*Alaska Climate Change Adaptation Series*

ACC-00111

# Regional Climate Projections: Interior Alaska

*Interior Alaska has a continental climate with the warmest summers in the state and the coldest winters. The Interior is projected to become warmer and drier over the next century. Warmer temperatures and a longer growing season are expected to increase evapotranspiration enough to outweigh a regional increase in precipitation. Seasonal changes in climate will have profound impacts on the condition and health of wildlife habitat, cause widespread loss of permafrost, lead to increased fire risk and contribute to the drying of wetlands, streams and lakes.*

## Who We Are

***SNAP*** — The Scenarios Network for Alaska & Arctic Planning links university researchers with communities and resource managers. Through partnerships involving data sharing, research, modeling and interpretation of model results, SNAP addresses some of the complex challenges of adapting to future conditions.

***CES*** — The Cooperative Extension Service is the educational outreach component of the national land grant university system — in Alaska, the University of Alaska Fairbanks. CES conducts research and provides educational outreach statewide.

***ACCAP*** — The aim of the Alaska Center for Climate Assessment and Policy is to assess the socioeconomic and biophysical impacts of climate variability in Alaska, make this information available to decision makers, and improve the ability of Alaskans to adapt to a changing climate.

Together, SNAP, ACCAP and CES provide a variety of services that may assist you in meeting your community planning needs.

## Planning for Change

Alaskans face many challenges in the next century. Rising energy costs have impacted the cost of food, fuel and other services. Changes in temperature and moisture can trigger profound landscape-level changes such as sea level rise, modified patterns of storms, flooding or fire, and altered migration routes, breeding patterns or survivorship of fish and wildlife.

Everyone — from engineers to farmers to wildlife managers — will need to take economic change, social change and climate change into account when planning for the future in order to avoid costly mistakes and take advantage of new opportunities. Planning requires objective analysis of future projections, including clear explanations of the uncertainty inherent in all forms of forecasting.

## Uncertainty

While values are based on the best available climate models, they are estimates only. There is variation among climate models and annual variation within each model. Interpretation of impacts adds additional uncertainty.

## Climate Models

SNAP provides average values of projections from five global models used by the Intergovernmental Panel on Climate Change (IPCC). Climate projections are based on three scenarios for carbon dioxide emissions that cover a wide range of possible future conditions.

## Statewide Trends

Temperatures and precipitation are expected to increase across the state throughout the next century. The growing season will lengthen, and glaciers, sea ice and permafrost will be reduced. Significant ecosystem shifts are likely statewide.

SNAP

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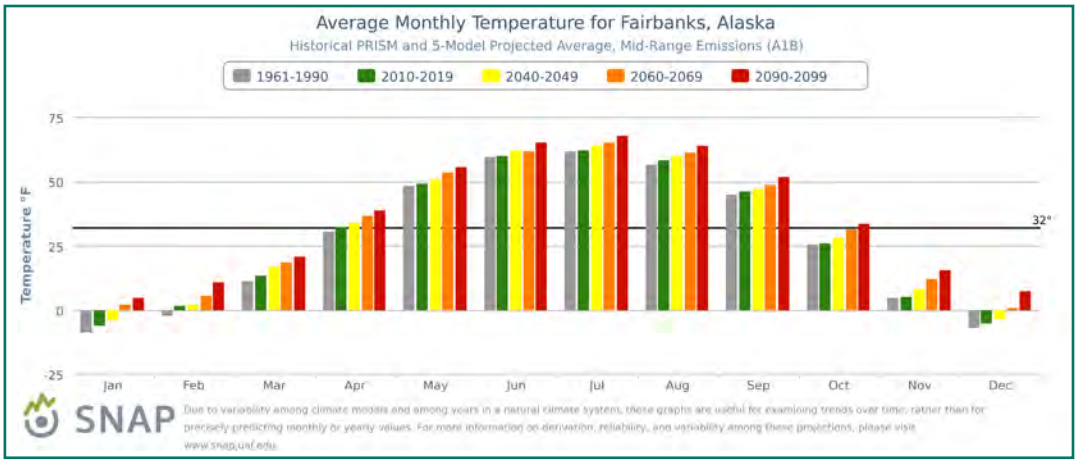
## Climate Projections




Even taking into account the natural variability of the climate system, it is likely that temperatures will continue to increase in the Interior, with the most significant increases in the winter. Over the next century, average temperatures in Fairbanks are projected to increase by roughly 10–15°F in winter and 5–10°F in summer. Projections indicate more precipitation overall, but because of hotter weather, an increase in overall drying and an increase in extreme fire seasons are expected. Shorter winters may mean less snowpack even with higher overall precipitation.

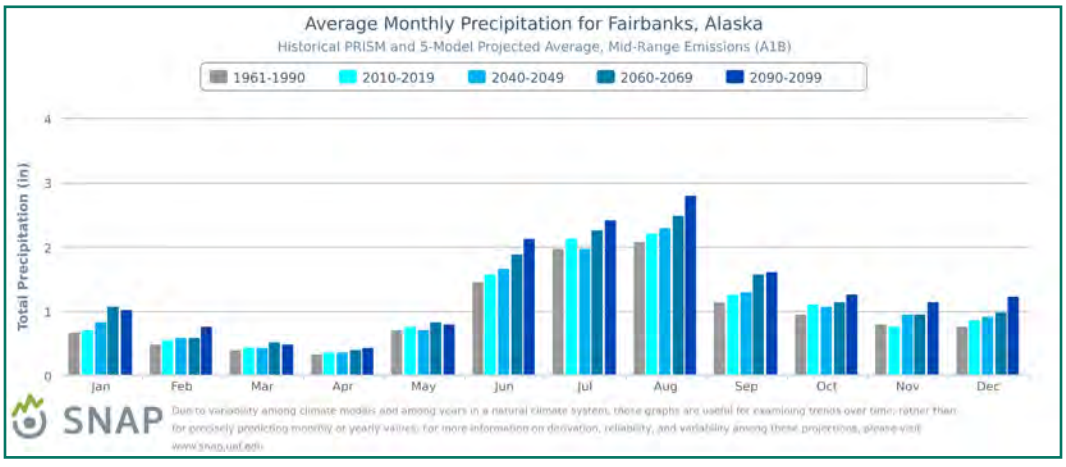
## Regional Impacts

Increasing temperatures in the Interior will cause shifts in vegetation, fire regimes, and wildlife habitat and migration patterns. Changes in hydrology and permafrost, as well as warmer winter temperatures, are also likely to cause species shifts, including the potential for increased invasive species occurrences and an increase in deciduous tree stands as compared to old growth spruce forests.

Climate change could also bring increased opportunity. More favorable weather during shoulder seasons may increase tourism, and a significantly longer growing season would have a positive impact on agriculture in the Interior. However, these conditions may also allow more invasive plants to enter the region. The migration of spruce northward and upward in elevation and the introduction of lodgepole pine into the Interior are likely. These vegetation shifts would affect the composition and frequency of the wildlife that depends upon those plant species for food and cover.

As winter temperatures increase, insect outbreaks could spread north into the boreal forest. The response of the boreal forests to wildfire is different than it used to be for several reasons, including decreased tree resilience due to insect infestations or drought stress. Changes in fire patterns are likely to have significant impacts on ecosystems, and fires may become more frequent and more intense due to drying soils.

With higher temperatures, permafrost thaw will affect roads, pipelines, buildings and other infrastructure. Also, pollutants such as mercury are released into aquatic environments when permafrost thaws. Permafrost degradation leads to the formation of thermokarsts, which can drain lakes and ponds, significantly altering wetland areas and other wildlife habitats.




**The chart tool used to create these graphs is available for more than 440 communities statewide at www.snap.uaf.edu.**

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