

Climate Change and Extreme Weather

PART I: TRENDS & PROJECTIONS

SYNOPSIS / NOVEMBER 30, 2015 / BY JENNIFER HUSHAW

As the climate changes, we will not only experience a gradual change in average conditions, but also an increase in the frequency & intensity of some types of extreme weather and climate events. ***These extremes may pose the biggest climate change risk for forest ecosystems in the short-term.***

[Link between Changing Climate and Changing Extremes](#)

Climate is the statistical distribution of any given weather variable (wind speed, rainfall, etc.), which generally resembles a bell curve. Take the example of a temperature distribution—as the climate warms the curve will shift toward the right, leading to more warm extremes, new record heat events, and formerly ‘extreme’ conditions becoming more normal.

In some regions, the variability may also change (the width of the bell curve) due to changing dynamics that are also linked to climate change, such as changing sea ice conditions, shifts in the jet stream, vegetation change, etc. Importantly, ***the risk of extreme heat and heavy precipitation events goes up exponentially as average temperatures increase.***

[Observed Changes \(since 1950\)](#)

EXTREME HEAT There have been more record hot days/nights than record cold days/nights, globally.

HEAVY PRECIPITATION Large regional variation, but overall more regions with significant increases in heavy precipitation events than decreases.

DROUGHT Significant regional variation in trends, with some regions experiencing more intense and longer droughts and opposite trends in others.

FLOODS Not much evidence for a change in flooding trends globally, but significant trends in certain regions, e.g. increased flood magnitude in Midwest and Northeast U.S.

[Future Extremes \(up to 2100\)](#)

EXTREME HEAT More unusually warm days and nights as the climate warms, as well as an increase in the length, frequency, and/or intensity of heat waves over most land areas.

HEAVY PRECIPITATION Increase in frequency of heavy precipitation events or the proportion of total rainfall that comes in the form of these heavy events, especially in the high latitudes and tropics, as well as winter in the northern mid-latitudes.

DROUGHT More impactful ‘hotter droughts’ as a result of warmer temperatures.

FLOODS Scientists expect that heavy precipitation events will contribute to more rain-generated local flooding, particularly in watersheds with topography that exacerbates the effects, e.g., steep slopes & canyons.

HOW DO WE KNOW AN EXTREME IS RELATED TO CLIMATE CHANGE?

See the [full bulletin](#) for a discussion about new research that is determining how much anthropogenic climate change contributed to the likelihood of recent extreme events.

[Conclusion](#)

Climate change is changing the odds of certain extreme events—it is loading the dice, so we are more likely to roll certain extremes, such as heat waves, heavy precipitation, or severe drought. As more of these events take place, researchers are beginning to assess how the probabilities are changing and this data can play an important role in improving our assessment of risk with regard to climate extremes. Manomet will be closely following this emerging research and updating CSLN members as the projections become clearer.

Click on the sub-headings above to go directly to the corresponding section of the full bulletin, or read the complete bulletin online:
<http://climatesmartnetwork.org/2015/12/climate-change-and-extreme-weather-part-1-trends-projections/>