

EXPLAINER: How Ida can be so deadly 1000 miles from landfall

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Natural and some man-made ingredients came together, causing the weakened but still soggy remnants of Hurricane Ida to devastate the Northeast more than 1,000 miles (1,600 kilometers) away from its

landfall.

This sort of distant and deadly flooding from hurricanes has happened before, and meteorologists had warned that Ida could cause it. But the head of the National Weather Service said the storm's onslaught of rain was so strong and came so quickly that it overwhelmed the region's ability to cope with the downpour.

Although Ida had lost most of its 150 mph (240 kph) wind force, the storm kept its strong rainy core. Then it merged with a wet and strengthening non-tropical storm front, according to meteorologists and atmospheric scientists.

When this happens, "very exceptional rainfall can occur," said MIT meteorology professor Kerry Emanuel.

"This is not rare," Emanuel added. "For example, it happened with Hurricane Camille of 1969, which took a similar path." Camille killed [more than 100 people in Virginia from flooding](#) after making landfall as a Category 5 hurricane in Mississippi.

Over the weekend, National Weather Service Director Louis Uccellini and other meteorologists started seeing an eerie similarity to Camille and it raised alarms for them.

"We collectively were aware of this possibility. These discussions were started even before the storm made landfall in Louisiana," Uccellini told The Associated Press in an interview Thursday.

Hurricane Ivan in 2004 took a similar track and triggered record rainfall in Pittsburgh, said meteorologist Bob Henson of Yale Climate Connections. In Ida's case, he said, conditions were ripe "for rainmaking and it all came to fruition along the I-95 corridor."

The storm dumped more than [3 inches of rain](#) on New York's Central Park in just an hour Wednesday night, obliterating a record set less than two weeks earlier by Tropical Storm Henri. Parts of New Jersey, Massachusetts, Rhode Island and Pennsylvania got more than 9 [inches of rain](#).

The death toll and damage amounts are mounting.

"Some of this is just bad luck too. If Ida had tracked just 100 miles farther east, that heaviest swath of rainfall would have been over the ocean and no one would care," said University of Miami hurricane researcher Brian McNoldy.

"The severe weather threat and the flash flooding threat in these areas were very well-forecast days in advance, but that doesn't reduce the destruction they cause," McNoldy said in an email, attaching National Weather Service warnings from Monday and Tuesday.

Ken Kunkel, a National Oceanic and Atmospheric Administration meteorologist who specializes in extreme rainfall and heat, said his study a few years ago found that one-third of the extreme rainfall events in the Northeast came from remnants of hurricanes and tropical storms.

Government officials in New York had been planning for heavy rain, but Uccellini said the rain that fell—more than 3 to 8 inches of rain forecast Tuesday—just overwhelmed infrastructure in the Northeast.

"People are ready but is the infrastructure ready for the magnitude of these storms?" Uccellini said. "It doesn't appear to be that way."

"I think with the weather getting worse. .. This is something we have to look at now and into the future," he said.

Human-caused global warming from burning of fossil fuels also likely made Ida's far-reaching impacts a bit worse, experts said.

Warmer air holds more moisture that it can dump, said former hurricane hunter meteorologist Jeff Masters, also of Yale Climate Connections. Air above the oceans has about 10% more moisture than in 1970 and that comes down in storms, he said.

That extra moisture condenses inside storms and releases extra heat energy, which leads to updrafts and makes storms more intense and longer lasting," This can lead to a 30% increase in rainfall, as has been documented in several cases of major flooding," he said.

Heavier rain falls onto urban areas where pavement such as roads and parking lots worsens water runoff leading to flooding, said University of Georgia meteorology professor Marshall Shepherd. "That human impact is a part of flooding disasters often overlooked."

Despite planning and efforts since 2012's Superstorm Sandy to be more resilient to extreme weather, more remains to be done, Columbia University climate scientist Adam Sobel said. "Obviously our infrastructure is not up to events like this."

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