

# Water Conservation – Fort Carson

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# Water Future?

## Humanity's Top Ten Problems for next 50 years

1. ENERGY
2. WATER
3. FOOD
4. ENVIRONMENT
5. POVERTY
6. TERRORISM & WAR
7. DISEASE
8. EDUCATION
9. DEMOCRACY
10. POPULATION



2004	6.5	Billion People
2050	~ 10	Billion People

**'Whiskey is for drinking, water is worth fighting over' – Mark Twain**

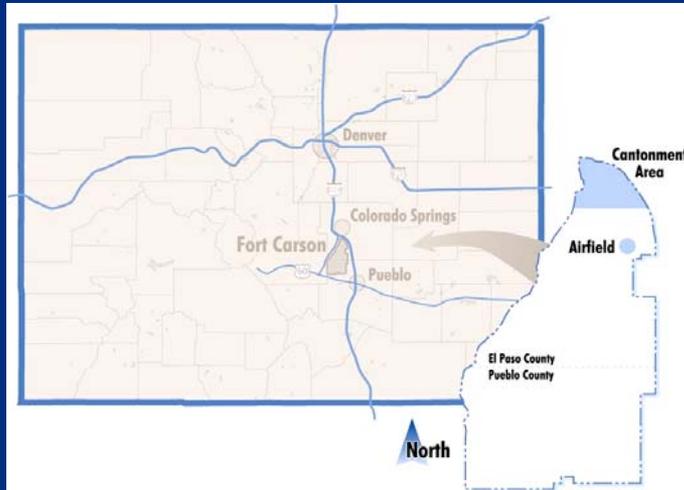


# Outline

- Fort Carson Background
- Water Conservation Efforts
  - Reuse of wastewater effluent
  - Central Vehicle Wash Facility (CVWF)
  - Rain sensors
  - Facility improvements
  - Operational improvements
  - Stormwater efforts
- Results and Impacts



# Fort Carson Background



- Annual potable water use in FY02 was 1,050 MGal
- Annual water bill approximately \$1.5 million
- Close to 18,000 troops currently assigned and will grow to 30,000 by FY13

# Water Conservation – Wastewater Effluent Reuse

- Wastewater Treatment Plant (WWTP) built in 1943; Major modifications in 1998
- Planned upgrade in 2008 to move from 3.0 mgd to 4.0 mgd
- Industrial pretreatment facility (motor pools and wash racks)





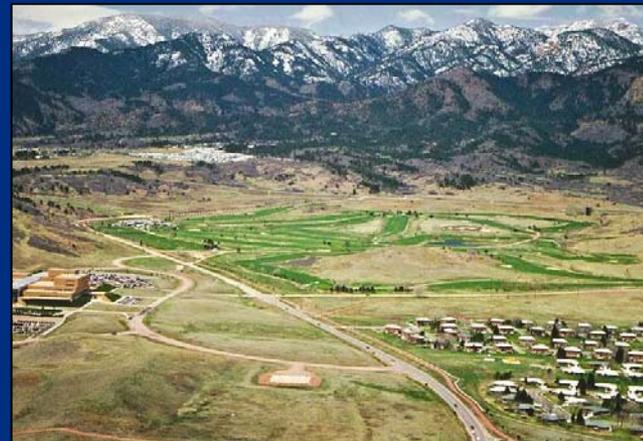
# Water Conservation – Wastewater Effluent Reuse

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- Effluent must meet BOD, TSS, E. Coli, Dissolved Oxygen, and pH standards
- Upgraded to ultraviolet disinfection vs. chlorine gas in 1998
- WWTP is permitted by EPA Region 8, not the State of Colorado

# Water Conservation – Wastewater Effluent Reuse

- Effluent reuse dates to 1971
- Effluent is pumped through a six mile delivery pipeline
- Effluent delivered to a large lined holding pond prior to irrigation (also a water hazard)



# Water Conservation – Wastewater Effluent Reuse

- 180 acres of irrigated turf (fairways, greens and driving range)
- Two other water hazards filled with the effluent
- Main operation is highest rate period
  - Summer rate is essentially double of winter rate





# Water Conservation – Wastewater Effluent Reuse

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- 80-100 MGal of wastewater effluent used per year to irrigate golf course
- Utility company now charging for reuse of wastewater effluent at 20% of potable rate
- Up until 2007, annual avoided cost of \$150K to \$200K

# Water Conservation – Central Vehicle Wash Rack



- Primary purpose -- remove sediment from tactical vehicles
- Serves Department of Transportation (DOT) vehicles
- Serves CO National Guard/Reserves
- Constructed 1987



# Water Conservation – Central Vehicle Wash Rack

- Major treatment facility
- Two storage basins -- nine mg capacity
- Grit traps/oil skimmers
- Rapid sand filtration
- Recycles Nearly 200 MGal per year



# Water Conservation – Rain Sensors

- Over 90 sensors installed in two year period (2003-2004)
- Equipment cost of \$75 per sensor; wireless sensors for easy installation
- Reduced water use by an estimated 80 MGal per year



# Water Conservation – Facility Improvements

- Over 50 Waterless Urinals Installed to Date (estimated savings of 30 KGal per year per urinal)
- Wash racks no longer built for new motor pools



# Water Conservation – Facility Improvements



- Replaced once through water cooling on two 75HP air compressors with a closed loop system (1.3 MGal per year)
- Buying H-axis clothes washers for barracks which use 50% less water



# Water Conservation – Facility Improvements

- Eight miles of waterline replaced from Trinidad to Pinon Canyon
  - Saving 40 MGal per year
- Designing to Silver LEED standard; limit irrigation, low flow fixtures, waterless urinals, etc.



# Water Conservation – Operational Improvements

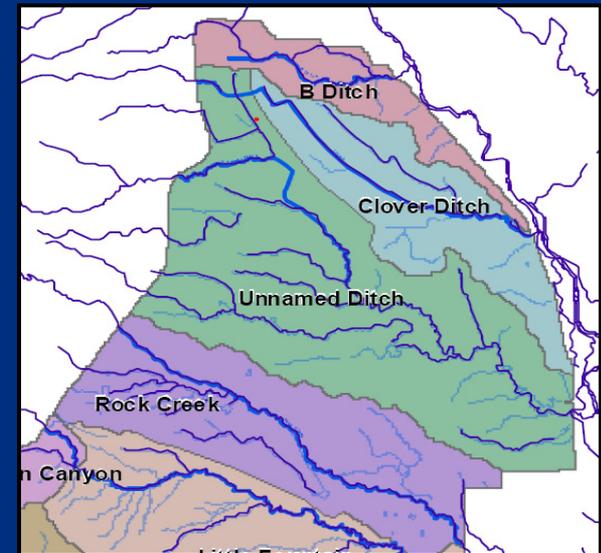


- Annual water policy letter limits watering to three days per week; privatized housing also adopted policy
- Winter irrigation and deep aeration



# Water Conservation – Stormwater Improvements

- Managing Stormwater on a Watershed-based level
  - Building hydrologic models will allow us to assess a projects overall impact on the sub-watershed prior to construction
  - Initiated a drainage sampling program to assess water quality and flow



# Water Conservation – Stormwater Improvements

- Providing Public Information/Events
  - Workshop providing information on regulation and program
  - Website that allows reporting of stormwater issues
  - Logo contest
  - Storm drain signage for water quality and safety
- Increasing inspections at construction and industrial sites





# Results and Impacts

- Annual potable water usage reduced from over 1,050 MGal to 650 MGal since FY02
- Water bill not much cheaper!
- Fort Carson sustainability goal of 75% reduction in water use per capita by 2027
- Next steps: Replacing lines, fixing leaking storage tank and water studies



# For More Information

- Would you like to know more about this session?
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- Don't forget to fill out and drop off your session evaluations!