
Red Sands Groundwater
Conservation District

***District
Management
Plan***

Adopted - June 28, 2012

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I. DISTRICT MISSION

The Mission of Red Sands Groundwater Conservation District (District) is to develop and implement an efficient, economical and environmentally sound groundwater management program to protect, preserve for the future, and enhance the water resources of the District.

II. PURPOSE OF THE MANAGEMENT PLAN

Senate Bill 1 (SB 1), enacted by the 75th Legislature in 1997, and Senate Bill 2 (SB 2), enacted by the 77th Legislature in 2001, established a comprehensive statewide planning process and the actions necessary for districts to manage and conserve the groundwater resources of the State of Texas. These bills require all underground water conservation districts to develop a management plan which defines the water needs and supply within each district and the goals of each district will use to manage the underground water in order to meet their needs. In addition, the 79th Texas Legislature enacted HB 1763 in 2005 that requires joint planning among districts that are within the same Groundwater Management Area (GMA). These districts must establish the desired future conditions of the aquifers within their respective GMAs. Through this process, the districts will submit the desired future conditions to the executive administrator of the Texas Water Development Board (TWDB) who will provide each district with the managed aquifers in the area. Technical information, such as the desired future conditions of the aquifers within the District's jurisdiction and the amount of managed available groundwater from such aquifers is required to be included in the District's management plan and will guide the District's regulatory and management policies.

The District's management plan satisfies the requirements of SB1, SB2, HB 1763, the statutory requirements of Texas Water Code (TWC) Chapter 36, and the rules and requirements of the TWDB.

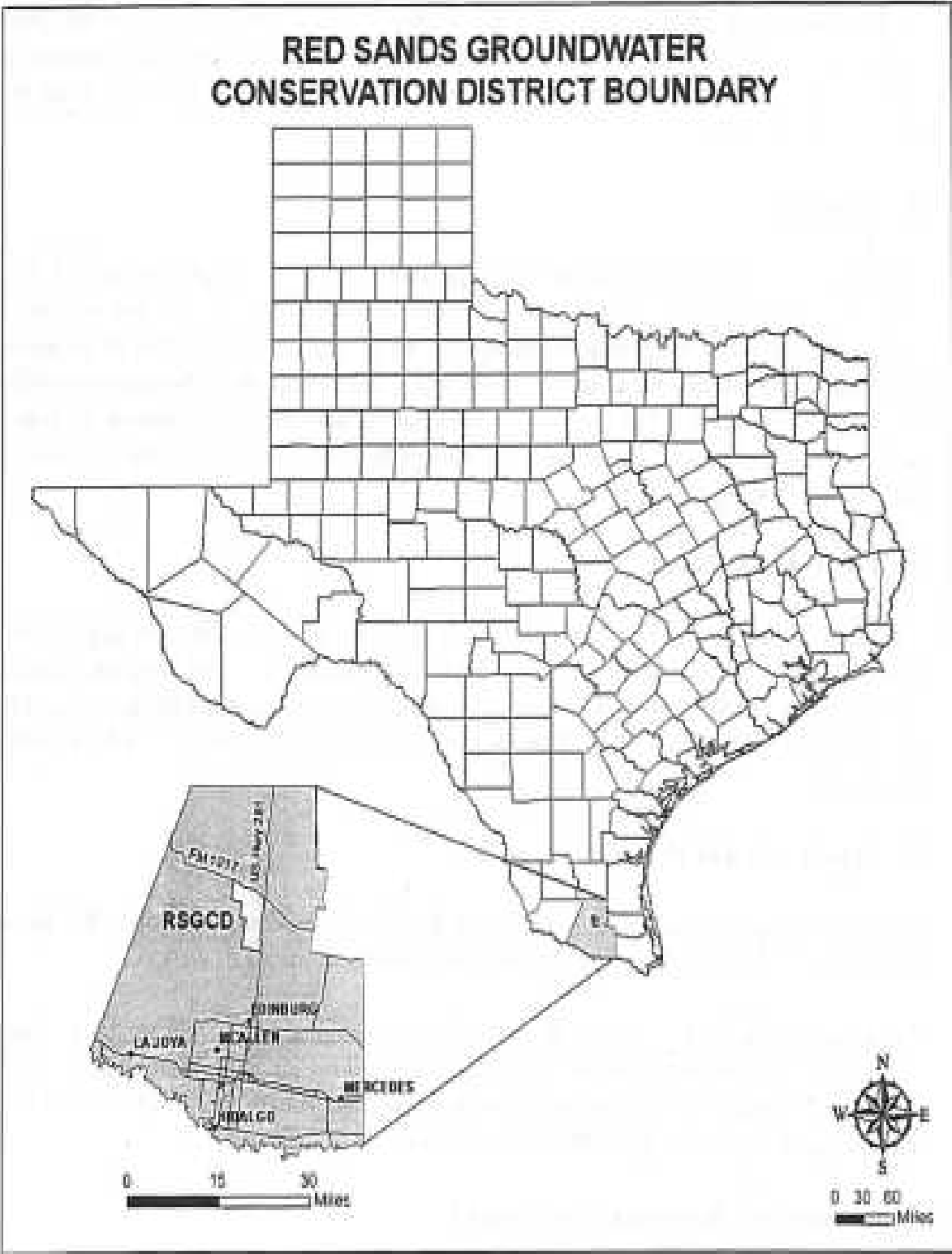
III. DISTRICT INFORMATION

A. District Creation

Creation of the District was authorized in 1999 by the 79th Texas Legislature under SB 1911. The citizens of Hidalgo County, within the District, confirmed the creation of the District by an election held in November 2002.

The District was formed to protect the underground water resources for the citizens of north-central Hidalgo County. Beyond its enabling jurisdiction, the District is governed primarily by the provisions of Chapter 36 of the Texas Water Code, the District's Management Plan, and the District Rules.

Exhibit A – Location of the Red Sands Groundwater Conservation District



B. Management

The Board of Directors consists of five members. These five directors are elected by the voters within the boundaries of the Red Sands Groundwater Conservation District and serve staggered 4 year terms. To be eligible to serve as director, an individual must reside within the district.

C. Authority

The District is governed primarily by the provisions of TWC Chapter 36 and 31 Texas Administrative Code (TAC) Chapter 356. The District has the power and authority to undertake various hydrogeological studies, to adopt a management plan, to establish a program for the permitting of certain wells, and to implement programs to achieve its statutory mandates. The District has rule-making authority to implement its policies and procedures and to help ensure the management of the groundwater resources of north-central Hidalgo County.

D. Location and Extent

The jurisdiction of the District includes all territory in north-central Hidalgo County located within the boundaries as described in Exhibit A. The District is located in the portion of Hidalgo County that is generally bounded by US Hwy 281 on the east, FM 490 on the south, the Hidalgo County line on the north, and up to the Starr County line on the west.

E. Topography and Drainage

Hidalgo County is located within the Lower Rio Grande Valley. The Lower Rio Grande Valley is a broad plain that gradually rises in elevation from east to west.

Most drainage flows to either the Rio Grande River or the Laguna Madre. In northern Hidalgo County, drainage is into shallow depressions that allow for either percolation into the subsurface or evaporation. The most prominent drainage feature in Hidalgo County is the Rio Grande River which forms the southern boundary of the County.

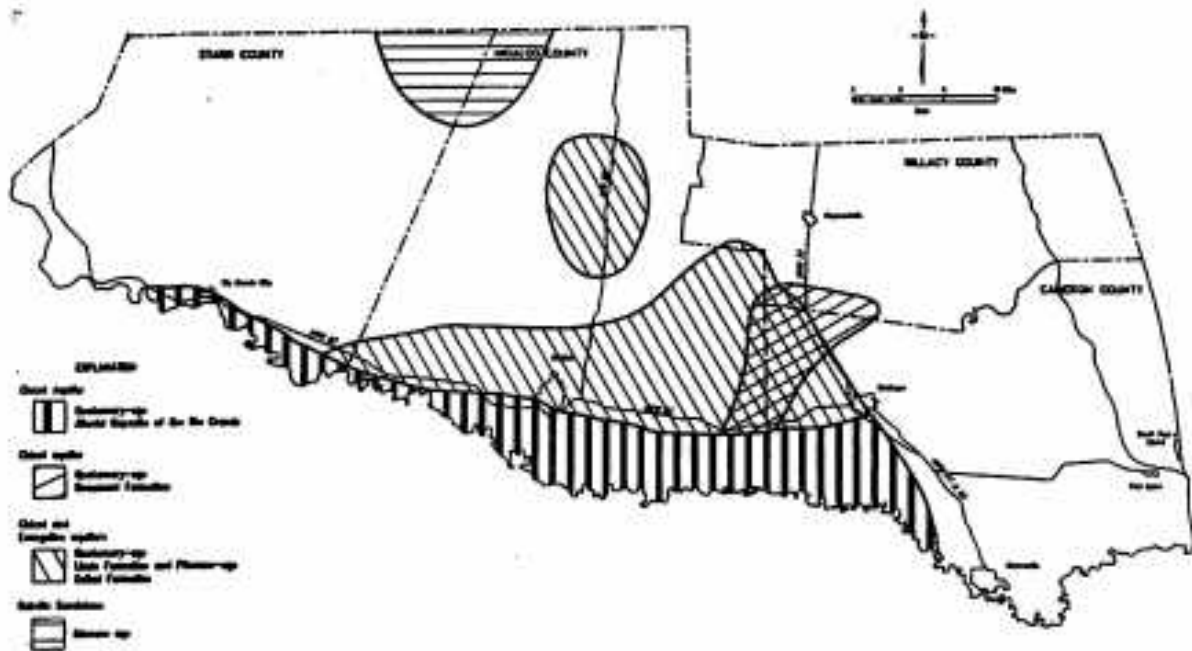
F. Groundwater Resources of the District

The District is located within the area of the Gulf Coast Aquifer. The aquifer receives recharge directly from precipitation of the land surface. Generally, the strata composing the Gulf Coast Aquifer are viewed as a large, leaky, artesian system where

recharge can occur at formational boundaries which include permeable sands. The Chicot aquifer and Evangeline aquifer are the hydrologic units which make up this portion of the Gulf Coast Aquifer. The groundwater in this portion of the Gulf Coast Aquifer may be brackish with fresh water found in specific localities. In the past, the groundwater system of the Lower Rio Grande area was classified to recognize four such localized sources of fresh groundwater: the Lower Rio Grande Valley groundwater reservoir; the Mercedes-San Sebastian shallow groundwater reservoir; the Linn-Faysville groundwater reservoir; and the Oakville Sandstone. (McCoy, 1990). The District is located within the formally recognized Linn-Faysville groundwater reservoir. This source of fresh groundwater is locally recognized as the Red Sands aquifer.

Most wells found within the boundaries of the District are less than 100 feet deep. The individual sand beds which contain the groundwater are discontinuous creating a “hit or miss” scenario when drilling for a productive well. However, where the sand is rather permeable, it is not uncommon to find wells yielding several hundred gallons per minute. Deep wells penetrate much thicker water-bearing sands than the shallow wells, and some may yield greater than 500 gallons per minute when pumped. The water produced from these wells may contain higher amounts of sodium, boron, and chloride than in the shallow wells. (Follett and others, 1949).

Exhibit B – Approximate Productive Areas of the Major Sources of Groundwater in the Lower Rio Grande Valley, from McCoy 1990.



IV. STATEMENT OF GUIDING PRINCIPLES

The District recognizes that the groundwater resources in the north central Hidalgo County region are of vital importance. The preservation of this most valuable resource can be managed in a prudent and cost effective manner through education, cooperation, and developing a comprehensive understanding of the aquifer. The greatest threat to the District in achieving its stated mission is the inappropriate management of its groundwater resources, based on a lack of understanding of local conditions. The District's management plan is intended to serve as a tool to focus the thoughts and actions of those given the responsibility for the execution of the District's activities.

V. CRITERIA FOR PLAN CERTIFICATION

A. Planning Horizon

The time period for this plan is 10 years from the date of approval by the executive administrator or, if appealed, on approval by the TWDB. This plan is being submitted as part of the five-year review and re-adoption process as required by TWC 36.1072(e). This plan will remain in effect until a revised management plan is approved by the executive administrator or the TWDB. The plan shall be reviewed annually, and updated and readopted in accordance with the requirements of the Texas Water Code.

B. Board Resolution

A certified copy of the Red Sands Groundwater Conservation District resolution adopting the plan is located in Appendix B – District Resolution

C. Plan Adoption

Public notices documenting that the plan was adopted following appropriate public meetings and hearings are located in Appendix C – Notice of Meetings.

D. Coordination with Surface Water Management Entities

A letter transmitting a copy of this plan to the surface water management entities with jurisdiction within the District are located in Appendix D – Letter to Surface Water Management Entities.

VI. ESTIMATES OF TECHNICAL INFORMATION REQUIRED BY TWC §36.1071 / 31 TAC 356.5

A. Managed available groundwater in the district based on the desired future conditions established under TWC §36.108 – TWC §36.10701(e)(3)(A)

Managed available groundwater is defined in TWC §36.001 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 36.108.” The desired future condition of the aquifer may only be determined through joint planning with other groundwater conservation districts (“GCDs”) in the same groundwater management area (“GMA”). The District is located in GMA 16. GMA 16 adopted the desired future conditions for the Gulf Coast Aquifer on August 30, 2010 and forwarded to the TWDB for development of the MAG. The submittal package for the DFCs can be found at:

http://www.twdb.state.tx.us/groundwater/docs/DFC/GMA16_DFC_Adopted_2010-0830.pdf

Table 1 - A summary of the DFC and the modeled available groundwater are summarized below:

Groundwater Conservation District	Drawdown (ft) in 2060 from Estimated 2010 Conditions					Total Gulf Coast Aquifer Pumping (AF/yr)
	Layer 1	Layer 2	Layer 3	Layer 4	Gulf Coast Aquifer Average	
Bee	59	72	54	49	58	10,653
Brush Country	97	164	151	154	150	68,595
Corpus Christi	12	69	25	25	33	1,794
Duval	146	171	157	131	150	14,055
Kenedy	41	241	62	61	101	94,804
Live Oak	82	80	71	23	41	11,433
McMullen				10	10	510
Red Sands		40	40	40	40	584
San Patricio	34	94	27	27	46	19,000
Starr		150	137	102	127	7,521

B. Amount of groundwater being used within the district on an annual basis – 31 TAC 356.5(a)(5)(B) [Implementing TWC §36.1071(e)(3)(B)].

Please refer to Appendix D.

- C. Annual amount of recharge from precipitation to the groundwater resources within the district – 31TAC 356.5(a)(5)(C) [Implementing TWC §36.1071(e)(3)(C)]

The estimated amount of annual amount of recharge to the groundwater resources of the District is approximately 182 acre-feet per year.

Please refer to Appendix D.

- D. For each aquifer, annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers – TWC §36.1071(e)(3)(D)

The estimates of the annual amount of water discharged to the surface water systems by the groundwater resources of the District is 0 acre-feet per year.

Please refer to Appendix D.

- E. Annual volume of flow into and out of the District within each aquifer and between aquifers in the District, if a groundwater availability model is available – TWC §36.1071(e)(3)(E)

The estimate of flow into the District within each aquifer is 2,277 acre-feet and the estimated annual volume of flow out of the District within each aquifer is 2,036 acre-feet. The GAM model assumes no interaction between the Gulf Coast Aquifer System and underlying units.

Please refer to Appendix D.

- F. Projected surface water supply in the district, according to the most recently adopted state water plan – TWC §36.1071(e)(3)(F)

Please refer to Appendix D.

- G. Projected total demand for water in the district according to the most recently adopted state water plan – TWC §36.1071(e)(3)(G)

Please refer to Appendix D.

VII. CONSIDER THE WATER SUPPLY NEEDS AND WATER MANAGEMENT STRATEGIES INCLUDED IN THE ADOPTED STATE WATER PLAN – TWC §36.1071(E)(4)

Please refer to Appendix D.

VIII. MANAGEMENT OF GROUNDWATER SUPPLIES

TWC §36.0015 states that groundwater conservation districts (GCDs) are the state's preferred method of groundwater management and establishes that GCDs will manage groundwater resources through rules developed and implemented in accordance with TWC Chapter 36. Chapter 36 gives directives to GCDs and the statutory authority to carry out such directives, so that GCDs are provided the proper tools to protect and manage the groundwater resources within their boundaries.

The District will manage the supply of groundwater within the District in order to conserve groundwater resources while seeking to maintain the economic viability of all groundwater 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 which, if implemented, would result in a reduction of groundwater use. The existing observation network of groundwater wells will be used to monitor the changing conditions of the groundwater resources within the District. If necessary, the observation network may be expanded.

The regulatory tools granted to GCDs by TWC Chapter 36 enable GCDs to preserve historic and existing users of groundwater. Some uncertainty exists in permitting based upon historic use following the Texas Supreme Court decision in *Edwards Aquifer Authority v. Day*. To the extent permitted under Chapter 36 and the case following *EAA v. Day*, the District protects historic and existing users by granting such groundwater users historic and existing use permits that have priority over operating permits. TWC Chapter 36 also allows GCDs to establish management zones within an aquifer or aquifer subdivision. The District's rules provide for the designation of management areas as needed to better manage and regulate the groundwater resources of the District.

The District may deny a water well drilling permit or limit groundwater withdrawals in accordance with the requirements stated in the rules of the District. In making a determination to deny a permit or limit groundwater withdrawals, the District will consider criteria identified in TWC §36.113.

In accordance with the District's mission of protecting the groundwater resources of the District, the District may require reduction of groundwater withdrawals to amounts that will not cause harm to the aquifer when considering the desired future condition of the District's aquifers and the amount of managed available groundwater within the District. To achieve this purpose, the District may, at the discretion of the Board, amend or revoke 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 as observed by the District. The District will enforce the terms and conditions of permits and the rules of the District by injunction or other appropriate relief in a court of competent jurisdiction as provided for in TWC §36.102.

A contingency plan to cope with the effects of water supply deficits due to climatic or other conditions may be developed by the District and adopted by the Board after notice and a hearing. In developing the contingency plan, the District will consider the economic effect of conservation measures upon all water resource user groups, the local implications of the extent and effect of changes in water storage conditions, the unique hydrogeological conditions of the aquifers within the District and the appropriate conditions under which the contingency plan will be implemented. The District will evaluate the groundwater resources available within the District and determine the effectiveness of regulatory or conservation measures. A public or private user may appeal to the Board for discretion in enforcement of the provisions of the water supply deficit contingency plan on grounds of adverse economic hardship or unique local conditions. The exercise of said discretion by the Board shall not be construed as limiting the power of the Board.

IX. 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.

Rules adopted by the District for the permitting of wells and the production of groundwater shall comply with TWC Chapter 36, including §36.113, and the provisions of this management plan. All rules will be adhered to and enforced. The promulgation and enforcement of rules will be based on the best technical evidence available to the District.

X. METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS – 31 TAC 356.5(a)(6)

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 fiscal year. The report will be presented within 120 days following the completion of the District’s fiscal year. The board will maintain the report on file, for public inspection at the District’s offices upon adoption.

XI. GOALS, MANAGEMENT OBJECTIVES AND PERFORMANCE STANDARDS

The management goals, objectives, and performance standards of the District in the areas specified in 31 TAC 356.5 are addressed below.

Management Goals

- A. Providing the Most Efficient Use of Groundwater – 31 TAC 356.5(a)(1)(A) [Implementing TWC §36.1071(a)(1)]
 - 1. *Objective:* Each year, the District will require the registration of all wells within the District’s jurisdiction.
 - 2. *Performance Standard:* Each year, the number of new and existing wells registered with the District will be presented in the District’s annual report.

- B. Controlling and Preventing Waste of Groundwater – 31 TAC 356.5(a)(1)(B) [Implementing TWC §36.1071(a)(2)]
 - 1. *Objective:* Each year, the District will disseminate educational information on eliminating and reducing the wasteful use of groundwater focusing on water quality protection. This may be accomplished by two of the following methods:
 - a. Conduct an annual contest on water quality protection;
 - b. Compile literature packets for distribution to schools within the District;
 - c. Conduct classroom presentations to schools with within the District;
 - d. Sponsor an educational program/curriculum;
 - e. Post information on the District’s website;
 - f. Provide newspaper articles for publication;

- g. Publish District newsletters;
 - h. Conduct public presentations;
 - i. Set up displays at public events;
 - j. Distribute brochures/literature.
2. *Performance Standard:* The annual report will include a summary of the District activities during the year to disseminate educational information on eliminating and reducing the wasteful use of groundwater focusing on water quality protection.
- C. Addressing Conjunctive Surface Water Management Issues – 31 TAC 356.5(a)(1)(D) [Implementing TWC §36.1071(a)(4)]
- 1. *Objective:* Each year, the District will participate in the regional planning process by attending at least one meeting of the Rio Grande Regional Water Planning Group per fiscal year.
 - 2. *Performance Standard:* Each year, attendance at Region M meetings by a representative of the District will be reflected in the District's annual report and will include the number of meetings attended and the dates.
- D. Controlling and Preventing Subsidence – 31 TAC 356.5(a)(1)(C)
- 1. *Objective:* Each year the District will manage the withdrawal of groundwater.
 - 2. *Performance Standard:* Each year, attendance at Region M meetings by a representative of the District will be reflected in the District's annual report and will include the number of meetings attended and the dates.
- E. Addressing Natural Resource Issues which Impact the Use and Availability of Groundwater, and which are Impacted by the Use of Groundwater – 31 TAC56.6(a)(1)(E) [Implementing TWC §36.10719a)(5)]
- 1. *Objective:* Each year, the District will require permits for all non-exempt use of groundwater in the District as defined in the District Rules, in accordance with adopted procedures.

2. *Performance Standard:* Each year, a summary of the number of applications for the drilling of non-exempt wells, the number of applications for the permitted use of groundwater and the disposition of the applications will be presented in the District’s annual report.
- F. Addressing Drought Conditions – 31 TAC 356.5(a)(1)(F) [Implementing TWC §36.1071(a)(6)]
1. *Objective:* Each month, the District will download the updated Palmer Drought Severity Index (PDSI) map and check for the periodic updates to the Drought Preparedness Council Situation Report (Situation Report) posted on the Texas Water Information Network website www.txwin.net.
 2. *Performance Standard:* Each year, the downloaded PDSI maps and Situation Reports will be included in the District Annual Report to the Board of Directors.
- G. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, or Brush Control, Where Appropriate and Cost Effectiveness – 31 TAC 356.59a)(1)(G) [Implementing TWC §36.1071(a)(7)]

Precipitation enhancement is not an appropriate or cost effective program for the District at this time because there is not an existing precipitation enhancement program operating in nearby counties in which the District could participate and share costs. The cost of operating a single county precipitation enhancement program is prohibitive and would require the District to increase taxes in its annexed territory in Hidalgo County.

1. *Objective:* Each year, the District will promote conservation by one or more of the following methods:
 - a. Conduct an annual contest on water conservation;
 - b. Distribute conservation literature packets to schools within the District territory located in Hidalgo County;
 - c. Conduct classroom conservation presentations;
 - d. Sponsor an educational conservation program/curriculum;
 - e. Post conservation information on the District’s website;
 - f. Provide a newspaper article on conservation for publication;
 - g. Publish an article on conservation in the District’s newsletter;
 - h. Conduct a public conservation presentation;

- i. Set up a conservation display at a public event;
- j. Distribute conservation brochures/literature to the public.

Performance Standard: Each year, the annual report will include a summary of the District activity during the year to promote conservation.

2. *Objective:* Each year, the District will promote rainwater harvesting by posting information on rainwater harvesting on the District website.

Performance Standard: Each year, the annual report will include a copy of the information on rainwater harvesting that is provided on the District's website.

3. *Objective:* Each year, the District will provide information relating to recharge enhancement and brush control on the District's website.

Performance Standard: Each year, the District annual report will include a copy of the information that has been provided on the District's website relating to recharge enhancement and brush control.

H. Addressing in a Quantitative Manner the Desired Future Conditions of the Groundwater Resources – 31 TAC (a)(1)(H) [Implementing TWC §36.1071(a)(8)].

1. *Objective:* Each year, the District will collect at least two (2) water level samples from two (2) different locations.

Performance Standard: Each year, the District's annual report will include water level measurements and include a discussion of the measurements of the change in water level as compared to previous years' water levels.

APPENDIX A

**Resolution of the Board of Directors of Red Sands
Groundwater Conservation District
Meeting Held June 28, 2012**

A Resolution Adopting a Groundwater Management Plan

Whereas, The Red Sands Groundwater Conservation District (the District) is a political subdivision of the State of Texas organized and existing under and by virtue of Article 26, Chapter 59, the Texas Constitution, and a groundwater conservation district acting under Chapter 36 of the Texas Water Code and the District's Enabling Act of the 76th Legislature, 1999.

Whereas, under the direction of the Board of Directors, and in accordance with the Texas Water Code Chapter 36, Section 36.1071 and 36.1072, Chapter 356 of the Texas Administrative Code, the District has developed a groundwater management plan.

Whereas, the district issued the appropriate notice and held a public hearing to receive public and written comment on the proposed management plan at the Law Office of Aaron I. Vela, 200 E. Cano, Edinburg, Texas 78539, on June 28, 2012.

Whereas, the Board of Directors upon appropriate notice and hearing and in an open meeting adopted a management plan pursuant to Texas Water Code Section 36.1071(e), on June 28, 2012.

Whereas, the District submitted its management plan to the TWDB Executive Administrator on July 2, 2012.

Whereas, the Board of Directors believes the management plan meets all requirements of Chapter 36 of the Texas Water Code and Chapter 356, Title 31 of the Texas Administrative Code; and

Whereas, the Board of Directors upon proper notice and hearing and in an open meeting seeks to adopt its management plan pursuant to Texas Water Code Section 36.1071(e).

Now Therefore Be It Resolved That:

The management plan adopted by the Board of Directors on June 28, 2012, is hereby adopted before the Board of Directors and after formal action on this date by the District's Board of Directors.

The Board of Directors further instructs the District consultant to compile a final, adopted management plan, and file it with the TWDB as may be required in furtherance of approval pursuant to the provisions of Section 36.1072 of the Texas Water Code.

And It Is So Ordered.

Upon this motion made by Director Travis Richards and seconded by Director Laura Gomez Ramirez, upon discussion, the Board of Directors voted 3 in favor and 0 opposed and 0 abstained, and 1 absent, and the motion thereby PASSED on this 28th day of June, 2012.

Red Sands Groundwater Conservation District

By:



Javier Moreno, Board President

Attest:



Board Member

APPENDIX B

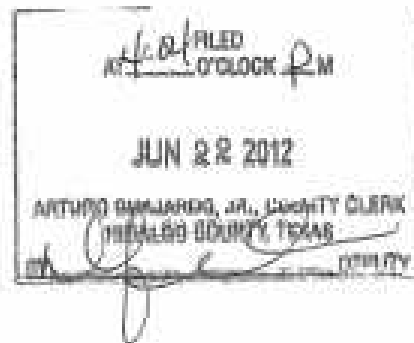
NOTICE OF REGULAR MEETING
of
RED SANDS GROUNDWATER CONSERVATION DISTRICT

A meeting of the Board of Directors of the Red Sands Groundwater Conservation District will be held on Thursday, June 28, 2012, at 11:30 a.m. at 200 East Cano, Edinburg, Texas 78539.

At this meeting, the following business may be considered and recommended for board action:

- A. Call to Order – Roll Call – Pledge of Allegiance.
- B. Public comments.
- C. Discussion and Possible Action on adopting District Management Plan.
- D. Adjournment.

Agenda items may be considered, deliberated and/or acted upon in a different order than numbered above. The Board of Directors of the Red Sands Groundwater Conservation District reserves the right to adjourn into Executive (Closed) Session at any time during the course of this meeting to discuss any of the items listed on this agenda, as authorized by the Texas Open Meetings Act, Chapter 551, Texas Government Code. No final action will be taken in Executive Session.



APPENDIX C

June 27, 2012

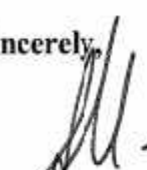
Mr. Lonnie Stewart, General Manager
Bee Groundwater Conservation District
P.O. Box 682
Beeville, TX 78104
Phone No. 361-358-2244
Fax No. 361-358-2247
Email: beegcd@yahoo.com

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Mr. Stewart,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

Felix Saenz
Brush Country Groundwater Conservation District
P.O. Box 136
Falfurrias, TX 78355
Phone No. 512-322-5800
Fax No. 512-472-0532
Email: fsaenz641@hotmail.com

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Management Plan

Dear Mr. Saenz,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

Mr. Gustavo Gonzales, Water Director
Corpus Christi ASR Conservation District
P.O. Box 9277
Corpus Christi, TX 78469
Phone No. 361-826-1681
Fax No.
Email: gustavogo@cctexas.com

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Mr. Gonzales,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

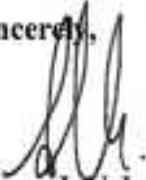
Mr. Alberto Garcia, Manager
Duval County Groundwater Conservation District
P.O. Box 506
Benavides, TX 78341
Phone No. 361-816-5368
Fax No. 361-256-3592

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Mr. Garcia,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron L. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

Mr. Andy Garza, District Manager
Kenedy County Groundwater Conservation District
P.O. Box 1433
Kingsville, TX 78363
Phone No. 361-592-9347
Fax No. 361-592-9364
Email: general_manager@kenedygcd.

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Mr. Garza,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

Mr. Lonnie Stewart, Manager
Live Oak Underground Water Conservation District
3460A Highway 281
George West, TX 78022
Phone No. 361-449-1151
Fax No. 361-449-2780
Email: louwcd@yahoo.com

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Mr. Stewart,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

Mr. Lonnie Stewart, Manager
McMullen Groundwater Conservation District
P.O. Box 232
Tilden, TX 78072
Phone No. 361-449-7017
Email: mcmullengcd@yahoo.com

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Mr. Stewart,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

Duane Campion,
San Patricio County Groundwater Conservation District
219 North Vineyard
Sinton, TX 78387
Phone No. 361-364-6234
Email: duanecampion@tamu.edu

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Mr. Campion,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela
General Counsel
200 E. Cano
Edinburg, Texas 78539
Phone No. (956) 381-4440
Fax No. (956) 381-4445

June 27, 2012

Ms. Rose Benavidez, Manager

Starr County Groundwater Conservation District

601 E. Main St.

Rio Grande City, TX 78582

Phone No. 956-487-2709

Fax No. 956-716-1650

Email: rguerra@co.starr.tx.us

Re: Notice of meeting for the Red Sands Groundwater Conservation District Draft Plan

Dear Ms. Benavidez,

Red Sands Groundwater Conservation District (RSGCD) is pleased to announce the development of a Draft Groundwater Management Plan (Draft Plan). RSGCD is seeking public input on the development of the Draft Plan. The Draft Management Plan will be discussed at the June 28th Board Meeting, to be held at 200 East Cano, Edinburg, Texas 78539 at 11:30 a.m. Copies of the Draft Plan will be made available at the meeting.

Sincerely,



Aaron I. Vela

General Counsel

200 E. Cano

Edinburg, Texas 78539

Phone No. (956) 381-4440

Fax No. (956) 381-4445

APPENDIX D

Estimated Historical Water Use And 2012 State Water Plan Datasets: Red Sands Groundwater Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Resources Division
Groundwater Technical Assistance Section
stephen.allen@twdb.texas.gov
(512) 463-7317
June 19, 2012

GROUNDWATER MANAGEMENT PLAN DATA:

This package of water data reports (part 1 of a 2-part package of information) is being provided to groundwater conservation districts to help them meet the requirements for approval of their five-year groundwater management plan. Each report in the package addresses a specific numbered requirement in the Texas Water Development Board's groundwater management plan checklist. The checklist can be viewed and downloaded from this web address:

<http://www.twdb.texas.gov/groundwater/docs/GCD/GMPchecklist0911.pdf>

The five reports included in part 1 are:

1. Estimated Historical Water Use (checklist Item 2)
from the TWDB Historical Water Use Survey (WUS)
2. Projected Surface Water Supplies (checklist Item 6)
3. Projected Water Demands (checklist Item 7)
4. Projected Water Supply Needs (checklist Item 8)
5. Projected Water Management Strategies (checklist Item 9)
reports 2-5 are from the 2012 State Water Plan (SWP)

Part 2 of the 2-part package is the groundwater availability model (GAM) report. The District should have received this report from the Groundwater Availability Modeling Section. Questions about the GAM can be directed to Dr. Shirley Wade, shirley.wade@twdb.texas.gov, or (512) 463-0749 (to contact the Administrative Assistant).

DISCLAIMER

The data presented in this report represents the most updated Historical Water Use and 2012 State Water Planning data available as of 6/19/2012. Although it does not happen frequently, neither of these datasets are static and they are subject to change pending the availability of more accurate data (Historical Water Use data) or an amendment to the 2012 State Water Plan (2012 State Water Planning data). District personnel must review these datasets and correct any discrepancies in order to ensure approval of their groundwater management plan.

The Historical Water Use dataset can be verified at this web address:

<http://www.twdb.texas.gov/wrpi/wus/summary.asp>

The 2012 State Water Planning dataset can be verified by contacting Wendy Barron (wendy.barron@twdb.texas.gov or 512-936-0886).

The data values provided in the tables of this report are county-based. But, for groundwater districts that cover only a portion of one or more counties, those county values have been modified using an apportioning multiplier to create new values that more accurately represent district conditions. The multiplier used within the following formula is a land area ratio: (county data value * land area of district in county/land area of county). For two of the four SWP tables (Projected Surface Water Supplies and Projected Water Demands) only the county-wide water user group (WUG) data values (county other, manufacturing, steam electric power, irrigation, mining and livestock) were modified using the multiplier. WUG values for municipalities, water supply corporations, and utility districts were not apportioned. Instead, their full values were retained if they are located within the district (each district is requested to report the location of these WUGs) and eliminated if they are located outside. The two other SWP tables (Water Supply Needs and Water Management Strategies) were not apportioned because district-specific values are not statutorily required for those data. In the Historical Water Use table every category of water use (including municipal) is apportioned. Staff determined that breaking down the annual municipal values into individual WUGs was too complex.

TWDB staff recognize that the apportioning formula being used is not perfect but it is the best available process with respect to time and staffing constraints. If the District believes it has data that is more accurate it has the option of including those data in the plan with an explanation of how the data were derived. The apportioning multiplier used in the calculation is displayed next to each county header on the affected tables.

For additional questions regarding this data, please contact Stephen Allen (stephen.allen@twdb.texas.gov or 512-463-7317) or Rima Petrossian (rima.petrossian@twdb.texas.gov or 512-936-2420).

Estimated Historical Water Use and 2012 State Water Plan Dataset:

Red Sands Groundwater Conservation District

June 19, 2012

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Estimated Historical Water Use TWDB Historical Water Use Survey (WUS) Data

Groundwater use estimates are currently unavailable for 2005, 2009 and 2010. TWDB staff anticipates the calculation and posting of such estimates during the first half of 2012.

HIDALGO COUNTY			<i>1.96 % (multiplier)</i>			All values are in acre-feet/year		
Year	Source	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1974	GW	89	11	0	368	22	25	515
1980	GW	65	4	0	176	5	3	253
1984	GW	101	1	0	173	11	2	288
1985	GW	74	2	2	195	11	2	286
1986	GW	99	9	0	0	0	9	117
1987	GW	87	9	0	0	12	2	110
1988	GW	93	9	0	0	12	7	121
1989	GW	103	11	0	214	11	7	346
1990	GW	104	15	0	400	11	8	538
1991	GW	109	9	0	388	12	8	526
1992	GW	110	7	0	162	13	6	298
1993	GW	105	6	0	253	12	6	382
1994	GW	144	14	0	292	7	6	463
1995	GW	152	15	0	259	5	7	438
1996	GW	153	9	33	159	17	6	377
1997	GW	156	18	14	113	22	6	329
1998	GW	156	15	29	228	22	5	455
1999	GW	125	8	26	236	22	6	423
2000	GW	112	10	35	87	22	5	271
2001	GW	192	17	15	73	12	4	313
2002	GW	172	15	12	68	17	4	288
2003	GW	179	10	18	39	9	4	259
2004	GW	182	15	18	30	7	4	256
2006	GW	79	9	0	20	6	6	120
2007	GW	99	8	0	22	3	6	138
2008	GW	142	8	0	1	2	7	160

*Estimated Historical Water Use and 2012 State Water Plan Dataset:
Red Sands Groundwater Conservation District
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Projected Surface Water Supplies TWDB 2012 State Water Plan Data

HIDALGO COUNTY

1.06 % (multiplier)

All values are in acre foot/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
M	ALAMO	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	ALTON	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	COUNTY-OTHER	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	177	171	169	167	165	163
M	COUNTY-OTHER	RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	10	9	9	9	9	9
M	DONNA	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	EDCOUCH	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	EDINBURG	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	ELSA	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	HIDALGO	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	HIDALGO COUNTY MUD #1	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	IRRIGATION	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	7,008	6,938	6,873	6,808	6,743	6,683
M	IRRIGATION	NUECES-RIO GRANDE	NUECES-RIO GRANDE RIVER COMBINED RUN-OF-RIVER	2	2	2	2	2	2
M	IRRIGATION	RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	57	56	56	55	55	54
M	LA JOYA	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	LA JOYA	RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						

Estimated Historical Water Use and 2012 State Water Plan Dataset:

Red Sands Groundwater Conservation District

June 15, 2012

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Projected Surface Water Supplies TWDB 2012 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
N	LA VILLA	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	LIVESTOCK	NUECES-RIO GRANDE	LIVESTOCK LOCAL SUPPLY	0	0	0	0	0	0
N	LIVESTOCK	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	0	0	0	0	0	0
N	MANUFACTURING	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	64	64	64	64	64	64
N	MCALLEN	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	MCALLEN	RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	MERCEDES	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	MINING	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	4	4	4	4	4	4
N	MINING	RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	0	0	0	0	0	0
N	MISSION	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	NORTH ALAMO WSC	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	PALMHURST	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	PALMVIEW	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	PENITAS	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	PHARR	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	SAN JUAN	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
N	SHARPLAND WSC	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						

Estimated Historical Water Use and 2012 State Water Plan Dataset:

Red Sands Groundwater Conservation District

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Projected Surface Water Supplies TWDB 2012 State Water Plan Data

RWFG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
M	STEAM ELECTRIC POWER	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM	116	116	116	116	116	116
M	SULLIVAN CITY	RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
M	WESLACO	NUECES-RIO GRANDE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM						
Sum of Projected Surface Water Supplies (acre feet/year)				7,433	7,360	7,233	7,225	7,157	7,094

*Estimated Historical Water Use and 2012 State Water Plan Dataset:
Red Sands Groundwater Conservation District
June 19, 2012
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Projected Water Demands TWDB 2012 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

HIDALGO COUNTY			<i>1.96 % (multiplier)</i>		All values are in acre-feet/year			
RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
M	ALTON	NUECES-RIO GRANDE						
M	DONNA	NUECES-RIO GRANDE						
M	EDCOUCH	NUECES-RIO GRANDE						
M	EDINBURG	NUECES-RIO GRANDE						
M	ELSA	NUECES-RIO GRANDE						
M	HIDALGO	NUECES-RIO GRANDE						
M	LA VILLA	NUECES-RIO GRANDE						
M	MCALLEN	NUECES-RIO GRANDE						
M	MISSION	NUECES-RIO GRANDE						
M	PHARR	NUECES-RIO GRANDE						
M	PROGRESO	NUECES-RIO GRANDE						
M	SAN JUAN	NUECES-RIO GRANDE						
M	CCUNTY-OTHER	NUECES-RIO GRANDE	183	242	307	380	462	546
M	MANUFACTURING	NUECES-RIO GRANDE	63	70	75	81	86	93
M	STEAM ELECTRIC POWER	NUECES-RIO GRANDE	203	277	324	381	451	536
M	MINING	NUECES-RIO GRANDE	25	27	29	30	31	32
M	IRRIGATION	NUECES-RIO GRANDE	10,982	9,907	8,547	8,547	3,547	8,547
M	LIVESTOCK	NUECES-RIO GRANDE	13	13	13	13	13	13
M	LA JOYA	NUECES-RIO GRANDE						
M	PRITTS	NUECES-RIO GRANDE						
M	HIDALGO COUNTY MUD #1	NUECES-RIO GRANDE						
M	NORTH ALAMO WSC	NUECES-RIO GRANDE						
M	SHARYLAND WSC	NUECES-RIO GRANDE						
M	ALAMO	NUECES-RIO GRANDE						
M	MERCEDES	NUECES-RIO GRANDE						
M	WESLACO	NUECES-RIO GRANDE						
M	MILITARY HIGHWAY WSC	NUECES-RIO GRANDE						
M	PALMVIEW	NUECES-RIO GRANDE						
M	PALMHURST	NUECES-RIO GRANDE						
M	HIDALGO	RIO GRANDE						
M	LA JOYA	RIO GRANDE						

Estimated Historical Water Use and 2012 State Water Plan Dataset

Red Sands Groundwater Conservation District

June 19, 2012

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Projected Water Demands TWDB 2012 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
M	SULLIVAN CITY	RIO GRANDE						
M	COUNTY-OTHER	RIO GRANDE	11	14	10	23	26	33
M	MINING	RIO GRANDE	3	3	3	3	4	4
M	IRRIGATION	RIO GRANDE	446	402	347	347	347	347
M	LIVESTOCK	RIO GRANDE	1	1	1	1	1	1
M	MCALLEN	RIO GRANDE						
M	MILITARY HIGHWAY WSC	RIO GRANDE						
Sum of Projected Water Demands (acre-feet/year)			11,930	10,956	9,664	9,806	9,970	10,152

*Estimated Historical Water Use and 2012 State Water Plan Dataset:
Red Sands Groundwater Conservation District
June 19, 2012
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Projected Water Supply Needs TWDB 2012 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

HIDALGO COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
M	ALAMO	NUECES-RIO GRANDE	-59	-762	-1,548	-2,415	-3,407	-4,424
M	ALTON	NUECES-RIO GRANDE	0	0	-2,446	-3,419	-4,482	-5,602
M	COUNTY-OTHER	NUECES-RIO GRANDE	1,028	-2,179	-5,775	-9,722	-14,197	-18,779
M	COUNTY-OTHER	RIO GRANDE	60	-187	-409	-652	-927	-1,210
M	DONNA	NUECES-RIO GRANDE	1,729	1,435	1,117	759	347	-103
M	EDCOUCH	NUECES-RIO GRANDE	-129	-100	-255	-332	-420	-516
M	EDINBURG	NUECES-RIO GRANDE	6,216	3,826	1,029	-1,805	-5,151	-8,580
M	ELSA	NUECES-RIO GRANDE	659	603	534	460	364	258
M	HIDALGO	NUECES-RIO GRANDE	594	209	-219	-685	-1,206	-1,740
M	HIDALGO	RIO GRANDE	-7	-18	-70	-77	-44	-71
M	HIDALGO COUNTY MUD #1	NUECES-RIO GRANDE	-1,130	-1,814	-2,588	-3,421	-4,341	-5,267
M	IRRIGATION	NUECES-RIO GRANDE	-179,009	-127,739	-61,663	-64,971	-68,279	-71,313
M	IRRIGATION	RIO GRANDE	-14,526	-12,328	-9,540	-9,567	-9,594	-9,619
M	LA JOYA	NUECES-RIO GRANDE	46	-5	-59	-120	-189	-265
M	LA JOYA	RIO GRANDE	19	-2	-25	-51	-80	-113
M	LA VILLA	NUECES-RIO GRANDE	256	258	259	261	261	258
M	LIVESTOCK	NUECES-RIO GRANDE	0	0	0	0	0	0
M	LIVESTOCK	RIO GRANDE	0	0	0	0	0	0
M	MANUFACTURING	NUECES-RIO GRANDE	912	589	297	5	-255	-564
M	MCALLEN	NUECES-RIO GRANDE	2,627	-2,501	-6,474	-14,830	-21,932	-29,483
M	MCALLEN	RIO GRANDE	0	-1	-1	-2	-3	-4
M	MERCEDES	NUECES-RIO GRANDE	3,231	3,123	2,988	2,846	2,652	2,424
M	MILITARY HIGHWAY WSC	NUECES-RIO GRANDE	-8	-143	-422	-780	-1,120	-1,479
M	MILITARY HIGHWAY WSC	RIO GRANDE	0	0	0	0	-4	-9
M	MINING	NUECES-RIO GRANDE	183	182	181	179	177	175
M	MINING	RIO GRANDE	23	22	21	21	21	20
M	MISSION	NUECES-RIO GRANDE	-1,470	-4,468	-7,824	-11,365	-15,469	-19,674
M	NORTH ALAMO WSC	NUECES-RIO GRANDE	8,983	5,677	1,853	-7,345	-7,180	-12,190
M	PALMHURST	NUECES-RIO GRANDE	0	0	209	-296	-929	-1,633
M	PALMVIEW	NUECES-RIO GRANDE	0	0	0	0	-447	-906
M	PENITAS	NUECES-RIO GRANDE	5	3	2	-1	-7	-16
M	PHARR	NUECES-RIO GRANDE	376	-1,754	-4,152	-6,799	-9,649	-12,665

Estimated Historical Water Use and 2012 State Water Plan Dataset

Red Sands Groundwater Conservation District

June 19, 2012

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Projected Water Supply Needs TWDB 2012 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
M	PROGRESO	NUECES-RIO GRANDE	0	0	0	0	0	0
M	SAN JUAN	NUECES-RIO GRANDE	-478	-1,642	-2,933	-4,361	-6,008	-7,697
M	SHARYLAND WSC	NUECES-RIO GRANDE	1,624	-391	-357	-1,331	-2,296	-3,335
M	STEAM ELECTRIC POWER	NUECES-RIO GRANDE	1,816	-1,980	-4,374	-7,291	-10,847	-15,183
M	SULLIVAN CITY	RIO GRANDE	159	186	184	13	-197	-411
M	WESLACO	NUECES-RIO GRANDE	1,043	286	-579	-1,537	-2,622	-3,787
Sum of Projected Water Supply Needs (acre-feet/year)			-196,811	-158,102	-113,703	-148,125	-191,288	-236,668

*Estimated Historical Water Use and 2012 State Water Plan Dataset:
Red Sands Groundwater Conservation District
June 19, 2012
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Projected Water Management Strategies TWDB 2012 State Water Plan Data

HIDALGO COUNTY

WUG, Basin (RWPG)

All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
ALAMO, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	5	10	14	19	24
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	100	200	277	381	471
ACQUISITION OF WATER RIGHTS THROUGH URBANIZATION	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	400	800	1,330	1,700	2,100
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	25	25	25	25	125	225
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	0	83	288	469	882	1,304
NON-POTABLE REUSE	DIRECT REUSE [HIDALGO]	34	150	225	300	400	500
ALTON, NUECES-RIO GRANDE (M)							
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	59	82	2,116	3,119	1,482	5,602
COUNTY-OTHER, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	1,090	3,888	5,660	10,099	14,390
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	94	257	395	554	736	942
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	0	1,089	1,887	3,661	4,098	4,389
COUNTY-OTHER, RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	187	409	652	927	1,210
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	50	100	200	300	400	483
DOWNA, NUECES-RIO GRANDE (M)							
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	15	32	51	72	95	118
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	0	50	50	50	50	50

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WUG, Basin (RWPG)		All values are in acre-feet/year					
Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	0	25	25	25	25	25
EDCOUCH, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	65	118	175	246	299	360
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	65	70	61	66	121	156
EDINBURG, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	1,631	3,114	4,591	6,619
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	74	328	500	606	682	1,097
NON-POTABLE REUSE	DIRECT REUSE [HIDALGO]	0	0	500	1,500	3,000	4,000
ELSA, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	50	50
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	2	5	7	10	14	17
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	0	100	100	100	100	100
PROPOSED ELEVATED STORAGE TANK AND INFRASTRUCTURE IMPROVEMENTS FOR CITY OF ELSA	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	105	105	105	105	105	105
HIDALGO, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	8	29	51
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	154	558	973
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	32	66	104	145	189	235
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	110	235	334	427	506	585
HIDALGO, RIO GRANDE (M)							
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	2	18	20	27	49	71

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WUG, Basin (RWPG) All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
HIDALGO COUNTY MUD #1, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	66	100	139	181	227	274
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	1,051	1,684	2,401	3,173	4,026	4,901
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	14	30	48	68	89	112
IRRIGATION, NUECES-RIO GRANDE (M)							
IRRIGATION CONVEYANCE SYSTEM CONSERVATION	CONSERVATION [HIDALGO]	5,976	20,245	34,268	48,044	61,572	74,904
ON- FARM WATER CONSERVATION	CONSERVATION [HIDALGO]	795	5,385	13,673	25,560	40,946	59,773
IRRIGATION, RIO GRANDE (M)							
IRRIGATION CONVEYANCE SYSTEM CONSERVATION	CONSERVATION [HIDALGO]	62	207	354	498	639	779
ON- FARM WATER CONSERVATION	CONSERVATION [HIDALGO]	8	55	142	265	425	621
LA JOVA, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH URBANIZATION	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	2	87	185
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	7	14	21	49	62	73
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	50	43	75	69	40	7
LA JOVA, RIO GRANDE (M)							
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	0	2	25	51	80	113
LA VILLA, NUECES-RIO GRANDE (M)							
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	0	1	1	1	1	1
MANUFACTURING, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	55	194
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	0	0	0	0	100	200

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WJG Basin (RWPG)		All values are in acre-feet/year					
Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
NON-POTABLE REUSE	DIRECT REUSE [HIDALGO]	0	0	0	0	100	200
MCALLEN, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	225	329	393	452
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	998	4,083	5,718	7,341
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	191	382	925	1,250	2,177	3,423
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	3,360	3,360	6,120	6,500	8,121	8,821
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	0	0	487	519	945	1,543
NON-POTABLE REUSE	DIRECT REUSE [HIDALGO]	0	0	0	2,349	5,578	9,893
MCALLEN, RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	1	1	2	3	4
MERCEDES, NUECES-RIO GRANDE (M)							
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	7	14	23	32	43	53
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	560	560	560	560	560	560
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	0	560	560	560	560	560
MILITARY HIGHWAY WSC, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	5	14	16	18
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	139	353	561	789
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	8	18	28	38	43	47
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	0	125	250	375	500	625
MILITARY HIGHWAY WSC, RIO GRANDE (M)							
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	0	0	0	0	4	9

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WUG, Basin (RWFG)		All values are in acre-feet/year					
Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
MISSION, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH URBANIZATION	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	299	2,633	4,901	7,235	10,014	12,118
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	260	637	598	789	1,394	2,135
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	560	560	560	560	560	560
NON-POTABLE RELIEF	DIRECT RELIEF [HIDALGO]	350	839	1,765	2,780	3,909	5,371
NORTH ALAMO WSC, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	48
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	902
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	248	538	863	1,215	3,098	4,000
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	11,201	11,201	11,201	11,201	11,201	11,201
PALMHURST, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	15	46	82
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	281	883	1,551
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	32	68	110	155	203	254
PALMVIEW, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	22	45
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	425	800
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	16	34	55	78	102	128
PENITAS, NUECES-RIO GRANDE (M)							
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	1	1	2	2	7	16

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WUG, Basin (RWPG)		All values are in acre-feet/year					
Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
PHARR, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	89	205	311	423	554
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	698	2,478	4,721	7,086	8,895
ACQUISITION OF WATER RIGHTS THROUGH URBANIZATION	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	400	766	928	1,067	2,003
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	143	392	478	589	798	943
EXPAND EXISTING GROUNDWATER WELLS	GLLF COAST AQUIFER [HIDALGO]	100	150	175	200	225	250
NON-POTABLE REUSE	DIRECT REUSE [HIDALGO]	50	50	50	50	50	50
PROGRESO, NUECES-RIO GRANDE (M)							
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	11	24	38	54	71	89
SAN JUAN, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	24	82	147	218	300	385
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	454	1,560	2,786	4,143	5,708	7,312
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	95	206	330	465	612	762
SHARYLAND WSC, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	20	20	67	115	167
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	372	377	1,264	2,181	3,168
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	29	62	100	141	186	231
STFAM ELECTRIC POWER, NUECES-RIO GRANDE (M)							
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	980	2,374	3,291	3,847	5,183
NON-POTABLE REUSE	DIRECT REUSE [HIDALGO]	0	1,000	2,000	4,000	7,000	10,000

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Projected Water Management Strategies TWDB 2012 State Water Plan Data

WUG, Basin (RWPG)		All values are in acre-feet/yea						
Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2061	
SULLIVAN CITY, RIO GRANDE (M)								
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	10	2	
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	186	39	
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	11	25	39	55	73	9	
WESLACO, NUECES-RIO GRANDE (M)								
ACQUISITION OF WATER RIGHTS THROUGH CONTRACT	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	10	
ACQUISITION OF WATER RIGHTS THROUGH PURCHASE	AMISTAD-FALCON LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	10	
ADVANCED WATER CONSERVATION	CONSERVATION [HIDALGO]	44	62	124	217	793	1,04	
BRACKISH WATER DESALINATION	GULF COAST AQUIFER-BRACKISH [HIDALGO]	100	100	100	100	250	35	
EXPAND EXISTING GROUNDWATER WELLS	GULF COAST AQUIFER [HIDALGO]	0	0	0	100	429	89	
POTABLE REUSE	DIRECT REUSE [CAMERON]	1,120	1,120	1,120	1,120	1,150	1,29	
Sum of Projected Water Management Strategies (acre-feet/year)		28,037	61,436	109,705	165,287	233,014	306,20	

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APPENDIX E

**GAM RUN 11-002: RED SANDS
GROUNDWATER CONSERVATION DISTRICT
MANAGEMENT PLAN**

by Mohammad Masud Hassan P.E.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 463-3337
June 15, 2011



Mohammad Masud Hassan is a Hydrologist in the Groundwater Availability Modeling Section of the Texas Water Development Board and is responsible for the work performed in this report. The seal appearing on this document was authorized by Mohammad Masud Hassan, P.E. 95699 on June 15, 2011.

GAM RUN 11-002: RED SANDS GROUNDWATER CONSERVATION DISTRICT MANAGEMENT PLAN

by Mohammad Masud Hassan P.E.
Texas Water Development Board
Groundwater Resources Division
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(512) 463-3337

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the Executive Administrator of the Texas Water Development Board in conjunction with any available site-specific information provided by the district for review and comment to the Executive Administrator. Information derived from groundwater availability models that shall be included in the groundwater management plan includes:

- the annual amount of recharge from precipitation to the groundwater resources within the district, if any;
- for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers; and
- the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The purpose of this model run is to provide information to the Red Sands Groundwater Conservation District for its groundwater management plan based on the district boundaries. Red Sands Groundwater Conservation District overlies the Gulf Coast Aquifer.

This report discusses the method, assumptions, model/analysis limitations, and results from a model run using the groundwater availability model for the southern section of the Gulf Coast Aquifer. Table 1 summarizes the groundwater availability model data required by statute, and figure 1 shows the areas of the model from which the values in table 1 were extracted. If after review of figure 1, Red Sands Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current district boundaries, please notify the Texas Water Development Board.

METHODS:

We ran the groundwater availability model for the southern section of the Gulf Coast Aquifer and (1) extracted the water budget for each year of the 1981 through 2000 period and (2) averaged the annual water budget values for recharge, surface water outflow, inflow to the district, outflow from the district, net inter-aquifer flow (upper), and net inter-aquifer flow (lower).

PARAMETERS AND ASSUMPTIONS:

Groundwater availability model for the southern section of the Gulf Coast Aquifer

- We used version 2.01 of the groundwater availability model for the southern section of the Gulf Coast Aquifer. See Chowdhury and others (2003) for assumptions and limitations of the model.
- The model includes four layers representing: the Chicot Aquifer (Layer 1), the Evangeline Aquifer (Layer 2), the Burkeville Confining Unit (Layer 3), and the Jasper Aquifer including parts of the Catahoula Formation, as appropriate (Layer 4).
- The model was calibrated to the transient water levels for 1981 to 2000. The mean absolute error (a measure of the difference between simulated and actual water levels during model calibration) for the aquifers is 14 feet for 1980-1990, and 15 feet for 1990-2000.
- We used Processing MODFLOW for Windows (PMWIN) (Version 5.3.0, W. H. Chiang & W. Kinzelbach 1991-2001) as the interface to process model output.

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifers according to the groundwater availability models. Selected components were extracted from the groundwater budget for the aquifers located within the district and averaged over the duration of the calibration and verification section of each model run (1981 through 1999 for the southern section of the Gulf Coast Aquifer) in the district as shown in Table 1. The components of the modified budget shown in Table 1 include:

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- Precipitation recharge—This is the distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.
- Surface water outflow—This is the total water exiting the aquifer (outflow) to surface water features such as streams, reservoirs, and drains (springs).
- Flow into and out of district—This component describes lateral flow within the aquifer between the district and adjacent counties.
- Flow between aquifers—This describes the vertical flow, or leakage, between aquifers or confining units. This flow is controlled by the relative water levels in each aquifer or confining unit and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs. “Inflow” to an aquifer from an overlying or underlying aquifer will always equal the “Outflow” from the other aquifer.

The information needed for the district’s management plan is summarized in Table 1.

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TABLE 1: SUMMARIZED INFORMATION FOR THE GULF COAST AQUIFER THAT IS NEEDED FOR RED SANDS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

<i>Management Plan requirement</i>	<i>Aquifer or confining unit</i>	<i>Results</i>
Estimated annual amount of recharge from precipitation to the district	Gulf Coast Aquifer	182
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Gulf Coast Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Gulf Coast Aquifer	2,277
Estimated annual volume of flow out of the district within each aquifer in the district	Gulf Coast Aquifer	2,036
Estimated net annual volume of flow between each aquifer in the district	Not applicable	*Not applicable

*Groundwater availability models assume no interaction between the Gulf Coast Aquifer System and underlying units.

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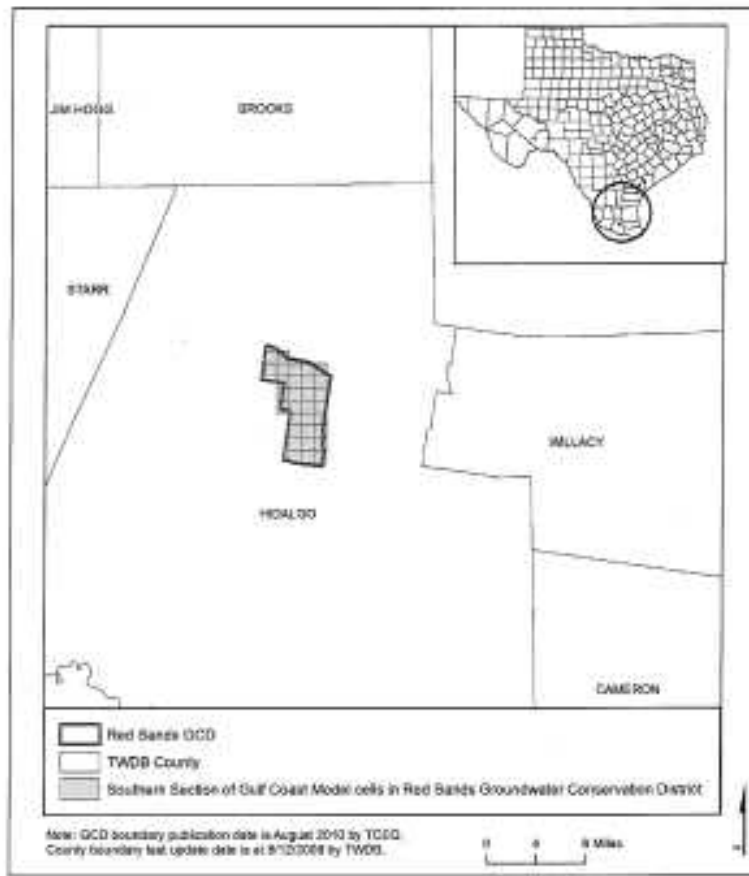


FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODELS FOR THE GULF COAST AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS:

The groundwater model(s) used in completing this analysis is the best available scientific tool that can be used to meet the stated objective(s). To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

“Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results.”

A key aspect of using the groundwater model to evaluate historic groundwater flow conditions includes the assumptions about the location in the aquifer where historic pumping was placed. Understanding the amount and location of historic pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and streamflow are specific to a particular historic time period.

Because the application of the groundwater model was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historic precipitation patterns also need

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to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as district or county boundaries, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located (see Figure 1).

REFERENCES:

Chowdhury, Ali H. and Mace Robert, 2003, A Groundwater Availability Model of the Gulf Coast Aquifer in the Lower Rio Grande Valley, Texas: Numerical Simulations through 2050: a report by the Texas Water Development Board, 176 p., http://www.twdb.state.tx.us/gam/glfc_s/Glfc_s_Oct2003Report.pdf

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