

# Billion Dollar U.S. Weather Disasters, 1980 - 2007

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<http://www.ncdc.noaa.gov/oa/reports/billionz.html>



The U.S. has sustained 78 weather-related disasters over the past 28 years in which overall damages/costs reached or exceeded \$1 billion. The total normalized losses for the 78 events exceed \$600 billion. Events are listed below beginning with the most recent. Two damage figures are given for events prior to 2007—the first figure represents actual dollar costs at the time of the event and is not adjusted for inflation. The value in parenthesis is the costs normalized to 2007 dollars using a GNP inflation index.

**2007 Great Plains and Eastern Drought** Entire year 2007. Severe drought with periods of extreme heat over most of the southeast and portions of the Great Plains, Ohio Valley, and Great Lakes area, resulting in major reductions in crop yields, along with very low stream-flows and lake levels. Includes states of ND, SD, NE, KS, OK, TX, MN, WI, IA, MO, AR, LA, MS, AL, GA, NC, SC, FL, TN, VA, WV, KY, IN, IL, OH, MI, PA, NY. Preliminary estimate of well over \$5.0 billion in damage/costs; some deaths reported due to heat but not beyond typical annual averages.

**Western Wildfires** Summer-Fall 2007. Continued drought conditions and high winds over much of the western US (AK, AZ, CA, ID, UT, MT, NV, OR, WA) resulting in numerous wildfires; with national acreage burned exceeding 8.9 million acres (mainly in the west) and over 3,000 homes and structures destroyed in southern California alone. Well over \$1.0 billion in damages/costs; at least 12 deaths.

**Spring Freeze** April 2007. Widespread severe freeze over much of the east and midwest (AL, AR, GA, IL, IN, IA, KS, KY, MS, MO, NE, NC, OH, OK, SC, TN, VA, WV), causing significant losses in fruit crops, field crops (especially wheat), and the ornamental industry. Temperatures in the teens/20's accompanied by rather high winds nullified typical crop-protection systems. Over \$2.0 billion in damage/costs; no deaths reported.

**East/South Severe Weather** April 2007. Flooding, hail, tornadoes, and severe thunderstorms across numerous states (CT, DE, GA, LA, ME, MD, MA, MS, NH, NJ, NY, NC, PA, RI, SC, TX, VT, VA) in mid-April, including 3 "killer" tornadoes. Over \$1.5 billion in damages/costs; 9 deaths.

**California Freeze** January 2007. Widespread agricultural freeze – for nearly two weeks in January, overnight temperatures over a good portion of California dipped into the 20's, destroying numerous agricultural crops; with citrus, berry, and vegetable crops most affected. \$1.4 billion estimated in damage/costs; 1 fatality reported.

**2006 Widespread Drought** Spring-Summer 2006. Rather severe drought affected crops especially during the spring-summer, centered over the Great Plains region with other areas affected across portions of the south and far west – including states of ND, SD, NE, KS, OK, TX, MN, IA, MO, AR, LA, MS, AL, GA, FL, MT, WY, CO, NM, CA. Estimate of over \$6.0 (6.2) billion in damages/costs; some heat-related deaths but not beyond typical annual averages.

**Northeast Flooding** June 2006. Severe flooding over portions of the northeast due to several weeks of heavy rainfall, affecting the states of NY, PA, DE, MD, NJ, and VA. Over \$1.0 billion in damage/costs; at least 20 deaths reported.

**Midwest/Southeast Tornadoes** April 2006. Severe weather and numerous tornadoes affecting the states of OK, KS, MO, NE, KY, OH, TN, IN, MS, GA, and AL on April 6-8 with 3 "killer" tornadoes in TN. Over \$1.5 billion in damages/costs; 10 deaths.

**Midwest/Ohio Valley Tornadoes** April 2006. Significant outbreak of tornadoes and severe weather affecting the states of IL, IN, IA, AR, MO, KY, and TN on April 2<sup>nd</sup> with 5 "killer" tornadoes. Approximately \$1.1 billion in damages/costs; 27 deaths.

**Severe Storms and Tornadoes** March 2006. Outbreak of tornadoes over portions of the midwest and south during a week-long period—affecting the states of AL, AR, KY, MS, TN, TX, IN, KS, MO, and OK. Over \$1.0 billion in damage/costs; at least 10 deaths.

**Numerous Wildfires** Entire year 2006. Numerous wildfires mainly over the western half of the country due to dry weather and high winds, burning nearly 10 million acres (new record for period since 1960), with the most affected states being AK, AZ, CA, CO, FL, ID, MT, NM, NV, OK, OR, TX, WA, WY. Well over \$1.0 billion in overall damages/costs; at least 28 fatalities, including 20 firefighters.

**2005 Hurricane Wilma** October 2005. Category 3 hurricane hits SW Florida resulting in strong damaging winds and major flooding across southeastern Florida. Prior to landfall, Wilma as a Category 5 recorded the lowest pressure (882 mb) ever recorded in the Atlantic basin. Estimate of approximately \$16.0 (17.1) billion in damages/costs; estimated 35 deaths.

**Hurricane Rita** September 2005. Category 3 hurricane hits Texas-Louisiana border coastal region, creating significant storm surge and wind damage along the coast, and some inland flooding in the FL panhandle, AL, MS, LA, AR, and TX. Prior to landfall, Rita reached the third lowest pressure (897 mb) ever recorded in the Atlantic basin. Estimate of approximately \$16.0 (17.1) billion in damage/costs; 119 deaths reported—most being indirect (many related to evacuations).

**Hurricane Katrina** August 2005. Category 3 hurricane initially impacts the U.S. as a Category 1 near Miami, FL, then as a strong Category 3 along the eastern LA-western MS coastlines, resulting in severe storm surge damage (maximum surge probably exceeded 25 feet) along the LA-MS-AL coasts, wind damage, and the failure of parts of the levee system in New Orleans. Inland effects included high winds and some flooding in the states of AL, MS, FL, TN, KY, IN, OH, and GA. Estimate of approximately \$125 (133.8) billion in damage/costs, making this the most expensive natural disaster in U.S. history; approximately 1833 deaths—the highest U.S. total since the 1928 major hurricane in southern Florida.

**Hurricane Dennis** July 2005. Category 3 hurricane makes landfall in western Florida panhandle resulting in storm surge and wind damage along the FL-AL coasts, along with scattered wind and flood damage in GA, MS, and TN. Estimate of over \$2.0 (2.1) billion in damage/costs; at least 15 deaths.

**Midwest Drought** Spring-Summer 2005. Rather severe localized drought causes significant crop losses (especially for corn and soybeans) in the states of AR, IL, IN, MO, OH, and WI. Estimate of over \$1.0 (1.1) billion in damage/costs; no reported deaths.

**2004 Hurricane Jeanne** September 2004. Category 3 hurricane makes landfall in east-central Florida, causing considerable wind, storm surge, and flooding damage in FL, with some flood damage also in the states of GA, SC, NC, VA, MD, DE, NJ, PA, and NY. Puerto Rico also affected. Estimate of over \$7.0 (7.7) billion in damage/costs; at least 28 deaths.

**Hurricane Ivan** September 2004. Category 3 hurricane makes landfall on Gulf coast of Alabama, with significant wind, storm surge, and flooding damage in coastal AL and FL panhandle, along with wind/flood damage in the states of GA, MS, LA, SC, NC, VA, WV, MD, TN, KY, OH, DE, NJ, PA, and NY. Estimate of over \$14.0 (15.4) billion in damage/costs; at least 57 deaths.

**Hurricane Frances** September 2004. Category 2 hurricane makes landfall in east-central Florida, causing significant wind, storm surge, and flooding damage in FL, along with considerable flood damage in the states of GA, SC, NC, and NY due to 5-15 inch rains. Estimate of over \$9.0 (9.9) billion in damage/costs; at least 48 deaths.

**Hurricane Charley** August 2004. Category 4 hurricane makes landfall in southwest Florida, resulting in major wind and some storm surge damage in FL, along with some damage in the states of SC and NC. Estimate of over \$15.0 (16.5) billion in damage/costs; at least 35 deaths.

**2003 Southern California Wildfires** Late October-early November 2003. Dry weather, high winds, and resulting wildfires in Southern California. More than 743,000 acres of brush and timber burned, over 3,700 homes destroyed; over \$2.5 (2.8) billion in damage/costs; 22 deaths.

**Hurricane Isabel** September 2003. Category 2 hurricane makes landfall in eastern North Carolina, causing considerable storm surge damage along the coasts of NC, VA, and MD, with wind damage and some flooding due to 4-12 inch rains in NC, VA, MD, DE, WV, NJ, NY, and PA; approximately \$5.0 (5.6) billion in damage/costs; 55 deaths.

**Severe Storms and Tornadoes** Early May 2003. Numerous tornadoes over the midwest, MS valley, OH/TN valleys, and portions of the southeast, with a modern record one-week total of approximately 400 tornadoes reported; over \$3.4 (3.8) billion in damage/costs; 51 deaths.

**Storms and Hail** Early April 2003. Severe storms and large hail over the southern plains and lower MS valley, with Texas hardest hit, and much of the monetary losses due to hail; over \$1.6 (1.8) billion in damage/costs; 3 deaths.

**2002 Widespread Drought** Spring through Fall 2002. Moderate to extreme drought over large portions of 30 states, including the western states, the Great Plains, and much of the eastern U.S.; estimate of over \$10.0 (11.4) billion in damage/costs; no deaths reported.

**Western Fire Season** Spring through Fall 2002. Major fires over 11 western states from the Rockies to the west coast, due to drought and periodic high winds, with over 7.1 million acres burned; over \$2.0 (2.3) billion in damage/costs; 21 deaths.

**2001 Tropical Storm Allison** June 2001. The persistent remnants of Tropical Storm Allison produce rainfall amounts of 30-40 inches in portions of coastal Texas and Louisiana, causing severe flooding especially in the Houston area, then moves slowly northeastward; fatalities and significant damage reported in TX, LA, MS, FL, VA, and PA; estimate of approximately \$5.0 (5.6) billion in damage/costs; at least 43 deaths.

**Midwest and Ohio Valley Hail and Tornadoes** April 2001. Storms, tornadoes, and hail in the states of TX, OK, KS, NE, IA, MO, IL, IN, WI, MI, OH, KY, WV, and PA, over a 6-day period; over \$1.9 (2.2) billion in damage/costs, with the most significant losses due to hail; at least 3 deaths.

**2000 Drought/Heat Wave** Spring-Summer 2000. Severe drought and persistent heat over south-central and southeastern states causing significant losses to agriculture and related industries; estimate of over \$4.0 (4.8) billion in damage/costs; estimated 140 deaths nationwide.

**Western Fire Season** Spring-Summer 2000. Severe fire season in western states due to drought and frequent winds, with nearly 7 million acres burned; estimate of over \$2.0 (2.4) billion in damage/costs (includes fire suppression); no deaths reported.

**1999 Hurricane Floyd** September 1999. Large, category 2 hurricane makes landfall in eastern NC, causing 10-20 inch rains in 2 days, with severe flooding in NC and some flooding in SC, VA, MD, PA, NY, NJ, DE, RI, CT, MA, NH, and VT; estimate of at least \$6.0 (7.4) billion in damage/costs; 77 deaths.

**Eastern Drought/Heat Wave** Summer 1999. Very dry summer and high temperatures, mainly in eastern U.S., with extensive agricultural losses; over \$1.0 (1.2) billion in damage/costs; estimated 502 deaths.

**Oklahoma-Kansas Tornadoes** May 1999. Outbreak of F4-F5 tornadoes hit the states of Oklahoma and Kansas, along with Texas and Tennessee, Oklahoma City area hardest hit; over \$1.6 (2.0) billion in damage/costs; 55 deaths.

**Arkansas-Tennessee Tornadoes** January 1999. Two outbreaks of tornadoes in 6-day period strike Arkansas and Tennessee; approximately \$1.3 (1.6) billion in damage/costs; 17 deaths.

**1998 Texas Flooding** October-November 1998. Severe flooding in southeast Texas from 2 heavy rain events, with 10-20 inch rainfall totals; approximately \$1.0 (1.3) billion in damage/costs; 31 deaths.

**Hurricane Georges** September 1998. Category 2 hurricane strikes Puerto Rico, Florida Keys, and Gulf coasts of Louisiana, Mississippi, Alabama, and Florida panhandle, 15-30 inch 2-day rain totals in parts of AL/FL; estimated \$5.9 (7.4) billion in damage/costs; 16 deaths.

**Hurricane Bonnie** August 1998. Category 3 hurricane strikes eastern North Carolina and Virginia, extensive agricultural damage due to winds and flooding, with 10-inch rains in 2 days in some locations; approximately \$1.0 (1.3) billion in damage/costs; 3 deaths.

**Southern Drought/Heat Wave** Summer 1998. Severe drought and heat wave from Texas/Oklahoma eastward to the Carolinas; \$6.0-\$9.0 (7.6-11.3) billion in damage/costs to agriculture and ranching; at least 200 deaths.

**Minnesota Severe Storms/Hail** May 1998. Very damaging severe thunderstorms with large hail over wide areas of Minnesota; over \$1.5 (1.9) billion in damage/costs; 1 death.

**Southeast Severe Weather** Winter-Spring 1998. Tornadoes and flooding related to El Nino in southeastern states; over \$1.0 (1.3) billion in damage/costs; at least 132 deaths.

**Northeast Ice Storm** January 1998. Intense ice storm hits Maine, New Hampshire, Vermont, and New York, with extensive forestry losses; over \$1.4 (1.8) billion in damage/costs; 16 deaths.

**1997 Northern Plains Flooding** April-May 1997. Severe flooding in Dakotas and Minnesota due to heavy spring snowmelt; approximately \$3.7 (4.8) billion in damage/costs; 11 deaths.

**MS and OH Valleys Flooding & Tornadoes** March 1997. Tornadoes and severe flooding hit the states of AR, MO, MS, TN, IL, IN, KY, OH, and WV, with over 10 inches of rain in 24 hours in Louisville; estimated \$1.0 (1.3) billion in damage/costs; 67 deaths.

**West Coast Flooding** December 1996-January 1997. Torrential rains (10-40 inches in 2 weeks) and snowmelt produce severe flooding over portions of CA, WA, OR, ID, NV, and MT; approximately \$3.0 (3.9) billion in damage/costs; 36 deaths.

**1996 Hurricane Fran** September 1996. Category 3 hurricane strikes North Carolina and Virginia, over 10-inch 24-hour rains in some locations and extensive agricultural and other losses; over \$5.0 (6.6) billion in damage/costs; 37 deaths.

**Southern Plains Severe Drought** Fall 1995 through Summer 1996. Severe drought in agricultural regions of southern plains--Texas and Oklahoma most severely affected; approximately \$5.0 (6.8) billion in damage/costs; no deaths.

**Pacific Northwest Severe Flooding** February 1996. Very heavy, persistent rains (10-30 inches) and melting snow over OR, WA, ID, and western MT; approximately \$1.0 (1.3) billion in damage/costs; 9 deaths.

**Blizzard of '96 Followed by Flooding** January 1996. Very heavy snowstorm (1-4 feet) over Appalachians, Mid-Atlantic, and Northeast; followed by severe flooding in parts of same area due to rain & snowmelt; approximately \$3.0 (4.0) billion in damage/costs; 187 deaths.

**1995 Hurricane Opal** October 1995. Category 3 hurricane strikes Florida panhandle, Alabama, western Georgia, eastern Tennessee, and the western Carolinas, causing storm surge, wind, and flooding damage; over \$3.0 (4.1) billion in damage/costs; 27 deaths.

**Hurricane Marilyn** September 1995. Category 2 hurricane devastates U.S. Virgin Islands; estimated \$2.1 (2.9) billion in damage/costs; 13 deaths

**Texas/Oklahoma/Louisiana/Mississippi Severe Weather and Flooding** May 1995. Torrential rains, hail, and tornadoes across Texas - Oklahoma and southeast Louisiana - southern Mississippi, with Dallas and New Orleans areas (10-25 inch rains in 5 days) hardest hit; \$5.0-\$6.0 (6.8-8.2) billion in damage/costs; 32 deaths.

**California Flooding** January-March 1995. Frequent winter storms cause 20-70 inch rainfall and periodic flooding across much of California; over \$3.0 (4.1) billion in damage/costs; 27 deaths.

**1994 Western Fire Season** Summer-Fall 1994. Severe fire season in western states due to dry weather; approximately \$1.0 (1.4) billion in damage/costs; death toll undetermined.

**Texas Flooding** October 1994. Torrential rain (10-25 inches in 5 days) and thunderstorms cause flooding across much of southeast Texas; approximately \$1.0 (1.4) billion in damage/costs; 19 deaths.

**Tropical Storm Alberto** July 1994. Remnants of slow-moving Alberto bring torrential 10-25 inch rains in 3 days, widespread flooding and agricultural damage in parts of Georgia, Alabama, and panhandle of Florida; approximately \$1.0 (1.4) billion in damage/costs; 32 deaths.

**Southeast Ice Storm** February 1994. Intense ice storm with extensive damage in portions of TX, OK, AR, LA, MS, AL, TN, GA, SC, NC, and VA; approximately \$3.0 (4.2) billion in damage/costs; 9 deaths.

**1993 California Wildfires** Fall 1993. Dry weather, high winds and wildfires in Southern California; approximately \$1.0 (1.4) billion in damage/costs; 4 deaths.

**Midwest Flooding** Summer 1993. Severe, widespread flooding in central U.S. due to persistent heavy rains and thunderstorms; approximately \$21.0 (30.2) billion in damage/costs; 48 deaths.

**Drought/Heat Wave** Summer 1993. Southeastern U.S.; about \$1.0 (1.4) billion damage/costs to agriculture; at least 16 deaths.

**Storm/Blizzard** March 1993. "Storm of the Century" hits entire eastern seaboard with tornadoes (FL), high winds, and heavy snows (2-4 feet); \$5.0-\$6.0 (7.2-8.6) billion damage/costs; approximately 270 deaths.

**1992 Nor'easter of 1992** December 1992. Slow-moving storm batters northeast U.S. coast, New England hardest hit; \$1.0-\$2.0 (1.5-3.0) billion in damage/costs; 19 deaths.

**Hurricane Iniki** September 1992. Category 4 hurricane hits Hawaiian island of Kauai; about \$1.8 (2.7) billion in damage/costs; 7 deaths.

**Hurricane Andrew** August 1992. Category 4 hurricane hits Florida and Louisiana, high winds damage or destroy over 125,000 homes; approximately \$27.0 (40.0) billion in damage/costs; 61 deaths.

**1991 Oakland Firestorm** October 1991. Oakland, California firestorm due to low humidities and high winds; approximately \$2.5 (3.9) billion in damage/costs; 25 deaths.

**Hurricane Bob** August 1991. Category 2 hurricane--Mainly coastal North Carolina, Long Island, and New England; \$1.5 (2.3) billion in damage/costs; 18 deaths.

**1990 Texas/Oklahoma/Louisiana/Arkansas Flooding** May 1990. Torrential rains cause flooding along the Trinity, Red, and Arkansas Rivers in TX, OK, LA, and AR; over \$1.0 (1.6) billion in damage/costs; 13 deaths.

**1989 Hurricane Hugo** September 1989. Category 4 hurricane devastates South and North Carolina with ~ 20 foot storm surge and severe wind damage after hitting Puerto Rico and the U.S. Virgin Islands; over \$9.0 (15.3) billion in damage/costs (about \$7.1 (12.1) billion in Carolinas); 86 deaths (57--U.S. mainland, 29--U.S. Islands).

**Northern Plains Drought** Summer 1989. Severe summer drought over much of the northern plains with significant losses to agriculture; at least \$1.0 (1.7) billion in damage/costs; no deaths reported.

**1988 Drought/Heat Wave** Summer 1988. 1988 drought in central and eastern U.S. with very severe losses to agriculture and related industries; estimated \$40.0 (71.2) billion in damage/costs; estimated 5,000 to 10,000 deaths (includes heat stress-related).

**1986 Southeast Drought/Heat Wave** Summer 1986. Severe summer drought in parts of the southeastern U.S. with severe losses to agriculture; \$1.0-\$1.5 (1.9-2.8) billion in damage/costs; estimated 100 deaths.

**1985 Hurricane Juan** October-November 1985. Category 1 hurricane--Louisiana and Southeast U.S.--severe flooding; \$1.5 (2.9) billion in damage/costs; 63 deaths.

**Hurricane Elena** August-September 1985. Category 3 hurricane--Florida to Louisiana; \$1.3 (2.5) billion in damage/costs; 4 deaths.

**Florida Freeze** January 1985. Severe freeze central/northern Florida; about \$1.2 (2.3) billion in damage to citrus industry; no deaths.

**1983 Florida Freeze** December 1983. Severe freeze central/northern Florida; about \$2.0 (4.2) billion in damage to citrus industry; no deaths.

**Hurricane Alicia** August 1983. Category 3 hurricane--Texas; \$3.0 (6.3) billion in damage/costs; 21 deaths.

**Western Storms and Flooding** 1982 - Early 1983. Storms and flooding related to El Nino, especially in the states of WA, OR, CA, AZ, NV, ID, UT, and MT; approximately \$1.1 (2.3) billion in damage/costs; at least 45 deaths.

**Gulf States Storms and Flooding** 1982 - Early 1983. Storms and flooding related to El Nino, especially in the states of TX, AR, LA, MS, AL, GA, and FL; approximately \$1.1 (2.3) billion in damage/costs; at least 50 deaths.

**1980 Drought/Heat Wave** June-September 1980. Central and eastern U.S.; estimated \$20.0 (55.4) billion in damage/costs to agriculture and related industries; estimated 10,000 deaths (includes heat stress-related).

*These statistics were taken from a wide variety of sources and represent, to the best of our ability, the estimated total costs of these events---that is, the costs in terms of dollars and lives that would not have been incurred had the event not taken place. Insured and uninsured losses are included in damage estimates, and direct plus indirect deaths (i.e., related to the event, would not have occurred otherwise) are included in fatality totals. Economic costs are included for wide-scale, long-lasting events such as drought.*

*Estimates are periodically updated as more data/information become available. Sources include Storm Data (NCDC publication), the National Weather Service, the Federal Emergency Management Agency, other U.S. government agencies, individual state emergency management agencies, state and regional climate centers, and insurance industry estimates. The WWW version of this report (<http://www.ncdc.noaa.gov/oa/reports/billionz.html>) -- accessible via NCDC homepage) includes links to detailed technical reports on many of these events.*

**Authors: Neal Lott, Tom Ross, Tamara Houston, Adam Smith.**