

**PRESIDIO COUNTY UNDERGROUND
WATER CONSERVATION DISTRICT**

MANAGEMENT PLAN

Effective 2015-2020

DISTRICT MISSION

The Presidio County Underground Water Conservation District will strive to develop, promote, and implement water conservation and management strategies to protect water resources for the benefit of the citizens, economy, and environment of the District.

TIME PERIOD FOR THIS PLAN

This plan becomes effective upon adoption by the District Board of Directors and approval by the Texas Water Development Board (TWDB) affirming the plan is administratively complete. This plan replaces the existing plan adopted by the District Board of Directors, which was approved by TWDB on January 12, 2010. This District management plan will remain in effect for a period of five (5) years from the date of TWDB's approval, or until a revised plan is approved by the TWDB.

STATEMENT OF GUIDING PRINCIPLES

The District recognizes that the groundwater resources of the county are of vital importance. The preservation of this most valuable resource can be managed in a prudent and cost effective manner through education, regulations, and permitting. The greatest threat to prevent the District from achieving the stated mission is inappropriate management, based in part on the lack of understanding of local conditions. A basic understanding of the aquifers and their hydro geologic properties, as well as quantification of resources is the foundation from which to build prudent planning measures. The goals of this plan can best be achieved through guidance from the locally elected board members who have an understanding of local conditions as well as technical support from the Texas Water Development Board and qualified consulting agencies. This management plan is intended as a tool to focus the thoughts and actions and those given the responsibility for the execution of the District activities.

General Description of the District

History

This District was legislatively created and confirmed by the citizens of Presidio County through an election on August 31, 1999. The District's Board of Directors were appointed by the Presidio County Commissioners Court and : Jim White - President, Johnny Surratt - Vice President, Ike Livingston - Secretary and Board members - Terry Bishop and Robby Cabezuela. The District Manager is Janet Adams. The Presidio County Underground Water Conservation District (PCUWCD) consists of all of the County of Presidio except for 11,958 acres which is in the Jeff Davis County Underground Conservation District. The economy is predominately that of Agriculture. In the south portion of the county farming is the major income. Crops in the southern portion are mainly truck farming such as onions and other vegetables. The northern portion's income is produced mostly from cattle ranching, hunting, some farming, art and tourism.

Location and Extent

Presidio County is an area of 3,855 square miles, located in the Trans-Pecos region West Texas. The county is bound on the east by Brewster County, on the south by the Rio Grande River, and on the west and north by Jeff Davis County. Marfa is the county seat, which is located in the north portion of the county. Other towns in the county include Presidio and Redford in the south. Candalaria and Ruidoso are in the southwest. All the other towns except Marfa are located near the Rio Grande River.

Presidio County UWCD Areal Extent Estimation				
County	County TOTAL Area (acres)	Presidio County UWCD Area (acres)	Percent of Total County Area (%)	Decimal Percent of Total County Area
Presidio	2,458,491.65	2,447,785.67	99.56	0.9956

Topography

The topography of Presidio County is from high plains and plateaus in the north central portion of the county to rugged mountains in the south and southwest. The highest mountain is Chinati Peak, which is 7,730 feet. The farming areas lie in the southern portion of the county, near Presidio and to some extent near Candalaria and Ruidoso in the southwest. The area around Presidio is thought to be the oldest continuously cultivated farmland in Texas. The north central portion of the country or the high plains is the area consisting primarily of ranch land.

Groundwater Resources of Presidio County

In the Presidio County Underground Water Conservation District, the known groundwater resources are within the Presidio-Redford Bolson aquifer, the Ryan Flat West Texas Bolson aquifers and the Igneous aquifer. The principal water-bearing units in the Marfa area are the Petan basalt and the Tascotal formations of the Igneous aquifer. The Ryan Flat aquifer occurs in the northwestern part of the county and the Presidio-Redford Bolson in the southern portion along the Rio Grande. The West Texas Bools are fault-bounded basins filled with sediments eroded from the surrounding highlands. The Presidio-Redford Bolson is bounded along the northeast by the Chinati Mountains and along the southeast by the Cienega Mountains, the Black Hills and the Bofecillos Mountains. The southwest boundary of the Bolson in the District is the Rio Grande. This aquifer is the source of municipal supply for Presidio. Water quality above the Rio Grande flood plain is fresh. The drainage area of the aquifer in the District is 1,100 square miles, and the recharge area includes 480 square miles outside the drainage area. Ryan Flat is the southernmost extension of the Salt Basin in Texas. It is bounded by mountains along its western, southern and eastern margins, and is thought to be hydro geologically connected with Lobo Valley outside the District. The water quality is all fresh, with TDS typically in the range of 200-400mg/l. The storage area within Presidio County is estimated at about 360 square miles.

The Igneous aquifer consists of many layers of highly fractured and faulted igneous rocks. The known extent of the aquifer in Presidio County is about 400 square miles.

The TWDB has provided the District with countywide data to assist the District in determining the groundwater resources, usage and recharge characteristics of the aquifers in Presidio County. This information will assist the District in Planning for future estimates of available groundwater and its conservation and protection.

Currently the District is using the estimated recharge figures from TWDB. It is estimated that the annual recharge is as follows:

Management Plan Requirement	Aquifer	Results (in acre-feet per year)
Estimated annual amount of recharge from precipitation to the District	Igneous Aquifer	9,409 ¹
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers.	Igneous Aquifer	3,252
Estimated annual volume of flow into the district within each aquifer in the district	Igneous Aquifer	4,429
Estimated annual volume of flow out of the District within each aquifer in the district	Igneous Aquifer	1,783
Estimated net annual volume of flow between each aquifer in the district ²	From Igneous Aquifer into overlying West Texas Bolsons Aquifer	1,611
	From Igneous Aquifer into underlying Cretaceous and Permian units	5,909

Source: Texas Water Development Board, GAM Run 12-026

¹ Recharge applies with the recharge package to the Igneous Aquifer is both direct precipitation recharge and alluvial fan/stream bed recharge.

² The total estimated net annual volume of flow from the Igneous Aquifer to West Texas Bolsons Aquifer and other formations is 7520 acre-feet per year.

Management Plan Requirement	Aquifer	Results ³ (in acre-feet per year)
Estimated annual amount of recharge from precipitation to the District	West Texas Bolsons Aquifer	14,660
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers.	West Texas Bolsons Aquifer	9,117 ⁴
Estimated annual volume of flow into the District within each aquifer in the District	West Texas Bolsons Aquifer	22,987
Estimated annual volume of flow out of the District within each aquifer in the District	West Texas Bolsons Aquifer	39,097
Estimated net annual volume of flow between each aquifer in the District ⁵	From West Texas Bolsons Aquifer into overlying river alluvium	911
	From Igneous Aquifer and other underlying units into West Texas Bolsons Aquifer	13,372

Source: Texas Water Development Board, GAM Run 12-026

Additional Amount of Natural/Artificial Recharge That Would Feasibly Be Achieved

The additional amount of natural or artificial recharge that would be realized from implementation of feasible weather modification would be an 8% increase in rainfall. This data was obtained from the direct gathering of evidence of the High Plains Water District of their weather modification program.

³ Total for Presidio County from all three groundwater availability models for the West Texas Bolsons.

⁴ Total also includes annual estimated riparian evapotranspiration discharge for the Groundwater Availability Model for the West Texas Bolsons (Presidio and Redford Bolsons).

⁵ The total estimated net annual volume of flow between the West Texas Bolsons Aquifer and river alluvium, the Igneous Aquifer, Cretaceous units and Permian units is 12,461 acre-feet per year.

ESTIMATE OF MODELED AVAILABLE GROUNDWATER BASED ON DESIRED FUTURE CONDITIONS

Section 36.001 of the Texas Water Code defines Modeled Available Groundwater as the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108. House Bill 1763 passed by the 79th Texas Legislature in 2005 provided that the Desired Future Conditions of the aquifer may only be determined through the joint planning process within a Groundwater Management Area and must be adopted prior to the statutory deadline of September 1, 2010, and every five years thereafter.

The joint planning process set forth in Section 36.108 of the Texas Water Code must be conducted by all groundwater conservation districts within the same Groundwater Management Area. The District is a member of GMA 4. The groundwater conservation districts adopted Desired Future Conditions prior to the September 1, 2010 deadline and then forwarded them to the TWDB for development of the Modeled Available Groundwater calculations.

The Desired Future Conditions adopted by Groundwater Management Area 4 represent the quantified, measurable conditions of the groundwater resources of the District over the 50-year planning period (2010-2060). Section 36.001(30) defines Desired Future Condition as a quantitative description, adopted in accordance with Section 36.108, of the desired condition of the groundwater resources in a management area at one or more specified future times. The Desired Future Conditions provided below demonstrate the maximum amount of water level declines that the District must not exceed over the 50 year planning period (2010-2060).

DESIRED FUTURE CONDITIONS ESTABLISHED FOR THE DISTRICT

Aquifer	Amount average draw down should not exceed after 50 years (in ft.)
Igneous	14
West Texas Bolsons	72

**MODELED AVAILABLE GROUNDWATER ESTIMATES
BASED ON DISTRICT DESIRED FUTURE CONDITIONS**

Aquifer (Trinity subdivisions)	Modeled Available Groundwater Totals for each decade in the planning period, 2010-2060 (in acre-ft. per year)					
	2010	2020	2030	2040	2050	2060
Igneous ⁶	4,064	4,064	4,064	4,064	4,063	4,063
West Texas Bolsons ⁷	9,126	9,112	8,982	8,834	8,710	8,640
Presidio-Redford Bolson Aquifer ⁸	6,282	6,282	6,282	6,282	6,282	6,282
Total	19,472	19,458	19,328	19,180	19,055	18,985

Source: Texas Water Development Board, Groundwater Availability Model (GAM) Runs 10-036 (MAG) and 10-037 (MAG) and Groundwater Technical Assistance (GTA) Aquifer Assessment 10-24 (MAG)

Projected Amount of Groundwater Being Used within the District on an Annual Basis

Please refer to Appendix A.

Projected Surface Water Supply within the District

Please refer to Appendix A.

Projected Total Demand for Water within the District

Please refer to Appendix A.

⁶ GR 10-036 MAG.

⁷ GR 10-037 MAG.

⁸ GTA Aquifer Assessment 10-24 MAG.

Projected Water Supply Needs

Please refer to Appendix A.

Water Management Strategies

Please refer to Appendix A.

Total Estimated Recoverable Storage (TERS)

Total Estimated Recoverable Storage by County For the West Texas Bolsons Aquifer within Groundwater Management Area 4.

County	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Presidio	35,000,000	8,750,000	26,250,000
Total	35,000,000	8,750,000	26,250,000

Source: GAM Task 13-028

Total Estimated Recoverable Storage by Groundwater Conservation District for the West Texas Bolsons Aquifer within Groundwater management Area 4.

County	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Presidio	35,000,000	8,750,000	26,250,000
Total	35,000,000	8,750,000	26,250,000

Source: GAM Task 13-028

Total Estimated Recoverable Storage by County for the Igneous Aquifer within Groundwater Management Area 4.

County	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Presidio	34,000,000	8,500,000	25,500,000
Total	34,000,000	8,500,000	25,500,000

Source: GAM Task 13-028

Total Estimated Recoverable Storage by Groundwater Conservation District for the Igneous Aquifer within Groundwater Management Area 4.

County	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Presidio	34,000,000	8,500,000	25,500,000
Total	34,000,000	8,500,000	25,500,000

Source: GAM Task 13-028

Management of Groundwater Supplies

The District will manage the supply of groundwater within the District in order to conserve the resource while seeking to maintain the economic viability of all the resource user groups, public and private. In consideration of the economic and cultural activities occurring within the District, the District will identify and engage in such activities and practices, that if implemented would result a reduction of groundwater use. An observation network shall be established and maintained in order to monitor changing storage conditions of groundwater supplies within the District. The District will make regular assessments of water supply and groundwater storage conditions and will report those conditions to the Board and to the public. The district will undertake, as necessary and co-operate with investigations of the groundwater resources within the District and will make the results of investigations available to the public upon adoption of the Board.

The District has rules to regulate groundwater withdrawals by means of production limits. The District may grant or deny a well construction permit application or limit groundwater withdrawals in accordance with the guidelines stated in the rules of the District.

In pursuit of the Districts mission of protecting the resource, the District may require reduction of groundwater withdrawals to amounts that will allow the District to achieve the Desired Future Conditions established for the aquifers within the District's boundaries. To achieve this purpose, the District may, at the Boards discretion and in accordance with District's rules, amend or revoke any permit after notice and hearing. The determination to seek such an amendment or revocation of a permit by the District will be based on aquifer conditions observed by the District and as set forth in the District's rules.

Actions, Procedures, Performance and Avoidance for Plan Implementation

The District will implement the provisions of this plan and will utilize the provision of this plan as a guidepost for determining the direction or priority for all District activities. All operations of the District, all agreements entered into by the District and any additional planning efforts in which the District may participate will be consistent with the provision of this plan.

The District has adopted and implemented rules that regulate the permitting of wells and the production of groundwater. The rules adopted by the District were adopted pursuant to TWC 36 and consistent with the provisions of this plan. All rules will be adhered to and enforced. The

promulgation and enforcement of the rules will be based on the best technical evidence available.

The district shall treat all citizens with equality. Citizens may apply to the District for discretion in enforcement of the rules on grounds of adverse economic effects or unique local conditions. In granting of discretion to any rule, the Board shall consider the potential for adverse effects on adjacent landowners. The exercise of said discretion by the Board shall not be construed as limiting the power of the Board.

The District will seek the cooperation in the implementation of the plan and management of groundwater supplies within the District. All activities of the District will be undertaken in cooperation and coordinated with the appropriate state, regional or local water management entity.

The methodology that the District will use to trace its progress on an annual basis in achieving all of its management goals will be as follows:

The District manager will prepare and present an annual report to the Board of Directors on District performance in regards to achieving management goals and objectives (during last monthly Board of Directors meeting each fiscal year. The report will include the number of instances each activity was engaged in during the year, referenced to the expenditure of staff time and budget so that the effectiveness and efficiency of each activity may be evaluated.

The annual report will be maintained on file at the District office.

GOALS, MANAGEMENT OBJECTIVES AND PERFORMANCE STANDARDS

Goal

1.0 Providing the Most Efficient Use of Groundwater.

Management Objective

1.1 Each year, require meters to be installed on 100 percent of the new non-exempt production wells.

Performance Standard

1.1a Each year, provide a report to the Board of Directors indicating the number of meters installed on new non-exempt production wells in the District and the location and ownership.

Management Objective

- 1.2 All current existing rules and regulations will be reviewed and amended, if necessary to address the needs of the District at least once every three years.

Performance Standard

- 1.2a Each year, report to the Board of Directors the number of changes required to keep District rules updated to District needs.

Goal

- 2.0 Controlling and Preventing Waste of Groundwater.

Management Objective

- 2.1 Each year, investigate 100 percent of the reports of wasteful practices within the District.

Performance Standards

- 2.1a Each year, locate 100 percent of the complaint sites on a District map.
- 2.1b Each year, provide a report to the Board of Directors indicating the number of wasteful practice reports and the number of those reports that were investigated.

Management Objective

- 2.2 Each year, register 100 percent of the new wells drilled in the District.

Performance Standards

- 2.2a District will maintain files including information on the drilling and completion of all new wells in the District.
- 2.2b Annually report to the Board of Directors on the number of new wells registered during the year.

Goal

- 3.0 Controlling and preventing subsidence.

Not applicable - The rigid geologic framework of the region precludes significant subsidence from occurring.

Goal

- 4.0 Addressing conjunctive surface water management issues.

Management Objective

- 4.1 Each year, the District will participate in the regional planning process by attending the Region F-Regional Water Planning Group meetings to convey information about groundwater availability and groundwater use within the

District and to explore the development of surface water supplies to meet the needs of water user groups in the District.

Performance Standard

4.1a The attendance of a District representative at at least one Region F Regional Water Planning Group meeting will be noted in the annual report presented to the District's Board of Directors.

Goal

5.0 Addressing natural resource issues that impact the use and availability of groundwater or that are impacted by the use of groundwater.

Addressing natural resources is not applicable to the District. The District has no documented occurrences of endangered or threatened species dependent upon groundwater resources, nor any other natural resource issues that impact the use and availability of groundwater or that are impacted by the use of groundwater.

Goal

6.0 Implement management strategies that will address drought conditions.

Management Objective

6.1 The District will monitor the Palmer Drought Severity Index (PDSI) by Texas Climatic Divisions at least once quarterly. If PDSI indicates that the District will experience severe drought conditions, the District will notify all public water suppliers within the District.

Performance Standard

6.1a The District will report in the annual report to the Board of Directors the number of times the District experienced severe drought conditions according to the PDSI and the number of times notification was sent to all public water suppliers within the District.

Goal

7.0 Implement management strategies that will address water conservation, rainwater harvesting, recharge enhancement, precipitation enhancement, or brush control, where appropriate and cost-effective

Management Objective - Conservation

7.1 Distribute educational information yearly regarding the current conservation practices for efficient use of water resources.

Performance Standard

7.1a Each year, the District will include in the annual report to the Board of Directors the number of water conservation literature packets handed out.

Management Objective - Rainwater Harvesting

7.2 Provide demonstrations on the rainwater harvesting system installed at District office.

Performance Standards

7.2a District staff will provide information about rainwater harvesting through demonstrations of the system installed at District office.

7.2b Each year, report to the Board of Directors the number of demonstrations given on rainwater harvesting.

Management Objective - Recharge Enhancement

7.3 Not Applicable - not cost effective.

Management Objective - Precipitation Enhancement

7.4 Not Applicable - not cost effective.

Management Objective - Brush Control

7.5 Not Applicable - not cost effective.

Goal

8.0 Addressing the Desired Future Conditions.

Management Objective - Desired Future Conditions

8.1 The District will review and calculate the amount of water allocated through permits and well registrations, and will also estimate actual use within the District to determine whether the District is on target to meet the Desired Future Conditions estimates for the groundwater resources within its boundaries.

Performance Standard

8.1a Each year, the annual report will include a discussion of the amount of water allocated through permits and well registrations and the estimate of actual use within the District and will include an evaluation of the District's progress towards meeting its Desired Future Conditions.

SUMMARY DEFINITIONS

“Board” - the Board of Directors of the Presidio County Underground Water Conservation District.

“District” - the Presidio County Underground Water Conservation District.

“TWDB” - Texas Water Development Board.

“Waste” - as defined by Chapter 36 of the Texas Water Code means anyone or more of the following:

1. Withdrawal of groundwater from a groundwater reservoir at a rate and in an amount that causes or threatens to cause intrusion into the reservoir of water unsuitable for agricultural, gardening, domestic, or stock raising purposes.
2. The flowing or producing of wells from a groundwater reservoir if the water produced is not used for a beneficial purpose.
3. Escape of groundwater from a groundwater reservoir to any other reservoir or geologic strata that does not contain groundwater.
4. Pollution or harmful alteration of groundwater in a groundwater reservoir by salt water or by other deleterious matter admitted from another stratum or from the surface of the ground.
5. Willfully or negligently causing, suffering, or allowing groundwater to escape into a river, creek, natural watercourse, depression, lake, reservoir, drain, sewer, street, highway, road, or road ditch, or onto any land other than that of the owner of the well unless such discharge is authorized by permit, rule, or order issued by the commission under Chapter 26 of the Texas Water Code.
6. Groundwater pumped for irrigation that escapes as irrigation tail water onto land other than that of the owner of the well unless permission has been granted by the occupant of the land receiving the discharge.
7. For water produced from an artesian well "waste" has the meaning assigned by Section 11.205 of the Texas Water Code.