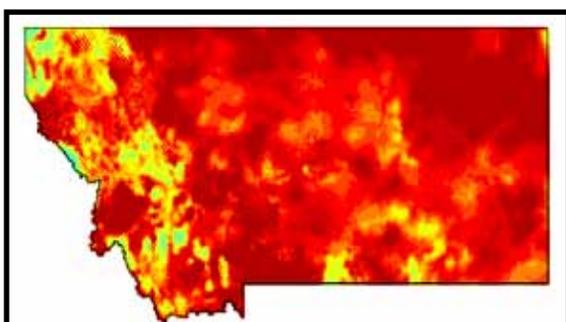


## CLIMATE CHANGE IN MONTANA: *How can we respond?*

Climate change will affect people, property, the economy, and the environment for the next several decades even if we stop all greenhouse gas emissions tomorrow. Reducing greenhouse gas emissions – typically called mitigation – is critical for controlling the *scale* of climate change. If we aggressively reduce emissions, climate change impacts will occur, but will be lessened. If we fail to reduce emissions, the consequences will be severe. In fact, they've already begun, and that's why we need to invest in ways that people, the economy, and the environment can adapt to climate change impacts.



### Spring Temperature Change Since 1955

The darkest red areas have warmed by 5°F. The areas in yellow have generally warmed by more than 2°F.

### Montana's climate is already changing.

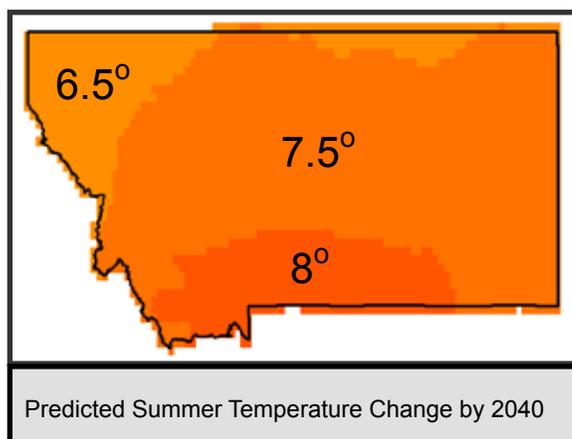
Average spring temperatures in the state have risen by almost 4°F over the last 55 years, with winter temps close behind with a 3°F increase. Summer temps have also climbed just over 1°F.

Precipitation patterns have changed as well, but not evenly across the state. In general, the Northern Rockies are now seeing less winter snow while the southeastern plains are receiving slightly more spring and fall rain. But, that additional rain is coming in fewer, more severe, storms.

### Montana's climate will continue to change.

The average annual temperature in Montana is projected to increase an additional 5°F over the next 30 years. This is **4 times faster** than warming during the last 55 years. The greatest seasonal increase will be in the summer, when average temperatures are projected to jump by more than 7°F.

Climate models are projecting that average annual precipitation levels will continue to trend slightly higher over the next 30 years, but there will be a significant change in the time of year when it comes.



Predicted Summer Temperature Change by 2040

On average, less rain is predicted in the summer and fall; more in winter and spring. The continuing trend of less snow and earlier spring snowmelt could compromise the state's water resources. The historical trend towards fewer, more severe storms will continue as well.

# CLIMATE IMPACTS AND ADAPTATION STRATEGIES FOR MONTANA



**IMPACT:** Drier forests could result in more frequent and more severe wildfires, especially as excessively dense, drought-stressed trees are more susceptible to bark beetle attacks.

## ADAPTATION:

Manage forests to historical densities to reduce wildfire risk and to make trees more resilient against bark beetles during droughts.

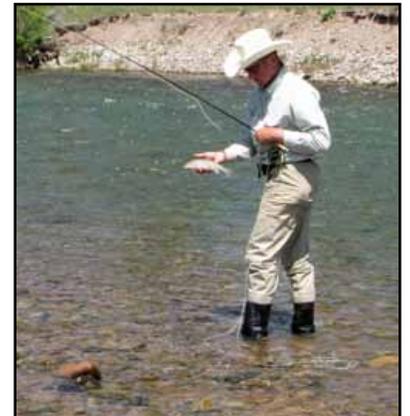
**IMPACT:** Drier soils will increase the need for irrigation to support wheat, hay, and barley production in Montana, which in 2007 generated \$1.7 billion.

## ADAPTATION

- Support programs that help farmers use available water supplies more sustainably.
- Protect watersheds, particularly forests and wetlands, to feed aquifers & ensure water in summer.

**IMPACT:** Thinner snowpack will allow streams to warm, decreasing their quality for trout, closing rivers to fishing and affecting winter recreation and the state's multi-million dollar tourism industry.

## ADAPTATION



- Protect and restore streamside corridors to maintain shade over and cool prime trout waters.
- Protect wetlands and surrounding uplands to allow rain and runoff to seep into the ground, thereby providing a steadier supply of cool water through the summer.

**IMPACT:** More erratic and extreme storms lead to more flood and drought .

## ADAPTATION

- Protect wetlands and river corridors to slow flood waters and let water to be held after big storms.
- Guide development out of floodplains to protect people and reduce property damage.
- Provide guidance and resources to help communities and landowners adapt to more frequent and more severe floods in ways that don't worsen problems for landowners downstream.
- Support efficient use of agricultural, industrial and municipal water sources.

IMPACT: Higher CO2 levels, drought and higher temperatures will make weeds even more problematic for ranchers and the \$1.3 billion cattle industry.



## ADAPTATION

- Support weed management programs that block the arrival of new weed types and support ranchers and other land managers to control and eradicate weeds that are already here.

IMPACT: Higher temperatures could increase energy demand for air conditioning, pumps etc.

## ADAPTATION

- Promote energy conservation and efficiency as well as power sources that don't contribute to greenhouse gases. The Nature Conservancy in Montana has produced the first assessment of where wind generation facilities can be located with minimal risk to wildlife and the environment.

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