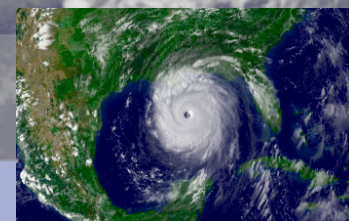


U.S. Billion-Dollar Weather & Climate Disasters 1980-2020

<https://www.ncdc.noaa.gov/billions/>



The U.S. has sustained 279 weather and climate disasters since 1980 in which overall damages/costs reached or exceeded \$1 billion. Values in parentheses represent the 2020 Consumer Price Index cost adjusted value (if different than original value). The total cost of these 279 events exceeds \$1.825 trillion.

■ Drought
 ■ Flooding
 ■ Freeze
 ■ Severe Storm
 ■ Tropical Cyclone
 ■ Wildfire
 ■ Winter Storm

2020

■ Western Wildfires - California, Oregon, Washington Firestorms - Fall 2020: Since mid-August more than 4.0 million acres have burned across California breaking the statewide burn record set in 2018 by more than 2 million acres. Five of the top six largest wildfires on record in California (dating to 1932) burned during August and September. The August Complex is the largest California wildfire, which began as 37 separate wildfires within the Mendocino National Forest, set off after storms caused >10,000 lightning strikes across Northern California. Over 8,500 structures have burned across California. Oregon also has historic levels of wildfire spread and damage, as over 2,000 structures have burned. These wildfires have spread rapidly and destroyed several small towns in California, Oregon and Washington. Dense wildfire smoke has also produced hazardous air quality affecting millions of people including major cities for weeks. Hundreds of additional wildfires have also burned in other Western states. *Total Estimated Costs: TBD; 41 Deaths*

■ Western/Central Drought and Heatwave - Summer-Fall 2020: Widespread, continuous drought and record heat affected more than a dozen Western and Central states for much of the summer and early fall. Death Valley recorded a temperature of 130 degrees F - the highest measured temperature globally in decades - while Los Angeles county recorded a record high of 121 degrees F. There may be a significant fatality total resulting from persistent, excessive heat over large population centers, which will be reflected in the next update. The drought and heat also helped to dry out vegetation across the West that contributed to the Western wildfire potential and severity. *Total Estimated Costs: TBD; 0 Deaths*

■ Hurricane Sally - September 2020: Hurricane Sally was a category 2 hurricane at landfall in the Florida panhandle. Wind gusts up to 100 mph and 20-30 inches of rainfall caused considerable flood and wind damage across the panhandle of Florida, into Alabama and Georgia. Many homes and businesses in downtown Pensacola, FL were impacted from flooding produced by storm surge and heavy rainfall. 2020 is now the fourth consecutive year (2017-2020) that the U.S. has been impacted by a slow moving tropical cyclone that produced extreme rainfall and damaging floods - Harvey, Florence, Imelda and Sally. *Total Estimated Costs: TBD; 5 Deaths*

■ Hurricane Laura - August 2020: Hurricane Laura was a powerful category 4 that made landfall at Cameron Parish, in southwestern Louisiana. Winds up to 150 mph and storm surge in excess of 15 feet caused heavy damage along the coast as well as inland to the city of Lake Charles. Many broken water systems and severely damaged electrical grid in southern Louisiana will slow the recovery process. Laura was the strongest hurricane (by maximum sustained windspeed at landfall) to hit Louisiana since the 1856 Last Island hurricane. Laura also had highest landfall wind speed to impact the U.S. since Hurricane Michael in 2018. There were additional impacts to surrounding states including Texas, Mississippi and Arkansas. *Total Estimated Costs: \$14.0 Billion; 42 Deaths*

■ Central Severe Weather - Derecho - August 2020: A powerful derecho traveled from southeast South Dakota to Ohio, a path of 770 miles in 14 hours producing widespread winds greater than 100 mph. The states most affected included Iowa, Illinois, Minnesota, Indiana and Ohio. This derecho caused widespread damage to millions of acres of corn and soybean crops across central Iowa. There was also severe damage to homes, businesses and vehicles particularly in Cedar Rapids, Iowa. In addition, there were 15 tornadoes across northeastern Illinois several affecting the Chicago metropolitan area. *Total Estimated Costs: \$7.5 Billion; 4 Deaths*

■ Hurricane Isaias - August 2020: Hurricane Isaias made landfall in southeastern North Carolina as a category 1 storm. Isaias accelerated up the East Coast, resulting in widespread damage and power outages across New York, New Jersey and Pennsylvania. There was also considerable inland flooding most notably in Pennsylvania. In addition, 34 tornadoes developed across North Carolina, Virginia, Maryland, Delaware and New Jersey due to Isaias. Many tornadoes were weaker (EF-0 and EF-1) producing scattered damage to agriculture, structures and residences. Isaias also produced several EF-2 tornadoes and one EF-3 tornado that caused damage in coastal North Carolina and Virginia. *Total Estimated Costs: \$4.5 Billion; 16 Deaths*

■ South Texas Hail Storms - May 2020: South Texas hail storms cause widespread impact to several cities with golf-ball sized hail damaging many homes, vehicles and businesses. The highest concentration of hail damage occurred across the northern portion of the San Antonio metroplex. There was also significant damage east of San Marcos, southeast of Waco and to the west and south of Bryan and College Station. *Total Estimated Costs: \$1.4 Billion; 0 Deaths*

■ South, Central and Eastern Severe Weather - May 2020: A combination of thunderstorm high winds, hail and tornadoes affected numerous Southern, Central and Eastern states. The states most affected included Texas, Illinois and North Carolina with damage to homes, businesses and vehicles. Oklahoma, Arkansas, Indiana, Tennessee, Alabama, Georgia, Florida and South Carolina. *Total Estimated Costs: \$1.6 Billion; 2 Deaths*

■ Central and Eastern Severe Weather - May 2020: Severe weather across several Central and Eastern states including Kansas, Missouri, Arkansas, Tennessee and South Carolina. High wind and hail damage was notably clustered across southern Missouri and western to central Tennessee, which were the states with the highest damage totals for the event. *Total Estimated Costs: \$2.1 Billion; 2 Deaths*



<https://www.ncdc.noaa.gov/billions/events.pdf>

■ **Southern Severe Weather** - April 2020: Severe weather caused damage across many Southern states. The states most affected from a combination of high winds, hail and tornadoes included Texas, Oklahoma, Louisiana, Mississippi, Alabama, Georgia, Florida and Virginia. The states with the highest damage totals for the event were Oklahoma, Louisiana and Texas. *Total Estimated Costs: \$1.4 Billion; 3 Deaths*

■ **Southeast and Eastern Tornado Outbreak** - April 2020: Outbreak of at least 140 tornadoes from Texas to Maryland including 3 EF4s, 12 EF3s, 20 EF2s, 77 EF1s and 28 EF0s. Damage was extensive and highly destructive to many homes, vehicles and businesses across more than a dozen Southeast and Eastern states. *Total Estimated Costs: \$3.5 (\$3.6) Billion; 35 Deaths*

■ **North Central and Ohio Valley Hail Storms and Severe Weather** - April 2020: Numerous hail storms caused widespread damage across many North Central and Ohio Valley states including Illinois, Iowa, Indiana, Ohio, Michigan, Wisconsin and Missouri. More than 20 tornadoes were also reorted across southern Indiana and Ohio. There was additional widespread high wind damage to homes, vehicles and businesses in many other surrounding states. *Total Estimated Costs: \$2.9 Billion; 0 Deaths*

■ **Midwest and Ohio Valley Severe Weather** - March 2020: Severe weather caused damage across many Midwest and Ohio Valley states including Missouri, Oklahoma, Texas, Illinois, Indiana, Ohio, Arkansas, Kentucky, Tennessee, West Virginia and Pennsylvania. The states most affected from a combination of high winds and hail were Missouri, Ohio and Arkansas. There were also two dozen tornadoes across Iowa, Illinois, Indiana and Arkansas causing additional damage. *Total Estimated Costs: \$2.6 Billion; 0 Deaths*

■ **Tennessee Tornadoes and Southeast Severe Weather** - March 2020: Powerful EF-3 and EF-4 tornadoes cause considerable damage across the Nashville metroplex and several counties east of Nashville. This damage included many homes, businesses, vehicles, 90 planes and numerous buildings at the Nashville airport. There was also additional hail and wind damage in the surrounding states including Alabama, Kentucky, Mississippi and Missouri. *Total Estimated Costs: \$2.4 (\$2.5) Billion; 25 Deaths*

■ **South, East and Northeast Severe Weather** - February 2020: Severe weather across many South, East and Northeastern states including AL, FL, GA, SC, LA, MS, TN, NC, VA, PA, RI, NY, NJ, MD and MA. There were more than 20 tornadoes clustered across central Mississippi into Tennessee. There were also hundreds of high wind damage reports from Florida to New Jersey, with the Carolinas and Florida receiving the most costly damage. *Total Estimated Costs: \$1.3 Billion; 3 Deaths*

■ **Southeast Tornadoes and Northern Storms and Flooding** - January 2020: More than 80 tornadoes and severe storms caused damage across many southeastern states (AL, AR, GA, IL, IN, KY, LA, MS, MO, NC, OH, SC, TN, TX, VA, WI). Storms and severe flooding also impacted northern states including Michigan, Wisconsin and New York. Significant damage occurred along the shoreline of Lake Michigan to roads, the foundation of homes and to Port Milwaukee. These powerful waves were generated by high winds and a lack of seasonal ice cover. *Total Estimated Costs: \$1.1 (\$1.2) Billion; 10 Deaths*

2019

■ **California and Alaska Wildfires** - Summer-Fall 2019: California experienced a damaging wildfire season in 2019, largely resulting from the Kincade and Saddle Ridge wildfires. In addition, a key California electrical utility provider turned off power to millions of homes and businesses several times during days with forecasted high winds and extremely dry conditions. This step was designed to minimize wildfires, with some success, but it also caused billions of dollars in losses to those affected. Alaska also suffered a near-historic wildfire season with more than 2.5 million acres burned. These wildfire conditions were primed due to Alaska's record-breaking heat and dry conditions during the summer months. July 2019 was the warmest month ever recorded in Alaska. *Total Estimated Costs: \$4.5 Billion; 3 Deaths*

■ **Texas Tornadoes and Central Severe Weather** - October 2019: Numerous tornadoes caused widespread damage across northern Dallas damaging thousands of homes, vehicles, businesses and other public infrastructure. Tornadoes up to EF-3 intensity with maximum winds of 140 mph tracked across a large section of highly developed northern Dallas. Additionally high winds and hail damage also caused damage in other states including Oklahoma, Missouri, Arkansas, Louisiana and Tennessee. *Total Estimated Costs: \$1.7 Billion; 2 Deaths*

■ **Tropical Storm Imelda** - September 2019: Tropical storm and its remnants cause 24 to 36 inches of rainfall over a 3-day period across a large area between Houston and Beaumont, Texas. The largest storm total, 43.39 inches, was reported at North Fork Taylors Bayou, Texas. Many thousands of homes, cars and businesses were impacted by flood water due to this extraordinarily heavy rainfall. Imelda is yet another of the historically extreme rainfall and flood events that have become a regular occurrence across Southeast Texas over the last 5 years. *Total Estimated Costs: \$5.0 (\$5.1) Billion; 5 Deaths*

■ **Hurricane Dorian** - September 2019: Category 1 hurricane makes landfall on the Outer Banks of North Carolina, after devastating the northern Bahama Islands as a historically-powerful and slow-moving hurricane. Dorian tracked offshore parallel to the Florida, Georgia and South Carolina coastline before making a North Carolina landfall, bringing a destructive sound-side surge that inundated many coastal properties and isolated residents who did not evacuate. Significant flood, severe storm, and tornado damage to many homes and businesses occurred on the Outer Banks of North Carolina. Dorian's intensification to a category 5 storm marks the fourth consecutive year, in which a maximum category 5 storm developed in the Atlantic basin - a new record. Dorian also tied the record for maximum sustained wind speed for a landfalling hurricane (185 mph) in the Atlantic, a record shared with the historic 1935 Labor Day Hurricane. *Total Estimated Costs: \$1.6 Billion; 10 Deaths*

■ **Mississippi River, Midwest and Southern Flooding** - July 2019: Additional major flooding impacted many Southern Plains states significantly affecting agriculture, roads, bridges, levees, dams and other assets across many cities and towns. The states most affected were Oklahoma, Nebraska, Missouri, Illinois, Kansas, Arkansas, Kentucky, Tennessee, Texas, Mississippi and Louisiana. Very high water levels also disrupted barge traffic along the Mississippi River, which negatively impacted a variety of dependent industries. Indiana and Ohio were also affected by persistent heavy rainfall that flooded farmland, which prevented and reduced crop planting by millions of acres. *Total Estimated Costs: \$6.2 (\$6.3) Billion; 4 Deaths*

■ **Colorado Hail Storms** - July 2019: Colorado hail storms across the Denver and Fort Collins that damaged many homes and vehicles. *Total Estimated Costs: \$1.0 Billion; 0 Deaths*

■ **Arkansas River Flooding** - June 2019: Historic flooding impacts the Arkansas River Basin with damage to homes, agriculture, roads, bridges and levees focused across eastern Oklahoma and western Arkansas. Thousands of homes, cars and businesses were flooded due a combination of high rivers, levee failure and persistently heavy rainfall from May 20 through June. *Total Estimated Costs: \$3.0 (\$3.1) Billion; 5 Deaths*



■ **Rockies, Central and Northeast Tornadoes and Severe Weather - May 2019:** A four-day tornado outbreak impacts many states across the Rockies, Central and Northeast (CO, WY, NE, KS, OK, MO, IA, IL, IN, OH, PA and NJ). This outbreak produced 190 tornadoes in addition to hundreds of reports of damaging hail and straight-line thunderstorm winds. Of particular note was an EF-4 tornado that produced heavy damage near the city of Dayton, Ohio on May 27. *Total Estimated Costs: \$4.5 Billion; 3 Deaths*

■ **Central Severe Weather - May 2019:** Central severe storms across the Illinois, Indiana, Iowa and Texas damaged many homes, businesses and vehicles. *Total Estimated Costs: \$1.0 Billion; 0 Deaths*

■ **South and Southeast Severe Weather - May 2019:** Persistent severe storms impacted numerous states from Texas to North Carolina (TX, OK, KS, AR, LA, MS, AL, NC). Tornadoes and damaging hail particularly affected Texas, Louisiana and North Carolina focused across the Raleigh metro region. *Total Estimated Costs: \$1.5 Billion; 0 Deaths*

■ **Southern and Eastern Tornadoes and Severe Weather - April 2019:** Tornado outbreak and severe storms impacted many states (TX, LA, MS, AL, GA, NC, OH and PA). More than 50 tornadoes occurred across central Mississippi and Alabama causing damage to vehicles, homes and businesses. More than 25 additional tornadoes also caused damage across several eastern states from Georgia to Pennsylvania. These severe storms also delivered damaging hail and high wind damage that was widespread across many Southern and Eastern states. *Total Estimated Costs: \$1.3 Billion; 7 Deaths*

■ **Missouri River and North Central Flooding - March 2019:** Historic Midwest flooding inundated millions of acres of agriculture, numerous cities and towns, and caused widespread damage to roads, bridges, levees, and dams. The states most affected were Nebraska, Iowa, Missouri, South Dakota, Minnesota, North Dakota, Wisconsin and Michigan. This flood was triggered by a powerful storm with heavy precipitation that intensified snow melt and flooding. Of note, the Offutt Air Force Base in Nebraska was also severely flooded - the third U.S. military base to be damaged by a billion-dollar disaster event over a 6-month period (Sept 2018-Feb 2019). This historic flooding was one of the costliest U.S. inland flooding events on record. *Total Estimated Costs: \$10.7 (\$10.9) Billion; 3 Deaths*

■ **Texas Hail Storm - March 2019:** Texas hail storm over the Dallas metroplex damaged many homes, businesses and vehicles. Oklahoma also received hail damage resulting from the same severe weather system. *Total Estimated Costs: \$1.5 (\$1.6) Billion; 0 Deaths*

■ **Southeast, Ohio Valley and Northeast Severe Weather - February 2019:** Tornadoes, severe weather and flooding in the south (MS, AL, TN) and high-wind damage across many Ohio Valley (IL, IN, OH) and Northeastern states (CT, MD, MA, NJ, NY, PA, VA, WV). This storm system produced heavy rain that caused major flooding along parts of the Ohio, Mississippi and Tennessee rivers. *Total Estimated Costs: \$1.2 (\$1.3) Billion; 2 Deaths*

2018

■ **Western Wildfires, California Firestorm - Summer-Fall 2018:** In 2018, California has experienced its costliest, deadliest and largest wildfires to date, with records back to 1933. The Camp Fire is the costliest and deadliest wildfire - destroying more than 18,500 buildings. California also endured its largest wildfire on record - the Medincino Complex Fire - burning over 450,000 acres. Additionally, California was impacted by other destructive wildfires: the Carr Fire in Northern California and the Woolsey Fire in Southern California. The total 2018 wildfire costs in California (with minor costs in other Western states) approach \$24.0 (\$24.7) billion - a new U.S. record. In total, over 8.7 million acres has burned across the U.S. during 2018, which is well above the 10-year average (2009-2018) of 6.8 million acres. The last 2 years of U.S. wildfire damage has been unprecedented in damage, with losses exceeding \$40.0 (\$41.2) billion. *Total Estimated Costs: \$24.0 (\$24.7) Billion; 106 Deaths*

■ **Southwest/Southern Plains Drought - Summer-Fall 2018:** Drought conditions were present across numerous Southwestern and Plains states (TX, OK, KS, MO, CO, NM, AZ, UT). The most extreme drought conditions continue to persist across the Four Corners region of the Southwest. The agriculture sector has been impacted across the affected states including damage to field crops from lack of rainfall. Ranchers have also be forced to sell-off livestock early in some regions due to high feeding costs. *Total Estimated Costs: \$3.0 (\$3.1) Billion; 0 Deaths*

■ **Hurricane Michael - October 2018:** Powerful category 5 hurricane made landfall at Mexico Beach, Florida with devastating winds of 160 mph and storm surge in excess of 15 feet. Mexico Beach was nearly destroyed, while Panama City suffered extensive damage. Florida's Tyndall Air Force Base also suffered a direct strike from Michael's most intense eye wall winds causing billions in damage costs. Michael's intense winds also reached well inland causing billions in damage costs to agriculture and forestry, as high winds hit during harvest season for numerous crops across several states. Michael is the third category 4 or higher storm to make landfall in the U.S. since 2017. Michael is the first category 5 to strike the U.S. mainland since Hurricane Andrew in 1992 and is only the fourth on record. The others are the Labor Day Hurricane (1935) and Hurricane Camille (1969). Michael was initially rated as a category 4 with 155 winds but upgraded to a category 5 with 160 mph winds upon further analysis. *Total Estimated Costs: \$25.0 (\$25.7) Billion; 49 Deaths*

■ **Hurricane Florence - September 2018:** Hurricane Florence was a large and very slow moving hurricane that produced extreme rainfall across eastern North Carolina (up to 35.93") and South Carolina (up to 23.81"), as prodigious amounts of rainfall were common in many locations. Florence made landfall as a category 1, at Wrightsville Beach, NC with damaging storm surge up to 10 feet and wind gusts reported over 100 mph. However, the majority of the damage caused by Florence was due to the rainfall inland, which caused many rivers to surpass previous record flood heights. U.S. Marine base Camp Lejeune in North Carolina suffered extensive damage that will cost billions to repair. The total damage from Florence in North Carolina is more than the cost experienced during Hurricane Matthew (2016) and Hurricane Floyd (1999) combined. *Total Estimated Costs: \$24.0 (\$24.7) Billion; 53 Deaths*

■ **Rockies and Plains Hail Storms - August 2018:** Severe hail impacts from baseball to softball size impacted several states including Colorado, Nebraska and Wyoming. The most costly impacts occurred in numerous locations of eastern Colorado. *Total Estimated Costs: \$1.0 (\$1.1) Billion; 0 Deaths*

■ **Central and Eastern Tornadoes and Severe Weather - July 2018:** At least 41 tornadoes and high wind damage from thunderstorms impact numerous Central and Eastern states (MO, IA, IL, IN, KS, KY, AL, AR, GA, TN, NC, SC, VA, MD, PA) over a multi-day event. The tornado damage was most severe across Iowa. *Total Estimated Costs: \$1.6 Billion; 0 Deaths*

■ **Colorado Hail Storm - June 2018:** Severe hail storms cause golf ball to baseball-sized hail and widespread damage in many areas from northern Denver to Boulder and Fort Collins. Many homes, businesses and vehicles were impacted. Utah also experienced moderate hail damage. *Total Estimated Costs: \$2.2 (\$2.3) Billion; 0 Deaths*



■ **Texas Hail Storm - June 2018:** Large-hail impacts highly-populated area of the Dallas-Ft. Worth metroplex. Golfball to baseball-sized hail damages many homes, vehicles and businesses. *Total Estimated Costs: \$1.3 Billion; 0 Deaths*

■ **Central and Eastern Severe Weather - May 2018:** Severe storm damage across many Central states including TX, KS, CO, OK, MO, IL, IN, IA and OH. This was followed by a derecho event across the Northeastern states of MD, NJ, NY, PA, VA, WV, MA and CT that caused widespread high wind damage. Also, there were one dozen tornadoes reported across PA, NY and CT causing further damage. *Total Estimated Costs: \$1.4 Billion; 5 Deaths*

■ **Central and Northeastern Severe Weather - May 2018:** Numerous central states (KS, NE, OK, TX, NM, MO, IA, IL, IN, OH, WI) were impacted by large hail and tornadoes. Several northeastern states including NY, PA and VT were also impacted by high wind damage from severe storms. *Total Estimated Costs: \$1.4 Billion; 0 Deaths*

■ **Southern and Eastern Tornadoes and Severe Weather - April 2018:** Tornadoes and severe storms with large hail cause widespread damage across many Southern and Eastern states (AR, FL, GA, LA, MD, MI, MS, MO, NJ, NY, NC, PA, SC, TX, VA) over a multi-day period. There were over 70 confirmed tornadoes largely clustered in Louisiana, Mississippi, North Carolina and Virginia. This same system also caused winter storm impacts of high wind and ice accumulation in northeastern states. *Total Estimated Costs: \$1.3 (\$1.4) Billion; 3 Deaths*

■ **Southeastern Tornadoes and Severe Weather - March 2018:** A potent severe storm system caused over 20 tornadoes across Alabama and also widespread hail damage from Texas to Florida. Most notably this system produced an EF-3 tornado that caused extensive damage in Jacksonville, Alabama and across the campus of Jacksonville State University. *Total Estimated Costs: \$1.5 Billion; 0 Deaths*

■ **Northeast Winter Storm - March 2018:** Powerful Nor'easter impacted many Northeastern states including MD, MA, NH, NJ, NY, PA, CT, DE, RA and VA. Widespread damage resulted from the combination of high winds, heavy snow and heavy coastal erosion. *Total Estimated Costs: \$2.2 (\$2.3) Billion; 9 Deaths*

■ **Central and Eastern Winter Storm - January 2018:** A Nor'easter caused damage across many Northeastern states including MA, NJ, NY, CT, ME, NH, PA, MD, RI, SC, TN, VA, NC and GA. *Total Estimated Costs: \$1.0 (\$1.1) Billion; 22 Deaths*

2017

■ **Western Wildfires, California Firestorm - Summer-Fall 2017:** A historic firestorm damages or destroys over 15,000 homes, businesses and other structures across California in October. The combined destruction of the Tubbs, Atlas, Nuns and Redwood Valley wildfires represent the most costly wildfire event on record, also causing 44 deaths. Extreme wildfire conditions in early December also burned hundreds of homes in Los Angeles. Numerous other wildfires across many western and northwestern states burn over 9.8 million acres exceeding the 10-year annual average of 6.5 million acres. Montana in particular was affected by wildfires that burned in excess of 1 million acres. These wildfire conditions were enhanced by the preceding drought conditions in several states. *Total Estimated Costs: \$18.0 (\$18.9) Billion; 54 Deaths*

■ **North Dakota, South Dakota and Montana Drought - Spring-Fall 2017:** Extreme drought causes extensive impacts to agriculture in North Dakota, South Dakota and Montana. Field crops including wheat were severely damaged and the lack of feed for cattle forced ranchers to sell off livestock. This drought has also contributed to the increased potential for severe wildfires. *Total Estimated Costs: \$2.5 (\$2.6) Billion; 0 Deaths*

■ **Hurricane Maria - September 2017:** Category 4 hurricane made landfall in southeast Puerto Rico after striking the U.S. Virgin Island of St. Croix. Maria's high winds caused widespread devastation to Puerto Rico's transportation, agriculture, communication and energy infrastructure. Extreme rainfall up to 37 inches caused widespread flooding and mudslides across the island. The interruption to commerce and standard living conditions will be sustained for a long period, as much of Puerto Rico's infrastructure is rebuilt. Maria tied Hurricane Wilma (2005) for the most rapid intensification, strengthening from tropical depression to a category 5 storm in 54 hours. Maria's landfall at Category 4 strength gives the U.S. a record three Category 4+ landfalls this year (Maria, Harvey, and Irma). Maria was one of the deadliest storms to impact the U.S., with numerous indirect deaths in the wake of the storm's devastation. *Total Estimated Costs: \$90.0 (\$94.5) Billion; 2981 Deaths*

■ **Hurricane Irma - September 2017:** Category 4 hurricane made landfall at Cudjoe Key, Florida after devastating the U.S. Virgin Islands - St John and St Thomas - as a category 5 storm. The Florida Keys were heavily impacted, as 25% of buildings were destroyed while 65% were significantly damaged. Severe wind and storm surge damage also occurred along the coasts of Florida and South Carolina. Jacksonville, FL and Charleston, SC received near-historic levels of storm surge causing significant coastal flooding. Irma maintained a maximum sustained wind of 185 mph for 37 hours, the longest in the satellite era. Irma also was a category 5 storm for longer than all other Atlantic hurricanes except Ivan in 2004. *Total Estimated Costs: \$50.0 (\$52.5) Billion; 97 Deaths*

■ **Hurricane Harvey - August 2017:** Category 4 hurricane made landfall near Rockport, Texas causing widespread damage. Harvey's devastation was most pronounced due to the large region of extreme rainfall producing historic flooding across Houston and surrounding areas. More than 30 inches of rainfall fell on 6.9 million people, while 1.25 million experienced over 45 inches and 11,000 had over 50 inches, based on 7-day rainfall totals ending August 31. This historic U.S. rainfall caused massive flooding that displaced over 30,000 people and damaged or destroyed over 200,000 homes and businesses. *Total Estimated Costs: \$125.0 (\$131.3) Billion; 89 Deaths*

■ **Midwest Severe Weather - June 2017:** Severe hail and high wind damage impacting Nebraska, Illinois and Iowa. More than one dozen tornadoes touched down across parts of Iowa, in addition to other storm damage. *Total Estimated Costs: \$1.4 (\$1.5) Billion; 0 Deaths*

■ **Midwest Severe Weather - June 2017:** Severe hail, high winds and numerous tornadoes impact many states over several days including WY, TX, NE, KS, MO, IA, IL, PA, VA, NY. *Total Estimated Costs: \$1.5 (\$1.6) Billion; 0 Deaths*

■ **Minnesota Hail Storm and Upper Midwest Severe Weather - June 2017:** Severe hail and high winds cause considerable damage across Minnesota and Wisconsin. The Minneapolis metro area in particular was damaged from large, destructive hail impacting many buildings and vehicles. This damage is comparable to the May 15, 1998 Minnesota hail storm that was also very costly. *Total Estimated Costs: \$2.4 (\$2.5) Billion; 0 Deaths*

■ **Colorado Hail Storm and Central Severe Weather - May 2017:** Hail storm and wind damage impacting several states including CO, OK, TX, NM, MO. The most costly impacts were in the Denver metro region where baseball-sized hail caused the most expensive hail storm in Colorado history, with insured losses exceeding \$2.2 (\$2.4) billion. *Total Estimated Costs: \$3.4 (\$3.6) Billion; 0 Deaths*



■ **Missouri and Arkansas Flooding and Central Severe Weather** - May 2017: A period of heavy rainfall up to 15 inches over a multi-state region in the Midwest caused historic levels of flooding along many rivers. The flooding was most severe in Missouri, Arkansas and southern Illinois where levees were breached and towns were flooded. There was widespread damage to homes, businesses, infrastructure and agriculture. Severe storms also caused additional impacts during the flooding event across a number of central and southern states. *Total Estimated Costs: \$1.7 (\$1.8) Billion; 20 Deaths*

■ **South/Southeast Severe Weather** - March 2017: Large hail and high winds in Texas north of the Dallas metro region caused widespread damage to structures and vehicles. Severe storms also caused damage across several other states (OK, TN, KY, MS, AL) due to the combination of high winds, hail and tornadoes. *Total Estimated Costs: \$2.7 (\$2.9) Billion; 0 Deaths*

■ **Southeast Freeze** - March 2017: Severe freeze heavily damaged fruit crops across several southeastern states (SC, GA, NC, TN, AL, MS, FL, KY, VA). Mid-March freezes are not climatologically unusual in the Southeast, however many crops were blooming 3+ weeks early due to unusually warm temperatures during the preceding weeks. Damage was most severe in Georgia and South Carolina. Crops most impacted include peaches, blueberries, strawberries and apples, among others. *Total Estimated Costs: \$1.0 (\$1.1) Billion; 0 Deaths*

■ **Midwest Tornado Outbreak** - March 2017: Tornado outbreak and wind damage across many Midwestern states (AR, IA, IL, KS, MI, MN, MO, NE, NY, OH, WI). Missouri and Illinois were impacted by numerous tornadoes while Michigan and New York were affected by destructive, straight-line winds following the storm system. Nearly one million customers lost power in Michigan alone due to sustained high winds, which affected several states from Illinois to New York. *Total Estimated Costs: \$2.2 (\$2.3) Billion; 2 Deaths*

■ **Central/Southeast Tornado Outbreak** - March 2017: Over 70 tornadoes developed during a widespread outbreak across many central and southern states causing significant damage. There was also widespread straight-line wind and hail damage. This was the second largest tornado outbreak to occur early in 2017. *Total Estimated Costs: \$1.8 (\$1.9) Billion; 6 Deaths*

■ **California Flooding** - February 2017: Heavy, persistent rainfall across northern and central California created substantial property and infrastructure damage from flooding, landslides and erosion. Notable impacts include severe damage to the Oroville Dam spillway, which caused a multi-day evacuation of 188,000 residents downstream. Excessive rainfall also caused flood damage in the city of San Jose, as Coyote Creek overflowed its banks and inundated neighborhoods forcing 14,000 residents to evacuate. *Total Estimated Costs: \$1.5 (\$1.6) Billion; 5 Deaths*

■ **Southern Tornado Outbreak and Western Storms** - January 2017: High wind damage occurred across southern California near San Diego followed by 79 confirmed tornadoes during an outbreak across many southern states including AL, FL, GA, LA, MS, SC and TX. This was the 3rd most tornadoes to occur in a single outbreak of extreme weather during a winter month (Dec.-Feb.) based on records from 1950. *Total Estimated Costs: \$1.1 (\$1.2) Billion; 24 Deaths*

2016

■ **Western/Southeast Wildfires** - Summer-Fall 2016: Western and Southern states experienced an active wildfire season with over 5.0 million acres burned nationally. Most notable was the firestorm that impacted Gatlinburg, Tennessee with hurricane-force wind gusts in extremely dry conditions creating volatile wildfire behavior. These wildfires destroyed nearly 2,500 structures and caused 14 fatalities. The drought conditions in many areas of the Southeast and California worsened the wildfire potential. *Total Estimated Costs: \$2.4 (\$2.6) Billion; 21 Deaths*

■ **West/Northeast/Southeast Drought** - 2016: California's 5-year drought persisted during 2016 while new areas of extreme drought developed in states across the Northeast and Southeast. The long-term impacts of the drought in California have damaged forests where 100+ million trees have perished and are a public safety hazard. The agricultural impacts were reduced in California as water prices and crop following declined. However, agricultural impacts developed in Northeast and Southeast due to stressed water supplies. *Total Estimated Costs: \$3.5 (\$3.8) Billion; 0 Deaths*

■ **Hurricane Matthew** - October 2016: Category 1 hurricane made landfall in North Carolina, after it paralleled the Southeast coast along Florida, Georgia and the Carolinas causing widespread damage from wind, storm surge and inland flooding. The most costly impacts were due to historic levels of river flooding in eastern North Carolina where 100,000 homes, businesses and other structures were damaged. This inland flooding was comparable to Hurricane Floyd (1999) that also impacted eastern North Carolina. Matthew narrowly missed landfall on Florida's east coast as a powerful category 4 storm. *Total Estimated Costs: \$10.0 (\$11.0) Billion; 49 Deaths*

■ **Louisiana Flooding** - August 2016: A historic flood devastated a large area of southern Louisiana resulting from 20 to 30 inches of rainfall over several days. Watson, Louisiana received an astounding 31.39 inches of rain from the storm. Two-day rainfall totals in the hardest hit areas have a 0.2% chance of occurring in any given year: a 1 in 500 year event. More than 30,000 people were rescued from the floodwaters that damaged or destroyed over 50,000 homes, 100,000 vehicles and 20,000 businesses. This is the most damaging U.S. flood event since Superstorm Sandy impacted the Northeast in 2012. *Total Estimated Costs: \$10.0 (\$11.0) Billion; 13 Deaths*

■ **Rockies and Northeast Severe Weather** - July 2016: Severe storms across the Rockies and Northeastern states (CO, WY, VA, MD, PA, NJ, NY) caused large hail and high wind damage. Storm damage in Colorado was the most costly due to hail. *Total Estimated Costs: \$1.5 (\$1.6) Billion; 0 Deaths*

■ **West Virginia Flooding and Ohio Valley Tornadoes** - June 2016: Torrential rainfall caused destructive flooding through many West Virginia towns, damaging thousands of homes and businesses and causing considerable loss of life. Over 1,500 roads and bridges were damaged or destroyed making the impact on infrastructure comparable to the historic 2013 Colorado flood. The storm system also produced numerous tornadoes causing damage across several Ohio Valley states. *Total Estimated Costs: \$1.0 (\$1.1) Billion; 23 Deaths*

■ **Rockies/Central Tornadoes and Severe Weather** - May 2016: Sustained period of severe thunderstorms and tornadoes affecting several states including Montana, Colorado, Kansas, Missouri and Texas. The most concentrated days for tornado development were on May 22 and 24. Additional damage was created by straight-line high wind and hail damage. *Total Estimated Costs: \$1.1 (\$1.3) Billion; 0 Deaths*

■ **Plains Tornadoes and Central Severe Weather** - May 2016: Tornadoes and severe storms cause widespread damage across the Plains and Central states (NE, MO, TX, OK, KS, CO, IL, KY, TN) over a multi-day period. The damage from tornadoes and high wind was most costly in Nebraska and Missouri. *Total Estimated Costs: \$1.7 (\$1.9) Billion; 2 Deaths*



- **South/Southeast Tornadoes** - *April 2016*: Large outbreak of tornadoes affects numerous states across the South and Southeast. Additional damage also from large hail and straight-line wind during the multi-day thunderstorm event. *Total Estimated Costs: \$2.4 (\$2.6) Billion; 6 Deaths*
- **Houston Flooding** - *April 2016*: A period of extreme rainfall up to 17 inches created widespread urban flooding in Houston and surrounding suburbs. Thousands of homes and businesses were damaged and more than 1,800 high water rescues were conducted. This represents the most widespread flooding event to affect Houston since Tropical Storm Allison in 2001. *Total Estimated Costs: \$2.7 (\$2.9) Billion; 8 Deaths*
- **North/Central Texas Hail Storm** - *April 2016*: Widespread severe hail damage across north and central Texas including the cities of Plano, Wylie, Frisco, Allen and San Antonio. The damage in San Antonio was particularly severe as the National Weather Service verified reports of hail size reaching 4.5 inches in diameter. This ranks as one of the most costly hail events to affect the United States. *Total Estimated Costs: \$3.5 (\$3.8) Billion; 0 Deaths*
- **North Texas Hail Storm** - *March 2016*: Large hail and strong winds caused considerable damage in heavily populated areas of north Texas. This damage was most notable in the cities of Dallas, Fort Worth and Plano. *Total Estimated Costs: \$2.1 (\$2.3) Billion; 0 Deaths*
- **Southern Severe Weather** - *March 2016*: Severe hail impacts the Fort Worth and Arlington metro region in Texas. Additional large hail and high wind damage occurred in other locations of Texas, Louisiana and Mississippi. *Total Estimated Costs: \$1.2 (\$1.3) Billion; 1 Death*
- **Texas and Louisiana Flooding** - *March 2016*: Multiple days of heavy rainfall averaging 15 to 20 inches led to widespread flooding along the Sabine River basin on the Texas and Louisiana border. This prompted numerous evacuations, high-water rescues and destruction, as more than 1,000 homes and businesses were damaged or destroyed. *Total Estimated Costs: \$2.3 (\$2.5) Billion; 5 Deaths*
- **Southeast and Eastern Tornadoes** - *February 2016*: Early outbreak of tornadoes and severe weather across many southern and eastern states including (AL, CT, FL, GA, LA, MA, MD, MS, NC, NJ, NY, PA, SC, TX, VA). There were at least 50 confirmed tornadoes causing widespread damage. *Total Estimated Costs: \$1.0 (\$1.1) Billion; 10 Deaths*

2015

- **Western Drought** - *2015*: Drought conditions were present across numerous western states (CA, NV, OR, WA, ID, MT, UT, AZ) with the most severe conditions continuing to plague California for all of 2015. The agriculture sector was again impacted by a lack of rainfall resulting in hundreds of thousands of acres of farmland remaining fallow and requiring excess groundwater pumping to irrigate existing agriculture interests. Wildfire conditions were further enhanced by the ongoing drought. California experienced extensive damage from both drought and wildfire impacts. Drought conditions did improve dramatically across Texas and Oklahoma, in the form of several major flood events. *Total Estimated Costs: \$4.5 (\$5.0) Billion; 0 Deaths*
- **Texas Tornadoes and Midwest Flooding** - *December 2015*: A powerful storm system packing unseasonably strong tornadoes caused widespread destruction in the Dallas metropolitan region, damaging well over 1,000 homes and businesses. This same potent system also produced intense rainfall over several Midwestern states triggering historic flooding that has approached or broken records at river gauges in several states (MO, IL, AR, TN, MS, LA). The flooding has overtopped levees and caused damage in numerous areas. This historic storm also produced high wind, snow and ice impacts from New Mexico through the Midwest and into New England. Overall, the storm caused at least 50 deaths from the combined impact of tornadoes, flooding and winter weather. *Total Estimated Costs: \$2.0 (\$2.2) Billion; 50 Deaths*
- **Western and Alaskan Wildfires** - *Summer-Fall 2015*: Wildfires burned over 10.1 million acres across the U.S. in 2015, surpassing 2006 for the highest annual total of U.S. acreage burned since record-keeping began in 1960. The most costly wildfires occurred in California where over 2,500 structures were destroyed due to the Valley and Butte wildfires with the insured losses alone exceeding \$1.0 (\$1.1) billion. The most extensive wildfires occurred in Alaska where over 5 million acres burned within the state. There was extensive burnt acreage across other western states, most notably (OR, WA, ID, MT, ND, CO, WY, TX). *Total Estimated Costs: \$3.0 (\$3.4) Billion; 12 Deaths*
- **South Carolina and East Coast Flooding** - *October 2015*: Historic levels of flooding impacted South Carolina causing widespread damage to many homes, businesses, public buildings and infrastructure. This interrupted commerce and closed major transportation corridors (such as I-95) for weeks as rivers slowly receded. Locally extreme rainfall totals exceeding 20-inches were common resulting from the convergence of a powerful low pressure system / frontal boundary and copious moisture from Hurricane Joaquin in the Atlantic. *Total Estimated Costs: \$2.0 (\$2.2) Billion; 25 Deaths*
- **Central and Northeast Severe Weather** - *June 2015*: Severe storms across numerous Central and Northeast states (CO, CT, IA, IL, MD, MI, NJ, NY, PA, SD, VA, WI) with widespread hail and high wind damage. *Total Estimated Costs: \$1.2 (\$1.3) Billion; 1 Death*
- **Texas and Oklahoma Flooding and Severe Weather** - *May 2015*: A slow-moving system caused tremendous rainfall and subsequent flooding to occur in Texas and Oklahoma. The Blanco river in Texas swelled from 5 feet to a crest of more than 40 feet over several hours causing considerable property damage and loss of life. The city of Houston also experienced flooding which resulted in hundreds of high-water rescues. The damage in Texas alone exceeded \$1.0 (\$1.1) billion. There was also damage in other states (KS, CO, AR, OH, LA, GA, SC) from associated severe storms. *Total Estimated Costs: \$2.5 (\$2.8) Billion; 31 Deaths*
- **Southern Plains Tornadoes** - *May 2015*: Tornado outbreak across the Southern Plain states (IA, KS, NE, OK, CO, SD, TX) with 122 tornadoes. The most costly damage occurred across Texas and Oklahoma. *Total Estimated Costs: \$1.3 (\$1.4) Billion; 4 Deaths*
- **South/Southeast Severe Weather** - *April 2015*: Severe storms across the South and Southeastern states (AL, AR, FL, GA, KS, LA, MS, NC, OK, SC, TN, TX). High winds and severe hail created the most significant damage in Texas. *Total Estimated Costs: \$1.3 (\$1.4) Billion; 0 Deaths*
- **Midwest/Ohio Valley Severe Weather** - *April 2015*: Severe storms across the Midwest and Ohio Valley including the states (AR, IA, IL, IN, KS, KY, MI, MO, NC, OH, OK, PA, TN, TX, WI, WV). Large hail and high winds created the most damage across Missouri and Illinois. *Total Estimated Costs: \$1.6 (\$1.7) Billion; 2 Deaths*
- **Central and Eastern Winter storm, Cold Wave** - *February 2015*: A large winter storm and associated cold wave impacted many central, eastern and northeastern states (CT, DE, GA, IL, KY, MA, MD, ME, MI, NC, NH, NJ, NY, OH, PA, RI, SC, TN, VA). The city of Boston was particularly impacted as feet of snow continued to accumulate causing load-stress on buildings and clogging transportation corridors. Total, direct losses in Massachusetts alone exceed \$1.0 (\$1.1) billion for this event, with considerable damage in many other states. *Total Estimated Costs: \$3.0 (\$3.3) Billion; 30 Deaths*



2014

■ **Western Drought** - 2014: Historic drought conditions affected the majority of California for all of 2014 making it the worst drought on record for the state. Surrounding states and parts of Texas, Oklahoma and Kansas also experienced continued severe drought conditions. This is a continuation of drought conditions that have persisted for several years. *Total Estimated Costs: \$4.0 (\$4.4) Billion; 0 Deaths*

■ **Rockies/Plains Severe Weather** - September 2014: Severe storms across the Rockies and Plains states (CO, KS, TX). Large hail and high winds created significant damage across eastern Colorado and Texas, particularly in the Dallas metro area. *Total Estimated Costs: \$1.4 (\$1.6) Billion; 0 Deaths*

■ **Michigan and Northeast Flooding** - August 2014: Heavy rainfall in excess of 5 inches caused significant flooding in cities across Michigan damaging thousands of cars, business, homes and other infrastructure. Flooding also occurred across Maryland and New York's Long Island, as the slow-moving storm system delivered 24-hour rainfall exceeding 6 and 12 inches, respectively, creating more flood damage. Islip, NY received 13.57 inches of rain over a 24-hour period on Aug 12-13 setting a new 24-hour precipitation record for New York. *Total Estimated Costs: \$1.0 (\$1.1) Billion; 2 Deaths*

■ **Rockies/Central Plains Severe Weather** - June 2014: Severe storms across the Rockies and Central Plains states (NE, KS, WY, IA, AR). Wind gusts exceeding 90 mph and baseball to softball sized hail caused severe damage to structures and vehicles in central and eastern Nebraska. *Total Estimated Costs: \$1.9 (\$2.1) Billion; 2 Deaths*

■ **Rockies/Midwest/Eastern Severe Weather** - May 2014: Severe storms across the Rockies, Midwest and Eastern states (CO, MT, IA, IL, IN, OH, SC, VA, PA, DE, NY) with the most costly damage in Colorado, Illinois and Pennsylvania. *Total Estimated Costs: \$3.7 (\$4.1) Billion; 0 Deaths*

■ **Midwest/Southeast/Northeast Tornadoes and Flooding** - April 2014: Tornado outbreak across the Midwest, Southeast and Northeast states (AL, AR, DE, FL, GA, KS, MD, MO, MS, NC, NJ, NY, PA, TN, VA) with 83 confirmed tornadoes. Mississippi had its 3rd greatest number of tornadoes reported for any day since 1950. Torrential rainfall in the Florida panhandle also caused major flooding, as Pensacola set new 1-day and 2-day precipitation records of 15.55 and 20.47 inches, respectively. Flooding rains were also reported in coastal Alabama, as Mobile received 11.24 inches of rain, the third greatest calendar day rainfall total for the city. *Total Estimated Costs: \$1.7 (\$1.9) Billion; 33 Deaths*

■ **Plains Severe Weather** - April 2014: Severe storms across the Plains states (IL, KS, MO, TX) causing considerable hail and wind damage in Texas. *Total Estimated Costs: \$1.4 (\$1.6) Billion; 0 Deaths*

■ **Midwest/Southeast/Northeast Winter Storm** - January 2014: Winter storm caused widespread damage across numerous Midwest, Southeast and Northeastern states (AL, GA, IL, IN, KY, MD, MI, MO, MS, NC, NJ, NY, OH, PA, SC, TN, VA). *Total Estimated Costs: \$2.2 (\$2.4) Billion; 16 Deaths*

2013

■ **Western/Plains Drought/Heatwave** - Spring-Fall 2013: The 2013 drought slowly dissipated from the historic levels of the 2012 drought, as conditions improved across many Midwestern and Plains states. However, moderate to extreme drought did remain or expand into western states (AZ, CA, CO, IA, ID, IL, KS, MI, MN, MO, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, WI, WY). In comparison to 2011 and 2012 drought conditions the US experienced only moderate crop losses across the central agriculture states. *Total Estimated Costs: \$10.4 (\$11.8) Billion; 53 Deaths*

■ **Ohio Valley Tornadoes** - November 2013: Late-season outbreak of tornadoes and severe weather over the Ohio Valley (IL, IN, KY, MI, MO, OH) with 70 confirmed tornadoes. Most severe impacts occurred across Illinois and Indiana. *Total Estimated Costs: \$1.1 (\$1.2) Billion; 8 Deaths*

■ **Colorado Flooding** - September 2013: A stalled frontal boundary over Colorado led to record rainfall, as some areas received > 15 inches over several days. This resulted in historic flooding across numerous cities and towns. Destruction of residences, businesses and transportation infrastructure was widespread. *Total Estimated Costs: \$1.5 (\$1.7) Billion; 9 Deaths*

■ **Midwest Severe Weather** - August 2013: Severe weather and large hail causes considerable damage across Minnesota and Wisconsin. *Total Estimated Costs: \$1.0 (\$1.2) Billion; 0 Deaths*

■ **Midwest/Plains/Northeast Tornadoes** - May 2013: Outbreak of tornadoes and severe weather over the Midwest, Plains and Northeast (IL, IN, KS, MO, NY, OK, TX) with 92 confirmed tornadoes including the deadly tornado that struck El Reno, OK. There was also significant damage resulting from hail and straight-line wind. *Total Estimated Costs: \$1.8 (\$2.0) Billion; 10 Deaths*

■ **Midwest/Plains/East Tornadoes** - May 2013: Outbreak of tornadoes and severe weather over the Midwest, Plains and Eastern states (GA, IA, IL, KS, MO, NY, OK, TX) with 59 confirmed tornadoes including the deadly tornado that impacted Moore, OK. Many destructive tornadoes remained on the ground for an extended time. *Total Estimated Costs: \$2.4 (\$2.7) Billion; 27 Deaths*

■ **Illinois Flooding and Severe Weather** - April 2013: A slow-moving storm system created rainfall totals of 5 to 10 inches across northern and central Illinois including the Chicago metro. This resulted in damage to many homes and businesses. There was also severe weather damage from wind and hail across Indiana and Missouri. *Total Estimated Costs: \$1.1 (\$1.2) Billion; 4 Deaths*

■ **Midwest/Plains Severe Weather** - April 2013: Severe weather across the Midwest and Plains states (IN, KS, MO, NE) with a total of 26 confirmed tornadoes. Considerable damage resulting from hail and straight-line wind. *Total Estimated Costs: \$1.4 (\$1.6) Billion; 1 Death*

■ **Southeast Severe Weather** - March 2013: Severe weather over the Southeast (MS, AL, GA, TN) with 10 confirmed tornadoes. Considerable damage resulting from large hail and straight-line wind. *Total Estimated Costs: \$2.0 (\$2.3) Billion; 1 Death*

2012

■ **U.S. Drought/Heatwave** - 2012: The 2012 drought is the most extensive drought to affect the U.S. since the 1930s. Moderate to extreme drought conditions affected more than half the country for a majority of 2012. The following states were affected: CA, NV, ID, MT, WY, UT, CO, AZ, NM, TX, ND, SD, NE, KS, OK, AR, MO, IA, MN, IL, IN, GA. Costly drought impacts occurred across the central agriculture states resulting in widespread harvest failure for corn, sorghum and soybean crops, among others. The associated summer heatwave also caused 123 direct deaths, but an estimate of the excess mortality due to heat stress is still unknown. *Total Estimated Costs: \$30.0 (\$34.5) Billion; 123 Deaths*



■ **Western Wildfires** - *Summer-Fall 2012*: Wildfires burned over 9.2 million acres across the U.S. in 2012. This is the 3rd highest annual total since the year 2000. The most damaging wildfires occurred in the western states (CO, ID, WY, MT, CA, NV, OR, WA). Colorado experienced the most costly wildfires (e.g., Waldo Canyon fire) where several hundred residences were destroyed. *Total Estimated Costs: \$1.7 (\$2.0) Billion; 8 Deaths*

■ **Hurricane Sandy** - *October 2012*: Extensive damage across several northeastern states (MD, DE, NJ, NY, CT, MA, RI) due to high wind and coastal storm surge, particularly NY and NJ. Damage from wind, rain and heavy snow also extended more broadly to other states (NC, VA, WV, OH, PA, NH), as Sandy merged with a developing Nor'easter. Sandy's impact on major population centers caused widespread interruption to critical water / electrical services and also caused 159 deaths (72 direct, 87 indirect). Sandy also caused the New York Stock Exchange to close for two consecutive business days, which last happened in 1888 due to a major winter storm. *Total Estimated Costs: \$65.0 (\$74.8) Billion; 159 Deaths*

■ **Hurricane Isaac** - *August 2012*: Category 1 hurricane made landfall over Louisiana. Isaac's slow motion and large size led to a large storm surge and flooding rains. This created damage across several southeastern states (LA, MS, AL, FL) including 9 deaths (5 direct, 4 indirect). *Total Estimated Costs: \$2.8 (\$3.2) Billion; 9 Deaths*

■ **Plains/East/Northeast Severe Weather** - *June-July 2012*: Sustained outbreak of thunderstorms / high winds from a strong derecho event over the central, eastern, and northeastern states (IL, IN, KY, OH, WV, SC, NC, VA, MD, DC, NJ). *Total Estimated Costs: \$2.9 (\$3.3) Billion; 28 Deaths*

■ **Rockies/Southwest Severe Weather** - *June 2012*: Severe storms and damaging hail over several states (CO, NM, TX) with 25 confirmed tornadoes. Colorado experienced over \$1.0 (\$1.2) billion in damage due to hail. *Total Estimated Costs: \$2.6 (\$3.0) Billion; 0 Deaths*

■ **Southern Plains/Midwest/Northeast Severe Weather** - *May 2012*: Severe storms over the southern plains, midwest and northeast (TX, OK, KS, MN, PA, NY) with 27 confirmed tornadoes. Significant damage also from severe hail and straight-line winds. *Total Estimated Costs: \$2.3 (\$2.6) Billion; 1 Death*

■ **Midwest/Ohio Valley Severe Weather** - *April-May 2012*: Severe weather over the midwest and Ohio Valley (TX, OK, KS, MO, IL, IN, KY) with 38 confirmed tornadoes. Considerable damage resulting from hail. *Total Estimated Costs: \$3.3 (\$3.8) Billion; 1 Death*

■ **Midwest Tornadoes** - *April 2012*: Outbreak of tornadoes and severe weather over the midwest (OK, KS, NE, IA) with 98 confirmed tornadoes including many tornadoes that remained on the ground for an extended time - traveling tens of miles. *Total Estimated Costs: \$1.1 (\$1.3) Billion; 6 Deaths*

■ **Texas Tornadoes** - *April 2012*: Outbreak of tornadoes across the greater Dallas-Ft. Worth metropolitan area. Several moderate strength tornadoes (EF-2 and EF-3) affected towns in this area with a total of 22 confirmed tornadoes. *Total Estimated Costs: \$1.0 (\$1.2) Billion; 0 Deaths*

■ **Southeast/Ohio Valley Tornadoes** - *March 2012*: Outbreak of tornadoes and severe weather over the southeast and Ohio Valley (AL, GA, IN, OH, KY, TN) with 75 confirmed tornadoes. *Total Estimated Costs: \$3.1 (\$3.6) Billion; 42 Deaths*

2011

■ **Texas, New Mexico, Arizona Wildfires** - *Summer-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 Estimated Costs: \$1.8 (\$2.1) Billion; 5 Deaths*

■ **Tropical Storm Lee** - *September 2011*: 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 Estimated Costs: \$2.5 (\$3.0) Billion; 21 Deaths*

■ **Southern Plains/Southwest Drought & Heat Wave** - *Spring-Summer 2011*: Drought and heat wave 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. *Total Estimated Costs: \$12.0 (\$14.2) Billion; 95 Deaths*

■ **Hurricane Irene** - *August 2011*: 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. *Total Estimated Costs: \$13.5 (\$15.9) Billion; 45 Deaths*

■ **Midwest/Southeast Severe Weather** - *August 2011*: Severe weather impacts the states IA, KS, MO, NE, SD across the Midwest and Southeast. *Total Estimated Costs: \$1.2 (\$1.4) Billion; 0 Deaths*

■ **Rockies and Midwest Severe Weather** - *July 2011*: 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 Estimated Costs: \$1.2 (\$1.4) Billion; 2 Deaths*

■ **Missouri River flooding** - *May-June 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. *Total Estimated Costs: \$2.0 (\$2.4) Billion; 5 Deaths*

■ **Midwest/Southeast Tornadoes and Severe Weather** - *June 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). *Total Estimated Costs: \$1.5 (\$1.8) Billion; 3 Deaths*



- **Mississippi River flooding** - April-May 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 (\$590.0) million to agriculture in Arkansas; \$320 (\$377.6) million in damage to Memphis, Tennessee; \$800 (\$944.0) million to agriculture in Mississippi; \$317 (\$374.1) million to agriculture and property in Missouri's Birds Point-New Madrid Spillway; \$80 (\$94.4) million for the first 30 days of flood fighting efforts in Louisiana. *Total Estimated Costs: \$3.0 (\$3.5) Billion; 7 Deaths*
- **Midwest/Southeast Tornadoes** - May 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. *Total Estimated Costs: \$9.1 (\$10.7) Billion; 177 Deaths*
- **Southeast/Ohio Valley/Midwest Tornadoes** - April 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. *Total Estimated Costs: \$10.2 (\$12.1) Billion; 321 Deaths*
- **Ohio Valley/South Tornadoes** - April 2011: Dozens of tornadoes and severe storms affect the states AR, IL, IN, KY, MO, OH, TN, TX across the Ohio Valley and South. *Total Estimated Costs: \$1.0 (\$1.2) Billion; 0 Deaths*
- **Midwest/Southeast Tornadoes** - April 2011: Outbreak of tornadoes over central and southern states (OK, TX, AR, MS, AL, GA, NC, SC, VA, PA) with an estimated 177 tornadoes. *Total Estimated Costs: \$2.1 (\$2.4) Billion; 38 Deaths*
- **Southeast/Midwest Tornadoes** - April 2011: Outbreak of tornadoes over central and southern states (NC, SC, TN, AL, TX, OK, KS, IA, WI) with an estimated 59 tornadoes. *Total Estimated Costs: \$2.2 (\$2.6) Billion; 0 Deaths*
- **Midwest/Southeast Tornadoes** - April 2011: Outbreak of tornadoes over central and southern states (KS, MO, IA, IL, WI, KY, GA, TN, NC, SC) with an estimated 46 tornadoes. *Total Estimated Costs: \$2.8 (\$3.3) Billion; 9 Deaths*
- **Groundhog Day Blizzard** - February 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. *Total Estimated Costs: \$1.8 (\$2.1) Billion; 36 Deaths*

2010

- **Arizona Severe Weather** - October 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. *Total Estimated Costs: \$3.8 (\$4.6) Billion; 0 Deaths*
- **Midwest/Northeast Severe Storms and Flooding** - July 2010: Severe storms and flooding affect the states IA, IL, MD, NY, PA, WI across the Midwest and Northeast. *Total Estimated Costs: (\$1.1) Billion*; 0 Deaths*
- **Rockies/Central/East Severe Weather** - June 2010: Severe storms cause high wind and hail damage across numerous states including CO, NM, KS, OK, IL, IN, GA, SC and NC. *Total Estimated Costs: (\$1.1) Billion*; 2 Deaths*
- **Oklahoma, Kansas, and Texas Tornadoes and Severe Weather** - May 2010: An outbreak of tornadoes, hail, and severe thunderstorms occurred across Oklahoma, Kansas, and Texas in mid-May. Oklahoma was hardest hit with > \$1.5 (\$1.8) billion in damages. *Total Estimated Costs: \$3.3 (\$4.0) Billion; 3 Deaths*
- **East/South Flooding and Severe Weather** - May 2010: Flooding, hail, tornadoes, and severe thunderstorms occurred across many Southern states (TN, AR, KY, GA) on April 30-May 2. Flooding in the Nashville, TN area alone contributed > \$1.0 (\$1.2) 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 Estimated Costs: \$2.3 (\$2.7) Billion; 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. *Total Estimated Costs: \$1.8 (\$2.2) Billion; 11 Deaths*

2009

- **Southwest/Great Plains Drought** - 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. *Total Estimated Costs: \$3.5 (\$4.3) Billion; 0 Deaths*
- **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. *Total Estimated Costs: \$1.0 (\$1.2) Billion; 10 Deaths*
- **Colorado Hail Storm** - July 2009: Severe hail impacts Colorado. Jefferson County was most affected with hail at least 8 inches deep. The hail damage from this storm was comparable to the July 11, 1990 Colorado hail storm. *Total Estimated Costs: \$1.0 (\$1.2) Billion; 0 Deaths*
- **Midwest, South and East 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). *Total Estimated Costs: \$1.3 (\$1.6) Billion; 0 Deaths*
- **Central Tornadoes and Severe Weather** - May 2009: More than 50 tornadoes and large hail from severe storms caused damage across many southeastern states (IL, KS, KY, MO, TN, TX). *Total Estimated Costs: (\$1.1) Billion*; 7 Deaths*



■ **South/Southeast Severe Weather & Tornadoes** - 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. *Total Estimated Costs: \$1.4 (\$1.8) Billion; 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. *Total Estimated Costs: \$1.6 (\$2.0) Billion; 0 Deaths*

■ **Southeast/Ohio Valley Severe Weather** - February 2009: Complex of severe thunderstorms and high winds across the region (TN, KY, OK, OH, VA, WV, PA). *Total Estimated Costs: \$1.7 (\$2.1) Billion; 10 Deaths*

2008

■ **U.S. Drought** - 2008: Severe drought and heat caused agricultural losses across a large portion of the U.S. Record low lake levels also occurred in areas of the southeast. The states impacted include AL, AR, CA, CO, GA, ID, IN, KS, KY, MD, MN, MS, MT, NC, ND, NJ, NM, OH, OK, OR, SC, TN, TX, UT, VA, WA and WI. *Total Estimated Costs: \$7.0 (\$8.6) Billion; 0 Deaths*

■ **U.S. Wildfires** - 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. *Total Estimated Costs: \$1.2 (\$1.5) Billion; 16 Deaths*

■ **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 U.S. due to damaged oil platforms, storage tanks, pipelines and off-line refineries. *Total Estimated Costs: \$30.0 (\$36.9) Billion; 112 Deaths*

■ **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. *Total Estimated Costs: \$6.0 (\$7.4) Billion; 53 Deaths*

■ **Hurricane Dolly** - July 2008: Category 2 hurricane makes landfall in southern Texas causing considerable wind and flooding damage in TX and NM. *Total Estimated Costs: \$1.3 (\$1.6) Billion; 3 Deaths*

■ **Midwest Flooding** - Summer 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. *Total Estimated Costs: \$10.0 (\$12.2) Billion; 24 Deaths*

■ **Midwest/Mid-Atlantic Severe Weather** - 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). *Total Estimated Costs: \$1.6 (\$2.0) Billion; 18 Deaths*

■ **Midwest Tornadoes and Severe Weather** - May 2008: Outbreak of tornadoes over the Midwest/Ohio Valley regions (IL, IN, IA, KS, MN, NE, OK, WY, CO) with 235 tornadoes confirmed. *Total Estimated Costs: \$3.0 (\$3.7) Billion; 13 Deaths*

■ **Southern Severe Weather** - April 2008: Severe storms affect Arkansas, Oklahoma and Texas across the South. *Total Estimated Costs: \$1.0 (\$1.3) Billion; 2 Deaths*

■ **Southeast Tornadoes** - March 2008: Tornadoes and severe weather across Georgia and South Carolina. This includes an EF-2 tornado causing damage to numerous buildings in downtown Atlanta. *Total Estimated Costs: \$1.1 (\$1.4) Billion; 5 Deaths*

■ **Southeast Tornadoes and Severe Weather** - 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. *Total Estimated Costs: \$1.2 (\$1.5) Billion; 57 Deaths*

■ **Western, Central and Northeast Severe Weather** - January 2008: Strong storm produces severe weather including hail, high winds and heavy precipitation from California to New York. Flash floods and landslides cause damage in California. In addition, more than 70 tornadoes were reported from Arkansas to Wisconsin, with the highest concentration of tornadoes in Missouri. *Total Estimated Costs: \$1.0 (\$1.2) Billion; 12 Deaths*

2007

■ **Western/Eastern Drought/Heatwave** - Summer-Fall 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. *Total Estimated Costs: \$3.5 (\$4.5) Billion; 15 Deaths*

■ **Western Wildfires** - Summer 2007: Continued drought conditions and high winds over much of the western U.S. (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. *Total Estimated Costs: \$2.7 (\$3.5) Billion; 12 Deaths*

■ **East/South Severe Weather and Flooding** - 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. *Total Estimated Costs: \$2.5 (\$3.2) Billion; 9 Deaths*

■ **Spring Freeze** - April 2007: Widespread severe freeze over much of the east and midwest (AL, AR, GA, IA, IL, IN, KS, KY, MO, MS, NC, NE, OH, OK, SC, TN, VA, WV), causing significant losses in fruit crops, field crops (especially wheat), and the ornamental industry. Temperatures in the teens/20s accompanied by rather high winds nullified typical crop-protection systems. *Total Estimated Costs: \$2.0 (\$2.6) Billion; 0 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 20s, destroying numerous agricultural crops; with citrus, berry, and vegetable crops most affected. *Total Estimated Costs: \$1.4 (\$1.8) Billion; 1 Death*



2006

■ **Numerous Wildfires** - 2006: Numerous wildfires driven by dry weather and high winds burned over 9.8 million acres, across the western half of the country including Alaska. This is the second highest annual total behind the 10.1 million acres burned in 2015 since record-keeping began in 1960. The most affected states were AK, AZ, CA, CO, FL, ID, MT, NM, NV, OK, OR, TX, WA, WY; *Total Estimated Costs: \$1.5 (\$1.9) Billion; 28 Deaths*

■ **Central Severe Weather** - October 2006: Severe storms cause high wind and hail damage across numerous states including OH, IL, IN, MI, MN and WI. *Total Estimated Costs: (\$1.2) Billion*; 1 Death*

■ **Midwest/Plains/Southeast 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 -- including states of ND, SD, NE, KS, OK, TX, MN, IA, MO, AR, LA, MS, AL, GA, FL, MT, WY, CO, NM. *Total Estimated Costs: \$6.0 (\$7.9) Billion; 0 Deaths*

■ **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. *Total Estimated Costs: \$1.5 (\$2.0) Billion; 20 Deaths*

■ **Midwest Tornadoes** - April 2006: Tornadoes and severe weather cause significant damage in the states of IA, IL, IN, and WI. The state of Indiana was most affected with over one billion dollars in damage. *Total Estimated Costs: \$2.4 (\$3.2) Billion; 27 Deaths*

■ **Midwest/Southeast Tornadoes** - April 6-8, 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. *Total Estimated Costs: \$1.6 (\$2.1) Billion; 10 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. *Total Estimated Costs: \$1.3 (\$1.8) Billion; 10 Deaths*

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. *Total Estimated Costs: \$19.0 (\$25.8) Billion; 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. *Total Estimated Costs: \$18.5 (\$25.2) Billion; 119 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. *Total Estimated Costs: \$1.5 (\$2.0) Billion; 0 Deaths*

■ **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. *Total Estimated Costs: \$125.0 (\$170.0) Billion; 1833 Deaths*

■ **Hurricane Dennis** - July 2005: Category 3 hurricane makes landfall in western Florida panhandle resulting in storm surge and wind damage along the FL and AL coasts, along with scattered wind and flood damage in GA and MS. *Total Estimated Costs: \$2.5 (\$3.4) Billion; 15 Deaths*

■ **Southeast Severe Weather** - March 2005: Severe storms cause widespread hail damage across numerous states including TX, AL, MS, GA, FL, NC and VA. *Total Estimated Costs: (\$1.2) Billion*; 0 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. *Total Estimated Costs: \$7.5 (\$10.5) Billion; 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. *Total Estimated Costs: \$20.5 (\$28.7) Billion; 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. *Total Estimated Costs: \$9.8 (\$13.7) Billion; 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. *Total Estimated Costs: \$16.0 (\$22.4) Billion; 35 Deaths*

■ **Severe Storms, Hail, Tornadoes** - May 2004: Severe storms including tornadoes and hail cause damage across the Midwest, South, Southeast and Northeast regions. The states impacted include IA, IL, IN, KY, MI, MO, NC, NE, NY, OK, OH and WI. *Total Estimated Costs: \$1.0 (\$1.4) Billion; 4 Deaths*

2003

■ **California Wildfires** - Fall 2003: Dry weather, high winds, and resulting wildfires in Southern California burned over 3,700 homes. Nearly 4.0 million acres burned across numerous western states including Alaska. *Total Estimated Costs: \$3.9 (\$5.6) Billion; 22 Deaths*



■ **Western/Central Drought/Heatwave** - *Spring-Fall 2003*: 2003 drought across western and central portions of the U.S. with losses to agriculture. The states impacted include AZ, CO, IA, ID, IL, KS, MI, MN, MO, MT, ND, NE, NM, OR, SD, WA and WI. *Total Estimated Costs: \$5.0 (\$7.1) Billion; 35 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. *Total Estimated Costs: \$5.5 (\$7.8) Billion; 55 Deaths*

■ **Severe Weather** - *July 2003*: Severe storms impact states across the South, Southeast, Midwest and Northeast regions. The states most impacted include AR, AL, MS, GA, FL, SC, TN, KY, MI, NY, OH, PA and VT. *Total Estimated Costs: \$1.0 (\$1.4) Billion; 7 Deaths*

■ **Midwest/Plains Severe Weather** - *July 2003*: Severe storms affect the states IA, IL, IN, MI, MN, OH, VA, WV across the Midwest and Plains. *Total Estimated Costs: (\$1.2) Billion*; 7 Deaths*

■ **Severe Storms/Tornadoes** - *May 2003*: Numerous tornadoes over the midwest, Mississippi valley, OH/TN valleys, and portions of the southeast, with a modern record one-week total of approximately 400 tornadoes reported; *Total Estimated Costs: \$4.1 (\$5.9) Billion; 51 Deaths*

■ **Severe Storms/Hail** - *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. *Total Estimated Costs: \$2.0 (\$2.9) Billion; 3 Deaths*

2002

■ **Western Fire Season** - *Fall 2002*: Major wildfires 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. *Total Estimated Costs: \$1.3 (\$1.9) Billion; 21 Deaths*

■ **U.S. Drought** - *Spring-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. *Total Estimated Costs: \$9.0 (\$13.2) Billion; 0 Deaths*

■ **Eastern Tornadoes and Severe Storms** - *November 2002*: Tornado outbreak of over 100 tornadoes across many eastern states causes widespread damage (AL, MS, GA, TN, KY, OH, PA). Tennessee and Ohio had the highest count of tornadoes. *Total Estimated Costs: (\$1.0) Billion*; 28 Deaths*

■ **Tropical Storm Isidore** - *September 2002*: Tropical Storm Isidore caused heavy rain, flooding, tornadoes and coastal storm surge that impacted Louisiana, Mississippi, Alabama and Tennessee. Rainfall exceeded 15 inches across southern Louisiana with storm surge over 8 feet. *Total Estimated Costs: \$1.2 (\$1.7) Billion; 5 Deaths*

■ **Hurricane Lili** - *October 2002*: Category 1 hurricane makes landfall in Louisiana after causing damage across Saint Lucia, Jamaica, Haiti and Cuba. *Total Estimated Costs: \$1.1 (\$1.6) Billion; 2 Deaths*

■ **Severe Storms and Tornadoes** - *April 2002*: Numerous tornadoes and widespread hail damage over the Central and Eastern states including NC, GA, VA, TX, AR, MO, MS, TN, IL, IN, KY, PA, MD, NY, OH, WV, and KS. *Total Estimated Costs: \$2.1 (\$3.1) Billion; 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 *Total Estimated Costs: \$8.5 (\$12.6) Billion; 43 Deaths*

■ **Midwest/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. *Total Estimated Costs: \$3.1 (\$4.6) Billion; 3 Deaths*

2000

■ **Western/Central/Southeast Drought/Heatwave** - *Spring-Fall 2000*: Western/Central/Southeast Drought/Heatwave. The states impacted include AZ, AL, AR, CA, CO, FL, GA, IA, KS, LA, MS, MT, NE, NM, OK, OR, SC, TN, and TX. *Total Estimated Costs: \$5.0 (\$7.7) Billion; 140 Deaths*

■ **South Florida Flooding** - *October 2000*: Heavy rainfall up to 15 inches affected south Florida surrounding Miami that resulted in severe flooding that damaged thousands of homes and businesses. There was also several hundred million in damage done to agriculture. *Total Estimated Costs: (\$1.4) Billion*; 3 Deaths*

■ **Western Fire Season** - *Spring-Summer 2000*: Severe wildfire season in the western states due to drought and frequent winds, with nearly 7 million acres burned. *Total Estimated Costs: \$1.1 (\$1.7) Billion; 0 Deaths*

■ **Southeast Winter Storm** - *January 2000*: Strong winter storm causes disruption and damage over numerous southeastern states (AL, GA, NC, SC, TN, LA, VA). Record amounts of snowfall occurred across central North Carolina, with snow totals in excess of 20 inches. *Total Estimated Costs: (\$1.1) Billion*; 4 Deaths*

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. *Total Estimated Costs: \$6.5 (\$10.3) Billion; 77 Deaths*



■ **Eastern Drought/Heatwave** - *Summer 1999*: Very dry summer and high temperatures, mainly in eastern U.S., with extensive agricultural losses. The states impacted include AL, AR, FL, GA, KY, LA, MD, MS, NC, NJ, OH, SC, TN, VA, WV and PA. *Total Estimated Costs: \$2.5 (\$3.9) Billion; 502 Deaths*

■ **Oklahoma and 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. *Total Estimated Costs: \$2.0 (\$3.2) Billion; 55 Deaths*

■ **Central and Eastern Winter Storm** - *Mid-January 1999*: Winter storm affecting the Central and Eastern states including IL, IN, OH, MI, WV, VA, MD, PA, NJ, NY, MA, CT, VT, NH and ME. *Total Estimated Costs: (\$1.4) Billion*; 0 Deaths*

■ **Central and Eastern Winter Storm** - *January 1999*: South, Southeast, Midwest, Northeast affected by damaging winter storm; *Total Estimated Costs: \$1.0 (\$1.6) Billion; 25 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°F temperatures occurred over an 8-day period. *Total Estimated Costs: \$2.5 (\$4.0) Billion; 0 Deaths*

■ **Texas Flooding** - *October 1998*: Severe flooding in southeast Texas from 2 heavy rain events, with 10-20 inch rainfall totals; *Total Estimated Costs: (\$1.5) Billion*; 31 Deaths*

■ **Hurricane Georges** - *September 1998*: Category 2 hurricane strikes Puerto Rico, Virgin Islands, Florida Keys, and Gulf coasts of Louisiana, Mississippi, Alabama, and Florida panhandle, 15-30 inch 2-day rain totals in parts of Alabama and Florida; *Total Estimated Costs: \$6.0 (\$9.6) Billion; 16 Deaths*

■ **Southern Drought/Heat Wave** - *Summer 1998*: Severe drought and heat wave from Texas/Oklahoma eastward to the Carolinas. The states impacted include AL, AR, FL, GA, LA, MS, NC, OK, SC, TN, TX, and VA. *Total Estimated Costs: \$3.5 (\$5.7) Billion; 200 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. *Total Estimated Costs: \$1.0 (\$1.6) Billion; 3 Deaths*

■ **Tropical Storm Frances** - *September 1998*: Tropical Storm Frances caused extensive flooding in Texas and Louisiana. The rainfall totals from Frances were 10 to 20 inches across eastern Texas into southern Louisiana. *Total Estimated Costs: (\$1.1) Billion*; 2 Deaths*

■ **Severe Storms, Tornadoes** - *June 1998*: Severe storms in late May through early June hit the Midwest, North, Northeast, and Southeast; *Total Estimated Costs: \$1.1 (\$1.8) Billion; 20 Deaths*

■ **Minnesota Severe Storms/Hail** - *May 1998*: Very damaging severe thunderstorms with large hail over wide areas of Minnesota; *Total Estimated Costs: \$1.6 (\$2.6) Billion; 1 Death*

■ **Western/Eastern Severe Weather and Flooding** - *Winter-Spring 1998*: Tornadoes and flooding cause damage across the West and Southeast. The states impacted include CA, TX, FL, AL, GA, LA, MS, NC and SC. *Total Estimated Costs: \$1.0 (\$1.6) Billion; 132 Deaths*

■ **Northeast Ice Storm** - *January 1998*: Intense ice storm hits Maine, New Hampshire, Vermont, and New York, with extensive forestry losses; *Total Estimated Costs: \$1.4 (\$2.3) Billion; 16 Deaths*

1997

■ **Northern Plains Flooding** - *Spring 1997*: Severe flooding in North Dakota, South Dakota and Minnesota due to heavy spring snow melt. This flooding caused widespread damage to agriculture, infrastructure, homes and businesses. *Total Estimated Costs: \$3.7 (\$6.0) Billion; 11 Deaths*

■ **Mississippi and Ohio Valley Severe Weather and Flooding** - *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. *Total Estimated Costs: \$1.0 (\$1.6) Billion; 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. *Total Estimated Costs: \$3.0 (\$4.9) Billion; 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. *Total Estimated Costs: \$5.0 (\$8.4) Billion; 37 Deaths*

■ **Southern Plains Drought** - *Spring-Summer 1996*: Severe drought in agricultural regions of southern plains--Texas and Oklahoma most severely affected; *Total Estimated Costs: \$1.8 (\$3.0) Billion; 0 Deaths*

■ **Pacific Northwest Severe Flooding** - *February 1996*: Very heavy, persistent rains (10-30 inches) and melting snow over OR, WA, ID, and western MT. *Total Estimated Costs: \$1.0 (\$1.7) Billion; 9 Deaths*

■ **Blizzard/Floods** - *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 and snowmelt. *Total Estimated Costs: \$3.0 (\$5.0) Billion; 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. *Total Estimated Costs: \$4.7 (\$8.1) Billion; 27 Deaths*



■ **Central, Southern and Northeast Drought/Heatwave** - September 1995: Historic mid-July heatwave and urban heat island amplification caused hundreds of deaths across several major cities including Chicago, Milwaukee, and Philadelphia. Following the heat wave was hot, dry weather in July and August 1995 that affected crops in numerous states, as crops had not rooted well due to late planting from previous wet soils. This left crops vulnerable to a flash drought during a key portion of the growing season. *Total Estimated Costs: \$1.0 (\$1.7) Billion; 872 Deaths*

■ **Hurricane Marilyn** - September 1995: Category 2 hurricane impacts the U.S. Virgin Islands and Puerto Rico with maximum sustained winds of 110 mph. *Total Estimated Costs: \$2.1 (\$3.6) Billion; 13 Deaths*

■ **Hurricane Erin** - August 1995: Hurricane Erin impacted Florida as a category 1 hurricane. Most of the damage resulted from heavy rainfall and flooding in Florida, Alabama and Mississippi. *Total Estimated Costs: (\$1.5) Billion*; 6 Deaths*

■ **South Plains Severe Weather** - 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. *Total Estimated Costs: \$5.5 (\$9.5) Billion; 32 Deaths*

■ **California Flooding** - January-March 1995: Frequent winter storms cause 20-70 inch rainfall and periodic flooding across much of California; *Total Estimated Costs: \$2.5 (\$4.3) Billion; 27 Deaths*

1994

■ **Western Fire Season** - Summer-Fall 1994: Severe wildfire season in the western states due to dry weather conditions. The states most impacted include CA, AZ, OR, WA, CO, UT, NV, NM and TX. *Total Estimated Costs: (\$1.3) Billion*; 0 Deaths*

■ **Texas Flooding** - October 1994: Torrential rain (10-25 inches in 5 days) and thunderstorms cause flooding across much of southeast Texas; *Total Estimated Costs: \$1.0 (\$1.8) Billion; 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. *Total Estimated Costs: \$1.0 (\$1.8) Billion; 32 Deaths*

■ **Midwest/Plains Tornadoes** - April 1994: Tornadoes and severe storms cause damage in states across the South, Southeast and Midwest. The states impacted include TX, OK, AR, CO, KS, NE, IA, SD, IL, IN, MN and MO. *Total Estimated Costs: \$1.0 (\$1.8) Billion; 3 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. *Total Estimated Costs: \$3.0 (\$5.3) Billion; 9 Deaths*

■ **Winter Storm, Cold Wave** - January 1994: Winter storm affects the Southeast and Northeast regions. The states impacted include CT, DE, IL, IN, KY, MA, MD, ME, NC, NH, NJ, NY, OH, PA, RI, SC, TN, VA, VT and WV. *Total Estimated Costs: \$1.0 (\$1.9) Billion; 70 Deaths*

1993

■ **California Wildfires** - Fall 1993: Dry weather, high winds and wildfires in Southern California; *Total Estimated Costs: \$1.4 (\$2.5) Billion; 4 Deaths*

■ **Southeast Drought/Heat Wave** - Summer 1993: Drought and heat wave across Southeastern U.S. The states most impacted include AL, FL, GA, MD, NC, SC, TN, and VA. *Total Estimated Costs: \$1.3 (\$2.3) Billion; 16 Deaths*

■ **Midwest Flooding** - Summer 1993: Severe, widespread flooding in central U.S. due to persistent heavy rains and thunderstorms. There was extensive damage to agriculture, infrastructure, homes and businesses in many areas across several states. Many river stations also established new records for historical flood heights. This is the most costly non-tropical, inland flood event to affect the United States on record. *Total Estimated Costs: \$21.0 (\$38.1) Billion; 48 Deaths*

■ **Northern Plains and Ohio Valley Severe Weather** - July 1993: Severe storms caused high wind, hail and tornado damage across many Northern/Central Plains (NE, KS, MO, IA, MN, ND) and Ohio Valley states (IL, IN). *Total Estimated Costs: (\$1.2) Billion*; 1 Death*

■ **East Coast Blizzard and Severe Weather** - March 1993: The "Storm of the Century" impacts the entire Eastern seaboard from Florida to Maine. This historic storm dumped 2-4 feet of snow and caused hurricane force winds across many Eastern and Northeastern states. This caused power outages to over 10 million households. Additional impacts included numerous tornadoes across Florida causing substantial damage. This is the most destructive and costly winter storm to affect the United States since at least 1980. *Total Estimated Costs: \$5.5 (\$10.1) Billion; 270 Deaths*

1992

■ **Northeast Winter Storm** - December 1992: Slow-moving winter storm batters northeast U.S. coast, with the New England region hardest hit. The states impacted include VA, MD, DE, PA, NJ, NY, CT, RI, MA and WV. *Total Estimated Costs: \$2.5 (\$4.7) Billion; 19 Deaths*

■ **Southeast Severe Weather** - November 1992: Three-day tornado outbreak strikes many Central and Eastern states including TX, LA, AL, MS, GA, AR, IN, OH, KY, TN, and NC. Major damage was reported across many areas, as more than 100 tornadoes were reported. This event remains one of the most prolific Fall season tornado outbreaks on record. *Total Estimated Costs: (\$1.2) Billion*; 26 Deaths*

■ **Hurricane Iniki** - September 1992: Category 4 hurricane causes severe damage to the Hawaiian island of Kauai. Hurricane Iniki is the costliest and deadliest hurricane to affect Hawaii since 1900. *Total Estimated Costs: \$3.1 (\$5.8) Billion; 7 Deaths*

■ **Hurricane Andrew** - August 1992: Category 5 hurricane hits Florida and later impacts Louisiana as a category 3. High winds damage or destroy over 125,000 homes and leave at least 160,000 people homeless in Dade County, Florida alone. Initially rated as a category 4, Andrew was later upgraded to a category 5 upon further analysis. Andrew joins Hurricane Camille (1969) and the Labor Day Hurricane (1935), as the only land falling category 5 hurricanes on record to affect the U.S. mainland. Adjusted to present-day dollars, Andrew is the 6th most costly hurricane to impact the U.S. since 1980, after Katrina (2005), Harvey (2017), Maria (2017), Sandy (2012) and Irma (2017). *Total Estimated Costs: \$27.0 (\$50.8) Billion; 61 Deaths*



- **Severe Storms, Hail** - June 1992: Severe storms with hail hit Kansas and Oklahoma; *Total Estimated Costs: (\$1.4) Billion*; 0 Deaths*
- **Hail, Tornadoes** - April 1992: Severe Storms hit Oklahoma and Texas with tornadoes and hail; *Total Estimated Costs: \$1.0 (\$1.8) Billion; 0 Deaths*
- **Severe Storms** - March 1992: Severe storms affect the South, Southeast. The states most impacted include Texas, Louisiana and Florida. *Total Estimated Costs: (\$1.5) Billion*; 0 Deaths*

1991

- **Oakland Firestorm** - October 1991: Oakland, California firestorm due to low humidity and high winds burned over 3,000 homes. This was the costliest urban wildfire to affect the United States since 1980 when it occurred. *Total Estimated Costs: \$3.3 (\$6.4) Billion; 25 Deaths*
- **U.S. Drought** - Spring-Summer 1991: Drought conditions over parts of the West, Central and eastern U.S. most affected the states IL, IN, KS, MN, OH, OR, PA, SD, and WA. *Total Estimated Costs: \$3.0 (\$5.8) Billion; 0 Deaths*
- **Hurricane Bob** - August 1991: Category 2 hurricane brushes the Outer Banks of North Carolina before making landfall in Rhode Island. Its impacts were felt from North Carolina to Long Island and into New England. *Total Estimated Costs: \$1.5 (\$2.9) Billion; 18 Deaths*
- **Severe Storms, Tornadoes** - March 1991: Severe storms hit the Midwest, Southeast, Northeast. The states impacted include KS, IL, MI, IN, MS, TN, KY, OH, AL, PA, NY, GA, SC and NC. *Total Estimated Costs: (\$1.2) Billion*; 0 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. *Total Estimated Costs: \$3.4 (\$6.9) Billion; 0 Deaths*
- **Colorado Hail Storm** - July 1990: Denver, CO (including airport) hit by severe hail storm. This was the costliest hail storm on record for Colorado when it occurred. *Total Estimated Costs: (\$1.7) Billion*; 0 Deaths*
- **Southern Flooding** - May 1990: Torrential rains cause flooding along the Trinity, Red, and Arkansas Rivers in TX, OK, LA, and AR; *Total Estimated Costs: \$1.0 (\$2.1) Billion; 13 Deaths*

1989

- **Winter Storm, Cold Wave** - December 1989: Winter storm and deep cold impacts the Northeast, South and Southeast. The states impacted include AL, AR, CT, FL, GA, IL, IN, KY, LA, ME, MO, MS, NC, NH, NY, OH, OK, PA, SC, TN, TX, VA, VT and WV. *Total Estimated Costs: (\$1.5) Billion*; 100 Deaths*
- **Florida Freeze** - December 1989: Severe freeze damages citrus crops across central/northern Florida. *Total Estimated Costs: \$2.0 (\$4.3) Billion; 10 Deaths*
- **Northern Plains Drought** - Summer-Fall 1989: Severe summer drought over much of the northern plains with significant losses to agriculture. The states impacted include CO, IA, IL, KS, MO, ND, NE, NV, SD, TX and UT. *Total Estimated Costs: \$3.0 (\$6.5) Billion; 0 Deaths*
- **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; *Total Estimated Costs: \$9.0 (\$19.3) Billion; 86 Deaths*
- **Severe Storms** - May 1989: Severe storms cause damage in states across the South and Southeast. The states impacted include OK, TX, LA, MS, GA, SC, NC and VA. *Total Estimated Costs: (\$1.2) Billion*; 21 Deaths*

1988

- **U.S. Drought/Heatwave** - Summer 1988: 1988 drought across a large portion of the U.S. with very severe losses to agriculture and related industries. Combined direct and indirect deaths (i.e., excess mortality) due to heat stress estimated at 5,000. *Total Estimated Costs: \$20.0 (\$45.0) Billion; 454 Deaths*

1987

No billion-dollar weather or climate disaster events were recorded for 1987.

1986

- **Southeast Drought/Heatwave** - Summer 1986: Severe summer drought in parts of the southeastern U.S. with severe losses to agriculture. The states impacted include AL, AR, GA, LA, MS, NC, SC, TN and VA. *Total Estimated Costs: \$1.8 (\$4.3) Billion; 100 Deaths*
- **Western Severe Storms and Flooding** - February 1986: Severe storms and flooding affect the states CA, CO, NV, OR, WY across the West. *Total Estimated Costs: (\$1.3) Billion*; 13 Deaths*



1985

■ **Virginia, West Virginia, Pennsylvania and Maryland Flooding** - November 1985: Historic flooding damaged or destroyed over 10,000 homes and businesses across West Virginia and Virginia. Rainfall exceeded 19 inches, which forced the Roanoke and James Rivers, among others, to record levels. The damage in Virginia was most severe in the towns of Roanoke and Richmond. In Pennsylvania, floods also damaged or destroyed several thousand homes. Maryland experienced severe but more isolated flooding and damage. *Total Estimated Costs: \$1.4 (\$3.3) Billion; 62 Deaths*

■ **Hurricane Juan** - October 1985: Category 1 hurricane makes landfall near Morgan City, Louisiana. Hurricane Juan's slow movement causes severe flooding in Louisiana, Mississippi, Alabama and Florida. Southern Louisiana was most severely affected due to widespread rainfall of 10-15 inches that caused substantial flooding. *Total Estimated Costs: \$1.5 (\$3.7) Billion; 63 Deaths*

■ **Hurricane Gloria** - September 1985: Category 2 hurricane makes several landfalls along the eastern seaboard, affecting states from North Carolina to Maine. *Total Estimated Costs: (\$2.1) Billion*; 11 Deaths*

■ **Hurricane Elena** - September 1985: Category 3 hurricane approaches the Florida Panhandle prior to landfall near Biloxi, Mississippi. Considerable wind and rain impacts were felt from Florida to Louisiana. *Total Estimated Costs: \$1.3 (\$3.2) Billion; 4 Deaths*

■ **Florida Freeze** - January 1985: Severe freeze over central/northern Florida damages citrus crops. *Total Estimated Costs: \$1.2 (\$3.0) Billion; 0 Deaths*

■ **Winter Storm, Cold Wave** - January 1985: Extreme cold and winter storms in the Southeast, South, Southwest, Northeast, Midwest, and North; *Total Estimated Costs: (\$2.1) Billion*; 150 Deaths*

1984

■ **Severe Storms and Hail** - June 1984: Severe storms and hail impact Colorado, South Dakota and Nebraska. *Total Estimated Costs: (\$1.1) Billion* ; 1 Death*

■ **Tornadoes, Severe Storms, Floods** - Spring 1984: States in the Southeast and Northeast regions are impacted by tornadoes, severe storms, and flooding. The states impacted include GA, FL, SC, NC, VA, MD, DE, NJ, NY, PA, CT, MA and RI. *Total Estimated Costs: (\$1.5) Billion*; 80 Deaths*

1983

■ **Freeze, Cold Wave** - December 1983: Severe freeze damages citrus crops across central/northern Florida. Associated cold wave over much of the U.S. causes over 100 deaths and additional damages. *Total Estimated Costs: \$2.0 (\$5.3) Billion; 151 Deaths*

■ **Southeast Drought** - Summer 1983: 1983 flash drought in the southeastern U.S. with losses to agriculture, most notably corn and soybeans. The states impacted include AL, AR, GA, KY, LA, MO, MS, NC, SC, TN and VA. *Total Estimated Costs: \$3.0 (\$7.9) Billion; 0 Deaths*

■ **Hurricane Alicia** - August 1983: Category 3 hurricane makes landfall near Galveston, Texas with maximum sustained winds 115 mph. Hurricane Alicia was the first hurricane to hit the United States mainland since Hurricane Allen in August 1980. *Total Estimated Costs: \$3.0 (\$8.0) Billion; 21 Deaths*

■ **Western Storms & Flooding** - December 1982-March 1983: Severe storms and flooding, especially in the states of WA, OR, CA, AZ, NV, ID, UT, and MT; *Total Estimated Costs: \$1.5 (\$4.1) Billion; 50 Deaths*

■ **Gulf States Storms and Flooding** - December 1982-January 1983: Severe storms and flooding, especially in the states of TX, AR, LA, MS, AL, GA, and FL; *Total Estimated Costs: \$1.5 (\$4.2) Billion; 45 Deaths*

1982

■ **Severe storms** - June 1982: Severe storms cause damage across the South, Southeast and Central regions. The states impacted include AR, IL, KY, IN, SC, GA and OH. *Total Estimated Costs: (\$1.3) Billion*; 30 Deaths*

■ **Midwest/Plains/Southeast Tornadoes** - April 1982: Tornadoes and severe weather affect the states (AL, AR, CO, IA, IL, IN, KS, KY, LA, MI, MN, MO, MS, NE, OH, OK, PA, TN, TX, WI, WV) across the Midwest, Plains and Southeast. *Total Estimated Costs: (\$1.3) Billion*; 33 Deaths*

■ **Midwest/Southeast/Northeast Winter Storm, Cold Wave** - January 1982: Winter storm and coldwave affect numerous states (AL, AR, CT, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, ND, NH, NJ, NY, OH, OK, PA, RI, SC, TN, TX, VA, VT, WI, WV) across the Midwest, Southeast and Northeast. *Total Estimated Costs: (\$1.8) Billion*; 85 Deaths*

1981

■ **Severe Storms, Flash Floods, Hail, Tornadoes** - May 1981: Severe storms cause damage across the Midwest and South. The states most impacted include TX, OK, KS, AL and LA. *Total Estimated Costs: (\$1.2) Billion*; 20 Deaths*

■ **Florida Freeze** - January 1981: Severe freeze heavily damaged fruit crops across Florida. Over 25,000 Florida farms were impacted and sustained losses. *Total Estimated Costs: (\$1.7) Billion*; 0 Deaths*

1980

■ **Central/Eastern Drought/Heatwave** - Summer-Fall 1980: Central and eastern U.S. drought/heat wave caused damage to agriculture and other related industries. Combined direct and indirect deaths (i.e., excess mortality) due to heat stress estimated at 10,000. *Total Estimated Costs: \$10.0 (\$33.5) Billion; 1260 Deaths*



■ **Hurricane Allen** - August 1980: Category 3 hurricane makes landfall north of Brownsville, Texas with maximum sustained winds of 115 mph. Hurricane Allen causes rainfall up to 20 inches in southern Texas and storm surge as high as 12 feet along the coast. *Total Estimated Costs: (\$2.0) Billion**; 13 Deaths

■ **Southern Severe Storms and Flooding** - April 1980: Severe storms and flooding affect several states (AR, LA, MS) across the South. *Total Estimated Costs: (\$2.4) Billion**; 7 Deaths

**Exceeds one-billion dollar threshold after 2020 Consumer Price Index adjustment*

Caveat for 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 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. This report is also available at <https://www.ncdc.noaa.gov/billions/> and includes links to detailed technical reports on many of these events.

A research article "U.S. Billion-dollar Weather and Climate Disasters: Data Sources, Trends, Accuracy and Biases" (Smith and Katz, 2013) regarding the loss data we use, our methods and any potential bias was published in 2013. This was followed by the research article "Quantifying Uncertainty and Variable Sensitivity within the U.S. Billion-dollar Weather and Climate Disaster Cost Estimates" (Smith and Matthews, 2015) as a next step to enhance the value and usability of estimated disaster costs given data limitations and inherent complexities.

Authors: Adam Smith, Neal Lott, Tamara Houston, Karsten Shein, Jake Crouch, Jesse Enloe.

