

### 5B.31 Stephens County Water Supply Plan

Table 5B.31-1 lists each water user group in Stephens County and their corresponding surplus or shortage in years 2030 and 2050. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections. Water supply plans are also presented for some entities that need pumping/conveyance facilities to utilize their existing water resources, or to become a regional provider. In addition, long-term considerations are provided for some entities with projected surpluses. Stephens County, through its County Commissioner's Court, and the City of Breckenridge have submitted a series of resolutions supporting a variety of regional water supply planning and development initiatives. The specific resolutions are included at the end of Volume 1. The recommended plans described below either include specific proposed projects mentioned in the resolutions, or are generally consistent with them.

**Table 5B.31-1.  
Stephens County Surplus/(Shortage)**

<b>Water User Group</b>	<b>Surplus/(Shortage)<sup>1</sup></b>		<b>Comment</b>
	<b>2030 (acft/yr)</b>	<b>2050 (acft/yr)</b>	
City of Breckenridge	613	570	Projected surplus
County-Other	16,680	14,705	Projected surplus
Manufacturing	(1)	(1)	Projected shortage – see plan below
Steam-Electric	0	0	No demand or supply
Mining	376	400	Projected surplus
Irrigation	(341)	(328)	Projected shortage – see plan below
Livestock	0	0	Supply equals demand

<sup>1</sup> From Tables 4-61 and 4-62, Section 4 – Comparison of Water Demands with Water Supplies to Determine Needs.

#### 5B.31.1 The City of Breckenridge

##### 5B.31.1.1 Description of Supply

The City of Breckenridge obtains water from Hubbard Creek Reservoir through the West Central Texas Municipal Water District.

**5B.31.1.2 Water Supply Plan**

The City has submitted a letter to the Brazos G RWPG requesting that water treatment, distribution, and storage improvements be included in the recommended plan in order for Breckenridge to provide requested demands of Stephens County Rural WSC, Shackelford County Rural WSC, and other out-of-city demands. The total capital cost of the needed improvements is \$2,800,000. Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to be implemented by 2010:

- Capital Improvements Program for regional service.

As a long-term strategy, beyond 2030, for supply to Breckenridge and a regional supply, the following is recommended:

- Use of the Oryx/Kerr-McGee pipeline to deliver treated water from Possum Kingdom Reservoir.

**5B.31.1.3 Costs**

Costs of the recommended plan for City of Breckenridge prior to 2030 are:

- a. Capital Improvements Program for regional service.
  - Cost source: letter from City of Breckenridge, April 17, 2000
  - Date to be Implemented: by 2010
  - Total Project Cost: \$2,800,000
  - Total Annual Cost: \$213,500
- b. Purchase of Possum Kingdom Water delivered through Oryx/Kerr-McGee pipeline
  - Cost source: Section 5.20
  - Date to be Implemented: 2030
  - Total Project Cost: \$8,327,000
  - Total Annual Cost: \$1,147,000

The Oryx/Kerr-McGee pipeline is also recommended for the City of Abilene, in which case the project would be larger and the economy of scale would cause the unit cost to decrease significantly.

**Table 5B.31-2.  
Recommended Plan Costs by Decade for City of Breckenridge**

<i>Plan Element</i>	<i>2000</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>
<b>Capital Improvements Program</b>						
Supply From Plan Element (acft/yr)	0	not est.	not est.	not. est	not. est.	not est.
Annual Cost (\$/yr)	\$0	\$213,500	\$213,500	\$213,500	\$0	\$0
Unit Cost (\$/acft)	\$0	not est.	not est.	not est.	\$0	\$0
<b>Possum Kingdom Water through Oryx/Kerr-McGee Pipeline</b>						
Projected Surplus/(Shortage) (acft/yr)	111	42	(44)	(87)	(96)	(94)
Supply From Plan Element (acft/yr)	-	-	-	560	560	560
Annual Cost (\$/yr)	-	-	-	\$1,147,000	\$1,147,000	\$1,147,000
Unit Cost (\$/acft)	-	-	-	\$2,048	\$2,048	\$2,048

### **5B.31.2 County-Other Category**

Surface water supply is the firm yield of Hubbard Creek Reservoir less existing contract withdrawals. No future shortages are projected and no changes in water supply are recommended in the near-term before 2030. In the long-term, the following project is recommended beyond 2030 to serve County-Other entities.

- Purchase of Possum Kingdom Water delivered through Oryx/Kerr-McGee pipeline (possible joint project with Breckenridge, Abilene, and others).

### **5B.31.3 Manufacturing**

#### **5B.31.3.1 Description of Supply**

Stephens County Manufacturing supply is from small, unclassified groundwater resources.

#### **5B.31.3.1 Options Considered**

Table 5B.31-2 lists the water management strategies, references to the report section discussing the strategy, total project cost, and unit costs that were considered for Manufacturing.

**Table 5B.31-3.  
Water Management Strategies Considered for Stephens County Manufacturing**

<i>Option</i>	<i>Yield (acft/yr)</i>	<i>Approximate Cost</i>	
		<i>Total</i>	<i>Unit (\$/acft)</i>
Voluntary redistribution from Municipal Supply	1	\$0	\$0
South Bend Reservoir (Section 5A.14.2)	106,700	\$241,761,000	\$173
No Action	-	\$217,000 <sup>1</sup>	\$217,000 <sup>1</sup>

<sup>1</sup> Economic impact of not meeting shortage (i.e., "no action") in 2030 as estimated by TWDB.

### **5B.31.3.1 Water Supply Plan**

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected 2050 shortage for Manufacturing:

- Voluntary redistribution from Municipal supply

The South Bend Reservoir has been recommended for consideration for long-term needs for the Brazos River Authority, as a major water provider, as described in Section 5B.38. The project is much too large to be pursued by any individual municipality, but if the BRA pursues it, this source should be considered by local entities.

### **5B.31.3.1 Costs**

Costs of the recommended plan to meet 2030 shortages for Manufacturing are:

- a. Voluntary redistribution from Municipal supply:
  - No modifications to existing supplies needed
  - Date to be Implemented: In place
  - Total Project Cost: \$0

### **5B.31.4 Steam-Electric**

No Steam-Electric demand or supply exists for the county.

### **5B.31.5 Mining**

The water supply entities for Mining show a projected surplus and no changes in water supply are recommended.

**5B.31.6 Irrigation**

**5B.31.6.1 Description of Supply**

Surface water supplies in Stephens County are obtained from the Clear Fork of the Brazos River and Lake Hubbard. Estimated reliable annual surface water supplies for Irrigation are 134 acft until 2050. There are no significant groundwater sources in the county.

**5B.31.6.2 Options Considered**

Table 5B.31-3 lists the water management strategies that were considered for Stephens County irrigation shortages, and references the report section discussing the strategy, total project cost, and unit costs for meeting the shortage.

**Table 5B.31-4.  
Water Management Strategies Considered for Stephens County Irrigation**

Option	Yield (acft/yr)	Approximate Cost	
		Total	Unit (\$/acft)
Irrigation System Conversion <sup>1</sup>	92	\$10,950/yr	\$119
Pecan Micro-irrigation Upgrade <sup>1</sup>	56	\$2,460/yr	\$44
Brush Control	(*)	(*)	(*)
Weather Modification <sup>2</sup>	(*)	\$500,000 to \$850,000/yr	(*)
No Action	(*)	\$49,000 <sup>3</sup>	\$144 <sup>3</sup>
<sup>1</sup> Source of Cost Estimate: Texas Agriculture Experiment Station <sup>2</sup> Source of Cost Estimate: Section 5B.10. <sup>3</sup> Economic impact of not meeting shortage (i.e., "no action") in 2030 as estimated by TWDB. * Definitive yield and/or cost cannot be determined.			

**5B.31.6.3 Water Supply Plan**

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water supply plan is recommended to meet the projected 2030 shortage of the Irrigation category.

No new water supplies are economically feasible to meet this projected shortage. Water conservation strategies in the form of conversion to irrigation systems with increased efficiency could partially meet the projected shortages. The irrigation systems in Stephens County are relatively efficient. Options are upgrade of side roll systems to center pivots, possibly some

renozzling of older center pivots, and conversion of hand moved sprinkler to microirrigation in 50 acres of pecans. Cultural practices such as crop selection, deficit irrigation, and conversion to dryland will account for the remainder of the water conserved (i.e., water not used).

As shown in Table 5B.31-5, conservation practices can meet about 148 acft/yr of the projected irrigation shortage. Apart from the conservation options presented, it is not economically feasible to meet projected Irrigation shortages listed as unmet demand in Stephens County.

**5B.31.6.4 Costs**

Costs of the Recommended Plan for Stephens County Irrigation supply are outlined in Table 5B6.3. Costs for some options, such as brush control and weather modification, can not be directly quantified due to lack of specific data. Costs for these options have been estimated based on generally available data outlined in the corresponding chapter in Section 5B. Upgrade of 400 acres of sideroll to center pivot would provide a maximum of 92 acft of water annually at a cost of \$119/acft. Conversion of pecan irrigation systems would conserve 56-acft at an annual cost of \$44/acft.

**5B.31.7 Livestock**

No future shortages are projected in the Livestock category and no changes in water supply are recommended.

**Table 5B.31-5.  
Recommended Plan Costs by Decade for Stephens County Irrigation<sup>1</sup>**

<i>Plan Element</i>	<i>2000</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>2040</i>	<i>2050</i>
<b>Irrigation System Conversion<sup>2</sup></b>						
Projected Shortage (acft/yr) <sup>3</sup>	(360)	(353)	(347)	(341)	(334)	(328)
Supply from Plan Element (acft/yr)	92	92	92	92	92	92
Annual Cost (\$/yr)	\$10,950	\$10,950	\$10,950	\$10,950	\$10,950	\$10,950
Unit Cost (\$/acft)	\$119	\$119	\$119	\$119	\$119	\$119
<b>Micro-Irrigation Upgrade<sup>2</sup></b>						
Supply from Plan Element (acft/yr)	56	56	56	56	56	56
Annual Cost (\$/yr)	\$2,464	\$2,464	\$2,464	\$2,464	\$2,464	\$2,464
Unit Cost (\$/acft)	\$44	\$44	\$44	\$44	\$44	\$44
<b>Weather Modification<sup>4</sup></b>						
Supply from Plan Element (acft/yr)	(*)	(*)	(*)	(*)	(*)	(*)
Annual Cost (\$/yr)	\$500,000 to \$850,000	\$500,000 to \$850,000	\$500,000 to \$850,000	\$500,000 to \$850,000	\$500,000 to \$850,000	\$500,000 to \$850,000
Unit Cost (\$/acft)	(*)	(*)	(*)	(*)	(*)	(*)
<b>Brush Control</b>						
Supply from Plan Element (acft/yr)	(*)	(*)	(*)	(*)	(*)	(*)
Annual Cost (\$/yr)	(*)	(*)	(*)	(*)	(*)	(*)
Unit Cost (\$/acft)	(*)	(*)	(*)	(*)	(*)	(*)
<b>Sum of Supply from Plan Elements (acft/yr)</b>	(148)	(148)	(148)	(148)	(148)	(148)
<b>Unmet Demand<sup>5</sup></b>	(212)	(205)	(199)	(193)	(186)	(180)

<sup>1</sup> Unless otherwise noted, costs are Total Project Cost and Unit Cost (\$/acft per year) for water conserved through management practices. Unit cost is for full utilization of project capacity.

<sup>2</sup> Source of Cost Estimate: Texas Agriculture Experiment Station.

<sup>3</sup> Total projected irrigation shortages are presented.

<sup>4</sup> Source of Cost Estimate: Section 5B.10.

<sup>5</sup> Apart from the conservation options presented, it is not economically feasible to meet projected irrigation shortages listed as unmet demand in Stephens County.

\* Definitive yield and/or cost cannot be determined.