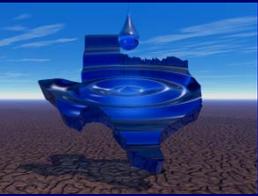




**City Of Wichita Falls  
Status of Water Resources**

**March 25, 2014**



# Causes of Problem

## *Loss of Rainfall*

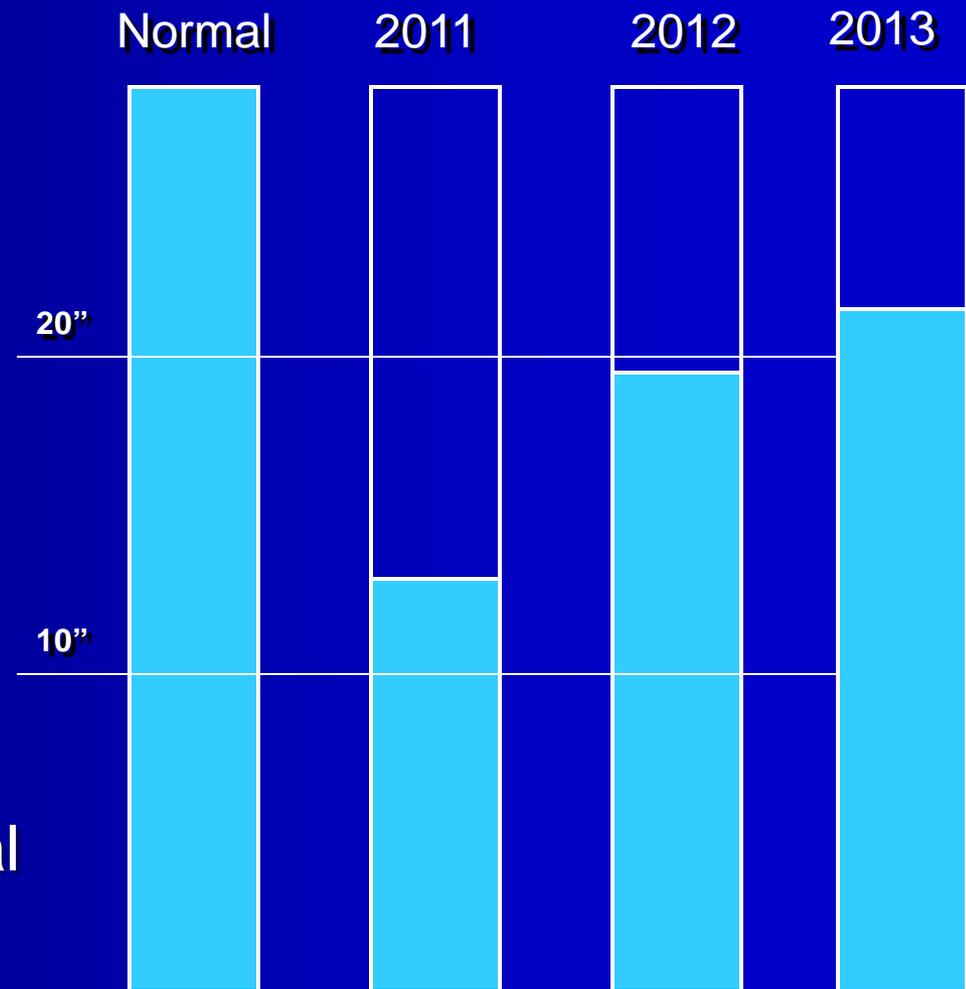
The annual average rainfall for the Wichita Falls area is 28.5 inches.

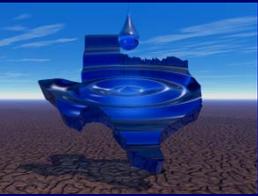
In 2011 we were 15.5 inches below normal.

In 2012 we were 8.75 inches below normal.

In 2013 we were 7.24 inches below normal.

Over 30 inches below normal for the past 3 years





# Causes of Problem

## *Record Temperatures*

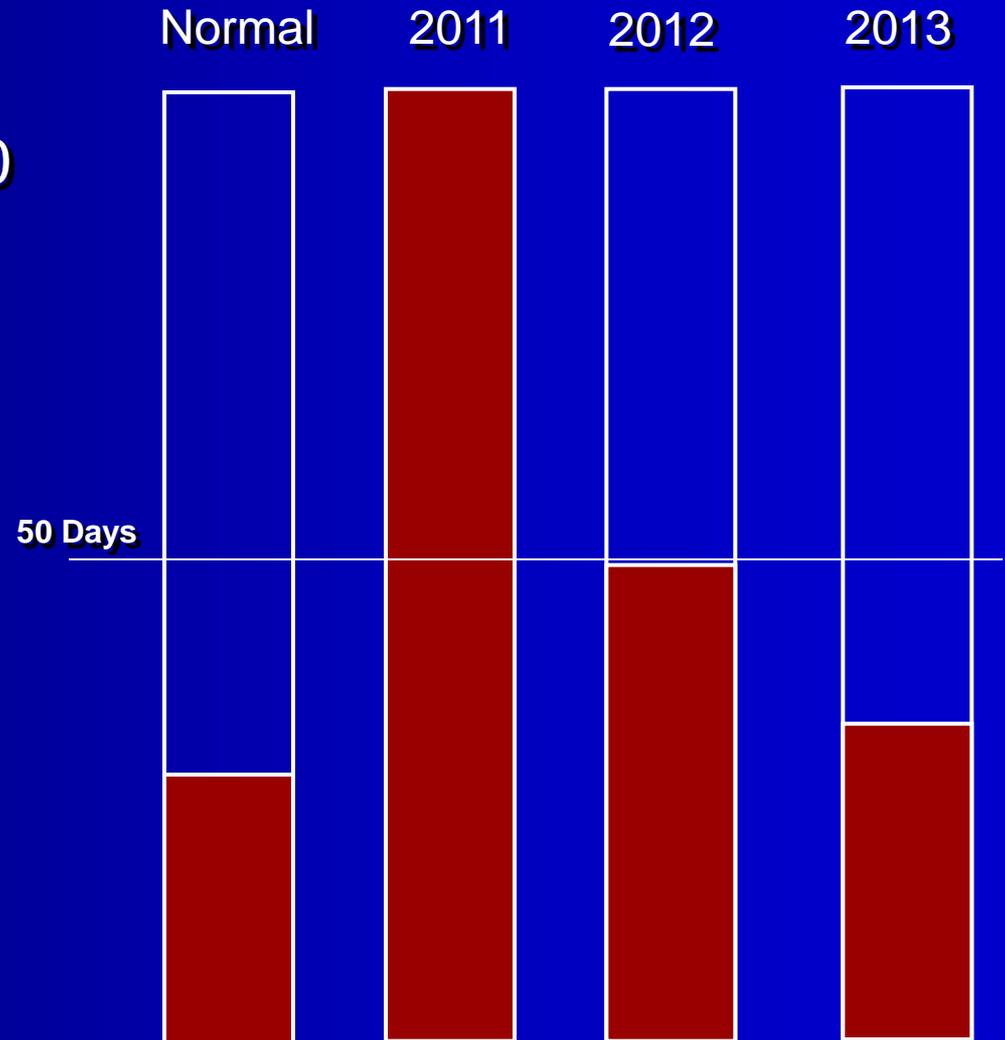
Wichita Falls typically averages 28 days over 100 degrees

In 2011 we had 100 days.

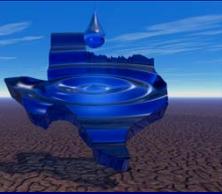
The Weather Channel ranked Wichita Falls the #1 Worst Summer anywhere in the U.S. for 2011.

In 2012 we had 50 days.

In 2013 we had 32 days.



# State of the Drought 2011



*Drought Conditions (Percent Area)*

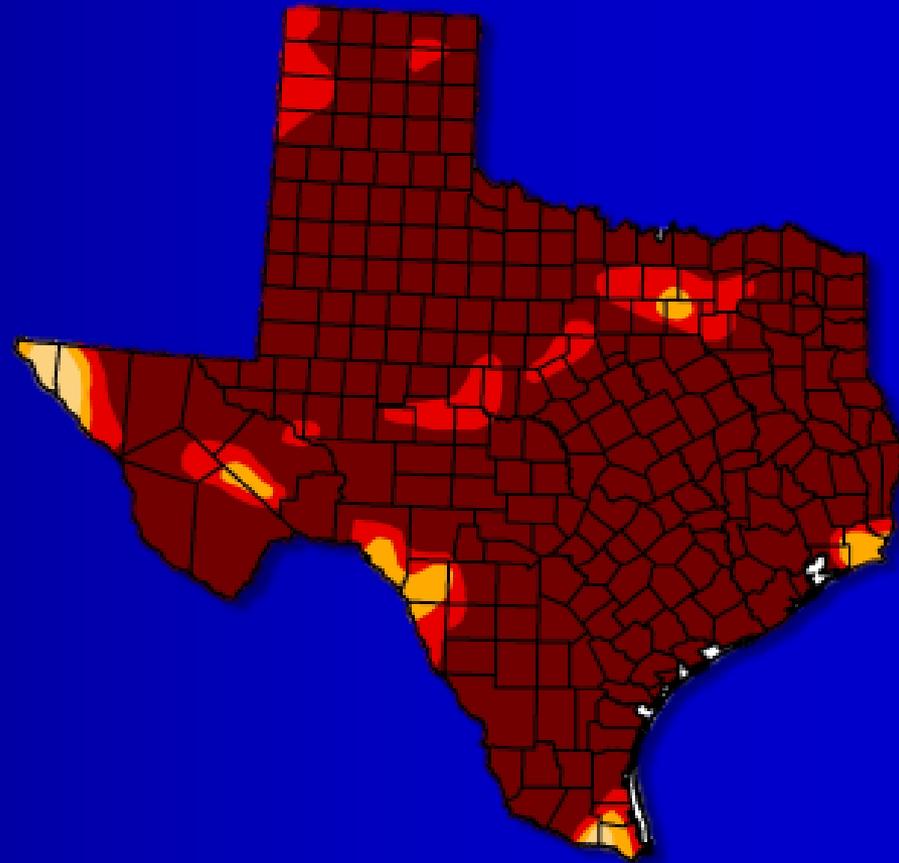
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	99.17	96.75	87.83
Last Week (09/06/2011 map)	0.00	100.00	99.93	99.01	95.68	81.06
3 Months Ago (06/14/2011 map)	1.97	98.03	96.53	94.77	88.57	64.78
Start of Calendar Year (12/28/2010 map)	7.89	92.11	69.43	37.46	9.59	0.00
Start of Water Year (09/28/2010 map)	75.57	24.43	2.43	0.99	0.00	0.00
One Year Ago (09/07/2010 map)	69.60	30.40	5.25	1.51	0.00	0.00

*Intensity:*

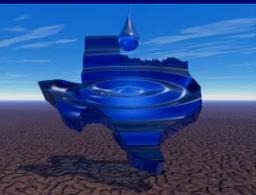
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

<http://drought.unl.edu/dm>



October 2011



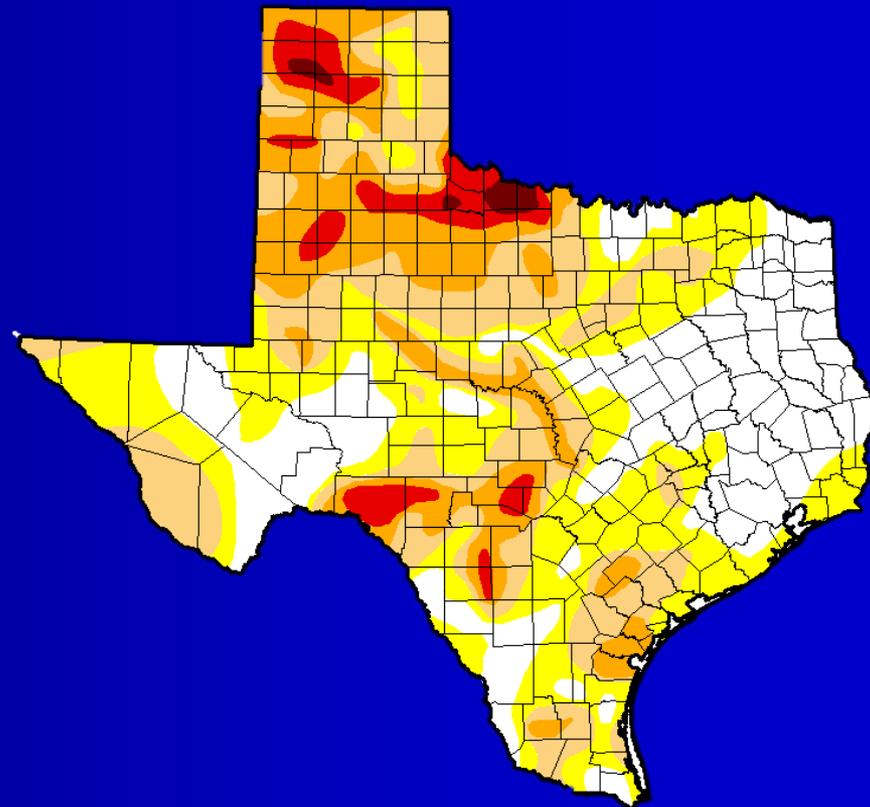
# State of the Drought 2014

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.58	99.42	91.80	75.22	34.70	12.20
Last Week (07/02/2013 map)	1.23	98.77	87.13	68.67	32.63	12.20
3 Months Ago (04/09/2013 map)	0.44	99.56	89.44	69.35	29.91	11.56
Start of Calendar Year (01/01/2013 map)	3.04	96.96	87.00	65.39	35.03	11.96
Start of Water Year (09/25/2012 map)	9.13	90.87	78.73	57.41	24.91	5.18
One Year Ago (07/03/2012 map)	2.65	97.35	76.76	36.79	8.77	0.00

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

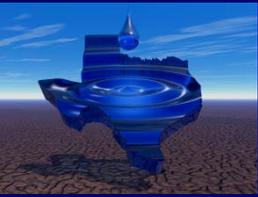


*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

January 2014

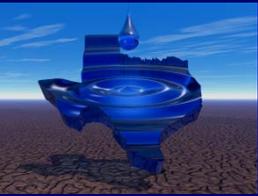
<http://droughtmonitor.unl.edu>





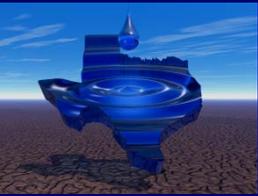
# Emergency Reuse Project

- April 2012 Staff begins to revive 1999/2000 Reuse Project
- Met with Texas Commission on Environmental Quality (TCEQ) staff on numerous occasions
- New regulations established
  - Direct Potable Reuse (DPR)
  - Indirect Potable Reuse (IPR)
- Regulations and level of treatment identified
- Consultants hired to evaluate long-term reuse options
- Staff developed an Emergency Reuse



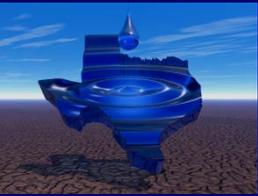
# Emergency Reuse Project

- Temporary Pump Station and pipeline to convey 7.5 MGD of treated effluent from RRWWTP to Cypress Microfiltration/Reverse Osmosis Plant
- Treat water through both membrane plants
- Blend water with lake water 50/50 ratio
- Treat blended water through conventional treatment plant (*water is treated 4 times*)



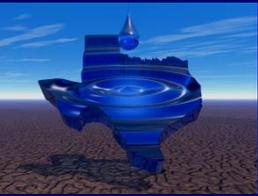
# Emergency Reuse Project

- Concept paper developed
- TCEQ gave general approval of the concept paper
- Wholesale customers support project
- Health Board and Health Coalition support project
- Dr. McBroom MD, Dr. Mattar MD, Dr. Hallford PhD  
Dr. Dodge PhD, all understand and support the project. (*Video on City web site*)



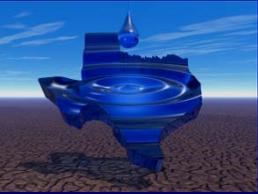
# Emergency Reuse Project

- Preliminary Engineering Report
- Submitted Plans and Specifications
  - 65,000 feet of 30" HDPE Pipe
  - Temporary Pump Station
  - Isolation piping work at Cypress WTP
- Developed Full Scale Verification Protocol
- Weekly Conference Calls with TCEQ
- Numerous trips to Austin.

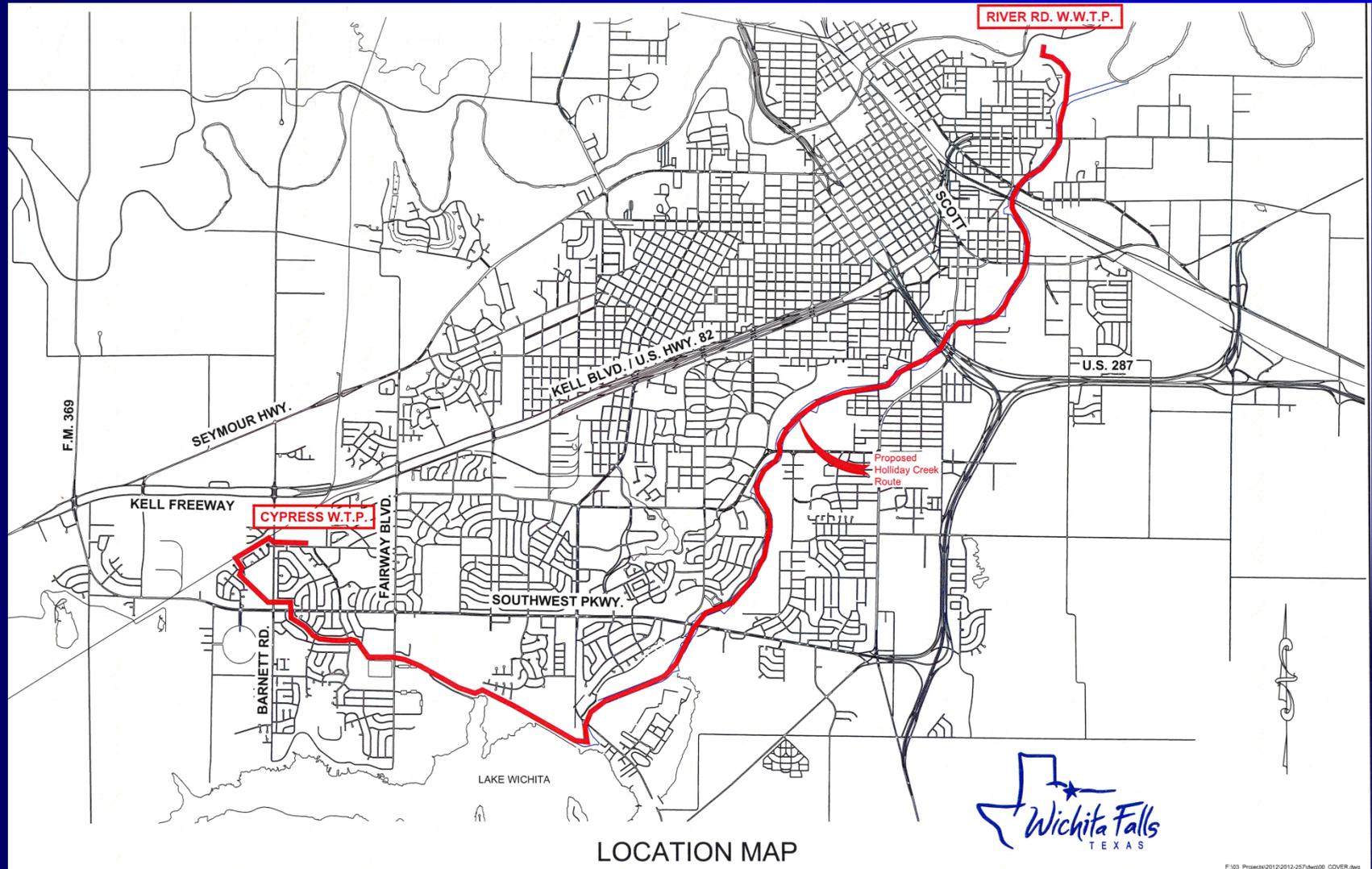


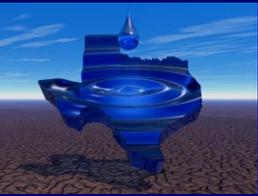
# Emergency Reuse Project

- Construction began August 23, 2013
- TCEQ approval in Sept 5, 2013
- Construction Completed in January 2013
- Full Scale Verification testing January 27, 2014
- Testing Completed March 10, 2014
- Verification Report the be submitted end of March
- Water in system ~ May 2014
- Project will add 5 to 6 million gallons per day to the water supply *(all effluent is utilized)*



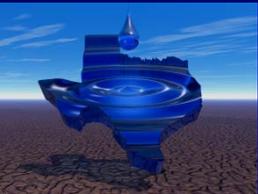
# Emergency Reuse Project





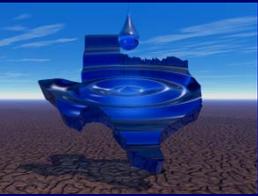
# Emergency Reuse Project





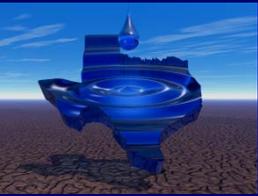
# Emergency Reuse Project





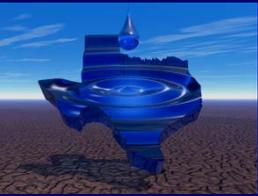
# Emergency Reuse Project





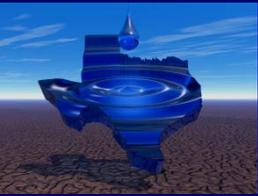
# Emergency Reuse Project





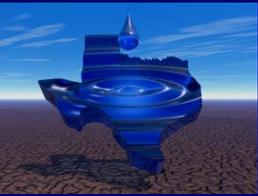
# Permanent Reuse Project

- Alternatives evaluated
  - Discharge to Lake Arrowhead ~\$29,000,000
  - Discharge to Lake Wichita ~\$158,300,000
  - Construct new MF/RO Plant at Cypress ~\$91,000,000
  - Construct new MF/RO Plant at Jasper ~\$81,000,000
  
- Discharge to Lake Arrowhead identified as most economical and feasible.



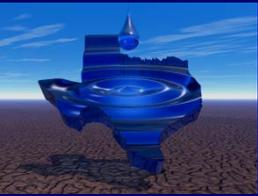
# Permanent Reuse Project

- Project requires:
  - Discharge permit from TCEQ
    - Permit app submitted Dec 20, 2013
  - Improvements to River Road WWTP
    - Design to begin after permit issued
  - 15 miles of ROW acquisition
    - Acquisition is underway
  - Construction of pipeline and pump station
- 4 to 5 years to complete



# Ringgold Reservoir

- Feasibility Study Completed Nov 2013
  - Reservoir size evaluated (firm yield, total acres required)
  - Dam Site evaluated (geotechnical analysis)
  - Environmental conflicts identified (wetlands, endangered species)
  - Other conflicts identified (roads, wells, pipelines, structures, etc.)
- Ringgold is a viable water supply project
- Yield from Ringgold estimated to be 25 MGD
- Staff and Council to determine next steps
- Project will take 20 to 30 years to develop
- Cost Estimated ~ \$400 million



# *Conclusion*

- Current Water Strategies for Wichita Falls
  - Direct Potable Reuse Project (5 MGD)
  - Permanent Reuse Project (12 MGD)
  - Development of Lake Ringgold (25 MGD)
- Other Strategies may need to be developed if drought continues