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Impacts of Regional Water Plan and Consistency with Resource Protection

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[31 TAC §357.33(c), 31 TAC §357.34(e), 31 TAC §357.40, 31 TAC §357.41, and [31 TAC §357.43(b)(2)]

The guidelines for 2026 Texas Water Development Board (TWDB) regional water plan development include describing major impacts of recommended and alternative water management strategies on key parameters of water quality identified by the regional water planning group (RWPG). This also includes consideration of third-party social and economic impacts associated with voluntary redistribution of water from rural and agricultural areas, and effects of ground and surface water relationships on water resources of the state. Furthermore, 2026 TWDB regional water plans should consider statutory provisions regarding inter-basin transfers of surface water, including summation of water needs in basins of origin and receiving basins, as well as how the regional water plan is consistent with protection of natural resources. The regional water plan development was guided by the principle that the designated water quality and related water uses as shown in the state water quality management plan shall be improved or maintained.

6.1 Impacts of Water Management Strategies on Key Water Quality Parameters in the State

The Llano Estacado Regional Water Planning Group (LERWPG) identified key parameters of water quality to consider for water management strategies in the 2026 Llano Estacado Regional Water Plan (LERWP). The selection of significant water quality parameters are based on water quality concerns identified in research and studies completed within the Llano Estacado Region, water user concerns expressed during LERWPG meetings, the Brazos River Authority's Basin Highlights Report[1], the Colorado River Basin Highlights Report[2], and the Canadian and Red River Basin Highlights Report[3] completed as part of the Texas Clean Rivers Program (CRP), and water quality studies conducted for water management strategies included in previous and current plans. The LERWPG has identified the following key water quality parameters to consider for recommended water management strategies (WMSs).

- Chlorides,
- Sulfates,
- Total dissolved solids (TDS),
- Total suspended solids (TSS),
- Dissolved oxygen,
- pH range,
- Indicator bacteria (Escherichia coli or fecal coliform),

[1] https://www.brazos.org/Portals/0/crpPDF/BasinHighlightsReport-2019.pdf

[2] https://www.lcra.org/water/quality/texas-clean-rivers-program/Documents/2018_BasinHighlights_Report_FINAL.pdf

[3] http://rra.texas.gov/publications/crp/crp2016/FY2016%20BHR.pdf

- Temperature,
- Nitrates,
- Total phosphorous, and
- Total nitrogen-ammonia.

The major impacts of recommended WMSs on these key parameters of water quality are described in greater detail in the respective WMS summaries (Part D). These identified water quality concerns present challenges that may need to be overcome before the WMS can be used as a water supply. For water quality parameters that cannot be fully addressed due to lack of available information or inconclusive water quality studies, the WMS evaluations include recommendations for further studies prior to implementation.

6.2 Impacts of Moving Water from Agricultural and Rural Areas

The implementation of WMSs recommended in the 2026 LERWP and evaluated in Chapter 5 is not expected to have impacts on water supplies that are used for agricultural purposes. Most of the recommended WMSs for municipal water user groups (WUGs) will be developed using existing water rights. Moving large volumes of water from agricultural and rural areas to other users would have a negative impact on the agricultural communities in the region; however, no significant movement of water is recommended in the 2026 LERWP. Declining water supplies available to irrigated agriculture would result in reduced numbers of irrigated acres and irrigation application rates, adversely affecting producers and the local and regional economy.

6.3 Impacts to Navigation of Implementing the 2026 Llano Estacado Regional Water Plan

In accordance with Section 10 of the Rivers and Harbors Act of 1899, navigable waters are those waters that are subject to the ebb and flow of the tide and/or are presently being used or have been used in the past for use to transport interstate or foreign commerce. In the Llano Estacado Planning Area, the major rivers include the Colorado, Brazos, and Red rivers. None of these rivers is considered navigable within the Llano Estacado Planning Area. Therefore, the 2026 LERWP does not have an impact on navigation.

6.4 Impacts of the Plan on Threats to Agricultural Resources

Agricultural resources are an important component of the Llano Estacado Planning Area as this region is heavily reliant on agriculture to support the economy. The greatest water needs identified in the 2026 LERWP are associated with irrigated agriculture. The plan assumes that irrigation agriculture demands will decline over time due to reductions in available supply and increased conservation measures. In addition to these reductions, the LERWPG recommended additional water conservation to meet a portion of the water needs identified for irrigated agriculture. This will help to conserve and preserve limited water sources for future use. This strategy will reduce the projected deficit in the heavily irrigated counties and preserve water supplies for future use in counties with no identified needs.

6.5 Impacts of the Plan on Threats to Natural Resources

The Llano Estacado area contains many natural resources and the WMSs recommended in this plan are intended to protect those resources, while still meeting the projected water needs of the region.

6.5.1 Threatened and Endangered Species

The abundance and diversity of wildlife in the Llano Estacado Region is influenced by vegetation and topography, with areas of greater habitat diversity having the potential for more wildlife species. The presence or potential occurrence of threatened or endangered species is an important consideration in planning and implementing any water resource project or WMS. Both state and federal governments have identified species that need protection as detailed in Chapter 1. The proposed infrastructure strategies in the 2026 LERWP can be designed to avoid and/or minimize impacts to threatened and endangered species. Most of the recommended strategies include developing or expanding groundwater, which has flexibility in the placement of wells and pipelines. The recommended conservation strategies in the 2026 LERWP will continue to preserve water for wildlife.

6.5.2 Public Lands

No recommended strategies in the 2026 LERWP will require water supply projects to be located within public lands. Implementation of WMSs should not directly impact these lands.

6.5.3 Oil and Gas Production

The oil and gas industry represent an important economic base for the region. The projected water demands reflect the increased water needs for production of local energy reserves. The 2026 LERWP identifies sufficient water to meet these needs. None of the recommended WMSs is expected to impact oil or gas production in the region.

6.6 Hydrologic Effects of Implementing the 2026 Llano Estacado Regional Water Plan

Hydrologic effects on surface water and groundwater resources can occur when new water supply projects are constructed and implemented. This section describes the hydrologic effects of the implementation of recommended water management strategies in the 2026 LERWP.

6.6.1 Groundwater

Recommended WMSs involving additional development of groundwater would increase groundwater usage by entities in the Llano Estacado Region. The development of groundwater by WMSs recommended in the 2026 plan is likely to be concentrated in a few areas that could experience noticeable declines locally in groundwater levels. However, none of the WMSs increase projected groundwater pumpage beyond the modeled available groundwater (MAG) established by county and aquifer. Thus, projected groundwater conditions are expected to be within the desired future conditions (DFCs) and within a range that the local groundwater conservation districts consider manageable.

6.6.2 Surface Water

In the 2026 LERWP, one new reservoir, the City of Lubbock's Jim Bertram Lake 7, is considered a recommended WMS. To quantify the effects of implementation of the reservoir through the year 2080, water availability modeling (WAM) was used. Surface water effects were quantified using the Texas Commission on Environmental Quality (TCEQ) Brazos WAM Run 3 (Brazos WAM), which, based on the TWDB planning guidelines, is the standard tool used to evaluate surface water management strategies in the region. The Brazos WAM assumptions include no return flows (unless included as a specific component to a strategy), as-permitted reservoir contents, and the environmental flow standards adopted by TCEQ for the Brazos Basin.

The cumulative effects of the plan can be quantified by comparing conditions prior to implementation of the plan (base condition) to conditions with the reservoir in place. The base condition to compare to conditions with the plan in place was computed by the Brazos WAM under the Run 3 assumptions. The base condition assumes full use of water rights, and conservation or transfers of water will not impact the assumption of full use of water rights. Jim Bertram Lake 7 was operated junior to the proposed appropriation under the Brazos River Authority (BRA) System Operations Permit because this strategy will receive a priority date from TCEQ that is senior to Jim Bertram Lake 7.

The effects of Jim Bertram Lake 7 on regulated streamflow were evaluated by comparing descriptive streamflow statistics for the base condition with those from the plan condition at the selected evaluation locations. Figure 6.1 presents these comparisons for regulated streamflow at the Brazos River at Seymour. Regulated flow is the total streamflow remaining in the stream after all existing water rights have been exercised and other water management activities have taken place. It represents the total flow passing a location (model control point) after all water rights have appropriated the flows to which they are entitled.

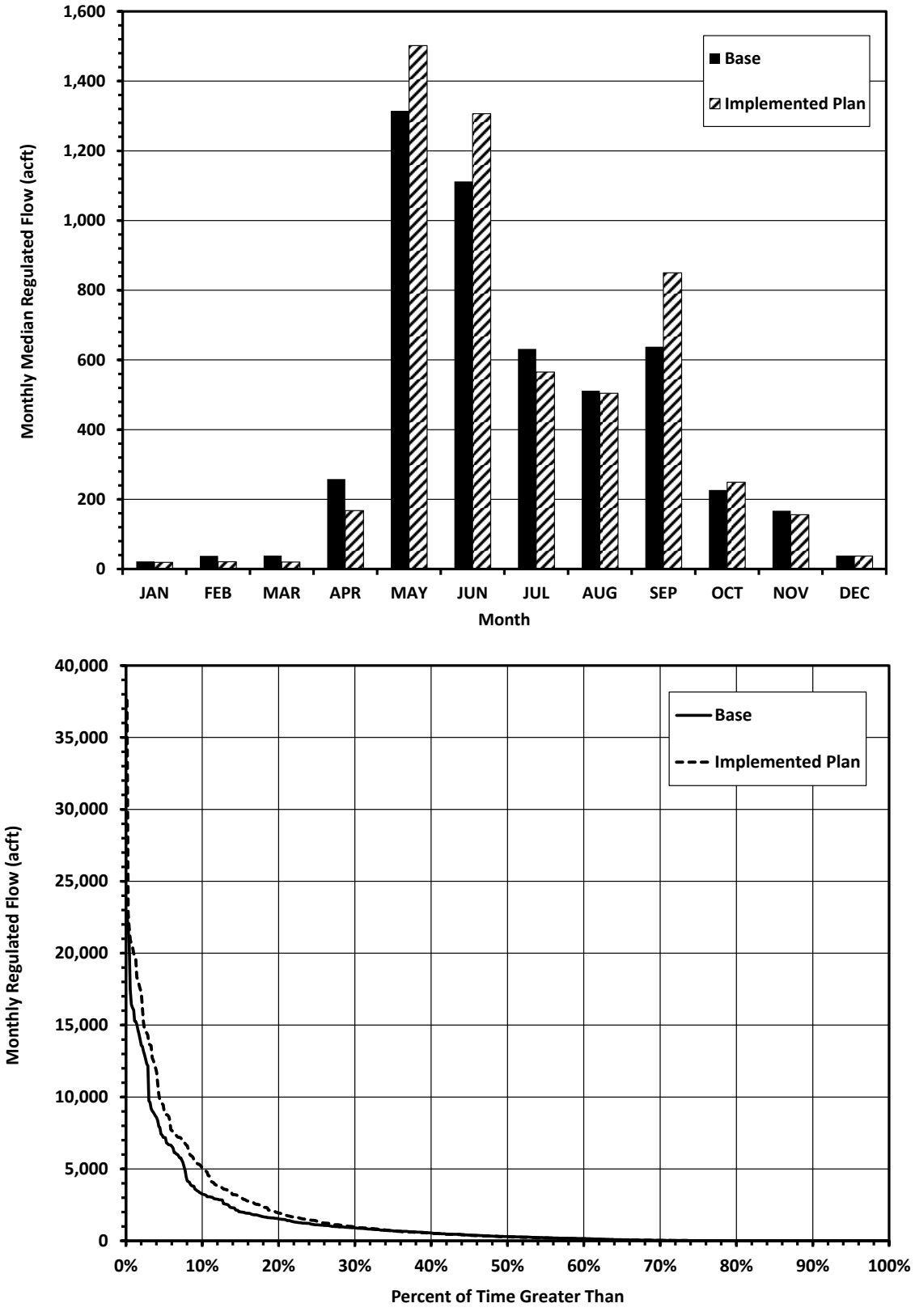

Figure 6.1. Comparisons for Regulated Streamflow at the Brazos River at Seymour

The effects of implementing Jim Bertram Lake 7 will have slight effects on streamflows in the Brazos Basin with both increases and decreases. Locations below new reservoirs or reservoirs with augmented supplies will generally experience reduced streamflows, although generally not to significant levels. The detrimental effects of these reductions can be minimized with proper consideration of reservoir pass-through requirements to maintain flows necessary to meet the needs of the environment. Significantly different streamflows will not occur with implementation of recommended WMSs in the 2026 LERWP.

Overall, the strategies recommended in the 2026 LERWP will have limited negative effects on the environment. The largest localized impact is from one new reservoir. In the 2026 LERWP, Jim Bertram Lake 7 is the only new reservoir included as a recommended WMS and has minimal effects on streamflow and the environment.

Jim Bertram Lake 7 will inundate 774 acres, reducing wildlife habitat and cultivated farmland as documented in the Chapter 5 WMS evaluations. Permitting for the WMS will require mitigation land of at least equal ecological value, reducing the negative environmental consequences of the WMS. Streamflows immediately downstream from the WMS will decrease, but permit requirements will specify reservoir pass-through flows necessary to maintain ecological health in the downstream receiving stream.

6.7 Groundwater and Surface Water Interrelationships Impacting Water Resources of the State

The LERWPG recognizes the importance of considering groundwater and surface water interaction when managing water resources and evaluating development of future water supplies. The LERWPG encourages groundwater conservation districts (GCDs) and groundwater management areas GMAs) to consider protection of springs and groundwater-surface water interaction during when considering new DFCs.

6.8 Consistency with Protection of Water Resources, Agricultural Resources, and Natural Resources

The 2026 LERWP is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources, and was developed based on guidance principles outlined in the Texas Administrative Code (TAC) Chapter 358 - State Water Planning Guidelines. The 2026 LERWP was produced with an understanding of the importance of orderly development, management, and conservation of water resources, and is consistent with all laws applicable to water use for the state and regional water planning areas (RWPAs). Furthermore, the plan was developed according to principles governing surface water and groundwater rights. For groundwater, the 2026 LERWP also recognizes principles for groundwater use in Texas and the authority of GCDs and GMAs within the Llano Estacado Region. The modeled available groundwater (MAG) estimates developed by the TWDB based on DFCs developed by GCDs and GMAs were used to determine groundwater availability. The LERWPG recognizes the need to protect groundwater quality.

The 2026 LERWP identifies actions and policies necessary to meet the Llano Estacado Region's near and long-term water needs by developing and recommending WMSs to meet needs with reasonable cost, good water quality, and sufficient protection of agricultural and natural resources of

the state. The LERWPG recommended WMSs that considered public interest of the state, major water providers (MWPs), protection of existing water rights, and opportunities that encourage voluntary transfers of water resources while balancing economic, social, and ecological viability. When needs could not be met economically with WMSs, the TWDB performed a socioeconomic impact analysis to estimate the economic loss associated with not meeting these needs (electronic Appendix F - Final Plan only).

The 2026 LERWP considered environmental information resulting from site-specific studies and ongoing water development projects when evaluating WMSs. The WMSs have the potential of impacting instream flows. For the 2026 plan, recommended WMSs either originate from neighboring regions or groundwater and surface water projects that are expected to have minimal to no cumulative adverse effect on instream flows. A list of endangered and threatened species in the Llano Estacado Region for each county was obtained from the U.S. Fish and Wildlife Service (USFWS) and discussed in Chapter 1. Possible habitats for endangered and threatened species were considered for each WMS (Chapter 5). In addition, the 2026 plan consists of initiatives to respond to drought conditions and includes drought contingency measures by regional entities (Chapter 7).

6.9 Consistency with Protection of Agricultural Resources

Agricultural resources are a vital part of the Llano Estacado Region economy. In the semi-arid Llano Estacado Region, farmers supplement precipitation with irrigation from groundwater to increase crop yields and to raise livestock. In 2020, it is projected that irrigated crop land and livestock will account for approximately 96 percent of the total water used in the Llano Estacado Region.

The projected irrigation water supply need in 2030 is 552,793 ac-ft/yr, decreasing to 22,717 ac-ft/yr in 2080, primarily due to decreasing irrigation demands during the planning period. The LERWPG recommends six irrigation conservation measures to reduce water use and the resulting projected need. These agricultural water conservation strategies are recommended for all 21 counties in the Llano Estacado Region. Achievement of these conservation goals would preserve the limited groundwater supplies for the future use.

6.10 Consistency with Protection of Natural Resources

In the Llano Estacado Region, the principal uses of water for natural resource are for the recovery of crude petroleum, for sand and gravel washing, for sand used in the hydraulic fracturing process in the recovery of crude petroleum, and recreation such as hunting and fishing. Water use associated with oil and gas exploration (mining) in the Llano Estacado Region is projected to peak in 2030 and then decline as this area sees less exploration and drilling activity and more production activity that uses less water.

The decline in mining demands indicates sufficient water supplies will be available to meet these demands and heavy use of groundwater supplies in the region will result in minimal impacts to hunting and fishing. Additionally, none of the recommended WMSs is anticipated to impact oil and gas production or hunting and fishing resources.

6.11 Consistency with State Water Planning Guidelines

The LERWP is in compliance with state water planning regulations, including portions of 31 TAC 357 and 358. The LERWPG conducted meetings during the 2026 planning cycle, with meetings open to the public and decisions based on accurate, objective, and reliable information. The LERWPG coordinated water planning and management activities with local, regional, state, and federal agencies, and participated in interregional communication with the Panhandle Region (Region A) and Brazos G Region (Region G) to identify common needs and worked together with Region A and Region G to develop interregional strategies in an open, equitable, and efficient manner. The Llano Estacado Region considered recommendations of stream segments with unique ecological value by the Texas Parks and Wildlife Department (TPWD) and sites of unique value for reservoirs. At this time, the LERWPG recommends that no stream segments with unique ecological value be designated. The LERWPG developed policy recommendations for the 2026 LERWP, including protection of water quality, reconsideration of agricultural demand estimates, groundwater management, request for additional studies for water supply projects, and continued funding for regional water planning efforts. The LERWPG policy recommendations are included in Chapter 8.

6.12 Summary of Unmet Water Needs

Agricultural resources are an important component of the region as it is heavily reliant on agriculture to support the economy. The greatest water needs identified in the LERWP are associated with irrigated agriculture. The 2026 LERWP assumes that irrigation agriculture demands will decline over time due to reductions in available supply and increased conservation measures. In addition to these reductions, the LERWPG recommended additional water conservation to meet a portion of the water needs identified for irrigated agriculture. This will help to conserve and preserve limited water sources for future use. This strategy will reduce the projected deficit (Table 6-1) in the heavily irrigated counties and preserve water supplies for future use in counties with no identified needs.

Table 6-1. Unmet Needs in the Llano Estacado Region

Water User Group	Annual Water Need (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Irrigation	548,265	586,823	315,949	22,234	20,693	16,834