

WINTERGARDEN GROUNDWATER CONSERVATION DISTRICT DROUGHT CONTINGENCY PLAN

Approved By Board of Directors and Effective as of December 13, 2023

A. Introduction

This document provides a Drought Contingency Plan (Plan) for the Wintergarden Groundwater Conservation District (District). The District comprises the area of Zavala, Dimmit, and LaSalle counties, Texas (Figure 1). The Carrizo-Wilcox Aquifer is the principal source of water in the District. The Carrizo-Wilcox Aquifer is classified as a major aquifer in Texas and provides an estimated 430,000 acre-ft/yr of water (TWDB, 2002), of which approximately 41,000 to 132,000 acre-ft/yr is currently estimated to be from within the District. Locally, the Queen City and Sparta Aquifers provide limited and locally available water resources (Green, 2006; Green et al., 2008). Because the Carrizo-Wilcox Aquifer provides most of the water supply for the District, this Plan is designed to protect the Carrizo-Wilcox Aquifer.

The goal of the Plan is to preserve and sustain water availability by reducing water use in response to drought or emergency conditions. Because emergency conditions can occur rapidly, responses must be enacted quickly. This Plan has been prepared in advance, considering conditions that will prompt initiation and termination of the actions set forth herein.

The District Board of Directors (Board) and District staff will monitor water usage patterns; inform the public of drought conditions through the media and/or online; make decisions on the degree of conservation level to apply to the District; and consider appropriate changes to this Plan. The District will develop public awareness notices, information sheets, and other material that will serve as reminders that water should be conserved at all times, not just during a drought or emergency.

The District Water Management Plan, approved by the Texas Water Development Board on October 19, 2021, states that the District Manager will update the Board on drought conditions in the District at every regular Board meeting. A groundwater monitoring well observation network has been established and is maintained by the District to monitor changing storage conditions of groundwater supplies within the District. The District will make a regular assessment of water supply and groundwater storage conditions and will report those conditions to the Board and to the public as set forth in this Plan.

This Plan, when implemented, will monitor groundwater elevation as an indication of drought severity in lieu of the use of a drought severity index. Drought severity indices, such as the Palmer Drought Severity Index, are useful for regional assessment of the state of drought, but they have limitations when used to stipulate the severity of drought for specific localities. The District will identify wells that represent the stress imposed on the Carrizo-Wilcox Aquifer in response to decreases in recharge or increases in pumping that occur during periods of drought or emergency (the Drought Index Wells). Given the relatively large size of the District, each of the three counties in the District will be represented by a well or several wells as indicators of the severity of the effect of the drought on the Carrizo-Wilcox Aquifer in that county. Lower groundwater elevations

are interpreted to indicate greater stress on the Carrizo-Wilcox Aquifer.

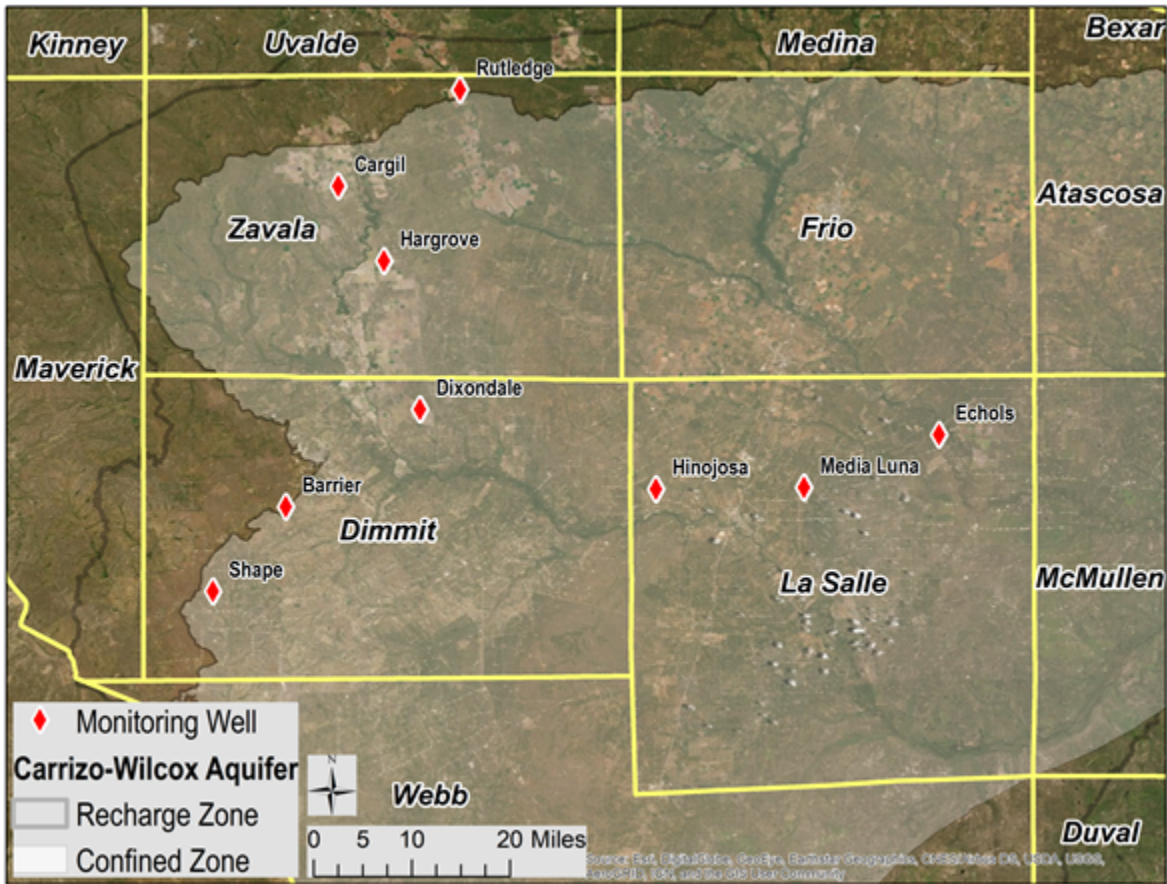


Figure 1. Locations of wells in the Wintergarden GCD monitoring well network

B. Background

Zavala, Dimmit, and LaSalle counties in the District cover a 2,685,148-acre area. In the absence of significant surface water, the District is mostly dependent on groundwater resources for its water supply. The annual precipitation averages for Carrizo Springs, Crystal City, and Cotulla were 20.71, 20.70, and 23.70 inches for 1970-2000 and 19.57, 19.46, and 23.36 inches for 1990-2020, respectively (NOAA, 2002; National Centers for Environmental Information accessed September 7, 2022). The median annual net pan evaporation rate for quadrangle 905, which includes the District, is 57.73 inches (TWDB, 2006). An evaluation of the hydrogeology in semi-arid regions in central Texas indicates a region must receive at least 16-17 inches per year of rain before distributed recharge can occur (Green and Bertetti, 2010). Negligible recharge occurs when precipitation is less than this threshold because of factors such as temperature, solar radiation, soil, antecedent moisture conditions, and vegetation.

During recent years, the District has established a monitoring network to track the Carrizo-Wilcox Aquifer static groundwater level across the District. The names and locations of the nine wells currently in the District monitoring well network are listed in Table 1 and mapped in Figure 1. The

monitoring well network will be expanded as appropriate.

Table 1. Names and locations of District monitoring wells.

Name	Latitude	Longitude	County	Location
Barrier	28° 27' 13	99° 54' 13	Dimmit	5 mi. SW of Carrizo Springs
Cargil	28° 55' 32.98	99° 49' 35.27	Zavala	22 mi. NNE of Crystal City
Dixondale	28° 35' 54.70	99° 42' 32.84	Dimmit	3 mi. West of Brundage
Echols	28° 33' 35.1"	99° 56' 29.3"	LaSalle	8 mi. NNE of Los Angeles
Hargrove	28° 48' 53.6"	99° 46' 02.0"	Zavala	12 mi. NE of Crystal City
Hinojosa	28° 28' 46.90	99° 21' 29.52	LaSalle	8 mi. West of Cotulla
Media Luna	28° 28' 54.53	99° 8' 25.67	LaSalle	4 mi. East of Cotulla
Rutledge	29° 04' 03.3"	99° 38' 49.0"	Zavala	8 mi. North of Batesville
Shape	28° 21' 12.3"	100° 01' 35.0"	Dimmit	18 mi. SW of Carrizo Springs

Water elevations measured at selected wells in the District’s monitoring well network are used to designate the drought stage for each county. The Cargil and Hargrove wells are both suitable Drought Index Wells for Zavala County. The Dixondale well is selected as the Drought Index Well for Dimmit County. All three monitoring wells in LaSalle County are suitable Drought Index Wells, however the Echols well and the Hinojosa well have longer records of measurement compared with the Media Luna well.

The Shape well in Dimmit County and the Rutledge well in Zavala County are located in the recharge zone of the Carrizo-Wilcox Aquifer and provide valuable information on the state of recharge to the aquifer, but they are not suitable to monitor the state of the aquifer confined zone.

The wells have a variety of water-level measurement instrumentation. The District is in the process of upgrading the existing instrumentation and adding additional wells to the well monitoring network. It is the goal of the District that all wells in the District monitoring well network will record at a frequency not longer than a day and measurements will be transmitted to the District office at least once a day. The District does not have a rain gauge monitoring network at this time.

Measured water levels can be used to prepare a map of the potentiometric surface of the aquifer. This surface describes the groundwater surface of the aquifer at the time measurements were taken. Over time, changes in the potentiometric surface can be used to show increases and decreases in the water level of the aquifer.

Stress on the aquifer during drought is exacerbated by reduced pressure resulting from reduced recharge coupled with increased pumping that typically occurs during periods of reduced precipitation and drought.

C. Public Involvement

The Board provided an opportunity for public input into the preparation of the Plan through informal outreach and through a public meeting. The public meeting was done by scheduling and providing public notice and posting the notice at the District Office and in the local newspaper. In the adoption of this Plan, the Board considered all stakeholder comments.

D. Public Education

The District will periodically provide the public with information about the Plan, including information about the conditions under which each drought stage of the Plan is to be initiated or terminated and the drought response measures to be implemented at each stage. This information will be made available to the public periodically through articles/news releases in the local newspaper and/or on the District website.

E. Coordination with Regional Water Planning Group, Local Governments, and Public Water Supply Companies

The service area of the District is located within the Regional Water Planning Group L (RWPG L). RWPG L has been provided a copy of this Plan. The District has also coordinated with area local governments and public water supply companies regarding the development and implementation of the Plan.

F. Application

The provisions of the Plan shall apply to all water supply users located within the boundaries of this District, except to the extent such water supply user is subject to a drought management plan that conflicts with or is more protective than this Plan.

G. Trigger Conditions for Initiating and Terminating Drought Stages

The District is responsible for monitoring water supply and demand conditions and it shall determine when conditions warrant initiation or termination of each drought stage of the Drought Contingency Plan. The District will monitor drawdown reports, water supply in storage, and rainfall to determine when drought conditions are reached. The drought stage triggering conditions described below consider the vulnerability of the water source under drought of record conditions, the production and distribution capacities of the aquifer, and projected water usage based upon historical patterns. Table 2 illustrates drought trigger designations, drought stages, and associated aquifer levels in terms of groundwater elevation at the Drought Index Wells.

Table 2. Drought stages, Drought Index Wells, and groundwater elevations (expressed as feet below ground level) for each county

Drought Stage	County	Drought Index Well	Groundwater Elevation (ft)
Moderate Drought	Zavala	Cargil	430
		Hargrove	440
	LaSalle	Echols	370
		Hinojosa	525
	Dimmit	Dixondale	480
Exceptional Drought	Zavala	Cargil	440
		Hargrove	450
	LaSalle	Echols	385
		Hinojosa	540

	Dimmit	Dixondale	500
Severe Drought	Zavala	Cargil	450
		Hargrove	460
	LaSalle	Echols	400
		Hinojosa	555
	Dimmit	Dixondale	520

The stage levels of water conservation are to be placed in effect by the drought stage triggers identified in Table 2. A drought stage will be entered when the depth to water at the Drought Index Well has decreased below the trigger level for a period of ten (10) consecutive days. For Zavala and LaSalle counties, both Drought Index Wells for those counties will need to be at a particular drought stage for that drought stage to be invoked.

A drought stage will be lifted 30 days after the depth to groundwater at a particular Drought Index Well has been measured at a level above the drought trigger depth for a period of ten (10) consecutive days. For Zavala and LaSalle counties, both Drought Index Wells for those counties will need to be measured at a level above the drought trigger depth for a period of ten (10) consecutive days for that drought stage to be lifted.

H. Stage Levels of Water Allocations

The District will recommend implementation of each component of the Plan for each of the designated drought stages. Water conservation measures are included in these summaries. The District will coordinate with local governments and public water supply companies in providing these recommendations.

Stage I—Moderate Drought

Goal: Achieve a 10% reduction in total water use.

1. Water users are requested to limit irrigation of landscaped areas between 8:00 p.m. and 10:00 a.m. of the following day.
2. Reduction of water use will be encouraged through local media notices. Public service announcements will be made as conditions change via local media (e.g., TV, radio, newspaper, and/or District website).
3. Water troughs or any water receptacles with mechanical float controls should be routinely inspected and properly maintained to prevent leaks and water waste.

Stage II—Severe Drought

Goal: Achieve a 20% reduction in total water use.

1. All requirements of Stage I shall remain in effect during Stage II.

2. Irrigation of landscaped areas shall be limited to designated watering days between 8:00 p.m. and 10:00 a.m. of the following day and should be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler systems only. Watering day designation is determined by the last digit of the property street address according to the Table 3.

Table 3. Watering day schedule

Last digit of address watering day	
0 or 1	Monday
2 or 3	Tuesday
4 or 5	Wednesday
6 or 7	Thursday
8 or 9	Friday
No watering on weekends	

3. Washing of automobiles, trucks, trailers, boats, and other types of mobile equipment should be done over pervious cover or at wash facilities that recycle wash water.
4. Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or Jacuzzi-type pools is discouraged. When such facilities are not in use, some form of surface cover should be used to limit the evaporation of water.
5. Operation of any ornamental fountain or pond for aesthetic or scenic purposes should be discontinued except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.
6. Irrigation of athletic fields should be limited to no more than twice a week between the hours of 8:00 p.m. and 10:00 a.m. of the following day.
7. All restaurants are encouraged to serve water to their customers only upon request.

Stage III—Exceptional Drought

Goal: Achieve mandatory 40% reduction in groundwater use.

1. All requirements of Stage II shall remain in effect during Stage III.
2. Irrigation of lawns and landscaped areas should be limited to once a week and should be by means of hand-held hoses or hand-held buckets only. No hose end sprinklers or automatic sprinklers should be used at any time. Watering day designation is determined by the digit of the property street address according to the Table 3.
3. The watering of golf courses should be discontinued. This recommendation also applies to the irrigation of parks, public properties, and athletic fields.
4. Use of water from hydrants should be limited to fire fighting and related activities, or other

activities necessary to maintain public health, safety, and welfare.

5. Irrigation of hay crops is discouraged.
6. Use of groundwater for construction activities is discouraged.
7. During this time any hydraulic fracturing activity within the District and/or export of water outside the District is discouraged.
8. The issuance of new well drilling permits may be suspended by the Board except to replace an existing well.
9. Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane, or any other mobile vehicle at all times is discouraged.
10. Additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be discouraged if groundwater is to be used.

I. Initiation and Termination Procedures

The District Manager will declare the initiation or termination of the Drought Plan stages based on the triggers designated in this Plan (Section G).

The initiation of the designated drought stage may be delayed if there is a reasonable possibility the aquifer's performance will not be compromised by the condition. If water conservation is to be instituted, notice will be made via public local media (e.g., TV, radio, newspapers) and/or the District website.

The notice will contain the following information:

- a. The date water conservation shall begin
- b. The stage (level) of water conservation to be employed and the affected area or counties affected

Water restriction recommendations will remain in effect until satisfaction of the trigger condition set out in Paragraph G. Because there is a lead/lag relationship between precipitation and pumping rates and aquifer recovery, it is not possible to predict the length of time restrictions must remain active. Landowners will be notified about the easing of recommended restrictions via local media (e.g., TV, radio, newspapers) and/or the District website.

J. Implementation

The Board will review the procedures in this Plan every other year or more frequently at the Board's discretion. Modifications may be required to accommodate system growth, changes in water-use demand, available water supply, and/or other circumstances.

The District Board adopted this Plan at the properly noticed public meeting held on _____.

REFERENCES

Green, R.T. 2006. Preliminary Investigation of the Groundwater Systems in the Wintergarden Groundwater Conservation District. Contract report prepared for the Wintergarden Groundwater Conservation District

Green, R.T., F.P. Bertetti, B.P. Wilcox, and R.N. McGinnis. 2008. Investigation of the Groundwater Systems in the Wintergarden Groundwater Conservation District—Phase II. Conducted for the Wintergarden Groundwater Conservation District by Southwest Research Institute. San Antonio, TX.

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NOAA. 2002. Climatology of the United States No. 81. Monthly Station Normals of Temperature, Precipitation, and Heat and Cooling Degree Days 1971-2000. National Oceanic and Atmospheric Administration.

TWDB. 2002. Water for Texas—2002. January 2002, Report No. 155. Texas Water Development Board (<http://www.twdb.state.tx.us/data/popwaterdemand/2003Projections/DemandProjections.asp>).

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