A History of Water Reuse in Colorado

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Reuse Drivers

- Growth & Development
- Water Rights
  - Trans-Basin Water
- Disposal of Treated Effluent
  - Land Application
- Water Conservation/Rates
Colorado Regulatory History

- Before 1977: Unregulated
- 1977: Guidelines-Primarily Voluntary
- 1982: Land Application (and Other Reuse) Addressed in Discharge Permits
- 2000: Regulation 84
- 2004: More Uses
- 2013: Resident Controlled

De Facto Reuse
Early Agricultural Irrigation Reuse

Front Range Growth & Development
- Barr Lake
- Colorado Springs
- Northglenn
Barr Lake

Early 1800’s - Buffalo wallow, oasis for cattle drives

1885 - Oasis Reservoir built, 19-mile canal from South Platte River, to supply irrigation water

1908 - Renamed Barr Lake, double in size

50+ Years - Influx of raw & partially treated WW

1960’s - Labeled as Nation’s Largest Lagoon

1966 - New WWTF built

1976 - Barr Lake became a State Park

1990’s - Source for drinking water

Colorado Municipalities Practicing Reuse

1975
7 In Colorado
138 In California

2013
21 Entities
4 On West Slope

Early Turf Irrigation

- 1957 - U.S. Air Force Academy
- 1960 - City of Colorado Springs
- Early 1960’s - City of Aurora
- 1971 - Fort Carson Army Base

Air Force Academy

- 1957 - Treatment Plant Completion
- 347 Acres
- Cadet Athletic Fields, Parade Grounds, Golf Course, and Stadium
Colorado Springs–Las Vegas
WWTF

- Early Century Use of Raw Water for Irrigation
- First Portions Built 1955 - Construction of I-25
- Industrial Reuse 1973 Cooling Tower Makeup
- 1975 City Parks, Golf Course, Colorado College, Cemetery

Aurora - Sand Creek

- Water Reuse Facility - Pioneer 1964
- Sand Creek WWTP - Pressure Filtration
- Golf Course & City Park Irrigation
- Fourth Entity in State to Use Effluent for Irrigation
- Sand Creek WWTP at 5.5 MGD Currently
Fort Carson Colorado Springs

- 1971 Golf Course Irrigation
- Tertiary Treatment Using Pressure Filters
- Tank Wash Recycle

Unique Colorado Reuse

- Northglenn “First Use”
- Snowmaking
- Potable Reuse Planning
Northglenn

- Pioneered the concept of the “First Use Agreement”
  - Water first used by Northglenn for municipal use then treated and reused by downstream irrigators

Mayor of Northglenn and president of FRICO signing the 1976 agreement which allowed Northglenn to borrow water from FRICO.


Water Reuse Case Study: Steamboat Springs

- 1974 Study conducted to test feasibility of storing treated sewage effluent as snow as an alternative to reservoir storage
- Conclusions:
  - No noticeable odor or color difference
  - Marked decreases in pollutants including BOD5, ammonia, phosphorus, total dissolved solids, and suspended solids

Denver’s Direct Potable Reuse Demonstration Project

Objectives:
- Establish product water safety
- Demonstrate dependability of the process
- Generate public awareness and regulatory agency acceptance
- Provide data for large scale implementation

Pilot Plant Studies - University of Colorado

Denver Water Reuse Demonstration Plant

Denver’s Direct Potable Reuse Demonstration Project

Conclusions:
- Satisfied all current and proposed U.S. EPA drinking water standards
- No adverse health or reproductive effects were detected in animals
- Physical, chemical, and microbiological testing revealed purity not normally found in domestic water supplies


Denver Water

1994-1997:
- Conducted an Integrated Resource Planning study
- Found that recycling trans-basin effluent and conserving water was preferable in the short term

Today:
- Operates the largest water recycling facility in the state
- Treats up to 30 million gallons of effluent water a day

Colorado Reuse Projects

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