

**PRESIDIO COUNTY UNDERGROUND
WATER CONSERVATION DISTRICT**

MANAGEMENT PLAN

2009-2014

Adopted November 23, 2009

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 approved 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 on September 28, 2004. This District management plan will remain in effect until September 28, 2014, or a period of ten (10) years, which ever is later, 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 hydrogeologic properties, as well as a 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 of 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 current Board of Directors are: Jim White - President, Johnny Surratt – Vice President, Ike Livingston – Secretary and Board members – Terry Bichop 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 consists mostly 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	<u>County</u> <u>TOTAL</u> Area (acres)	<u>Presidio</u> <u>County</u> <u>U.W.C.D.</u> Area (acres)	Percent of Total County Area (%)	Decimal Percent of Total County Area
Presidio	2458491.65	2447785.67	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 county 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 Bolsons 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 hydrogeologically 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 is currently conducting a groundwater hydrology study of the Igneous Aquifer and the West Texas Bolsons. This study should assist the district in its effort to better understand the water resources of that part of the District. 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 as the Groundwater Availabilities Estimation. It is estimated that the annual recharge to the PCUWCD is as follows:

Management Plan requirement	Aquifer or confining unit	Results Acre-feet
Estimated annual amount of recharge from precipitation to the district	Green River Valley portion of the West Texas Bolsons Aquifer	3
	Ryan Flat portion of the West Texas Bolsons Aquifer	1,445
	Igneous Aquifer	9,369
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Green River Valley portion of the West Texas Bolsons Aquifer	4
	Ryan Flat portion of the West Texas Bolsons Aquifer	NA ^a
	Igneous Aquifer	3,252
Estimated annual volume of flow into the district within each aquifer in the district	Green River Valley portion of the West Texas Bolsons Aquifer	2
	Ryan Flat portion of the West Texas Bolsons Aquifer	723
	Igneous Aquifer	4,391
Estimated annual volume of flow out of the district within each aquifer in the district	Green River Valley portion of the West Texas Bolsons Aquifer	0
	Ryan Flat portion of the West Texas Bolsons Aquifer	3,992

	Igneous Aquifer	1,852
Estimated net annual volume of flow between each aquifer in the district	From the underlying units to the Green River Valley portion of the West Texas Bolsons Aquifer	18
	From the Igneous Aquifer to the Ryan Flat portion of the West Texas Bolsons Aquifer	1,492
	From the Igneous Aquifer to the underlying Cretaceous and Permian Units	5,872

^aThe groundwater availability model does not consider outflow to any major springs, lakes, streams, or rivers within the Ryan Flat portion of the West Texas Bolsons Aquifer in the district.

Source: Texas Water Development Board, Groundwater Availability Run 08-88

Additional Amount of Natural/Artificial Recharge That Would Feasible 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.

MANAGED AVAILABLE GROUNDWATER

The managed available groundwater for Presidio County UWCD has not been established. Upon establishing a Desired Future Condition for Groundwater Management Area 4, the District will amend this portion of the plan.

Historical Groundwater use in Presidio County

In the past, annual groundwater usage in the District has varied from a high of 14,200 acre-feet to a low of 2,137 acre-feet. Annual usage for 1974 through 2004 is as follows:

Unit: Acre Feet (ACFT)

GW = groundwater; SW = surface water

Year	Source	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1974	GW	1,263	1	0	7,909	2	1,041	10,216
	SW	0	0	0	15,562	0	0	15,562
	Total	1,263	1	0	23,471	2	1,041	25,778
1980	GW	1,295	0	0	12,000	0	905	14,200
	SW	0	0	0	21,175	0	48	21,223
	Total	1,295	0	0	33,175	0	953	35,423
1984	GW	1,641	0	0	3,349	11	509	5,510
	SW	0	0	0	25,745	0	26	25,771
	Total	1,641	0	0	29,094	11	535	31,281
1985	GW	1,478	0	0	3,563	11	574	5,626
	SW	0	0	0	24,078	0	30	24,108
	Total	1,478	0	0	27,641	11	604	29,734
1986	GW	1,471	0	0	2,275	0	333	4,079
	SW	0	0	0	20,475	0	17	20,492
	Total	1,471	0	0	22,750	0	350	24,571
1987	GW	1,282	0	0	529	9	317	2,137
	SW	0	0	0	25,920	0	16	25,936
	Total	1,282	0	0	26,449	9	333	28,073
1988	GW	1,453	0	0	2,435	10	368	4,266
	SW	0	0	0	21,915	0	19	21,934
	Total	1,453	0	0	24,350	10	387	26,200
1989	GW	1,573	0	0	4,317	0	475	6,365
	SW	0	0	0	24,394	0	25	24,419
	Total	1,573	0	0	28,711	0	500	30,784
1990	GW	1,316	0	0	5,242	0	469	7,027
	SW	0	0	0	24,668	0	24	24,692
	Total	1,316	0	0	29,910	0	493	31,719
1991	GW	1,307	0	0	460	10	478	2,255
	SW	0	0	0	53,538	0	25	53,563
	Total	1,307	0	0	53,998	10	503	55,818
1992	GW	1,306	0	0	2,422	10	473	4,211

	SW	0	0	0	54,141	0	25	54,166
	Total	1,306	0	0	56,563	10	498	58,377
1993	GW	1,449	0	0	1,939	10	472	3,870
	SW	0	0	0	20,528	0	25	20,553
	Total	1,449	0	0	22,467	10	497	24,423
1994	GW	1,611	0	0	1,725	10	568	3,914
	SW	0	0	0	20,779	0	30	20,809
	Total	1,611	0	0	22,504	10	598	24,723
1995	GW	1,673	0	0	1,969	10	473	4,125
	SW	0	0	0	20,847	0	25	20,872
	Total	1,673	0	0	22,816	10	498	24,997
1996	GW	1,540	0	0	2,016	10	361	3,927
	SW	0	0	0	21,346	0	19	21,365
	Total	1,540	0	0	23,362	10	380	25,292
1997	GW	1,428	0	0	3,178	10	361	4,977
	SW	0	0	0	21,189	0	19	21,208
	Total	1,428	0	0	24,367	10	380	26,185
1998	GW	1,564	0	0	3,196	10	589	5,359
	SW	0	0	0	21,306	0	31	21,337
	Total	1,564	0	0	24,502	10	620	26,696
1999	GW	1,575	0	0	2,111	10	646	4,342
	SW	0	0	0	20,098	0	34	20,132
	Total	1,575	0	0	22,209	10	680	24,474
2000	GW	1,662	0	0	2,564	10	591	4,827
	SW	0	0	0	14,861	0	31	14,892
	Total	1,662	0	0	17,425	10	622	19,719
2001	GW	1,583	0	0	2,425	10	591	4,609
	SW	0	0	0	16,169	0	31	16,200
	Total	1,583	0	0	18,594	10	622	20,809
2002	GW	1,606	0	0	5,132	10	516	7,264
	SW	0	0	0	29,081	0	27	29,108
	Total	1,606	0	0	34,213	10	543	36,372
2003	GW	1,713	0	0	4,110	10	340	6,173
	SW	0	0	0	4,442	0	18	4,460
	Total	1,713	0	0	8,552	10	358	10,633
2004	GW	1,411	0	0	4,395	10	324	6,140
	SW	0	0	0	2,855	0	17	2,872
	Total	1,411	0	0	7,250	10	341	9,012

NOTE: All Pumpage reported in acre-feet

2/23/2009

Source: TWDB Water Use Survey Database

(<http://www.twdb.state.tx.us/wushistorical/DesktopDefault.aspx?PageID=1>)

The total county estimates included in this table are preferred by the District. A parcel of land located in northwestern Presidio County but excluded from the Presidio County UWCD's boundaries has no production on it so apportionment of estimates is not necessary.

Projected Total Water Demands

This management plan is based upon the estimates received from “Far West Texas Regional Water Plan, 2006. The FWTRWP has projected that the total water demands for Presidio County will be 21,558 acre-feet per year by 2060. This estimate is based on projections of the following breakdown.

RWPG	Water User Group	County	River Basin	2010	2020	2030	2040	2050	2060
E	County Other*	Presidio	Rio Grande	81	66	52	42	37	34
E	Irrigation*	Presidio	Rio Grande	19,981	19,584	19,195	18,814	18,440	18,075
E	Livestock*	Presidio	Rio Grande	619	619	619	619	619	619
E	Mining*	Presidio	Rio Grande	7	7	7	7	7	7
E	Marfa	Presidio	Rio Grande	886	969	1,060	1,049	1,042	1,042
E	Presidio	Presidio	Rio Grande	1,039	1,255	1,458	1,642	1,727	1,781
Total Projected Water Demands (acre-feet per year) =				22,613	22,500	22,391	22,173	21,872	21,558

Source: Volume 3, 2007 State Water Planning Database
(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

2/24/2009

*Values have been apportioned by multiplying the total county estimates by 0.9956 in order to more accurately represent District estimates since the District does not encompass the entire county

Projected Water Management Strategies

RWPG	WUG	WUG County	River Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
E	Irrigation	Presidio	Rio Grande	Irrigation Water Use Management	Conservation	Presidio	0	0	0	0	0	0
E	Irrigation	Presidio	Rio Grande	Land Management Systems	Conservation	Presidio	0	0	0	0	0	0
E	Irrigation	Presidio	Rio Grande	Miscellaneous Systems	Conservation	Presidio	0	0	0	0	0	0
E	Irrigation	Presidio	Rio Grande	On-Farm Water Delivery Systems	Conservation	Presidio	0	0	0	0	0	0
E	Irrigation	Presidio	Rio Grande	Water District Delivery Systems	Conservation	Presidio	0	0	0	0	0	0
Total Projected Water Management Strategies (acre-feet per year) =							0	0	0	0	0	0

Source: Volume 3, 2007 State Water Planning Database

2/23/2009

(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

Projected Surface Water Supply

RWPG	Water User Group	County	River Basin	Source Name	2010	2020	2030	2040	2050	2060
E	Irrigation	Presidio	Rio Grande	Lower Rio Grande River Combined Run-of-River	10,853	10,853	10,853	10,853	10,853	10,853
Total Projected Surface Water Supplies (acre-feet per year) =					10,853	10,853	10,853	10,853	10,853	10,853

Source: Volume 3, 2007 State Water Planning Database
(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

2/23/2009

The total county estimates are used in this table due to there is no surface water within the parcel of land excluded from the District

PROJECTED WATER NEEDS

Positive values reflect a water surplus; **negative values reflect a water need.**

RWPG	WUG	County	River Basin	2010	2020	2030	2040	2050	2060
E	County Other	Presidio	Rio Grande	13	28	42	52	57	60
E	Irrigation	Presidio	Rio Grande	-3,546	-3,148	-2,757	-2,374	-1,999	-1,632
E	Livestock	Presidio	Rio Grande	24	24	24	24	24	24
E	Marfa	Presidio	Rio Grande	3,953	3,870	3,779	3,790	3,797	3,797
E	Mining	Presidio	Rio Grande	3	3	3	3	3	3
E	Presidio	Presidio	Rio Grande	2,380	2,164	1,961	1,777	1,692	1,638
Total Projected Water Needs (acre-feet per year) =				-3,546	-3,148	-2,757	-2,374	-1,999	-1,632
Source: Volume 3, 2007 State Water Planning Database									2/23/2009

(<http://www.twdb.state.tx.us/DATA/db07/defaultReadOnly.asp>)

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 deny a well construction permit or limit groundwater withdrawals in accordance with the guidelines stated in the rules of the District. In making a determination to deny a permit or limit groundwater withdrawals, the District will consider the public benefit against individual hardship after considering all appropriate testimony.

The relevant factors to be considered in making a determination to deny a permit or limit groundwater withdrawals will include:

- 1) The purpose of the rules of the District
- 2) The equitable distribution of the resources
- 3) The economic hardship resulting from grant or denial of a permit or the terms prescribed by the permit

In pursuit of the Districts mission of protecting the resource, the District may require reduction of groundwater withdrawals to amounts, which will not cause harm to the aquifer. To achieve this purpose, the District may, at the Boards discretion amend or revoke any permit after notice and hearing. The determination to seek the amendment or revocation of a permit by the District will be based on aquifer conditions observed by the District. The District will enforce the terms and conditions of permits and the rules of the District by enjoining the permit holder in a court of competent jurisdiction as provide for in TWC 36.102.

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 will adopt rules relating to the permitting of wells and the production of groundwater. The rules adopted by the District shall be pursuant to TWC 36 and 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, beginning December 31, 2000). 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% of the new production wells.

Performance Standard

1.1a - Each year, provide a report to the Board of Directors indicating the number of meters installed on new 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 Implement management strategies that will address drought conditions.

Management Objective

3.1 - 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

3.1a - 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

4.0 Implement management strategies that will promote water conservation.

Management Objective

4.1 Disperse educational information yearly regarding the current conservation practices for efficient use of water resources.

Performance Standard

4.1a - Each year, the District will include in the annual report to the Board of Directors the number of water conservation literature packets handed out.

Goal

5.0 Rainwater Harvesting, Recharge Enhancement, Precipitation Enhancement, and Brush Control where appropriate.

Management Objective: Rainwater Harvesting

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

Performance Standards

5.1a - District staff will provide information about rainwater harvesting through demonstrations of the system installed at District office

5.1b – Each year, report to the Board of Directors the number of demonstrations given on rainwater harvesting.

Management Objective – Recharge Enhancement

5.2 Not Applicable – not cost effective

Management Objective – Precipitation Enhancement

5.3 Not Applicable – not cost effective

Management Objective – Brush Control

5.4 Not Applicable – not cost effective

SB - 1 MANAGEMENT GOALS DETERMINED NOT-APPLICABLE

Goal

1.0 Control and prevention of subsidence.

The rigid geologic framework of the region precludes significant subsidence from occurring.

Goal

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

The District has no documented occurrences of endangered or threatened species dependent upon groundwater resources.

Goal

3.0 Addressing conjunctive surface water management issues.

There is no surface water entity within the District that could be located at the time this plan was submitted.

Goal

4.0 Addressing the Desired Future Conditions in a Quantitative Manner..

The desired future conditions of the groundwater within the District have not yet been established in accordance with Chapter 36.108 of the Texas Water Code. The District is

actively participating in the joint planning process and the development of a desired future condition for the portion of the aquifer(s) within the District. Therefore, this goal is not applicable to the District at this time

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 any one or more of the following:

1. Withdrawal of groundwater from a groundwater reservoir at a rate and in a 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.