

Section 4

Comparison of Water Demands with Water Supplies to Determine Needs

4.1 Introduction

In this section, the demand projections from Section 2 and the supply projections from Section 3, are brought together to estimate projected water needs in the region for the next 50 years.

As a recap, Section 2 presented demand projections for six types of use: municipal, manufacturing, steam-electric, mining, irrigation, and livestock. The projections are for dry year demands. Additionally, municipal water demand projections were shown for each city with a population of more than 500 and for the County-Other category in each county. Section 3 presented surface water and groundwater availability.

4.1.1 Methods to Estimate Water Supplies

Surface water and groundwater availability were determined among the six user groups using the methods explained below.

4.1.1.1 Surface Water Supplies

Surface water in the region available to meet projected demands consists of firm yield of reservoirs, dependable supply of run-of-river water rights through drought of record conditions, and local on-farm sources. Contracts and/or rights to reservoirs, and run-of-river rights were allocated as supplies to their stated type of use: municipal, industrial (manufacturing, steam-electric, and mining), and irrigation. Additionally, municipal supply was further allocated among cities and other municipal water supply entities. This was done by obtaining water seller information (i.e., which contract/right holders – a wholesaler – are reselling water to other water supply entities) and water purchase contract limits between buyers and sellers. This information was obtained from TWDB files and follow-up queries to water supply entities. For contracts expiring prior to 2050, the water supplies shown in Tables 4-1 through 4-74 reflect the cessation of supplies under that contract. If contract expiration date information was unavailable, it was assumed that the contract would remain in place through 2050. Please see Appendix G.5 for a summary of available surface water contract information, expiration dates, and renewal clause

information. Water associated with a wholesaler that is not resold, remains as an available supply to the wholesaler in the supply tables. In the case where a wholesaler's supply is deficient to meet its own demands and contract requirements, it was assumed that contracts were met in full, and any shortage is shown in the wholesaler's projections.

As an illustration, Eastland County Water Supply District has a contract to supply 1,791 acft/yr to the City of Eastland from Lake Leon. This contract expires in 2032 and does not have a renewal clause; therefore, City of Eastland is shown with no supply in Table 4-16 after year 2032. The City of Eastland also sells water under contract to the City of Carbon and Westbound Water Supply Corporation. Neither contract has a renewal clause. The contract with the City of Carbon is for 73 acft/yr and expires in 2009; this water is shown reverting back to a supply for Eastland in Table 4-16, starting in 2010. The contract with Westbound Water Supply Corporation is for 47 acft/yr and expires in 2022. Again, this 47 acft reverts back to a supply to Eastland after 2022 until 2032, as shown in Table 4-16.

In most cases, surface water supply from stock ponds and streams was shown to be available to meet livestock needs when groundwater supplies were insufficient to meet those demands.

4.1.1.2 Groundwater Allocation

Total groundwater availability in the region was determined based on the specific methods identified for each aquifer as discussed in Appendix B. For many aquifers the availability is based on the long-term effective recharge. For other aquifers, various methods consistent with those used in the 1997 Water Plan were used. This total groundwater availability was shown for each county, by aquifer, in Table 3-14. For each county, total available groundwater was allocated among the six user groups—municipal, manufacturing, steam-electric, mining, irrigation, and livestock—in the following manner:

- Using TWDB records, user groups relying on groundwater supply were determined.
- Allocation percentages for each user group using groundwater were made based on their 1997 groundwater use.
- Allocation percentages were used to distribute sustainable groundwater pumpage estimates in each county to each user group in each county.

Groundwater distributed to municipal use was further redistributed to cities and County-Other. For each county, this was done in the following manner:

- Using TWDB records, cities and County-Other relying on groundwater supply were determined.
- Allocation percentages for each city and County-Other using groundwater were made based on 1997 groundwater use.
- Allocation percentages were used to distribute sustainable groundwater pumpage estimates to each municipality and County-Other category.

Additional minor adjustments were made to several of the cities and/or categories based upon more current information and the consultant team's local understanding of the areas involved.

Unless otherwise noted, Tables 4-1 to 4-74, reflect the above methodology.

4.1.1.3 Infrastructure Constraints

Surface water and groundwater distributed to cities and County Other in each county were also examined for infrastructure constraints. A surface water constraint and a groundwater constraint were developed for each entity.

Both groundwater and surface water infrastructure constraints were developed using information from the annual Compliance Evaluation Program conducted by TNRCC. The groundwater constraint was based upon the well pumping capacity given in the sanitary survey. This capacity was converted to acft per year. Dividing by a peaking factor of 2.0 represented the pumping capacity of the wells in terms of an average annual supply. This was then compared to the groundwater supply that had been allocated to the city. The lesser of the two supplies (i.e., groundwater supply or annual pumping capacity) was reported as the water supply for the entity. In the cases where the supply was restricted by well pumping capacity, the entity was footnoted as "infrastructure limited".

The surface water constraint was based upon three factors, raw water intake capacity, booster or pump station capacity, and pipeline capacity. The lowest capacity of the three was the controlling capacity. As in the groundwater constraint development, the controlling capacity was converted to acft per year. Dividing by a peaking factor of 2.0 represented the capacity of the surface water infrastructure in terms of an average annual supply. This was then compared to the surface water supply of the entity. The lesser of the two supplies (i.e., surface water supply or infrastructure capacity) was reported as the water supply for the entity.

For example: In Robertson County, the City of Hearne was initially allocated 2,416 acft/yr of groundwater. However, the city has a well capacity of 1,476 acft/yr, which is

less than Hearne's actual availability. Consequently the City of Hearne was reported having a 1,476-acft/yr water supply (Table 4-56).

For both surface water and groundwater, the municipal supply totals in the county summary pages may be larger than the sum of municipal supplies on the city summary pages. This is because the county summary pages report total available supply, regardless of constraints, whereas the city summary pages reflect constraints.