

When I think of hurricanes, I think of...

▪ **Hurricane Sandy**

Hurricane Sandy was the deadliest and most destructive tropical cyclone of the 2012 Atlantic hurricane season, as well as the second-costliest hurricane in United States history. Classified as the eighteenth named storm, tenth hurricane and second major hurricane of the year, Sandy was a Category 3 storm at its peak intensity when it made landfall in Cuba. While it was a Category 2 storm off the coast of the Northeastern United States, the storm became the largest Atlantic hurricane on record (as measured by diameter, with winds spanning 1,100 miles (1,800 km)). Preliminary estimates assess damage at nearly \$75 billion (2012 USD), a total surpassed only by Hurricane Katrina. At least 285 people were killed along the path of the storm in seven countries. The severe and widespread damage the storm caused in the United States, as well as its unusual merge with a frontal system, resulted in the nicknaming of the hurricane by the media and several organizations of the U.S. government "Superstorm Sandy".

Sandy developed from a tropical wave in the western Caribbean Sea on October 22, quickly strengthened, and was upgraded to Tropical Storm Sandy six hours later. Sandy moved slowly northward toward the Greater Antilles and gradually intensified. On October 24, Sandy became a hurricane, made landfall near Kingston, Jamaica, a few hours later, re-emerged into the Caribbean Sea and strengthened into a Category 2 hurricane. On October 25, Sandy hit Cuba as a Category 3 hurricane, then weakened to a Category 1 hurricane. Early on October 26, Sandy moved through the Bahamas. On October 27, Sandy briefly weakened to a tropical storm and then restrengthened to a Category 1 hurricane. Early on October 29, Sandy curved north-northwest and then moved ashore near Brigantine, New Jersey, just to the northeast of Atlantic City, as a post-tropical cyclone with hurricane-force winds.

In Jamaica, winds left 70% of residents without electricity, blew roofs off buildings, killed one, and caused about \$100 million (2012 USD) in damage. In Haiti, Sandy's outer bands brought flooding that killed at least 54, caused food shortages, and left about 200,000 homeless. In the Dominican Republic, two died. In Puerto Rico, one man was swept away by a swollen river. In Cuba, there was extensive coastal flooding and wind damage inland, destroying some 15,000 homes, killing 11, and causing \$2 billion (2012 USD) in damage. In The Bahamas, two died amid an estimated \$700 million (2012 USD) in damage. In Canada, two were killed in Ontario and an estimated \$100 million (2012 CAD) in damage was caused throughout Ontario and Quebec.

Impact on America

A total of 24 U.S. states were in some way affected by Sandy. The hurricane caused tens of billions of dollars in damage in the United States, destroyed thousands of homes, left millions without electric service, and caused 72 direct deaths in eight states, including 48 in New York, 12 in New Jersey, 5 in Connecticut, 2 each in Pennsylvania and Virginia, and 1 each in New Hampshire, West Virginia and Maryland. There were also 2 direct deaths from Sandy in U.S. coastal waters in the Atlantic Ocean, about 90 miles (150 km) off the North Carolina coast, which are not counted in the U.S. total. In addition, the storm resulted in 87 indirect deaths. This makes Sandy the deadliest hurricane to hit the United States mainland since Hurricane Katrina in 2005, as well as the deadliest hurricane to hit the U.S. East Coast since Hurricane Agnes in 1972.

Due to flooding and other storm-related problems, Amtrak canceled all Acela Express, Northeast Regional, Keystone, and Shuttle services for October 29 and 30. More than 13,000 flights were canceled across the U.S. on October 29, and more than 3,500 were called off October 30. From October 27 through early November 1, airlines canceled a total of 19,729 flights, according to FlightAware.

As of October 31, over 6 million customers were reported to be still without power in 15 states and the District of Columbia, according to a US Department of Energy tally. The states with the most customers without power were New Jersey with 2,040,195 customers; New York with 1,933,147; Pennsylvania with 852,458; and Connecticut with 486,927. The storm underlines the fragility of the aging American infrastructure, with an electricity network that is ranked lower than that of considerably poorer nations like Slovenia or Portugal.

The New York Stock Exchange and Nasdaq reopened on October 31 after a two-day closure for storm. More than 1,500 FEMA personnel were along the East Coast working to support disaster preparedness and response operations, including search and rescue, situational awareness, communications and logistical support. In addition, 28 teams containing 294 FEMA Corps members were pre-staged to support Sandy responders. Three federal urban search and rescue task forces were positioned in the Mid-Atlantic and ready to deploy as needed.

On November 2, the American Red Cross announced they have 4,000 disaster workers across storm damaged areas, with thousands more en route from other states. Nearly 7,000 people spent the night in emergency shelters across the region.

Hurricane Sandy: Coming Together, a live telethon on November 2 that featured rock and pop stars such as Bruce Springsteen, Billy Joel, Jon Bon Jovi, Mary J. Blige, Sting and Christina Aguilera, raised around \$23 million dollars for American Red Cross hurricane relief efforts.

As of November 5, 2012, the National Hurricane Center ranks Hurricane Sandy the second costliest US hurricane since 1900 in constant 2010 dollars, and the sixth costliest after adjusting for inflation, population and property values.[209] Their report also states that due to global warming the number of future hurricanes will "either decrease or remain essentially unchanged" overall, but the ones that do form will likely be stronger, with fiercer winds and heavier rains.

- **Hurricane Katrina**

Hurricane Katrina: Before the Storm

The tropical depression that became Hurricane Katrina formed over the Bahamas on August 23, 2005, and meteorologists were soon able to warn people in the Gulf Coast states that a major storm was on its way. By August 28, evacuations were underway across the region. That day, the National Weather Service predicted that after the storm hit, "most of the [Gulf Coast] area will be uninhabitable for weeks...perhaps longer."

New Orleans was at particular risk. Though about half the city actually lies above sea level, its average elevation is about six feet below sea level--and it is completely surrounded by water. Over the course of the 20th century, the Army Corps of Engineers had built a system of levees and seawalls to keep the city from flooding. The levees along the Mississippi River were strong and sturdy, but the ones built to hold back Lake Pontchartrain, Lake Borgne and the waterlogged swamps and marshes to the city's east and west were much less reliable. Even before the storm, officials worried that those levees, jerry-built atop sandy, porous, erodible soil, might not withstand a massive storm surge. Neighborhoods that sat below sea level, many of which housed the city's poorest and most vulnerable people, were at great risk of flooding.

The day before Katrina hit, New Orleans Mayor Ray Nagin issued the city's first-ever mandatory evacuation order. He also declared that the Superdome, a stadium located on relatively high ground near downtown, would serve as a "shelter of last resort" for people who could not leave the city. (For

example, some 112,000 of New Orleans' nearly 500,000 people did not have access to a car.) By nightfall, almost 80 percent of the city's population had evacuated. Some 10,000 had sought shelter in the Superdome, while tens of thousands of others chose to wait out the storm at home.

Hurricane Katrina: Storm and Flooding

By the time Hurricane Katrina struck New Orleans early in the morning on Monday, August 29, it had already been raining heavily for hours. When the storm surge (as high as 9 meters in some places) arrived, it overwhelmed many of the city's unstable levees and drainage canals. Water seeped through the soil underneath some levees and swept others away altogether. By 9 a.m., low-lying places like St. Bernard Parish and the Ninth Ward were under so much water that people had to scramble to attics and rooftops for safety. Eventually, nearly 80 percent of the city was under some quantity of water.

Hurricane Katrina: The Aftermath

Many people acted heroically in the aftermath of Hurricane Katrina. The Coast Guard, for instance, rescued some 34,000 people in New Orleans alone, and many ordinary citizens commandeered boats, offered food and shelter, and did whatever else they could to help their neighbors. Yet the government--particularly the federal government--seemed unprepared for the disaster. The Federal Emergency Management Agency (FEMA) took days to establish operations in New Orleans, and even then did not seem to have a sound plan of action. Officials, even including President George W. Bush, seemed unaware of just how bad things were in New Orleans and elsewhere: how many people were stranded or missing; how many homes and businesses had been damaged; how much food, water and aid was needed. Katrina had left in her wake what one reporter called a "total disaster zone" where people were "getting absolutely desperate."

(For one thing, many had nowhere to go. At the Superdome in New Orleans, where supplies had been limited to begin with, officials accepted 15,000 more refugees from the storm on Monday before locking the doors. City leaders had no real plan for anyone else. Tens of thousands of people desperate for food, water and shelter broke into the Ernest N. Morial Convention Center complex, but they found nothing there but chaos. Meanwhile, it was nearly impossible to leave New Orleans: Poor people especially, without cars or anyplace else to go, were stuck. For instance, some people tried to walk over the Crescent City Connector bridge to the nearby suburb of Gretna, but police officers with shotguns forced them to turn back.)

Katrina pummeled huge parts of Louisiana, Mississippi and Alabama, but the desperation was most concentrated in New Orleans. Before the storm, the city's population was mostly black (about 67 percent); moreover, nearly 30 percent of its people lived in poverty. Katrina exacerbated these conditions, and left many of New Orleans's poorest citizens even more vulnerable than they had been before the storm.

In all, Hurricane Katrina killed nearly 2,000 people and affected some 90,000 square miles of the United States. Hundreds of thousands of evacuees scattered far and wide. Today, after years of recovery and rebuilding efforts, people along the Gulf Coast have made great strides in returning to life as usual even as they continue to rebuild.

- **Long Island Express**

The New England Hurricane of 1938 (or Great New England Hurricane, Yankee Clipper, Long Island Express, or simply the Great Hurricane) was the first major hurricane to strike New England since 1869. The storm formed near the coast of Africa in September of the 1938 Atlantic hurricane season, becoming a Category 5 hurricane on the Saffir-Simpson Hurricane Scale before making landfall as a Category 3 hurricane on Long Island on September 21. The hurricane was estimated to have killed between 682 and 800 people, damaged or destroyed over 57,000 homes, and caused property losses estimated at US\$306 million (\$4.7 billion in 2013). Even as late as 1951, damaged trees and buildings were still seen in the affected areas. It remains the most powerful, costliest and deadliest hurricane in recent New England history, eclipsed in landfall intensity perhaps only by the Great Colonial Hurricane of 1635 (Hurricane Sandy's destruction and damages are still being calculated).

Impact

The majority of the storm damage was from storm surge and wind. Damage was estimated at \$308 million USD, (the equivalent of \$4.8 billion adjusted for inflation in 2011 dollars), making it among the most costly hurricanes to strike the U.S. mainland. It is estimated that if an identical hurricane struck in 2005 it would have caused \$39.2 billion (2005 USD) in damage, due to changes in population and infrastructure.

Approximately 600 people died in the storm in New England, most in Rhode Island, and up to 100 people elsewhere in the path of the storm. An additional 708 people were reported injured.

In total, 4,500 cottages, farms, and other homes were reported destroyed. An additional 25,000 homes were damaged. Other damages included 26,000 automobiles destroyed, and 20,000 electrical poles toppled. The hurricane also devastated the forests of the Northeast, knocking down an estimated 2 billion trees in New York and New England. Freshwater flooding was minimal, however, as the quick passage of the storm decreased local rainfall totals, with only a few small areas receiving over 10 inches (250 mm).