5.20 Knox County Water Supply Plan

Table 5.20-1 lists each water user group in Knox County and their corresponding surplus or shortage in years 2040 and 2070. A brief summary of each water user group supply is presented in the following subsections.

Table 5.20-1. Knox County Surplus/(Shortage)

Water User Group	Surplus/(Shortage)[1]		Comment
	2040 (acft/yr)	2070 (acft/yr)	
Knox City	(118)	(226)	Projected shortage – see plan below
City of Munday	(125)	(237)	Projected shortage – see plan below
County-Other	71	16	Projected surplus
Manufacturing	0	0	No projected demand
Steam-Electric	0	0	No projected demand
Mining	(14)	(14)	Projected shortage – see plan below
Irrigation	(8,505)	(5,105)	Projected shortage – see plan below
Livestock	0	0	Demand equals supply

1 – From Tables C-39 and C-40, Appendix C – Comparison of Water Demands with Water Supplies to Determine Needs.

5.20.1 Knox City

Description of Supply

Knox City obtains surface water via a contract with North Central Texas Municipal Water Authority (NCTMWA) and exempt groundwater use in the city limits from the Blaine Aquifer. Current supplies are insufficient to meet projected demands through 2070.

Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water management strategies are recommended for Knox City.

a. Conservation

- Cost Source: Volume II, Chapter 2
- Date to be Implemented: 2020
- Annual Cost: $27,280 in 2070
- Unit Cost: $496/acft

b. Millers Creek Reservoir Augmentation strategy by NCTMWA. This will provide supply at least up to the current amount contracted from NCTMWA.
   - Cost Source: Volume II, Chapter 7.5
     - Project requires a subordination agreement with the BRA, which is dependent on the BRA obtaining the System Operations permit
   - Date to be Implemented: 2020
   - Project Cost: none (cost would be borne by NCTMWA)
   - Unit Cost: none (supply already purchased from NCTMWA)

c. Alternative: Lake Creek Reservoir. This strategy would be developed by NCTMWA to augment existing supplies.
   - Cost Source: Volume II, Chapter 4.10
     - Project requires a subordination agreement with the BRA, which is dependent on the BRA obtaining the System Operations permit
   - Date to be Implemented: 2020
   - Project Cost: none (cost would be borne by NCTMWA)
   - Unit Cost: none (supply already purchased from NCTMWA)

Table 5.20-2. Recommended Plan Costs by Decade for Knox City

Plan Element	2020	2030	2040	2050	2060	2070
Projected Surplus/(Shortage) (acft/yr)	*(48)*	*(83)*	*(118)*	*(154)*	*(190)*	*(226)*
Conservation						
Supply From Plan Element (acft/yr)	9	25	45	54	54	55
Annual Cost ($/yr)	$4,464	$12,400	$22,320	$26,784	$26,784	$27,280
Projected Surplus/(Shortage) after Conservation (acft/yr)	*(39)*	*(57)*	*(72)*	*(101)*	*(136)*	*(171)*
Millers Creek Reservoir Augmentation						
Supply From Plan Element (acft/yr)	72	104	136	167	199	231
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Alternative: Lake Creek Reservoir						
Supply From Plan Element (acft/yr)	72	104	136	167	199	231
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—

5.20.2 City of Munday

Description of Supply

City of Munday obtains surface water via a contract with North Central Texas Municipal Water Authority (NCTMWA) and exempt groundwater use in the city limits from the Seymour Aquifer. Current supplies are insufficient to meet projected demands through 2070.

Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water management strategies are recommended for the City of Munday.

a. Conservation
   - Cost Source: Volume II, Chapter 2
   - Date to be Implemented: 2020
   - Annual Cost: $27,280 in 2070
   - Unit Cost: $496/acft

b. Millers Creek Reservoir Augmentation strategy by NCTMWA. This will provide supply at least up to the current amount contracted from NCTMWA.
   - Cost Source: Volume II, Chapter 7.5
     - Project requires a subordination agreement with the BRA, which is dependent on the BRA obtaining the System Operations permit
   - Date to be Implemented: 2020
   - Project Cost: none (cost would be borne by NCTMWA)
   - Unit Cost: none (supply already purchased from NCTMWA)

c. Alternative: Lake Creek Reservoir. This strategy would be developed by NCTMWA to augment existing supplies.
   - Cost Source: Volume II, Chapter 4.10
     - Project requires a subordination agreement with the BRA, which is dependent on the BRA obtaining the System Operations permit
   - Date to be Implemented: 2020
   - Project Cost: none (cost would be borne by NCTMWA)
   - Unit Cost: none (supply already purchased from NCTMWA)

Table 5.20-3. Recommended Plan Costs by Decade for the City of Munday

Plan Element	2020	2030	2040	2050	2060	2070
Projected Surplus/(Shortage) (acft/yr)	*(55)*	*(91)*	*(125)*	*(164)*	*(200)*	*(237)*
Conservation						
Supply From Plan Element (acft/yr)	8	26	36	37	36	37
Annual Cost ($/yr)	$3,968	$12,896	$17,856	$18,352	$17,856	$18,352
Projected Surplus/(Shortage) after Conservation (acft/yr)	*(47)*	*(65)*	*(89)*	*(127)*	*(164)*	*(200)*
Millers Creek Reservoir Augmentation						
Supply From Plan Element (acft/yr)	74	107	140	173	205	238
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Alternative: Lake Creek Reservoir						
Supply From Plan Element (acft/yr)	74	107	140	173	205	238
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—

5.20.3 County-Other

Entities in Knox County-Other obtain water supply from the Seymour and Blaine Aquifers and surface water via contracts with NCTMWA. Water supply surplus are adequate through 2070.

Conservation was also considered; however, the County-Other's current per capita use rate is below the selected target of 140 gpcd.

5.20.4 Manufacturing

No Manufacturing demand exists or is projected for the county.

5.20.5 Steam-Electric

No Steam-Electric demand exists or is projected for the county.

5.20.6 Mining

Description of Supply

No water supplies are currently allocated for Mining operations in Knox County. Water supply shortages are projected for Mining beginning in 2020.

Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water management strategies are recommended for Mining.

a. Conservation

- Cost Source: Volume II, Chapter 2
- Date to be Implemented: 2020
- Annual Cost: not determined

a. Groundwater Development – Blaine Aquifer

- Cost Source: Volume II, Chapter 12
- Date to be Implemented: 2020
- Project Cost: $223,000
- Unit Cost: Max of $1,388 (2020)

Table 5.20-4. Recommended Plan Costs by Decade for Knox County – Mining

Plan Element	2020	2030	2040	2050	2060	2070
Projected Surplus/(Shortage) (acft/yr)	*(15)*	*(15)*	*(14)*	*(14)*	*(14)*	*(14)*
Conservation						
Supply From Plan Element (acft/yr)	—	1	1	1	1	1
Annual Cost ($/yr)	—	ND	ND	ND	ND	ND
Projected Surplus/(Shortage) after Conservation (acft/yr)	*(15)*	*(14)*	*(13)*	*(13)*	*(13)*	*(13)*
Groundwater Development – Blaine Aquifer						
Supply From Plan Element (acft/yr)	15	15	15	15	15	15
Annual Cost ($/yr)	$20,815	$20,815	$1,815	$1,815	$1,815	$1,815
Unit Cost ($/acft)	$1,388	$1,388	$121	$121	$121	$121

ND – Not determined. Costs to implement industrial conservation technologies will vary based on each location

5.20.7 Irrigation

Description of Supply

Knox County Irrigation obtains water supplies from the Seymour and the Blaine Aquifer as well as surface water supplies from Lake Davis and run-of-the river water rights. Irrigation shortages are projected through 2070.

Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG and TWDB, the following water management strategies are recommended for Irrigation.

a. Conservation

- Cost Source: Volume II, Chapter 2
- Date to be Implemented: 2020

- Annual Cost: $628,590 in 2030
- Unit Cost: $230/acft

b. Groundwater Development – Blaine Aquifer
   - Cost Source: Volume II, Chapter 12
   - Date to be Implemented: 2020
   - Project Cost: $2,436,000
   - Unit Cost: Max of $482/acft (2020)

c. Groundwater Development – Seymour Aquifer
   - Cost Source: Volume II, Chapter 12
   - Date to be Implemented: 2020
   - Project Cost: $9,817,000
   - Unit Cost: Max of $571/acft (2020)

d. Reallocate supplies from Stonewall County – Blaine Aquifer
   - Cost Source: Volume II, Chapter 12
   - Date to be Implemented: 2030
   - Project Cost: Capital cost unknown, as demands vary geographically.
   - Unit Cost: Assumed $250/acft

e. Brush Control (unquantifiable costs and savings)

Table 5.20-5. Recommended Plan Costs by Decade for Knox County – Irrigation

Plan Element	2020	2030	2040	2050	2060	2070
Projected Surplus/(Shortage) (acft/yr)	*(3,121)*	*(5,515)*	*(8,505)*	*(9,283)*	*(5,956)*	*(5,105)*
Conservation						
Supply From Plan Element (acft/yr)	1,231	2,001	2,733	2,666	2,600	2,539
Annual Cost ($/yr)	$283,130	$460,230	$628,590	$613,180	$598,000	$583,970
Projected Surplus/(Shortage) after Conservation (acft/yr)	(1,890)	(3,514)	(5,773)	(6,618)	(3,356)	(2,566)
Groundwater Development – Blaine Aquifer						
Supply From Plan Element (acft/yr)	461	461	461	461	461	461
Annual Cost ($/yr)	$222,054	$222,054	$18,054	$18,054	$18,054	$18,054
Unit Cost ($/acft)	$482	$482	$39	$39	$39	$39
Groundwater Development – Seymour Aquifer						
Supply From Plan Element (acft/yr)	1,571	1,345	1,193	1,116	1,041	1,041
Annual Cost ($/yr)	$896,747	$896,747	$72,747	$72,747	$72,747	$72,747
Unit Cost ($/acft)	$571	$571	$46	$46	$46	$46

Table 5.20-5. Recommended Plan Costs by Decade for Knox County – Irrigation

Plan Element	2020	2030	2040	2050	2060	2070
Reallocate Supplies from Stonewall County – Blaine Aquifer						
Supply From Plan Element (acft/yr)	—	1,709	4,120	5,042	1,855	1,065
Annual Cost ($/yr)	—	$427,250	$1,030,000	$1,260,500	$463,750	$266,250
Unit Cost ($/acft)	—	$250	$250	$250	$250	$250

5.20.8 Livestock

No shortages are projected for Livestock, the demand equals the supply, and no changes in water supply are recommended.

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