



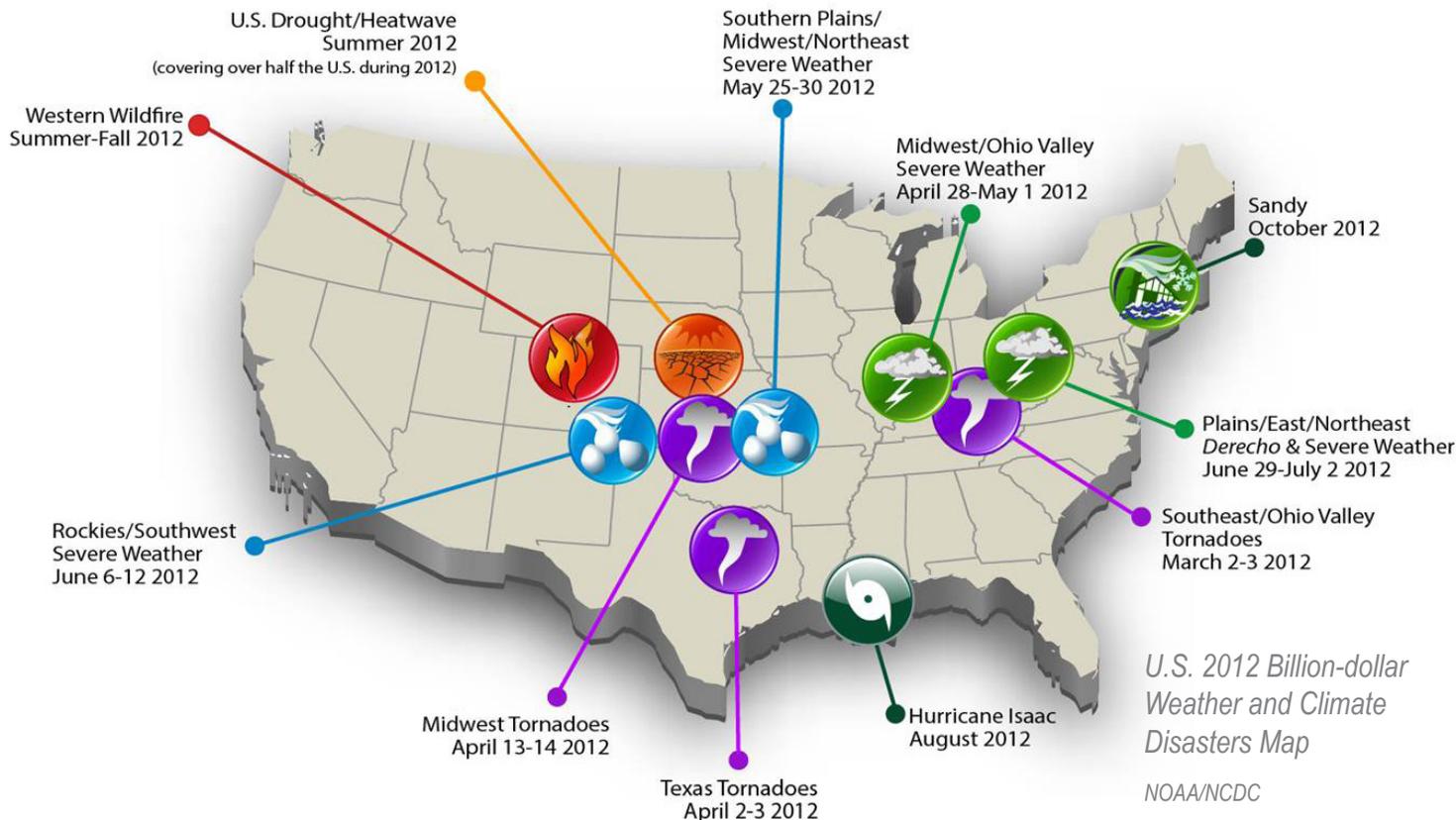
# Reducing the Nation's Vulnerability to Extreme Weather and Climate

The United States experiences some of the most severe weather on Earth. Extreme weather or climate events—such as hurricanes, flooding, drought, and heat waves—can devastate communities and businesses, cause loss of life and property, and impact valuable infrastructure and natural resources. Since 1980, the U.S. has experienced 144 extreme events in which overall damages reached or exceeded \$1 billion each, altogether resulting in more than \$1 trillion in combined damages. In 2012 alone, the U.S. suffered over \$110 billion in damages and 377 fatalities.<sup>1</sup>

The number and severity of extreme weather and climate events in the U.S. has risen since 1980, and is projected to continue rising this century.<sup>2</sup> This is due to the combination of natural climate variability and change, and population growth in regions that are

particularly prone to extremes.<sup>2</sup> If today's trends continue, economic damages from extreme weather and climate could grow four times greater by 2050. To get ahead of this growing problem, NOAA is working to help businesses, communities, and individuals reduce their vulnerabilities to extreme events and to improve their resilience when they occur.

Americans want to know how weather and climate patterns are changing so they can protect their homes, communities, and businesses. To meet this demand, NOAA researchers are advancing understanding of the cause-and-effect relationships between climate variability and change and extreme events on regional to local scales, with emphasis on particularly vulnerable populations. We are leveraging our unique climate research, observations, and models to produce timely and accurate forecasts and services to help build a more weather-ready and climate-smart nation.

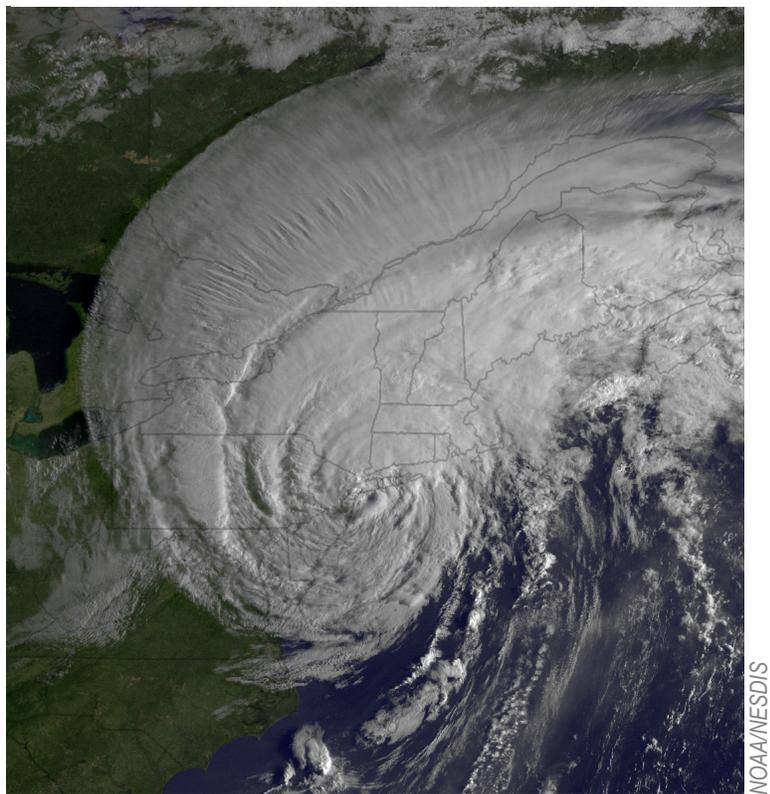
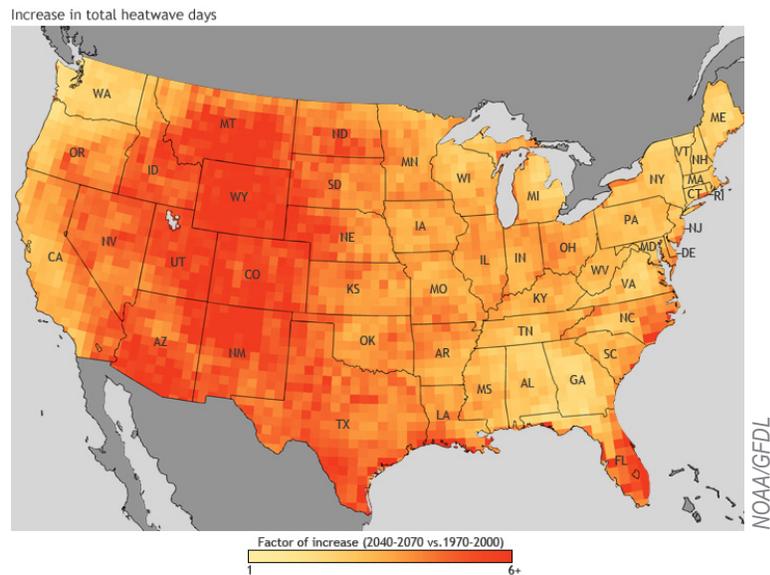


NOAA envisions a future in which businesses and communities are better prepared for, and more resilient to, extreme events.

NOAA, working with its partners, recently established an interdisciplinary team to develop products and services designed to help local communities prepare for extreme weather and climate events, and become more resilient to their impacts. For example:

- **We provide early warnings and forecast future trends in extreme events.** For example, NOAA provides a U.S. hazards outlook, a state-by-state forecast of potential hazards—including extreme heat, cold, flood, drought, winds and severe weather—up to 14 days into the future. NOAA also produces the climate extremes index, which tracks changes and trends in the location, frequency, and intensity of extremes across the U.S.
- **We provide cutting-edge science on extreme events to help people understand their weather and climate connections.** For example, NOAA led a task force to understand why the 2012 central plains drought occurred, whether it was related to climate change and could have been predicted, and whether this drought was an indicator of things to come. NOAA also is a world-leader in research exploring how climate change will influence the intensity and frequency of Atlantic hurricanes.
- **We develop decision-support tools.** Nationally, NOAA produces the North American Climate Extremes Monitoring (NACEM) product, a mapping tool to improve the understanding of observed changes in extreme climate conditions across North America. At the local level, the NOAA-funded Southern Climate Impacts Planning Program (SCIPP) has developed a range of tools to help people prepare for weather and climate extremes now and in the future across the Southern-Central United States. The NOAA Local Climate Analysis Tool (LCAT) enables users to conduct studies identifying the impacts of climate variability and change on weather and water events at regional and local levels.

NOAA's scientific expertise and information services that are essential to helping the nation anticipate and respond to extreme events today and in the future.



(top) Going from yellow to red, the colors on this map show the projected ratio of total heatwave days per summer (frequency times duration) in the mid-21st century compared to the end of the 20th century. (bottom) Hurricane Irene made 3 landfalls along the Atlantic coast in Aug. 2011, disrupting power to more than 7 million homes and businesses and spawning numerous tornados. Irene caused at least 45 deaths and more than \$7.3 billion in damages.

<sup>1</sup> <http://www.ncdc.noaa.gov/billions/> (CPI adjusted to 2013 dollars)  
<sup>2</sup> Preston, B.L. Global Environmental Change, v23, No. 4, Aug. 2013.