

Chapter 8

Dry Periods and Drought Events of the Gulf Coastal Region

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Introduction

The purpose of this chapter is to describe the dry periods that have occurred and to identify the major drought events along the Gulf Coast of Texas. The Palmer Drought Severity Index and Standardized Precipitation Index will be used to identify major events. A tabulation of dry periods is included as a reference.

The study area is roughly the area covered by the Gulf Coastal plain of Texas (Figure 8-1). Because of the large study area, it covers parts of five climatic divisions (Figure 8-1) as defined by the National Oceanic and Atmospheric Administration. Climatic divisions are reporting regions within a state that are generally climatically homogeneous and are used to report climatic data such as drought indices (NCDC, 1983).

The climate of the study area varies. Average annual precipitation varies from less than 20 inches along the Rio Grande to more than 60 inches along the Sabine River (NCDC, 2002). The eastern two-thirds of the study area have a subtropical humid climate that has warm summers, while the southern third of the area has a subtropical subhumid climate characterized by hot summers and dry winters (Larkin and Bomar, 1983).

Palmer Drought Severity Index

Discussions about agricultural, meteorological, or hydrological drought typically look at parts of the hydrological cycle. One misconception is that a specific drought index is the only technique to characterize a drought event. For example, the Palmer Drought Severity Index (PDSI) and most other indices use a single number representing the general dryness conditions at a measurement location.

The PDSI is the most commonly used drought index in the United States. In Texas, it is the standard “Drought Index” for determining dry or drought conditions. Yet, due to the spatial scale

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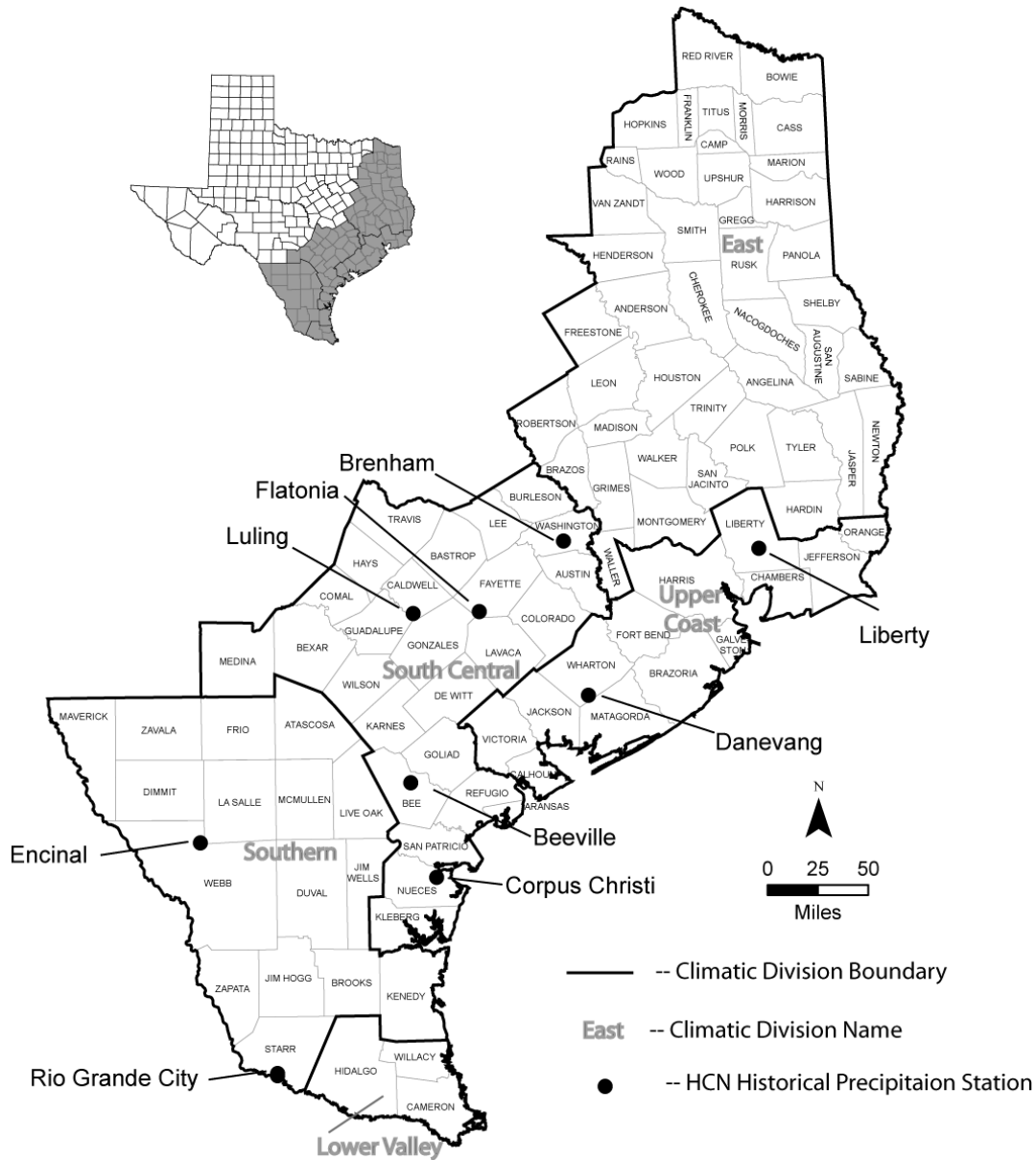


Figure 8-1. Study area showing the National Oceanic and Atmospheric Administration climatic divisions and Historical Climatology Network weather stations used in this chapter (NCDC, 1983; Williams and others, 2005).

at which the PDSI is calculated, the index is not suitable for determining local drought conditions.

The PDSI series ranges roughly from -6.0 to +6.0. The base index of the Palmer Index series is called the “Z” index, which is assumed to represent moisture conditions. Palmer (1965) selected the classification scale of moisture conditions based on study areas in Iowa, Kansas, and Texas. A listing of the PDSI classifications is in Table 8-1.

Table 8-1. Classifications of the Palmer Drought Severity Index and Texas Drought Preparedness Council drought evaluation process (DPC, 2005).

Palmer classifications		Drought Preparedness Council classifications			
Range	Description	Range	Description	Stage	Stage no.
4.00 or more	Extremely wet				
3.00 to 3.99	Very wet				
2.00 to 2.99	Moderately wet				
1.00 to 1.99	Slightly wet				
0.50 to 0.99	Incipient wet spell				
0.49 to -0.49	Near normal				
-0.50 to -0.99	Incipient dry spell				
-1.00 to -1.99	Mild drought	-1.00 to -1.99	Abnormally dry	Advisory	1
-2.00 to -2.99	Moderate drought	-2.00 to -2.99	First-stage drought	Watch	2
-3.00 to -3.99	Severe drought	-3.00 to -3.99	Severe drought	Warning	3
-4.00 or less	Extreme drought	-4.00 to -4.99	Extreme drought	Emergency	4
		-5.00 or less	Exceptional drought	Disaster	5

Values of historical monthly long-term PDSI are available for the entire United States from 1895 to the present (NCDC, 2005). To analyze this historical information, graphs of these PDSI values for the five climatic divisions within the Gulf Coast area are shown in Figure 8-2.

Defining a threshold to aid in the analysis of drought data is a common way to define drought events (Hisdal and Tallaksen, 2000). For analysis of the PDSI, the stages from the Texas Drought Preparedness Council’s drought evaluation process are used as the ranges for this analysis (TDPC, 2005). To filter out “normal” dry periods, a period of twelve months establishes the minimum for an abnormally dry period.

Table 8-2 lists the historical dry periods and drought events for the study area. A discussion of the most severe events and the most recent events are included in this chapter. Based on the selection criteria, abnormally dry periods occur within the five climatic divisions approximately 20 to 30 percent of the time. The events reach up to 85 months in duration. The average abnormally dry period lasts approximately two years. The median period ranges from 16 months in East Texas climatic division up to 34 months in the Lower Valley.

East Texas Climatic Division

In the East Texas climatic division, the dry periods range in duration from 12 to 36 months with a median duration of 16 months (Figure 8-2; Table 8-2). Generally, these events start in the late fall months (Table 8-2).

The most severe drought event occurred from November 1915 to September 1918. This event had four months in which the PDSI values were equal to or less than -5.0. These values occurred in February, March, July, and August of 1918. Most of this event stayed in mild to moderate drought conditions, according to the PDSI classification. The second most severe event occurred between July 1924 and August 1925; it lasted just 14 months, but the PDSI stayed below -5.0 for a total of five months between April and August of 1925. The next two most severe periods were

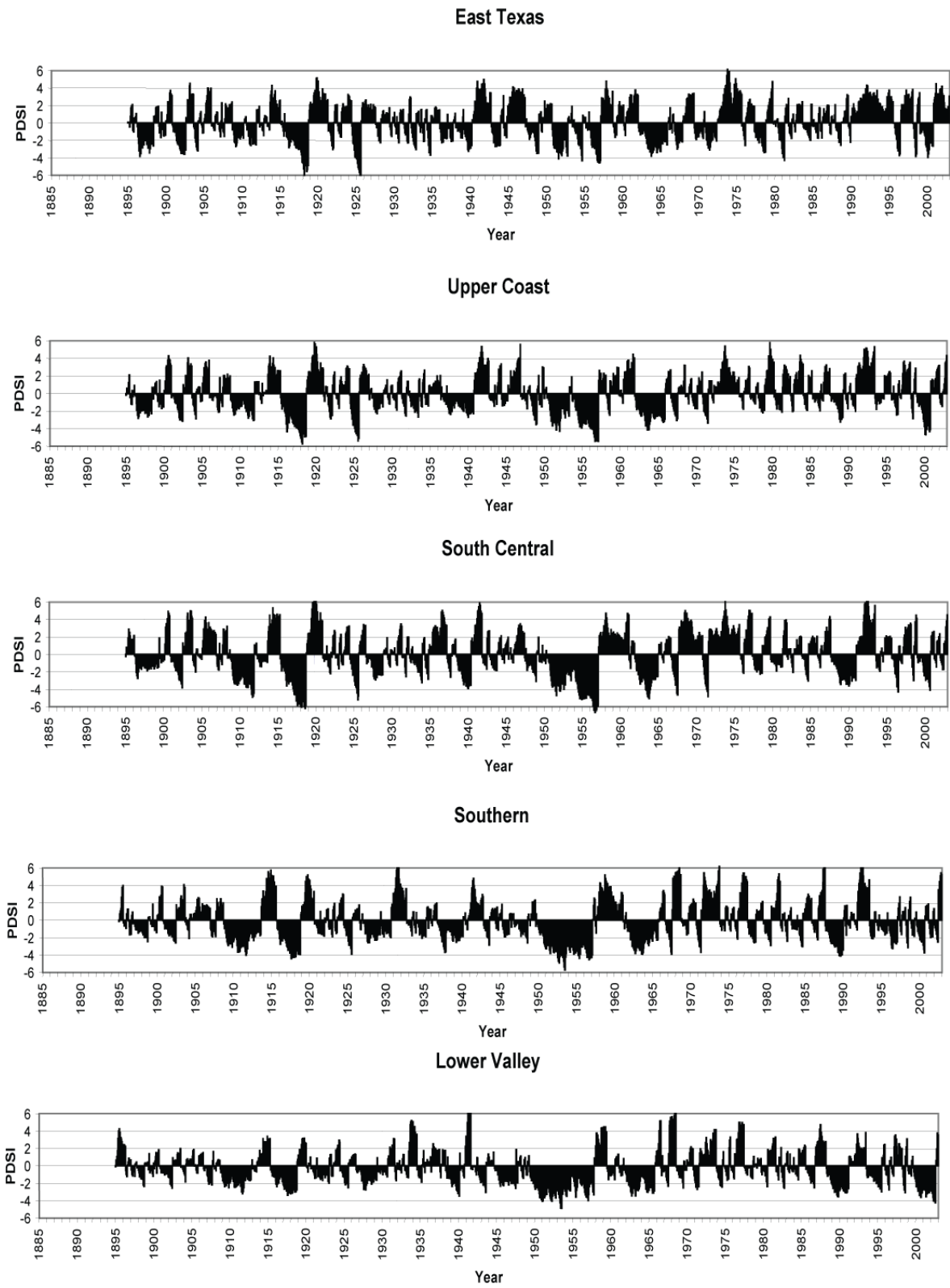


Figure 8-2. Long-term Palmer Drought Severity Index by climatic division (NCDC, 2005).

Table 8-2. East Texas dry periods and drought events based on the long-term Palmer Drought Severity Index (NCDC, 2005).

	Period		Months in DPC stage					Total months
	Start	End	1	2	3	4	5	
East Texas	May 1896	May 1898	6	15	4			25
	May 1901	August 1902	1	7	8			16
	December 1908	November 1909	7	5				12
	November 1915	September 1918	8	13	4	6	4	35
	July 1924	August 1925	1	2	4	2	5	14
	April 1939	March 1940	4	6	2			12
	November 1942	December 1943	3	11				14
	November 1950	October 1952	5	8	10	1		24
	November 1955	February 1957	1	7	2	6		16
	December 1962	November 1965	9	16	11			36
	December 1966	November 1967	5	6	1			12
	December 1970	December 1972	6	6	1			13
	June 1977	October 1978	9	4	4			17
	August 1999	October 2000	5	6	4			15
	Upper Coast	May 1896	May 1898	13	12			
January 1909		April 1910	12	4				16
August 1910		November 1911	8	7	1			16
June 1915		September 1918	6	7	13	11	3	40
July 1924		August 1925	2	2	4	4	2	14
August 1937		September 1940	4	10				14
September 1950		April 1953	10	8	12	2		32
February 1954		February 1957	4	6	16	6	5	37
February 1962		November 1965	8	25	11	2		46
August 1999		October 2000	2	2	5	6		15
South Central	May 1896	May 1897	10	3				13
	August 1901	June 1902	6	4	3			13
	January 1909	November 1911	1	12	18	4		35
	September 1915	September 1918	4	5	8	4	16	37
	August 1924	August 1925	3	3	4	2	1	13
	June 1927	October 1928	4	14				18
	September 1938	May 1940	6	3	12			21
	October 1950	February 1957	10	8	23	22	14	77
	February 1963	December 1964	3	18	7	6	1	35
	August 1977	August 1978	10	3				13
	August 1988	December 1990	6	17	10			33
	October 1999	September 2000	2	7	2	1		12
	Southern	June 1901	June 1902	9	4			
January 1909		August 1913	22	22	11	1		56
January 1916		October 1918	4	9	13	8		34
May 1927		April 1929	16	8				24
February 1937		March 1938	8	3	3			14
September 1938		February 1940	10	8				18
February 1950		February 1957	8	20	36	19	2	85
December 1961		February 1965	7	17	15			39
December 1987		January 1990	4	12	7	3		26

Table 8-2. Continued.

	Period		Months in DPC stage					Total months
	Start	End	1	2	3	4	5	
Lower Valley	February 1996	February 1997	3	8	2			13
	January 1909	February 1912	20	17	1			38
	October 1915	October 1918	12	17	8			37
	June 1927	April 1929	17	7				24
	October 1938	February 1940	8	6	3			17
	May 1945	July 1947	17	10				27
	June 1949	October 1954	7	30	22	6		65
	January 1955	October 1957	13	12	9			34
	February 1962	September 1965	14	22	8			44
	November 1988	March 1991	4	17	8			29
	April 1994	July 1995	9	7				16
	November 1999	August 2002	3	16	13	2		34

DPC = Texas Drought Preparedness Council

November 1950 to October 1952 and November 1955 to February 1957. Severe drought conditions dominated both of these periods. The most recent event occurred from August 1999 to October 2000 and lasted 15 months. This event reached severe drought conditions (greater than -3.0 PDSI) but did not go into the extreme drought conditions.

Upper Coast Climatic Division

In the upper coast climatic division, the periods range in duration from 14 to 46 months, with a median period of 16 months (Figure 8-2; Table 8-2).

Two events of similar duration are the most severe for this area. The longer of these two events was between June 1915 and September 1918, lasting for 40 months. This event had three months, January to March of 1918, in which the PDSI values were less than -5.0, or exceptional drought conditions. During most of this period, the PDSI was between -5.0 and -3.0. The shorter episode occurred between February 1954 and February 1957. This event lasted 37 months. For five months, September to November of 1956 and January and February of 1957, the PDSI showed exceptional drought conditions. Throughout this event, the PDSI stayed between -3.00 and -3.99 for 16 months.

Preceding this event was a 32-month event between September 1950 and April 1953. Combining this with the 1954 to 1957 event would make this the most severe drought event for the upper coast climate division.

A short-term severe event occurred from July 1924 to August 1925; although only lasting 14 months, the PDSI stayed in extreme drought conditions for 6 months.

The longest event recorded lasted 43 months, from February 1962 to November 1965. It was less severe than the 1915 to 1918 event because the PDSI values are not as severe.

The most recent event occurred from August 1999 to October 2000 and lasted 15 months. This event reached extreme drought conditions (under -4.0 PDSI), but did not go into exceptional drought conditions.

South Central Climatic Division

In the south central climatic division, the twelve periods identified range in duration from 12 to 77 months, with a median period of 18 months. One-third of the events in this area lasted greater than two years in duration (Figure 8-2; Table 8-2).

The period from October 1950 to February 1957 was the most severe event for the south central climatic division and the second largest duration event for the entire study area, based on the selection criteria. This event lasted for 77 months, remained between -5.0 to -4.0 PDSI for 22 months, and was below -5.0 for 14 months. This period is approximately twice the duration of any other event in the south central climatic division.

The second most severe event occurred between September 1915 and September 1918. This event lasted 37 months and remained in the exceptional drought category for 16 months, or approximately one-third of the time.

The most recent event occurred between October 1999 and September 2000 and lasted for 12 months. This was a mild event, with the PDSI only reaching extreme drought conditions for one month.

Southern Climatic Division

The southern climatic division had 10 events ranging from 13 to 85 months in duration, with a median event of 26 months (Figure 8-2; Table 8-2).

The longest event in the study area and worst event in the southern climatic division occurred from October 1950 to February 1957, lasting 85 months. This event remained in extreme drought conditions (PDSI less than -4.0) for 21 months.

The second longest event occurred over 56 months from January 1909 to August 1913. For most of this dry period, the PDSI remained between -1.0 and -4.0 (extreme drought) for 55 months, with one month—September of 1911—reaching -4.0.

The latest event occurred between February 1996 and February 1997. This was one of the mildest events to occur within the southern climatic division. The PDSI remained between -1.0 and -4.0 for its duration.

Lower Valley Climatic Division

Drought events in the lower valley climatic division ranged from 16 to 65 months in duration, with a median period of 34 months. The duration of 9 out of the 11 events for the lower valley are 2 years or longer (Figure 8-2; Table 8-2). The events in this area start and end at any time of year (Table 8-2).

The most severe event in this climatic division was during the period between June 1949 and October 1954. This episode lasted for 65 months. The PDSI shows that the area was under extreme drought conditions for six months but was in mild to severe drought the rest of the period.

Subsequent to this event was a 34-month event between January 1955 and October 1957. Combining this with the 1949 to 1954 event would make this the most severe drought event for the lower valley climatic division. Also, prior to the 1949 to 1954 event, a mildly dry period of 27 months between May 1945 and July 1947 exacerbated to the severity of the subsequent events.

The second most severe event lasted 44 months, from February 1962 to September 1965. The event was dominated by mild to moderate drought conditions.

Standardized Precipitation Index

To quantify precipitation deficits, the Standardized Precipitation Index (SPI) is used to show dry periods within the study area. McKee and others (1993) developed the SPI to show precipitation deficits at different time scales. For example, soil moisture responds to precipitation deficits on a short time scale, while groundwater and surface water respond to precipitation deficits on a longer time scale. Because of this, McKee and others (1993) originally calculated the SPI for 3-, 6-, 12-, 24-, and 48-month time scales, which indicate different types of drought events based on precipitation deficits.

To compute the SPI, precipitation stations with long-term records (more than 30 years) are used. The data set is put into a probability distribution appropriate for the data set and transformed into a normal distribution. The result is that the mean SPI for the station and desired period is zero (Edwards and McKee, 1997). Positive SPI values show above mean precipitation, whereas negative values signify below mean precipitation. Additionally, values of SPI between -1.0 and 1.0 represent the “normal” precipitation range. Because the SPI is normalized, wet and dry periods can be represented in similar ways. The SPI can also be used to monitor wet periods. The National Drought Mitigation Center categorized SPI Values with descriptive terms—these are in Table 8-3.

Table 8-3. SPI values classification (NCDC, 2005).

SPI values	
2.00 and more	extremely wet
1.50 to 1.99	very wet
1.00 to 1.49	moderately wet
-0.99 to 0.99	near normal
-1.00 to -1.49	moderately dry
-1.50 to -1.99	severely dry
-2.00 and less	extremely dry

SPI = Standardized Precipitation Index

The SPI can be calculated on any time scale, but the number associated with the SPI value represents the period used for analysis. For example, a six-month SPI for January 2001 would use the precipitation for August 2000 to January 2001 to calculate the SPI. A comparison of similar periods (August to January) throughout the data set is possible.

SPI values were calculated by using the SPI_SL_6 program provided by the National Drought Mitigation Center (2005). Eight stations were selected from the U. S. Historical Climatology Network Monthly Temperature and Precipitation Data (USHCN) from the National Climatic Data Center (Williams and others, 2005), which is a long-term historical data set used for climatic studies.

Because the SPI requires long-term data sets, there are gaps within the selected station records at the beginning and ends of the records. Only three stations, Brenham, Corpus Christi, and Danevang have records from the late 1800s through 2002, the last year available from the USHCN.

The 12-month SPI is used to filter out short-term dry periods and to provide a good measure of intermediate drought conditions (Edwards and McKee, 1997; d Ó, 2005). In addition, the analysis includes a minimum duration of 12 months. A list of events at each station within the Gulf Coast region is in Table 8-4. The selected stations fall within the upper coast, south central, and southern climatic divisions.

According to McKee and others (1993), a drought event for any time scale is defined as a period in which the SPI is constantly negative and the SPI reaches a value of -1.0 or less. The drought event starts when the SPI first becomes negative and ends with the next positive value of SPI following a value of -1.0 or less. D Ó (2005) discusses methods to identify drought events using the SPI. Each event has a start, an end, a duration (in months), an intensity, and a severity ranking. The intensity equals the individual SPI monthly values; severity is the positive sum of the SPI values within an event. The frequency of events is the ratio of duration to the number of events. For all the stations, the average length of drought events is 25 months and most events occur every 5 to 6 years.

Upper Coast Climatic Division

The Danevang station (Wharton County) (Figures 8-1 and 8-3) shows 19 drought events (Table 8-4), with a median duration of 18 months. The 12-month SPI shows the longest and most severe event occurred from October 1915 to June 1919. This event lasted for 45 months.

The Liberty station (Liberty County) (Figures 8-1 and 8-3; Table 8-4) data period is from 1934 to 1999. Eleven events are identified for this station, which have median duration of 24 months. The SPI evaluation shows the longest duration event lasted 49 months, from January 1962 to January 1966. It is the second most severe event for this station. The most severe event, lasting 41 months, occurred between November 1975 and March 1979. The highest magnitude event lasted 24 months between June 1947 and May 1949.

South Central Climatic Division

The Brenham SPI values (Washington County) (Figures 8-1 and 8-3) show 18 drought events (Table 8-4) with a median duration of 23 months. The SPI shows the longest duration event

Table 8-4. Duration and severity of dry periods based on the 12-month SPI.

Station	Begin	End	Duration (months)	Duration rank	Severity	Severity rank
Danevang	January 1897	March 1898	15	14	8.15	17
	July 1901	November 1902	17	11	25.19	7
	November 1911	January 1905	15	15	4.95	19
	November 1908	November 1911	37	4	40.12	3
	December 1912	April 1914	17	12	15.84	11
	October 1915	June 1919	45	1	73.30	1
	September 1924	February 1926	18	9	24.26	8
	May 1927	December 1928	20	8	22.82	9
	December 1930	July 1932	21	7	10.47	15
	May 1937	October 1940	42	3	27.92	6
	February 1943	February 1944	13	18	7.80	18
	August 1948	September 1949	14	17	13.61	12
	October 1950	September 1953	34	6	39.89	4
	May 1954	March 1957	35	5	48.78	2
	September 1962	March 1966	43	2	35.61	5
	February 1967	May 1968	16	13	18.59	10
	September 1977	February 1979	18	10	11.80	13
July 1980	September 1981	15	16	11.75	14	
September 1987	August 1988	12	19	9.65	16	
Liberty	October 1938	November 1940	26	5	23.05	7
	October 1942	April 1944	19	10	19.01	9
	June 1947	May 1949	24	6	30.83	4
	October 1950	April 1952	19	9	22.11	8
	May 1954	June 1957	38	3	27.83	5
	January 1962	January 1966	49	1	39.08	2
	November 1966	September 1968	23	7	23.80	6
	December 1968	September 1970	22	8	15.22	10
	December 1970	May 1973	30	4	34.48	3
	November 1975	March 1979	41	2	45.90	1
June 1988	May 1989	12	11	12.33	11	
Brenham	January 1893	July 1894	19	12	11.91	14
	June 1896	January 1898	20	11	11.64	15
	July 1901	September 1902	15	14	24.17	9
	December 1908	February 1912	39	3	29.29	8
	March 1916	April 1919	38	4	55.41	1
	December 1924	May 1926	18	13	33.38	4
	March 1927	December 1928	22	10	22.06	11
	April 1930	April 1931	13	15	7.38	17
	November 1932	November 1935	37	5	38.70	3
	May 1937	October 1940	42	2	31.55	5
	October 1950	September 1953	36	6	29.97	6
	February 1954	August 1957	43	1	54.36	2
	July 1962	January 1965	31	7	29.93	7
May 1966	May 1968	25	8	20.72	12	
June 1970	April 1972	23	9	22.61	10	

Table 8-4. Continued.

Station	Begin	End	Duration (months)	Duration rank	Severity	Severity rank	
Brenham	June 1970	April 1972	23	9	22.61	10	
	June 1990	May 1991	12	17	8.28	16	
	January 1996	December 1996	12	18	7.12	18	
	October 1999	October 2000	13	16	16.13	13	
Luling	December 1864	December 1895	13	15	11.06	16	
	May 1896	May 1898	25	7	20.73	8	
	October 1898	March 1900	18	11	17.02	11	
	April 1904	October 1902	19	9	22.98	7	
	May 1905	April 1907	12	18	6.17	18	
	February 1909	November 1912	46	1	41.04	2	
	October 1915	November 1911	38	4	32.49	5	
	December 1924	February 1926	15	13	19.41	9	
	December 1932	November 1934	24	8	14.68	14	
	July 1937	February 1941	44	2	38.37	4	
	July 1943	July 1944	13	16	14.69	13	
	September 1947	March 1949	19	10	18.21	10	
	April 1954	August 1957	41	3	50.42	1	
	October 1961	August 1964	35	5	30.82	6	
	November 1970	December 1971	14	14	10.01	17	
	May 1984	May 1985	13	17	13.70	15	
	June 1988	August 1990	27	6	40.65	3	
	October 1995	January 1997	16	12	16.65	12	
	Beeville	May 1898	June 1890	50	1	63.85	1
		April 1891	November 1892	20	10	19.77	7
June 1896		July 1898	26	7	15.96	9	
June 1906		May 1902	12	15	5.88	16	
August 1905		November 1908	40	4	57.00	2	
September 1910		February 1912	18	12	9.33	14	
January 1917		October 1918	22	9	12.42	13	
May 1927		September 1928	17	13	15.21	11	
December 1928		October 1930	23	8	17.68	8	
September 1937		March 1939	19	11	15.53	10	
April 1940		June 1942	27	6	27.38	6	
July 1943		April 1947	46	2	53.54	4	
December 1951		September 1955	46	3	30.85	5	
May 1961		April 1962	12	16	9.19	15	
June 1972		July 1973	13	14	14.47	12	
September 1977	April 1980	32	5	54.51	3		
Corpus Christi	September 1890	August 1891	12	17	9.66	15	
	January 1892	January 1892	13	15	7.73	17	
	October 1893	April 1895	19	11	17.84	11	
	July 1895	September 1899	51	2	36.96	5	
	April 1901	February 1903	23	8	18.42	10	
	June 1906	May 1912	72	1	75.36	1	
	November 1915	October 1918	36	6	58.49	2	
	July 1920	June 1921	12	18	6.56	18	

Table 8-4. Continued.

Station	Begin	End	Duration (months)	Duration rank	Severity	Severity rank
Corpus Christi	August 1924	April 1926	21	10	34.50	6
	September 1926	August 1928	24	7	19.51	8
	July 1932	December 1933	18	13	10.75	14
	April 1950	October 1951	19	12	18.64	9
	September 1952	September 1953	13	16	9.44	16
	August 1954	August 1957	37	5	44.98	3
	October 1961	July 1965	46	3	42.94	4
	September 1974	June 1976	22	9	14.18	13
	February 1988	May 1991	40	4	32.64	7
June 2000	July 2001	14	14	14.81	12	
Encinal	May 1927	September 1930	41	1	38.43	2
	November 1938	May 1940	19	6	21.28	5
	April 1943	April 1944	13	10	7.33	10
	May 1945	August 1946	16	9	9.13	9
	May 1951	September 1953	29	4	30.11	4
	April 1955	October 1957	31	3	33.75	3
	November 1961	August 1964	34	2	40.93	1
	September 1968	February 1970	18	7	13.65	7
	December 1970	April 1972	17	8	10.17	8
November 1973	June 1975	20	5	15.18	6	
Rio Grande City	March 1952	September 1953	19	4	16.52	4
	April 1955	December 1957	33	1	26.32	1
	September 1959	November 1960	15	6	14.03	5
	December 1961	March 1964	28	2	21.98	2
	September 1977	August 1979	24	3	19.94	3
October 1979	April 1981	19	5	11.25	6	

SPI = Standardized Precipitation Index

occurred between February 1954 and August 1957 and lasted 43 months (Table 8-4; Figure 8-3). This is also the second most severe event for this station. The most severe event occurred between March 1916 and April of 1919 and lasted 38 months.

The Luling station (Caldwell County) (Figures 8-1 and 8-3) shows 18 events identified that have a median duration of 19 months (Table 8-4). The longest event lasted 46 months, between February 1909 and November 1912. This is also the second most severe event. The most severe event was between April 1954 and August 1957 and ranks as the third longest event.

The Beeville station (Bee County) (Figures 8-1 and 8-3) has 16 identified events (Table 8-4), with a median length of 23 months. The longest duration and most severe event occurred between May 1898 and June 1890, lasting 50 months.

The Corpus Christi station (Nueces County) (Figures 8-1 and 8-3) shows 18 events with a median duration of 22 months (Table 8-4). The longest duration and most severe event at this station occurred between June 1906 and May 1912 and lasted 72 months. The next longest event lasted 51 months, from July 1895 to September 1899. The second most severe event occurred between November 1915 and October 1918, lasting for 36 months.

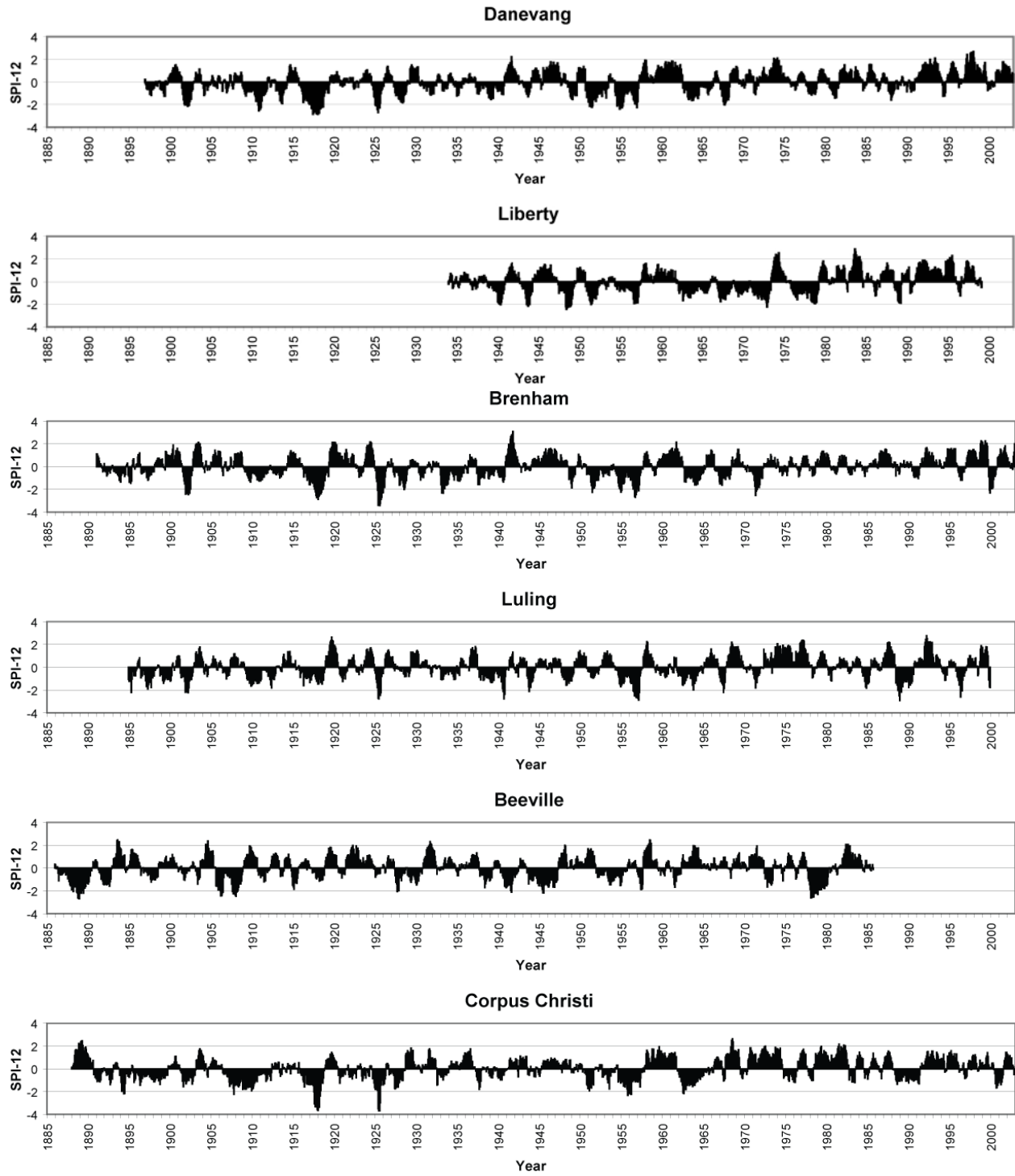


Figure 8-3. Standardized Precipitation Index graphs.

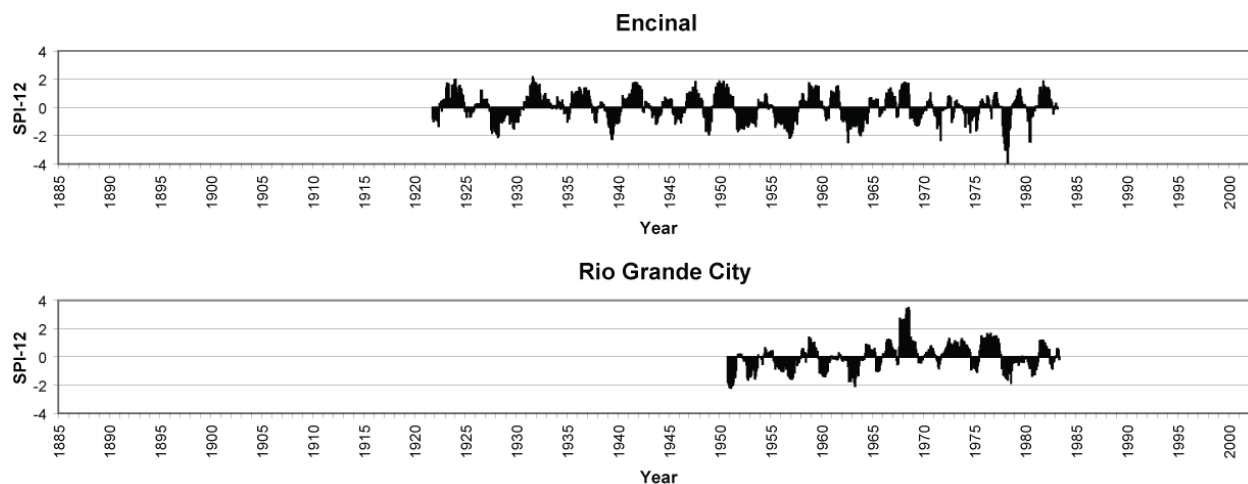


Figure 8-3. Continued.

Southern Climatic Division

The longest drought event at the Encinal station (La Salle County) (Figures 8-1 and 8-3) occurred between May 1927 and September 1930, lasting 41 months (Table 8-4). This event is also the second most severe event based on the 12-month SPI data. The most severe event of 34 months occurred between November 1961 and August 1964.

The Rio Grande City station's (Starr County) (Figures 8-1 and 8-3) longest and most severe dry period occurred from September 1955 to December 1957 (Table 8-4). The second longest and second most severe event occurred soon after, between December 1961 and November 1960.

Summary

There are many ways to analyze dry periods or drought events along the Gulf Coast region. In this discussion, the long-term PDSI and the 12-month SPI were used to indicate possible dry periods and dry events. Methods were applied to each index to show dry periods and drought events.

Based on the PDSI, the most severe event occurred from February 1950 to February 1957 in the southern climatic division. This event lasted 85 months and severe to extreme drought conditions dominated the area during this period (Table 8-2). This is also reflected in the SPI-12 values for the Encinal and Rio Grande City stations, where two events are identified between May 1951 and December 1957 (Table 8-4).

Based on the SPI values, the longest duration and most severe event occurred at Corpus Christi—this event lasted for 72 months between June 1906 and May 1912. The PDSI for the south central climatic division shows a related event for January 1909 to November 1911 (Table 8-2) that is dominated by moderate to severe drought conditions.

Dry periods and drought events are common throughout the Gulf Coast region. They can occur every 5 to 6 years and have typical durations of 18 to 24 months.

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