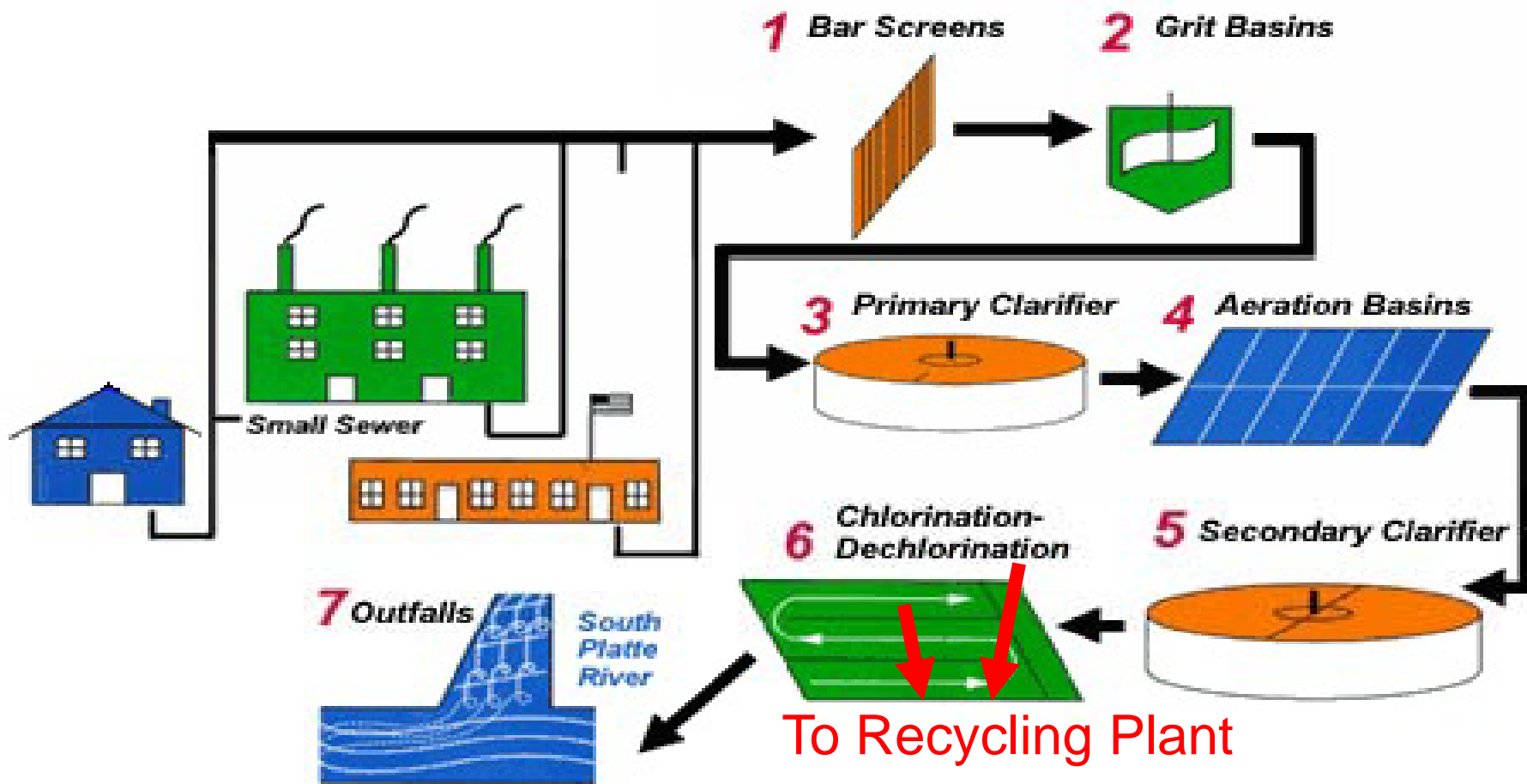
## 1. Why Recycled Water?

- **Lessens load on drinking water system**
- **Delays requirement for developing new drinking water supplies**
- **Required for sustainable growth**
- **Lower cost alternative to customers**
- **Blue River decree**
- **Right water for the right use**

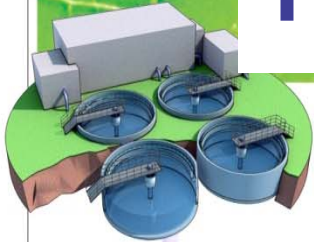


# 1. Recycled Water Source

## Metro Wastewater Treatment Plant

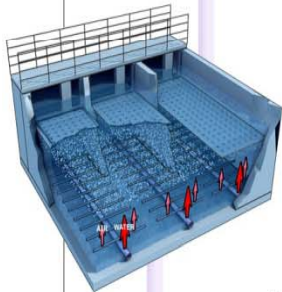


# 1. Recycled Water Treatment



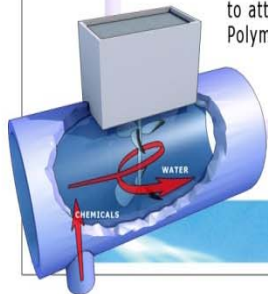
## Metro Secondary Clarifier

A quantity of treated wastewater from Metro Waste is captured just before it is discharged into the river and is pumped to Denver Water's Recycled Water Plant.



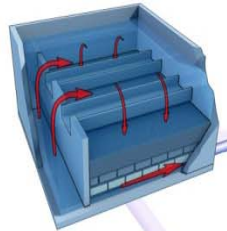
## Biological Aerated Filter Building

Ammonia eating bacteria catch a ride on polystyrene beads, filtering the water as they go.



## Rapid Mix Room

A coagulant is added at this point to attract particles to one another. Polymers aid in the process.



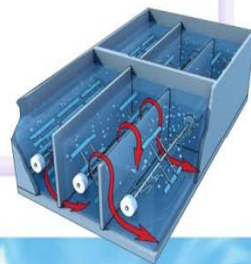
## Filter Beds

Water filters through anthracite particles. Remaining sediment "gets trapped."



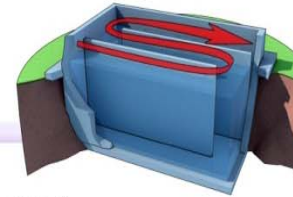
## Sedimentation Basin

Water moves up a series of closely spaced plates causing sediment to fall to the bottom.



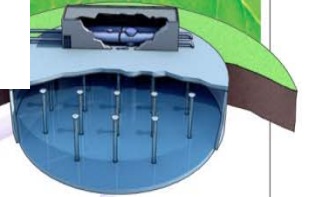
## Flocculation

Paddles force collision of particles to further bind them together. Water turbulence is decreased by reducing the surface area on the paddle wheels. This allows snowflake like particles to grow even bigger and heavier.



## Contact Basin

Water flows through a series of baffled walls, which allows chlorine to react with the water for at least 30 minutes.



## Finished Water Reservoir

The treated water is stored in a 300 foot wide, 23 foot deep reservoir which holds 11 million gallons of water.



Recycled water will go to irrigate parks, golf courses, schools, commercial applications, etc., providing the capacity to "free up" enough raw water resources to serve 35,000 households annually.

This saves water in Colorado!

DENVER WATER  RECYCLED WATER SYSTEM





# 1. Distribution

- > 30 miles of pipe
- 2 pump stations
- 2 storage reservoirs
- 1 potable water back-up
- Purple pipes, valves, etc.
- Stamped “Recycled Water”



DENVER WATER  RECYCLED WATER SYSTEM





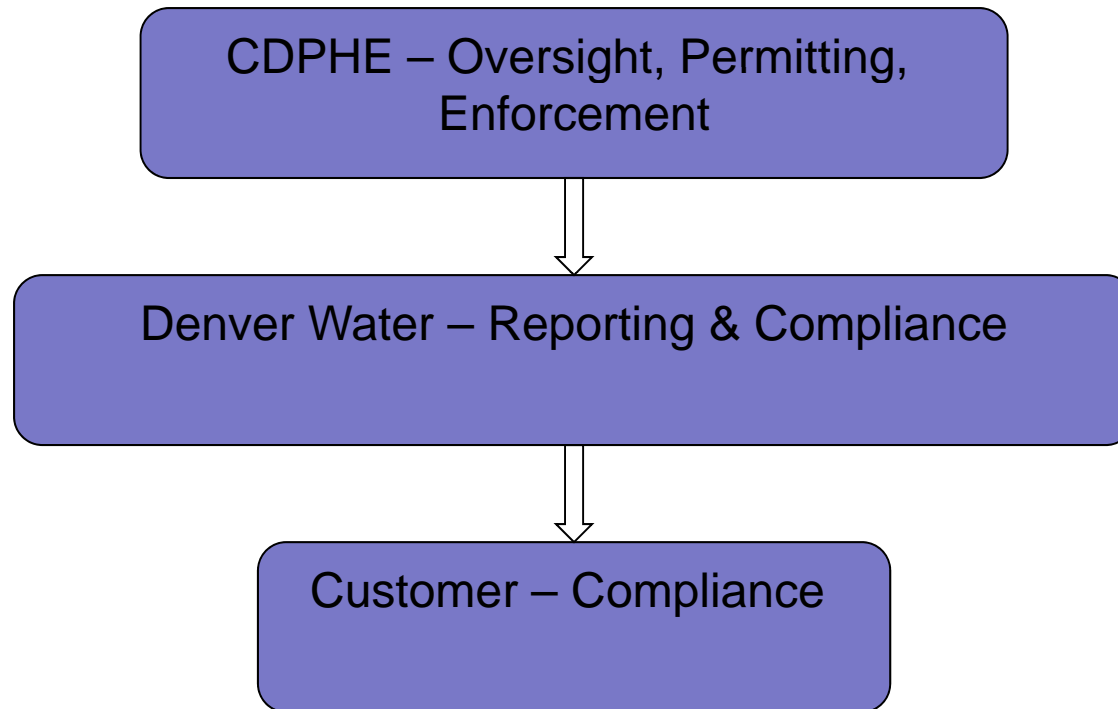
# 1. Distribution

- **Manhole rings & covers**
  - Stamped “Non-potable water”
  - Entirely purple
- **Valves**
  - Triangular lids
  - Purple lids
  - Open left
  - Pentagon nuts





## 2. Regulation 84





## 2. Regulation 84

- **Recycled water is regulated by the Colorado Department of Public Health and the Environment (CDPHE) under Regulation 84**
- **3 water quality categories under Regulation 84**
- **Denver Water produces Category 3 water, highest quality category**





## 2. Regulation 84

### Denver Water must:

- Provide annual training for all recycled water customers, including regulatory requirements & safe handling
- Submit Letters of Intent to CDPHE annually
- Treat the water to meet water quality standards
- Submit annual reports to CDPHE
- Conduct a representative number and type of annual audits at recycled water customer sites
- Report violations to CDPHE



## 2. Regulation 84

### Customers must:

- Submit a User Plan to Comply and obtain a Notice of Authorization before using recycled water
- Ensure all recycled water system operators are trained via Denver Water's recycled water training program
- Provide signage indicating use of recycled water
- Use purple pipe, sprinkler heads, and valve boxes for all repairs or modifications to recycled water system
- Provide emergency contact details to Denver Water & respond to emergency calls within 1 hour
- Participate in annual audits
- Certify annual water usage
- Report violations to CDPHE





## 2. Regulation 84 Minor Violations

- **Ponding/runoff**
- **Overspray**
- **Modifications/repairs not distinguished as recycled water**
- **No backflow prevention on potable water**
- **Operation by unauthorized/untrained personnel**
- **Irrigation above agronomic rate**
- **Supplementing recycled water with other water sources without approved backflow prevention**
- **Application or permeable storage within 100' of domestic water source**
- **No signage**





## 2. Regulation 84 Minor Violations

- **Self Reporting**
  - **Written report to CDPHE within 30 days**
- **Denver Water Reporting**
  - **60-day period allowed for customer and DW to come to a resolution**
  - **If resolution is reached within 60 days, no reporting to CDPHE is required**



## 2. Regulation 84 Serious Violations

- Discharge to surface water (includes storm water)
  - Cross-connection without backflow prevention
  - Irrigation outside an area approved in Notice of Authorization
- **Customer provides verbal report to CDPHE within 24 hours**
- **Customer provide written report to CDPHE within 5 business days of verbal report**



## 3. Operating Rules and Engineering Standards

### Operating Rules – Chapter 4

- Customer designates responsible person
- Use schedules must be adhered to
- Maintain current records for recycled water system
- Obtain approval from Denver Water & CDPHE for modifications to recycled water system
- Plan review submission requirements
- **Signage: 12” tall x 13.5” wide**
  - **Golf courses: 1<sup>st</sup> tee, 10<sup>th</sup> tee, driving range, putting green**
  - **All other irrigators: vehicle/pedestrian entries to irrigated area, 1 sign/500’ of perimeter**
  - **Non-irrigators: appropriate locations for worker notification**





## 3. Operating Rules and Engineering Standards

### Engineering Standards – Chapter 11

- Backflow prevention required 5' downstream of meter for potable services at recycled water sites (per Chapter 6)
- Potable water back-up only available via Denver Water distribution system
- No hose bib connections
- Purple colored exposed surface for irrigators (e.g., spray-painted valve boxes, sprinkler heads)
- Restricted public access
- Pumping & storage not allowed without Denver Water approval
- Dual supply systems not allowed without Denver Water approval
- Separation from potable & sanitary sewer pipes:
  - Potable: 10 foot horizontal separation, 1 foot above recycled water mains
  - Sanitary Sewer: 10 foot horizontal separation, 1 foot below recycled water mains



## 4. Cross Connections

- **Definition (EPA): Connection between potable and non-potable (raw or recycled) water supply**
- **Risks: spread of disease, health hazards**
- **Avoiding cross connections:**
  - **Backflow prevention devices**
  - **Cross connection control surveys**
  - **Water quality testing**



## 5. Recycled Water Usage

- **Safe for incidental contact with humans and animals**
- **Category 3 (highest quality class) defined by CDPHE**
- **Disinfected at treatment plant**
- **Higher quality than water at open swim beach**





## 5. Recycled Water Hygiene

- **Don't drink recycled water**
- **Wash hands thoroughly after working with recycled water systems**
- **Avoid irrigating during high public use times**
- **Minimize volatilization exposure to workers**



## 5. Maintenance Practices

- **Use separate tools for recycled water and potable water**

**OR**

- **Thoroughly disinfect tools after use on recycled water systems before using on potable water systems**