

**REAL-EDWARDS
CONSERVATION AND RECLAMATION
DISTRICT**

Management Plan

2014-2019

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Real-Edwards Conservation and Reclamation District Management Plan

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Real-Edwards Conservation and Reclamation District

Management Plan

Mission Statement

The Real-Edwards Conservation and Reclamation District (the District) was created to provide for the conservation, preservation, development and recharging of the underground waters and water-bearing formations within the District consistent with Article XVI, Section 59, of the Texas Constitution and Chapter 36 of the Texas Water Code.

Guiding Principles

The District has operated from its inception, with a strong belief in private property rights and that when some of those rights relating to the management of groundwater are relinquished for the benefit of the community, local control through an elected Board of Directors is the preferred way to manage those rights.

The District has adopted the principle of education first and regulation second in their effort to encourage conservation of groundwater. The rules of the District are designed to give landowners a fair and equal opportunity to use the groundwater underlying their property for beneficial purposes. The District will monitor groundwater quality and quantity in order to better understand the dynamics of the aquifer systems over which it has jurisdiction. This Management Plan document is intended to be used as a tool to provide continuity in the management of the District. It will be used by the District staff as a guide to insure that all aspects of the goals of the District are carried out and will be referred to by the Board of Directors for future planning.

The dynamic nature of this Management Plan shall be maintained in a manner that allows the District to best serve the needs of the constituents. At the very least, the Board of Directors will review and readopt this plan every five years.

The goals, management objectives, and performance standards put forth in this planning document have been set at a reasonable level considering existing and future fiscal and technical resources. Whatever the future holds, the following guidelines will be used to insure that the management objectives are set at a sufficient level to be realistic and effective:

- The duly elected Board of Directors will guide and direct the District staff and will gauge the achievement of the goals set forth in this document.
- The interests and needs of the District's constituency including absentee landowners shall control the direction of the management of the District.

- The Board of Directors will endeavor to maintain local control of the privately owned resource over which the District has jurisdictional authority.
- The District budget operates on an October 1st through September 30th fiscal year.
- The Board of Directors will evaluate District activities based upon the fiscal year, when considering stated goals, management objectives, and performance standards.

History

The Real-Edwards Conservation and Reclamation District was created by Senate Bill 447 in the 56th Texas Legislature in 1959. Initially the District included parts of Edwards and Real County; however during the 71st Texas Legislature in 1989, House Bill 3127 was passed modifying the District's enabling legislation to include all of Edwards and Real Counties. The District is funded through fees and a \$0.025 per one hundred dollars valuation ad valorem tax on property within the District.

Planning Period

This Management Plan becomes effective upon review and approval by the Texas Water Development Board (TWDB) and remains in effect until a revised plan is approved or ten (10) years from the date of approval, whichever is earlier. The plan may be reviewed annually. The Management Plan must be reviewed by the Board of Directors, readopted with or without revisions, and be resubmitted to the TWDB for approval at least once every five years to insure that it is consistent with the applicable Regional Water Plans and the State Water Plan.

As outlined in Chapter 36.1071, Texas Water Code, the District's Management Plan is required, as applicable, to address the following management goals:

- Providing the most efficient use of groundwater §36.1071(a)(1);
- Controlling and preventing waste of groundwater §36.1071(a)(2);
- Controlling and preventing subsidence §36.1071(a)(3);
- Addressing conjunctive surface water management issues §36.1071(a)(4);
- Addressing natural resource issues that impact the use and availability of groundwater and which are impacted by the use of groundwater §36.1071(a)(5);
- Addressing drought conditions §36.1071(a)(6);
- Addressing a) conservation, b) recharge enhancement, c) rainwater harvesting, d) precipitation enhancement, and e) brush control (where appropriate and cost effective), §36.1071(a)(7) and;
- Addressing the desired future conditions established under TWC §38.108. §36.1071(a)(8)

The following goals referenced in Chapter 36.1071, Texas Water Code, have been determined not applicable to the District:

- §36.1071(a)(3) Controlling and preventing subsidence;
- §36.1071(a)(7) Addressing b) recharge enhancement and;
- §36.1071(a)(7) Addressing d) precipitation enhancement.

General Description

The District is governed by nine Directors who are elected by local voters and serve a four-year staggered term of office. District rules were revised in July 2013 which will affect the Management Plan. The District encompasses the total of Real and Edwards Counties, which is located in the southwestern part of the Texas Hill Country with Leakey and Rocksprings as the county seats, respectively. Real and Edwards Counties economies are primarily based on agriculture, tourism and hunting industries. The rugged terrain with its winding roads, the magnificent vistas, and the crystal clear springs, streams, and rivers along with some of the best hunting in Texas; have made the area a favorite for vacationers and absentee landowners alike.

Geographical Information

The District lies within the Edwards Plateau and consists of approximately 1,810,169 acres in Real and Edwards Counties. The land is generally rolling to mountainous with elevations from 1500 to 4000 ft. The District is included in three different river basins, the Nueces, Colorado, and the Rio Grande. The headwaters of the Nueces River and Frio River and a portion of the headwaters of the Sabinal River and the South Llano River are located within the District. The western half of Edwards County slopes southwestward into the Devils River. The eastern part of Edwards County drains into the Nueces River and the northern part drains into the Llano River. Real County drains into the Nueces River on the west and into the Frio River on the east with a small northern portion draining into the South Llano River. The land also includes many shallow depressions that catch rainfall and runoff to be either evaporated or infiltrated into the soil.

Groundwater Resources

Aquifers within Edwards and Real Counties have been divided by the Texas Water Development Board (TWDB) into two types, namely, major and minor aquifers. The TWDB has classified two major aquifers within the District: the Edwards-Trinity (Plateau) Aquifer and the Trinity Aquifer in the southeast corner of Real County. The District, along with the Region J Planning Group has identified two minor aquifers in the District; the Frio River Alluvium Aquifer and the Nueces River Alluvium Aquifer. These minor aquifers were included in the last Plateau Region (Region J) Water Plan that was approved by the TWDB in January 2011. There are numerous wells completed in the alluvium, with a majority being used for domestic and/or livestock purposes; others are used for irrigation and

municipal purposes. The City of Leakey's well field is completed in the Frio River Alluvium Aquifer, and the Barksdale Water Supply Corporation's wells are completed in the Nueces River Alluvium Aquifer approximately one-half mile from the Nueces River near the community of Barksdale.

Edwards-Trinity (Plateau) Aquifer

Limestone is the predominant rock underlying the Edwards Plateau soils. The permeability of the limestone is not necessarily due to inter-granular pore space as in sandstone, but more to joints, crevices, and solution openings that have been enlarged by solvent action of water charged with carbon dioxide. The Edwards-Trinity (Plateau) Aquifer covers all or part of thirty-three (33) counties or the boundary of Groundwater Management Area 7 (GMA 7). Real and Edwards Counties sit on the Southeastern edge of this aquifer. Groundwater availability data from GAM Run 10-043 MAG (Version 2) of the groundwater availability model for the Edwards-Trinity (Plateau), Trinity, and Pecos Valley Aquifers were used for this report and show that there is approximately 13,115 acre-feet/year of water per year available to the District from this aquifer. ^{Appendix 3} The Pecos Valley Aquifer does not occur within the District, therefore no groundwater budget values are included in this report. Within the District, groundwater is fresh, with total dissolved solids of less than 500 milligrams per liter in most sampled wells. The permeability of the formation is such that a well's pumping capacity may vary from as little as one (1) gallon per minute (gpm) to several hundred gallons per minute in limited locations. For the most part wells completed in this formation within Edwards and Real Counties consistently yield between three (3) and 10 gpm.

Trinity Aquifer

The Trinity aquifer is composed of marine sediments (primarily limestone) deposited during the Cretaceous Period. The Trinity Group in Edwards and Real Counties includes the Glen Rose and underlying Travis Peak formations. In some areas, the Glen Rose consists of up to approximately 1,000 feet of limestone with embedded shale, marl and occasional anhydrite (gypsum) and is the primary unit in the Trinity Aquifer in the southern part of the Edwards Plateau area. The Travis Peak contains sands, clays and limestones that are subdivided into water-bearing members of the Glen Rose Limestone, Hensell Sand, Cow Creek Limestone, Sligo Limestone and Hosston Sand water-bearing formations. Samples from the Trinity aquifer have total dissolved solids (TDS) concentrations above the secondary standard of slightly saline (1,000 - 3,000 mg/l). ^{Plateau Region Water Plan 2011}

Groundwater availability data from GAM Run 10-043 MAG (Version 2) of the groundwater availability model for the Edwards-Trinity (Plateau), Trinity, and Pecos Valley aquifers were used for this report and show there is approximately 52 acre-feet/year available to the District from this aquifer. ^{Appendix 3} Wells completed within the Trinity formation of the District (southeast Real County) tend to yield substantially more water (50 -150+ gpm). However, as noted above often the high TDS and sulfide content requires water from this formation to undergo fairly extensive treatment prior to becoming potable.

Frio River Alluvial Aquifer

The Frio River Alluvium Aquifer in central Real County extends over an area of approximately 9,530 acres. The alluvium (clay, silt, gravel, etc. deposited by running water) generally follows the flood plain of the Frio River in Real County. The aquifer's width varies from almost nonexistent to over a mile. As with the width, the aquifer's thickness varies but is thought to not exceed 42 feet. Wells in the Frio River Alluvium Aquifer are generally shallow and provide water in small quantities for domestic and livestock purposes within Real County. However, as mentioned above, there are several large capacity wells completed in this zone and the City of Leakey's well field is completed in this aquifer. Because of the limited extent of this aquifer and its shallow water table, the aquifer system is potentially susceptible to contamination from surface sources. Recharge to the aquifer is from stream loss and direct infiltration of precipitation. Estimates indicate there is approximately 2,145 acre-feet/year available within this aquifer. Plateau Region Water Plan

2011 Appendix 5

Nueces River Alluvial Aquifer

The Nueces River Alluvium Aquifer lies between Edwards and Real Counties and extends over an area of approximately 24,450 acres. As with the Frio Alluvium Aquifer, the Nueces River Alluvium Aquifer is readily susceptible to diminished supplies during drought conditions, potentially from over-pumping, and from contaminated surface sources. Recharge of this aquifer is much like that of the Frio River Alluvium Aquifer, from stream loss and direct infiltration of precipitation. Alluvial deposits of Pleistocene and Recent age materials occur along nearly all the stream courses on the Edwards Plateau. These deposits consist of sand, gravel, silt and clay derived from the erosion of the underlying rocks, and occur primarily as terrace and flood plain alluvium. As with the defined Frio River Alluvium Aquifer, the alluvium deposits along the flood plains of the Nueces, West Nueces and South Llano Rivers vary in width and thickness. The thickness is thought not to exceed 35 feet. There appears to be some hydraulic connection between the alluvial formations and the rivers and streams that meander through them. For the most part wells in the alluvium within the District are generally shallow and provide water in small quantities for domestic and livestock purposes. The Barksdale Water Supply Corporation (serving the community of Barksdale), has its well field completed within the alluvium approximately one-half mile from the Nueces River. Estimates indicate there is approximately 3,574 acre-feet/year available within this aquifer. Plateau Region Water Plan 2011 Appendix 5

Estimated Available Groundwater

All estimates of groundwater availability, usage, supply, recharge, storage and future demands are from data supplied by the Texas Water Development Board unless otherwise noted. Tables 1 thru 5 herein are taken from the TWDB GAM Run 13-023, December 18th, 2013. Appendix 1 The groundwater model used in completing this analysis is the best available scientific tool that can be used to meet the stated objectives. While the District is required to use these estimates, it is hoped that the TWDB will continue to improve the

models and the data use herein. The District contends that the methodology used by the TWDB to project current and future water use is flawed in that it fails to consider factors including but not limited to; absentee landowners, vacationers, hunters, wildlife management, and exotic game. ^{Appendix 4}

Desired Future Conditions (DFC)

House Bill (HB) 1763 passed by the 79th Legislature became effective and incorporated into Chapter 36 of the Texas Water Code. This Bill regionalizes decisions of groundwater availability, requires regional water planning groups to use groundwater availability numbers, DFC, from groundwater conservation districts, and defines a permitting target for groundwater production Modeled Available Groundwater (MAG).” Groundwater conservation districts, in accordance with HB-1763 must establish their Respective DFCs of how their aquifer will be managed for 50 years, starting in 2010 through 2060.

TWC § 36.001 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”. The joint planning process set forth in TWC § 36.108 must be collectively conducted by all groundwater conservation districts within the same GMA. The District is a member of GMA 7, which along with the other districts in the GMA did establish a comprehensive DFC. Appendix 3 contains the GAM run (GAM Run: 10.043 (Version 2)) ^{Appendix 3} used to establish the DFC of 7 feet of drawdown or 449,400 acre-feet/year from 2010 to 2060.

Natural and/or Artificial Recharge

Recharge is the addition of water to an aquifer. The principal source of groundwater recharge in Edwards and Real Counties is precipitation that falls on the outcrop of the various aquifers. In addition, seepage from streams located on the outcrop and possibly inter-formation leakage are sources of groundwater recharge. Recharge is a limiting factor in the amount of water that can be developed from an aquifer, as it must balance discharge over a long period of time or the water in storage in the aquifer will eventually be depleted. Among the factors that influence the amount of recharge received by an aquifer are: the amount and frequency of precipitation; the extent of the outcrop or intake area; topography, type and amount of vegetation, the condition of soil cover in the outcrop area; and the ability of the aquifer to accept recharge and transmit it to areas of discharge. On aquifer outcrops where vegetation is dense, the removal of underbrush and non-beneficial plants will reduce evaporation and transpiration losses, making more water available for groundwater recharge. According to estimates from the TWDB GAM Run 13-023, December 18th, 2013, ^{Appendix 1} the District receives approximately 76,462 acre-feet/year of recharge annually from precipitation. See Table 1.

Table 1: ESTIMATED ANNUAL AMOUNT OF RECHARGE FROM PRECIPITATION TO THE DISTRICT. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Aquifers or Confining Units	Results (acre-feet/year)
Edwards and associated limestone	75,382
Undifferentiated Trinity Units	1,080
Total	76,462

In the Edwards Plateau region, the annual rate of evaporation is three times greater than the annual rate of precipitation, thus creating perpetual low soil moisture content that retards percolation except under the most ideal conditions. Percolation usually occurs during relative short periods after rainfall. Soil permeability is an expression of the ability of water to pass through pore spaces of the soil and varies throughout the Edwards Plateau from less than 0.06 to 0.63 inches per hour. This information is derived from a 1979 report by Lloyd Walker titled "Occurrence, Availability, and Chemical Quality of Ground Water in the Edwards Plateau Region of Texas, Report 235, Texas Department of Water Resources."

Additional Recharge

The estimate of the annual amount of additional natural or artificial recharge of groundwater within the District that could result from implementation of feasible methods for increasing the natural or artificial recharge is difficult to determine due to the direct correlation to rainfall. There are several feasible methods of additional recharge:

Flood Prevention Sites- Along the headwaters of the Frio and Nueces River there are numerous privately owned dams that catch and retain water. On the Nueces, there is a public dam along the Uvalde and Real County line. There are a few privately owned dams on the Llano River as well. Construction of small dams to slow down runoff may be beneficial to the recharge of the aquifers within the District.

Range Management through Brush Control- Real and Edwards Counties have a coverage of approximately 65% Ash Juniper or cedar. Natural Resource Conservation Service, Edwards County, 1999 Brush control can be accomplished by mechanical control, prescribed burning, combination of mechanical and burn, or chemical application. Brush control may be considered more as a conservation method than an additional recharge method. Recent studies indicate in certain instances over certain terrain and with proper techniques, brush control may enhance recharge as well as serve as a water conservation measure. Redecker et al. (1998)

Natural and Artificial Discharge

Discharge is the loss of water from an aquifer. The discharge may be either artificial or natural. Artificial discharge takes place from flowing and pumped water wells, drainage ditches, gravel pits, and other excavations that intersect the water table. Natural discharge

occurs as seepage, springs, evaporation, transpiration, and inter-formational leakage. Groundwater moves from the areas of recharge to areas of discharge or from points of higher hydraulic head to points of lower hydraulic head. Movement is in the direction of the hydraulic gradient just as in the case of surface water flow. Under normal artesian conditions movement of groundwater usually is in the direction of the aquifer's regional dip. The slope of the water-table and consequently the direction of groundwater movement is closely related to the slope of the land surface. However, for both artesian and water-table conditions, local anomalies are developed in areas of pumping and some water moves toward the point of artificial discharge. The rate of groundwater movement in an aquifer is usually very slow, being in the magnitude of a few feet to a few hundred feet per year. While it appears that substantial recharge occurs via precipitation, approximately 41,232 acre-feet/year of water per year is discharged from the aquifer to springs, streams and rivers within the District. See Table 2.

TABLE 2: ESTIMATED ANNUAL VOLUME OF WATER THAT DISCHARGES FROM THE AQUIFER TO SPRINGS, STREAMS, AND RIVERS. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Aquifers or Confining Units	Results (acre-feet/year)
Edwards and associated limestone	41,232
Undifferentiated Trinity Units	0
Total	41,232

In planning for future use and availability, it is necessary to look at the amount of water coming into the District from each aquifer. The TWDB estimates that there is a total of 25,653 acre-feet/year flowing into the District. This estimate is made from the TWDB GAM Run 13-023, December 18th, 2013. ^{Appendix 1} See Table 3.

TABLE 3: ESTIMATED ANNUAL VOLUME OF FLOW INTO THE DISTRICT WITHIN EACH AQUIFER IN THE DISTRICT. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Aquifers or Confining Units	Results (acre-feet/year)
Edwards and associated limestone	25,004
Undifferentiated Trinity Units	649
Total	25,653

Likewise it is equally important to know how much water is leaving the District and how much flow there is between the different aquifers. The section above addressed the issue relating to discharges to springs, streams and rivers. However if there is water entering into the District through the aquifers there is also water leaving the District via the aquifers. Again, according to the Texas Water Development Board, there is 80,462 acre-

feet/year flowing out of the District annually. See Table 4. There also appears to be a limited amount of flow between the Edwards formation and the Trinity units. This amounts to about 272 acre-feet/year. See Table 5.

TABLE 4: ESTIMATED ANNUAL VOLUME OF FLOW OUT OF THE DISTRICT WITHIN EACH AQUIFER IN THE DISTRICT. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Aquifers or Confining Units	Results (acre-feet/year)
Edwards and associated limestone	79,007
Undifferentiated Trinity Units	1,455
Total	80,462

TABLE 5: ESTIMATED NET ANNUAL VOLUME OF FLOW BETWEEN EACH AQUIFER IN THE DISTRICT. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Aquifers or Confining Units	Results (acre-feet/year)
Edwards & associated limestone flowing into undifferentiated Trinity Units	272
Total	272

Surface Water Resources and Availability

Surface water sources within the District include the Nueces River, the Frio River, the Llano River along with numerous small streams and hundreds of springs. Major springs include; Seven Hundred Springs, Evans Springs and Old Faithful Springs. The City of Camp Wood, in Real County, uses Old Faithful Springs as its sole source of municipal water. While even during the Drought of Record during the 1950's Old Faithful Spring still flowed at a rate that was adequate for the City of Camp Wood's municipal use. The current drought has put a strain on Old Faithful Springs but as of publication of this document the spring has sufficiently supplied the City of Camp Wood with municipal water. According to projections, the City of Camp Wood may be short as much as 172 acre-feet of water per year thru 2060. ^{Appendix 2} Knowing this, the District asked the Plateau Planning Group to include a strategy relating to the City of Camp Wood drilling one or more wells to supplement community's water supply. Surface water from the Frio, Nueces and South Llano Rivers as well as springs contribute 2,520 acre-feet/year. ^{Appendix 2} However, this cannot be considered available as surface water does not fall under the jurisdiction of the District. Flow data on most of the springs is sparse. The District has been monitoring the flow of the Nueces and Frio Rivers in an effort to gather data to be used to set future conditions as well as used for specific drought triggers when combined with other data. The flow of Old Faithful Springs and Evans Springs will be major components in the establishment and monitoring of Desired Future Conditions for the District. As mentioned

above the aquifers discharge approximately 41,232 acre-feet/year to numerous springs, streams and rivers within the District. See Table 2 Above.

Current and Projected Use

As mentioned, artificial discharge is considered the amount of water from flowing and pumped water wells, drainage ditches, gravel pits, and other excavations that intersect the water table. According to the TWDB, the projected total water demand in 2010 was estimated to be 2,422 acre-feet. ^{Appendix 2}

According to data provided by the TWDB ^{Appendix 2} the projected demand in 2010 was 2,422 acre-feet and estimates from the Plateau Region Water Plan indicate a decline in water use in the District thru the year 2060. These figures are based primarily upon population thru census and livestock use. The District feels these figures do not take into consideration the large number of absentee landowners in the District (approximately 65-70%), nor do the figures consider the rapid change from normal livestock to Game Management and Exotic Game ranches. Other factors the District feels were not considered in these estimates are the abundance of wild game such as hog, axis deer, blackbuck antelope, mouflon and aoudad, nor do these figures take the large amount of tourism and summer homes.

Projected Water Supply

According to data from the Plateau Region Water Plan,(January 2011), there are approximately 23,055 acre-feet/year of water available for District use. See Table 6. However since a part of this water is surface water and for the most part is permitted by TCEQ and not under District control, that number should be lowered to 20,707 acre-feet /year.

TABLE 6: WATER SOURCE AVAILABILITY (ACRE-FEET/YEAR).

COUNTY	AQUIFER/RIVER	RIVER BASIN	SOURCE AVAILABILITY
Edwards	Edwards-Trinity (Plateau)	Colorado	2,610
	Edwards-Trinity (Plateau)	Nueces	3,480
	Edwards-Trinity (Plateau)	Rio Grande	2,609
	Nueces River Alluvium	Nueces	1,787
	Livestock Local Supply	Colorado	61
	Livestock Local Supply	Nueces	62
	Nueces River	Nueces	138
	West Nueces River	Nueces	5
	South Llano River	Colorado	43
	County Total		10,796

Real	Edwards-Trinity (Plateau)	Colorado	200
	Edwards-Trinity (Plateau)	Nueces	5,537
	Trinity	Nueces	380
	Frio River Alluvium	Nueces	2,145
	Nueces River Alluvium	Nueces	1,787
	Livestock Local Supply	Colorado	24
	Livestock Local Supply	Nueces	25
	Old Faithful Springs	Nueces	0
	Nueces River	Nueces	648
	Frio River	Nueces	1,514
	County Total		

Management of Groundwater Supplies

The District will work with other agencies and entities including but not limited to the Texas Water Development Board, The Plateau Region (Region J) Planning Group and the Groundwater Management Area 7 (GMA 7) to establish and monitor the Managed Available Groundwater within the District. On an Annual basis, the District will make an assessment of water supply and groundwater storage conditions and will report those conditions to the Board of Directors and to the public.

The District has, or will amend as necessary, rules to regulate groundwater withdrawals by means of spacing and/or production limits.

The relevant factors to be considered in making the determination to grant a permit or limit groundwater withdrawal will include:

- The purpose of the District and its rules;
- The equitable conservation and preservation of the resource;
- The economic hardship resulting from granting or denying a permit or the terms prescribed by the rules;
- The modeled available groundwater (MAG) for use in the District; and
- The Desired Future Conditions (DFC) of the Aquifer.

In pursuit of the District's 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 Board of Directors' discretion amend or revoke any permits 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 provided 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 provisions 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 provisions of this plan. The District has adopted and will amend, as necessary, rules relating to the implementation of this plan. The rules adopted by the District shall be pursuant to TWC Chapter 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 variance in enforcement of the rules on grounds of adverse economic effect or unique local characteristics. In granting of discretion to any rule, the Board of Directors shall consider the potential for adverse effect on adjacent owners and aquifer conditions. The exercise of said discretion by the Board of Directors shall not be construed as limiting the power of the Board of Directors. Current District rules may be found on the District website at www.recrd.org/reports/

Methodology for Tracking Progress

Prior to the first quarterly Board of Directors meeting of the fiscal year, the District manager will prepare an annual report on District performance in achieving the management goals for the preceding year. This report will be presented to the Board of Directors of Directors during the first quarterly Board of Directors meeting each fiscal year. The report will include the number of instances in which each of the activities specified in the Districts management objectives was engaged in during the fiscal year. The Board of Directors will maintain the report on file, for public inspection at the Districts offices upon adoption. This methodology will apply to all management goals contained within this plan.

Goals, Management Objectives and Performance Standards

Goal 1 – Providing for the most Efficient Use of Groundwater (36.1071(a)(1))

Management Objective

1.1: Registration of Wells - The District will review all new well applications and will conduct site visits prior to any new well construction. The District will encourage the registration of existing well through news articles and other means.

Performance Standards

1.1 (a): Within five days of the receipt of an application for a new well, staff will review the application and contact the applicant to arrange for a site visit.

1.1 (b): Staff will conduct an onsite inspection of the well location prior to any new construction.

1.1 (c): Data will be entered into the District's computer system and a well number will be issued within five days of the receipt of the well log/report from the Driller.

1.1 (d): Staff will furnish a report to the Board of Directors on the number of wells currently listed in the District's computer system on a quarterly basis. The report will include at a minimum; the total number of wells in the data base, the completed number of wells, and the number of pending well files.

1.1 (e): At least 2 times per year, the District will publish an article on the need to register existing wells.

Management Objective

1.2: Operating Permits, Transport Permits, and Other Permits - The District will review and act upon all requests for all permits as outlined in the District's Rules.

Performance Standards

1.2 (a): The District will follow procedures as outlined in District rules for permitting.

1.2 (b): On a quarterly basis the staff will furnish the Board of Directors with the number of active permits and the number of permits pending.

Management Objective

1.3: Improve/Enhance Water Level Monitoring Program - The District will improve its water level monitoring network by first, identifying additional wells to be monitored, and secondly, by annually measuring the depth to water in those wells; record all measurements and/or observations; enter all measurements into District's computer data base. Establish a baseline by using existing wells, preferably those for which the District already has some historical data, in all major and minor aquifers where wells are available.

Performance Standards

1.3 (a): Annually report to the Board of Directors on the percent of water level monitoring wells for which measurements were recorded each year. The number of data records entered into District's data base each year. The number of wells in the water level measurement network each year. The number of wells added to the network each year.

Goal 2 - Controlling and Preventing Waste of Groundwater (36.1071(a)(2))

Management Objective

2.1: Control and Prevention of Water Waste - The District will investigate identified wasteful practices within a reasonable number of working days of identification or complaint received. The District will publish at least three (3) articles per year via the local newspapers regarding the prevention of waste.

Performance Standards

2.1 (a): Annually report to the Board of Directors on the number of wasteful practices identified and the average number of days District personnel took to respond or investigate after identification or complaint received. The actions taken to resolve the identification or complaint received.

2.1 (b): Annually report to the Board of Directors on the number of news articles published on Management Objective 2.1.

Goal 3 - Addressing Conjunctive Surface Water Management Issues (36.1071(a)(4))

Except as provided in Chapter 36 of the Texas Water Code, the District has no jurisdiction over surface water. The District shall consider the effects of surface water resources as required by Section 36.113 and other state law. However, the Headwaters to the Nueces, Frio and to some extent the South Llano Rivers initiate in the District and the District is well aware of the ecological and economic impact of these rivers. The Nueces River Authority is the predominant agency in dealing with the Nueces River and Frio Rivers and the District works with that entity in promoting water conservation and prevention of waste and contamination of ground and surface water. Currently one member of the District Staff serves on the Nueces Bay and Estuary Advisory Council. The District also promotes the Clean Rivers Program initiated by the Nueces River Authority. A newly formed Stake Holders Group has been started to address the concerns along the Llano River and the District has been and will continue to be active with that group.

Management Objective

3.1: The District will work in conjunction with the Nueces River Authority and other stakeholders groups to promote the Clean Rivers Program and will include information about that program.

Performance Standards

3.1 (a): Annually report the number of programs, meetings etc. participated in.

3.1 (b): Annually report the number of articles relating to the Clean Rivers program.

Management Objective

3.2: The District will include information regarding the need to prevent contamination of the springs, streams and or rivers within the District.

Performance Standards

3.2 (a): Annually report the number of news articles relating to contamination.

Management Objective

3.3: Upon request and in conjunction with the Nueces River Authority, the District will conduct school and/or public presentations relating to the impact of contamination on the Nueces River Basin Watershed.

Performance Standards:

3.3 (a): Annually report the number of requests and number of programs participated in.

Goal 4 – Addressing Natural Resource Issues that Impact the Use and Availability of Groundwater and Which are Impacted by the Use of Groundwater (36.1071(a)(5))

Management Objective

4.1: The District will investigate any reported contamination and work with the Railroad Commission, the Texas Commission on Environmental Quality and/or other entities/agencies to insure that any contamination is minimized or eliminated.

Performance Standards

4.1 (a): Investigate any report of potential contamination.

4.1 (b): Annually report the number of potential contamination incidents and the location of such incidents to the Board of Directors

Management Objective

4.2: During the next round of Regional Planning, the District will again work to include Strategies relating to the investigation and/or impact of the contamination of wells in Southwestern Edwards County and the potential contamination of aquifers due to unlined pits and/or improperly closed lined pits.

Performance Standards

4.2 (a): Annually report to the Board of Directors on the progress and/or the success of the objective.

Goal 5 –Addressing Drought Conditions (36.1071(a)(6))

Management Objective

5.1: Curtailment of Groundwater Withdrawal - The annual amount of groundwater permitted by the District for withdrawal from the portion of the aquifers located

within the District may be curtailed during periods of extreme drought in the recharge zones of the aquifers or because of other conditions that cause significant declines in groundwater surface elevations. Such curtailment may be triggered by the District's Board of Directors based on the groundwater elevation measured in the District's monitoring well(s) and/or stream flow measurements along with other indices such as rainfall and soil moisture. District staff currently monitors five locations along the Frio River and its tributaries and two locations on the Nueces River.

Performance Standards

5.1 (a): Flow measurements will be taken monthly on the Frio and Nueces Rivers. The information will be published on the District's webpage for public viewing and in local papers.

5.1 (b): Upon declaration of a change in drought stage, all permit holders will be notified of the need to curtail production.

5.1 (c): Upon declaration of a change in drought stage, staff will submit an article to the local papers. Said article will describe the drought stage and the conditions and request that the public initiate conservation measures.

5.1. (d): The District will annually review its drought contingency plan to see what if any changes need to be made.

5.1. (e): District staff will report quarterly to the Board of Directors on local drought conditions. Such reports may be oral or written and presented at Board of Directors Meetings. Data for this report may be drawn from information contained on the TWDB web site: <http://www.twdb.state.tx.us/data/drought/> or from other sites as deemed relevant by District staff.

Goal 6 – Addressing a) Conservation, b) Recharge Enhancement, c) Rainwater Harvesting, d) Precipitation Enhancement, and e) Brush Control Where Appropriate and Cost Effective (36.1071(a)(7))

Management Objective

6.1: Emphasize Water Conservation through Public Education - The District will sponsor the "Water Wise" conservation education curriculum, available upon request for all 5th Grade Classrooms within the District. The District will furnish book covers to the schools within the District on an as need basis. These covers will reflect water related topics such as waste, contamination and conservation.

Performance Standards

6.1(a): Annually report to the Board of Directors on the number of schools districts and number of students instructed in the “Water Wise” conservation education curriculum. The number of water conservation articles presented to the public.

6.1 (b): Annually document the number of schools and number of book covers.

Management Objective

6.2: Public Education – Provide and distribute literature on water conservation by publishing news articles.

Performance Standards

6.2 (a): Annually document number of news articles published.

6.2 (b): Promote rainwater harvesting, Xeriscaping and brush control where appropriate and cost-effective. Promotion of these projects may be accomplished through news articles and/or the District’s webpage.

6.2 (c): Update District Webpage with informative links that relate to conservation, waste prevention and enhancement of groundwater. The District web page is a direct link to a large number of individuals who reside or own property within the District. Links on the District webpage will be reviewed regularly to insure they are current and that the linked information reflects the management objective. Annually document that the District webpage was reviewed and/or updated.

Management Objective

6.3: Addressing Rainwater Harvesting - The District believes that the harvesting of rainwater is a viable way to both conserve groundwater and to supplement domestic supply in areas within the District where groundwater is in sparse supply. The District will promote rainwater harvesting through news articles and through the District’s website.

Performance Standards

6.3 (a): Information regarding rainwater harvesting will be included in news articles.

6.3 (b): On at least a quarterly basis the District web page will be reviewed to insure that links to information on rainwater harvesting are current.

Management Objective

6.4: Addressing Brush and Invasive plant control. The District is supportive of activities related to brush and invasive plant control as it relates to the recharge of the aquifers. The District will promote brush and invasive plant control through newspaper articles and through links on the District's webpage.

Performance Standards

6.4 (a): The control of brush and/or other invasive plants will be included in news articles. The Board of Directors will be informed when such articles are presented.

6.4 (b): On at least a quarterly basis the District web page will be reviewed to insure that links to information on brush control are current.

Goal 7 – Addressing the Desired Future Conditions (36.1071(a)(8))

The District actively participates in developing the desired future conditions for the aquifers within the District's boundaries and within the boundaries of Groundwater Management Area (GMA) 7.

Management Goals Not Applicable to the District

Goal 6 – Addressing a) Conservation, b) Recharge Enhancement, c) Rainwater Harvesting, d) Precipitation Enhancement, and e) Brush Control Where Appropriate and Cost Effective (36.1071(a)(7))

Addressing Recharge Enhancement - This management goal is not applicable to the operations of the District as it is cost prohibitive at this time. Nor is it thought that the karst formation of the aquifer is readily conducive to this issue.

While the District is supportive of Precipitation Enhancement such a program is costly, thus making it prohibitive. Therefore this portion of Management Goal 6 is not applicable to the operations of the District at this time.

Goal 8 - Controlling and Preventing Subsidence (36.1071(a)(3))

The geologic framework, the population level, and the current groundwater demands of the District preclude any significant subsidence from occurring. This management goal is not applicable to the operations of the District.

Definitions and Concepts

In the administration of its duties, the Real-Edwards Conservation and Reclamation District follows the definitions of terms set forth in the District Act, Chapter 36 of the Texas Water Code, and other definitions as follows:

“Acre” means the unit of measure used to calculate the total land surface area. One acre is equal to 42,560 square-feet.

“Acre-foot” means the amount of water necessary to cover one acre of land one foot deep, or about 325,851 gallons of water.

“Agricultural Use or Purpose” means any use or activity involving agriculture, including irrigation.

“Alluvial/Alluvium” means a geological deposit composed of sediment deposited by a stream or river. The alluvium may be in direct hydraulic connection with the rivers and streams that meander through the area.

“Alluvial Aquifer” means a minor aquifer(s) in the District that is mostly composed of gravel and sands eroded from the surrounding limestone hills and deposited along the flood plains near rivers and streams.

“Aquifer” means a geologic formation, group of formations, or part of a formation that is capable of yielding a sufficient amount of groundwater to make the production from this formation feasible for beneficial use.

“Board” means the Board of Directors of the District.

“Conservation” means those water saving practices, techniques, and technologies that will reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.

“Desired Future Conditions” (DFC’s) means a quantitative description, adopted in accordance with Section 36.108 of the Texas Water Code, of the desired condition of the groundwater resources in a management area at one or more specified future times.

“Discharge” means the amount of water that leaves an aquifer by natural or artificial means.

“Director” means a person elected or appointed to serve on the Board of Directors of the District.

“District” means the Real-Edwards Conservation and Reclamation District.

“District Act” means Chapter 341, Acts of the 56th Legislature, Regular Session, 1959 (Article 8280-233, Vernon's Texas Civil Statutes), including all amendments thereto, and the non-conflicting provisions of Chapter 36, Texas Water Code.

“District boundaries” means the boundaries of the District, and such boundaries that are coexisting with the outside boundary lines of Edwards and Real Counties.

“District Official” means District Directors and Officers.

“District office” means the office of the District as established by the Board.

“Drought” means that term as defined in the District’s Drought Contingency Plan.

“Drought Contingency Plan” (DCP) means a plan by the District that is designed to reduce demand on the available water supply through a process that becomes more restrictive as drought conditions worsen.

“Drought Stage” means one of the designated drought conditions listed in the District’s Drought Contingency Plan.

“Edwards Trinity (Plateau) Aquifer” means the major aquifer within the District. The Edwards Trinity Aquifer extends from the Texas Hill Country to the Trans-Pecos area of West Texas.

“Frio River Alluvial Aquifer” means the minor aquifer in central Real County that extends over an area of approximately 1,220 acres and is mostly composed of gravel and sands eroded from the surrounding limestone hills and deposited along the floodplain of the Frio River.

“Groundwater” means water percolating beneath the surface of the earth.

“Modeled Available Groundwater” (MAG) means 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 of the Texas Water Code.

“Municipal or Public Water Supply Use” means the use of groundwater through public water systems that are authorized for providing potable water to the public by the State of Texas.

“Nueces River Alluvial Aquifer” means the minor aquifer within the District extending into both Edwards and Real Counties that extends over an area of approximately 17,115 acres and is mostly composed of gravel and sands eroded from the surrounding limestone hills and deposited along the floodplain of the Nueces River.

“Pollution” means the alteration of the physical, thermal, chemical, or biological quality of, or the contamination of any water in the District that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property or to public health, safety, or welfare, or impairs the usefulness or public enjoyment of the water for any lawful or reasonable purpose including the alteration of groundwater by saltwater or other deleterious matter admitted from another stratum or from the surface of the ground.

“Recharge” means the amount of water that infiltrates into the water table of an aquifer from the surface of the ground or from other underground formations.

“Registration” means a certificate issued by the District for an exempt or excluded well, or the initial registration of a well that upon completion is to be determined by the District to be non-exempt.

“Rules” means the rules of the District compiled in this document and as may be supplemented, repealed or amended from time to time.

“Spring” means a point of natural discharge from an aquifer.

“Waste” means any one or more of the following:

- (a) 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 use, gardening, domestic or stock watering purposes;
- (b) the flowing or producing of wells from a groundwater reservoir if the water produced is not used for a beneficial purpose;
- (c) escape of groundwater from a groundwater reservoir to any other reservoir or geologic strata that does not contain groundwater;
- (d) pollution or harmful alteration of groundwater in a groundwater reservoir by saltwater or by other deleterious matter admitted from another stratum or from the surface of the ground;
- (e) willfully or negligently causing, suffering, or allowing groundwater to escape into any river, creek, natural watercourse, depression, lake, reservoir, drain, sewer, street, highway, road, or 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

Texas Commission on Environmental Quality under Chapter 26, Texas Water Code;

- (f) groundwater pumped for irrigation that escapes as irrigation tail water onto land other than that of the owner of the well, unless the occupant of the land receiving the discharge has granted permission;
- (g) for water produced from an artesian well, “waste” has the meaning assigned by Section 11.205 of the Texas Water Code.

In event of a conflict between “Beneficial Use” or “Beneficial Purposes” and “Waste”, “Beneficial Use” or “Beneficial Purposes” shall be subordinate to “Waste”.

“Water Table” means the upper boundary of the saturated zone in an unconfined aquifer.

“Well” means any facility, device, or method used to withdraw groundwater; or any artificial excavation or borehole constructed for the purposes of exploring for or producing groundwater, or for injection, monitoring, or dewatering purposes, or a leachate or remediation well.

“Well Registration” means the creation of a record of a well, as determined by its use, and a well identification number for purposes of registering the well as to its geographic location, and for notification to the well owner in cases of spills or accidents, data collection, record keeping, or future planning purposes.

“Xeriscape” means a landscape practice combining the use of low water use plants, design, conservation, and other landscaping principles to conserve water and energy.

Appendix 1

GAM Run 13-023: Real-Edwards Conservation and Reclamation District Management Plan



GAM Run 13-023 RECRD.pdf

Appendix 2

Estimated Historical Water Use And 2012 State Water Plan Datasets: Real-Edwards Conservation And Reclamation District, February 12, 2014



Estimated Historical Water Use and 2012 State Water Plan Datasets RECRD.pdf

Appendix 3

GAM Run 10-043 (Version 2): Modeled Available Groundwater for the Edwards-Trinity (Plateau), Trinity, and Pecos Valley Aquifers in Groundwater Management Area 7, November 12, 2012



GAM Run 10-043 MAG (Version 2).pdf

Appendix 4

Water Use by Livestock and Game Animals in the Plateau Regional Planning Area, Plateau Region Water Plan, January 2011



Water Use by Livestock and Game Animals in Region J.pdf

Appendix 5

Occurrence of Significant River Alluvium Aquifers in the Plateau Region, Plateau Region Water Plan, January 2011



RECRD Hydrogeologic Data Report Related to DFC.pdf