5B.20 Knox County Water Supply Plan

Table 5B.20-1 lists each water user group in Knox 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. Knox County, through its County Commissioner's Court, has 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.20-1.
Knox County Surplus/(Shortage)

Water User Group	Surplus/(Shortage)[1]		Comment
	2030 (acft/yr)	2050 (acft/yr)	
City of Benjamin	31	28	Projected surplus
Knox City	(235)	(235)	Projected shortage – see plan below
City of Munday	(294)	(295)	Projected shortage – see plan below
County-Other	5	5	Projected surplus
Manufacturing	0	0	No demand or supply
Steam-Electric	0	0	No demand or supply
Mining	8	9	Projected surplus
Irrigation	(2,199)	(799)	Projected shortage – see plan below
Livestock	0	0	Supply equals demand

[1] From Tables 4-39 and 4-40, Section 4 – Comparison of Water Demands with Water Supplies to Determine Needs.

5B.20.1 City of Benjamin

Small surface water supplies are obtained from Millers Creek Reservoir and local sources, but primary groundwater sources are the Seymour and Blaine Aquifers. The groundwater supply is limited by well capacity. No current or future shortages are projected and no changes in water supply are recommended.

5B.20.2 Knox City

5B.20.2.1 Description of Supply

Knox City obtains surface water via a contract with North Central Texas MWD. This contract expires in 2010, however, the supply is limited. Knox has a projected shortage of 235 acft in 2030, representing 100 percent of demand.

5B.20.2.2 Options Considered

Table 5B.20-2 lists the water management strategies, report section references discussing the strategy, total project cost, and unit costs that were considered for meeting Knox City's shortages.

Table 5B.20-2.
Water Management Strategies Considered for Knox City

Option	Yield (acft/yr)	Approximate Cost	
		Total	Unit ($/acft)
Extend existing contract with NCTMWD	235	$152,750/yr	$650[1]
No Action	-	$9,974,000*	$42,443*

[1] Estimated wholesale rate for treated water.
* Economic impact of not meeting shortage (i.e., "no action" alternative) in 2030 as estimated by TWDB.

5B.20.2.3 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 Knox City:

- Extend and amend existing contract to supply an additional 235 acft/yr

5B.20.2.3 Costs

Costs of the Recommended Plan for Knox City.

a. Extension of existing contract:
   - Cost Source: Estimated wholesale of $650/acft for treated water
   - Date to be Implemented: 2010
   - Total Annual Cost: $152,750

5B.20.3 City of Munday

5B.20.3.1 Description of Supply

The City of Munday obtains surface water via a contract with North Central Texas MWD. This contract expires in 2010; however, the supply is limited. Munday has a projected shortage of 291 acft in 2030, this represents 100 percent of demand.

5B.20.3.2 Options Considered

Table 5B.20-3 lists the water management strategies, report section references discussing the strategy, total project cost, and unit costs that were considered for meeting the City of Munday's shortages.

Table 5B.20-3.
Water Management Strategies Considered for the City of Munday

Option	Yield (acft/yr)	Approximate Cost	
		Total	Unit ($/acft)
Extend existing contract with NCTMWD	295	$191,750/yr	$650[1]
No Action	-	$12,478,000*	$42,443*

[1] Estimated wholesale rate for treated water.
* Economic impact of not meeting shortage (i.e., "no action" alternative) in 2030 as estimated by TWDB.

5B.20.3.3 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 Munday:

- Extend and amend existing contract to supply an additional 294 acft/yr.

5B.20.3.4 Costs

Costs of the Recommended Plan for Munday.

a. Extension of existing contract:
   - Cost Source: Estimated wholesale value of $650/acft for treated water
   - Date to be Implemented: 2010
   - Total Annual Cost: $191,100

5B.20.4 County-Other Category

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

5B.20.5 Manufacturing

No Manufacturing demand exists or is projected for the county.

5B.20.6 Steam-Electric

There is no Steam-Electric demand or supply in Knox County.

5B.20.7 Mining

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

5B.20.8 Irrigation

5B.20.8.1 Description of Supply

Surface water supplies for Irrigation in Knox County are obtained from Wild Horse Creek, Lake Catherine, and Lake Davis. The estimated annual reliable surface water supply for Irrigation is 2,064 acft until 2050. The primary groundwater source in Knox County is the Seymour Aquifer. Estimated reliable supply of groundwater is 25,000 acft until 2050. As demonstrated in Table 5B.20-1, there is a current and long-term shortage in Irrigation water supplies through the year 2050.

5B.20.8.2 Options Considered

Table 5B.20-4 lists the water management strategies that were considered for Knox County Irrigation shortages, total project cost, and unit costs for meeting the shortage.

Table 5B.20-4.
Water Management Strategies Considered for Knox County Irrigation

Option	Yield (acft/yr)	Approximate Cost	
		Total	Unit ($/acft)
Irrigation System Conversion [1]	2,200	$96,800/yr	$44
Brush Control	(*)	(*)	(*)
Weather Modification [2]	(*)	$500,000 to $850,000/yr	(*)
No Action	-	$318,000[3]	$144[3]

[1] Source of Cost Estimate: Texas Agriculture Experiment Station
[2] Source of Cost Estimate: Section 5B.10.
[3] 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.20.8.3 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.

Knox County has a projected Irrigation shortage of 2,199 acft in 2030 and 779 acft in 2050. 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 supply some of the unmet demands. The options are to upgrade the gated pipe systems to center pivot systems and to upgrade older center pivots. Conversion of 2,000 acres of the 19,500 acres of irrigated cotton in Knox County from gated pipe to center pivot could meet the projected shortage in 2030.

As shown in Table 5B.20-5, conservation practices can meet about 2,200 acft/yr of the projected shortages. This will meet the projected shortages by the year 2030. Prior to that, it is not economically feasible to meet projected Irrigation shortages in Knox County.

5B.20.8.4 Costs

Costs of the Recommended Plan for Knox County Irrigation supply are outlined in Table 5B.20-5. 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. Conversion of 2,000 acres of the 19,500 acres of irrigated cotton in Knox County from gated pipe to center pivot could meet the projected shortage in 2030. This would conserve 1.11 acft water per acre at an average annual cost of $44.11/acft and it would provide 2,200 acft/yr.

Table 5B.20-5.
Recommended Plan Costs by Decade for Knox County Irrigation[1]

Plan Element	*2000*	*2010*	*2020*	*2030*	*2040*	*2050*
Irrigation System Conversion[2]						
Projected Shortage (acft/yr)[3]	(4,465)	(3,691)	(2,936)	(2,199)	(1,480)	(779)
Supply from Plan Element (acft/yr)	2,200	2,200	2,200	2,200	2,200	2,200
Annual Cost ($/yr)	$96,800	$96,800	$96,800	$96,800	$96,800	$96,800
Unit Cost ($/acft)	$44	$44	$44	$44	$44	$44
Weather Modification[4]						
Supply from Plan Element (acft/yr)	(*)	(*)	(*)	(*)	(*)	(*)
Annual Cost ($/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)	(*)	(*)	(*)	(*)	(*)	(*)
Brush Control[4]						
Supply from Plan Element (acft/yr)	(*)	(*)	(*)	(*)	(*)	(*)
Annual Cost ($/yr)	(*)	(*)	(*)	(*)	(*)	(*)
Unit Cost ($/acft)	(*)	(*)	(*)	(*)	(*)	(*)
Sum of Supply from Plan Elements (acft/yr)	2,200	2,200	2,200	2,200	2,200	2,200
Unmet Demand [5]	(2,265)	(1,491)	(736)	0	0	0

[1] 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.
[2] Source of Cost Estimate: Texas Agriculture Experiment Station
[3] Total projected irrigation shortages are presented.
[4] Source of Cost Estimate: Section 5B.10.
[5] Apart from the conservation options presented, it is not economically feasible to meet projected irrigation shortages listed as unmet demand in Knox County.
* Definitive yield and/or cast cannot be determined.

5B.20.9 Livestock

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