

Regional Climate Projections: North Slope and Northwest Coast



The climate of Alaska's North Slope and northwest coast is best described as moist polar. All months have mean temperatures below 50°F and precipitation is light, increasing somewhat toward the foothills of the Brooks Range. Vegetation is primarily tundra, and permafrost is continuous with varying degrees of thickness. The coast is bordered by sea ice in the winter. Climate projections show increasing temperatures in this area over the next century, with increased evapotranspiration outweighing slight increases in precipitation. Reduced sea ice, a drier landscape and a longer snow-free season could have profound impacts on vegetation, wildlife and subsistence activities.

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 explana-

tions 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

Significant temperature change is predicted for this region, particularly in fall and winter months. In Barrow, average June temperatures are projected to rise only 2–3°F this century, but October–March temperatures are projected to increase by 20–25°F. Projections for precipitation are less linear but show significant changes for every month throughout the year. The increase in arctic precipitation is likely to be most concentrated over coastal regions and in the fall and winter.

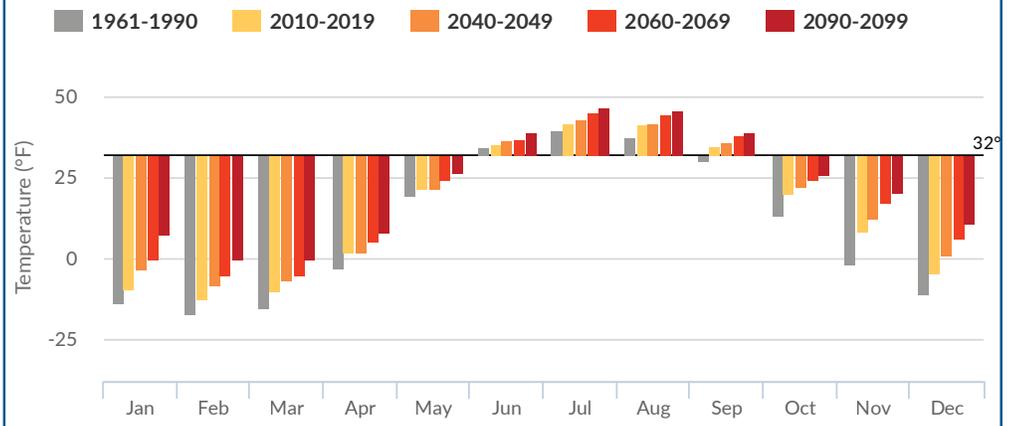
Regional Impacts

For some coastal communities in this region, erosion is by far the most pressing issue. Loss of landfast sea ice and thawing of frozen ground along coastlines allows for greater wind and water erosion, especially during severe storms. A combination of erosion and sea level rise may eventually force some coastal communities to relocate.

Shishmaref has already lost several buildings due to erosion of its northern shoreline, which is eroding at an average of 3–5 feet per year. The community has chosen to relocate to a nearby mainland location that is

Average Monthly Temperature for Utqiagvik, Alaska

Historical CRU 3.2 and 5-Model Projected Average at 10min resolution, Mid-Range Emissions (RCP 6.0)



suitable for subsistence and preserves its culture and integrity.

Loss of sea ice also impacts habitat for arctic species and affects subsistence activities. Reductions in sea ice will drastically shrink marine habitat for polar bears, seals and seabirds, which could push some species toward extinction. Changing sea ice conditions present serious challenges to travel, which in turn threatens food security of communities that rely on subsistence hunting, fishing and gathering.

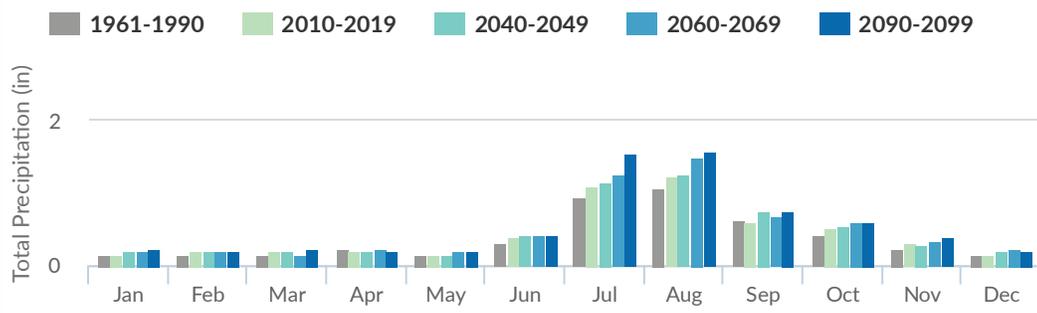
Higher temperatures and a longer growing season are already causing an increase in shrub cover on the tundra, and higher evapotranspiration is likely to cause drying of some soils and wetlands. Warmer winters and

lower water availability may impact the manner in which heavy industry can operate on the North Slope. On the other hand, a decline in the extent and thickness of arctic sea ice would improve ship accessibility in the Arctic Ocean, increasing marine transport and access to resources.

Shifting tree line and changing hydrology will likely lead to species shifts and habitat loss for some arctic flora and fauna. New species assemblages may become predominant as conditions change, particularly in western coastal areas. Shrub cover, drying and lightning together are likely to result in higher fire incidence.

Average Monthly Precipitation for Utqiagvik, Alaska

Historical CRU 3.2 and 5-Model Projected Average at 10min resolution, Mid-Range Emissions (RCP 6.0)



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