

Regional Climate Projections: Southeast Alaska



The Southeast Alaska region encompasses the Chugach-St. Elias Mountains, Boundary Ranges and Alexander Archipelago. This temperate maritime area has cool summers, relatively warm winters and some of the highest precipitation totals in the state. It supports temperate rainforests and forested wetlands. The mountain ranges have large ice fields, glaciers and alpine communities of plants and animals. Climate change may cause species shifts and major hydrologic change as glaciers recede and winter precipitation shifts from snow to rain. Fisheries may also be impacted by ocean acidification.

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.



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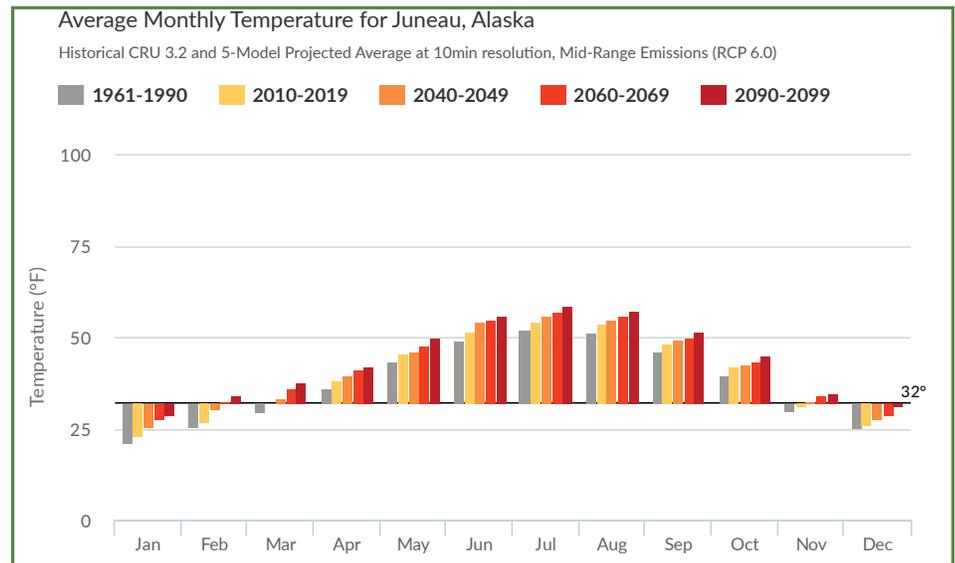
Climate Projections

SNAP models suggest that below-freezing temperatures and snowfall will become increasingly rare in this region. In Juneau and other locations in Southeast, mean winter temperatures are projected to rise from below freezing to well above freezing in the next few decades, potentially leading to little or no snowpack, except at the highest elevations. This will affect hydrologic cycles, since winter runoff is likely to increase and less snowpack will be available to feed spring runoff.

Regional Impacts

Long-term projections indicate that most glaciers in Southeast Alaska follow a regional and global trend of accelerated melting. Locally, land surface rises as a result of the loss of glacial ice (isostatic rebound), and this will likely be at a rate greater than the rate of sea level rise. Melting glaciers also affect the seasonal discharge and turbidity of glacial streams, which impacts aquatic productivity and hydroelectric potential.

Changes in climate may outpace the capacity of some plants and animals to adapt, resulting in local or global extinctions. Shrubs and trees will colonize elevations that are currently

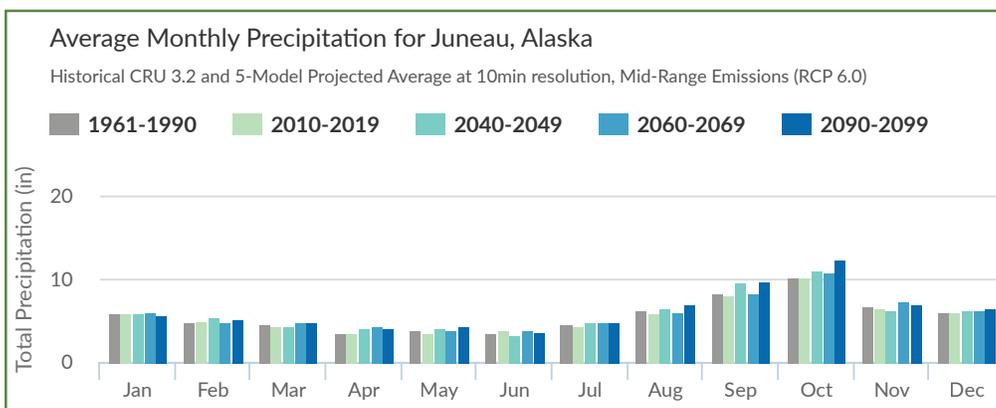


characterized as alpine or tundra habitat in Southeast Alaska. Warming and drying of soils and insect infestations may increase fire risk over the coming decades. The loss of insulating snow cover allows yellow cedar trees to freeze in the spring. Reductions in winter snow cover at lower elevations will also negatively impact winter recreational activities.

Rapid changes of terrestrial and marine environments will alter commercial, subsistence and recreational harvesting in ways that cannot be readily predicted. Increasing temperature and precipitation will likely alter the ecology of salmon fisheries. Early entry of salmon into the marine

environment — when food resources are low — will decrease their growth and survival. Changes in ocean temperature, invasive species, erosion and storms may impact the fishing industry. However, since fisheries in other parts of the world may also be impacted, it is hard to predict the relative competitiveness of Alaska fisheries.

Longer and warmer summers could potentially benefit the tourism industry. However, SNAP models predict relatively modest increases in temperatures during the May–September season. Increased intensity and frequency of coastal storms will negatively impact shoreline and wetland areas, which could impact tourism as well.



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