

# Chapter 6

## Impacts of the Regional Water Plan and Consistency with Protection of Resources

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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 2021 Regional Water Plan (2021 Plan) is consistent with the long-term protection of the State's water resources, agricultural resources, and natural resources. The requirement to evaluate the impact of the regional water plan and its consistency with protection of resources is found in 31 Texas Administrative Code Chapter 357.40 & 41, which require the following:

- A description of potential impacts of the regional water plan regarding agricultural resources; other water resources; threats to agricultural and natural resources; third-party social and economic impacts resulting from voluntary redistributions of water; major impacts of recommended water management strategies (WMS) on key water quality parameters; and, effects on navigation. (§357.40(b))
- A description of how the 2021 Plan is consistent with the long-term protection of the state's water resources, agricultural resources, and natural resources. (§357.41)
- A summary of identified water needs that remain unmet by the plan. (§357.40(c))
- A description of the socioeconomic impacts of not meeting identified water needs in the region. (§357.40(a))

These requirements are addressed by providing general descriptions of how the plan is consistent with protection of water resources, agricultural resources, and natural resources.

Additionally, the chapter will specifically address consistency of the 2021 Plan with the State's water planning requirements.

### 6.1 Impacts of Water Management Strategies

The Impacts of Water Management Strategies (WMSs) on Key Water Quality Parameters and the threat to Agricultural Resources/Rural Areas due to moving water were evaluated for each WMS included in the 2021 Regional Water Plan (2021 Plan). The result of this evaluation for each WMS is included in Appendix 5B-A, in the Project Evaluation section of each Technical Memorandum. Each WMS Technical Memorandum presents a rating for the strategy on a scale of 1-5 and a brief explanation for the rating. Appendix 5B-B provides a summary of the methodology behind the quantification of the rating system for each category. In addition, each technical memorandum describes impacts to other water sources, threats to natural resources, third-party social and economic impacts resulting from voluntary redistribution of water, and effects on navigation, if applicable.



### 6.1.1 Key Water Quality Parameters in the State

All WMSs in the 2021 Plan received a rating of a 4 in the category for “Major Impacts on Key Water Quality Parameters” with an Explanation of “Minimal or No Negative Impacts/Some Positive Impacts” with three exceptions:

The City of Center Raw Water Pipeline from Toledo Bend to Lake Center and Reuse Pipeline from their wastewater treatment plant to Lake Center WMSs both received a rating of 3 due to the WMSs’ potential impacts of the addition of raw water and return flows, respectively, on the quality of the receiving bodies. The third exception was the Lower Neches Valley Authority Neches Trinity Basin Interconnect which also received a rating of 3 for the projects potential “Low Negative Impacts.”

### 6.1.2 Moving Water from Agricultural and Rural Areas

All WMSs in the 2021 Plan were reviewed for their potential “Threat to Agricultural Resources/Rural Areas” and assigned a rating from 1-5 with an explanation listed rating.

Of the 64 WMSs presented in Appendix 5B-A, 1 received a rating of 3 indicating “Low Negative Impacts,” 56 received a rating of 4 indicating “Minimal or No Negative Impacts”, and 7 received a rating of 5 indicating High Positive Impacts. According to this evaluation, the WMS with the greatest impact to Agricultural/Rural areas is Lake Columbia due to the large project area compared to the remaining Region I WMSs. The strategies with the lowest impacts include permit amendments, contract amendments where the infrastructure to access water is already in place, volumetric surveys, and reuse strategies.

## 6.2 Consistency with the Long-term Protection of the State

To be considered consistent with long-term protection of the State’s water, agricultural, and natural resources, the ETRWPA Water Plan must be in compliance with provisions of 31 Texas Administrative Code Chapter 357. The information, data, evaluation, and recommendations included in Chapters 1 through 5C and 7 through 11 of the 2021 Plan collectively demonstrate compliance with these regulations. To demonstrate compliance, the ETRWPA has developed a matrix addressing the specific recommendations contained in the applicable regulations from 31 Texas Administrative Code Chapters 357 and 358. Appendix 6-A contains a completed matrix or checklist highlighting each pertinent paragraph of the regulations. The content of the 2021 Plan has been evaluated against this matrix.

### 6.2.1 Protection of Water Resources

The water resources in the ETRWPA include portions of three river basins providing surface water, and portions of four aquifers providing groundwater. The three major river basins within the ETRWPA boundaries are the Sabine River Basin (Basin 5), the Neches River Basin (Basin 6), and the Trinity River Basin (Basin 8). The respective boundaries of these basins are depicted in Figure 1.10, in Chapter 1.

The region’s groundwater resources include, primarily, the Gulf Coast and Carrizo-Wilcox aquifers. Lesser amounts of water are also drawn from the Sparta aquifer, Queen City aquifer, and localized aquifers, such as the Yegua-Jackson. The extents of these aquifers within the region are depicted on Figures 1.7 and 1.8, in Chapter 1.

Surface water accounts for approximately 75 percent of the total water use in the region. Sources within the region include 11 reservoirs in the Neches River Basin, three in the Sabine River Basin, and one in the Trinity River Basin. If constructed, Lake Columbia would be located in the Neches River Basin. Currently, the majority of the available surface water supply used in the ETRWPA comes from the Neches River Basin.



The Carrizo-Wilcox aquifer and Gulf Coast aquifers are, by far, the most important groundwater resources in the ETRWPA, accounting for approximately 75 percent of the available groundwater. Significant water level declines have been observed in the Carrizo-Wilcox aquifer around the cities of Tyler, Lufkin, and Nacogdoches over the past two decades. Lufkin and Nacogdoches are both considering development of new surface water sources to meet projected shortages. The City of Tyler already relies largely on surface water supplies.

Protection of surface water resources and groundwater resources necessarily involves understanding potential impacts to the interrelationship between groundwater and surface water. This is particularly important in aquifer recharge (i.e., outcrop) areas and contributing zones to recharge areas. The Carrizo-Wilcox Aquifer outcrops in the northeastern area of the region, predominantly in Panola, Shelby, and Rusk counties. In addition, the Queen City Aquifer outcrop is found in the northwestern area of the region, mostly in Henderson, Smith, Cherokee, and Anderson counties. All of these counties support surface water supplies that are likely located on a portion of an aquifer outcrop.

Hence, water management impacts on surface water sources could affect supplies in these important groundwater supplies. Strategies to manage impacts in the ETRWPA need to consider protection of the groundwater-surface water interfaces, where it may be possible to do so.

To be consistent with the long-term protection of water resources, the 2021 Plan must recommend strategies that minimize threats to the region's sources of water over the planning period. The WMSs identified in Chapter 5B were evaluated for threats to water resources. The recommended strategies represent a comprehensive plan for meeting the needs of the region while effectively minimizing threats to water resources. Threats to water resources are minimized in the 2021 Plan in the following ways:

- **Water conservation.** Strategies for water conservation have been recommended that will help reduce the demand for water, thereby reducing the impact on the region's groundwater and surface water sources. Water conservation practices are expected to save over 20,000 ac-ft of water annually by 2070, reducing impacts on both groundwater and surface water resources. The plan also assumes significant savings in municipal demands due to the implementation of plumbing codes. Water conservation benefits the State's water resources by reducing the volumes of water withdrawals necessary to support human activity. This can benefit surface water, groundwater, and groundwater-surface water relationships.
- **Development of Lake Columbia.** This strategy will increase surface water supplies available for cities, industry, and agriculture in the ETRWPA.
- **Optimized use of existing surface water resources.** WMSs that involve existing surface water resources work to optimize the utilization of these resources. The Water Availability Model, a part of the regional planning process, assesses how the increased use of surface water resources will impact the Region's water resources. The Water Availability Models developed for the ETRWPA indicate adequate availability of surface water in the region. As with conservation, optimized use of existing surface water resources can help protect groundwater-surface water relationships where surface waters extend across an aquifer outcrop.
- **Optimized use of groundwater.** This strategy has generally been recommended for entities with sufficient groundwater supply available to meet needs, but currently without adequate infrastructure (i.e., well capacity). Groundwater availability reported in the plan is based on the long-term sustainability of the aquifer. No strategies are recommended to use water above currently identified sustainable levels.



## 6.2.2 Consistency with Protection of Agricultural Resources

Agriculture is an important economic cornerstone of the ETRWPA. Even with adequate rainfall, irrigation is a critical aspect of some agriculture in the region. Rice irrigation in the coastal counties is supplied by Lower Neches Valley Authority, primarily, with water from the Rayburn/Steinhagen system. The Water Availability Models indicate adequate availability of surface water to meet the projected irrigation demands for the planning period.

## 6.2.3 Consistency with Protection of Natural Resources

The ETRWPA contains many natural resources including threatened or endangered species; local, state, and federal parks and public land; and energy/mineral reserves. Following is a brief discussion of how the 2021 Plan is consistent with the long-term protection of these resources.

**Threatened/Endangered Species.** A list of species of special concern, including threatened or endangered species, located within the ETRWPA is contained in Appendix 1-A. Included are 22 species of birds, eight insects, six mammals, 11 reptiles, one amphibian, nine fish, six mollusks, 27 plants, and two crustaceans. In general, most WMSs planned for the ETRWPA will not affect threatened or endangered species. Development of new reservoirs in the region could affect threatened or endangered species and their habitats. However, the development of any reservoir requires extensive environmental impact studies that address potential effects on threatened or endangered species. Any such impacts indicated by these studies would need to be mitigated in accordance with federal and state environmental regulations in order for the reservoir project to be allowed.

**Parks and Public Lands.** The ETRWPA contains national forests, wildlife refuges, and a preserve; as well as state parks, forests, and wildlife management areas. In addition, there are numerous local (e.g., city or county parks), recreational facilities, and other local public lands located throughout the region. None of the WMSs currently proposed for the ETRWPA is expected to adversely impact state or local parks or public land.

In general, federal lands (i.e., national forests, wildlife refuges, or preserves) cannot be subjugated by state or local projects. Therefore, a proposed WMS for the ETRWPA would not be permitted to adversely impact such properties unless adequate mitigation measures were planned, and the plans approved by the appropriate federal agencies.

**Timber Resources.** Timber is an important economic resource for the ETRWPA. Although the development of Lake Columbia would inundate some forested areas, this loss in timber resources would be partially offset by gains in wetland areas, aquatic habitat and water recreation areas. A full environmental assessment is part of the planning process for development of reservoirs. The results of such environmental assessments identify any significant effects on timber resources and propose mitigation, as necessary.

**Energy Reserves.** Numerous oil and gas wells are located within the ETRWPA, including the East Texas Oil Field, and four of the top 10 producing gas fields in the state. Producing oil wells and top producing oil fields are depicted in Chapter 1 Figures 1.16 and 1.17, respectively. In addition, significant lignite coal resources can be found in the ETRWPA under portions of 12 counties. Lignite coal resources are depicted in Figure 1.19. These resources represent an important economic base for the region. None of the WMSs is expected to significantly impact oil, gas, or coal production in the region.

## 6.3 Unmet Water Need

Unmet water need refers to the portion of a water need identified in Chapter 4 that is not met by a recommended WMS in Chapter 5B.



The development of demand and supply projections for the 2021 Plan created 'artificial' needs in the region. Each planning decade represents a snapshot of conditions. Both the demand and supply listed for a decade represent conditions for that year and the subsequent years prior to the next decade; for example, 2020-decade demands shall be assumed to carry through the year 2029 while a 2020-decade supply must come online prior to the year 2020. The TWDB has allowed a slight variance in this requirement allowing for a WMS to include an online decade of 2020 if the project provides a water supply by January 5, 2023. Twenty-two projects are expected to go online between 2023 and 2029 and therefore have a supply decade of 2030 in order to meet demands that will develop between 2023 and 2029 and therefore have a demand decade of 2020. This gap in planning decade between demand and supply creates an 'artificial' need in 2020 for the 15 entities identified in Table 6.1 below, two of which are municipal: the City of Overton and the City of San Augustine.

**Table 6.1 Unmet Needs Projected in 2020**

County	Water User Group	2020 Unmet Need (ac-ft/yr)	Conservation Recommended
Angelina	Mining	473	No
Cherokee	Mining	238	No
Henderson	Mining	10	No
Jefferson	Manufacturing	101,138	No
Jefferson	Steam Electric Power	2,391	No
Nacogdoches	Livestock	5,970	No
Nacogdoches	Mining	5,475	No
Orange	Irrigation	526	No
Panola	Livestock	982	No
Rusk	Overton	62	Yes
Rusk	Steam Electric Power	1,103	No
San Augustine	San Augustine	110	Yes
San Augustine	Livestock	1,333	No
San Augustine	Mining	2,102	No
Smith	Bullard	130	Yes

TWDB guidance requires for any unmet municipal needs included in the 2021 Plan to include:

1. documentation that all potentially feasible WMS were considered to meet the need, including drought management WMS;
2. explanations as to why additional conservation and/or drought management WMS were not recommended to address the need;
3. descriptions of how, in the event of a repeat of the drought of record, the WUG associated with the unmet need shall ensure the public health, safety, and welfare in each planning decade with an unmet need; and,
4. explanation as to whether there may be occasion, prior to the development of the next Initially Prepared Plan (IPP), to amend the Regional Water Plan (RWP) to address all or a portion of the unmet municipal need.

For the cities of Overton, San Augustine, and Bullard, all potentially feasible WMSs types were considered to meet their 2020 Needs. Water conservation WMSs were included in the 2021 Plan for these cities as



discussed in Chapter 5B, while drought management WMSs were considered but ultimately not recommended as discussed in Chapter 7. The municipal unmet needs presented in the table above are due to future demands that will develop late in the 2020 decade, after January 5, 2023, the TWDB deadline for a project to come online to be considered a supply for an entity in the 2020 planning decade. Therefore, these unmet needs are considered to be 'artificial' rather than 'true' needs. The cities opted not to include an additional WMS for a project they did not intend to implement prior to the 2023 supply deadline, and instead, confirmed their corresponding WMSs with an online decade of 2030 will meet the late 2020 demand increases that exceed their present-day existing supplies. Each WMS project sponsor has developed the timeline of their WMSs with an online year prior to the anticipated development of projected demands, and therefore, in the event of a repeat drought of record, the public health, safety, and welfare of each city is ensured through the 2020 decade. It is not feasible to amend the 2021 Plan prior to development of the 2026 IPP to meet all or a portion of the unmet municipal needs because the project sponsors do not foresee any water supply infrastructure projects to yield a supply prior to January 5, 2023.

Despite the 'artificial' needs identified; the ETRWPA is a water-rich region with no 'true' unmet needs, municipal or non-municipal, across the planning horizon.

## 6.4 Socioeconomic Impacts of Not Meeting Identified Needs

Administrative rules in 31 TAC §357.10 require regional water planning groups to evaluate socioeconomic impacts of not meeting water needs as a part of the regional water planning process. The TWDB conducted a comprehensive socioeconomic analysis to assess the impacts of failing to meet projected water needs within the region. This analysis calculated the impacts of a severe drought occurring in a single year at each decadal period within Region I. It was assumed that all of the projected impacts were attributed to drought conditions. Under these assumptions, notable findings from TWDB socioeconomic impact analysis are summarized as follows:

With the projected shortages, the region's projected 2020 population would be reduced by 12,571 people, which equates to approximately 1.1 percent of the total projected population.

Without any additional supplies, the projected water needs would reduce the region's projected 2020 employment by approximately 68,468 jobs (11.5 percent reduction). Employment is projected to continue to decline to 51,585 lost jobs by 2070. The mining sector accounts for nearly 56 percent of these jobs losses in 2020 but only accounts for 5 percent by 2070. Conversely, the livestock sector accounts for approximately 38 percent of job losses in 2020 and increases to account for nearly 83 percent of job losses by 2070. Municipal and manufacturing sectors are the next biggest contributors, particularly in later decades.

Without any additional supplies, the projected water needs would reduce the region's projected annual income by \$9.3 billion in 2020, approximately 77 percent of which is within the mining industry. This represents nearly 16 percent of the region's current income. The loss in income reduces to approximately \$3.9 billion in 2070, after mining is projected to decline.

The full socioeconomic impact analysis performed by the TWDB is attached in Appendix 6-B.

