



Oklahoma Water History, Drought, and Current Trends in **Water** Supply

A Presentation to:
Oklahoma Clean Lakes and Watershed
Association



April 18, 2013

AGENDA

- Introduction
- **Water** Conversations
- Terms and Concepts
- Water Resources Planning
- OK Water History
- Today's Trends and Activities
- Summary

INTRODUCTION

- Ken Senour CEP, QEP: 40 Yrs. Experience, Former Regulator (Ohio EPA), Water Resources Planning, Environmental Management
- Larry Roach, PE: 40 Yrs. Experience, Water Resources Planning, Treatment Design, Utility Infrastructure and Construction Management
- **Guernsey**: Architectural, Engineering, and Consulting firm; established in 1928 in Cherokee, OK; focused on water planning and engineering

WATER CONVERSATIONS

- OK Clean Lakes and Watershed Association
- OK Governor's Water Conference
- KS Governor's Water Conference
- Oklahoma Municipal League
- Oklahoma Water Law
- Oklahoma Water Survey
- Oklahoma Watershed Academy
- Oklahoma City Chamber of Commerce
- Cherokee Nation Water Conference
- Environmental Federation of Oklahoma
- Society of American Military Engineers
- Legal Concerns
 - Tarrant Regional
 - Native American Litigation



LOCAL HEADLINES GETTING ATTENTION



OLD AND NEW TERMS/CONCEPTS BEING DISCUSSED

Optimization
Sustainability
Conservation
RightsToWater
Passion
Fracking
BrackishWater
WaterTransfer
GlobalWarming
DroughtPlanning
DustBowl
Reuse
ClimateChange

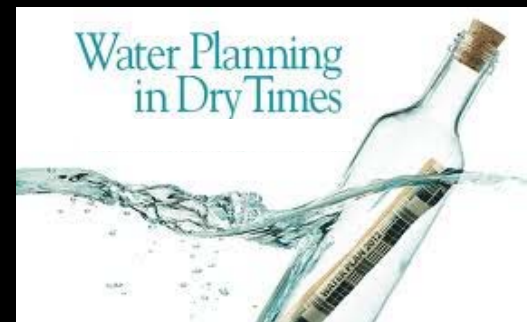
WATER PLANNING DILEMMAS

- “If you don’t know where you’re going, how can you expect to get there?” Basil S. Walsh
- “Prediction is difficult, especially about the future.” Yogi Berra
- “If you come to a fork in the road, take it.” Yogi Berra
- “Everybody has a plan, until they get punched in the face.” Mike Tyson



WATER PLANNING

- **Full-time** responsibility (not just in crisis situations)
- Comprehensive (surface water, groundwater, land use, watersheds)
- Flexible (outside the box)
- Supported (public, stakeholders)
- Implemented (vehicles, mechanisms for most updated version)



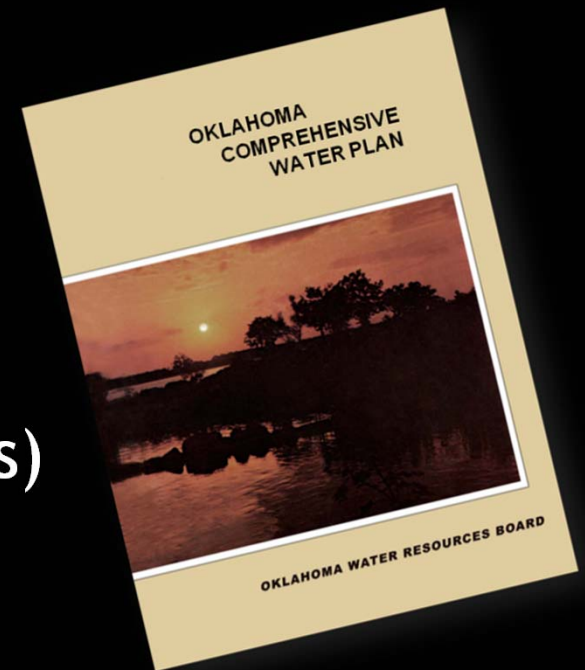
OKLAHOMA WATER HISTORY

- Trail of Tears 1830s
- Land Run 1889
- Statehood 1907
- **Dustbowl** 1930s



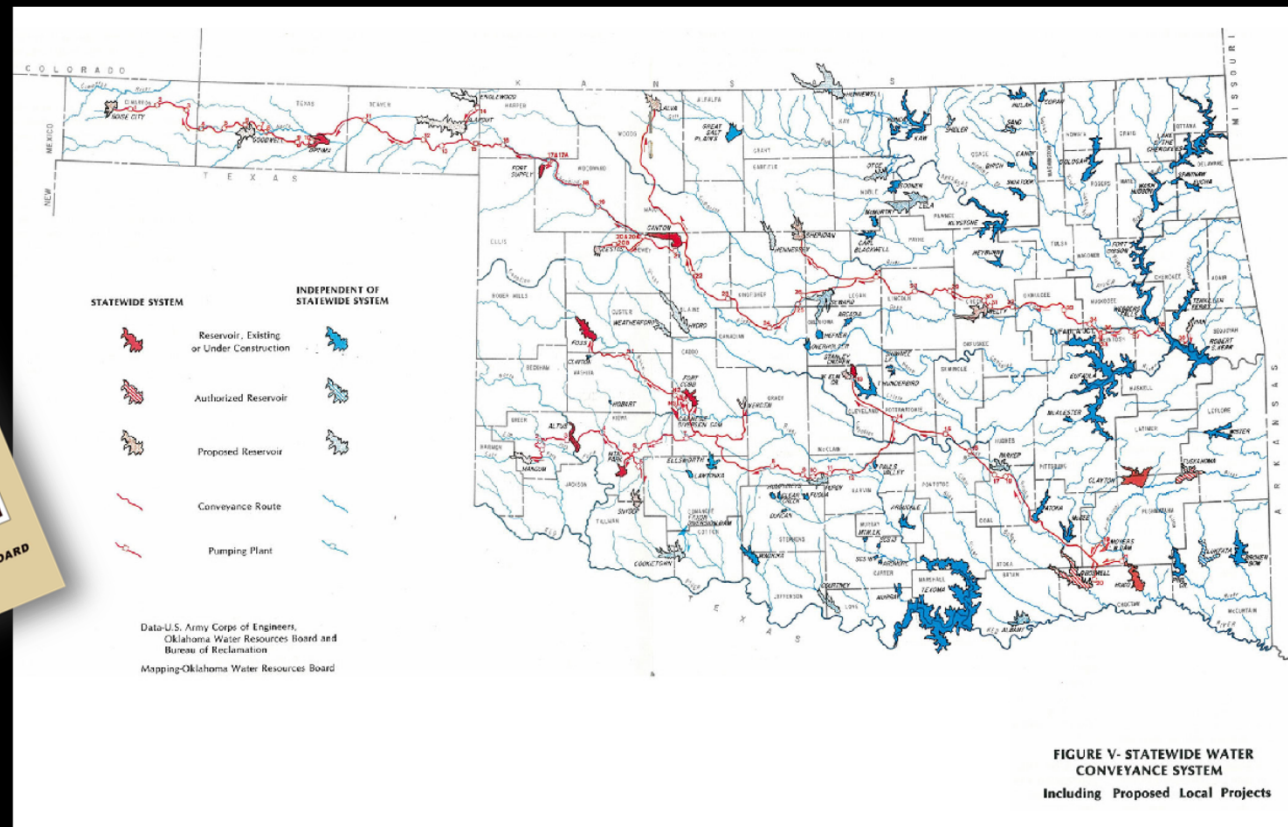
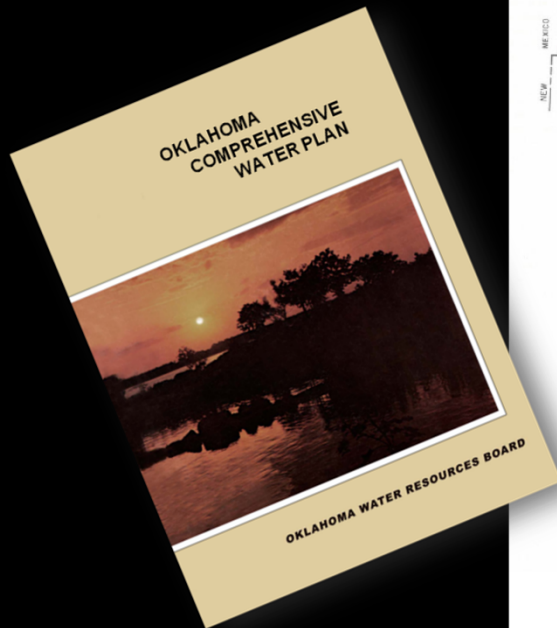
OKLAHOMA WATER HISTORY

- Trail of Tears 1830s
- Land Run 1889
- Statehood 1907
- Dustbowl 1930s
- Oklahoma Water Resources Board 1954
- US EPA Construction Grants Program, PL 92-500 (1970s & 1980s)
- Oklahoma Comprehensive Water Plan (With Conveyance) 1980
- Oklahoma Comprehensive Water Plan Update (No Conveyance) 1995



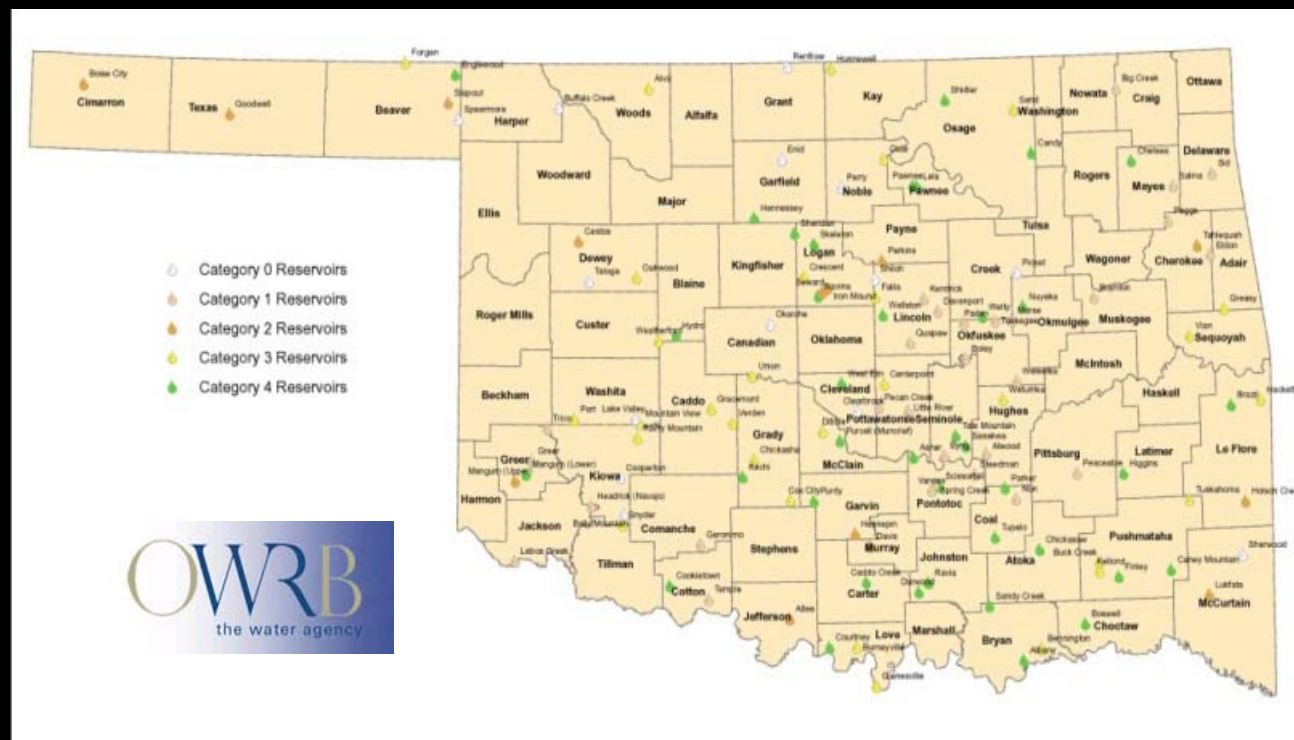
OKLAHOMA WATER HISTORY

Conveyance (1980)



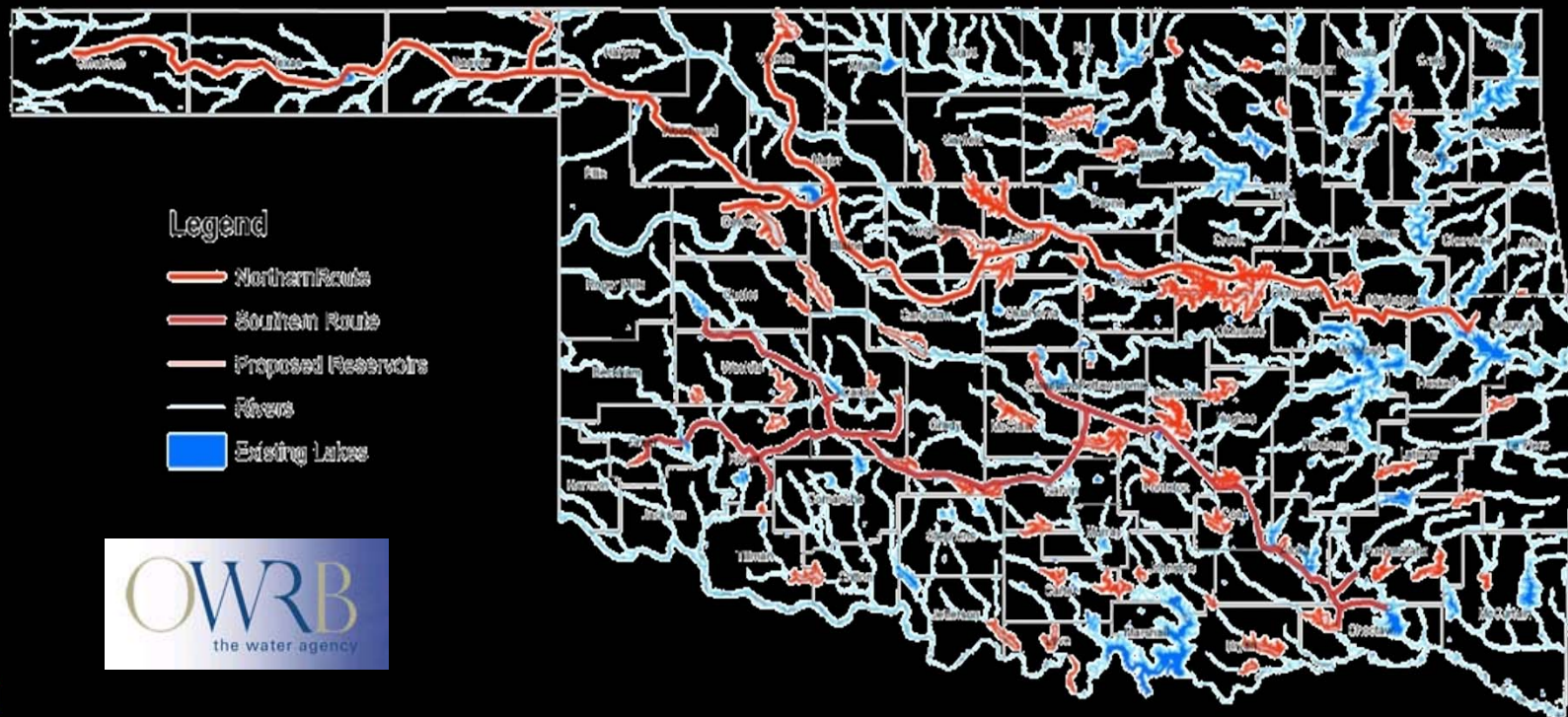
OKLAHOMA WATER HISTORY

- Oklahoma Comprehensive Water Plan
2012 Reservoir **Viability**



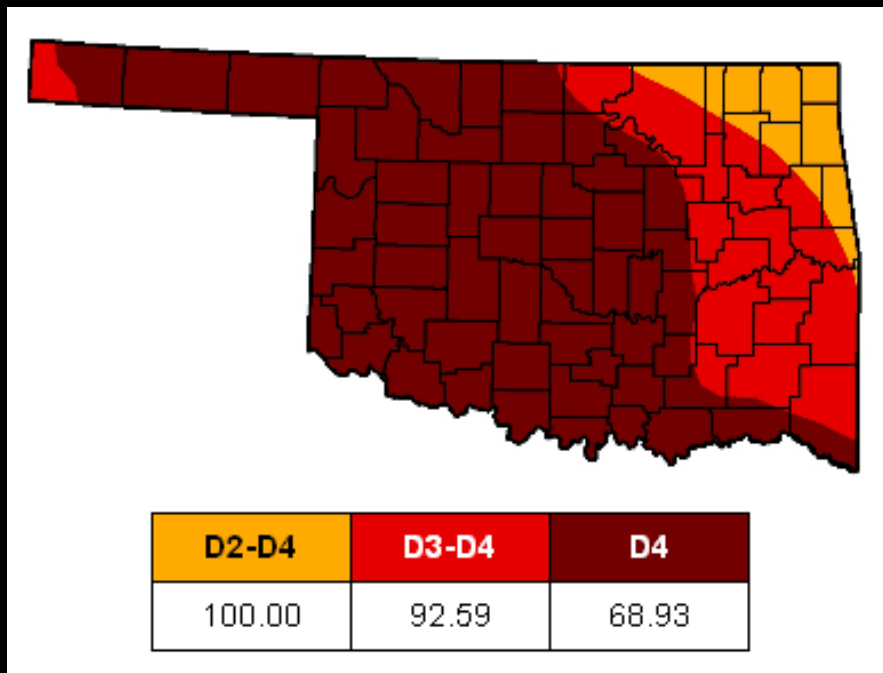
OKLAHOMA WATER HISTORY

- Oklahoma Comprehensive Water Plan 2012
Conveyance



OKLAHOMA WATER HISTORY

- **Drought** of 2011, 2012...?



OKLAHOMA WATER HISTORY

- Oklahoma Comprehensive Water Plan 2012
- **Reuse** Regulations 2012
- April 2013 –Water Alternatives
 - Saline/Brackish Water
 - Wastewater Reuse
 - Inter-basin Conveyance
 - Interstate Conveyance
 - Regionalization
 - Others

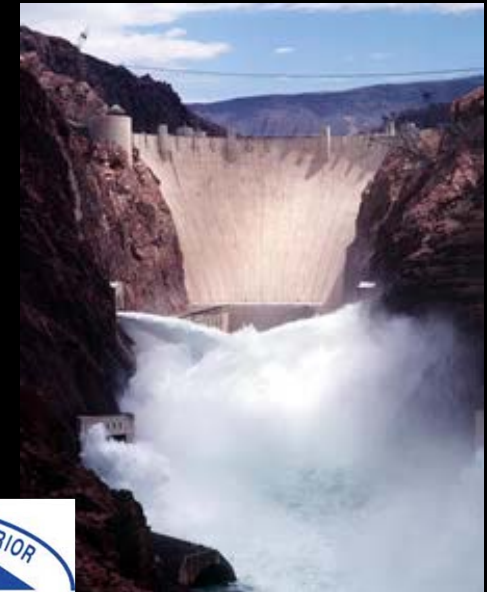


OKLAHOMA WATER HISTORY



FEDERAL PROGRAMS

- Bureau of Reclamation
- Corps of Engineers
- US Environmental Protection Agency
- Natural Resources Conservation Service
- US Geological Society
- Bureau of Indian Affairs
- Indian Health Service
- Native American Tribes



STATE PROGRAMS

- Department of Environmental Quality
- Oklahoma Water Resources Board
 - OCWP
 - Reservoir Viability Study
 - Conveyance Study
- Oklahoma Conservation Commission



SURFACE WATER TRENDS

- Rehabilitate Existing Systems
- Consideration of New Reservoirs (Time & Cost)
- Watershed Protection



SURFACE WATER TRENDS

Rehabilitation, Foss Reservoir Master Conservancy District, Butler, OK

- Upgrade and Expand 4.5 MGD Desalination Plant
- TDS Increasing
- Reservoir Salinity Management
- Brine Discharge a Major Issue



SURFACE WATER TRENDS

Regional Water Planning, Sunflower H₂O Initiative, South- Central, KS and Panhandle of OK

- PAS Funding from USACE, Tulsa District
- Six Counties, Two States and Multiple State & Federal Agencies
- Surface and Groundwater Water Supplies
- Fatal Flaws
- Financial Analysis
- Selection of Reservoir and Groundwater Options



SURFACE WATER TRENDS

Water System Master Plan/Water Supply Study, Enid, OK

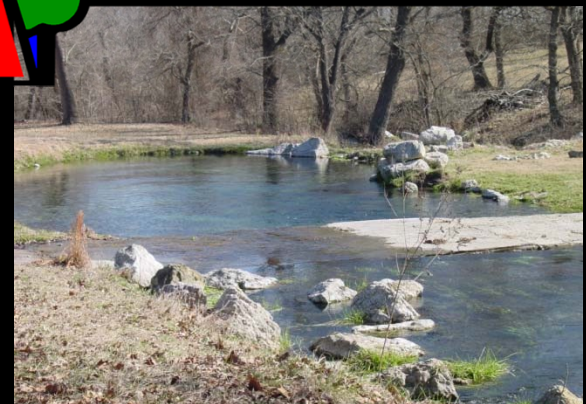
- 160 Existing Wells
- Two New Potential Well Fields
- Three Potential Reservoir Sites
 - 20-30 MGD
 - \$200 Million
 - Quality of Life Benefits
 - New Treatment Requirements
 - Bird Strike Considerations



SURFACE **WATER** TRENDS

Feasibility & Engineering Study for Proposed Scissortail Lake, Ada, OK

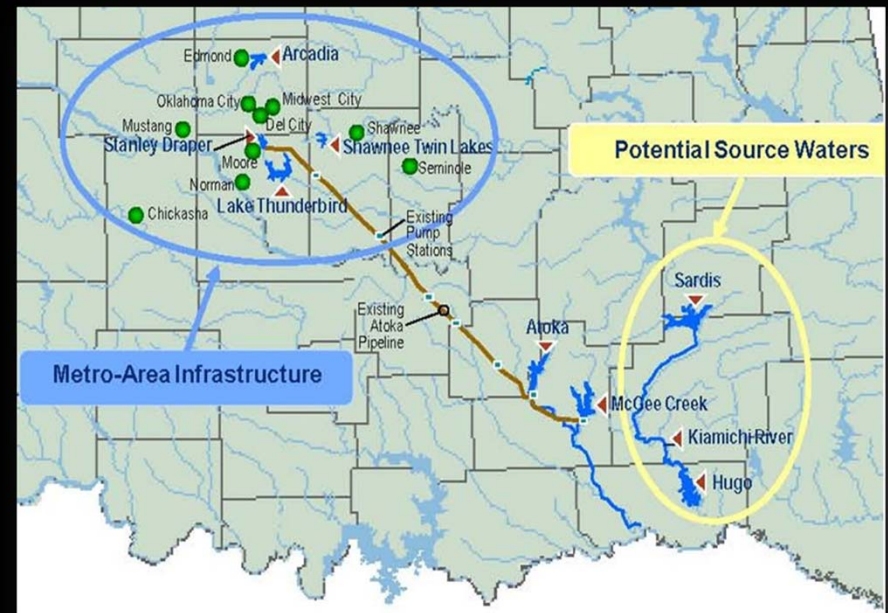
- Watershed Inventory
- Water Quality
- Hydrology and Hydraulics
- Concept Design
- \$200 Million
- 29 MGD
- Regionalization Opportunity



SURFACE WATER TRENDS

Water Reuse and Non-Reuse Feasibility Study, Lake Thunderbird, OK

- Examined Five Alternatives Related to Water / Wastewater Reuse and Non-Reuse
 1. Reuse Treated Wastewater
 2. “Reuse” Water from Canadian River
 3. A Proposed New Reservoir
 4. An Existing Lake in Northern OK
 5. Proposed Oklahoma City Southeast Oklahoma Supply



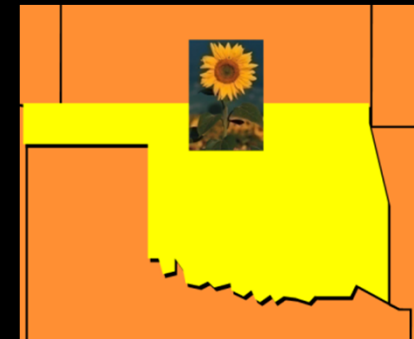
GROUNDWATER TRENDS

- Expansion of Existing Systems
- Consideration of Brackish Water
- Contamination Issues
- Not Necessarily Drought Proof
- Move to Sustainable Water Rights
- Potential for Indirect Reuse



GROUNDWATER TRENDS

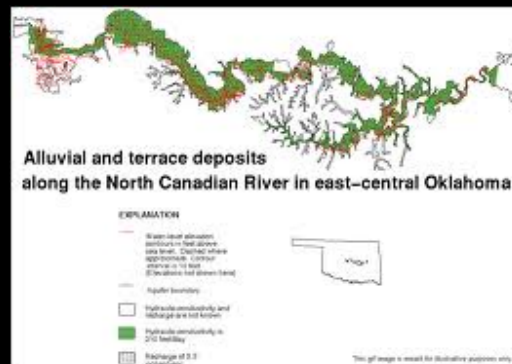
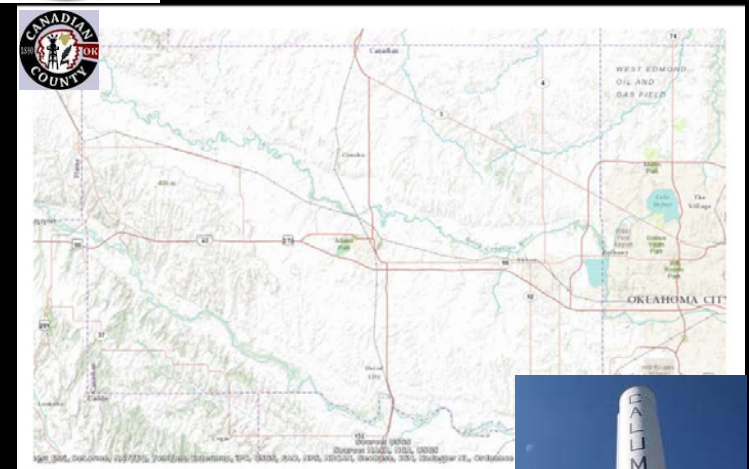
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GROUNDWATER TRENDS

Brackish Groundwater Evaluation, Canadian County, OK

- Feasibility Study
- Brackish Groundwater Source Analysis
- Alternatives for Wellfield & Desalination Facility
- Centralized Facility
- Implementation Plan



REUSE TRENDS

Water Reuse **Regulations**, Title 252, Chapter 627

- Category 2 Reclaimed Water: Irrigation, Sports Fields and Golf Courses, Fire Protection Systems, Toilets and Urinals, Range Cattle Watering, and Vehicle Washing
- Category 3 Reclaimed Water: Subsurface Irrigation of Orchards or Vineyards, Irrigation of Restricted Access Landscape, Livestock Pastures, Golf Courses and Sod Farms, Concrete Mixing, Aggregate Washing and Dust Control.
- Category 4 Reclaimed Water, Primarily Treated in Lagoon System: Soil Compaction and Similar Construction Activities, Existing Restricted Golf Course Irrigation
- Category 5 Reclaimed Water: Restricted Access Pasture Irrigation for Range Cattle, Fiber, Seed, Forage, Similar Crops, and Irrigation of Silviculture



REUSE TRENDS

City of Oklahoma City

- Irrigation for Golf Courses
- Power Plants



REUSE TRENDS

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Central Oklahoma Master Conservancy District

- Indirect Reuse



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Central Oklahoma Master Conservancy District

- Indirect Reuse

Lawton

- Power Plant



REUSE TRENDS

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Lawton

- Power Plants

Enid

- Industrial Cooling Water



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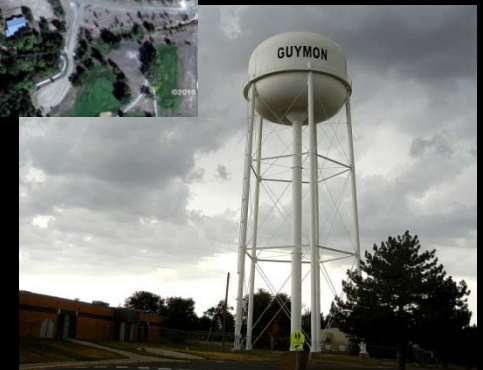
- Power Plants

Enid

- Industrial Cooling Water

Guymon

- Irrigation
- Recreation



Summary

- Water Conversations are taking Place Routinely Throughout the Region
- Water Resources Planning should be a Full-Time Activity
- Oklahoma has a Significant and **Important** Water History
- Expanding Existing Systems
- Looking for Alternative Supplies
- Considering Reuse/Reclamation
- 1970s and 80s have been rejuvenated—You are living it Today

