RECLAMATION

Managing Water in the West

Oklahoma-Texas Area Office

Drought Mitigation Tools

October 22, 2013

Collins Balcombe
Supervisory Program Coordinator

Drought at Lugert-Altus Reservoir

U.S. Department of the Interior
Bureau of Reclamation

Presentation Outline

- Drought planning at the local level
  - An interactive, web-based tool for rapidly assessing temporary water supplies during an emergency drought
- Drought planning at the basin level
  - A “supply reliability” study on the Upper Washita River Basin in west-central Oklahoma
- Water Conservation and Reuse
  - City of Sulphur - a regional assessment of benefits/costs of surface water and/or groundwater versus conservation and reuse
  - Lake Thunderbird Reuse Study - using the reservoir to store and regulate treated effluent, and the role wetlands might play in improving water quality

Reclamation Background

- Constructed more than 600 dams & reservoirs
- Provide water for 60% of nation's vegetables and 25% of fruits/nuts
- Provide drinking water to 31 million people annually
- 90 million visitor days per year
- The 2nd largest hydro producer, with 58 hydropower facilities producing 41 billion kwh

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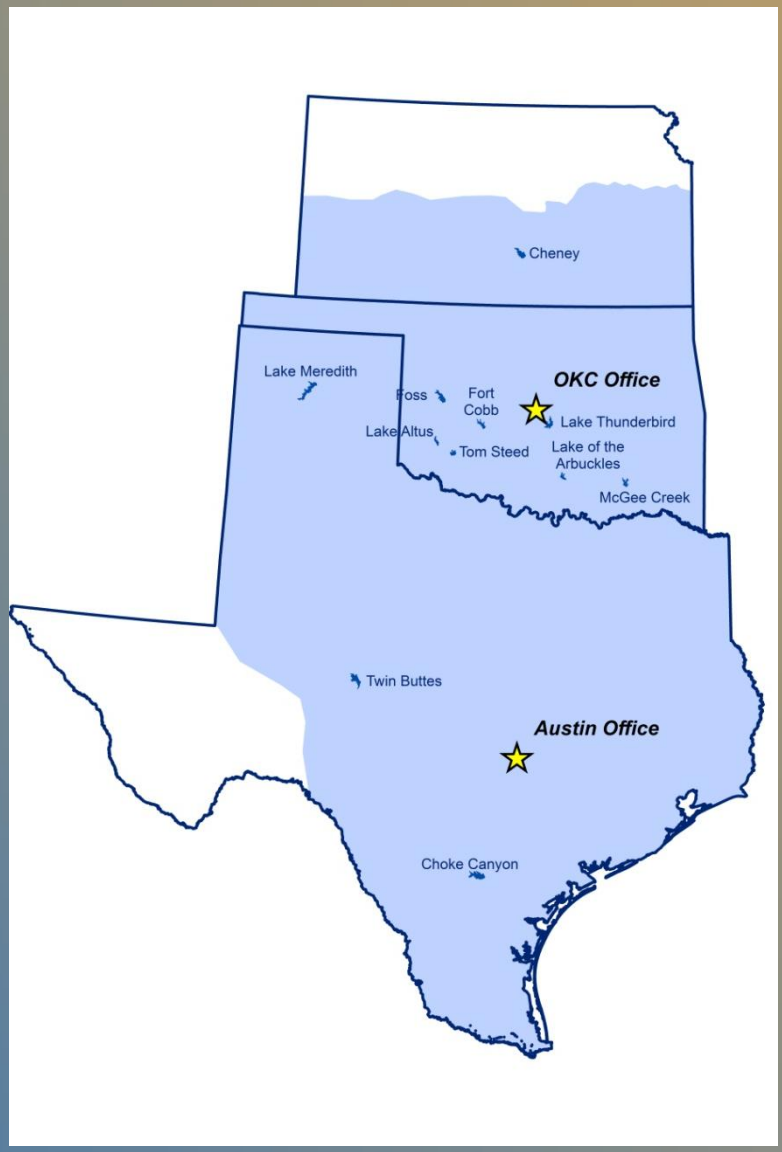
Oklahoma-Texas Area Office

- 11 reservoirs with a total capacity of 4.2 million acre-feet.
- M&I - 539,000 acre-ft/yr to about 2.7 million customers.
- Irrigation – 111,000 acre-ft/yr for about 63,000 acres.
- 5 million visitor-days each year.



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Local-level Drought Planning

Tool for Planning Temporary Water Supply Response in Drought Emergencies

A Collaboration between the Bureau of Reclamation and State of Oklahoma

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Local-level Drought Planning

Kick-Off Meeting, Jan. 2013

- OK Water Resources Board
- OK Dept of Emergency Mgt
- OK Dept of Env Quality
- OK Corporation Commission
- OK Dept of Wildlife Conservation
- OK Dept of Agriculture
- OK Forestry Services
- OK Climatological Survey
- OK State University
- OK Rural Water Association
- OK Municipal League
- U.S. Bureau of Reclamation
- U.S. Dept. of Agriculture
- National Weather Service
- U.S. Army Corps of Engineers
- OK Army National Guard

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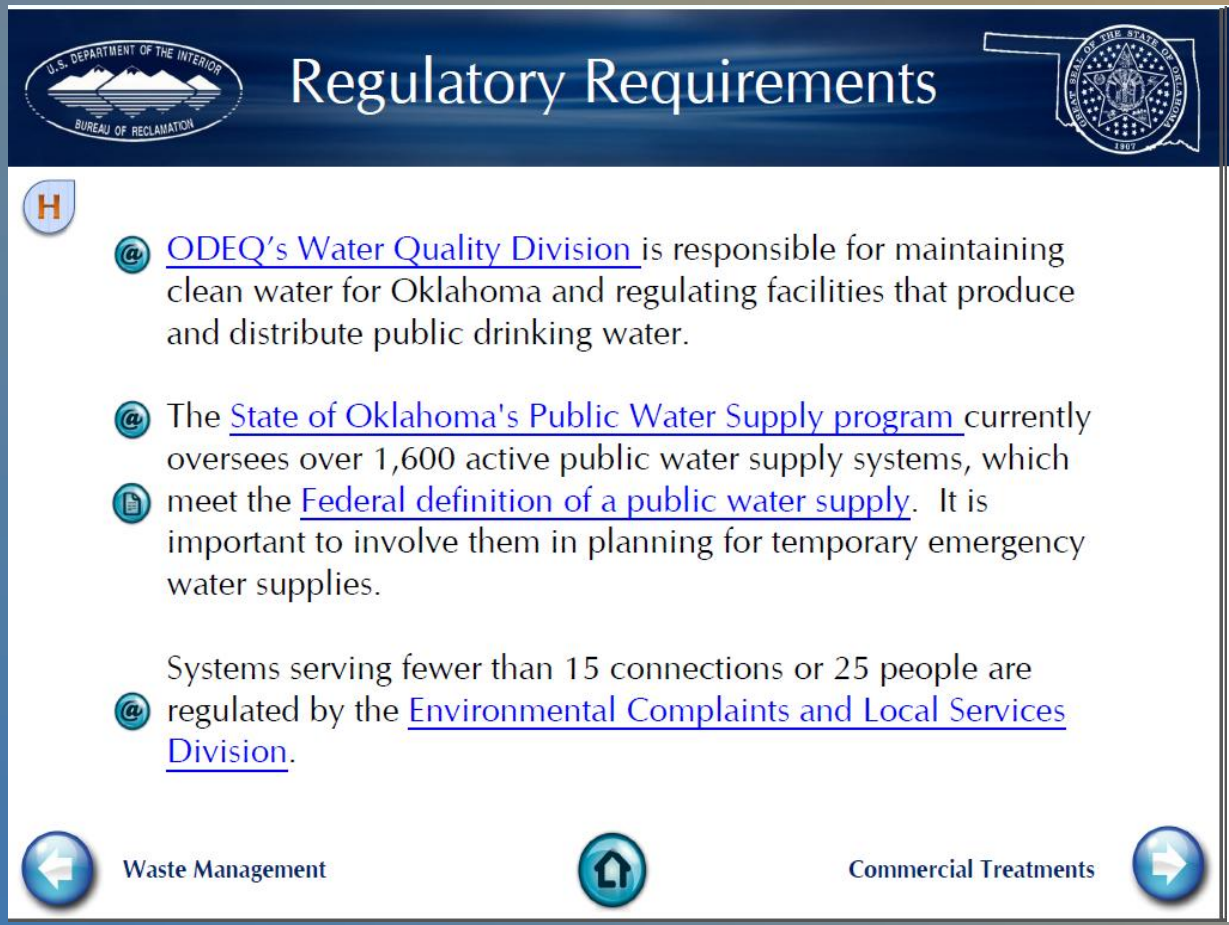
Local-level Drought Planning

Tool for Rapidly Assessing Temporary Water Supplies During Drought

- Survey sent out by OWRB with assistance from OML and RWA
  - 175 responses
- Draft tool circulated for comments
- Will be available on OWRB website



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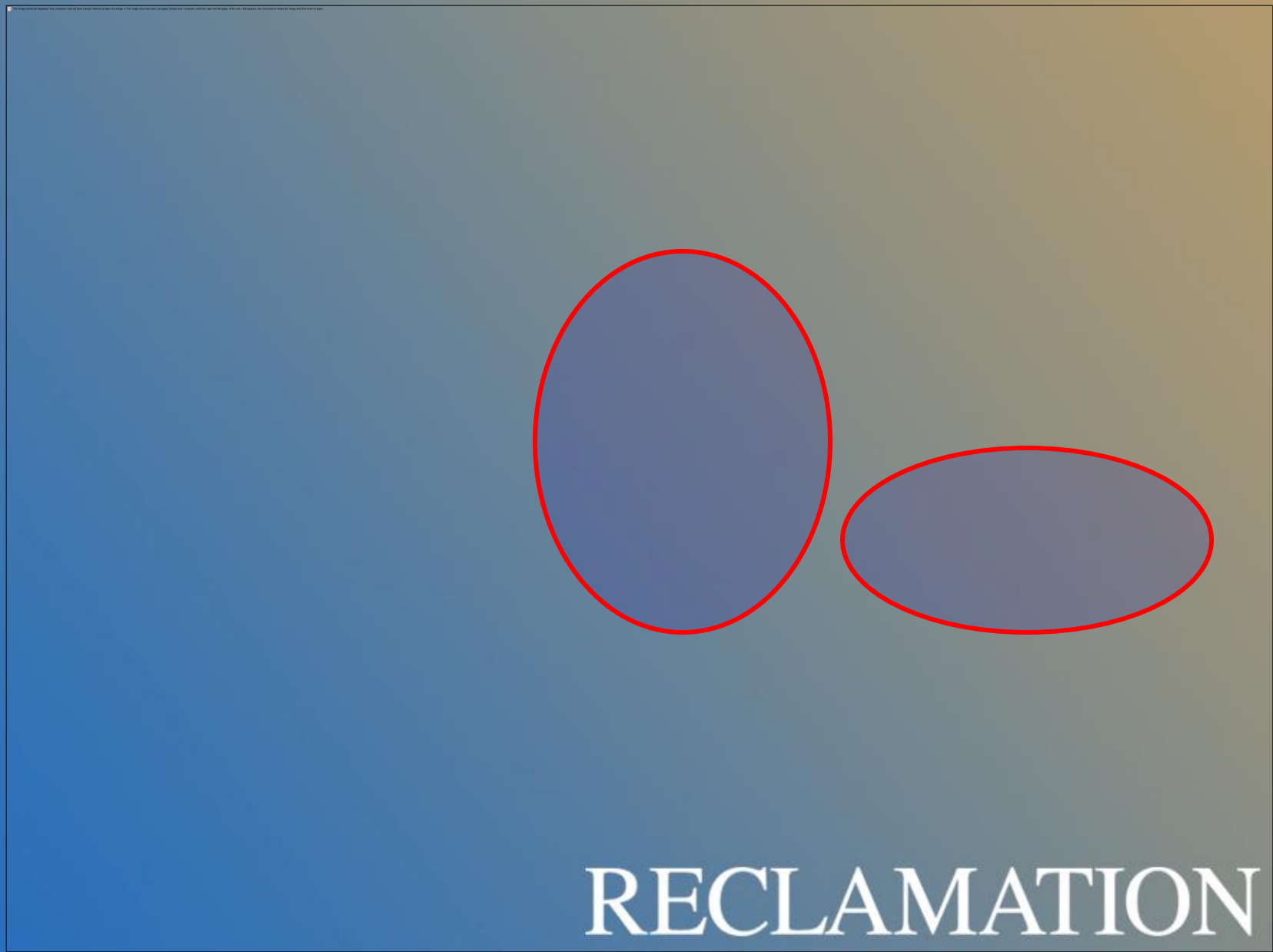
Basin-Level Drought Planning

Upper Washita Basin Study



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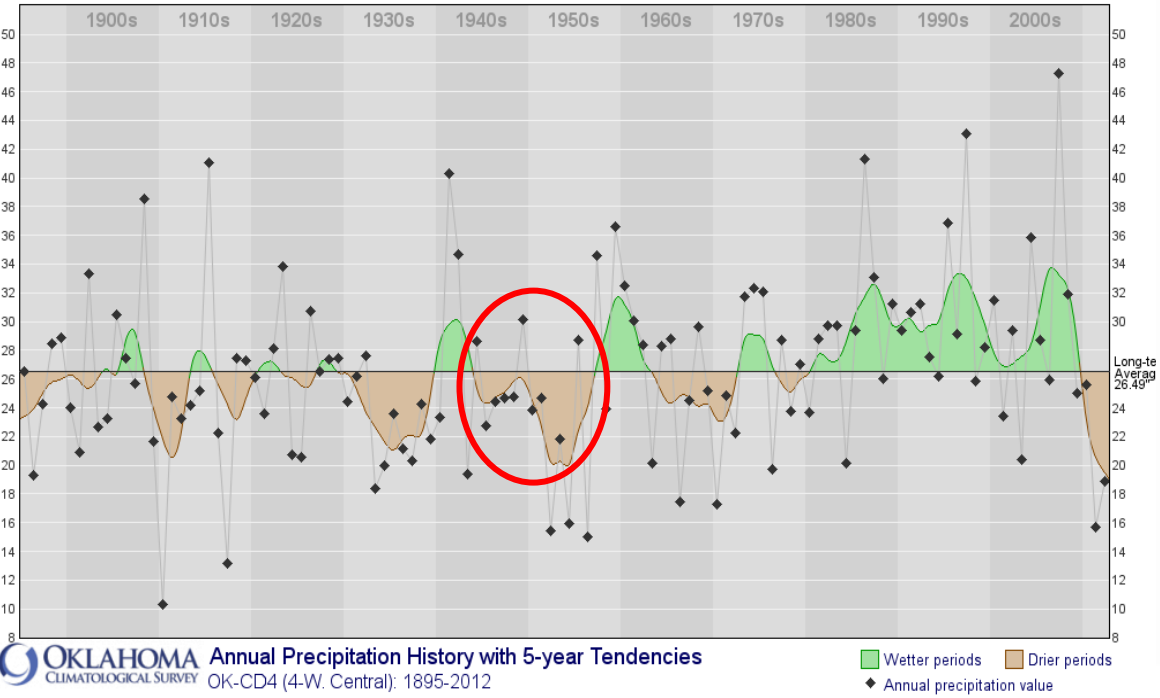
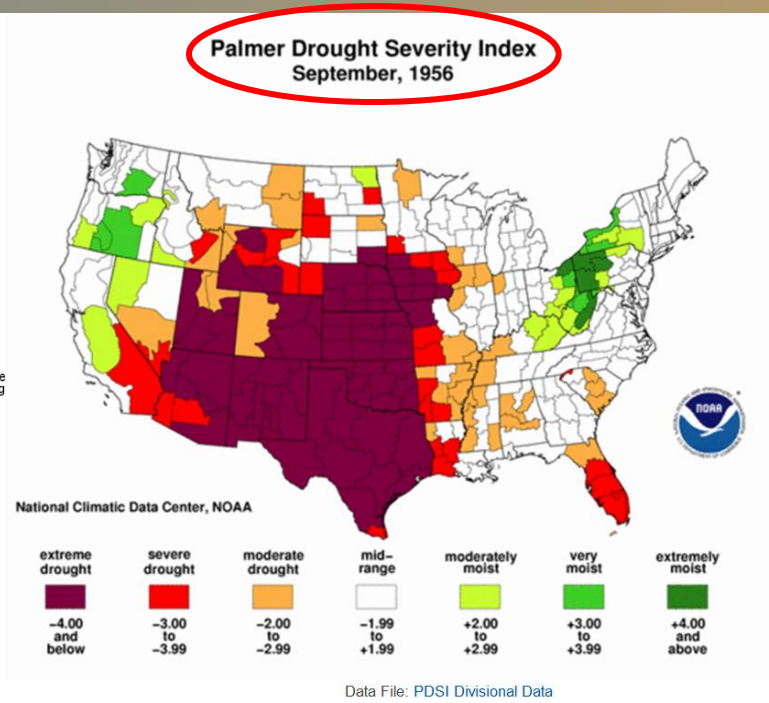
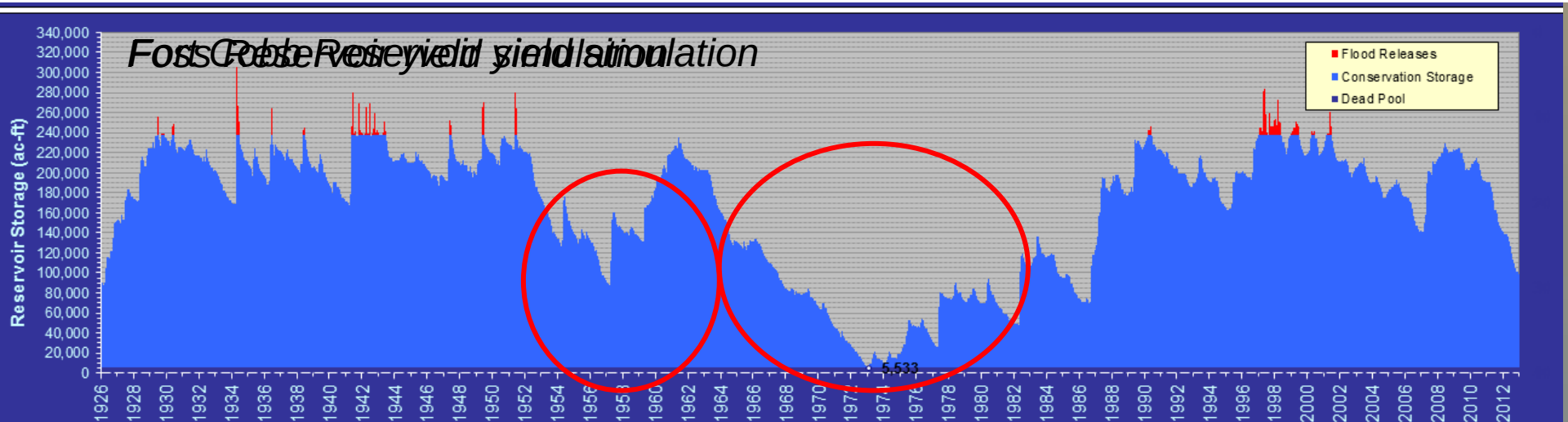
Basin-Level Drought Planning

Upper Washita Basin Study



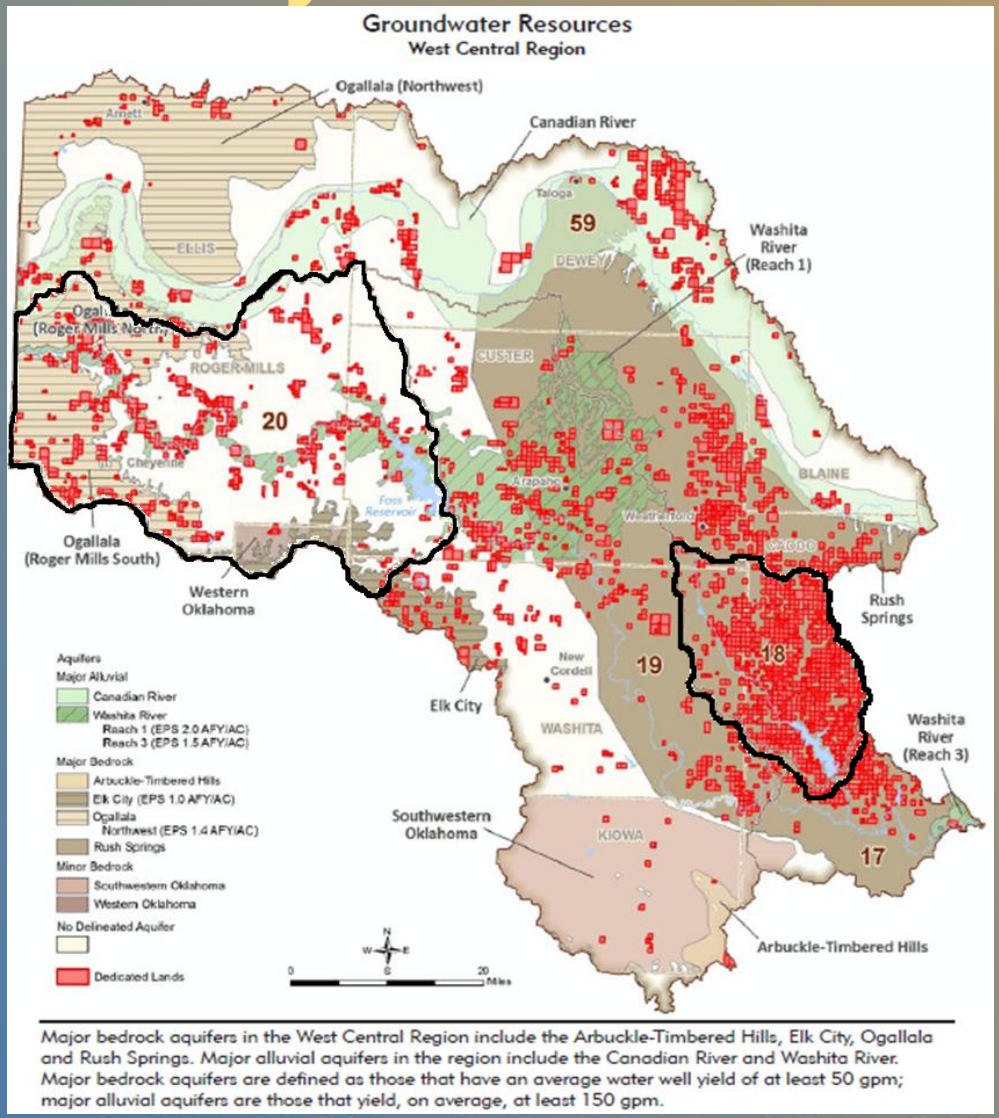




Basin-Level Drought Planning

Upper Washita Basin Study

- Dedicated lands for groundwater permits
- Red squares = active permits



Major bedrock aquifers in the West Central Region include the Arbuckle-Timbered Hills, Elk City, Ogallala and Rush Springs. Major alluvial aquifers in the region include the Canadian River and Washita River. Major bedrock aquifers are defined as those that have an average water well yield of at least 50 gpm; major alluvial aquifers are those that yield, on average, at least 150 gpm.

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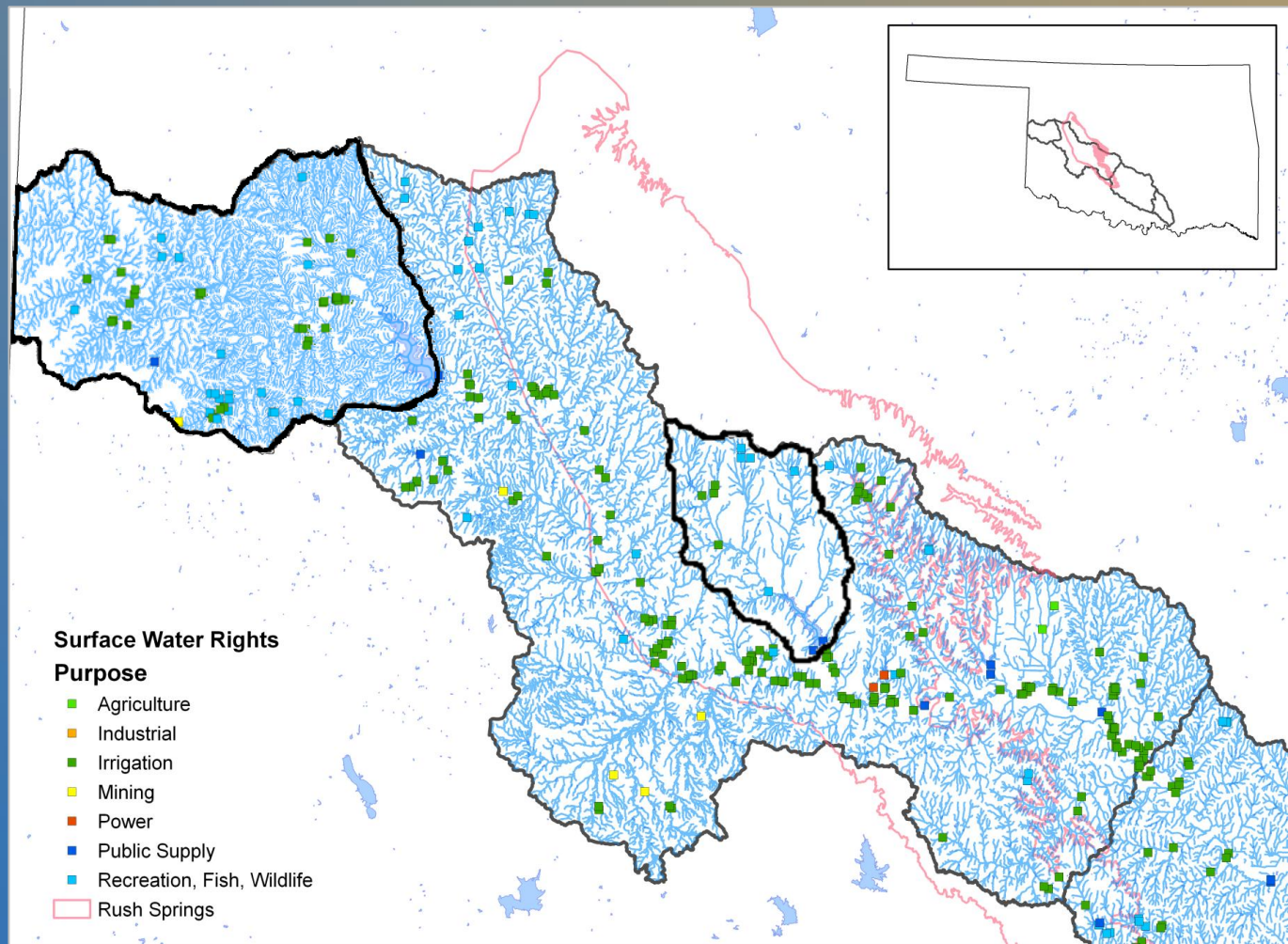
Basin-Level Drought Planning

Upper Washita Basin Study

- Active surface water permits
- Green squares represent active permits



Basin-Level Drought Planning

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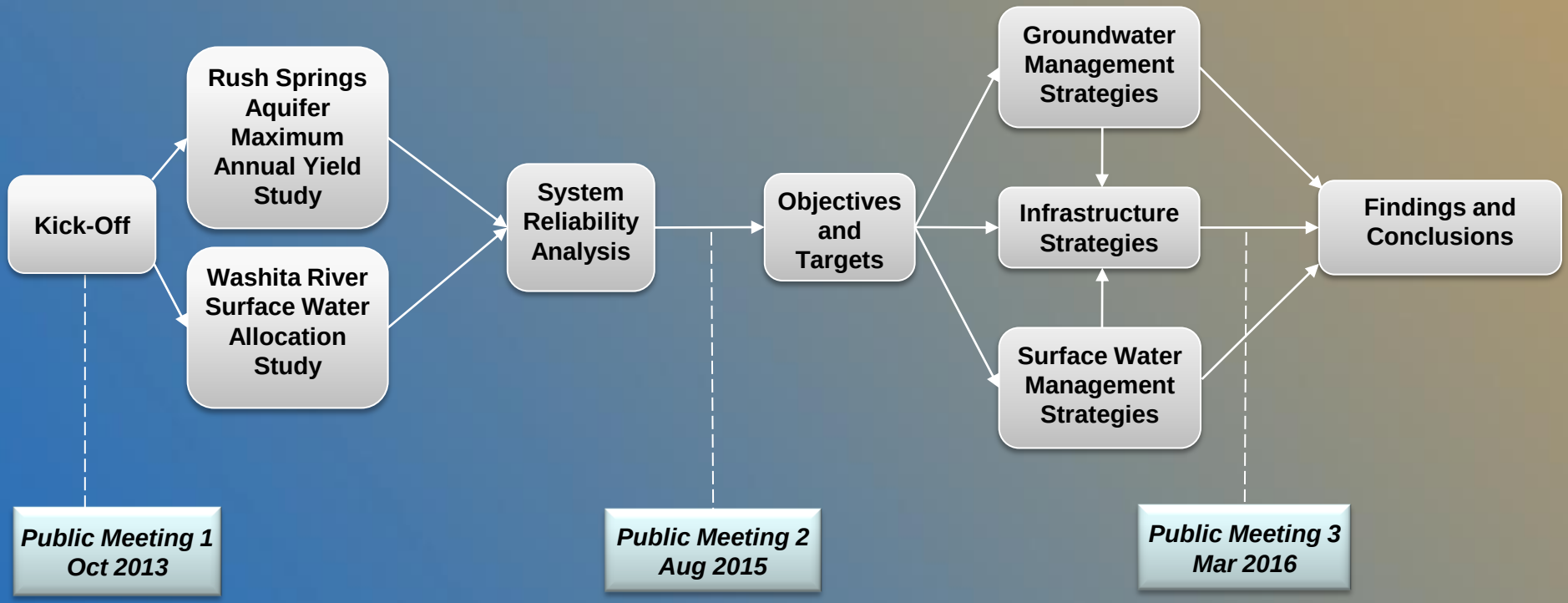

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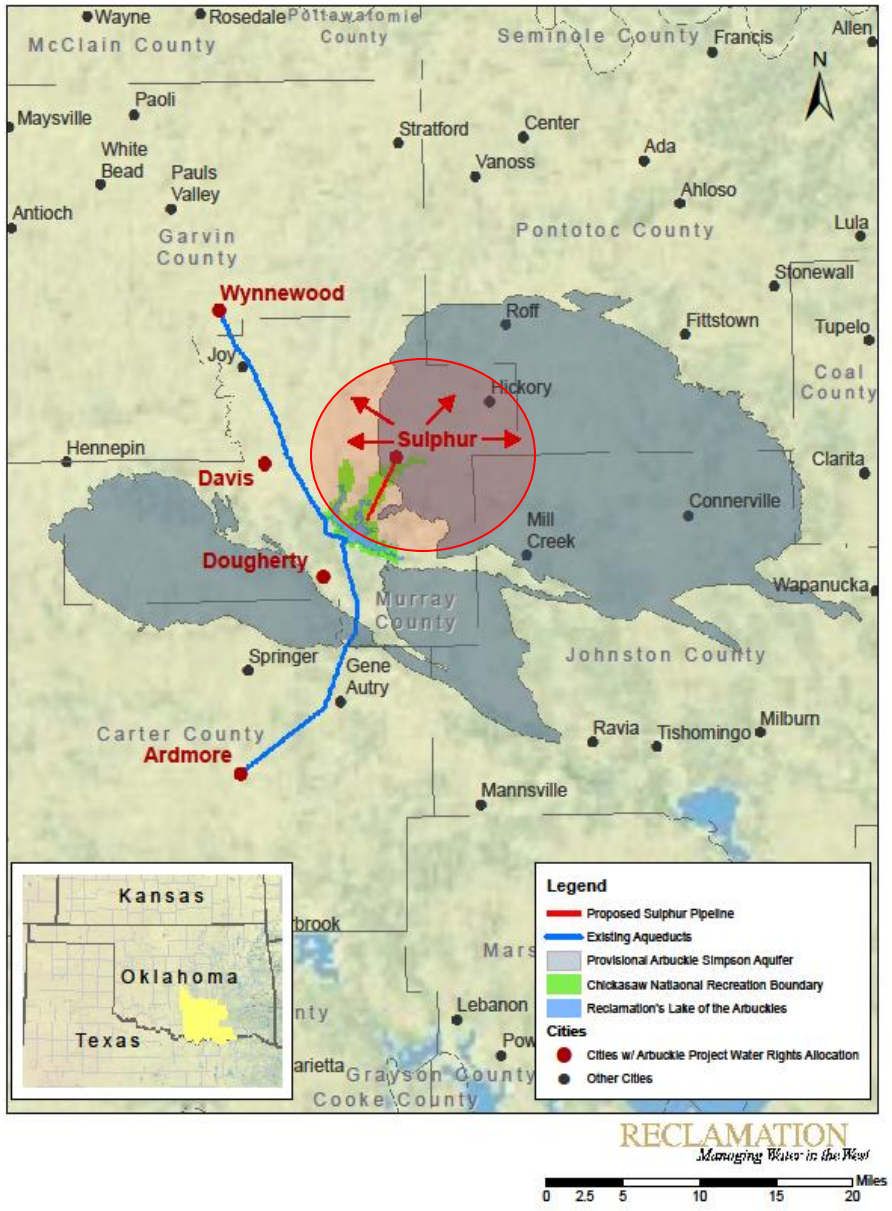
Water Conservation & Reuse

Sulphur Pipeline Study

- Evaluate alternatives to convey and treat Sulphur's share (1,997 acre-feet per year) of Arbuckle Lake water to the City and surrounding area

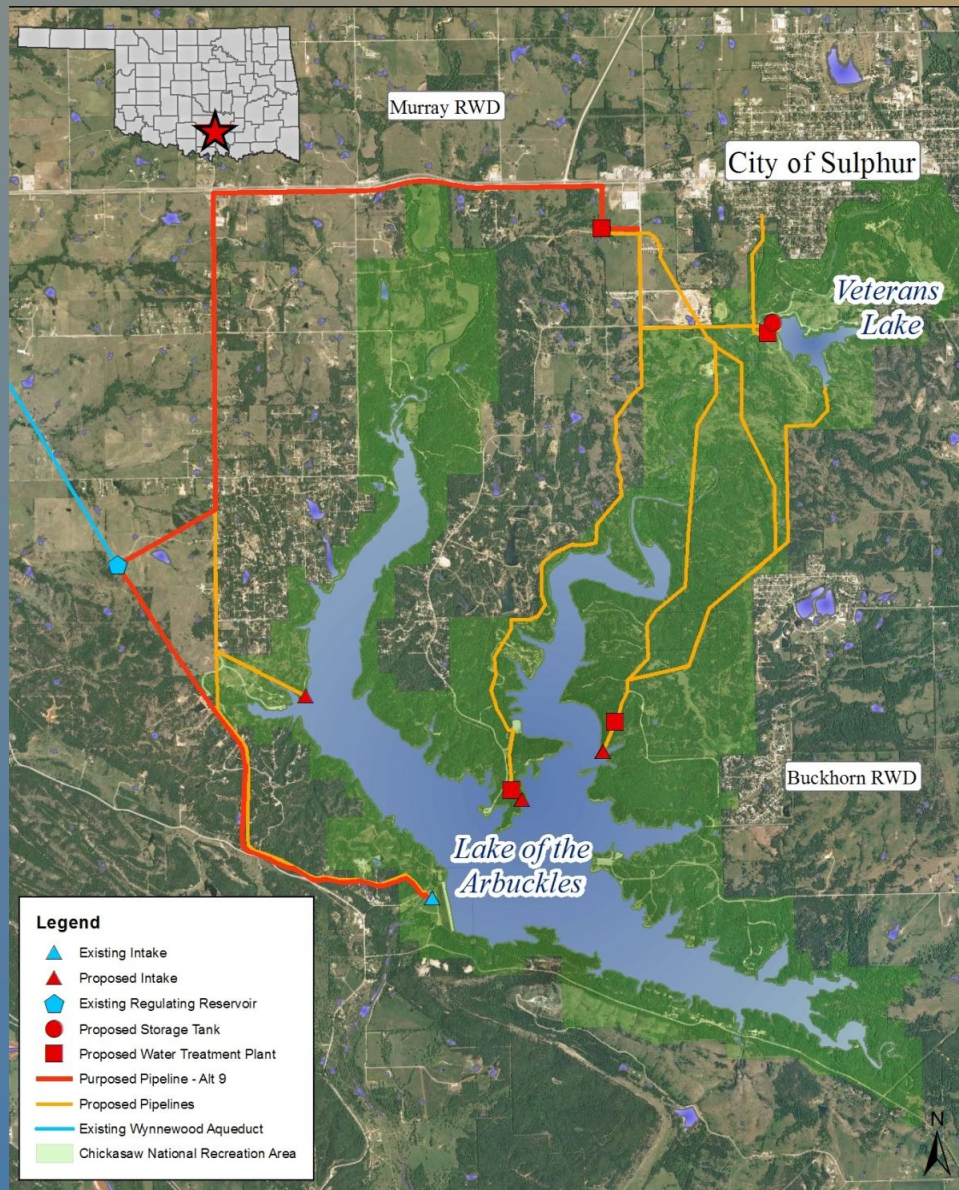


Water Conservation & Reuse

Sulphur Pipeline Study

Proposed Pipeline Alternative:

- Most reliable water delivery
- Maximizes use of existing infrastructure
- Avoids environmental and recreation impacts
- Most acceptable to stakeholders



Sulphur Pipeline Study

Costs versus Benefits

- Benefts associated with “willingness to pay” and avoided land acquisition costs for new groundwater rights
- Benefits associated with recreation/environmental (R/E) values tied to the Chickasaw National Recreation Area, including the Arbuckle-Simpson springs and Lake of the Arbuckles
- Which is “better” in terms of preserving R/E benefits, especially during the most severe drought?
  - Maintaining aquifer levels? (i.e., using the lake)
  - Maintaining lake levels? (i.e., using groundwater)

Water Conservation & Reuse

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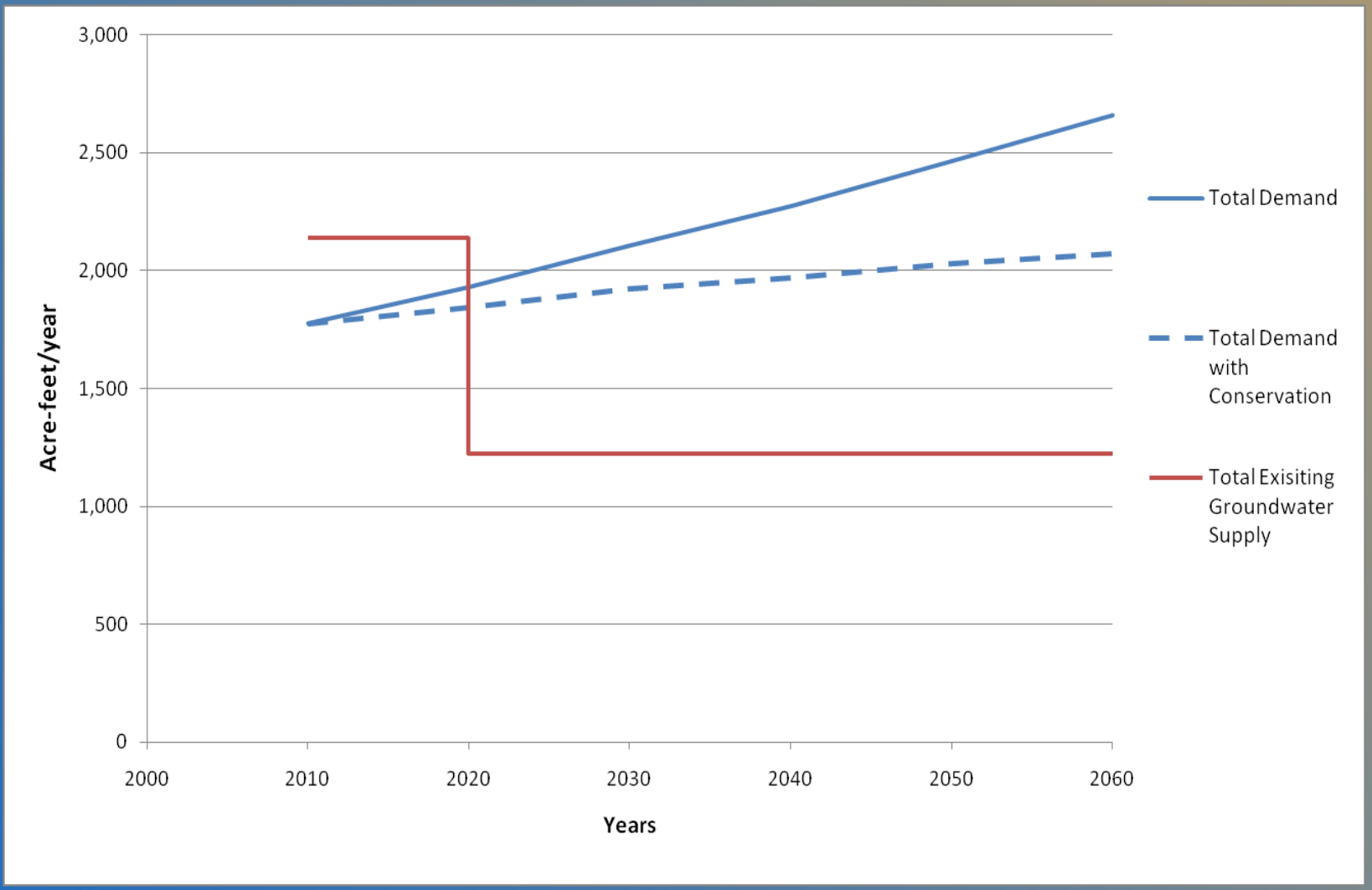

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Water Conservation & Reuse

Sulphur Pipeline Study

- Appraisal study is complete and awaiting final approval
- Further study is needed to evaluate the role water conservation and reuse can play in preserving recreation/environmental benefits.
- Perform an “apples to apples” comparison of benefits vs. costs of different options.
- Develop an implementation strategy.

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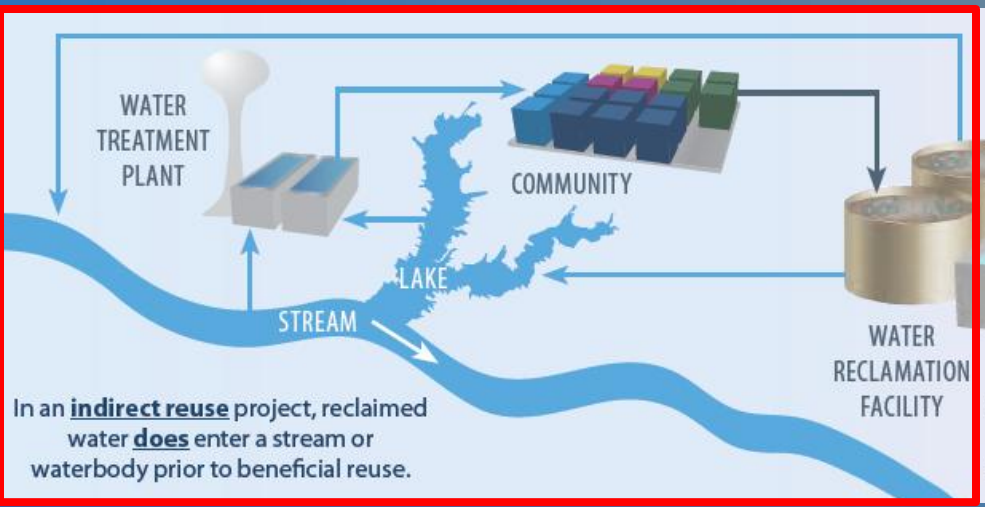
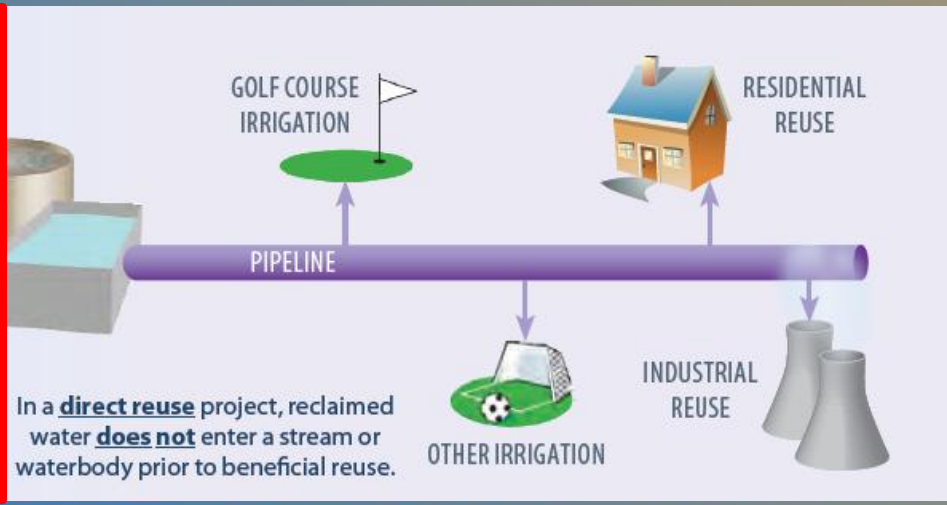
Lake Thunderbird Reuse Study

- Central Oklahoma Master Conservancy District owns water rights and operates the Norman Project
- Increasing population, driven by Norman
- Existing and projected water supply deficits
- Drought-induced lowering of lake levels
- Expensive importation options





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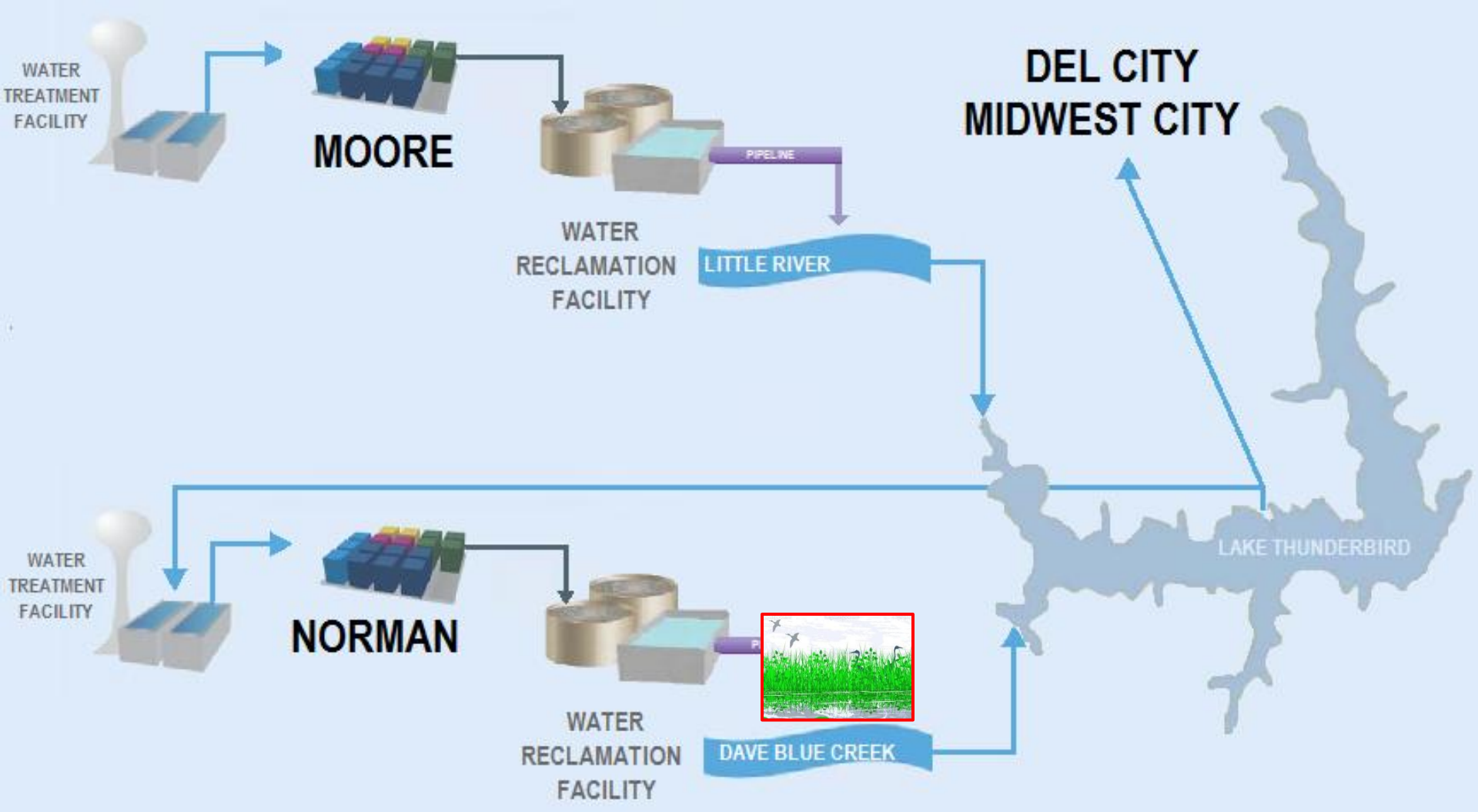
Lake Thunderbird Reuse Study



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Water Conservation & Reuse

Innovative Wetland Design

Indirect Potable Reuse

- Priority research area (Water Reuse Research Foundation)
- Optimize wetland design to reduce potentially regulated “emerging contaminants” such as EDCs, trace organics, pharmaceuticals, etc.

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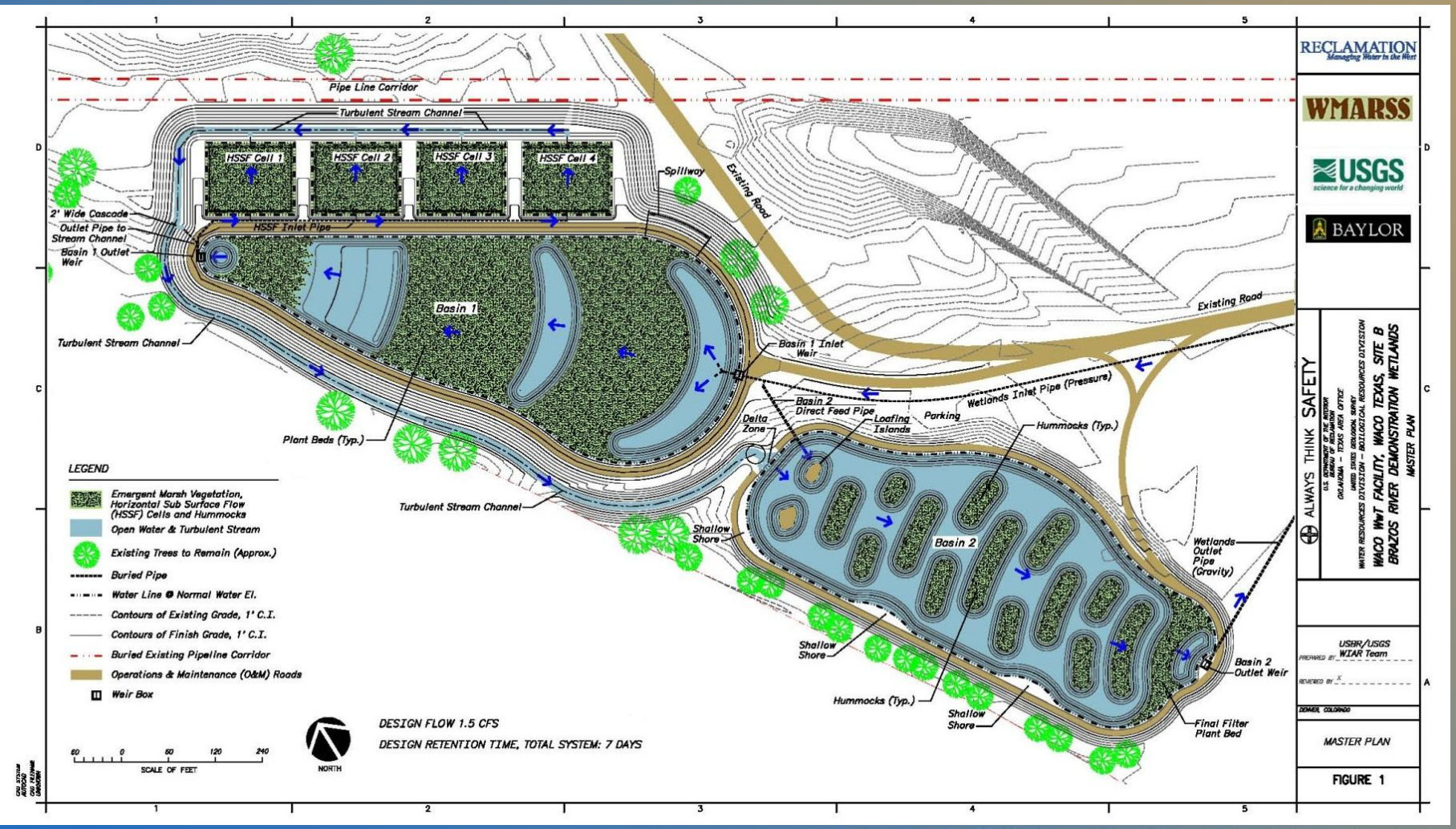
Innovative Wetland Design

Indirect Potable Reuse



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Recap Summary

Contact Info: Collins Balcombe: *cbalcombe @usbr.gov*

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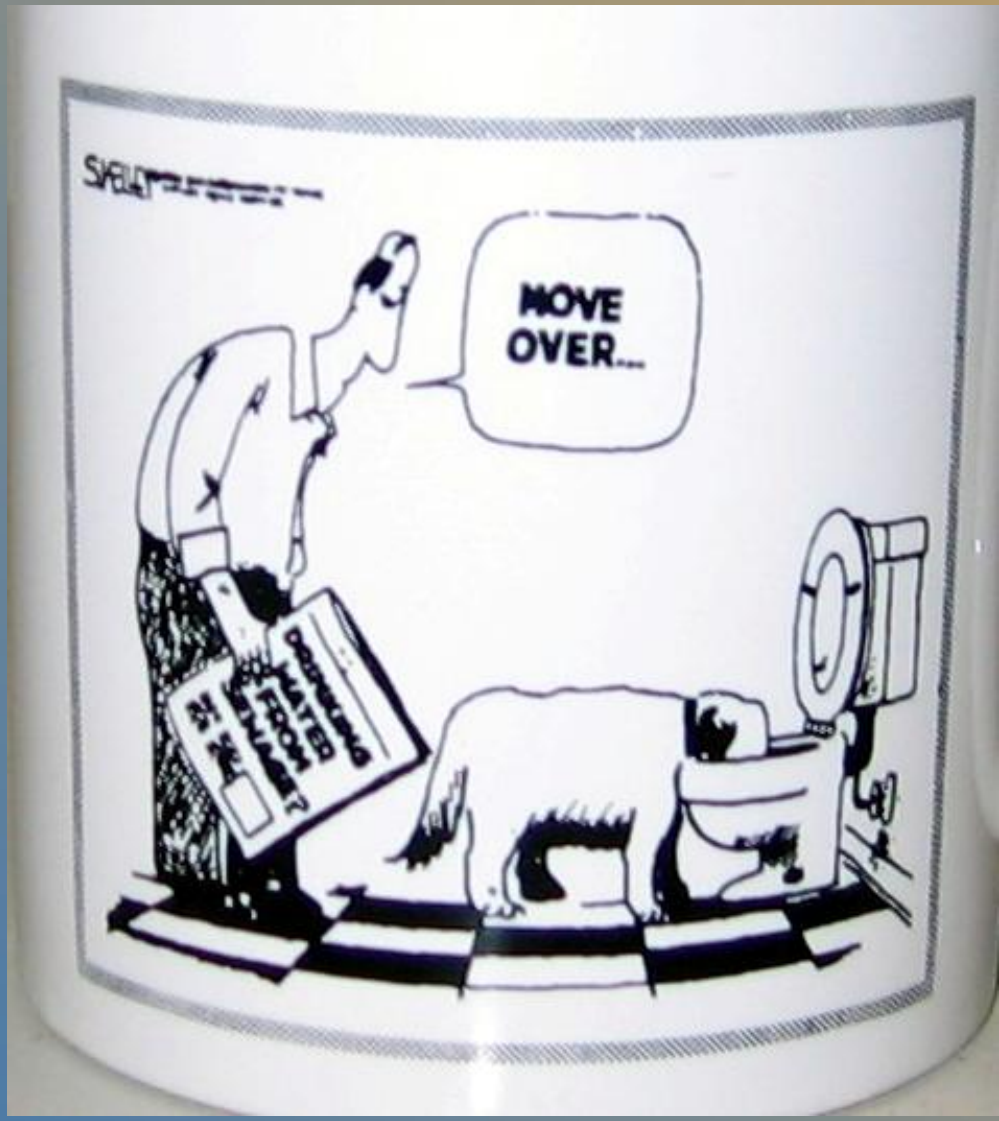
THANK YOU!

"the potable reuse of highly treated reclaimed water without an environmental buffer is worthy of consideration, if adequate protection is engineered within the system."

National Academy of Sciences (2012)



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