

Section 7. Thunderstorms

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Why Thunderstorms Are a Threat

According to the National Weather Service (NWS), thunderstorms form when clouds develop sufficient upward motion and are cold enough to provide the ingredients (ice and super-cooled water) to generate and separate electrical charges within the cloud. The cumulonimbus cloud is the perfect lightning and thunder factory, earning its nickname, "thunderhead."

The National Weather Service classifies a thunderstorm as severe if it contains hail of three-quarter inches or larger in diameter, and/or wind gusts of 58 mph or higher, and/or spawns a tornado. Severe thunderstorm watches, meaning that conditions are suitable for severe thunderstorm development during the next several hours, are issued for areas several hundred miles wide by the NWS Storm Prediction Center in Norman, Oklahoma. A severe thunderstorm warning is issued by the local NWS office, usually for a county or several counties over an hour or so, based on spotter reports or radar indications of conditions that exceed specified levels. If a distinct threat exists or a tornado is actually observed, a tornado warning is issued. Tornadoic storms also produce hail, downbursts, and lightning.

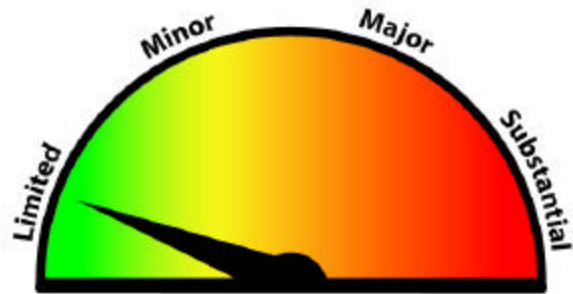


Hazard Profile

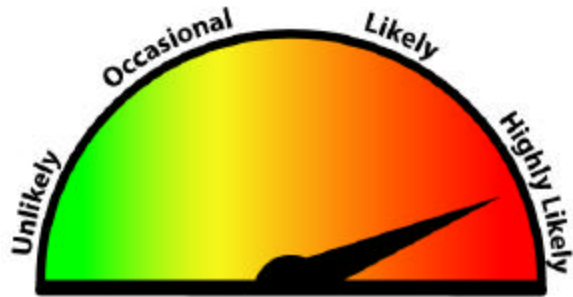
Thunderstorms are generally localized. The severity of their impact is considered to be limited since they generally result in injuries treatable with first aid, shut down critical facilities and services for no more than 24, and less than ten percent of affected properties are destroyed or incur major damage.

Most thunderstorms occur during the spring (March, April and May) and the fall, during the month of September.

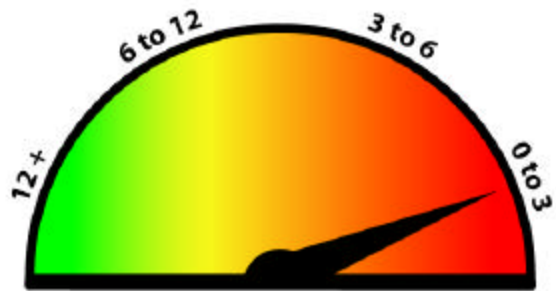
Warning time for thunderstorms minimal at best, and there is no warning at worst.



SEVERITY OF IMPACT



FREQUENCY OF OCCURRENCE



HOURS OF WARNING TIME

Figure 7-1. Thunderstorm Hazard Profile Summary

History of Thunderstorms

Figure 7-2 plots the frequency of historical thunderstorms as reported to the National Oceanic and Atmospheric Administration.¹ On average, more than 16 storms are reported annually. Table 7-1 lists historical thunderstorm events reported in the Guadalupe River Basin.¹

Figure 7-2. Historical Reported Thunderstorms

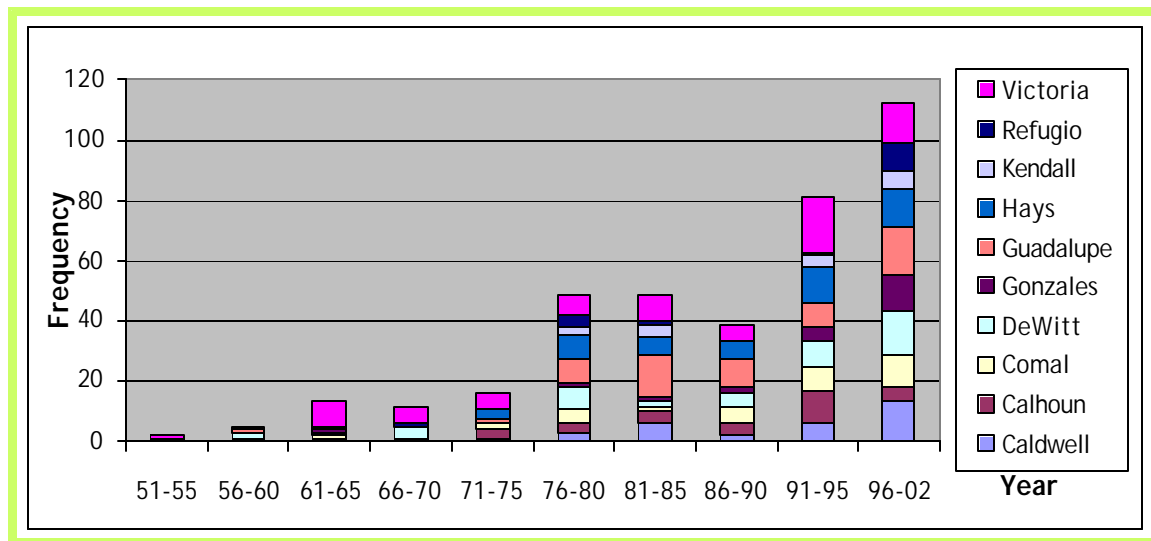


Table 7-1. Historical Reported Thunderstorms in the Guadalupe River Basin, 1950 to 2002, National Oceanic and Atmospheric Administration

Lower Basin

Event	Year	Date	Wind Speed	Injuries	Deaths	County/Community
CALHOUN COUNTY						
Thunderstorm winds	1965	24 Dec	0 kts.	0	0	Calhoun
Thunderstorm winds	1968	11 May	0 kts.	0	0	Calhoun

¹ <http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms>



GUADALUPE-BLANCO RIVER AUTHORITY

Event	Year	Date	Wind Speed	Injuries	Deaths	County/ Community
Thunderstorm winds	1975	30 May	0 kts.	0	0	Calhoun
Thunderstorm winds	1975	30 May	69 kts.	0	0	Calhoun
Thunderstorm winds	1975	30 May	0 kts.	0	0	Calhoun
Thunderstorm winds	1980	8 May	52 kts.	0	0	Calhoun
Thunderstorm winds	1980	13 May	87 kts.	0	0	Calhoun
Thunderstorm winds	1980	16 May	50 kts.	0	0	Calhoun
Thunderstorm winds	1981	2 Jun	60 kts.	0	0	Calhoun
Thunderstorm winds	1981	22 Oct	0 kts.	0	0	Calhoun
Thunderstorm winds	1983	23 Nov	61 kts.	0	0	Calhoun
Thunderstorm w inds	1984	12 Mar	52 kts.	0	0	Calhoun
Thunderstorm winds	1986	17 May	61 kts.	0	0	Calhoun
Thunderstorm winds	1987	30 May	52 kts.	0	0	Calhoun
Thunderstorm winds	1990	29 Mar	0 kts.	0	1	Calhoun
Thunderstorm winds	1990	31 Aug	0 kts.	0	0	Calhoun
Thunderstorm winds	1991	14 Jan	0 kts.	0	0	Calhoun
Thunderstorm winds	1991	5 Apr	0 kts.	0	0	Calhoun
Thunderstorm winds	1991	7 Jun	0 kts.	0	0	Calhoun
Thunderstorm winds	1991	1 Oct	0 kts.	0	0	Calhoun
Thunderstorm winds	1992	16 Oct	0 kts.	0	0	Calhoun
Thunderstorm winds	1993	11 Mar	N/A	0	0	Port Lavaca
Thunderstorm winds	1993	11 Mar	N/A	0	0	Port O'Connor
Thunderstorm winds	1994	23 Feb	N/A	0	0	Seadrift
Thunderstorm winds	1995	11 Apr	N/A	0	0	Port O'Connor
Thunderstorm winds	1995	30 May	N/A	0	0	Port Lavaca
Thunderstorm winds	1995	11 Jun	N/A	0	0	Countywide
Thunderstorm winds	1997	17 Mar	50 kts.	0	0	Port O'Connor
Thunderstorm winds	1998	6 Oct	50 kts.	0	0	Port Lavaca
Thunderstorm winds	2000	23 Jul	50 kts.	0	0	Port Lavaca
Thunderstorm winds	2001	5 May	50 kts.	0	0	Port Lavaca
Thunderstorm winds	2001	22 Jun	60 kts.	0	0	Magnolia Beach

Total Number of Storms: 32

REFUGIO COUNTY

Thunderstorm winds	1968	2 Jun	52 kts.	0	0	Refugio
Thunderstorm winds	1979	29 Apr	0 kts.	0	0	Refugio
Thunderstorm winds	1980	8 May	0 kts.	0	0	Refugio
Thunderstorm winds	1980	21 May	0 kts.	0	0	Refugio
Thunderstorm winds	1980	10 Aug	0 kts.	0	0	Refugio
Thunderstorm winds	1984	1 Jul	0 kts.	0	0	Refugio



Event	Year	Date	Wind Speed	Injuries	Deaths	County/ Community
Thunderstorm winds	1994	30 May	N/A	0	0	Refugio
Thunderstorm winds	1998	18 Feb	50 kts.	0	0	Refugio
Thunderstorm winds	1998	22 Aug	50 kts.	0	0	Refugio
Thunderstorm winds	1998	6 Oct	50 kts.	0	0	Refugio
Thunderstorm winds	1999	12 May	50 kts.	0	0	Refugio
Thunderstorm winds	1999	18 May	50 kts.	0	0	Refugio
Thunderstorm winds	1999	18 May	60 kts.	0	0	Refugio
Thunderstorm winds	2001	7 Jun	50 kts.	0	0	Bayside
Thunderstorm winds	2002	29 May	50 kts.	0	0	Tivoli
Thunderstorm winds/hail	2002	23 Oct	0 kts.	0	0	Woodsboro

Total Number of Storms: 16

VICTORIA COUNTY

Thunderstorm winds	1955	5 Jun	70 kts.	0	0	Victoria
Thunderstorm winds	1958	13 Aug	0 kts.	0	0	Victoria
Thunderstorm winds	1961	25 May	58 kts.	0	0	Victoria
Thunderstorm winds	1961	25 May	60 kts.	0	0	Victoria
Thunderstorm winds	1962	27 Apr	0 kts.	0	0	Victoria
Thunderstorm winds	1963	24 Jul	86 kts.	0	0	Victoria
Thunderstorm winds	1963	26 Jul	52 kts.	0	0	Victoria
Thunderstorm winds	1965	19 Apr	0 kts.	0	0	Victoria
Thunderstorm winds	1965	8 May	0 kts.	0	0	Victoria
Thunderstorm winds	1965	18 May	61 kts.	0	0	Victoria
Thunderstorm winds	1966	9 Feb	0 kts.	0	0	Victoria
Thunderstorm winds	1968	11 May	53 kts.	0	0	Victoria
Thunderstorm winds	1969	14 Feb	0 kts.	0	0	Victoria
Thunderstorm winds	1969	11 Apr	62 kts.	0	0	Victoria
Thunderstorm winds	1969	12 Apr	52 kts.	0	0	Victoria
Thunderstorm winds	1970	10 Mar	51 kts.	0	0	Victoria
Thunderstorm winds	1972	7 May	0 kts.	0	0	Victoria
Thunderstorm winds	1975	8 May	87 kts.	0	0	Victoria
Thunderstorm winds	1975	8 May	55 kts.	0	0	Victoria
Thunderstorm winds	1975	27 May	62 kts.	0	0	Victoria
Thunderstorm winds	1975	30 May	0 kts.	0	0	Victoria
Thunderstorm winds	1977	16 Apr	0 kts.	0	0	Victoria
Thunderstorm winds	1977	22 Oct	52 kts.	0	0	Victoria
Thunderstorm winds	1979	29 Apr	65 kts.	0	0	Victoria
Thunderstorm winds	1979	29 Apr	0 kts.	0	0	Victoria



GUADALUPE-BLANCO RIVER AUTHORITY

Event	Year	Date	Wind Speed	Injuries	Deaths	County/ Community
Thunderstorm winds	1979	1 May	0 kts.	0	0	Victoria
Thunderstorm winds	1980	18 May	60 kts.	0	0	Victoria
Thunderstorm winds	1980	10 Aug	0 kts.	0	0	Victoria
Thunderstorm winds	1981	11 Jul	53 kts.	0	0	Victoria
Thunderstorm winds	1981	22 Oct	0 kts.	0	0	Victoria
Thunderstorm winds	1983	26 Mar	50 kts.	0	0	Victoria
Thunderstorm winds	1983	26 Mar	50 kts.	0	0	Victoria
Thunderstorm winds	1983	15 Jul	0 kts.	0	0	Victoria
Thunderstorm winds	1983	4 Aug	0 kts.	0	0	Victoria
Thunderstorm winds	1983	4 Aug	0 kts.	0	0	Victoria
Thunderstorm winds	1983	12 Sep	0 kts.	0	0	Victoria
Thunderstorm winds	1984	12 Mar	0 kts.	0	0	Victoria
Thunderstorm winds	1986	17 May	59 kts.	0	0	Victoria
Thunderstorm winds	1986	17 May	60 kts.	0	0	Victoria
Thunderstorm winds	1987	27 Feb	0 kts.	0	0	Victoria
Thunderstorm winds	1987	16 May	52 kts.	0	0	Victoria
Thunderstorm winds	1987	16 Nov	63 kts.	0	0	Victoria
Thunderstorm winds	1987	16 Nov	0 kts.	0	0	Victoria
Thunderstorm winds	1992	28 May	53 kts.	0	0	Victoria
Thunderstorm winds	1993	30 Apr	N/A	0	0	Victoria
Thunderstorm winds	1993	5 May	N/A	0	0	Bloomington
Thunderstorm winds	1993	18 May	N/A	0	0	Victoria
Thunderstorm winds	1993	31 May	N/A	0	0	Victoria
Thunderstorm winds	1993	31 May	N/A	0	0	Victoria
Thunderstorm winds	1993	31 May	N/A	0	0	Victoria
Thunderstorm winds	1993	31 May	N/A	0	0	Victoria
Thunderstorm winds	1994	13 May	N/A	0	0	Victoria
Thunderstorm winds	1994	30 May	N/A	0	0	Nursery
Thunderstorm winds	1994	30 May	N/A	0	0	Victoria
Thunderstorm wind	1994	16 Aug	N/A	0	0	Victoria
Thunderstorm wind	1994	22 Aug	N/A	0	0	Bloomington
Thunderstorm wind	1994	8 Oct	N/A	0	0	Victoria
Thunderstorm wind	1994	8 Oct	N/A	0	0	Victoria
Thunderstorm wind	1994	8 Oct	N/A	0	0	Victoria
Thunderstorm wind	1994	8 Oct	N/A	0	0	Victoria
Thunderstorm winds	1995	11 Jun	N/A	0	0	Countywide
Thunderstorm winds	1996	4 Jun	60 kts.	0	0	Victoria
Thunderstorm winds	1996	14 Aug	50 kts.	0	0	Victoria Regional Airport



Event	Year	Date	Wind Speed	Injuries	Deaths	County/ Community
Thunderstorm winds	1996	21 Sep	62 kts.	0	0	Nursery
Thunderstorm winds	1997	19 Jun	52 kts.	0	0	Victoria
Thunderstorm winds	1997	19 Jun	50 kts.	0	0	Victoria
Thunderstorm winds	1997	23 Dec	60 kts.	0	0	Victoria
Thunderstorm winds	1998	16 Mar	50 kts.	0	0	Victoria
Thunderstorm winds	1998	6 Oct	50 kts.	0	0	Mission Valley
Thunderstorm winds	1999	18 May	60 kts.	0	0	Victoria
Thunderstorm winds	2001	5 May	50 kts.	0	0	Bloomington
Thunderstorm winds	2002	29 May	50 kts.	0	0	Victoria Regional Airport
Thunderstorm winds	2002	29 Jun	50 kts.	0	0	Mission Valley
Thunderstorm winds	2002	3 Aug	52 kts.	0	0	Victoria Regional Airport

Total Number of Storms: 74

Source: National Climatic Data Center, National Oceanic and Atmospheric Administration.

Middle Basin

Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
CALDWELL COUNTY						
Thunderstorm winds	1957	2 Sep	0 kts.	0	0	Caldwell
Thunderstorm winds	1975	9 Jun	0 kts.	0	0	Caldwell
Thunderstorm winds	1979	18 Apr	52 kts.	0	0	Caldwell
Thunderstorm winds	1980	Feb-29	55 kts.	0	0	Caldwell
Thunderstorm winds	1980	28 Jul	0 kts.	0	0	Caldwell
Thunderstorm winds	1982	13 May	0 kts.	0	0	Caldwell
Thunderstorm winds	1983	9 Feb	50 kts.	0	0	Caldwell
Thunderstorm winds	1983	20 May	0 kts.	0	0	Caldwell
Thunderstorm winds	1983	20 May	0 kts.	0	0	Caldwell
Thunderstorm winds	1984	13 Dec	69 kts.	0	0	Caldwell
Thunderstorm winds	1985	1 May	51 kts.	0	0	Caldwell
Thunderstorm winds	1989	19 Apr	70 kts.	0	0	Caldwell
Thunderstorm winds	1990	4 Jun	0 kts.	0	0	Caldwell
Thunderstorm winds	1992	3 Sep	0 kts.	0	0	Caldwell
Thunderstorm winds	1993	30 May	N/A	0	0	Lockhart
Thunderstorm winds	1994	27 Mar	N/A	0	0	Lockhart



GUADALUPE-BLANCO RIVER AUTHORITY

Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
Thunderstorm winds	1994	13 May	N/A	0	0	Luling
Thunderstorm winds	1995	8 Mar	N/A	0	0	Countywide
Thunderstorm winds	1995	7 Sep	N/A	0	0	Countywide
Thunderstorm winds	1996	28 Apr	0 kts.	0	0	Luling
Thunderstorm winds	1996	2 Jun	0 kts.	0	0	Mc Mahan
Thunderstorm winds	1996	20 Sep	0 kts.	0	0	Lockhart
Thunderstorm winds	1996	20 Sep	0 kts.	0	0	Mustang Ridge
Thunderstorm winds	1997	3 Sep	0 kts.	0	0	Maxwell
Thunderstorm winds	1998	14 Jul	0 kts.	0	0	Luling
Thunderstorm winds	1999	17 May	0 kts.	0	0	Luling
Thunderstorm winds	2000	22 Oct	0 kts.	0	0	Martindale
Thunderstorm winds	2000	5 Nov	0 kts.	0	0	Martindale
Thunderstorm winds	2001	20 May	0 kts.	0	0	Countywide
Thunderstorm winds	2002	19 Mar	0 kts.	0	0	Countywide
Thunderstorm winds	2002	8 Oct	0 kts.	0	0	Maxwell
Thunderstorm winds	2002	21 Oct	0 kts.	0	0	Fentress

Total Number of Storms: 32

DeWITT COUNTY

Thunderstorm winds	1958	22 Jun	0 kts.	0	0	DeWitt
Thunderstorm winds	1958	22 Jun	0 kts.	0	0	DeWitt
Thunderstorm winds	1965	9 May	0 kts.	0	0	DeWitt
Thunderstorm winds	1966	25 Apr	0 kts.	0	0	DeWitt
Thunderstorm winds	1968	11 May	0 kts.	0	0	DeWitt
Thunderstorm winds	1968	11 May	0 kts.	0	0	DeWitt
Thunderstorm winds	1968	11 May	62 kts.	0	0	DeWitt
Thunderstorm winds	1976	7 Apr	0 kts.	0	0	DeWitt
Thunderstorm winds	1976	7 Apr	0 kts.	0	0	DeWitt
Thunderstorm winds	1976	7 Apr	0 kts.	0	0	DeWitt
Thunderstorm winds	1979	1 May	0 kts.	0	0	DeWitt
Thunderstorm winds	1980	15 May	0 kts.	0	0	DeWitt
Thunderstorm winds	1980	18 May	60 kts.	0	0	DeWitt
Thunderstorm winds	1980	10 Aug	0 kts.	0	0	DeWitt
Thunderstorm winds	1982	2 Nov	0 kts.	0	0	DeWitt
Thunderstorm winds	1986	17 May	0 kts.	0	0	DeWitt
Thunderstorm winds	1989	28 Apr	0 kts.	0	0	DeWitt
Thunderstorm winds	1990	29 Mar	52 kts.	0	0	DeWitt
Thunderstorm winds	1990	31 Aug	0 kts.	0	0	DeWitt
Thunderstorm winds	1991	16 May	0 kts.	0	0	DeWitt



Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
Thunderstorm winds	1993	9 May	N/A	0	0	Cuero
Thunderstorm winds	1993	18 May	N/A	0	0	Cuero
Thunderstorm winds	1994	15 Apr	N/A	0	0	Countywide
Thunderstorm winds	1994	13 May	N/A	0	0	Countywide
Thunderstorm winds	1994	13 May	N/A	0	0	Countywide
Thunderstorm winds	1995	1 Jun	N/A	0	0	Cuero
Thunderstorm winds	1995	11 Jun	N/A	0	0	Countywide
Thunderstorm winds	1996	28 Apr	0 kts.	0	0	Yorktown
Thunderstorm winds	1996	13 Jun	0 kts.	0	0	Cuero
Thunderstorm winds	1997	27 May	0 kts.	0	0	Countywide
Thunderstorm winds	1997	31 May	0 kts.	0	0	Cuero
Thunderstorm winds	1997	23 Dec	0 kts.	0	0	Cuero
Thunderstorm winds	1998	10 Feb	0 kts.	0	0	Westhoff
Thunderstorm winds	1998	10 Feb	0 kts.	0	0	Cuero
Thunderstorm winds	1998	10 Feb	0 kts.	0	0	Petersville
Thunderstorm winds	1998	20 Aug	0 kts.	0	0	Hochheim
Thunderstorm winds	1999	17 May	0 kts.	0	0	Cuero
Thunderstorm winds	2000	10 Mar	0 kts.	0	0	Hochheim
Thunderstorm winds	2000	10 Mar	0 kts.	0	0	Yorktown
Thunderstorm winds	2001	25 May	0 kts.	0	0	Yorktown
Thunderstorm winds	2002	29 May	0 kts.	0	0	Nordheim

Total Number of Storms: 41

GONZALES COUNTY

Thunderstorm winds	1955	3 Aug	0 kts.	0	0	Gonzales
Thunderstorm winds	1965	30 Mar	0 kts.	0	0	Gonzales
Thunderstorm winds	1979	1 May	0 kts.	0	0	Gonzales
Thunderstorm winds	1982	13 May	0 kts.	0	0	Gonzales
Thunderstorm winds	1983	19 May	0 kts.	0	0	Gonzales
Thunderstorm winds	1986	17 May	0 kts.	0	0	Gonzales
Thunderstorm winds	1989	11 Jun	0 kts.	0	0	Gonzales
Thunderstorm winds	1997	3 May	60 kts.	0	0	Gonzales
Thunderstorm winds	1991	15 Aug	0 kts.	0	0	Gonzales
Thunderstorm winds	1994	13 May	N/A	0	0	Gonzales
Thunderstorm winds	1995	7 Sep	N/A	0	0	Gonzales
Thunderstorm winds	1995	12 Sep	N/A	0	0	Smiley
Thunderstorm winds	1996	28 Apr	0 kts.	0	0	Nixon
Thunderstorm winds	1996	25 Jul	0 kts.	0	0	Smiley



GUADALUPE-BLANCO RIVER AUTHORITY

Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
Thunderstorm winds	1997	27 May	0 kts.	0	0	Leesville
Thunderstorm winds	1997	5 Jun	0 kts.	0	0	Gonzales
Thunderstorm winds	1998	10 Feb	0 kts.	0	0	Cheapside
Thunderstorm winds	1998	14 Jul	0 kts.	0	0	Gonzales
Thunderstorm winds	1999	17 May	0 kts.	0	0	Gonzales
Thunderstorm winds	1999	17 May	0 kts.	0	0	Smiley
Thunderstorm winds	2000	10 Mar	0 kts.	0	0	Gonzales
Thunderstorm winds	2000	10 Mar	0 kts.	0	0	Smiley
Thunderstorm winds	2000	2 Nov	0 kts.	0	0	Gonzales
Thunderstorm winds	2002	17 May	0 kts.	0	0	Cost

Total Number of Storms: 24

Source: National Climatic Data Center, National Oceanic and Atmospheric Administration.

Upper Basin

Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
GUADALUPE COUNTY						
Thunderstorm winds	1960	16 Oct	70 kts.	0	0	Guadalupe
Thunderstorm winds	1962	28 Oct	0 kts.	0	0	Guadalupe
Thunderstorm winds	1971	20 Jul	0 kts.	0	0	Guadalupe
Thunderstorm winds	1973	5 Jun	0 kts.	0	0	Guadalupe
Thunderstorm winds	1978	12 Feb	0 kts.	0	0	Guadalupe
Thunderstorm winds	1979	2 Mar	0 kts.	0	0	Guadalupe
Thunderstorm winds	1979	18 Apr	0 kts.	0	0	Guadalupe
Thunderstorm winds	1979	29 Apr	0 kts.	0	0	Guadalupe
Thunderstorm winds	1979	1 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1979	30 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1979	30 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1980	27 Aug	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	6 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	6 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	6 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	30 Jun	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	30 Jun	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	30 Jun	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	30 Jun	0 kts.	0	0	Guadalupe
Thunderstorm winds	1982	30 Jun	0 kts.	0	0	Guadalupe



Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
Thunderstorm winds	1983	19 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1983	23 Nov	61 kts.	0	0	Guadalupe
Thunderstorm winds	1984	13 Dec	0 kts.	0	0	Guadalupe
Thunderstorm winds	1984	13 Dec	0 kts.	0	0	Guadalupe
Thunderstorm winds	1984	30 Dec	0 kts.	0	0	Guadalupe
Thunderstorm winds	1985	8 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1986	3 Mar	0 kts.	0	0	Guadalupe
Thunderstorm winds	1986	12 Apr	0 kts.	0	0	Guadalupe
Thunderstorm winds	1986	17 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1986	1 Sep	52 kts.	0	0	Guadalupe
Thunderstorm winds	1987	19 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1988	20 May	0 kts.	0	0	Guadalupe
Thunderstorm winds	1988	24 Aug	0 kts.	3	0	Guadalupe
Thunderstorm winds	1989	29 Apr	0 kts.	0	0	Guadalupe
Thunderstorm winds	1990	4 Jun	0 kts.	0	0	Guadalupe
Thunderstorm winds	1991	13 Apr	0 kts.	0	0	Guadalupe
Thunderstorm winds	1991	3 Jun	0 kts.	0	0	Guadalupe
Thunderstorm winds	1991	29 Jul	52 kts.	0	0	Guadalupe
Thunderstorm winds	1991	29 Jul	0 kts.	0	0	Guadalupe
Thunderstorm winds	1994	27 Mar	N/A	0	0	Seguin
Thunderstorm winds	1994	13 May	N/A	0	0	Seguin
Thunderstorm winds	1995	8 Mar	N/A	0	0	Countywide
Thunderstorm winds	1995	7 Sep	N/A	0	0	NWS Office
Thunderstorm winds	1996	28 Apr	58 kts.	0	0	New Braunfels
Thunderstorm winds	1996	28 Apr	0 kts.	0	0	Lake McQueeney
Thunderstorm winds	1996	2 Jun	63 kts.	0	0	NWS Office
Thunderstorm winds	1996	15 Sep	0 kts.	0	0	Countywide
Thunderstorm winds	1997	15 May	0 kts.	0	0	New Braunfels
Thunderstorm winds	1997	27 May	0 kts.	0	0	Seguin
Thunderstorm winds	1998	16 Mar	0 kts.	0	0	Staples
Thunderstorm winds	1999	10 May	0 kts.	0	0	Seguin
Thunderstorm winds	1999	17 May	0 kts.	0	0	McQueeney
Thunderstorm winds	1999	12 Jun	0 kts.	0	0	Cibolo
Thunderstorm winds	1999	12 Jun	53 kts.	0	0	New Braunfels
Thunderstorm winds	1999	12 Jun	0 kts.	0	0	Geronimo
Thunderstorm winds	2000	26 Mar	0 kts.	0	0	Seguin
Thunderstorm winds	2000	5 Nov	0 kts.	0	0	Schertz
Thunderstorm winds	2002	19 Mar	0 kts.	2	0	Countywide



GUADALUPE-BLANCO RIVER AUTHORITY

Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
Thunderstorm winds	2002	19 Mar	59 kts.	0	0	New Braunfels

Total Number of Storms: 59

HAYS COUNTY

Thunderstorm winds	1974	9 May	0 kts.	0	0	Hays
Thunderstorm winds	1975	7 Apr	0 kts.	0	0	Hays
Thunderstorm winds	1975	19 May	70 kts.	0	0	Hays
Thunderstorm winds	1976	31 May	0 kts.	0	0	Hays
Thunderstorm winds	1976	31 May	0 kts.	0	0	Hays
Thunderstorm winds	1978	11 May	0 kts.	0	0	Hays
Thunderstorm winds	1978	29 May	0 kts.	0	0	Hays
Thunderstorm winds	1979	18 Apr	52 kts.	0	0	Hays
Thunderstorm winds	1979	10 Jul	0 kts.	0	0	Hays
Thunderstorm winds	1980	Feb-29	55 kts.	0	0	Hays
Thunderstorm winds	1980	13 May	52 kts.	0	0	Hays
Thunderstorm winds	1980	28 Jul	0 kts.	0	0	Hays
Thunderstorm winds	1982	13 May	0 kts.	0	0	Hays
Thunderstorm winds	1982	22 Jun	0 kts.	0	0	Hays
Thunderstorm winds	1983	30 Mar	0 kts.	0	0	Hays
Thunderstorm winds	1984	21 Oct	0 kts.	0	0	Hays
Thunderstorm winds	1984	31 Dec	0 kts.	0	0	Hays
Thunderstorm winds	1985	8 May	0 kts.	0	0	Hays
Thunderstorm winds	1986	12 Jun	0 kts.	0	0	Hays
Thunderstorm winds	1989	5 May	0 kts.	0	0	Hays
Thunderstorm winds	1989	20 May	0 kts.	0	0	Hays
Thunderstorm winds	1990	26 Apr	0 kts.	0	0	Hays
Thunderstorm winds	1990	26 Apr	0 kts.	0	0	Hays
Thunderstorm winds	1990	18 May	0 kts.	0	0	Hays
Thunderstorm winds	1991	7 Apr	0 kts.	0	0	Hays
Thunderstorm winds	1992	27 May	53 kts.	0	0	Hays
Thunderstorm winds	1992	12 Jun	60 kts.	0	0	Hays
Thunderstorm winds	1992	12 Jun	0 kts.	0	0	Hays
Thunderstorm winds	1992	3 Sep	50 kts.	0	0	Hays
Thunderstorm winds	1992	3 Sep	50 kts.	0	0	Hays
Thunderstorm winds	1994	5 Apr	N/A	0	0	San Marcos
Thunderstorm winds	1994	13 May	N/A	0	0	San Marcos
Thunderstorm winds	1994	29 May	N/A	0	0	San Marcos
Thunderstorm winds	1995	8 Mar	N/A	0	0	Countywide
Thunderstorm winds	1995	31 May	N/A	0	0	Buda



Event	Year	Date	Mag.	Injuries	Deaths	County/ Community
Thunderstorm winds	1995	11 Jun	N/A	0	0	Countywide
Thunderstorm winds	1996	14 Aug	0 kts.	0	0	San Marcos
Thunderstorm winds	1996	14 Aug	51 kts.	0	0	San Marcos
Thunderstorm winds	1996	20 Sep	0 kts.	0	0	Wimberley
Thunderstorm winds	1997	22 Jul	0 kts.	0	0	Buda
Thunderstorm winds	1998	7 Mar	0 kts.	0	0	San Marcos
Thunderstorm winds	1998	16 Mar	0 kts.	0	0	San Marcos
Thunderstorm winds	1998	30 Aug	0 kts.	0	0	Buda
Thunderstorm winds	2000	26 Mar	0 kts.	0	0	Dripping Springs
Thunderstorm winds	2000	31 Jul	0 kts.	0	0	San Marcos
Thunderstorm winds	2000	22 Oct	0 kts.	0	0	Kyle
Thunderstorm winds	2002	19 Mar	0 kts.	0	0	Countywide
Thunderstorm winds	2002	19 Mar	50 kts.	0	0	San Marcos Municipal Airport
Thunderstorm winds	2002	7 Apr	0 kts.	0	0	Buda

Total Number of Storms: 49

KENDALL COUNTY

Thunderstorm winds	1980	25 Apr	0 kts.	0	0	Kendall
Thunderstorm winds	1980	15 Oct	0 kts.	0	0	Kendall
Thunderstorm winds	1981	3 Mar	0 kts.	0	0	Kendall
Thunderstorm winds	1982	20 Apr	0 kts.	0	0	Kendall
Thunderstorm winds	1982	15 Sep	0 kts.	0	0	Kendall
Thunderstorm winds	1985	30 Apr	0 kts.	0	0	Kendall
Thunderstorm winds	1991	17 Nov	0 kts.	0	0	Kendall
Thunderstorm winds	1993	12 Oct	N/A	0	0	Boerne
Thunderstorm windss	1994	23 Jun	N/A	0	0	Boerne
Thunderstorm winds	1995	8 Mar	N/A	0	0	Boerne
Thunderstorm winds	1997	3 Sep	0 kts.	0	0	Countywide
Thunderstorm winds	1997	3 Sep	0 kts.	0	0	Sisterdale
Thunderstorm winds	1999	27 Mar	0 kts.	0	0	Welfare
Thunderstorm winds	2001	20 May	0 kts.	0	0	Boerne
Thunderstorm winds	2001	12 Oct	0 kts.	0	0	Comfort
Thunderstorm winds	2002	28 May	0 kts.	0	0	Boerne

Total Number of Storms: 16

Source: National Climatic Data Center, National Oceanic and Atmospheric Administration.



Location of Hazardous Areas

All buildings and facilities are exposed to the thunderstorm hazard and could potentially be affected. There is no way to predict where a thunderstorm will occur.

People and Property at Risk

All the population, buildings, critical facilities, infrastructure, lifelines, and hazardous materials facilities are considered exposed to the hazard and could potentially be affected.

Table 7-2. Exposure to Thunderstorms, by County, in the Guadalupe River Basin

Jurisdiction	Population (2000)	Residential Buildings		Commercial Buildings		Critical Facilities
		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
TOTAL	471,774	214,237	52,282,213,000	1,456	6,329,878,000	492
		Infrastructure and Lifelines			Hazardous Materials Facilities	
Jurisdiction	Oil Pipe (km)	Gas Pipe (km)	Highway (km)	Railroad (km)	Number of Sites	Number of Materials
Caldwell	211	83	142	65	1	3
Calhoun	62	151	170	56	6	107
Comal	-	46	153	87	7	16
DeWitt	89	223	213	52		





Gonzales	138	1	329	65	3	8
Guadalupe	170	92	224	69	6	14
Hays	38	21	227	67	6	6
Kendall	-	46	139	-		
Refugio	380	838	147	65		
Victoria	302	680	223	157	5	43
TOTALs	1,391	2,181	1,967	684		

Potential Damages and Losses

Modeling results from PBS&J Engineering Company indicate that, on average, the Guadalupe River Basin experiences \$3.6 million in losses from thunderstorms each year. The data indicate that DeWitt County has the highest risk relative to replacement value.

Estimated annualized losses cannot be broken down into further categories (residential, commercial, etc.) since the exact path of thunderstorms cannot be determined. All people, buildings, and facilities are considered to be exposed to this hazard and could potentially be affected.

Table 7-3 shows estimated exposure, potential annualized losses, and annualized loss ratios by county for thunderstorms.

Table 7-3. Potential Annualized Losses and Percent Loss Ratio by County (Thunderstorm)

Jurisdiction	Total Exposure	Annualized Expected Property Losses (\$)	Annualized Loss Ratio
Caldwell	2,806,776,000	219,330	0.0078%
Calhoun	2,681,601,000	285,496	0.0106%
Comal	11,640,775,000	511,487	0.0044%
DeWitt	2,021,890,000	544,278	0.0269%
Gonzales	1,637,234,000	147,122	0.0090%
Guadalupe	10,376,784,000	650,643	0.0063%
Hays	14,756,866,000	606,648	0.0041%
Kendall	3,728,076,000	107,553	0.0029%
Refugio	740,701,000	142,743	0.0193%
Victoria	11,424,428,000	407,082	0.0036%





GUADALUPE-BLANCO RIVER AUTHORITY

Totals	61,815,131,000	3,622,383	
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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.

