TECHNICAL CONSULTANT PRESENTATION

PLATEAU WATER PLANNING GROUP MEETING – Jan. 30, 2025

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07

Update on Regional Water Planning Schedule

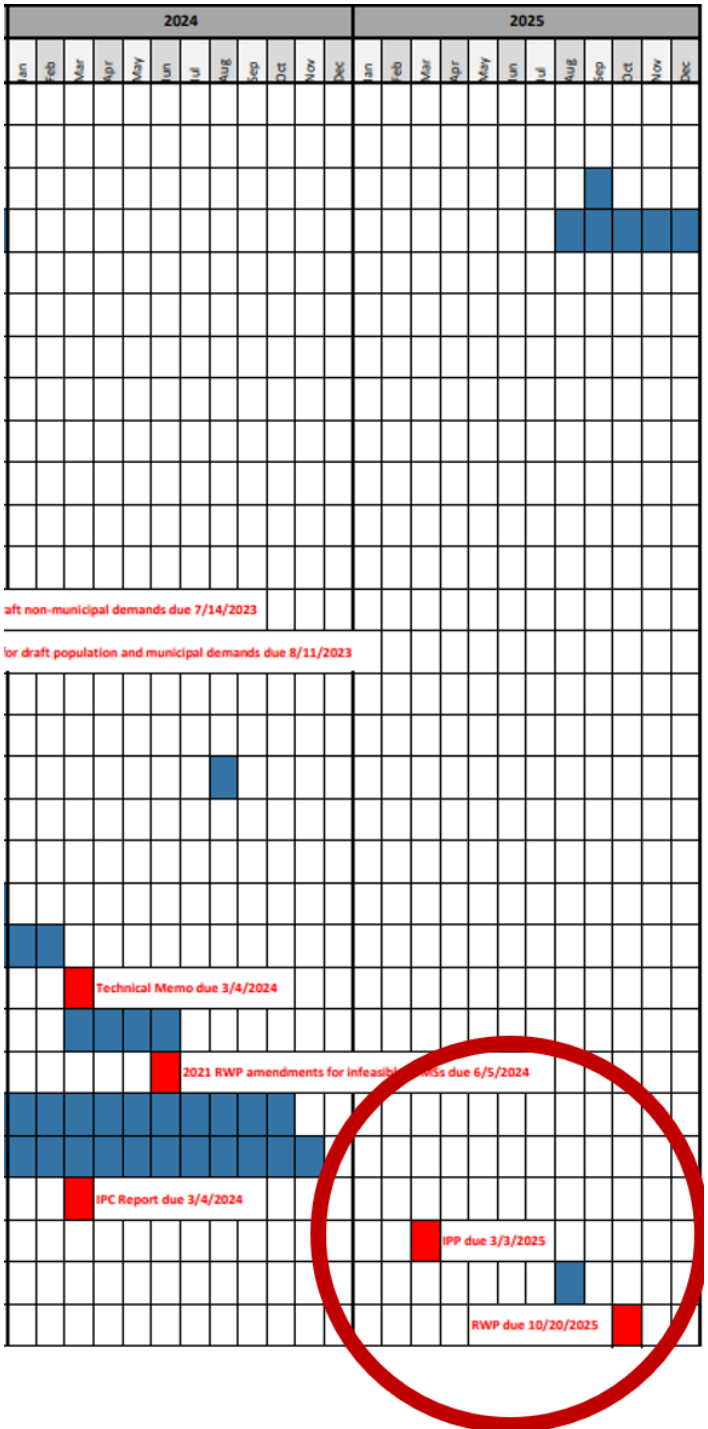
Agenda Item #7

Covered During the Previous Meeting

- Review and Approve IPP Chapters 3, 4 & 7
- Preliminary Review of Draft Chapters 8, 9 &10

Task for Today

- Review and Approve IPP Chapters 8, 9 & 10
- Review and Discuss Draft Chapters 5, Appendix 5A & 5B, and Draft Chapter 6
- Update on Other Regional Planning Efforts
  - » Select the 2026 Plateau Water Plan cover image



- **2026 IPP – Due to TWDB March 3, 2025**
- **Internal Comments – Due to Carollo Feb. 3, 2025**
- **Technical Consultants "Pencils Down" – Feb. 5, 2025**
- **Final IPP pdf to UGRA – Feb. 20, 2025, for posting**
- **Final IPP Hard Copies to UGRA – Feb. 25, 2025**

08

Approve IPP Chapters 8, 9 & 10

Agenda Item #8

– Chapter 8: Policy Recommendation

6 Major Sections

1. Conservation Recommendations
2. Water Management Recommendations
3. Water Planning Recommendations
4. Water Research Needs
5. Consideration of Ecologically Unique River & Stream Segments
6. Consideration of Unique Sites for Reservoir Construction

– Chapter 9: Implementation and Comparison to the Previous RWP

4 Major Sections

1. *Implementation of Previous Regional Water Plan*
2. *RWPA's Progress in Achieving Economies of Scale*
3. *Comparison to Previous Plan*
    - *Water Demand Projections*
    - *Drought of Record & Hydrologic & Modeling Assumptions*
    - *Source Water Availability*
    - *Existing Water Supplies of WUGs and WWPs*
    - *WUG and MWP Needs*
    - *Recommended & Alternate WMSs and Projects*
4. *Progress of Regionalization*

Chapter 10: Public Participation & Plan Adoption

5 Major Sections

1. *Plateau Water Planning Group*
2. *Administrative Process & Project Management*
3. *Planning Group Meetings and Public Hearings*
4. *Coordination with Other Regions*
5. *Plan Implementation*

10.3 PLANNING GROUP MEETINGS AND PUBLIC HEARINGS

All activities associated with the Regional Water Planning Process were performed in accordance with the State Open Meetings Act. All meetings of the PWPG, including committee meetings, are open to the public where visitors are afforded the opportunity and encouraged to voice their opinions, concerns, or suggestions. Meetings are primarily held in Kerrville Texas. Meeting notices are posted with the County Commissioners' Courts of each county.

All material to be presented at public meetings and all draft and final *Plan* documents were made available for public inspection on the Planning Group's website hosted by the UGRA in accordance with the Texas Public Information Act.

A public hearing was held on X, to receive comments on the *2026 Initially Prepared Plan.* Notice of the Public Hearings was sent to 334 down-river water rights holders as well as to each county commissioner's court and designated libraries. A hard copy of the *Initially Prepared Plan* was provided to UGRA, made available at the front desk. An electronic copy was made available on the Upper Guadalupe River Authority website. In addition, electronic copies, and/or hard copies were made available in the courthouse and a designated library in each of the Regions' six counties listed below.

- Bandera County Library
- Butt-Holdsworth Memorial Library (Kerr County)
- Claud H. Gilmer Memorial Library (Edwards County)
- Kinney County Public Library
- Real County Public Library
- Val Verde County Library

Prior to receiving official comments during the public hearing, a question-and-answer session was held so that the public attendees would have an opportunity to gain a better understanding of how the draft *Plan* was formulated. At the conclusion of the hearing, the public was notified that there would be a 60-day period in which the PWPG would continue to receive written comments. The TWDB and TPWD also reviewed the *Initially Prepared Plan* and provided comments. Responses to agency and public comments are provided in Appendix 10A, Appendix 10B and Appendix 10C. On X, the PWPG met in a public forum and approved the final *2026 Plateau Region Water Plan* for submittal to the TWDB.

Approve IPP Chapters 8, 9 & 10

Chapter 8 – Policy Recommendation

Chapter 9 – Comparison to the 2021 Plan

Chapter 10 – Public Participation

09

Review of Draft Chapters 5, Appendix 5A & 5B, & Chapter 6

Agenda Item #9

3 Sections in Chapter 5

1. *Identification of Potentially Feasible WMS*
   - Table 5-1. Potentially Feasible WMS (2021 Plan = Starting Point)
   - 2021 Plan = 67 WMSs (7 Alternate WMSs)
2. *Evaluation & Recommendation of WMSs*
   - Strategy Evaluation Procedure
   - Emphasis on Conservation & Reuse
   - Water Loss Audit Strategies
   - Recommended WMSs
   - Assessment of ASR Potential
   - Unmet Needs
   - Unqualified Strategies
   - Vegetative Management & Land Stewardship
3. *Water Conservation*
   - Overview
   - Model Plans
   - State Programs & Guides
   - Regional Conservation WMSs
   - GPCD Goals
   - Municipal Conservation
   - Irrigation Conservation
   - Manufacturing Conservation
   - Water Loss Audit & Main-Line Repair
   - WUG Conservation Management Plans
   - GCD Management Plans

Identification of Potentially Feasible WMSs

- First step, look at possible projects that could reasonably be expected to result in water-supply improvements.
- 2021 Plan had a total of 67 WMSs (7 of those were "alternate")

Table 5-1. Potentially Feasible Water Management Strategies

County	Water User Group	Strategy Source Basin	Water Management Strategy
Bandera	City of Bandera	San Antonio	Reuse treated wastewater effluent for irrigation use
			Promote, design & install rainwater harvesting systems
			Additional Lower Trinity well and lay necessary pipeline
			Additional Middle Trinity wells within city infrastructure
			Surface water acquisition, treatment, and ASR
	*Bandera County FWSD#1	San Antonio	Conservation
			New strategy - Additional groundwater well
	*Bandera County Other (Bandera River Ranch #1)	San Antonio	Water loss audit and main-line repair
	*Bandera County Other (Lake Medina Shores)	San Antonio	Conservation
			Additional groundwater wells
	*Bandera County Other (Medina WSC)	San Antonio	Conservation
			Additional groundwater well for the Town of Medina
			Drought management (BCRAGD)

5.2.1 Strategy Evaluation Procedure

The strategy evaluation procedure is designed to provide a side-by-side comparison such that all strategies can be assessed based on the same quantifiable factors as shown in Tables 5-2, 5-3 and 5-4. An explanation of the qualitative and quantifiable rankings is provided in Appendix 5B. All strategy analyses recognize and protect existing water rights, water contracts, and option agreements. For planning purposes, it is assumed that all strategies experience a two percent water loss over the life of the strategy project. Specific factors considered in each Table were:

Table 5-2

- Quantity of new water supply produced
- Total capital cost
- Chemical quality
- Reliability of supply
- Impacts to water, agricultural, and natural resources, and to ecologically unique stream segments

Table 5-3

- Financial cost (total capital cost, annual cost, and cost per acre-foot)

Table 5-4

- Environmental impacts
    - Environmental water needs
    - Wildlife habitat
    - Cultural resources
    - Environmental water quality
    - Inflows to bays and estuaries

Cost evaluations for all strategies include capital cost, debt service, and annual operating and maintenance (O&M) expenses and are estimated based on September ~~2018~~ 2023 US dollars. Capital costs consider construction costs, engineering and feasibility studies, legal assistance, financing, bond counsel and contingencies, permitting and mitigation, land purchase not associated with mitigation, easement costs, and purchase of water rights. The length of debt service is 20 years unless otherwise stated. An annual

3 Sections in Chapter 5

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   - GCD Management Plans

5.2.8 Vegetative Management and Land Stewardship

Reduced rainfall during drought-of-record conditions certainly reduces aquifer recharge potential. However, some rainfall (and thus recharge) still does occur. Research studies have documented potential recharge impacts (see discussion below) resulting from vegetative management. Chapter 7, Section 7.1.1 defines drought-of-record conditions pertaining to rainfall in the Plateau Region as being an average of 20 percent (five inch) reduction in rainfall per year during the 1950's drought and an average 40 percent (10 inch) reduction during more current years. Assuming the worst-case scenario of 40 percent reduction in precipitation will likewise result in 40 percent reduction in average recharge potential, the PWPG strongly believes that strategies J-13, J-42, J-39, J-51, J-52, J-60, and J-68 produce a reliable amount of supply even during drought conditions. The PWPG recognizes that the concept of properly managing rural range lands is essential in maintaining natural spring flows in the headwaters of surface streams and rivers.

2026 WMS ID	WMS Name	Average Rainfall	D-O-R Rainfall
J-13	Veg. Mgmt. Bandera County	2,314	1,388
J-24	Veg. Mgmt. Edwards County	145	87
J-39	Veg. Mgmt. Kerr County	218	131
J-51 & J-52	Veg. Mgmt. Kinney County	145	87
J-60	Veg. Mgmt. Real County	145	87
J-68	Veg. Mgmt. Val Verde County	145	87

Evaluation & Recommendation of WMSs

Recommended & Alternate WMSs

- Recommended = 65 total
- Alternate = 5 total

Strategy	Strategy ID
City of Bandera – Additional Trinity Well	J-4
Bandera County-Other (VFD) – Additional Wells	J-14
Kerr County Livestock – Additional Wells	J-43 and J-45
Kerr County Mining – Additional Wells	J-47

Evaluation & Recommendation of WMSs

Emphasis on Conservation & Reuse

- Water Loss Audit & Main-Line Repair = 10 total (5 new strategies based on updated AWWA methodology)
- Irrigation Conservation = 5 total
- Mining Conservation = 3 total
- Livestock Conservation = 4 total
- Municipal Conservation = 4 total
- Drought Management = 2 total
- Vegetative Management = 7 total
- Reuse = 3 total

Grand Total for Conservation Strategies = 38

Evaluation & Recommendation of WMSs

5.2.6 Unmet Needs

Sufficient water management strategy supplies are recommended to meet the identified projected needs of all water user groups (WUGs) in the Region except for Bandera County Irrigation, Edwards County Livestock, and Real County Manufacturing.

	WUG Unmet Needs (Acre-Feet per Year)					
Water User Group	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Bandera County Irrigation	(806)	(806)	(806)	(806)	(806)	(806)
Edwards County Livestock	(2)	(2)	(2)	(2)	(2)	(2)
Real County Manufacturing	(1)	(1)	(1)	(1)	(1)	(1)

Evaluation & Recommendation of WMSs

Unqualified Strategies

The TWDB requires that water management strategies listed in the regional water plans develop “NEW” water supplies to be applicable for SWIFT funding.

Projects that involve items such as replacing and/or repairing old infrastructure, and wastewater collection and treatment do not qualify.

However, the TWDB offers many other types of financing options. Additional details pertaining to the different types of grants and loans offered can be accessed on the TWDB’s Financial Assistance webpage.

Table 5-2. Summary of Recommended & Alternate WMSs

County	Water User Group	Strategy Source Basin	Strategy	Source	Strategy ID	Strategy Supply (Acre-Feet Per Year)						Total Capital Cost	Quantity [a]	Quality [b]	Reliability [c]	Strategy Impacts[d]		
						2030	2040	2050	2060	2070	2080		(1-3)	(1-3)	(1-3)	Water Resources (1-5)	Agricultural Resources (1-5)	Natural Resources (1-5)
Bandera	City of Bandera	San Antonio	Water loss audit and main-line repair	Demand Reduction	J-1	5	5	5	5	5	5	$5,327,000	3	na	na	2	2	2
			Reuse treated wastewater effluent for irrigation of public spaces	Direct Non-Potable Reuse	J-2	0	310	310	310	310	310	$2,117,000	na	3	1	1	2	2
			Promote, design & install rainwater harvesting systems on public buildings	Rainwater Harvesting | Demand Reduction	J-3	0	1	1	1	1	1	$83,000	na	3	2	1	2	1
			Additional Lower Trinity well and lay necessary pipeline **ALTERNATE**	Lower Trinity Aquifer	J-4	0	403	403	403	403	403	$7,067,000	na	1	1	4	2	2
			Additional Middle Trinity wells within City water infrastructure area	Middle Trinity Aquifer	J-5	161	161	161	161	161	161	$1,115,000	na	1	1	3	2	3
			Surface water acquisition, treatment and ASR	Trinity Aquifer ASR	J-6	0	1,500	1,500	1,500	1,500	1,500	$50,501,000	na	2	2	3	2	2
	Bandera County FWSD #1	San Antonio	Public conservation education	Demand Reduction	J-7	4	4	4	4	4	4	$5,342	3	na	na	na	na	na
			Additional groundwater well	Lower Trinity Aquifer	J-8	100	100	100	100	100	100	$1,562,000	1	1	1	3	2	3
	Bandera County-Other (Bridlegate Subdivision)	San Antonio	Water loss audit and main-line repair	Demand Reduction	J-9	1	1	1	1	1	1	$2,130,000	3	na	na	2	2	2
	Bandera County-Other (Flying L Ranch PUD)	San Antonio	Water loss audit and main-line repair	Demand Reduction	J-10	2	2	2	2	2	2	$1,065,000	3	na	na	2	2	2
	Bandera County-Other (Medina WSC)	San Antonio	Additional groundwater well	Lower Trinity Aquifer	J-11	55	55	55	55	55	55	$2,129,000	1	1	1	3	2	3
	Bandera County-Other (BCRAGD)	San Antonio	Drought management	Demand Reduction	J-12	441	491	516	525	533	537	$0	na	na	na	2	2	2
	***Bandera County-Other	San Antonio	Vegetative Management	Demand Reduction	J-13	1,388	1,388	1,388	1,388	1,388	1,388	$0	3	na	na	2	2	2
	Bandera County-Other (Volunteer Fire Dept.)	San Antonio	Additional groundwater wells to provide emergency supply **ALTERNATE**	Trinity Aquifer	J-14	189	189	189	189	189	189	$7,527,000	na	1	2	3	2	3
	Bandera County-Other (BCRAGD)	Nueces	Drought management	Demand Reduction	J-15	23	26	27	28	28	28	$0	na	na	na	2	2	2
	**Bandera County Irrigation	San Antonio	Irrigation scheduling	Demand Reduction	J-16	76	76	76	76	76	76	$0	3	na	na	2	2	2
			Additional groundwater wells	Trinity Aquifer	J-17	75	75	75	75	75	75	$399,000	1	3	1	2	2	3
	*Bandera County Livestock	Nueces	Livestock conservation	Demand Reduction	J-18	13	13	13	13	13	13	$0	3	na	na	2	2	2
			Additional groundwater wells	Middle Trinity Aquifer	J-19	8	8	8	8	8	8	$671,000	1	1	1	3	2	3

5A-1 WATER MANAGEMENT STRATEGIES FOR BANDERA COUNTY

5A 1.1 WATER MANAGEMENT STRATEGIES FOR THE CITY OF BANDERA

The City of Bandera and many other residents of Bandera County rely on the Lower Trinity Aquifer for municipal, domestic, livestock, and irrigation water-supply needs, and the demand from the Lower Trinity is projected to increase as the population increases. Because the water level in the Lower Trinity has declined about 350 feet in City of Bandera wells since pumping started in the 1950s, there is concern that continued withdrawals from the Aquifer may negatively impact the Aquifer's ability to meet the long-term water-supply needs of the area.

Although the supply-demand analysis does not project a future water-supply deficit for the City of Bandera, the following water management strategies are recommended to enhance the reliability of the City's future water supply availability.

- (J-1) Water loss audit and main-line repair
- (J-2) Reuse treated wastewater effluent for irrigation of public spaces
- (J-3) Promote, design, and install rainwater harvesting systems on public buildings
- (J-4) Additional Lower Trinity Aquifer well outside the current cone-of-depression and lay necessary pipeline **(ALTERNATE)**
- (J-5) Additional Middle Trinity Aquifer wells within City water infrastructure area
- (J-6) Surface water acquisition, treatment and ASR

The City of Bandera has been active in promoting water conservation during the current drought and has committed to using water conservation as a long-term water management strategy. Conservation practices that the City has adopted include tiered water rates; providing the public with water conservation information; meter change out program and water-line replacement program to reduce unaccounted for water loss. The City has also been working with residential and commercial water customers to identify BMPs that can be used to reduce water consumption as well as evaluating the potential for installing rainwater harvesting systems on public buildings. The City of Bandera has adopted the Bandera County River Authority and Groundwater District Drought Contingency Plan. The City is currently in Stage 4 of drought, which is considered critical conditions. During this stage, outdoor water use is prohibited, except for what is necessary for livestock. The implementation of various stages of drought over the past several years has ~~has been in drought stage in the past and has implemented various stages of the plan. The various stages of drought management have~~ reduced water use and heightened public awareness of the need to conserve water.

J-1 Water Loss Audit and Main-Line Repair

According to the 2022 TWDB Public Water System Water Loss Survey, the City of Bandera had real water losses (as opposed to apparent "paper" losses) of 36 acre-feet in 2022 (15 percent) due to leaking infrastructure. This amount of water loss is the sum of reported breaks and leaks, and unreported loss. The water-supply system can reduce water losses and get a more accurate look at water consumption by taking the proper measures to identify and repair old infrastructure and inaccurate water meters. This strategy

will provide a savings of only a portion of the total reported loss and assumes that a leak testing program would be implemented prior to possibly replacing portions of the existing leaking pipe.

Quantity, Reliability and Cost - The strategy assumes five miles of six-inch diameter pipe will be replaced, at a total estimated project capital cost of $5,327,000. The strategy is estimated to generate a potential savings of five acre-feet of water per year throughout the planning period.

J-2 Reuse Treated Wastewater Effluent for Irrigation of Public Spaces

The City of Bandera has requested funding through the Texas Water Development Board to study the potential of using treated wastewater effluent for irrigation of public parks and athletic fields. The importance of this effort is that the treated wastewater effluent is a known constant and can provide a new source of water for these uses. All current public supplies come predominantly from the Lower Trinity Aquifer, and therefore a significant aquifer cone-of-depression has resulted underlying the City of Bandera and surrounding area. If demands can be reduced it will potentially have a positive impact on water levels within the Aquifer.

Quantity, Reliability, and Cost – The quantity and reliability of this source is known through current wastewater discharges allowed under the City's wastewater discharge permit. Average daily flow from the wastewater plant is approximately 277,000 gallons/day (310 acre-feet/year). Based on the positive recommendation from the feasibility study, construction of this project will include amending the current discharge permit, potentially upgrading the wastewater treatment plant, a pump station, storage tanks and piping to deliver water. Total estimated capital cost for this project is approximately $2,117,000.

Appendix 5B – Strategy Evaluation Quantification Matrix

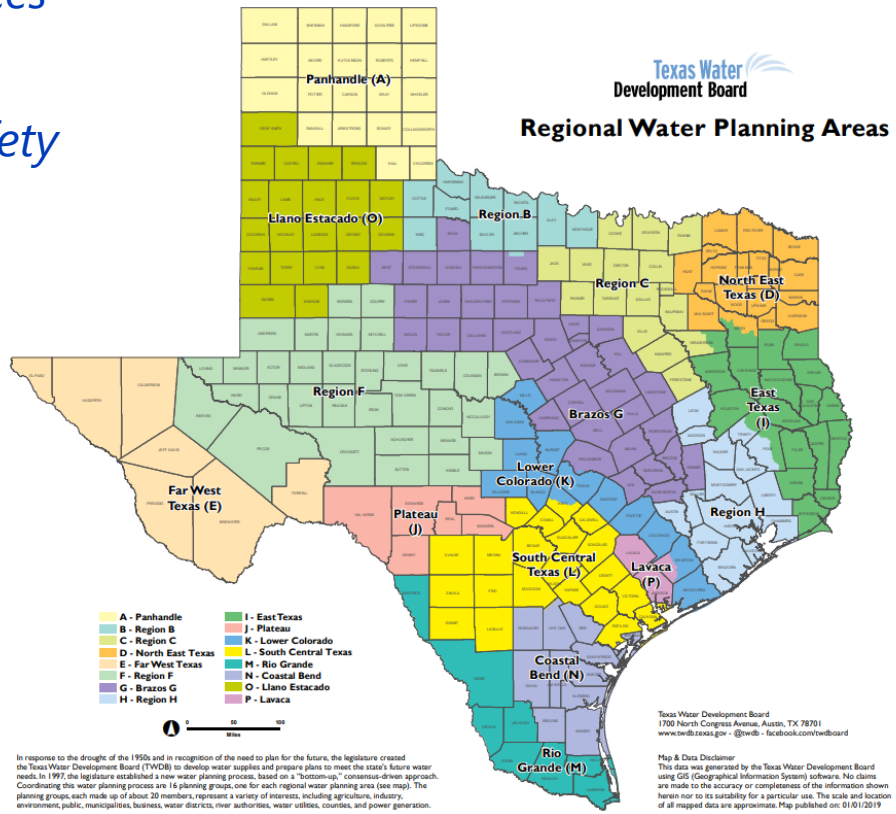
Quantity adequacy is measured as a percent of the volume of water needed to meet the specified water user group's (WUG's) shortage as calculated in Table 4-1 of Chapter 4 that is produced by the water management strategy. Percent volumes are only analyzed for WUGs with projected supply shortages.

Quality adequacy is measured in terms of meeting TCEQ Safe Drinking Water Standards. However, not all strategies are intended for use requiring SDWSs.

Reliability is evaluated based on the expected or potential for the water to be available during drought. Strategies that use water from a source that would not exceed permits or MAGs even during droughts are rated as sustainable. Strategies that use water from a source that is available during normal meteorological conditions but may not be 100% available during drought are rated as interruptible. Strategies in which 100% of the supply cannot be maintained even during normal meteorological conditions are rated as un-sustainable.

4 Sections in Chapter 6

1. *Protection of Water Resources*
2. *Protection of Agricultural Resources*
3. *Protection of Natural Resources*
4. *Protection of Public Health & Safety*



6 REGIONAL WATER PLAN IMPACTS AND CONSISTENCY WITH PROTECTION OF WATER, AGRICULTURAL AND NATURAL RESOURCES

Chapter 6 describes how this ~~2021~~2026 *Plan* is consistent with the long-term protection of water resources, agricultural resources, and natural resources that are important to the Plateau Region. All planning analyses applied, and recommendations made in the development of this *Plan* honor all existing water rights, contracts, and option agreements; and have no impact on navigation on any of the Region's surface water streams and rivers. Third-party social and economic impacts resulting from voluntary redistributions of water, including impacts of moving water from rural and agricultural areas were considered; however, no strategies were recommended that resulted in moving water from such areas.

The socioeconomic impact of not meeting water supply needs within the Region is discussed in an analysis report prepared by the Texas Water Development Board and presented in Appendix 6A at the end of this chapter. Based on projected water demands and existing water supplies, the Region identified water needs (potential shortages) that could occur under a repeat of the drought of record for ~~five~~ six water use categories (county-other, irrigation, livestock, manufacturing, mining and municipal). The TWDB then estimated the annual socioeconomic impacts of those needs—if they are not met—for each water use category and as an aggregate for the Region.

The report describes that the Plateau Region generated more than $X billion in gross domestic product (~~2018~~ 2023 dollars) and supported roughly X jobs in ~~2016~~ 2023. It is estimated that not meeting the identified water needs in the Plateau Region would result in an annually combined lost income impact of approximately $X million in ~~2020~~2030, increasing to $X million in ~~2070~~2080. In ~~2020~~2030, the Region would lose approximately X jobs, and by ~~2070~~ 2080 job losses would increase to approximately X if anticipated needs are not mitigated.

10

Report on Other Regional Planning Efforts

Agenda Item #10

Other Activities:

- Agree on the Cover of the 2026 Plateau Water Plan
  - Image 1 – Guadalupe Street in November
  - Image 2 – Martin Ranch at Carta Valley
  - Image 3 – North Fork Benson Crossing
- All feedback related to Chapter 5, Appendix 5A & 5B, and Chapter 6 due to consultant COB Feb. 3, 2025
- We are submitting the Initially Prepared Plan (Draft). If there are other changes and/or additions that need to be included after Feb. 3rd, we will have time to **make small changes between March 3 and Oct. 20, 2025.**

PWPG – Remaining Scope & RWPG Meeting Schedule

Activity	2024				2025		
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Approve Chapter 1		Oct. 17					
Approve Chapter 2							
Discuss & Review Chapter 3							
Discuss & Review Chapter 4							
Discuss & Review Chapter 7							
Approve Chapter 3				Dec. 5			
Approve Chapter 4							
Approve Chapter 7							
Discuss & Review Chapter 8							
Discuss & Review Chapter 9							
Discuss & Review Chapter 10							
Approve Chapter 8					Jan. 30		
Approve Chapter 9							
Approve Chapter 10							
Discuss & Review Chapter 5 & Appendix 5A & 5B							
Discuss & Review Chapter 6							
Review and Approve the IPP						Feb. 26	
Submit the IPP to TWDB							Mar. 3

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