Section 8. Drought

Contents

Why Drought Is a Threat

According to the National Weather Service, a drought is a period of abnormally dry weather which persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, the duration and the size of the affected area. The impacts of a drought can be economic, social or environmental.

Drought is a normal part of virtually all climatic regimes, including areas with high and low average rainfall. Drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 8-1 defines these different perspectives on drought.

Table 8-1. Drought Classification Definitions

Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on streamflows and reservoir, lake, and groundwater levels.
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops.
Socioeconomic Drought	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

Vegetation dried in drought conditions serves as a prime ignition source for wildland fires, which, in themselves, cause massive damage. Combined with a heat wave, a drought is a very dangerous situation indeed. Although drought can occur in any season, its result can be a community disaster when it combines with extreme heat.

Droughts can affect large areas and range in size from a couple of counties to several states. Their impact on wildlife and area farming is enormous. Droughts can kill crops, grazing land, edible plants, and, in severe cases, trees. Agricultural losses in Texas from the 1996 drought are estimated at $2 billion, and losses from the 1998 drought estimated at $2.1 billion, with some estimates being much higher.[1] Estimates of overall state losses from both droughts exceed $11 billion.[2]

Droughts occur regularly in Central Texas and are a normal condition. They vary greatly, however, in their intensity and duration. On average, a yearlong drought takes place somewhere in Texas once every 3 years and a major drought every 20 years. Major droughts can last for years.

[1] Todd H. Votteler, Ph.D., Texas Department of Parks and Wildlife
[2] Todd H. Votteler, Ph.D., Texas Department of Parks and Wildlife

Hazard Profile

The potential severity of drought effects is substantial, especially considering the economic losses that may result.

The frequency of occurrence of drought is occasional. Table 8-2 reflects the damage wrought by droughts over the last decade.

Drought events take place over extended periods of time. Information on drought conditions are issued by the State Drought Preparedness Council, as directed by H.B. 2660, based on input from NOAA, the Office of the State Climatologist, the U.S. Geological Survey, the Texas Water Development Board, Texas Commission on Environmental Quality, and the Texas Agricultural Statistics Service. Information reflects five "levels of concern" and takes into account assessments of climatology, agriculture, and water availability for each of 10 climatic regions of the State.

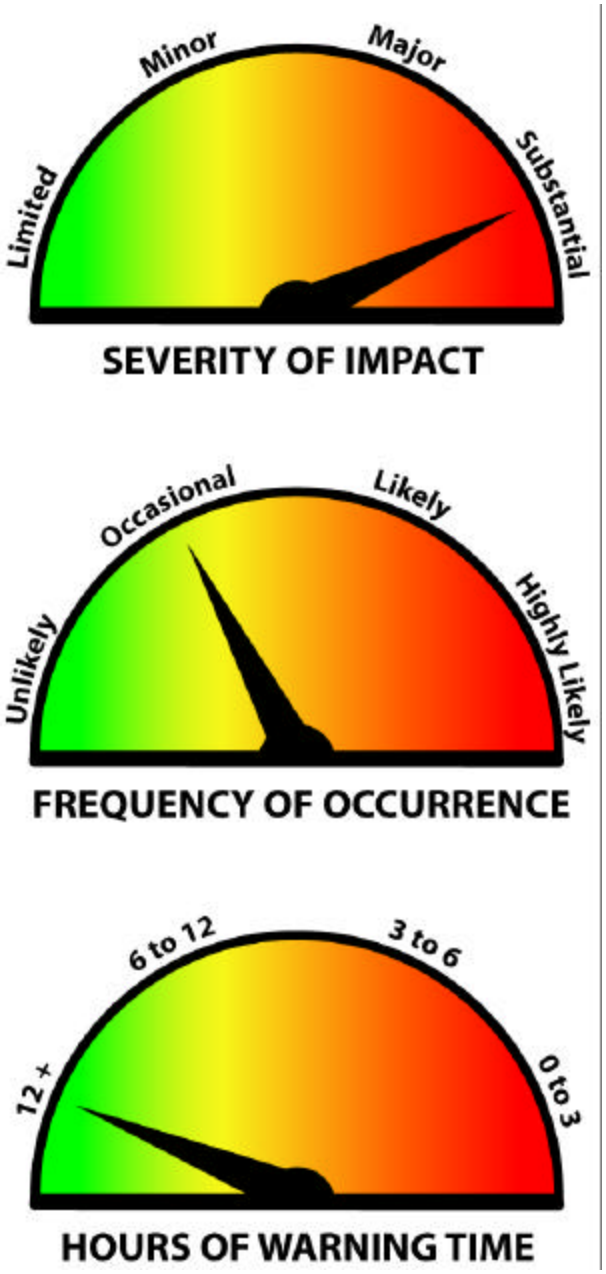

Figure 8-1. Drought Hazard Profile Summary

History of Drought

Droughts are slow-onset hazards, but over time can have very damaging effects to crops, municipal water supplies, recreational areas, and wildlife. If droughts extend over a number of years, the direct and indirect economic impact can be significant. Table 8-2 gives historical information on property and crop damage due to drought. Table 8-3 reports historical drought incidents, by region.

Table 8-2. Historical Drought Damage

Location	Time	Property Damage	Crop Damage
Calhoun, Victoria	April 1996		
Region-wide except Calhoun, Victoria, Refugio	May-August 1996		
Comal, Kendall	September-November 1996	$80.0M	$160.0M
Comal	December 1996-February 1997	$30.0M	$55.0M
Region-wide except Calhoun, Victoria, Refugio	July-October 2000	$20.0M	$42.0M

Source; PBS&J Risk Assessment for the Guadalupe River Basin

Table 8-3. Historical incidents of drought in the Guadalupe River Basin[3]

South Central Region

(Caldwell, DeWitt, Gonzales, Guadalupe, Hays, Victoria, and Refugio Counties)

Drought Year[4]	Drought Extent (percentage of average precipitation)	Drought Year	Drought Extent (percentage of average precipitation)
1893	56		
1897	73	1948	71
1901	62	1950	68
1909	70	1954	50
1910	69	1956	55
1916	73	1963	61
1917	42	1988	62
1925	72	1996	71
1939	69	1999	69

Upper Coast Region

(Calhoun County)

Drought Year	Drought Extent (percentage of average precipitation)	Drought Year	Drought Extent (percentage of average precipitation)
1892	73	1927	74
1893	64	1948	67
1901	70	1954	57
1910	74	1956	62
1916	69	1963	73
1917	50	1988	67
1924	72	1999	69

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4 A drought year is defined as one in which the average precipitation is less than 75 percent of the 1931-1960 average of 46 inches.

4 Source: Texas Almanac.

People and Property at Risk

Droughts may impact large geographical areas, thus all the population, buildings, critical facilities, infrastructure, lifelines, and hazardous materials facilities are considered exposed to the hazard and could potentially be affected.

Table 8-4. Exposure to Droughts by Occupancy Class and County

Jurisdiction	Exposed Population (2000)	Residential Buildings Exposed		Commercial Building Exposed		Critical Facilities Exposed
		Number	Value ($)	Number	Value ($)	Number
Caldwell	32,194	11,374	2,387,436,000	60	285,885,000	33
Calhoun	20,647	9,835	2,171,890,000	78	281,066,000	75
Comal	78,021	42,027	10,237,572,000	214	927,348,000	70
DeWitt	20,013	6,983	1,530,674,000	50	249,433,000	33
Gonzales	18,628	6,510	1,315,844,000	45	208,323,000	26
Guadalupe	89,023	39,668	8,760,265,000	232	950,030,000	77
Hays	97,589	45,837	12,655,070,000	333	1,433,860,000	64
Kendall	23,743	12,844	3,164,217,000	85	391,066,000	23
Refugio	7,828	2,953	640,396,000	11	54,484,000	22
Victoria	84,088	36,206	9,418,849,000	348	1,548,383,000	69
TOTALS	**471,774**	**214,237**	**52,282,213,000**	**1,456**	**6,329,878,000**	**492**

Potential Damages and Losses

Table 8-5 shows potential annualized losses and annualized loss ratios, by county, for drought.

Table 8-5. Potential Annualized Losses and Annualized Loss Ratios by County (Drought)

Jurisdiction	Annualized Expected Property Losses ($)	Annualized Loss Ratios (%)
Caldwell	71,485	0.0025
Calhoun	57,504	0.0021
Comal	49,380	0.0004
DeWitt	150,934	0.0075
Gonzales	191,238	0.0117
Guadalupe	93,715	0.0009
Hays	80,438	0.0005
Kendall	87,692	0.0024
Refugio	148,258	0.0200
Victoria	123,452	0.0011
Total	$1,054,096	

GBRA facilities (described on pages 4-18 and 4-19) are also at risk from this hazard. However, no estimate is currently available of potential damages and losses to those facilities.