

## **7. Description of How the Regional Water Plan is Consistent with Long-Term Protection of the State’s Water Resources, Agricultural Resources, and Natural Resources**

### **7.1 Introduction**

The development of viable strategies to meet the demand for water is the primary focus of regional water planning. However, another important goal of water planning is the long-term protection of resources that contribute to water availability and to the quality of life in the state. The purpose of this chapter is to describe how the *2011 Region C Water Plan* is consistent with the long-term protection of the state’s water resources, agricultural resources, and natural resources. The requirement to evaluate the consistency of the regional water plan with protection of resources is found in 31 TAC Chapter 357.14(2)(C) <sup>(1)</sup>, which states, in part:

“The regional water plan is consistent with the guidance principles if it is developed in accordance with §358.3 of this title (relating to Guidelines), §357.5 of this title (relating to Guidelines for Development of Regional Water Plans), §357.7 of this title (relating to Regional Water Plan Development), §357.8 of this title (relating to Ecologically Unique River and Stream Segments), and §357.9 of this title (relating to Unique Sites for Reservoir Construction).”

Chapter 7 provides a general description of how the Region C plan is consistent with protection of water resources, agricultural resources, and natural resources. This chapter also specifically addresses the consistency of the *2011 Region C Water Plan* with the state’s water planning requirements.

### **7.2 Consistency with the Protection of Water Resources**

Five river basins provide surface water for Region C, and six aquifers provide groundwater to the region. The four major river basins within Region C boundaries are the Trinity River Basin, the Red River Basin, the Brazos River Basin, and the Sabine River Basin. Only a small portion of the Sulphur River Basin lies within the Region C boundaries, but this basin provides important surface water supplies for Region C from Chapman Lake. These river basins are depicted on Figure I.1, in Chapter 1. The region’s groundwater resources include two major aquifers, the Trinity and Carrizo-Wilcox, and

three minor aquifers, the Woodbine, the Nacatoch, and the Queen City. The extents of these aquifers within the region are depicted on Figures 1.7 and 1.8 in Chapter 1.

The Trinity River Basin provides the largest amount of water supply in Region C. Surface reservoirs in the Trinity Basin in Region C with conservation storage over 50,000 acre-feet include:

- Lake Bridgeport
- Eagle Mountain Lake
- Lake Worth
- Lake Weatherford
- Benbrook Lake
- Lake Arlington
- Joe Pool Lake
- Grapevine Lake
- Ray Roberts Lake
- Lewisville Lake
- Lake Lavon
- Lake Ray Hubbard
- Bardwell Lake
- Lake Waxahachie
- Terrell Lake
- Navarro Mills Lake
- Richland-Chambers Reservoir
- Cedar Creek Reservoir
- Lake Fairfield

Other major reservoirs supplying surface water to Region C include the following:

- Lake Texoma in the Red River Basin.
- Only a small portion of the Sabine River Basin lies within Region C; however, Region C receives water from two major water supply reservoirs located in Region D and the Sabine Basin (Lake Tawakoni and Lake Fork Reservoir).
- Only small portions of the Brazos River Basin lie within Region C, and no Brazos River Basin reservoirs with conservation storage over 50,000 acre-feet are located in Region C.
- Chapman Lake is located in the Sulphur River Basin in Region D and provides water supply to Region C.
- Lake Palestine is already permitted for use in Region C, but is located in the Neches River Basin in Region I.

Of the groundwater resources in Region C, the Trinity aquifer provides about 71 percent of the region's groundwater, and about 17 percent comes from the Woodbine aquifer. The remainder of the groundwater is from the Carrizo-Wilcox (9 percent), the Nacatoch (less than 1 percent), the Queen City (less than 1 percent), and undifferentiated/other aquifers (2 percent).

To be consistent with the long-term protection of water resources, the plan must recommend strategies that minimize threats to the region's sources of water over the planning period. The water management strategies identified in Chapter 4 were

evaluated for threats to water resources. The state-developed surface Water Availability Models (WAMs) and Groundwater Availability Models (GAMs) were used to evaluate surface water and groundwater supplies, respectively. The results from these models were used to determine the amount of water supply that could be allocated while still protecting the sustainability of the water resources. The recommended strategies represent a comprehensive plan for meeting the needs of the region while effectively minimizing threats to water resources.

Descriptions of the major strategies and the ways in which they minimize threats include the following:

- *Water Conservation.* Strategies for water conservation have been recommended that will significantly reduce the demand for water, thereby reducing the impact on the region's groundwater and surface water sources. Not including reuse, water conservation practices are expected to reduce the water use in Region C by 567,473 acre-feet per year by 2060, reducing impacts on both groundwater and surface water resources (Table 6.7).
- *Reuse Projects.* Existing and recommended reuse projects in Region C account for a total water supply of 636,656 acre-feet per year as of 2060 (Table 6.7). The majority of the recommended reuse is for municipal use. A portion of the reuse water is for golf course and general irrigation in municipal areas and for steam electric power generation. These strategies will provide an economical and environmentally desirable source of water for Region C and delay the need for development of new water supplies.
- *Conservation and Reuse.* Conservation strategies and water reuse in Region C will account for 1,204,129 acre-feet per year in 2060, including the TWDB conservation measures. This is 37 percent of the region's total demand.
- *Full Utilization of Existing Surface Supplies Committed to Region C.* A number of recommended strategies for Region C are intended to make full use of existing supplies. Most reservoirs in Region C will be utilized at or near their firm yield capacities but not beyond, thus protecting these reservoirs and allowing the continued water supplies throughout a drought similar to the drought of record. In addition, by fully utilizing the existing water supplies, water providers will delay the need for new supplies.
- *Investigation of Existing Supplies Not Committed To Region C.* As part of this planning process, the Region C Water Planning Group investigated the cost and availability of existing water supplies that might be made available to Region C. Cost-effective existing supplies are included in the *2011 Region C Water Plan*.

- *Optimal Use of Groundwater.* This strategy is recommended for entities with limited alternative sources and sufficient groundwater supplies to meet their needs. Groundwater availability reported in the plan is the long-term sustainability of the aquifer, and is based on aquifer recharge. In a few instances, over-drafting is recommended in limited areas where no other alternatives are available until after 2010. By 2020, the recommended plan calls for groundwater use at a sustainable level, thus maintaining the long-term sustainability of the aquifers.
- *New Surface Reservoirs.* A number of new surface reservoirs have been recommended as water management strategies. They include: Lower Bois d'Arc Creek Reservoir in 2020, Lake Ralph Hall in 2020 and Marvin Nichols Reservoir in 2030. Lake Tehuacana has been under consideration as an alternate management strategy for future supply. These reservoirs will have significant impacts on the land, homes, and habitat that will be inundated and on the existing stream segments which will be altered. As part of reservoir development, the Corps of Engineers will determine the quantity of land that should be set aside to mitigate for impacts to aquatic and wildlife habitats. Landowners within the reservoir sites will be compensated for their land. These new reservoirs will make releases for environmental water needs in accordance with environmental regulations and permit conditions, which will help sustain aquatic and wildlife habitat downstream from the reservoir. Water right permits for these reservoirs will be granted based on results from the WAMs which will ensure that these new water rights do not interfere with existing prior water rights, thus protecting existing water resources of the state.

### **7.3 Consistency with Protection of Agricultural Resources**

Many areas of Region C are heavily urbanized, and the region has comparatively little irrigated agriculture. In the year 2006, 3.6 percent of the Region's total water use was for irrigation and livestock, as shown in Table 1.7. None of the recommended water management strategies involve transferring water rights from agricultural use to another use. Thus, the Region C plan protects current agricultural water use.

The proposed reservoirs in the *2011 Region C Water Plan* will inundate some agricultural areas, but agricultural use in the reservoir sites is limited. The proposed reservoirs located in Region C include Lower Bois d'Arc Creek Lake, Lake Ralph Hall and Lake Tehuacana. Very little agricultural activity exists in the area of these proposed reservoirs. During the permitting process, site specific analyses would address this topic in more detail.

The proposed Marvin Nichols Reservoir in the Region C Plan is located outside of Region C. The area of the proposed Marvin Nichol Reservoir site has some agricultural

activity, including cattle raising. This area is also known to have some hunting leases for game animals.

#### **7.4 Consistency with Protection of Natural Resources**

Region C contains many natural resources that must be considered in water planning. Natural resources include threatened or endangered species; local, state and federal parks and public land; and energy/mineral reserves. The Region C plan is consistent with the long-term protection of these resources. A brief discussion of consistency of the plan with protection of natural resources follows.

##### **Threatened/Endangered Species**

A list of threatened or endangered species located within Region C is contained in two tables in Chapter 1. Table 1.29 presents the Federal Endangered or Threatened Species in Region C, and Table 1.30 lists the State Species of Special Concern in Region C. According to the Texas Parks and Wildlife Department's listing <sup>(2)</sup>, there are 12 endangered species and 19 threatened species whose habitats are located in Region C counties. According to the Federal Listing from the U.S. Fish and Wildlife Service <sup>(3)</sup>, there are 7 endangered species and 2 threatened species whose habitats are located in Region C counties.

All recommended strategies in Region C have been chosen with the possible effects on these threatened and endangered species in mind. For example, strategies that are likely to disturb threatened or endangered species habitat include mitigation allowances that set aside additional land for that habitat.

##### **Wetland Habitats**

The Region C plan includes some projects that would have impacts to existing wetland habitats. The Marvin Nichols Reservoir project would inundate a portion of the state's Priority 1 bottomland hardwoods. These wetlands are considered high value to key waterfowl species and would require comparable mitigation. As discussed in Section 7.2, state and federal agencies will determine the quantity of land that should be set aside to

mitigate for impacts to aquatic and wildlife habitats during reservoir development. The quantity and quality of the mitigation lands will be designed to achieve no net loss of wetlands functions and values. In addition, the development of a lake will create new wetland and aquatic habitats.

### Parks and Public Lands

The Texas Parks and Wildlife Department operates several state parks in Region C listed below: <sup>(4)</sup>

- Bonham State Park in Fannin County
- Cedar Hill State Park in Dallas County
- Eisenhower State Park in Grayson County
- Fairfield Lake State Park in Freestone County
- Lake Mineral Wells State Park in Parker County
- Fort Richardson & Lost Creek Reservoir State Park in Jack County
- Purtis Creek State Park partially in Henderson County
- Caddo National Grasslands Wildlife Management Area in Fannin County
- Ray Roberts State Park in Cooke, Denton, and Grayson Counties
- Richland Creek Wildlife Management Area in Freestone and Navarro Counties
- Ray Roberts Lake Wildlife Management Area in Cooke, Denton, and Grayson Counties
- Cedar Creek Islands Wildlife Management Area in Henderson and Kaufman Counties.

Federal government natural resource holdings in Region C include the following:

- Parks and other land around all of the Corps of Engineers lakes in the region (Texoma, Ray Roberts, Lewisville, Lavon, Grapevine, Benbrook, Joe Pool, Bardwell, and Navarro Mills)
- Hagerman National Wildlife Refuge on the shore of Lake Texoma in Grayson County
- Lyndon B. Johnson National Grasslands in Wise County.
- The Caddo National Grasslands WMA in Fannin County.

In addition, there are a number of city parks, recreational facilities, and public lands located throughout the region.

Increased utilization of some reservoirs may lower the lake levels during a severe drought. This may affect the parks and public lands surrounding these reservoirs, but the strategies recommended in the Region C plan will have no additional impact on these water resources beyond what has already been allowed for in their water

right permits. None of the recommended water management strategies evaluated for the Region C plan is expected to adversely impact parks or public lands.

## Energy Reserves

Oil and natural gas fields are important natural resources in portions of Region C. Most of the oil production is in Jack, Wise, Cooke, Navarro, and Grayson Counties<sup>(5)</sup>, and most of the natural gas production is in Freestone, Parker, Denton, Jack, Tarrant, and Wise Counties<sup>(6)</sup>. Gas production in the Barnett Shale has rapidly increased in the past decade due in large part to improvements in hydraulic fracture stimulation technologies<sup>(7)</sup>. This use of water in gas production has significantly increased the mining use in Region C. In addition, there are some lignite coal resources in Region C<sup>(8)</sup>, the most significant of which is used to supply TXU Electric's Big Brown Steam Electric Station on Lake Fairfield. None of the recommended water management strategies are expected to impact oil, gas, or coal production in the region.

### **7.5 Consistency with Protection of Navigation**

No commercial navigation activities occur in Region C at this time. For the two river segments identified by the Corps of Engineers as "navigable waters" (Trinity River downstream of Fort Worth and the Red River downstream of Warren's Bend in Cooke County), there are no known plans to initiate navigation activities. This plan has no impact to navigation in Region C.

The Region C recommended strategies also do not impact navigation activities in other regions. Analysis of the proposed reuse projects found that there are limited impacts to stream flows from reuse projects, thus protecting potential downstream navigation activities. The recommended reservoir located in adjacent regions (Marvin Nichols Reservoir) includes sufficient releases that would protect instream uses and downstream navigation activities.

### **7.6 Consistency with State Water Planning Guidelines**

To be considered consistent with long-term protection of the state's water, agricultural, and natural resources, the Region C plan must be determined to be in

compliance with the following regulations <sup>(1, 9)</sup>:

- 31 TAC Chapter 358.3
- 31 TAC Chapter 357.5
- 31 TAC Chapter 357.7
- 31 TAC Chapter 357.8
- 31 TAC Chapter 357.9

The information, data, evaluation, and recommendations included in Chapters 1 through 6 and Chapter 8 of the Region C plan collectively comply with these regulations.

## CHAPTER 7 LIST OF REFERENCES

- (1) Texas Water Development Board: *Chapter 357, Regional Water Planning Guidelines*, Austin, October 1999, amended February 18, 2008.
- (2) Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs: *County Lists of Texas' Special Species. Region C Counties*, January 20, 2009.
- (3) U.S. Fish and Wildlife Service: *Listed Species Information Center*, [Online], Available URL: <http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm>, January 2008.
- (4) Texas Parks and Wildlife Department: State Parks and Destinations, [Online], Available URL : <http://www.tpwd.state.tx.us/> , February, 2010.
- (5) Texas Railroad Commission: Well Distribution by County, Oil Well Counts, Austin, [Online], Available URL : [http://www.rrc.state.tx.us/data/wells/wellcount/oilwellct\\_0210.pdf](http://www.rrc.state.tx.us/data/wells/wellcount/oilwellct_0210.pdf) , February 2010.
- (6) Texas Railroad Commission: Well Distribution by County, Gas Well Counts, Austin, [Online], Available URL: [http://www.rrc.state.tx.us/data/wells/wellcount/gaswellct\\_0210.pdf](http://www.rrc.state.tx.us/data/wells/wellcount/gaswellct_0210.pdf) , February 2010.
- (7) R.W. Harden & Associates, Inc, Freese & Nichols, Inc, Bureau of Economic Geology: *Northern Trinity/Woodbine GAM, Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development*, Austin, January 2007.
- (8) Texas Railroad Commission: Maps, Coal Mining Locations, Austin, [Online], Available URL: <http://www.rrc.state.tx.us/programs/mining/TxCoaLst.pdf> , October 27, 2008.
- (9) Texas Water Development Board: *Chapter 358, State Water Planning Guidelines*, Austin, October 1999, amended December 6, 2004.