How will global warming of 2°C affect New Hampshire?

Observed and projected changes in climate and their impacts
“To prevent dangerous interference with the climate system, the scientific view is that the increase in global temperature should be below 2°C [relative to pre-industrial levels].”

- United Nations Framework on Climate Change, 2010
How will global temperatures change in the future?

The global average temperature has already increased by about 1°C (1.8°F) relative to pre-industrial levels.

Current CO₂ emissions are tracking the ‘higher emissions’ scenario; unless emissions are reduced, the 2°C threshold will be crossed before 2050.

Higher Emissions 4.0-6.1°C
High Emissions 2.6-3.7°C
Lower Emissions 2.0-3.0°C
Warming in New Hampshire

OBSERVATIONS

The annual mean temperature in NH has already increased by about 2.6°F (1.4°C) since 1895 – faster than the rise in global mean temperature.

The annual mean temperature in NH exceeded the 20th-century average every year since 1998 (the last 17 years).
PROJECTIONS

In the next 50-60 years, when global warming crosses the 2°C threshold, NH average summer and winter temperatures are projected to increase by over 5°F (2.8°C) relative to pre-industrial levels.

Higher Emissions

Lower Emissions

Source: produced by CSRC, UMass Amherst
Warming in New Hampshire

How warm will Winter and Summer temperatures become?

PROJECTIONS

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hottest summers ...
...will become the coolest

Source: USGS
Migrating New Hampshire Climate

PROJECTIONS
Summer in New Hampshire by the end of this century could feel like a present-day typical summer in North Carolina.

Consequences:
Negative impacts on human health, ecosystems, and the economy.

Analysis is based on changes in average summer heat index (a measure of how it actually feels for a given temperature and humidity).

Source: UCSUSA
**Extreme Heat**

**OBSERVATIONS**
Summer daytime high temperatures in Concord/Manchester rarely go above 90°F in today’s climate.

**PROJECTIONS**
The number of days with dangerously high temperatures (above 100°F) is projected to increase significantly in the future.

Source: UCSUSA
Every year for the last 10 years, New Hampshire received more precipitation than the 20th century average.
Very Heavy Rainfall

OBSERVATIONS

The amount of precipitation falling during intense multi-day events has increased significantly in the Northeast US.

Observed increase in very heavy precipitation* from 1958 to 2012

(* the top 1% of storm totals)

Source: NCA 2014
Violent Storms

Hurricane Irene left a path of destruction in NH, 2011

Moodna Creek, before Irene (2007)  Moodna Creek, after Irene (2011)

Source: Daniel Case

Kancamagus Highway damage

Source: AP
Rain and Snow in New Hampshire

Due to increasing temperatures, there will be more rain and less snow.

Projected changes in rainfall in summer are uncertain.

Winter precipitation is projected to increase through the 21st century.

Source: USGS
Immediate action on local and global scales is required to limit the global mean temperature increase to $2^\circ$C ($3.6^\circ$F).

Average warming ($^\circ$C) projected by 2100

- If countries do not act: $4.5^\circ$C
- Following current policies: $3.6^\circ$C
- Based on Paris pledges: $2.7^\circ$C

Source: Climate Action Tracker, data compiled by Climate Analytics, ECOFYS, New Climate Institute and Potsdam Institute for Climate Impact Research.
Strategies and Actions

**National Climate Assessment:**

The National Climate Assessment summarizes the impacts of climate change in the US, now and in the future.

**Integrating Climate Change into State Wildlife Action Plan (SWAP):**

The goals of SWAP are to generate proactive, comprehensive wildlife conservation strategies that assess the health, challenges, and potential actions each State would like to accomplish during the coming decade and beyond.

**Climate and Health Assessment:**

This scientific assessment examines how climate change is already affecting human health in the US and the changes that may occur in the future.

This report was created by Prof. Raymond Bradley, Dr. Ambarish Karmalkar, and Kathryn Woods

[Climate System Research Center (CSRC)](https://www.universityofmassachusets.edu/climate-system-research-center)

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