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**EMERALD
UNDERGROUND WATER CONSERVATION DISTRICT**

MANAGEMENT PLAN

1998-2008

**P.O. Box 1458
Ozona, Texas 76943
Ph: 915-392-5156 Fax: 915-392-3135 Email: euwcd@airmail.net**

Adopted: July 6, 1998



**EMERALD UNDERGROUND
WATER CONSERVATION DISTRICT**

P.O. Box 1458 Ozona, Texas 76943 OFF (915) 392-5156 FAX (915) 392-3135

George Bunger, Pres.; Nat Read, Vice-Pres.; John R. Jones, Secretary; Larry Williams; James W. Owens

August 26, 1998

Mr. Craig Pedersen
Executive Administrator
Texas Water Development Board
1700 N. Congress
Austin, Texas 78711-3231

Dear Mr. Pedersen,

Attached is a copy of the adopted Management Plan of the Emerald Underground Water Conservation District (EUWCD) as required by §36.1072(a) of the Texas Water Code. The EUWCD Management Plan was adopted by the Board of Directors at their regular monthly meeting on July 6, 1998. In addition, a copy of the EUWCD Board of Directors resolution adopting the plan is also attached.

Upon receipt of your certification of this Management Plan, it is the intent of the Board of Directors that this plan replace the existing Management Plan of the Emerald Underground Water Conservation District.

The EUWCD Management Plan was developed during open meetings of the Board as required by the Open Meetings Act. Documentation that notice and hearing requirements were followed is presented as a separate attachment.

The following cross-references are provided as a means of documenting the completeness of the Management Plan as applicable to the statutory requirements of Chapter 36 of the Texas Water Code.

§36.1071(a)(1) is addressed in Section 1.0 - 1.1, 1.2.

§36.1071(a)(2) is addressed in Section 2.0 - 2.1.

§36.1071(a)(3) is addressed in Section titled SB-1 Management Goals Determined Not-Applicable 1.0.

§37.1071(a)(4) is addressed in Section titled Surface Water Resources of Emerald U.W.C.D. and Section titled SB-1 Management Goals Determined Not-Applicable 2.0.

§36.1071(a)(5) is addressed in Section 3.0 - 3.1, 3.2, 3.3 and 3.4.

§36.107(b) is addressed in Section titled Management Goals Determined Non-Applicable 3.0.

§36.1071(e)(1) is addressed by submission of this Management Plan to the TWDB.

§36.1071(e)(2) is addressed in Section titled Actions, Procedures, Performance and Avoidance for Plan Implementation.

§36.1071(e)(3)(A) is addressed in Section titled Groundwater Resources of the Emerald U.W.C.D.

§36.1071(e)(3)(B) is addressed in Section title Groundwater Use in Emerald U.W.C.D.

§36.1071(e)(3)(C) is addressed in Section titled Groundwater Resources of the Emerald U.W.C.D.

§36.1071(e)(3)(D) is addressed in Section titled Projected Water Supplies of Emerald U.W.C.D. and Section titled Potential Demand and Supply.

§36.1071(e)(4) is determined as Not Applicable since there is not an approved Regional Water Plan in place.

§36.1071(f) - is addressed in Section titled Management of Groundwater Supplies and Actions, Procedures, Performance and Avoidance for Plan Implementation.

36.1071(g) is determined as Not Applicable at this time, but will be addressed in five years in 2003 when the Management Plan must be recertified.

This new Emerald U.W.C.D. Management Plan will be in force for 10 years from the date of certification. If the TWDB has any questions or requires additional information, please contact us.

Sincerely,



Dennis Clark
District Manager

Attachments

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DISTRICT MISSION

The Emerald Underground Water Conservation District has and will strive to promote conservation, as well as preserve the quality and quantity of it's water resources within the District for the benefit of the citizens and economy of the area.

TIME PERIOD FOR THIS PLAN

This plan becomes effective upon adoption by the Board of Directors of the Emerald Underground Water Conservation District and certification by the Texas Water Development Board. This plan remains in effect until September 1, 2008, or until a revised plan is certified, whichever is earlier.

STATEMENT OF GUIDING PRINCIPLES

The citizens of Crockett County recognize the vital importance of groundwater to the economy and it's longevity. Being the predominate water resource, the district recognizes the need to conserve and protect the quantity and quality of this valuable natural resource through prudent and cost effective management. The goals of this plan can best be achieved through guidance from locally elected board members who have an understanding of local conditions as well as technical support from knowledgeable agencies. The greatest threat to prevent the district from achieving it's goals are excessive regulations, whether initiated through local or state government. Over-regulation is almost always met with stiff resistance and discourages voluntary cooperation. Command and control tactics not only discourage voluntary conservation, but create additional layers of bureaucracy to manage, and therefore jeopardize district time and resources. Management planning should be based on awareness of the hydrologic properties of the specific aquifers within the district as well as quantification of existing and future resource data. This management plan is intended only as a reference tool to provide guidance in the execution of the district activities, but should allow flexibility in achieving it's goals.

General Description

The Emerald Underground Water Conservation District was created by Acts of the 71st Legislature (1989). The district was confirmed by the citizens of Crockett County on January 26, 1991. Members of the current Board of Directors are George Bunger, Jr.-President, Nat Read-Vice President, John R. Jones-Secretary, Larry Williams and James W. Owens. The District General Manager is Dennis Clark. The Emerald Underground Water Conservation District encompasses all of Crockett County with the exception of the metes and bounds of the Crockett County Water Control & Improvement District No. 1. Historically, Crockett County's economy has been centered around agriculture, but in the last several years, oil and gas has become the dominate industry. The agricultural income is derived from sheep and goats as well as some beef cattle production. Due to the topography and climate of the area, there is very little farming. Recreational hunting has also

become a major supplemental income to the county.

Location and Extent

Crockett County, having an areal extent of 2,839 square miles or approximately 1,817,321 acres of land, is located in southwest Texas on the western edge of the Edwards Plateau. Crockett County is the eighth largest county in Texas with the Pecos River forming its western boundary. On the west lie Pecos and Terrell counties. Crane, Upton, Reagan and Irion counties border Crockett County on the north. On the east lie Schleicher and Sutton counties with Val Verde County on the south. Ozona, being the only town in the county, is centrally located in the eastern part of Crockett County.

Topography and Drainage

Crockett County's topography is characterized by deep, narrow, steepwalled canyons and flat mesas in the southern and western portions. Broad valleys and flat divides make up the northern part of the county; the northeastern area is a large flat divide. The altitude ranges from about 1,800 feet in the southwest to over 3,000 feet in the northwest. Karst topography, characterized by numerous sinkholes having underground drainage, occurs in the northeastern quarter of the county on the upper flat divide between the Colorado River and Rio Grande drainage basins.

Drainage of Crockett County is by means of intermittent, dendritic streams. On the east side of the county a dry tributary of Devils River drains southeastward into Sutton County. Johnsons Run and Howards Creek bisect central Crockett County and drain southward, joining Devils River and the Pecos River, respectively, in Val Verde County. In the Northwestern part of Crockett County, Live Oak Creek drains southward into the Pecos River at Lancaster Hill. The dry bed of Spring Creek originates in the northeastern corner of the county and runs northeastward. Generally, the county can be said to lie in the Rio Grande drainage basin. Only the extreme northeastern corner of the county lies in the Colorado River drainage basin.¹

Groundwater Resources of the Emerald U.W.C.D.

The primary sources of groundwater in Crockett County are derived from the Edwards-Georgetown aquifer of Cretaceous age, sands of the Trinity Group or Trinity aquifer and unconsolidated alluvium of Quaternary age which overlies the older Cretaceous rocks principally along the Pecos River, Live Oak Creek, Howard Creek and Johnson Draw.

¹ Texas Water Development Board Report 47 - Occurrence and Quality of Ground Water in Crockett County, Texas - May 1967

Most of the water wells in Crockett County produce water from the Edwards-Georgetown and the Trinity aquifers for domestic and livestock purposes. Generally, the wells yield only small quantities of water, 1 to 20 gallons per minute, although yields of up to 2,000 gallons per minute have been reported in both aquifers. Groundwater is encountered at varying depths depending primarily upon topography. Water levels in the alluvium along the Pecos River may be only a few feet below surface, while on the high divides, the water level may occur as much as 600 feet below land surface.

The quality of water from wells in Crockett County varies within wide limits, but is generally good quality. The water is typically very hard and generally high in fluoride content. Samples from a few wells indicate that the water is undesirable for domestic use, but only a very few are considered unusable.²

Currently the District is using the Texas Water Development Board's Groundwater Availabilities Estimation Process, which uses available datasets to generate digital descriptions of the aquifers as well as estimates of recharge and availability rates. It is estimated that the annual recharge to the Edwards-Trinity aquifers is 84,583 acre feet per year and 0 acre feet of recharge to the Alluvium aquifer. The estimated total volume of water in storage in the Antlers formation is 15,338,738 acre feet.³ The estimated total available groundwater in the Edwards-Trinity aquifers is 1,453,854 acre feet. Until improved aquifer yield estimates can be determined, the District must rely on its existing water level data to establish production limits or determine if production limits are necessary. Crockett County water levels have remained fairly constant except for temporary declines during drought years.

All estimates of groundwater availability were determined by using the formula $SP \text{ Yield} \times \text{Saturated Thickness} \times \text{Acres} = \text{Ac-ft.}$ using a SP Yield of .004 and Saturated Thickness of 150 ft.⁴

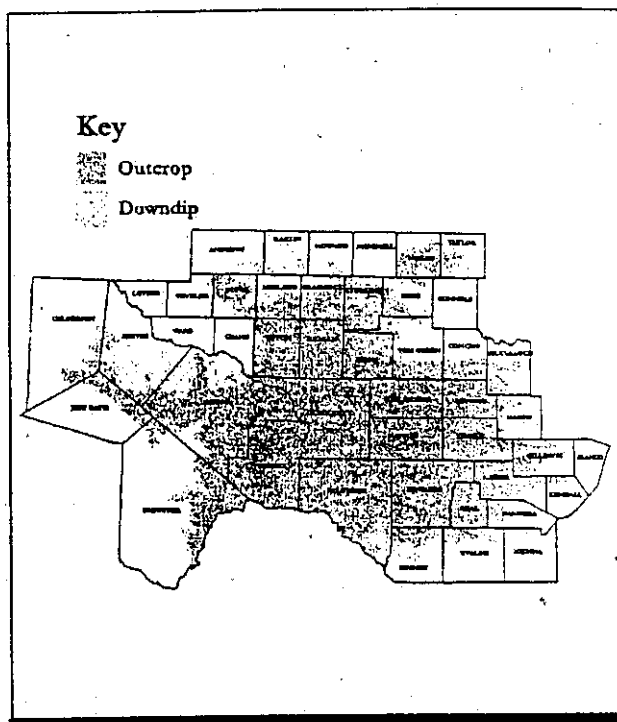


Figure 1. Location of Edwards-Trinity (Plateau) Aquifer

²Texas Water Development Board Report 47 - Occurrence and Quality of Ground Water in Crockett County, Texas - May 1967

³Texas Water Development Board Report 235, Page 106

⁴U.S. Geological Survey Water Resources Investigation Report 92-4125

The Colorado River Municipal Water District 1994 Summary Weather Modification Report indicated 23% enhancement to rainfall. Based on an average rainfall of 15 inches, 15,265 acre feet of additional recharge could feasibly be realized.

All estimates of additional recharge were determined by using the formula $\text{Rainfall (inches)} \div 12 \times \text{acres} \times 3\% \text{ infiltration} = \text{recharge}$.

Surface Water Resources of Emerald U.W.C.D.

There are no surface water management entities in Crockett County and little to no available surface water within the district with the exception of the Pecos River which forms the western boundary of the district. Although there are a few small surface impoundments used to store pumped groundwater for livestock consumption, they are not viewed by the district as an efficient means of storage.

Projected Water Supplies of Emerald U.W.C.D.

According to Water for Texas Today and Tomorrow, TWDB 1997, the annual effective recharge for Crockett County is 84,583 acre feet and the projected average annual groundwater availability is 1,453,854 acre feet from 1980 through the year 2030.

Groundwater Use in Emerald U.W.C.D.

During the preceding five years, groundwater usage has varied from a high of 4,864 acre feet in 1993 to a low of 4,526 acre feet in 1992. Annual usage for the past five years is depicted below.

1995	4,718 acre-feet per year
1994	4,820 acre-feet per year
1993	4,864 acre-feet per year
1992	4,526 acre-feet per year
1991	4,801 acre-feet per year

This data was obtained from Water for Texas Today and Tomorrow, TWDB 1997.

Projected Demands for Water in Crockett County

Due to the sparse population and limited pumpage, there has been little effect on water levels and water quality over the majority of the Edwards-Trinity (Plateau) aquifer in Crockett County. Based on estimated projections and population statistics, water resource demands should not increase substantially well into the year 2050. The Texas Water Development Board has projected that the total water demands for Crockett County will be 5,178 acre-feet per year by 2050.

Potential Demand and Supply

Based on supply and demand calculations and projections from Water for Texas Today and Tomorrow, TWDB 1997, the supply and demand totals for 2050 are as follows:

Projected Supplies	
Groundwater from the Edwards-Trinity (Plateau) Aquifer	1,453,854 acre-feet per year
Total Projected Supply	1,453,854 acre-feet per year
Total Projected Demand	5,178 acre-feet per year
Balance (excess)	1,448,676 acre-feet per year

All estimates of the total usable amount of groundwater in the district, the amount of recharge, the projected water supply and demand for water in the district, and the water supply needs are based on data supplied by the Texas Water Development Board and will be used until alternatives are generated.

The residents of Crockett County are aware of their responsibilities as guardians of this precious natural resource. Although projected estimates indicate there will be a more than adequate supply of water well into the year 2050, the District and its residents must make a combined effort to use the available groundwater resources in a conservative and efficient manner. An abundance of

groundwater has very little value if its quality is undesirable. Therefore, the main objective of the Emerald U.W.C.D. is to monitor water quality to protect this resource well into the future.

Management of Groundwater Supplies

Preservation and protection of groundwater quantity and quality has been the guiding principle of the District since its creation. The goals and objectives of this plan will provide guidance in the performance of existing District activities and practices. District rules adopted in 1992 address groundwater withdrawals by means of spacing and/or production limits, waste, and well drilling completion as well as capping and plugging of unused or abandoned wells. These rules are meant to provide equitable conservation and preservation of groundwater resources, protect vested property rights and prevent confiscation of property.

In pursuit of the District's mission to provide for conserving, preserving, protecting, recharging and preventing waste of water resources, the District may exercise the powers, rights and privileges to enforce its rules by injunction, mandatory injunction, or other appropriate remedies in a court of competent jurisdiction as provided for in TWC 36.102.

Actions, Procedures, Performance and Avoidance for Plan Implementation

All District activities will be carried out in accordance with this plan and will utilize the provisions of this plan as a guide in prioritizing all District operations.

District rules adopted in 1992 shall be amended and enforced, as necessary, to implement this plan. All rules adopted or amended by the District shall be pursuant to TWC Chapter 36 and the provisions of this plan.

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

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 for the previous fiscal year, during the first meeting of each new fiscal year. The reports will include the number of instances each activity was engaged in during the year.

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

**GOALS, MANAGEMENT OBJECTIVES
and PERFORMANCE STANDARDS**

Goal

1.0 Provide for the efficient use of groundwater within the District.

Management Objective

1.1 Annually provide and distribute all requested water conservation literature to promote the efficient use of water.

Performance Standards

1.1a - Number of water conservation packets distributed annually.

Management Objective

1.2 Each year the District will publish at least two articles on water conservation.

Performance Standards

1.2a - Number of articles published each year.

Goal

2.0 Implement management strategies that address controlling and preventing waste of groundwater.

Management Objective

2.1 Identify all reported wasteful practices and non-beneficial use of groundwater in the District within five (5) working days.

Performance Standard

2.1a - Number of wasteful practices and non-beneficial uses of groundwater identified and investigated each year.

Goal

3.0 Establish a groundwater monitoring system to improve the basic understanding of water conditions and provide information necessary in addressing natural resource issues that impact the use and availability of groundwater within the District.

Management Objective

3.1 Annually measure 90 percent of wells in the water level monitoring network within the District.

Performance Standards

3.1a - Number of wells monitored annually in the District's water level monitoring network.

Management Objective

3.2 Annually sample 90 percent of the wells in the water quality monitoring network within the District.

Performance Standard

3.2a - Number of wells sampled annually in the District's water quality monitoring network.

Management Objective

3.3 Enter all groundwater monitoring data into the District's database within 30 days of the project's completion.

Performance Standard

3.3a - Number of wells entered into the District's database within 30 days of the project's completion.

Management Objective

3.4 Each year the District will monitor all local periodicals for all public notices for application for fluid injection well permits within the District's boundaries. Each notice will be followed up with a request for copies of the permit application from the Texas Railroad Commission and filed in the District's office.

Performance Standards

3.4a - Number of notices and permit applications filed each year.

SB-1 MANAGEMENT GOALS DETERMINED NON-APPLICABLE

Goal

1.0 Control and prevention of subsidence.

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

Goal

2.0 Conjunctive surface water management issues

There exists only one permitted surface water user in Crockett County - this being treated waste water expelled from Crockett County Water Control and Improvement District No. 1's waste water treatment facility located south of the town of Ozona. The Emerald U.W.C.D. has no jurisdiction over surface water or permitted surface water users.

Goal

3.0 Compatibility of District Water Plan with approved Regional Water Plan

There is no regional water plan in place at this time.

***Summary definitions.**

"Board of Directors" - the Board of Directors of the Emerald Underground Water Conservation District

"District" - the Emerald Underground Water Conservation District

"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 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 saltwater 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 any 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;

(6) groundwater pumped for irrigation that escapes as irrigation tailwater 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.

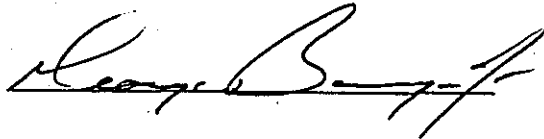
NOTICE

The Emerald Underground Water Conservation District will hold a Public Hearing on the 6th day of July, at 4:00 P.M. at Emerald Underground Water Conservation District Office at 1102 Ave. I.

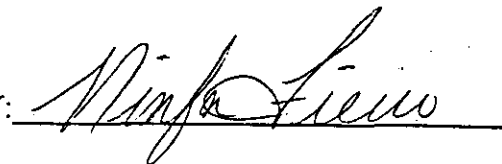
AGENDA

- I. Call to Order
- II. Receive public comment on the proposed Emerald U.W.C.D. 1998-2008 Management Plan
- III. Adjourn

PLEASE post this notice at least three (3) days prior to the day of the meeting.



Posted this 15th day of July, 1998, at 2:30 o'clock.

BY: 

NOTICE

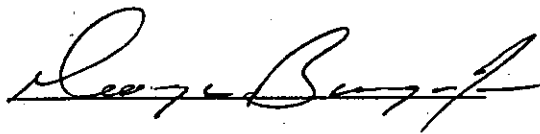
The Emerald Underground Water Conservation District will hold a Board of Directors meeting on the 6th day of July, at 4:30 P.M. at Emerald Underground Water Conservation District Office at 1102 Ave. I.

AGENDA

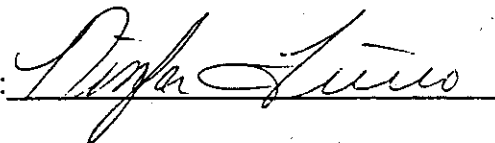
- I. Call to Order
- II. Reading of minutes of last meeting
- III. Audience with individuals from the floor
- IV. Report from Manager
- V. Financial Report
- VI. Unfinished or old business
 - 1) Discussion and possible action on tax abatement for Texas Wind Power Company
- VII. New business
 - 1) Discussion and possible action on Resolution adopting the Emerald U.W.C.D.'s 1998 - 2008 Management Plan
 - 2) Review 1998 Water Quality Monitor Well Results
- VIII. Discussion of non-agenda items
- IX. Adjourn

Any other items as may become pertinent or relevant.

PLEASE post this notice at least three (3) days prior to the day of the meeting.



Posted this 15th day of July, 1998, at 2:30 o'clock.

BY: 

**EMERALD UNDERGROUND
WATER CONSERVATION DISTRICT**

P.O. Box 1458
Ozona, Texas 76943

**MANAGEMENT PLAN
1998 - 2008**

WHEREAS, the Emerald Underground Water Conservation District (District) was created by Acts of the 71st Legislature (1989), p. 3245, Ch. 712, S.B. 1635 in accordance with Article 16, Section 59 of the Constitution of Texas and Chapters 51 and 52 of the Texas Water Code, as amended; and

WHEREAS, the District is required by SB1 through Chapter 36.1071 of the Texas Water Code to develop and adopt a new Management Plan; and

WHEREAS, the District is required by SB1 to submit the adopted Management Plan to the Executive Administrator of the Texas Water Development Board for review and certification by September 1, 1998; and

WHEREAS, the District's new Management Plan shall be certified by the Executive Administrator if the plan is administratively complete; and

WHEREAS, the District Board of Directors, after reviewing the existing Management Plan, has determined that this plan should be replaced with a new 10 year Management Plan; and

WHEREAS, the District Board of Directors has determined that the new 10 year Management Plan addresses the requirements of Chapter 36.1071.

NOW, THEREFORE, be it resolved, that the Board of Directors of the Emerald Underground Water Conservation District, following notice and hearing, hereby adopts this new 10 year Management Plan to replace the existing Management Plan; and

FURTHER, be it resolved, that this new Management Plan shall become effective immediately upon adoption.

Adopted this 6th day of July, 1998, by the Board of Directors of the Emerald Underground Water Conservation District.


John E. Jones, Board Secretary


George Bunker, Jr. - Board President