WES-TEX GROUNDWATER CONSERVATION DISTRICT

MANAGEMENT PLAN

Adopted by the Board of Directors

December 17, 2014

DISTRICT MISSION

The Wes-Tex Groundwater Conservation District is committed to providing for the conservation, protection, the enhancement of recharge, and the prevention of waste of groundwater within the District by developing and implementing an efficient, economical and environmentally sound conservation program with full consideration and respect for the individual citizens of the District.

TIME PERIOD FOR THIS PLAN

This plan becomes effective upon the adoption by the Board of Directors of the Wes-Tex Groundwater Conservation District and approval by the Texas Water Development Board. The plan will be readopted with or without changes by the District Board and submitted to the Texas Water Development Board for approval at least every five years. {TWC §36.1072(e)}

STATEMENT OF GUIDING PRINCIPLES

The citizens of Nolan County recognize the vital importance of groundwater to the economy and longevity of the county. Groundwater being the predominate water resource, the district recognizes the need to conserve and protect the quantity and the quality of groundwater through prudent and cost effective management. The goals of this plan can be best achieved through guidance from locally elected board members who have an understanding of local conditions as well as technical support from knowledgeable agencies. Management planning should be based upon an awareness of the hydrogeologic 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 district activities, but should allow flexibility in achieving its goals.

GENERAL DESCRIPTION

The District was created by the citizens of Nolan County through election in November, 2002. There are nine members of the District's Board of Directors, elected as follows: one Director representing each of the Nolan County Commissioner's precincts and a member from an incorporated area and an unincorporated area within each of the four precincts. Additionally, one director is elected as an at-large position from the entire county. The Wes-Tex Groundwater Conservation District is co-extensive with the boundaries of Nolan County, Texas.

The county has a diverse economy, with energy, agriculture and industry all represented. Livestock operations include cattle, sheep, goats, and hogs. Crops include cotton, sorghum, wheat, hay, pecans, and some fruits and vegetables. One of the major industries is United States Gypsum, which began operations in Nolan County in 1924. Wind energy has recently become a major economic force in the county, with several large wind fields constructed since 2000. Oil and gas production have been a part of Nolan County for several decades. Lone Star Industries

has been a major economic force since 1950. Texas State Technical College in Sweetwater is a vocational training facility that opened in 1970. Communities in the county include Sweetwater, Roscoe, Blackwell, Maryneal, and Nolan-Divide. The largest tourist attraction is the Sweetwater Rattlesnake Roundup held in March of each year.

LOCATION AND EXTENT

The Wes-Tex Groundwater Conservation District shares a boundary with Nolan County. Nolan County is in west central Texas, bounded on the east by Taylor County, on the south by Coke and Runnels counties, on the west by Mitchell County, and on the north by Fisher County. The center of the county lies at 32°18' north latitude and 100°24' west longitude. Sweetwater, the county seat and largest population center, is forty-two miles west of Abilene, 125 miles southeast of Lubbock, and 130 miles northeast of Odessa. The county was named for Philip Nolan. It lies on the lower plains, with the western end of the Callahan Divide in the southern section of the county. The loamy soils of the county are light to dark, with deep, clayey or loamy subsoils and lime accumulations. The county has very little timber; hackberry, scrubby post oak, cottonwood, and mesquite trees grow along the streams, and Rocky Mountain junipers or scrub cedars grow on the hillsides. Annual rainfall averages 22.19 inches, and the growing season averages 221 days. Temperatures range from an average minimum of 30° F in January to an average maximum of 96° F in July. The agricultural economy centers around cattle and livestock products, but 50 percent of the annual agricultural income is from crops, especially cotton, wheat, sorghum, and hay. Petroleum, natural gas, gypsum, rock, and sand and gravel are also produced in the county. *

*Taken from "NOLAN COUNTY." Handbook of Texas Online. <http:www.tshautexas.edu/handbook/online/view/NN/hcn4.html> [Accessed Tue Aug 17 9:43 US/Central 2004.] *by Gerald McDaniel*

TOPOGRAPHY AND DRAINAGE

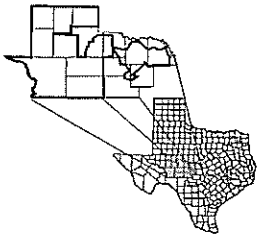
The land is predominantly rolling uplands to the north, with plateaus traversed by valleys in the south; altitudes range from 2,000 to 2,700 feet above sea level. Streams in the northern part of the county, including Cottonwood, Bitter, Stink, and Sweetwater creeks, drain into the Clear Fork of the Brazos River. In the southern part of the county Silver, Wilson, Fish, and Oak creeks drain into the Colorado River.* USDA Hydrogeologic Units include #4812060102 – Brazos Watershed in the northern half of the county, #481208002 – Upper Colorado and Champion Watershed in the middle western portion of the county, #4812080008 – Oak Creek / Spence Watershed in the southern third of the county, and #4812090101 – Valley Creek Watershed in the extreme southeastern portion of the county. *(Source: USDA Natural Resources Conservation Service, Abilene Field Office)*

*Taken from "NOLAN COUNTY." Handbook of Texas Online. <http:www.tshautexas.edu/handbook/online/view/NN/hcn4.html> [Accessed Tue Aug 17 9:43 US/Central 2004; B*y Gerald McDaniel*

REGIONAL COOPERATION AND COORDINATION

West Texas Regional Groundwater Alliance

As a groundwater conservation district within the boundaries of the Region F Regional Water Planning Group, the District is a cooperating member of the West Texas Regional Groundwater Alliance. In 1988, four groundwater conservation districts; Coke County UWCD, Glasscock County UWCD, Irion County WCD, and Sterling County UWCD signed an original Cooperative Agreement. In the fall of 1996, the original Cooperative Agreement was redrafted and the West Texas Regional Groundwater Alliance was created.



The regional alliance presently has a membership of eighteen locally created and locally funded groundwater conservation districts that encompass almost 9.34 million acres or 14,594 square miles of West Texas. This West Texas region is very diverse in aquifer characteristics, aquifer yields, types of agricultural production, water quality and other factors which make it necessary for each member district to develop its own unique management programs to best serve its constituents. At the same time, however, the member districts share data and technical information, co-ordinate management strategies, develop certain uniform procedures and forms, and conduct policy discussions.

The current member districts are:

Coke County UWCD	Crockett County GCD
Glasscock GCD	Hickory UWCD # 1
Hill Country UWCD	Irion County WCD
Jeff Davis County UWCD	Kimble County GCD
Lipan-Kickapoo WCD	Lone Wolf GCD
Menard County UWD	Middle Pecos GCd
Permian Basin UWCD	Plateau UWC & SD
Santa Rita UWCD	Sterling County UWCD
Sutton County UWCD	Wes-Tex GCD

Region G Regional Water Planning Group

The District is located within the Region G Regional Water Planning Group. The general manager of the District is currently the Groundwater Management Area 7 voting representative on the Brazos G Regional Water Planning Group and attends the meetings. Consequently the District participates in the exchange of information and coordination of groundwater and surface water management strategies between GMA 7 and the Brazos G RWPG.

Groundwater Management Area 7

In 2003 the Texas Water Development Board designated the boundaries of 16 groundwater management areas in Texas. The District lies entirely within Groundwater Management Area 7,

which encompasses 34 counties and 21 groundwater conservation districts within an area of approximately 42,000 square miles. The groundwater management area was designated for the Edwards-Trinity aquifer, but also includes all or portions of the minor Lipan-Kickapoo, Hickory, Ellenburger-San Saba, Dockum, Capitan Reef and Rustler aquifers, as well as a small portion of the Ogallala and Trinity aquifers.

The District participates in the joint planning process mandated by 36.108 of the Texas Water Code and is actively working with the other 20 GMA- 7districts to develop Desired Future Conditions for the Edwards-Trinity (Plateau), Dockum and Blaine Aquifers.

GROUNDWATER RESOURCES OF THE WES-TEX GROUNDWATER CONSERVATION DISTRICT

Only two formations constitute significant aquifers in Nolan County. These are the Antlers Sand of the Cretaceous Trinity Group and the Santa Rosa Formation of the Triassic Dockum Group. In many areas of western Nolan County, the Antlers Sand and the Santa Rosa Formation lie beneath the limestones of the Edwards Group. Where the Edwards limestone and the Antlers Sand have been stripped away by erosion, the Dockum Group is either exposed or buried beneath the sand and gravel deposits of the Ogallala Formation (Pliocene). In some areas, the Ogallala also lies above the Antlers Sand. Although a major aquifer in the High Plains of western Texas, the Ogallala Formation in Nolan County lies above the regional water table and provides a pathway for the downward movement of water to recharge the Antlers and the Santa Rosa. Permian rocks lie beneath the Dockum Group, and are present in the subsurface throughout the county. In the northern part of the county, these rocks form extensive outcrops where erosion has removed the younger Cretaceous and Triassic rocks. Permian Rocks are in this area of Texas, however, are not a significant source of water.

The Antlers Sand provides small volumes of stock water for farms and ranches. The yields of many of the wells producing from this formation are less than 20 gallons per minute (gpm), although a few irrigation wells are reported to have yields of greater than 100 gpm. The 2006 Brazos G Regional Water Plan estimates an average availability of groundwater from the Antlers Sand (Edwards-Trinity) of 1000 acre feet per year in Nolan County.

The Santa Rosa Formation is the only significant source of groundwater. The formation is present in western Nolan County, but disappears toward the east and south because of erosion preceding the deposition of the Cretaceous formations. The formation probably disappears slightly to the west of Maryneal and east of Roscoe. The aquifer is confined in areas where the Santa Rosa lies beneath the Antlers Sand and the Edwards limestone. Recharge occurs by leakage through the overlying formations. Where the Santa Rosa Formation lies beneath the Ogallala Formation, groundwater occurs under unconfined conditions, and recharge is traceable to leakage from the Ogallala. The Texas Water Development Board estimates there are 569,920 acre feet of groundwater in storage in the Dockum aquifer in Nolan County, with all of that water having less than 5,000 mg/l of total dissolved solids (TDS). This is an estimate of storage only, not recoverable water. The 2006 Brazos Region G Water Plan estimates that only 3500 acre feet are available each year from the Dockum aquifer in Nolan County. The Trinity Edwards and the Dockum aquifers combined have a total availability of 4000 acre feet of water per year in Nolan County.

The Blaine Aquifer occurs in a very small area in northern Nolan County and the groundwater produced from such aquifer is of poor quality and small volume. Based on data that is currently available, it is believed that the groundwater produced from the Blaine aquifer is not a significant source of water in Nolan County. Accordingly, the District Board does not anticipate

including the aquifer in its joint planning efforts and will not be setting a Desired Future Condition for the aquifer. In the event additional data is discovered to the contrary, the District Board will re-evaluate its position with regard to the Blaine Aquifer and include a comprehensive discussion of same in a future management plan.

In western Nolan County, there is a strong possibility of contamination by herbicides, pesticides and fertilizers. There is also a possibility of contamination by oil field brine.*

* *Report on Potential Areas for Groundwater Development in the Vicinity of Sweetwater, Nolan County, Texas:* LBG-Guyton Associates, Austin, Texas. February 1997. Used with permission from the City of Sweetwater.

TABLE 1. SUMMARIZED INFORMATION FOR THE EDWARDS-TRINITY (PLATEAU) AQUIFER THAT IS NEEDED FOR WES-TEX GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN

(ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.)

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Edwards-Trinity (Plateau) Aquifer	11,385
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Edwards-Trinity (Plateau) Aquifer	10,813
Estimated annual volume of flow into the district within each aquifer in the district	Edwards-Trinity (Plateau) Aquifer	215
Estimated annual volume of flow out of the district within each aquifer in the district	Edwards-Trinity (Plateau) Aquifer	1,197
Estimated net annual volume of flow between each aquifer in the district	*Not Applicable (NA)	NA*

*Not applicable because model assumes a no-flow boundary at the base.

Source: GAM Run 13-030 Wes-Tex GCD Management Plan
TWDB February 18, 2014
See Appendix A for full text of GAM Run 13-030

TABLE 2. SUMMARIZED INFORMATION FOR THE DOCKUM AQUIFER THAT IS NEEDED FOR WES-TEX GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN

(ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.)

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Dockum Aquifer	7,136
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Dockum Aquifer	516
Estimated annual volume of flow into the district within each aquifer in the district	Dockum Aquifer	84
Estimated annual volume of flow out of the district within each aquifer in the district	Dockum Aquifer	321
Estimated net annual volume of flow between each aquifer in the district	*Not Applicable	NA*

*Not applicable because model assumes a no-flow boundary at the base.

Source: GAM Run 13-030 Wes-Tex GCD Management Plan
TWDB February 18, 2014
See Appendix A for full text of GAM Run 13-030

TABLE 3. SUMMARIZED INFORMATION FOR THE *BLAINE AQUIFER THAT IS NEEDED FOR WES-TEX GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN

(ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT)

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Blaine Aquifer	459
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Blaine Aquifer	232
Estimated annual volume of flow into the district within each aquifer in the district	Blaine Aquifer	232
Estimated annual volume of flow out of the district within each aquifer in the district	Blaine Aquifer	593
Estimated net annual volume of flow between each aquifer in the district	From other Permian units to Blaine Aquifer	1737*

*The groundwater availability model for Seymour and Blaine Aquifers only partially represents the Blaine Aquifer. Therefore the values presented here are based on numerical approximations and should be used cautiously.

Source: GAM Run 13-030 Wes-Tex GCD Management Plan
TWDB February 18, 2014
See Appendix A for full text of GAM Run 13-030

MODELED AVAILABLE GROUNDWATER

Pursuant to provisions of §36.108 of the Texas Water Code enacted by HB 1763 in 2005, the groundwater conservation districts (GCDs) in groundwater management areas (GMAs) designated by the Texas Water Development board are required to meet jointly and adopt, by a two-thirds vote of the districts, Desired Future Conditions (DFC) for the aquifers within the respective GMAs. DFCs are defined as "a quantitative description of the desired condition of the groundwater resources in a management area at one or more specified future times."
Once DFCs have been adopted by the GMA, they are submitted to the Texas Water Development Board which, in turn, calculates for each district within the GMA the amount of modeled available groundwater (MAG) within the district.
Section 36.001 of the Texas Water Code defines modeled available groundwater as "the amount of water that the Executive Administrator (of the TWDB) determines may be produced on an average annual basis to achieve a desired future condition established under §36.108."

The table below sets forth the MAGS that were calculated for the Wes-Tex GCD by the TWDB for DFCS that were adopted by GMA 7 in July of 2010.

MODELED AVAILABLE GROUNDWATER IN THE WES-TEX GCD
2010-2060
(in acre-feet)

AQUIFER	YEAR					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Edwards-Trinity (Plateau)	693	693	693	693	693	693
Dockum	5,750	5,750	5,750	5,750	5,750	5,750
Total	6,443	6,443	6,443	6,443	6,443	6,443

Source: Texas Water Development Board
GR10-043 MAG Ver. 2 - MAG for Edwards-Trinity (Plateau), Pecos Valley Alluvium and Trinity Aquifers in GMA 7
November 12, 2012
GR 10—040 MAG Ver.2 - MAG for Dockum Aquifer in GMA 7
June 22, 2012

There are currently no Modeled Available Groundwater numbers for the Blaine Aquifer in the District. Only a very small area of the aquifer underlies the district in the northern part of the county. The water is generally of poor quality and primarily used for livestock.

HISTORICAL GROUNDWATER USE WITHIN THE DISTRICT

Historical Groundwater Use within the District between 2000 and 2012 has ranged from a low of 5,204 acre-feet/year in 2001 to highest use of 14,792 acre-feet/year in 2011. Irrigation is the major use of groundwater.

See Appendix B, Table 1. *Estimated Historical Water Use*, TWDB, December 9, 2014 for details of historic groundwater use.

SURFACE WATER RESOURCES OF THE DISTRICT

Surface water availability in the Wes-Tex GCD is limited to small allocations from the Brazos River and the Lake Sweetwater Reservoir. The City of Sweetwater has authorized storage in Lake Sweetwater of 10,000 acre feet, and an authorized diversion of 3,740 acre feet. The priority date on this right is 10/17/27.

However, the frequent and extended droughts since the late 1990's have forced the City of Sweetwater to depend upon groundwater withdrawals for municipal use.

With regard to Brazos River Rights, H&H Feedlot in Nolan County has a 45 acre feet per year authorized diversion from the Brazos River, with a 1958 of priority date. Additionally, there are 90 acre feet per year authorized diversions for irrigation use.

PROJECTED SURFACE WATER SUPPLY IN THE DISTRICT

Total surface water supply for the district is projected to be 584 acre-feet annually for the 2010-2060 planning period. The largest use of surface water is for livestock local supply.

See Appendix B. Table 2. *Projected Surface Water Supplies*, TWDB, September 24, 2014

PROJECTED WATER DEMANDS

Total water demands within the district for the 2010-2060 planning period are projected to increase from 10,989 acre-feet/year in 2010 to 30,233 acre-feet in 2030, and then decline to 29,811 acre-feet/year in 2060. Steam electric power is projected to account for most of the increase. Demand for public water supply and irrigation is projected to decrease 2010-2060.

See Appendix B. Table 3. *Projected Water Demands*, TWDB September 24, 2014

PROJECTED WATER SUPPLY NEEDS

Total projected water supply needs over the 2010-2060 planning period will range from 5,660 acre-feet/year in 2010, to 24,654 acre-feet/year in 2030, declining to 24,026 acre-feet/year in 2060.

See Appendix B, Table 4. *Projected Water Supply Needs*, TWDB, September 24, 2014

PROJECTED WATER MANAGEMENT STRATEGIES

Total projected water management strategies for the District for the 2010-2060 planning period range from 3,707 acre-feet/year in 2010 to 24,085 acre-feet in 2030 and 23,699 acre-feet/year in 2060. The major strategy is voluntary redistribution of 20,000 acre-feet/year for steam electric power from Cedar Ridge Lake/ Reservoir from 2030 through 2060.

See Appendix B, Table 5. *Projected Water Management Strategies*, TWDB, September 24, 2014

How Natural or Artificial Recharge of Groundwater Within The District Might Be Increased {31 TAC §356.5(a)(5)(C)}

Brush Management: The eradication of mesquite *(Prosopis sp.)* and juniper *(Juniperus sp.)* from areas of moderate to heavy brush canopy would yield additional groundwater supplies.

Groundwater Recharge Structures: Structures designed to collect impound surface water in canyons and streambeds cut into fractured rock could increase the volume of water available for recharge by slowing the amount of surface runoff during flood events.

DISTRICT MANAGEMENT OF GROUNDWATER SUPPLIES

Based on estimates of current supplies and projections it is obvious that issues will arise when demands exceed supplies. The District will use all regulatory statutes available to encourage the cities of Sweetwater and Roscoe, and the Water Supply Corporations in the District to develop conservation plans and additional surface water supplies. The District will also encourage the creation of additional water supplies through groundwater conservation education programs at the school and community levels.

The District will continue to identify and engage in such activities and practices, that if implemented, would result in the conservation and protection of the groundwater. The observation and monitoring network will continue to be reviewed and maintained in order to monitor changing conditions of groundwater within the District. The District will undertake investigations of the groundwater resources within the District and will make the results of those investigations available to the public.

The District will adopt, as necessary, rules to regulate the groundwater withdrawals by means of spacing and/or production limits. The relevant factors to be considered in making the determination to grant a permit or limit groundwater withdrawal will include:

1. The purpose of the District and its rules;
2. The equitable conservation and preservation of the resource, and;
3. The economic hardship resulting from granting or denying a permit or the terms prescribed by the rules.

In pursuit of the District mission of conserving and protecting the resource, the District will enforce the terms and conditions of permits and rules of the District by enjoining the permit holder in a court of competent jurisdiction, as provided for in TWC §36.102, if necessary.

ACTIONS, PROCEDURES, PERFORMANCES AND AVOIDANCE FOR PLAN IMPLEMENTATION
{31 TAC §356.5(a)(4)}

The District will implement the provisions of the plan and will utilize the provisions of the 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 the plan.

The District will adopt, as necessary, rules relating to the implementation of this plan. The rules adopted by the District shall be pursuant to TWC §36 and the provisions of this plan. All rules will be adhered and enforced. The promulgation and enforcement of the rules will be based upon the best technical evidence available. The current rules of the District are available in the District office and also online at http://westexgcd.org/documents/adoptedrules.pdf.

The District shall treat its citizens non-discriminatorily. Citizens may apply to the District for a discretionary exception or variance in enforcement of the rules on grounds of adverse economic effect or unique local characteristics. In exercising such discretion, the District Board shall

consider the potential for adverse effect on adjacent landowners, aquifer conditions across the district, and the effect on implementation of the District's Desired Future Condition and negative precedent. The exercise of such discretion by The District Board shall not be construed as limiting the power of The District Board.

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

The District Manager will prepare and present an annual report to The District Board of Directors on the District performance in regards to achieving management goals and objectives (during the first monthly Board of Directors meeting each fiscal year, beginning October 1, 2005.) This report 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 – Providing for the Most Efficient Use of Groundwater {31 TAC §356.52(a)(1)(A)}

1.1 Management Objective

Each year, on two (2) or more occasions, the District will disseminate educational information relating to conservation practices for the efficient use of water resources. These will include but are not limited to publications from the Texas Water Development Board, the Texas Commission on Environmental Quality, Texas Cooperative Extension Service, the Texas Water Resource Institute, and other resources.

1.1 Performance Standard - Number of occasions, annually, that the District distributed educational information packets related to conservation practices for the efficient use of groundwater will be reported to in the Annual Report to the Board of Directors

GOAL 2.0 – Controlling and preventing waste of groundwater {31 TAC §356(a)(1)(B)}

2.1 Management Objective

The District will track the number and status of reported wasteful practices and non-beneficial water use in the District. If a wasteful practice is reported to the District, the District will respond in writing within five (5) working days.

2.1 Performance Standard – All reports of wasteful practices will be summarized in the annual report to the Board of Directors. Summaries shall include all relevant dates, information, and any remedial action taken by the District (if applicable).

2.2 Management Objective

The general manager will disseminate educational information or article concerning beneficial use and the identification of wasteful practices on at least two occasions each year.

2.2 Performance Standard – The number of occasions the District submitted or disseminated information to district citizens shall be reported to the board of directors in the annual report each year.

GOAL 3.0 Addressing Conjunctive Surface Water Issues {TAC §356.5(a)(1)(D)}

3.1 Management Objective

The district will coordinate with the City of Roscoe to explore to opportunities for conjunctive use of surface water and groundwater for the City's public water supply.

3.1 Performance Standard – The district manager will meet once a year with the city manager and/or the city water utilities manager of Roscoe annually (once per year) to discuss conjunctive water use implementation. Documentation of this meeting will be included in the annual report.

3.2 Management Objective

The District will actively participate in the Brazos Region G Regional Planning Process to monitor surface water issues and data that has potential for implementation of conjunctive use in the district.

3.2 Performance Standard – The general manager will attend at least two meetings of the Brazos G

RPG annually, will review the agenda of each meeting available on the Brazos G RPG website, and will include in the District annual report a report of relevant agenda items relating to conjunctive use that were discussed in the Brazos G RWPG meetings.

Goal 4.0 - Addressing Natural Resource Issues Which Impact the Use and Availability of Groundwater, and Which are Impacted by the Use of Groundwater {31 TAC §356..

4.1. Management Objective

Although there is very little oil production in the District, one or more selected wells within areas of the District where there is oil production will be tested for possible petroleum related contamination which would jeopardize the integrity of the groundwater resource.

4.1 Performance Standard - Once each year two well samples will be collected and analyzed for petroleum-related contamination in areas of the district where there is oil production.

GOAL 5.0 – Addressing Drought Conditions {31 TAC §356.(a)(1)(F)}

5.1 Management Objective

On a monthly basis, provided updates have been posted, the district will download updated information from the U. S. Drought Monitor website www.droughtmonitor.unl.edu. In addition, the district will check for the periodic updates to drought monitoring information on www.waterdatafortexas.org/drought .

5.1 Performance Standard – At least quarterly, the District will assess the status of drought in the District and will provide information from the U. S. Drought Monitor website, if available, to the Board of Directors. The U. S. Drought Monitor information and other downloaded drought information will be included in the District annual report provided to the Directors.

GOAL 6.(a) – Addressing Conservation {TAC §356.52(a)(1)(G)}

6(a)1. Management Objective

The district will submit an article regarding water conservation for publication each year to at least one newspaper of general circulation in Nolan County.

6(a)1. Performance Standard – A copy of the article submitted by the District for publication will be included in the annual report given to the Board of Directors.

6(a)2. Management Objective

District personnel will at least once a year, present a water conservation program to school, 4-H, scouting, or a community group. Conservation literature will be distributed to participants at the program.

6(a)2. Performance Standard – A summary of programs presented, content, and audience group will be submitted in the annual report. A list of conservation literature distributed the audience will be included with the summary. The number of programs presented will be included in the report.

GOAL 6 (b) Addressing Rainwater Harvesting {TAC §356.52(a)(1)(G)}

6 (b)1. Management Objective

Include literature on rainwater harvesting in one public education presentation annually.

6 (b)1. Performance Standard - Annual report to Board including the number of presentations of rainwater harvesting literature at educational presentation. The title of documents distributed will be included in the Annual Report to the Board of Directors.

GOAL 6(c) - Addressing brush control {TAC §356.52(a)(1)(G)}

6 (c)1. Management Objective

Include literature on brush control in one conservation presentation annually including information on the TSSCB Water Supply Enhancement or NRCS EQIP cost-share programs.

6(c)1. Performance Standard - Annual report to Board will report the presentations at which brush control literature was distributed, including a list of literature provided.

GOAL 7.0 Addressing Desired Future Conditions { TWC §36.108}

7.1 Management Objective

The District will implement a district-wide monitoring network to evaluate implementation of Desired Future Conditions. The monitoring network will be comprised of voluntary well owners. At least twenty wells will be monitored by district personnel (or assigns) for static water levels at least quarterly each year. The District will monitor well levels in at least one well in each aquifer in the district. The District will also review TWDB-measured groundwater levels, if any, in the District. The District annual report will show the change in water levels in each monitor wells from the previous year, and once a five-year record of well levels has been established, will show the change from levels taken five years previously.

7.1 Performance Standard – The number of wells involved in the monitoring network, and respective static water levels, will be reported to the Board of Directors annually, as well as levels in TWDB-measured wells, if any. Wells will be placed on a well numbering grid map for reference. The change in water levels in each monitor well from the previous year, and, once a five-year record of well levels has been established, the change from levels taken five years previously, will be included in the annual report.

Management Goals Not Applicable to the District

Controlling and Preventing Subsidence: The District has not been advised as to any issues with subsidence that exist within the boundaries of the District.
{31 TAC §356.5(a)(1)(E)}

Recharge Enhancement: This management plan addresses groundwater recharge structures. Groundwater recharge structures, although a possible method for increase of recharge is not an economically feasible strategy for implementation at this time. {TWC §36.1071(a)(7)}

Precipitation Enhancement: There is no existing precipitation enhancement program operating in Nolan County or surrounding counties with which the District could participate and share costs.
The cost of operating a single county precipitation enhancement program is not economically feasible.
{TWC §36.1071(a)(7)}

Action Required for Plan Approval
{31 TAC §356.6}

The initial management plan for the Wes-Tex Groundwater Conservation District was adopted by resolution on November 4, 2004.
The current management plan, approved by the Board in April of 2009, will remain in effect until the District adopts an amended plan that is approved by the TWDB. The amended management plan will become effective as of the date of approval by the TWDB. To comply with the requirements of Chapter 36 of the Texas Water Code, the District will review its existing management plan annually and readopt the plan with or without revisions at least every five years.

References

2012 State Water Plan – Texas Water Development Board.

Aquifers of the Edwards Plateau, Texas Water Development Board, Report 360, edited by Mace, Angle and Mullican, February, 2004.

Aquifers of Texas, Texas Water Development Board, Report 345, by Ashworth and Hopkins, November, 1995.

GAM of the Edwards-Trinity (Plateau) Aquifer of Texas, Texas Water Development Board, by Anaya, R. and Ridgeway, C., October 2004.

GAM 09-013 of the Edwards-Trinity (Plateau) Aquifer of Texas, Texas Water Development Board.

Groundwater Availability in Texas, Texas Department of Water Resources, Report 238, by Muller, D.A. and Price, R.D., 1979.

"NOLAN COUNTY." Handbook of Texas Online.
<http:www.tshautexas.edu/handbook/online/view/NN/hcn4.html> [Accessed Tue Aug 17 9:43 US/Central 2004.] *by Gerald McDaniel*

Report on Potential Areas for Groundwater Development in the Vicinity of Sweetwater, Nolan County, Texas: LBG-Guyton Associates, Austin, Texas. February 1997. Used with permission from the City of Sweetwater.

APPENDICES

APPENDIX A

GAM RUN 13-030: Wes-Tex Groundwater Conservation District Management Plan
Texas Water Development Board
February 18, 2014

APPENDIX B

ESTIMATED HISTORICAL WATER USE
AND 2012 STATE WATER PLAN DATASETS

Table 1. Estimated Historical Water Use
Table 2. 2012 State Water Plan – Projected Surface Water Supplies
Table 3. 2012 State Water Plan – Projected Water Demands
Table 4. 2012 State Water Plan - Projected Water Supply Needs
Table 5. 2012 State Water Plan – Projected Water Management Strategies

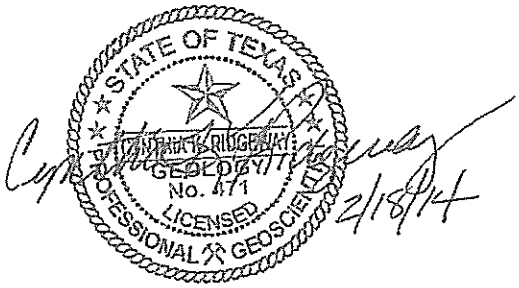
APPENDIX C

Nolan County Aquifer Maps

APPENDIX A

GAM Run 13-030: Wes-Tex Groundwater Conservation District Management Plan

by Rohit Raj Goswami, Ph.D.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 463-0495
February 18, 2014



Cynthia K. Ridgeway is the Manager of the Groundwater Availability Modeling Section and is responsible for oversight of work performed by Rohit Raj Goswami under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on February 18, 2014.

GAM Run 13-030: Wes-Tex Groundwater Conservation District Management Plan

by Rohit Raj Goswami, Ph.D.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 463-0495
February 18, 2014

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2011), 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 (TWDB) 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.

This report—Part 2 of a two-part package of information from the TWDB to Wes-Tex Groundwater Conservation District—fulfills the requirements noted above. Part 1 of the two-part package is the Historical Water Use/State Water Plan data report. The District will receive this data report from the TWDB Groundwater Technical Assistance Section. Questions about the data report can be directed to Mr. Stephen Allen, stephen.allen@twdb.texas.gov, (512) 463-7317.

The groundwater management plan for Wes-Tex Groundwater Conservation District should be adopted by the district on or before January 7, 2015 and submitted to the executive administrator of the TWDB on or before February 6, 2015. The current management plan for Wes-Tex Groundwater Conservation District expires on April 7, 2015.

This report discusses the methods, assumptions, and results from a model run using the groundwater availability models for the Edwards-Trinity (Plateau) Aquifer, Dockum Aquifer, and Seymour and Blaine aquifers. This model run replaces the results of GAM Run 09-013 (Aschenbach, 2009). GAM Run 13-030 meets current standards set after the release of GAM Run 09-013 including use of the extent of the official aquifer boundaries within the district rather than the entire active area of the model within the district. Tables 1, 2 and 3 summarize the groundwater availability model data required by statute, and Figures 1, 2 and 3 show the area of the model from which the values in the table were extracted. If after review of the figures, Wes-Tex Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the Texas Water Development Board immediately.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the groundwater availability models for the Edwards-Trinity (Plateau) Aquifer, Dockum Aquifer, and Seymour and Blaine aquifers were run for this analysis. Wes-Tex Groundwater Conservation District water budgets were extracted using ZONEBUDGET Version 3.01 (Harbaugh, 2009) for the historical model period (1) 1981 through 2000 for the Edwards-Trinity (Plateau) Aquifer and Blaine Aquifer and (2) 1980 through1997 for the Dockum Aquifer. The average 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) for the portion of the aquifer located within the district is summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Edwards-Trinity (Plateau) Aquifer

- We used version 1.01 of the groundwater availability model for the Edwards-Trinity (Plateau) and Pecos Valley aquifers. See Anaya and Jones (2009) for assumptions and limitations of the groundwater availability model for the Edwards-Trinity (Plateau) and Pecos Valley aquifers. The Pecos Valley Aquifer

does not occur within Nolan County and therefore no groundwater budget values are included for it in this report.

- This groundwater availability model includes two layers which generally represent the Edwards Group (Layer 1) and the Trinity Group (Layer 2) of the Edwards-Trinity (Plateau) Aquifer. Individual water budgets for the District were determined for the Edwards-Trinity (Plateau) Aquifer (Layer 1 and Layer 2 combined).

- The Edwards Group and equivalent limestone hydrostratigraphic units (Layer 1) are believed to be present in Nolan County, but they are not saturated. Therefore, no results are presented in Table 1 for this portion of the aquifer.

- The Edwards-Trinity (Plateau) Aquifer model assumes a no-flow boundary between the undifferentiated Trinity Group hydrostratigraphic units (Layer 2) and any underlying formations.

- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

Dockum Aquifer

- Version 1.01 of the groundwater availability model for the Dockum Aquifer was used for this analysis. See Ewing and others (2008) for assumptions and limitations of the groundwater availability model.

- This groundwater availability model includes three layers which generally represent the Ogallala, Edwards-Trinity (High Plains), Edwards-Trinity (Plateau), Pecos Valley, and Rita Blanca aquifers (Layer 1), the upper portion of the Dockum Aquifer (Layer2), and the lower portion of the Dockum Aquifer (Layer 3).

- The aquifers represented in Layer 1 of the groundwater availability model are only included in the model for the purpose of more accurately representing flow between these units and the Dockum Aquifer. This model is not intended to explicitly simulate flow in these overlying units (Ewing and others, 2008).

- The upper portion of the Dockum Aquifer, represented by Layer 2 of the groundwater availability model, is not present within the district. Therefore, no results are presented in Table 2 for this portion of the aquifer.

- The MODFLOW Drain package was used to simulate both evapotranspiration and springs. However, there are no spring cells defined in the portion of the model grid that covers the district. Therefore, all flows determined by the Drain

package for the district are considered to be evapotranspiration and are not included in the results for the surface water outflow presented in Table 2.

- The Dockum Aquifer is underlain by Permian-age sediments. Vertical flow between the Dockum Aquifer and the underlying Permian was assumed to be negligible and a no-flow boundary was set at the base of the Dockum Aquifer (Ewing and others, 2008).

- Groundwater in the Dockum Aquifer ranges from fresh to brine in composition (Ewing and others, 2008). Groundwater with total dissolved solids of less than 1,000 milligrams per liter are considered fresh, total dissolved solids of 1,000 to 10,000 milligrams per liter are considered brackish, and total dissolved solids greater than 35,000 milligrams per liter are considered brines.

- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

Blaine Aquifer

- We used version 1.01 of the groundwater availability model for the Seymour and Blaine aquifers. See Ewing and others (2004) for assumptions and limitations of the model.

- The model includes two layers representing the Seymour Aquifer (Layer 1) and the Blaine Aquifer and other Permian-age sediments (Layer 2). In areas where the Blaine Aquifer does not exist the model roughly replicates the various Permian units located in the study area.

- Seymour Aquifer, represented by Layer 1 of the groundwater availability model, is not present within the district. Therefore, no results are presented in Table 3 for this portion of the aquifer.

- Average annual recharge conditions were assumed in the simulation based on 1975 to 1999 climate data.

- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifer according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the model results for the aquifers located within the district and averaged over the duration of the calibration

and verification portion of the model run in the district, as presented in Tables 1, 2 and 3.

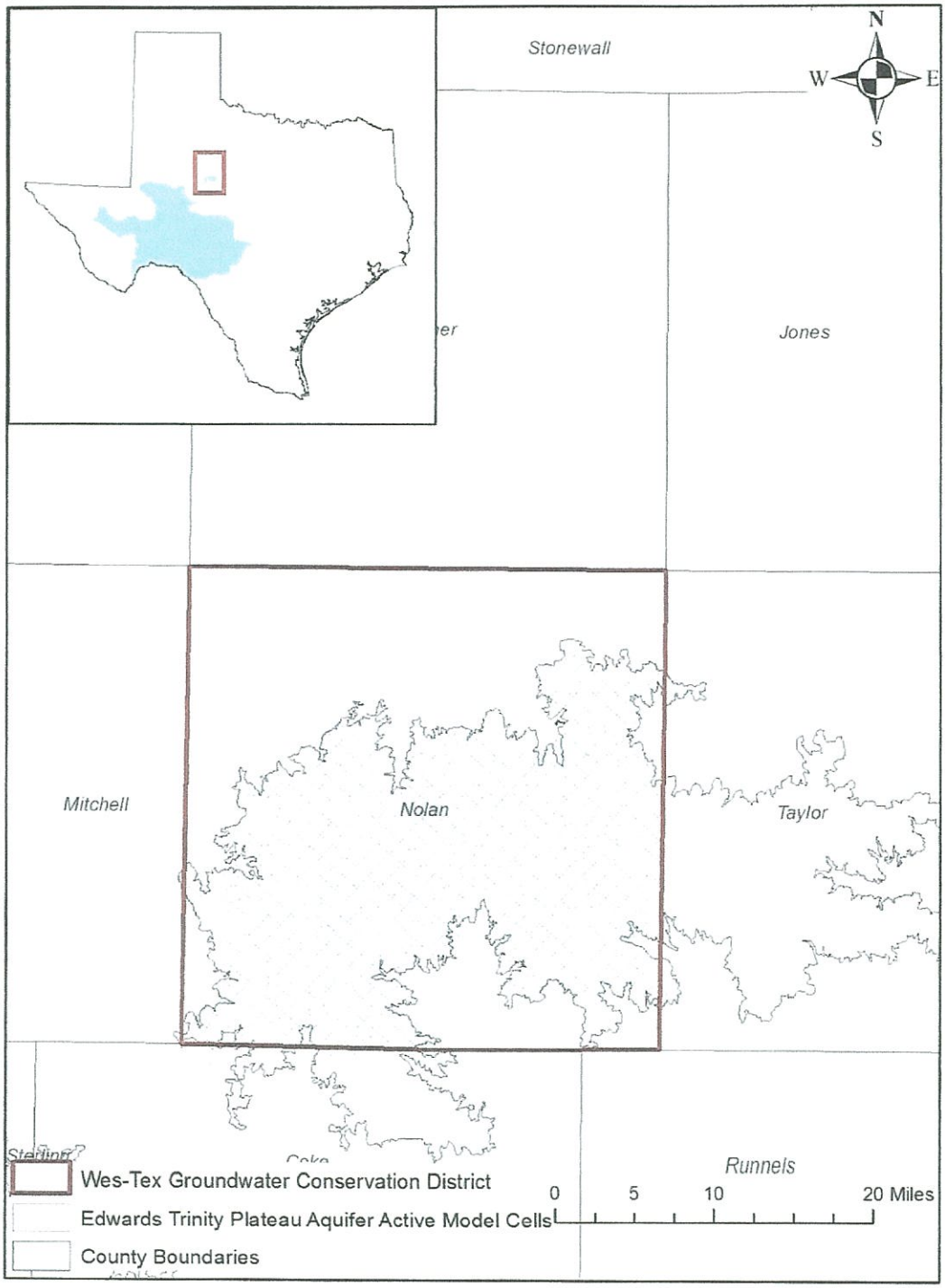
- Precipitation recharge—The areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.
- Surface water outflow—The total water discharging from the aquifer (outflow) to surface water features such as streams, reservoirs, and springs.
- Flow into and out of district—The lateral flow within the aquifer between the district and adjacent counties.
- Flow between aquifers—The net vertical flow between the aquifer and adjacent 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.

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 a district or county boundary, 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.

TABLE 1: SUMMARIZED INFORMATION FOR THE EDWARDS-TRINITY (PLATEAU) AQUIFER THAT IS NEEDED FOR WES-TEX GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Edwards-Trinity (Plateau) Aquifer	11,385
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Edwards-Trinity (Plateau) Aquifer	10,813
Estimated annual volume of flow into the district within each aquifer in the district	Edwards-Trinity (Plateau) Aquifer	215
Estimated annual volume of flow out of the district within each aquifer in the district	Edwards-Trinity (Plateau) Aquifer	1,197
Estimated net annual volume of flow between each aquifer in the district	*Not Applicable (NA)	NA*

*Not applicable because model assumes a no-flow boundary at the base.



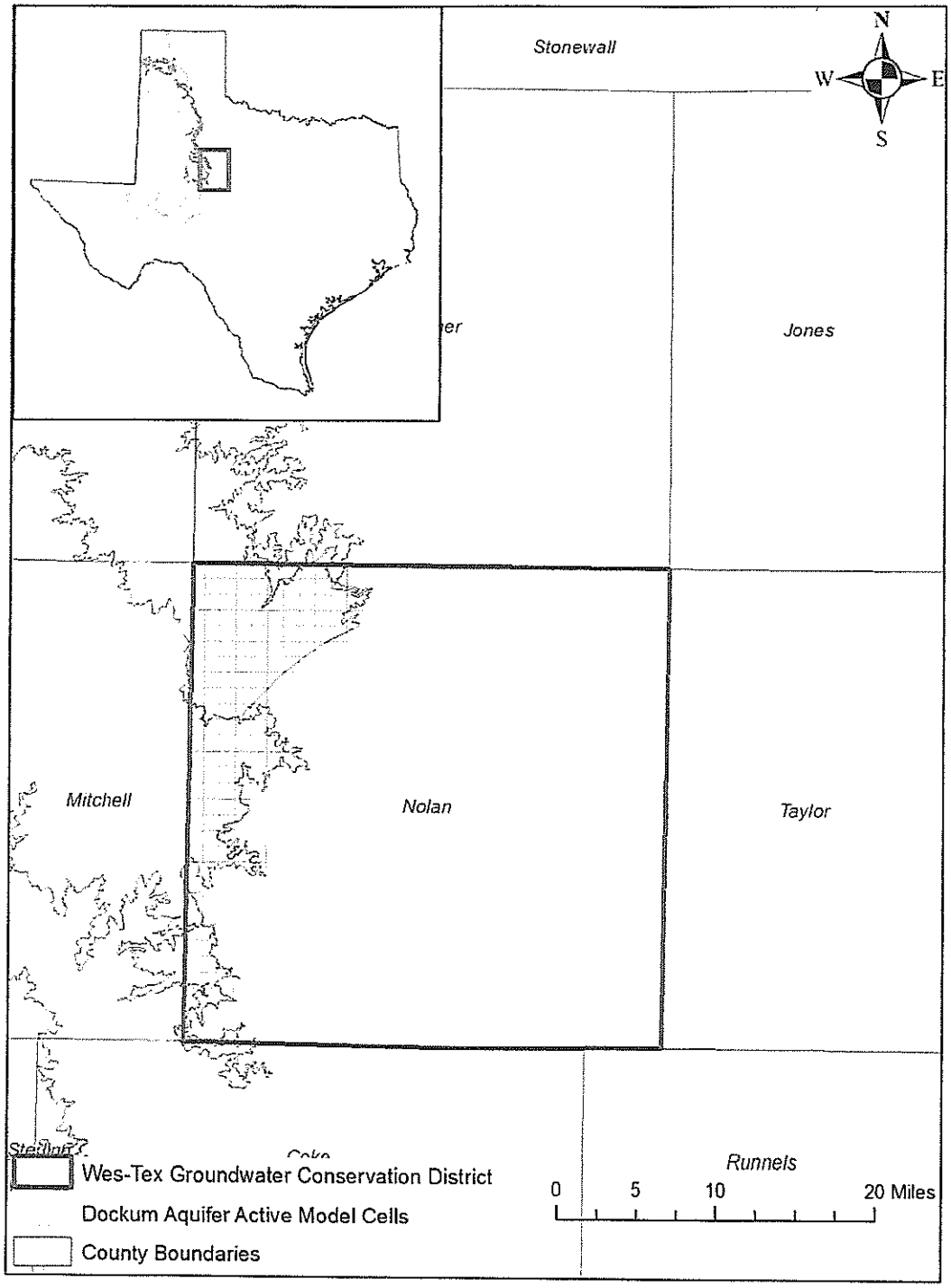
gcd boundary date = 09.25.13, county boundary date = 02.02.11, eddt_p model grid date = 08.05.13

FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODELS FOR THE EDWARDS-TRINITY (PLATEAU) AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER EXTENTS WITHIN THE DISTRICT BOUNDARY).

TABLE 2: SUMMARIZED INFORMATION FOR THE DOCKUM AQUIFER THAT IS NEEDED FOR WES-TEX GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Dockum Aquifer	7,136
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Dockum Aquifer	516
Estimated annual volume of flow into the district within each aquifer in the district	Dockum Aquifer	84
Estimated annual volume of flow out of the district within each aquifer in the district	Dockum Aquifer	321
Estimated net annual volume of flow between each aquifer in the district	*Not Applicable	NA*

*Not applicable because model assumes a no-flow boundary at the base.



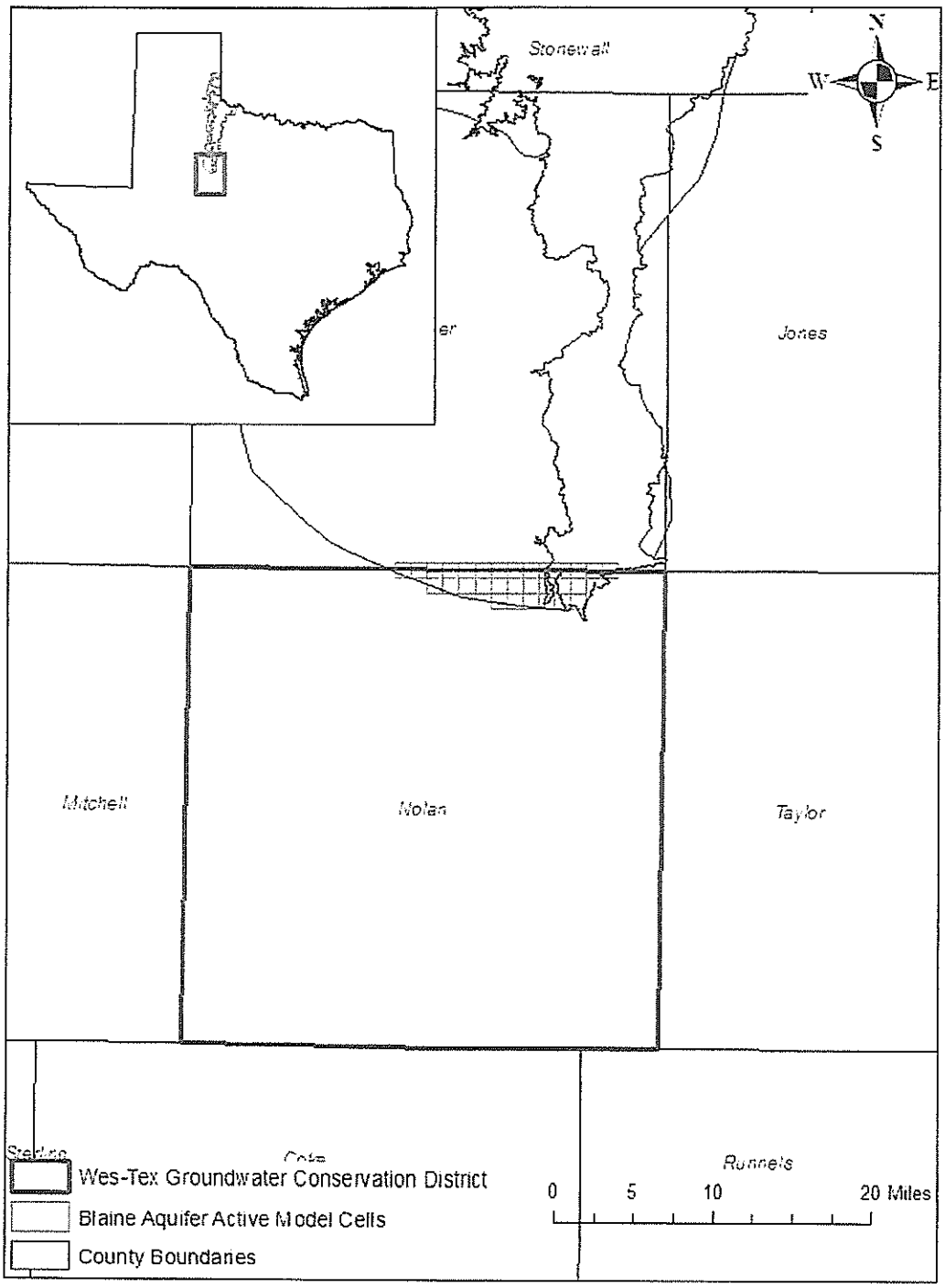
gcd boundary date = 09.25.13, county boundary date = 02.02.11, dckm model grid date = 08.05.13

FIGURE 2: AREA OF THE GROUNDWATER AVAILABILITY MODELS FOR THE DOCKUM AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE AQUIFER EXTENTS WITHIN THE DISTRICT BOUNDARY).

TABLE 3: SUMMARIZED INFORMATION FOR THE *BLAINE AQUIFER THAT IS NEEDED FOR WES-TEX GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Blaine Aquifer	459
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Blaine Aquifer	232
Estimated annual volume of flow into the district within each aquifer in the district	Blaine Aquifer	232
Estimated annual volume of flow out of the district within each aquifer in the district	Blaine Aquifer	593
Estimated net annual volume of flow between each aquifer in the district	From other Permian units to Blaine Aquifer	1737*

*The groundwater availability model for Seymour and Blaine Aquifers only partially represents the Blaine Aquifer. Therefore the values presented here are based on numerical approximations and should be used cautiously.



gcd boundary date = 09 25 13. county boundary date = 02 02 11. symr model grid date = 01 17 14

FIGURE 3: AREA OF THE GROUNDWATER AVAILABILITY MODELS FOR THE BLAINE AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE AQUIFER EXTENTS 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 interaction with streams are specific to particular historic time periods.

Because the application of the groundwater models was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related 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 to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

REFERENCES:

Anaya, R., and Jones, I., 2009, Groundwater availability model for the Edwards-Trinity (Plateau) and Pecos Valley Aquifers of Texas: Texas Water Development Board, Report 373, 103 p., http://www.twdb.texas.gov/groundwater/models/gam/eddt_p/ET-Plateau_Full.pdf.

Aschenbach, E., 2009, GAM Run 09-013: Texas Water Development Board, GAM Run 09-013 Report, 7 p., http://www.twdb.texas.gov/groundwater/docs/GAMruns/GR09-13.pdf.

Ewing, J.E., Jones, T.L., Pickens, J.F., Chastain-Howley, A., Dean, K.E., Spear, A.A., 2004, Groundwater availability model for the Seymour Aquifer: Final report prepared for the Texas Water Development Board by INTERA, Inc., 533 p., http://www.twdb.texas.gov/groundwater/models/gam/symr/SYMR_Model_Report.pdf.

Ewing, J.E., Jones, T.L., Yan, T., Vreugdenhil, A.M., Fryar, D.G., Pickens, J.F., Gordon, K., Nicot, J.P., Scanlon, B.R., Ashworth, J.B., and Beach, J., 2008, Groundwater Availability Model for the Dockum Aquifer - Final Report: contract report to the Texas Water Development Board, 510 p., http://www.twdb.texas.gov/groundwater/models/gam/dckm/DCKM_Model_Report.pdf.

Harbaugh, A. W., 2009, Zonebudget Version 3.01, A computer program for computing subregional water budgets for MODFLOW ground-water flow models, U.S. Geological Survey Groundwater Software.

Harbaugh, A. W., and McDonald, M. G., 1996, User's documentation for MODFLOW-96, an update to the U.S. Geological Survey modular finite-difference ground-water flow model: U.S. Geological Survey Open-File Report 96-485, 56 p.

Harbaugh, A.W., Banta, E.R., Hill, M.C., and McDonald, M.G., 2000, MODFLOW-2000, The U.S. Geological Survey modular ground-water model-User guide to modularization concepts and the ground-water flow process: U.S. Geological Survey, Open-File Report 00-92.National Research Council, 2007, Models in Environmental Regulatory Decision Making Committee on Models in the Regulatory Decision Process, National Academies Press, Washington D.C., 287 p., http://www.nap.edu/catalog.php?record_id=11972.

Texas Water Code, 2011, http://www.statutes.legis.state.tx.us/docs/WA/pdf/WA.36.pdf.

APPENDIX B

Estimated Historical Water Use And 2012 State Water Plan Datasets:

Wes-Tex 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
December 9, 2014

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/GMPChecklist0113.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 Texas State Water Plan (SWP)

Part 2 of the 2-part package is the groundwater availability model (GAM) report. The District should have received, or will receive, this report from the Groundwater Availability Modeling Section. Questions about the GAM can be directed to Dr. Shirley Wade, shirley.wade@twdb.texas.gov, (512) 936-0883.

DISCLAIMER:

The data presented in this report represents the most up-to-date WUS and 2012 SWP data available as of 12/9/2014. Although it does not happen frequently, neither of these datasets are static so they are subject to change pending the availability of more accurate WUS data or an amendment to the 2012 SWP. District personnel must review these datasets and correct any discrepancies in order to ensure approval of their groundwater management plan.

The WUS dataset can be verified at this web address:

http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/

The 2012 SWP dataset can be verified by contacting Sabrina Anderson (sabrina.anderson@twdb.texas.gov or 512-936-0886).

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).

Table 1.

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

Groundwater and surface water historical use estimates are currently unavailable for calendar year 2013. TWDB staff anticipates the calculation and posting of these estimates at a later date.

NOLAN COUNTY

All values are in acre-fee/year

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2012	GW	1,567	255	27	0	12,449	182	14,480
	SW	354	136	5	0	0	121	616
2011	GW	1,974	252	117	0	12,243	206	14,792
	SW	318	129	32	0	0	137	616
2010	GW	1,603	314	59	0	8,055	203	10,234
	SW	256	139	16	0	67	135	613
2009	GW	1,794	230	76	0	11,218	223	13,541
	SW	118	13	21	0	112	149	413
2008	GW	2,026	606	95	0	10,111	235	13,073
	SW	0	123	25	0	35	157	340
2007	GW	2,338	445	0	0	5,783	236	8,802
	SW	24	123	0	0	0	157	304
2006	GW	2,692	459	0	0	5,208	249	8,608
	SW	207	123	0	0	88	166	584
2005	GW	1,836	600	0	0	5,356	216	8,008
	SW	597	176	0	0	155	144	1,072
2004	GW	2,115	531	0	0	4,138	16	6,800
	SW	428	154	0	0	93	301	976
2003	GW	3,204	79	0	0	3,158	14	6,455
	SW	795	455	0	0	13	268	1,531
2002	GW	2,591	79	0	0	2,865	22	5,557
	SW	1,167	444	0	0	216	410	2,237
2001	GW	2,265	76	0	0	2,841	22	5,204
	SW	3,386	461	0	0	214	416	4,477
2000	GW	874	70	0	0	4,894	46	5,884
	SW	2,637	573	0	0	382	418	4,010

Table 2.

Projected Surface Water Supplies
TWDB 2012 State Water Plan Data

NOLAN COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
G	IRRIGATION	BRAZOS	BRAZOS RIVER COMBINED RUN-OF-RIVER IRRIGATION	120	120	120	120	120	120
G	LIVESTOCK	BRAZOS	LIVESTOCK LOCAL SUPPLY	223	223	223	223	223	223
G	LIVESTOCK	COLORADO	LIVESTOCK LOCAL SUPPLY	241	241	241	241	241	241
G	STEAM ELECTRIC POWER	BRAZOS	SWEETWATER LAKE/RESERVOIR	0	0	0	0	0	0
G	SWEETWATER	BRAZOS	SWEETWATER LAKE/RESERVOIR	0	0	0	0	0	0
	Sum of Projected Surface Water Supplies (acre-feet/year)			**584**	**584**	**584**	**584**	**584**	**584**

Table 3.

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.

NOLAN COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
G	SWEETWATER	BRAZOS	3,013	3,072	3,081	3,029	2,900	2,763
G	MANUFACTURING	BRAZOS	779	915	1,038	1,159	1,266	1,372
G	LIVESTOCK	BRAZOS	223	223	223	223	223	223
G	IRRIGATION	BRAZOS	1,747	1,701	1,656	1,612	1,570	1,529
G	MINING	BRAZOS	253	253	253	253	253	253
G	COUNTY-OTHER	BRAZOS	102	101	99	95	91	86
G	ROSCOE	BRAZOS	189	190	188	182	173	165
G	STEAM ELECTRIC POWER	BRAZOS	807	11,311	20,000	20,000	20,000	20,000
G	BITTER CREEK WSC	BRAZOS	118	118	116	112	106	101
G	COUNTY-OTHER	COLORADO	97	96	94	91	86	82
G	IRRIGATION	COLORADO	3,391	3,302	3,215	3,129	3,048	2,968
G	MINING	COLORADO	25	25	25	25	25	25
G	LIVESTOCK	COLORADO	241	241	241	241	241	241
G	BITTER CREEK WSC	COLORADO	4	4	4	3	3	3
	Sum of Projected Water Demands (acre-feet/year)		**10,989**	**21,552**	**30,233**	**30,154**	**29,985**	**29,811**

Table 4.

Projected Water Supply Needs
TWDB 2012 State Water Plan Data

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

NOLAN COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
G	BITTER CREEK WSC	BRAZOS	104	104	106	110	116	121
G	BITTER CREEK WSC	COLORADO	28	28	28	29	29	29
G	COUNTY-OTHER	BRAZOS	38	39	41	45	49	54
G	COUNTY-OTHER	COLORADO	20	21	23	26	31	35
G	IRRIGATION	BRAZOS	-730	-684	-639	-595	-553	-512
G	IRRIGATION	COLORADO	-1,002	-913	-826	-740	-659	-579
G	LIVESTOCK	BRAZOS	0	0	0	0	0	0
G	LIVESTOCK	COLORADO	0	0	0	0	0	0
G	MANUFACTURING	BRAZOS	529	393	270	149	42	-64
G	MINING	BRAZOS	-101	-101	-101	-101	-101	-101
G	MINING	COLORADO	-7	-7	-7	-7	-7	-7
G	ROSCOE	BRAZOS	63	62	64	70	79	87
G	STEAM ELECTRIC POWER	BRAZOS	-807	-11,311	-20,000	-20,000	-20,000	-20,000
G	SWEETWATER	BRAZOS	-3,013	-3,072	-3,081	-3,029	-2,900	-2,763
	Sum of Projected Water Supply Needs (acre-feet/year)		**-5,660**	**-16,088**	**-24,654**	**-24,472**	**-24,220**	**-24,026**

Table 5.
Projected Water Management Strategies
TWDB 2012 State Water Plan Data

NOLAN COUNTY

All values are in acre-feet/year

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
IRRIGATION, BRAZOS (G)							
IRRIGATION WATER CONSERVATION	CONSERVATION [NOLAN]	60	98	135	133	131	129
IRRIGATION, COLORADO (G)							
IRRIGATION WATER CONSERVATION	CONSERVATION [NOLAN]	94	152	206	199	192	186
MANUFACTURING, BRAZOS (G)							
MANUFACTURING WATER CONSERVATION	CONSERVATION [NOLAN]	23	46	73	81	89	96
VOLUNTARY REDISTRIBUTION	DOCKUM AQUIFER [NOLAN]	83	83	83	83	83	83
MINING, BRAZOS (G)							
ADDITIONAL EDWARDS-TRINITY (PLATEAU) AQUIFER DEVELOPMENT (INCLUDES OVERDRAFTING)	EDWARDS-TRINITY-PLATEAU AQUIFER [NOLAN]	114	114	114	114	114	114
MINING WATER CONSERVATION	CONSERVATION [NOLAN]	1	7	12	12	12	12
MINING, COLORADO (G)							
MINING WATER CONSERVATION	CONSERVATION [NOLAN]	7	7	7	7	7	7
STEAM ELECTRIC POWER, BRAZOS (G)							
VOLUNTARY REDISTRIBUTION	CEDAR RIDGE LAKE/RESERVOIR [RESERVOIR]	0	11,500	20,000	20,000	20,000	20,000
SWEETWATER, BRAZOS (G)							
CONJUCTIVE MANAGEMENT OF CHAMPION WELL FIELD AND OAK CREEK RESERVOIR WITH SUBORDINATION AGREEMENT	OAK CREEK LAKE/RESERVOIR [RESERVOIR]	688	755	878	948	953	963
EXPANSION OF CHAMPION WELL FIELD	DOCKUM AQUIFER [NOLAN]	864	864	864	864	864	864
MUNICIPAL WATER CONSERVATION	CONSERVATION [NOLAN]	94	195	156	113	95	91
OAK CREEK RESERVOIR WITH SUBORDINATION AGREEMENT	OAK CREEK LAKE/RESERVOIR [RESERVOIR]	1,679	1,671	1,557	1,435	1,301	1,154
Sum of Projected Water Management Strategies (acre-feet/year)		**3,707**	**15,492**	**24,085**	**23,989**	**23,841**	**23,699**