



Billion Dollar U.S. Weather/Climate Disasters, 1980-2011
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<http://www.ncdc.noaa.gov/oa/reports/billionz.html>

The U.S. has sustained 114 weather/climate disasters over the past 31+ years in which overall damages/costs reached or exceeded \$1 billion. The total standardized losses for the 114 events exceed \$800 billion. Events are listed below beginning with the most recent. Two damage figures are given for events prior to 2011—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 disaster cost adjusted to 2011 dollars using the Consumer Price Index (CPI).

2011

Tropical Storm Lee early September. Wind and flood damage across the southeast (LA, MS, AL, GA, TN) but considerably more damage from record flooding across the northeast (PA, NY, NJ, CT, VA, MD). Pennsylvania and New York were most affected. Total losses exceed \$1.0 billion; 21 deaths.

Rockies and Midwest Severe Weather July 10-14. An outbreak of tornadoes, hail, and high wind caused damage east of the Rockies and across the central plains (CO, WY, IA, IL, MI, MN, OH). Total losses exceed \$1.0 billion; 2 deaths.

Texas, New Mexico, Arizona Wildfires Spring-Fall 2011. Continued drought conditions and periods of extreme heat provided conditions favorable for a series of historic wildfires across Texas, New Mexico and Arizona. The Bastrop Fire in Texas was the most destructive fire in Texas history destroying over 1,500 homes. The Wallow Fire consumed over 500,000 acres in Arizona making it the largest on record in Arizona. The Las Conchas Fire in New Mexico was also the state's largest wildfire on record scorching over 150,000 acres while threatening the Los Alamos National Laboratory. Over 3 million acres have burned across Texas this wildfire season. Total damage in Texas alone due to loss of property, timber and agriculture exceed \$750 million. Losses for wildfire activity across all three states exceeds \$1.0 billion; at least 5 U.S. deaths.

Hurricane Irene August 20-29, 2011. Minimal Category 1 hurricane made landfall over coastal NC and moved northward along the Mid-Atlantic Coast (NC, VA, MD, NJ, NY, CT, RI, MA, VT) causing torrential rainfall and flooding across the Northeast. Wind damage in coastal NC, VA, and MD was moderate with considerable damage resulting from falling trees and power lines, while flooding caused extensive flood damage across NJ, NY, and VT. Over seven million homes and businesses lost power during the storm. Numerous tornadoes were also reported in several states further adding to the damage. Over \$7.3 billion in damages/costs; at least 45 deaths.

Upper Midwest Flooding Summer, 2011. Melting of an above-average snow pack across the Northern Rocky Mountains combined with above-average precipitation caused the Missouri and Souris Rivers to swell beyond their banks across the Upper Midwest (MT, ND, SD, NE, IA, KS, MO). An estimated 11,000 people were forced to evacuate Minot, North Dakota due to the record high water level of the Souris River, where 4,000 homes were flooded. Numerous levees were breached along the Missouri River, flooding thousands of acres of farmland. Estimated losses exceed \$2.0 billion; at least 5 deaths. The flooding also stretched into the Canadian Prairies, where property and agriculture losses were expected to surpass \$1.0 billion.

Mississippi River flooding Spring-Summer, 2011. Persistent rainfall (nearly 300 percent normal precipitation amounts in the Ohio Valley) combined with melting snowpack caused historical flooding along the Mississippi River and its tributaries. Examples of economic damage include: \$500 million to agriculture in Arkansas; \$320 million in damage to Memphis, Tennessee; \$800 million to agriculture in Mississippi; \$317 million to agriculture and property in Missouri's Birds Point-New Madrid Spillway; \$80 million for the first 30 days of flood fighting efforts in Louisiana. Estimated economic loss \$3.0-4.0 billion; at least 7 deaths.

Southern Plains/Southwest Drought and Heatwave Spring-Fall, 2011. Drought and heatwave conditions created major impacts across Texas, Oklahoma, New Mexico, Arizona, southern Kansas, and western Louisiana. In Texas and Oklahoma, a majority of range and pastures were classified in 'very poor' condition for much of the 2011 crop growing season. The total direct losses to crops, livestock and timber approach \$10.0 billion; both direct and total economic losses will rise as the drought continues.

Midwest/Southeast Tornadoes and Severe Weather June 18-22, 2011. Outbreak of tornadoes over central states (OK, TX, KS, NE, MO, IA, IL) with an estimated 81 tornadoes. Additional wind and hail damage across the Southeast (TN, GA, NC, SC). Over \$1.0 billion insured losses; total losses greater than \$1.3 billion; at least 3 deaths.

Midwest/Southeast Tornadoes May 22-27, 2011. Outbreak of tornadoes over central and southern states (MO, TX, OK, KS, AR, GA, TN, VA, KY, IN, IL, OH, WI, MN, PA)

with an estimated 180 tornadoes. Notably, an EF-5 tornado struck Joplin, MO resulting in at least 160 deaths, making it the deadliest single tornado to strike the U.S. since modern tornado record keeping began in 1950. Over \$6.5 billion insured losses for event; total losses greater than \$9.1 billion; 177 deaths.

Southeast/Ohio Valley/Midwest Tornadoes April 25-28, 2011. Outbreak of tornadoes over central and southern states (AL, AR, LA, MS, GA, TN, VA, KY, IL, MO, OH, TX, OK) with an estimated 343 tornadoes. The deadliest tornado of the outbreak, an EF-5, hit northern Alabama, killing 78 people. Several major metropolitan areas were directly impacted by strong tornadoes including Tuscaloosa, Birmingham, and Huntsville in Alabama and Chattanooga, Tennessee, causing the estimated damage costs to soar. Over \$7.3 billion insured losses; total losses greater than \$10.2 billion; 321 deaths [240 of which were in Alabama].

Midwest/Southeast Tornadoes April 14-16, 2011. Outbreak of tornadoes over central and southern states (OK, TX, AR, MS, AL, GA, NC, SC, VA, PA) with an estimated 177 tornadoes. Over \$1.4 billion insured losses; total losses greater than \$2.1 billion; 38 deaths [22 of which were in North Carolina].

Southeast/Midwest Tornadoes April 8-11, 2011. Outbreak of tornadoes over central and southern states (NC, SC, TN, AL, TX, OK, KS, IA, WI) with an estimated 59 tornadoes. Over \$1.5 billion insured losses; total losses greater than \$2.2 billion; numerous injuries, 0 deaths.

Midwest/Southeast Tornadoes April 4-5, 2011. Outbreak of tornadoes over central and southern states (KS, MO, IA, IL, WI, KY, GA, TN, NC, SC) with an estimated 46 tornadoes. Over \$2.0 billion insured losses; total losses greater than \$2.8 billion; 9 deaths.

Groundhog Day Blizzard Jan 29-Feb 3, 2011. A large winter storm impacted many central, eastern and northeastern states. The city of Chicago was brought to a virtual standstill as between 1 and 2 feet of snow fell over the area. Insured losses greater than \$1.0 billion; total losses greater than \$1.8 billion; 36 deaths.

2010 Arizona Severe Weather October 5-6, 2010. An unusual series of severe thunderstorms across Arizona produced numerous tornadoes and widespread, severe hail damage. Over one-hundred buildings were damaged or destroyed by tornadoes while thousands of automobiles and buildings were damaged by large hail across Phoenix and surrounding cities. Over 2.0 billion in damages/costs; 0 deaths.

Midwest Tornadoes and Severe Weather May 2010. An outbreak of tornadoes, hail, and severe thunderstorms occurred across several Midwest states (OK, KS, TX) in mid-May. Oklahoma was hardest hit with > \$1.5 (1.6) billion in damages. Total losses exceeded \$3.0 (3.1) billion in damages/costs; 3 deaths.

Mid-South Flooding and Severe Weather April-May 2010. Flooding, hail, tornadoes, and severe thunderstorms occurred across many Southern states (TN, AR, AL, KY, MS, GA) on April 30-May 2. Flooding in the Nashville, TN area alone contributed > \$1.0 billion in damages. Western and Middle Tennessee were hardest hit with local rainfall amounts of 18-20 inches to the south and west of Greater Nashville. Total losses exceeded \$2.3 (2.4) billion in damages/costs; 32 deaths.

Northeast Flooding March 2010. Heavy rainfall over portions of the Northeast in late March caused extensive flooding across several states (RI, CT, MA, NJ, NY, PA). The event caused the worst flooding in Rhode Island's history. Over \$1.5 (1.6) billion in damages/costs; 11 deaths.

2009 Southwest/Great Plains Drought Entire year, 2009. Drought conditions occurred during much of the year across parts of the Southwest, Great Plains, and southern Texas causing agricultural losses in numerous states (TX, OK, KS, CA, NM, AZ). The largest agriculture losses occurred in TX and CA. Estimate of over \$5.0 (5.3) billion in damages/costs.

Western Wildfires Summer-Fall 2009. Residual and sustained drought conditions across western and south-central states resulted in thousands of wildfires. Most affected states include CA, AZ, NM, TX, OK, and UT. National acreage burned exceeding 5.9 million. Over 200 homes and structures destroyed in the California "Station" fire alone. Over \$1.0 (1.1) billion in damages/costs (including annual fire suppression costs); 10 deaths.

Midwest, South and Eastern Severe Weather June 2009. Sustained outbreak of thunderstorms and high winds from a strong derecho event over the central, southern, and eastern states (TX, OK, MO, NE, KS, AR, AL, MS, TN, NC, SC, KY, PA). Over \$1.1 (1.2) billion in damages/costs; no deaths reported.

South/Southeast Tornadoes and Severe Weather April 2009. Outbreak of tornadoes, hail and severe thunderstorms over the south and southeastern states (AL, AR, GA, KY, MO, SC, TN) with 85 confirmed tornadoes. Over \$1.2 (1.3) billion in damages/costs; 6 deaths.

Midwest/Southeast Tornadoes March 2009. Outbreak of tornadoes over central and southern states (NE, KS, OK, IA, TX, LA, MS, AL, GA, TN, KY) with 56 tornadoes confirmed. Over \$1.0 (1.1) billion in damages/costs with majority of damage in TX; no deaths reported.

Southeast/Ohio Valley Severe Weather February 2009. Complex of severe thunderstorms and high winds across the region (TN, KY, OK, OH, VA, WV, PA). Over \$1.4 (1.5) billion in damages/costs with majority of damage in OK and OH; 10 deaths.

2008 Widespread Drought Entire year, 2008. Severe drought and heat caused agricultural losses in areas of the south and west. Record low lake levels also occurred in areas of the southeast. Includes states of CA, TX, NC, SC, GA, and TN. Estimate of over \$2.0 (2.1) billion in damages/costs.

Hurricane Ike September 2008. Category 2 hurricane makes landfall in Texas, as the largest (in size) Atlantic hurricane on record, causing considerable storm surge in coastal TX and significant wind and flooding damage in TX, LA, AR, TN, IL, IN, KY, MO, OH, MI and PA. Severe gasoline shortages occurred in the southeast US due to damaged oil platforms, storage tanks, pipelines and off-line refineries. Estimate of over \$27.0 (28.4) billion in damages/costs; 112 deaths; dozens of people missing.

Hurricane Gustav September 2008. Category 2 hurricane makes landfall in Louisiana causing significant wind, storm surge, and flooding damage in AL, AR, LA, and MS. Estimate of at least \$5.0 (5.3) billion in damages/costs; 53 deaths.

Hurricane Dolly July 2008. Category 2 hurricane makes landfall in southern Texas causing considerable wind and flooding damage in TX and NM. Over \$1.2 (1.3) billion in damages/costs; 3 deaths.

US Wildfires Summer-Fall 2008. Drought conditions across numerous western, central and southeastern states (AK, AZ, CA, NM, ID, UT, MT, NV, OR, WA, CO, TX, OK, NC, FL) resulted in thousands of wildfires; national acreage burned exceeding 5.2 million acres (mainly in the west) and over 1,000 homes and structures destroyed in California fires alone. Over \$2.0 (2.1) billion in damages/costs; 16 deaths.

Midwest Flood June 2008. Heavy rain and flooding caused significant agricultural loss and property damage in IA, IL, IN, MO, MN, NE, and WI with IA being hardest hit with widespread rainfall totals ranging from 4 to over 16 inches. Estimate of over \$15.0 (15.8) billion in damages/costs; 24 deaths.

Midwest/Mid-Atlantic Severe Weather/Tornadoes June 2008. An outbreak of tornadoes and thunderstorms over the Midwest/Mid-Atlantic states (IA, IL, IN, KS, NE, MI, MN, MO, OK, WI, MD, VA, WV). Over \$1.1 (1.2) billion in damages/costs; 18 deaths.

Midwest/Ohio Valley Severe Weather/Tornadoes May 2008. Outbreak of tornadoes over the Midwest/Ohio Valley regions (IL, IN, IA, KS, MN, NE, OK, WY, CO) with 235 tornadoes confirmed. Over \$2.4 (2.5) billion in damages/costs; 13 deaths.

Southeast/Midwest Tornadoes February 2008. Series of tornadoes and severe thunderstorms across the Southeast and Midwest states (AL, AR, IN, KY, MS, OH, TN, TX) with 87 tornadoes confirmed. Over \$1.0 (1.1) billion in damages/costs; 57 deaths.

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 (5.5) 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 (1.1) 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 (2.2) 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 (1.6) 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 (1.5) 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 (6.7) 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 (1.1) 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 (1.7) 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 2nd with 5 "killer" tornadoes. Approximately \$1.1 (1.2) 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 (1.1) 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 (1.1) 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 (18.6) 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 (18.6) 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 30 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 (145.0) 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 (2.3) 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 (1.2) 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 (8.3) 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 (16.7) 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 (10.7) 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 (17.9) 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 (3.1) 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 (6.2) 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 (4.2) 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 (2.0) 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 (12.5) 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 (2.5) billion in damage/costs; 21 deaths.

Central/Eastern Severe Weather/Tornadoes Late April - Early May 2002. Numerous tornadoes over the Central and Eastern states (NC, GA, VA, TX, AR, MO, MS, TN, IL, IN, KY, PA, MD, NY, OH, WV, KS). Over \$1.7 (2.1) billion in damages/costs; 7 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 (6.4) 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 (2.4) 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 (5.2) 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 (2.6) 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 (8.1) 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 (1.4) 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 (2.2) 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 (1.8) billion in damage/costs; 17 deaths.

1998 California Freeze December 1998. A severe freeze damaged fruit and vegetable crops in the Central and Southern San Joaquin Valley. Extended intervals of sub 27 degree F temperatures occurred over an 8-day period. \$2.5 (3.5) billion estimated damages/costs.

Texas Flooding October-November 1998. Severe flooding in southeast Texas from 2 heavy rain events, with 10-20 inch rainfall totals; approximately \$1.0 (1.4) 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 (8.1) 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 (1.4) 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 (8.3-12.4) 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 (2.1) 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 (1.4) 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 (1.9) 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 (5.2) 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 (1.4) 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 (4.2) 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 (7.2) 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 (7.2) 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 (1.4) 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 (4.3) 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 (4.4) billion in damage/costs; 27 deaths.

Hurricane Marilyn September 1995. Category 2 hurricane devastates U.S. Virgin Islands; estimated \$2.1 (3.1) 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 (7.4-8.9) 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 (4.4) 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 (1.5) 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 (1.5) 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 (1.5) 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 (4.6) billion in damage/costs; 9 deaths.

1993 California Wildfires Fall 1993. Dry weather, high winds and wildfires in Southern California; approximately \$1.0 (1.6) 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 (32.8) billion in damage/costs; 48 deaths.

Drought/Heat Wave Summer 1993. Southeastern U.S.; about \$1.0 (1.6) 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 (7.8-9.4) 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 (1.6-3.2) billion in damage/costs; 19 deaths.

Hurricane Iniki September 1992. Category 4 hurricane hits Hawaiian island of Kauai; about \$1.8 (2.9) 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 (43.5) billion in damage/costs; 61 deaths.

1991 Oakland Firestorm October 1991. Oakland, California firestorm due to low humidities and high winds; approximately \$2.5 (4.2) billion in damage/costs; 25 deaths.

Hurricane Bob August 1991. Category 2 hurricane--Mainly coastal North Carolina, Long Island, and New England; \$1.5 (2.5) billion in damage/costs; 18 deaths.

1990 California Freeze December 1990. Severe freeze in the Central and Southern San Joaquin Valley caused the loss of citrus, avocado trees, and other crops in many areas. Several days of subfreezing temperatures occurred, with some valley locations in the teens. \$3.4 (5.9) billion in direct and indirect economic losses, including damage to public buildings, utilities, crops, and residences.

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 (1.7) 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 (16.4) billion in damage/costs (about \$7.1 (12.9) 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 (1.8) 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 (76.4) 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 (2.1-3.1) 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 (3.2) billion in damage/costs; 63 deaths.

Hurricane Elena August-September 1985. Category 3 hurricane--Florida to Louisiana; \$1.3 (2.7) billion in damage/costs; 4 deaths.

Florida Freeze January 1985. Severe freeze central/northern Florida; about \$1.2 (2.5) billion in damage to citrus industry; no deaths.

1983 Florida Freeze December 1983. Severe freeze central/northern Florida; about \$2.0 (4.5) billion in damage to citrus industry; no deaths.

Hurricane Alicia August 1983. Category 3 hurricane--Texas; \$3.0 (6.8) 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 (2.5) 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 (2.5) billion in damage/costs; at least 50 deaths.

1980 Drought/Heat Wave June-September 1980. Central and eastern U.S.; estimated \$20.0 (54.8) billion in damage/costs to agriculture and related industries; estimated 10,000 deaths (includes heat stress-related).

Caveat for 2011 preliminary economic loss estimates:

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. These estimates are likely to change as damage assessments become more complete.

Estimates are periodically updated as more data/information become available. Sources include the National Weather Service, the Federal Emergency Management Agency, US Department of Agriculture, other U.S. government agencies, individual state emergency management agencies, state and regional climate centers, media reports, and insurance industry estimates including Property Claim Services and Munich Re. 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.

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