

# Extreme Weather:

## What's climate change got to do with it?

*“As the climate has warmed over the years, a new pattern of more frequent and more intense weather events is unfolding in the U.S. and across the globe. Because of a rapidly advancing new area of science called ‘event attribution,’ we can now estimate how climate change increases the risk to society of some types of extreme events.”*

Marcia McNutt, President, National Academy of Sciences

### WHAT WE KNOW

**1** As the climate warms, we are seeing trends in many weather extremes, for example:

**2** Many factors contribute to any individual extreme weather event, including:



Heat waves are becoming more frequent



Cold snaps are becoming less frequent



More rain is falling in heavy rainfall events



Wildfires are burning larger areas over longer seasons



Daily and seasonal weather patterns



Natural climate patterns such as El Niño or La Niña



Human-caused climate change

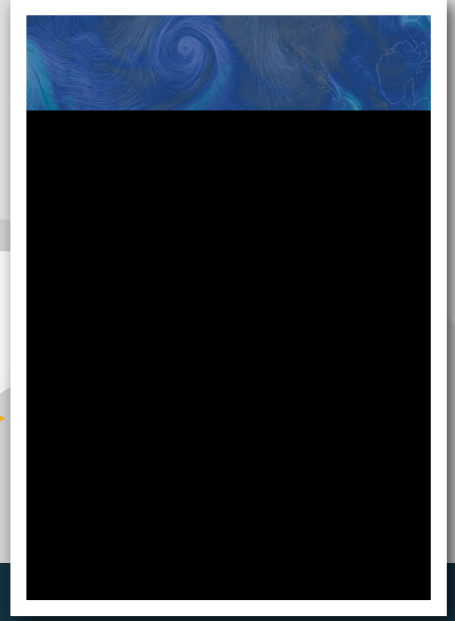


Land management, infrastructure, and other human factors

**3** Given all of these factors, can we estimate the influence of climate change on an individual extreme weather event?



Increasingly, the answer is YES.



### WHAT WE LEARNED

**4** We can now estimate how much climate change influenced the severity or frequency of some types of individual extreme events.

To do it, we need the following information

Event can be simulated in climate models

Observational record is long and frequent enough to show trends

Physical processes are well understood

Here's how our event attribution capabilities stack up for some types of extreme weather



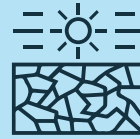
Extreme cold events



Extreme heat events



Confidence levels:



Droughts



High  
Medium  
Low



Extreme rainfall



Wildfires



*“A better understanding of the underlying causes of extreme weather events gives society a powerful tool for anticipating risks and making informed choices. Sadly, a tragic experience with an extreme weather event may be a citizen's most personal encounter with the consequences of climate change, and what ultimately spurs collective action.”*

Marcia McNutt, President, National Academy of Sciences