

# Regional Water Planning and the Implementation of the State Water Plan in the Red Basin

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**Doug Shaw, TWDB Project Manager  
for Regions A, B and F  
March 26, 2013**



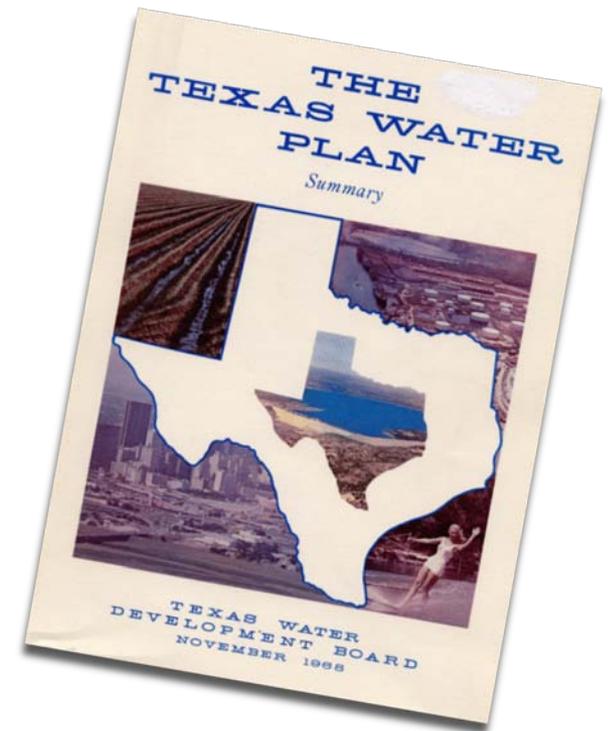


# Outline

- History of Water planning in Texas
- 2011 Regional Water Plans
- Update on the 4<sup>th</sup> round of Regional Planning
- Legislative update

# Water Planning: Legislative Response to Drought

- Late 1950s Drought of Record
  - 1957: Creation of TWDB
  - \$200 million Water Development Fund
  - 9 State Water Plans, 1961-2012
- Late 1990s: Potential New Drought of Record
  - ~\$6 billion economic losses in '96 (mostly agriculture)
  - ~300 entities with threat to water supplies
  - 1997 & 2001: Implementation of SB 1 & 2 which created & refined regional water planning

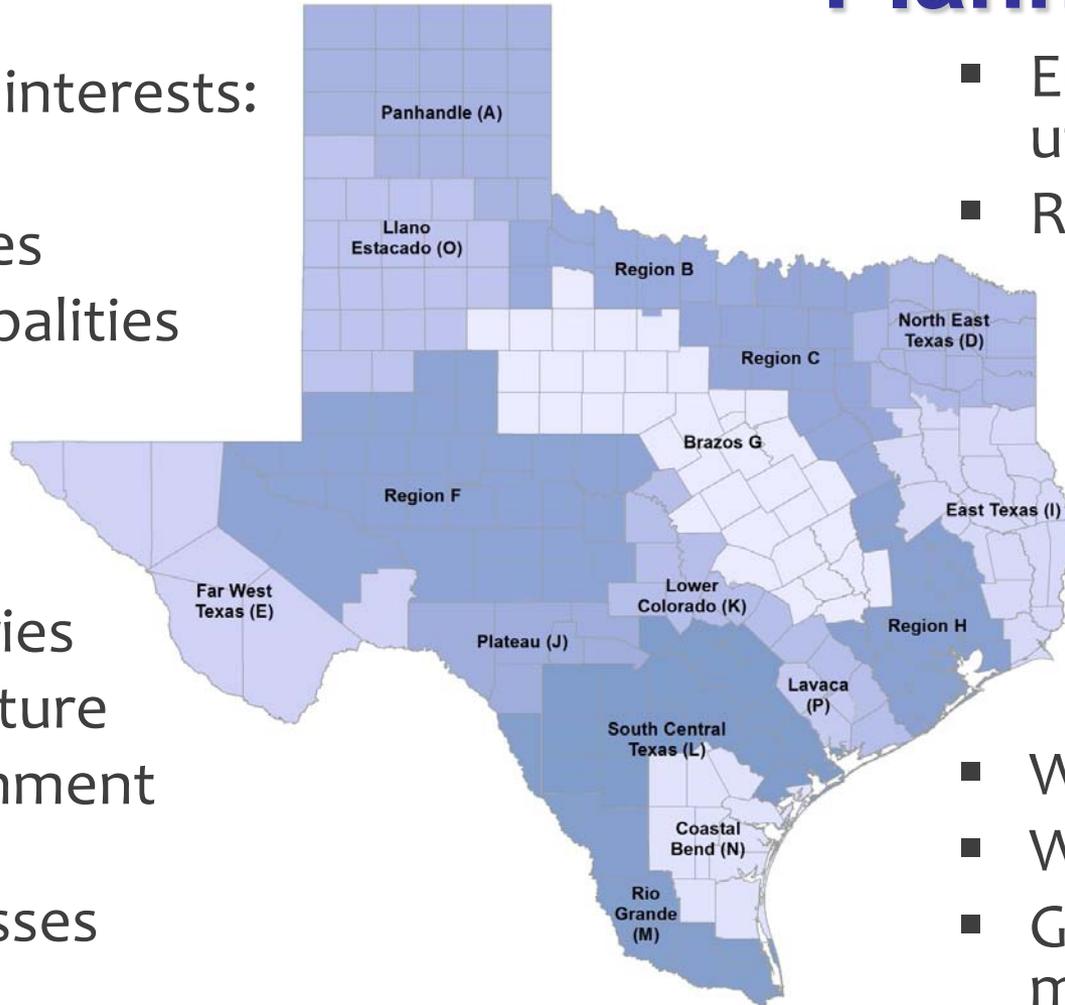


# Regional Water Planning

Statutory interests:

- Public
- Counties
- Municipalities

- Industries
- Agriculture
- Environment
- Small businesses



- Electric-generating utilities
- River authorities

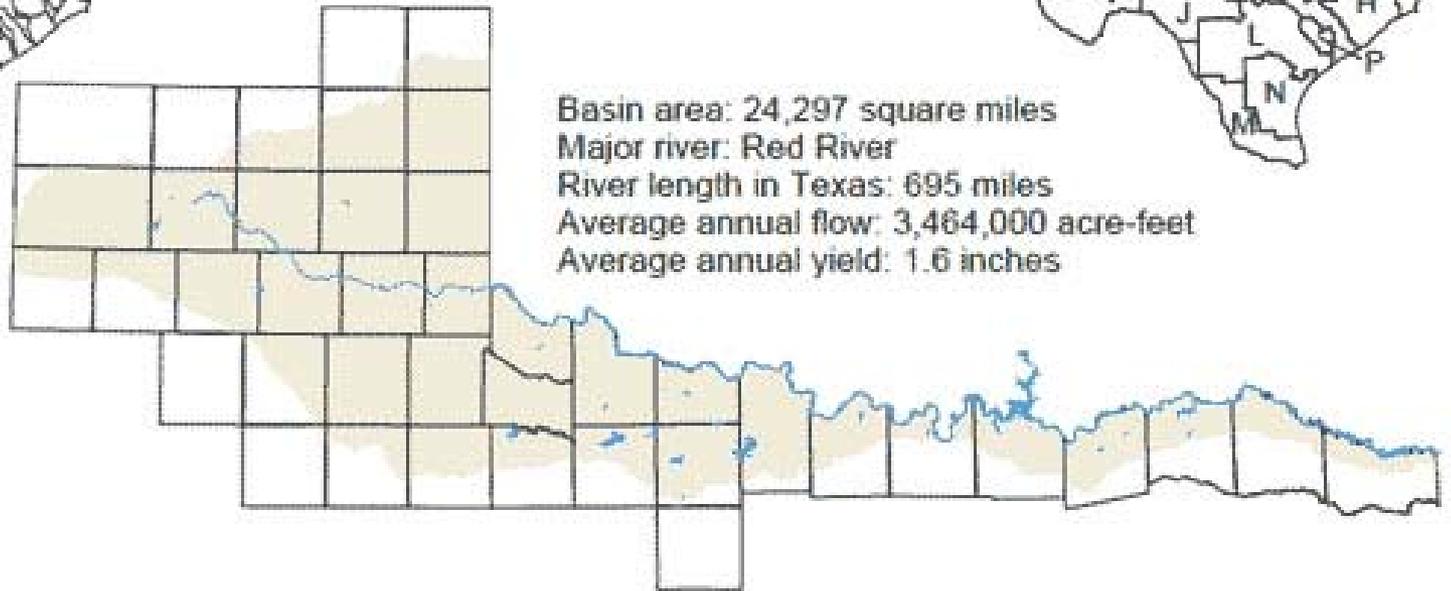
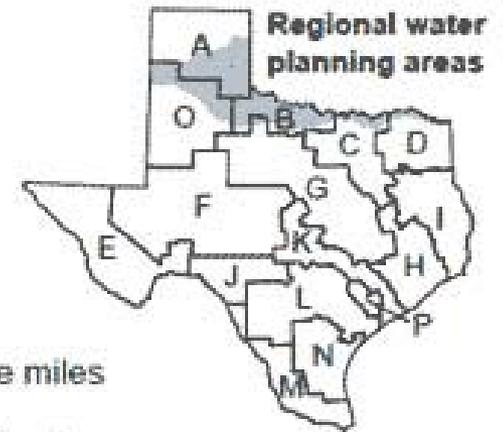
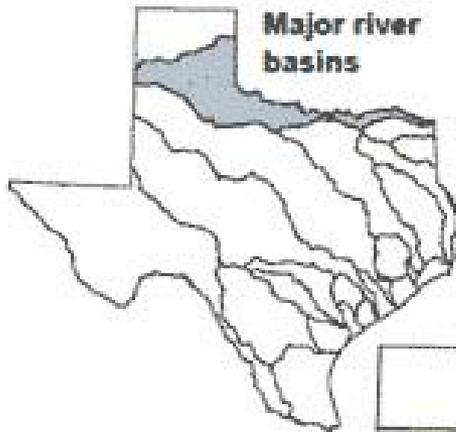
- Water districts
- Water utilities
- Groundwater management areas

# Regional Water Planning

- Project future population and water demand
- Quantify existing and future water supplies
- Identify surpluses and needs
- Evaluate and recommend water management strategies
- Make policy recommendations
- Adopt the plan

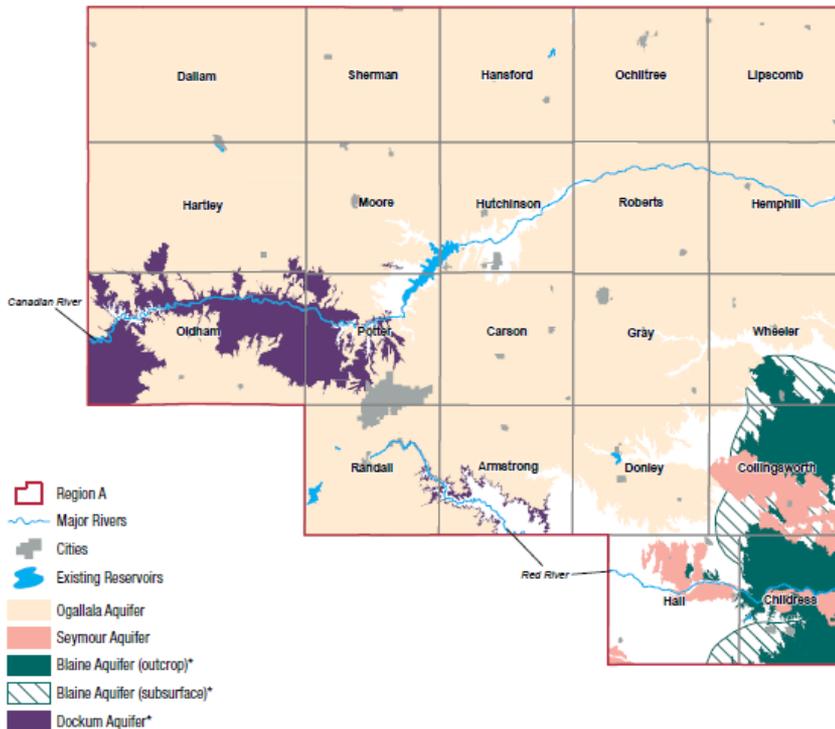


# The Red River Basin



# 2011 Panhandle (Region A) Regional Water Plan

The Panhandle Regional Water Planning Area includes 21 counties split between the Canadian and Red River basins.



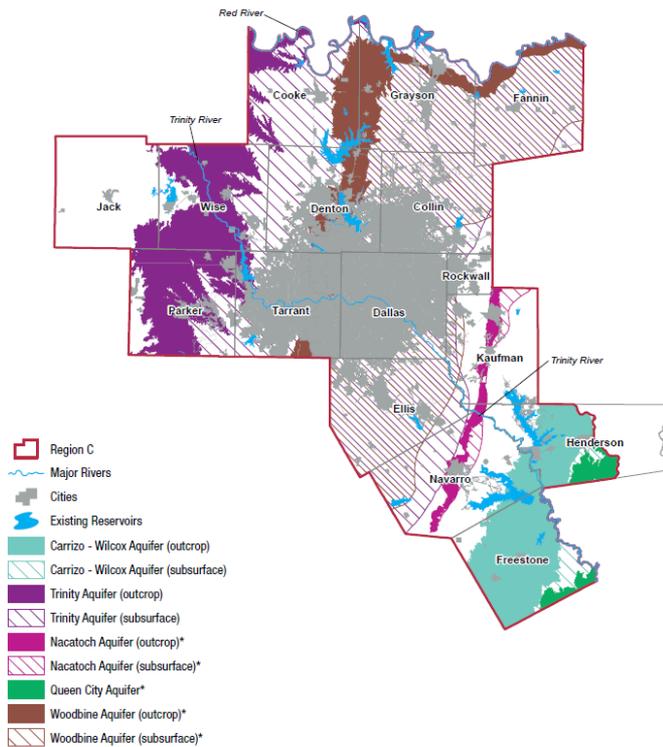
\* Minor aquifer (only shown where there is no major aquifer)

## Plan Highlights

- Additional Supply needed in 2060 – 418,414 acft/year
- Recommended water management strategy volume in 2060 – 648,221 acft/year
- Total capital cost - \$739 Million
- Conservation accounts for 86 percent of 2060 strategy volumes, primarily associated with irrigation
- Significant groundwater development

# 2011 Region C Regional Water Plan

The Region C Regional Water Planning Area includes all or parts of 16 counties.



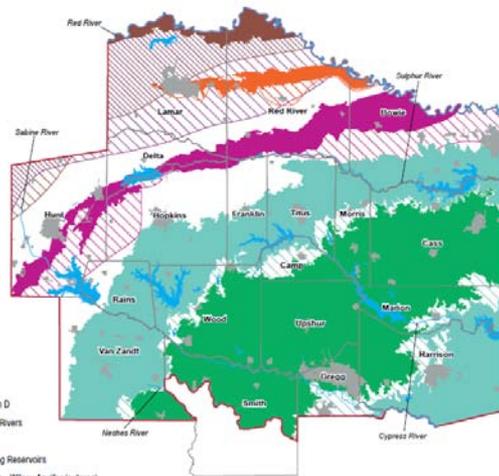
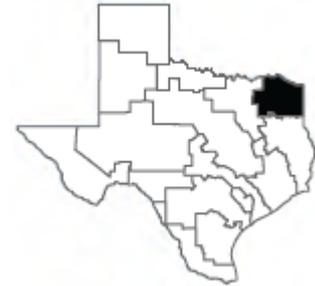
\* Minor aquifer (only shown where there is no major aquifer)

## Plan Highlights

- Additional Supply needed in 2060 – 1,588,236 acft/year
- Recommended water management strategy volume in 2060 – 2,360,302 acft/year
- Total capital cost - \$21.5 Billion
- Conservation accounts for 12 percent of 2060 strategy volume
- Significant groundwater development
- Re use accounts for 11 percent of 2060 strategy volume
- Recommends 4 new Reservoirs

# 2011 North East Texas (Region D) Regional Water Plan

The North East Texas Regional Water Planning Area encompasses all or parts of 19 counties.



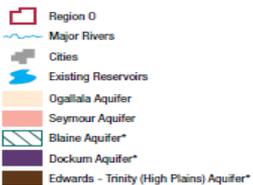
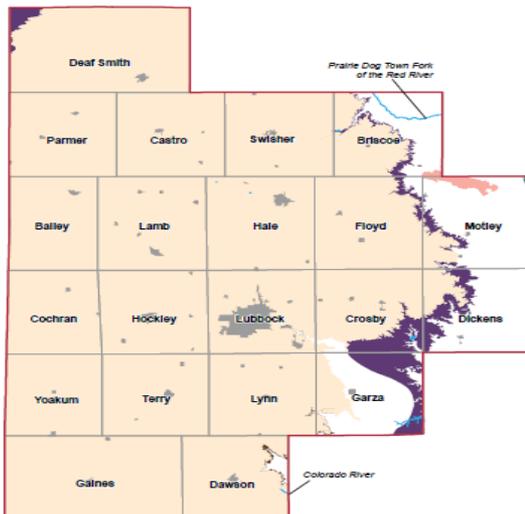
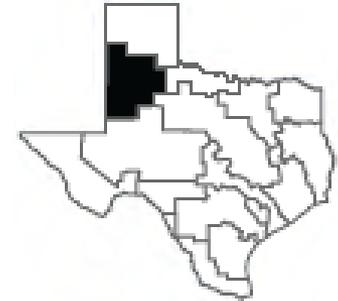
Region D  
Major Rivers  
Cities  
Existing Reservoirs  
Carlizo - Wilcox Aquifer (outcrop)  
Carlizo - Wilcox Aquifer (subsurface)  
Trinity Aquifer (subsurface)  
Blossom Aquifer (outcrop)\*  
Blossom Aquifer (subsurface)\*  
Nacatoch Aquifer (outcrop)\*  
Nacatoch Aquifer (subsurface)\*  
Owen City Aquifer\*  
Woodbine Aquifer (outcrop)\*  
Woodbine Aquifer (subsurface)\*  
\* Minor aquifer (only shown where there is no major aquifer)

## Plan Highlights

- Additional Supply needed in 2060 – 96,142 acft/year
- Recommended water management strategy volume in 2060 – 98,466 acft/year
- Total capital cost - \$39 Million
- Opposition to Marvin Nichols Reservoir
- Recommends 4 new Reservoirs

# 2011 Llano Estacado (Region O) Regional Water Plan

The Llano Estacado Regional Water Planning Area encompasses 21 counties in the southern High Plains of Texas.



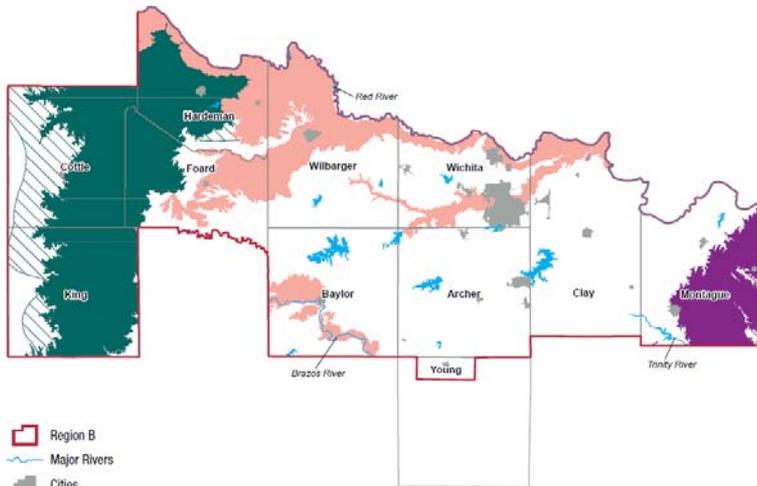
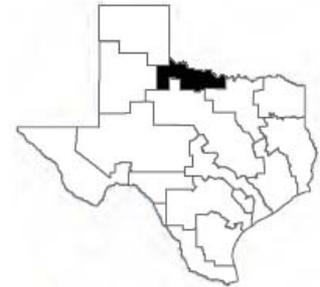
\* Minor aquifer (only shown where there is no major aquifer)

## Plan Highlights

- Additional Supply needed in 2060 – 2,366,036 acft/year
- Recommended water management strategy volume in 2060 – 395,957 acft/year
- Total capital cost - \$1.1 Billion
- Conservation accounts for 74 percent of strategy volume
- Recommends 2 new major Reservoirs
- Significant unmet irrigation and livestock needs

# 2011 Region B Regional Water Plan

The Region B Regional Water Planning Area encompasses all or parts of 11 counties in north central Texas bordering the Red River.

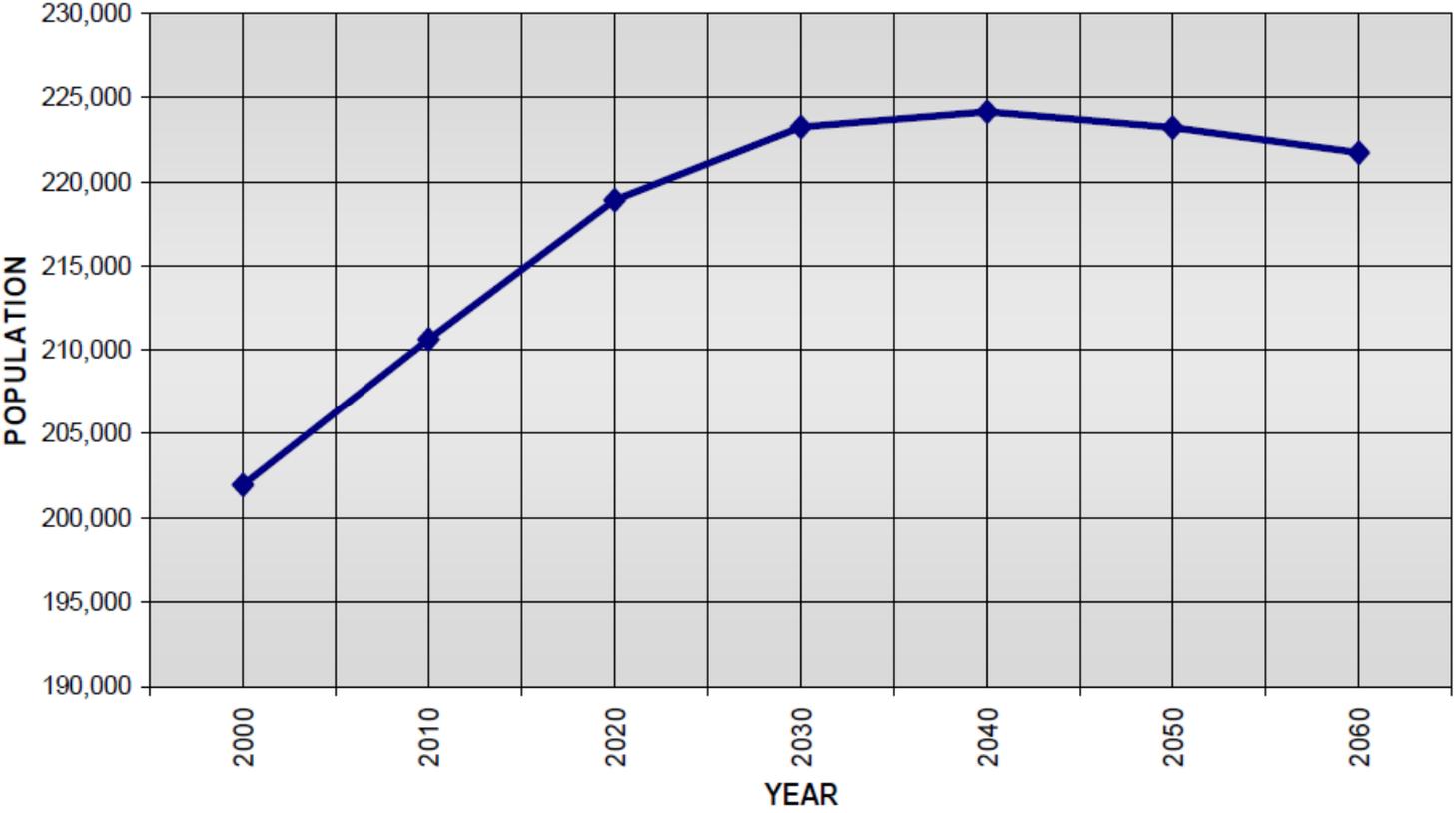


\* Minor aquifer (only shown where there is no major aquifer)

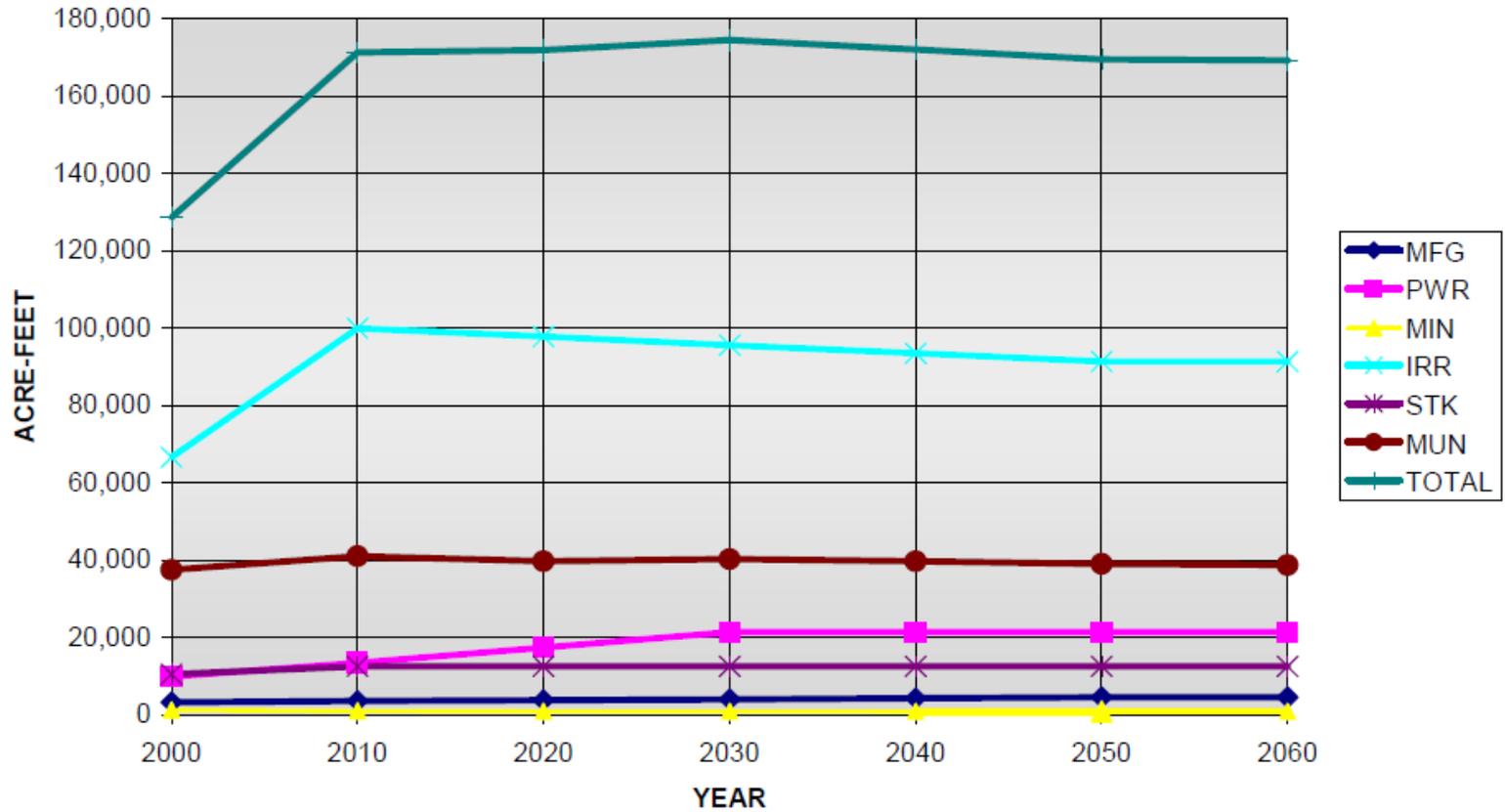
## Plan Highlights

- Additional Supply needed in 2060 – 40,397 acft/year
- Recommended water management strategy volume in 2060 – 77,003 acft/year
- Total capital cost - \$499 Million
- Conservation accounts for 19 percent of 2060 strategy volumes
- One new Major Reservoir (Ringold)

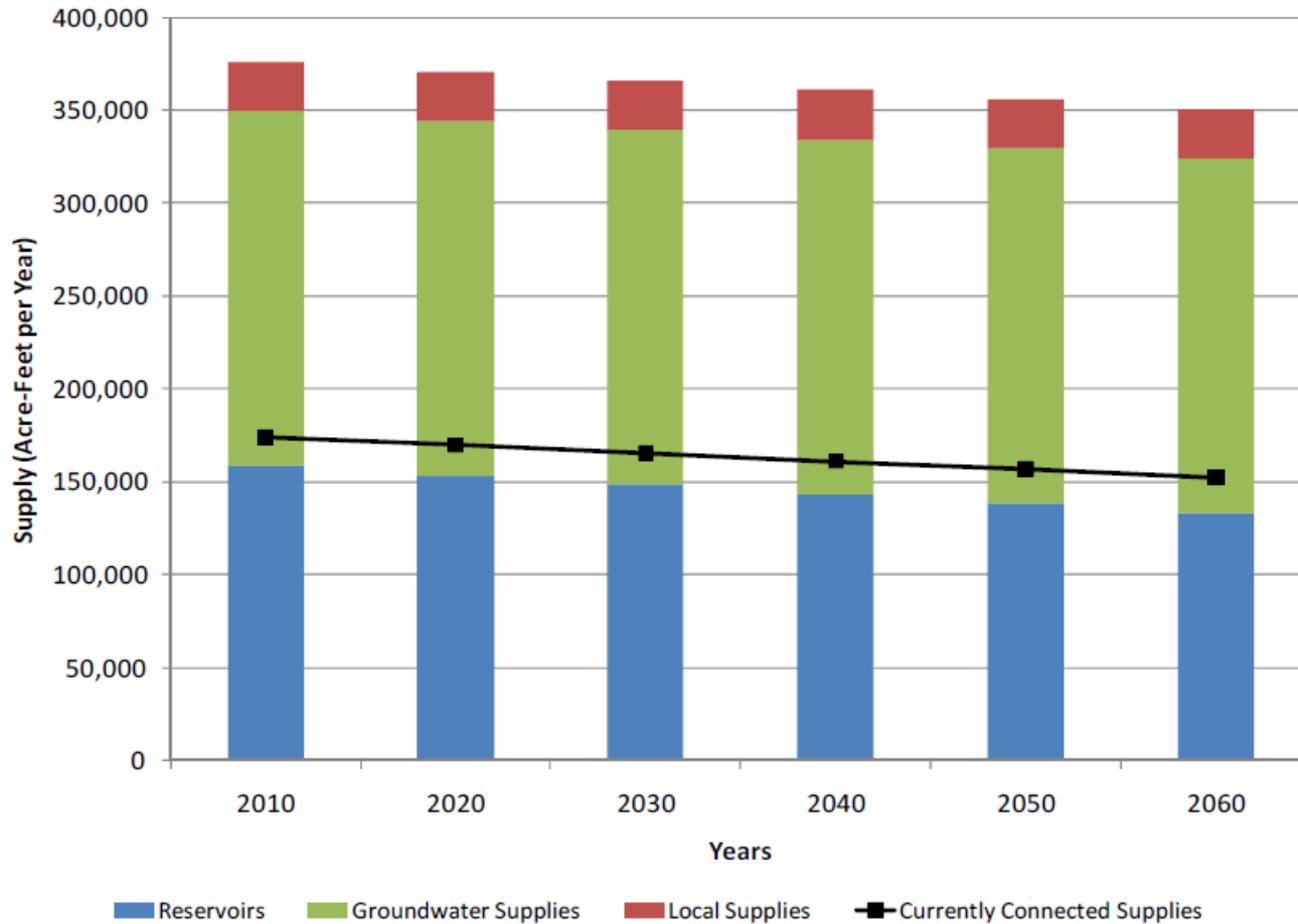
# Projected Population



# Projected Water Demands



# Existing Water Supplies



# Existing Water Supplies

## Firm Yields of Reservoirs used in Region B

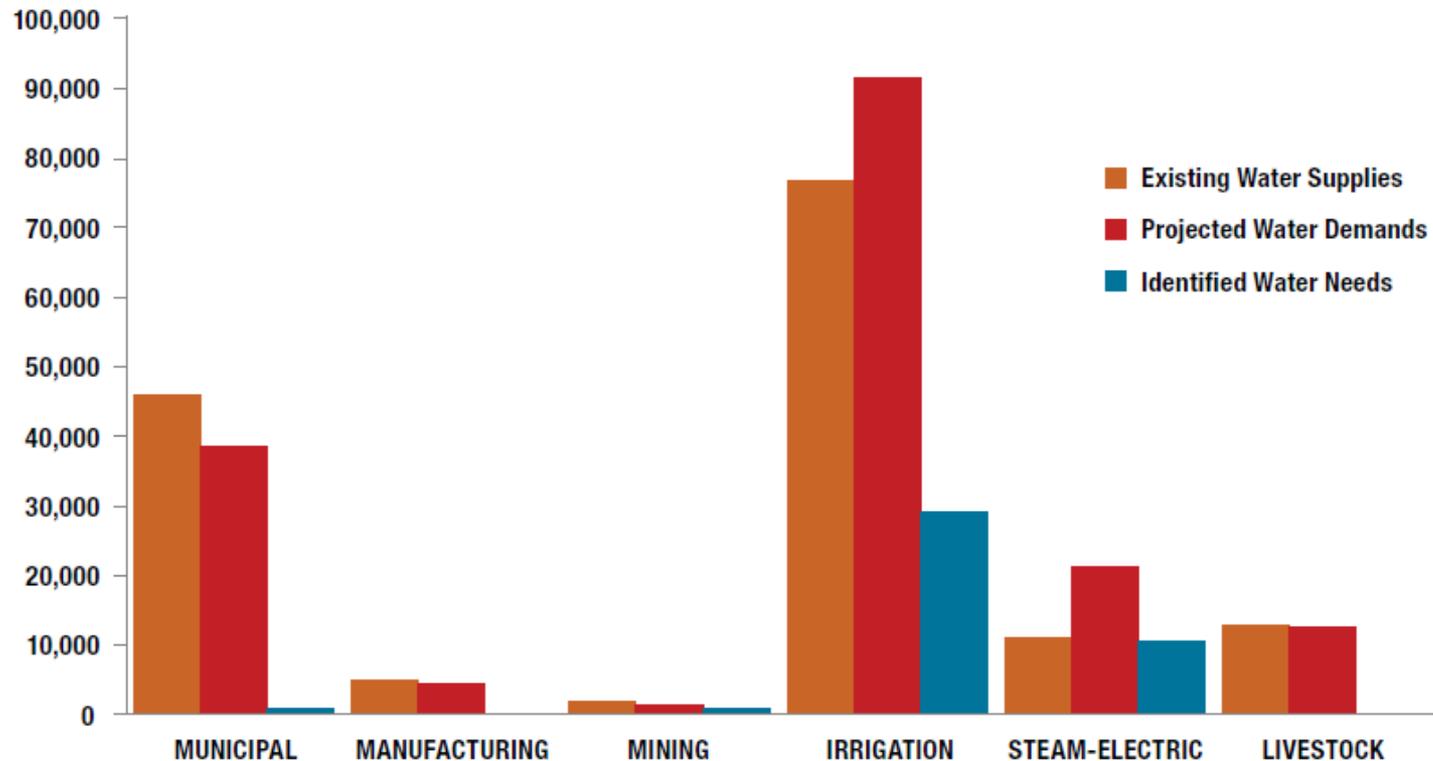
-Values are in Acre-Feet per Year-

|                                       | Basin      | 2000           | 2010           | 2020           | 2030           | 2040           | 2050           | 2060           |
|---------------------------------------|------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>WATER SUPPLY SYSTEMS</b>           |            |                |                |                |                |                |                |                |
| Lake Kemp/<br>Diversion System        | Red        | 105,500        | 100,983        | 96,466         | 91,949         | 87,432         | 82,915         | 78,400         |
| Wichita System                        |            |                |                |                |                |                |                |                |
| Kickapoo                              | Red        | 20,200         | 19,800         | 19,400         | 19,000         | 18,600         | 18,200         | 17,800         |
| Arrowhead                             | Red        | 26,000         | 26,000         | 26,000         | 26,000         | 26,000         | 26,000         | 26,000         |
| <i>TOTAL</i>                          | <i>Red</i> | <i>46,200</i>  | <i>45,800</i>  | <i>45,400</i>  | <i>45,000</i>  | <i>44,600</i>  | <i>44,200</i>  | <i>43,800</i>  |
| <b>Subtotal</b>                       |            | <b>151,700</b> | <b>146,783</b> | <b>141,866</b> | <b>136,949</b> | <b>132,032</b> | <b>127,115</b> | <b>122,200</b> |
| <b>RESERVOIRS IN REGION B</b>         |            |                |                |                |                |                |                |                |
| Lake Amon Carter                      | Trinity    | 2,200          | 2,107          | 2,014          | 1,921          | 1,828          | 1,735          | 1,640          |
| Lake Electra                          | Red        | 470            | 462            | 454            | 446            | 438            | 430            | 420            |
| North Fork Buffalo<br>Creek Reservoir | Red        | 840            | 840            | 840            | 840            | 840            | 840            | 840            |
| Santa Rosa Lake                       | Red        | 3,075          | 3,075          | 3,075          | 3,075          | 3,075          | 3,075          | 3,075          |
| Lake Pauline                          | Red        | 1,200          | 1,200          | 1,200          | 1,200          | 1,200          | 1,200          | 1,200          |
| Lake Cooper/Olney                     | Red        | 960            | 960            | 960            | 960            | 960            | 960            | 960            |
| Lake Nocona                           | Red        | 1,260          | 1,260          | 1,260          | 1,260          | 1,260          | 1,260          | 1,260          |
| <b>Subtotal</b>                       |            | <b>10,005</b>  | <b>9,904</b>   | <b>9,803</b>   | <b>9,702</b>   | <b>9,601</b>   | <b>9,500</b>   | <b>9,395</b>   |
| <b>RESERVOIRS OUTSIDE REGION B</b>    |            |                |                |                |                |                |                |                |
| Greenbelt Lake                        | Red        | 8,430          | 8,297          | 8,164          | 8,031          | 7,898          | 7,765          | 7,630          |
| <b>TOTAL</b>                          |            | <b>170,135</b> | <b>164,984</b> | <b>159,833</b> | <b>154,682</b> | <b>149,531</b> | <b>144,380</b> | <b>139,225</b> |

Firm yields were determined from the TCEQ-approved WAMs, as modified for regional water planning.

# Water Supply Needs

Comparison of Existing Supplies, Projected Demands and Identified Water Needs for the 2060 Decade.



# Water Supply Needs

Entities or Water User Groups with Projected needs:

| <b>Water User Group</b>             | <b>2010</b>    | <b>2020</b>    | <b>2030</b>    | <b>2040</b>    | <b>2050</b>    | <b>2060</b>    |
|-------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| County-Other - Archer               | -162           | -126           | -161           | -187           | -142           | -136           |
| Irrigation - Archer                 | -1,301         | -1,344         | -1,386         | -1,426         | -1,465         | -1,584         |
| County-Other - Clay                 | -45            | -25            | -8             | 0              | 0              | 0              |
| Irrigation - Clay                   | -349           | -331           | -309           | -284           | -253           | -274           |
| County-Other - Montague             | -224           | -280           | -295           | -304           | -290           | -295           |
| Mining - Montague                   | -177           | -153           | -145           | -149           | -162           | -162           |
| Irrigation - Wichita                | -21,296        | -22,252        | -23,215        | -24,184        | -25,159        | -27,201        |
| Steam Electric Power -<br>Wilbarger | 0              | -3,800         | -8,529         | -9,258         | -9,987         | -10,715        |
| <b>TOTAL</b>                        | <b>-23,554</b> | <b>-28,311</b> | <b>-34,047</b> | <b>-35,792</b> | <b>-37,458</b> | <b>-40,366</b> |

# Effect of Water Quality on Supply

## **Nitrate Concerns:**

- Moderate to High in portions of the Seymour Aquifer
- Possibly caused by long-standing practices of Fertilizing crops
- Removal can be expensive (reverse osmosis)

## **Salinity Concerns for Lake Kemp and Diversion Lake:**

- High dissolved solids and chloride concentrations in the Wichita River Basin
- Limit use of water for municipal, industrial and irrigation purposes
- Chloride Control Project

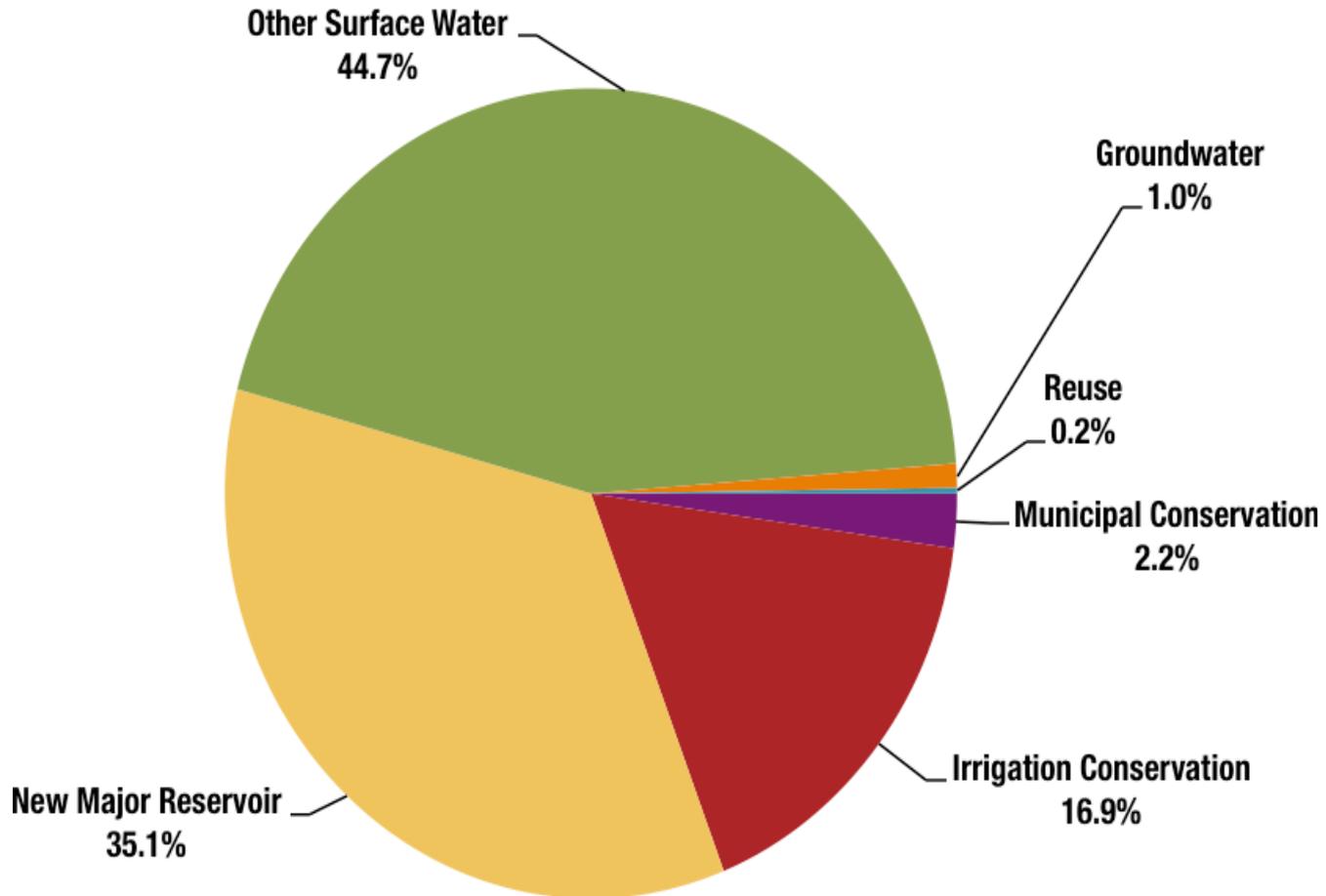


# Recommended Water Management Strategies

In accordance with regional water planning guidance, each of the potentially feasible strategies was then evaluated with respect to:

- Quantity, reliability and cost
- Environmental factors
- Impacts on water resources and other water management strategies
- Impacts on agriculture and natural resources
- Other relevant factors

# Recommended Water Management Strategies





# Select Major Water Management Strategies

- Construction of Lake Ringgold
- Increasing the Conservation pool at Lake Kemp
- Enclosing canal laterals
- Wichita Basin Chloride Control Project

# Recommended Water Management Strategies

## Archer County

| Water User                             | Strategy Description                               | Supply (ac-ft/yr)   | Cost/1,000 gal | Implement Decade |
|--|--|---------------------|----------------|------------------|
| Archer Co. (other)                     | Municipal Conservation                             | 18 <sup>1.</sup>    | 1.72           | 2010             |
|  | Purchase water from Local Provider                 | 296                 | 5.26           | 2010             |
| Lakeside City                          | Municipal Conservation                             | 11 <sup>1.</sup>    | 1.39           | 2010             |
|  | Purchase water from Wichita Falls                  | 12                  | 3.25           | 2010             |
| Archer Co. Irrigation                  | Increase water conservation elevation at Lake Kemp | 1,584 <sup>1.</sup> | 0.01           | 2010             |
| TOTAL                                  |  | 1,921               |                |                  |
| ALTERNATE STRATEGIES – NONE IDENTIFIED |  |                     |                |                  |

1. Supply varies by decade. The amount shown is the supply from this strategy in year 2060.

# Recommended Water Management Strategies

## Baylor County

| <b>Water User</b> | <b>Strategy Description</b>          | <b>Supply<br/>(ac-ft/yr)</b> | <b>Cost/<br/>1,000 gal</b> | <b>Implement<br/>Decade</b> |
|-------------------|--------------------------------------|------------------------------|----------------------------|-----------------------------|
| Baylor WSC        | Interconnect Millers Creek Reservoir | 250                          | \$3.84                     | 2010                        |

# Recommended Water Management Strategies

## Clay County

| Water User          | Strategy Description                               | Supply (ac-ft/yr) | Cost/ 1,000 gal | Implement Decade |
|---------------------|--|-------------------|-----------------|------------------|
| Clay Co. (other)    | Municipal Conservation                             | 39 <sup>1</sup>   | 0.78            | 2010             |
|                     | Purchase water from Local Provider                 | 223               | \$4.44          | 2010             |
| Clay Co. Irrigation | Increase water conservation elevation at Lake Kemp | 274 <sup>1</sup>  | \$0.01          | 2020             |
| Charlie WSC         | Nitrate Removal Plant                              | 10                | \$7.83          | 2010             |
| TOTAL               |  | 546               |                 |                  |

### ALTERNATE STRATEGIES – NONE IDENTIFIED

1. Supply varies by decade. The amount shown is the supply from this strategy in year 2060.

# Recommended Water Management Strategies

## Montague County

| Water User                  | Strategy Description                       | Supply<br>(ac-ft/yr) | Cost/<br>1,000 gal | Implement<br>Decade |
|-----------------------------|--|----------------------|--------------------|---------------------|
| Montague Co.<br>(other)     | Develop Additional<br>Groundwater Supplies | 584                  | \$1.88             | 2010                |
| City of Bowie               | Municipal Conservation                     | 72 <sup>1.</sup>     | \$0.71             | 2010                |
|                             | Wastewater Reuse                           | 171                  | \$2.92             | 2040                |
| Montague Co.<br>(Mining)    | Purchase Water from Local<br>Provider      | 177                  | \$4.18             | 2010                |
| <b>TOTAL</b>                |  | <b>1,004</b>         |                    |                     |
| <b>ALTERNATE STRATEGIES</b> |  |                      |                    |                     |
| Montague Co.<br>(other)     | Purchase water from Local<br>Provider      | 584                  | \$3.68             | 2010                |
| City of Bowie               | Develop Additional<br>Groundwater Supply   | 171                  | \$3.68             | 2040                |
| Montague Co.<br>(Mining)    | Develop Additional<br>Groundwater Supply   | 177                  | \$1.37             | 2010                |

1. Supply varies by decade. The amount shown is the supply from this strategy in year 2060.

# Recommended Water Management Strategies

## Wichita County

| Water User                   | Strategy Description                               | Supply (ac-ft/yr)  | Cost/1,000 gal | Implement Decade |
|------------------------------|--|--------------------|----------------|------------------|
| City of Iowa Park            | Municipal Conservation                             | 80 <sup>1</sup>    | \$0.83         | 2010             |
|                              | Purchase Water from Wichita Falls                  | 229                | \$3.25         | 2010             |
| City of Wichita Falls        | Municipal Conservation                             | 1367 <sup>1</sup>  | \$0.24         | 2010             |
|                              | Increase water conservation elevation at Lake Kemp | 3,340              | \$0.01         | 2020             |
|                              | Construction Lake Ringgold                         | 27,000             | \$4.32         | 2050             |
| Wichita Co. Irrigation       | Increase water conservation elevation at Lake Kemp | 8,687 <sup>1</sup> | \$0.01         | 2020             |
|                              | Wichita River Diversion                            | 8,850              | \$0.22         | 2040             |
|                              | Enclose Canal Laterals in Pipe                     | 13,034             | \$0.16         | 2010             |
| Wichita County Manufacturing | Purchase Water From Wichita Falls                  | 462                | \$3.25         | 2010             |
| TOTAL                        |  | 63,049             |                |                  |
| ALTERNATE STRATEGIES         |  |                    |                |                  |
| City of Wichita Falls        | Wastewater Reuse                                   | 11,000             | \$3.25         | 2010             |

1. Supply varies by decade. The amount shown is the supply from this strategy in year 2060.

# Recommended Water Management Strategies

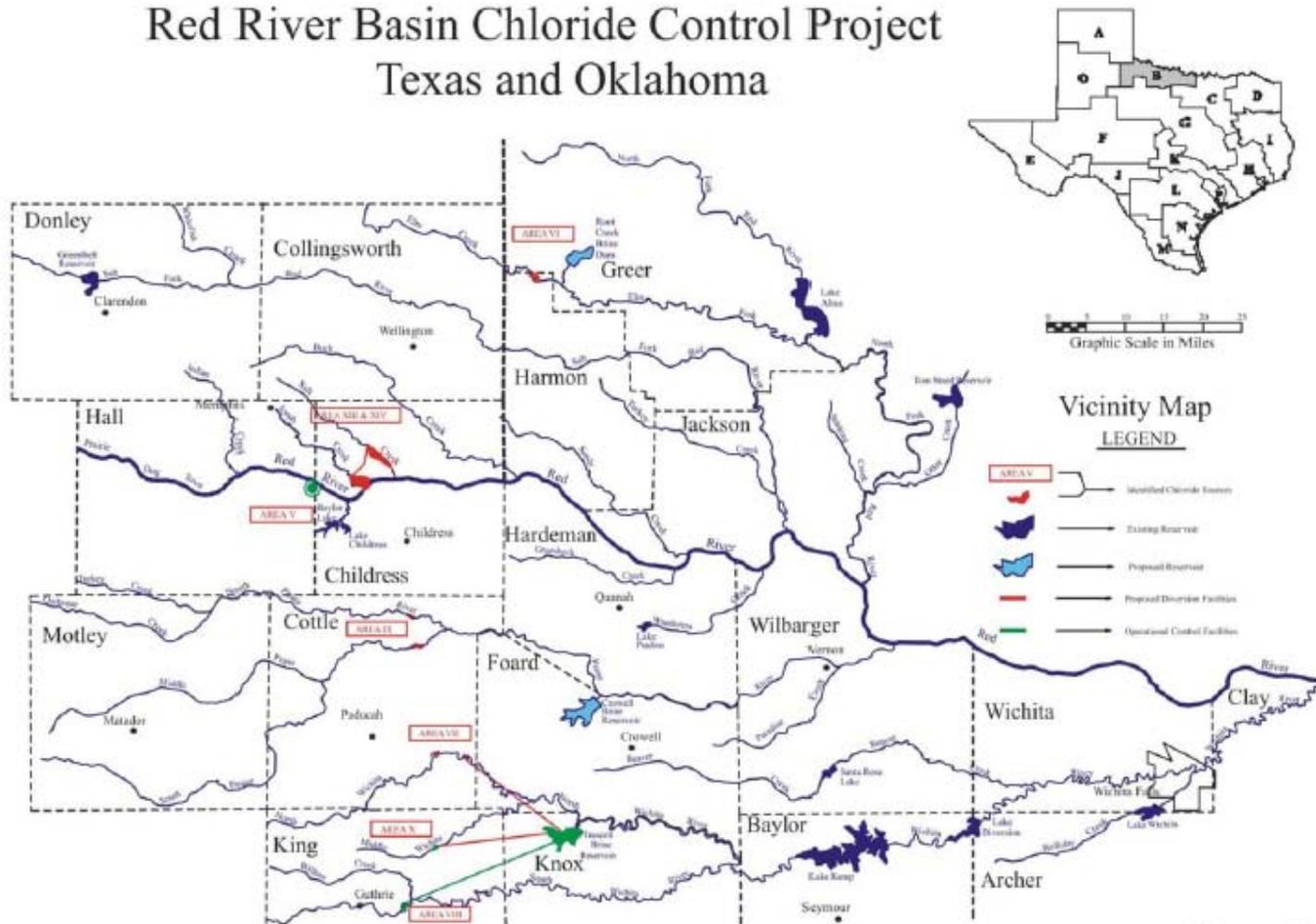
## Wilbarger County

| Water User                         | Strategy Description                               | Supply (ac-ft/yr)     | Cost/ 1,000 gal | Implement Decade |
|------------------------------------|--|-----------------------|-----------------|------------------|
| Lockett Water System               | Purchase water from City of Vernon                 | 109                   | \$6.96          | 2010             |
| Hinds-Wildcat System               | Nitrate Removal Plant                              | 40                    | \$4.18          | 2010             |
| Wilbarger Co. Steam Electric Power | Increase Water Conservation elevation at Lake Kemp | 10,715 <sup>1</sup> . | \$0.01          | 2020             |
| <b>TOTAL</b>                       |  | 10,864                |                 |                  |
| <b>ALTERNATE STRATEGIES</b>        |  |                       |                 |                  |
| Hinds-Wildcat System               | Purchase water from City of Vernon                 | 40                    | 9.36            | 2010             |

1. Supply varies by decade. The amount shown is the supply from this strategy in year 2060.

# Recommended Water Management Strategies

## Red River Basin Chloride Control Project Texas and Oklahoma

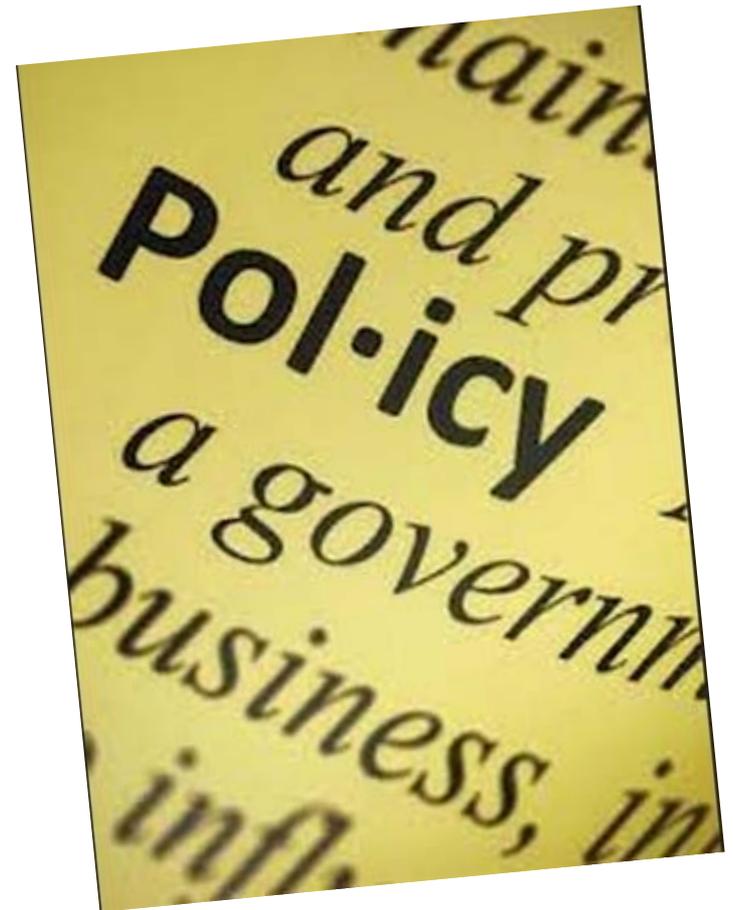


# Implementation

- Baylor WSC (Region B)
  - Connect to Miller's Creek Reservoir (Brazos Basin) – \$575,000 (RWAF)
- Greater Texoma Utility Authority (Region C)
  - Lake Texoma Water Storage – \$21,230,000 (WIF)
  - Gainesville SWTP Expansion – \$7,235,000 (WIF)

# Select Recommendations from 2011 Region B Plan

- Chloride Control
- Brush Management
- Sediment Control Structures
- Extend protection for unique reservoir sites
- Implementation
- Continued legislative support of Regional Water Planning



# Update on the 4<sup>th</sup> Round of Regional Planning (2011 – 2016)

- Non-Municipal Demand Projections – Fall 2011
  - Update to Mining Water Use Study by Bureau of Economic Geology (BEG)
- Population and Municipal Demands – Spring 2013
- Technical Memorandum - May 2014
- Initially Prepared Plan (IPP) – May 2015
- Adopted Regional Plan – November 2015

# Revised Rules

**§355**



**§357**



**§358**



# Revised Rules

**incorporated new statutes**

**reorganized existing rule content**

**emphasized existing requirements**

**added new requirements**

# Revised Rules

**Rule changes will require RWPGs to:**

- a) report additional (existing) information in plans**
- b) collect, analyze, and consider additional information**
- c) make additional recommendations**

# Revised Rules

## By Regional Water Plan Chapter:

- |                    |                                  |
|--------------------|----------------------------------|
| 1* description     | 7 * <b>NEW</b> drought response  |
| 2 demands          | 8 policy recommendations         |
| 3* supply          | 9 financing of plan              |
| 4* needs           | 10* plan adoption                |
| 5* WMS evaluations | 11* <b>NEW</b> impl & comparison |
| 6* plan impacts    |                                  |

\* *new requirements*

# Legislative Updates

## Current Proposed Legislation:

\*as of February 28, 2013

### Senate

- SB 4
- SB 22
- SB 224
- SB 235
- SB 272
- SB 302
- SB 385

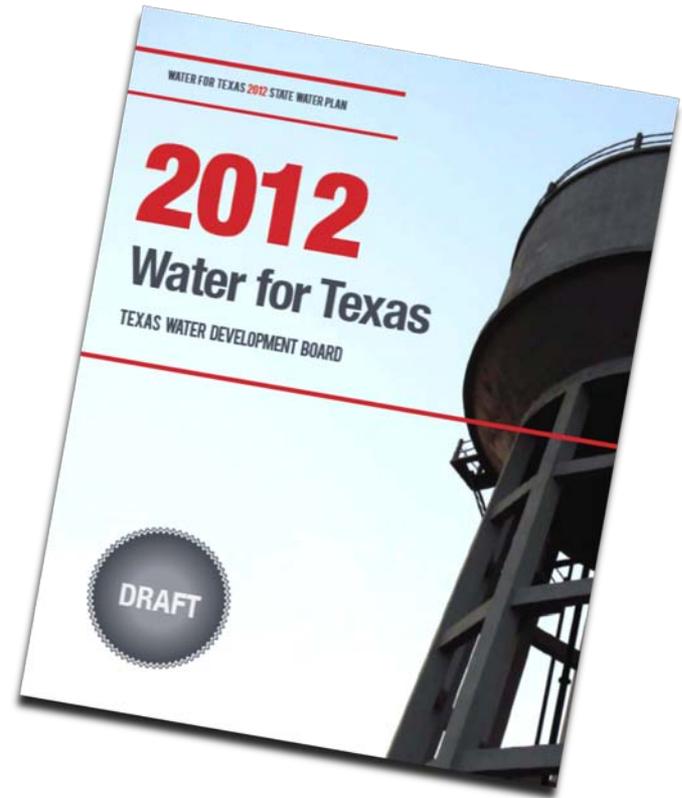
### House

- HB 4
- HB 11
- HB 227
- HB 857
- HB 867
- HB 998
- HB 1317



# Questions and Comments

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**Texas Water**  
**Development Board**