

Alaska & Climate Change

Alaska Division of Geological & Geophysical Surveys



During the last several decades,

Alaska has warmed twice as fast as the rest of the United States.

The impacts of a rapidly changing climate on Alaska are already pronounced, and are likely to intensify as climate continues to change.

Climate change presents both challenges and opportunities to Alaskans.



Glacier retreat impacts streamflow and hydropower development.

Floods

Since 2000:

- 12 state/federal disaster flood events related to ice jam flooding and rain storms have occurred
- More than \$227 mil. was spent on disaster relief and property damage



Intense storms enhance flooding and erosion in coastal environments.



Greater storm intensity can lead to larger and more frequent landslides.

Storms

Since 2000:

- 14 state/federal disaster coastal storm events occurred
- More than \$157 mil. was spent on disaster relief and property damage
- Some coastal and riverine communities face whether and how to relocate



Permafrost thaw and slope instability threaten critical infrastructure.

Snow, Ice & Permafrost

- Alaska's glaciers are in steep decline and are among the fastest melting glaciers on Earth
- Arctic sea ice extent has decreased dramatically and is now declining at a rate of 13% per decade
- Snow cover extent and depth have been decreasing in Alaska for nearly three decades

- Permafrost is thawing statewide, impacting more than 150 communities and thousands of miles of roads
- As snow, ice and permafrost change, slopes are becoming more unstable, threatening public safety and critical infrastructure
- Climate change is producing more frequent rain-on-snow events, which is leading to an increase in avalanche hazards across the state



Permafrost degradation can create hazards and impacts water resources.

Alaskans need up-to-date, science-based information about climate change in order to capitalize on new opportunities, and safely and efficiently adapt to changing conditions.



Winter storms and less sea ice during fall lead to more erosion and flooding.

Division of Geological & Geophysical Surveys and Climate Change

Supporting Informed Decision Making

The Division of Geological & Geophysical Surveys (DGGS) responds directly to stakeholder needs by providing data products and conducting applied research investigations that help communities and resource managers understand the impacts of climate change

Hazards Assessments DGGS monitors climate-related geologic hazards and conducts hazard assessments to help resource managers, planners and decision-makers understand how and where changes in climate will influence hazards and threaten communities and infrastructure (*flooding/landslides/storm surge/avalanches*)

Targeted Data Collection DGGS deploys personnel and instrumentation, and uses remote sensing technology to collect critical baseline data from underrepresented parts of the state (*topography/water level/weather-climate/permafrost temperature/glacier runoff*)

Monitoring DGGS uses real-time instrumentation and community-based observers to monitor active geologic hazards and dynamic weather- and climate-related variables across the state (*snow distribution/water level/ice-dammed lakes/landslides/coastal flooding & erosion/permafrost/groundwater*)

Modeling DGGS develops and implements numerical modeling to understand and estimate the future impacts of changing climate on earth surface processes that can influence communities, infrastructure and natural resources (*streamflow/avalanches/groundwater/landslides/permafrost*)

Bear Glacier
outburst flood
monitoring.
Real-time hazard
monitoring provides
critical warning of
imminent threats to
public safety.



Avalanches threaten public safety and infrastructure.

Meeting Future Statewide Needs

- DGGS has the expertise to combine field-based observations, remote sensing and modeling to assess, monitor and predict the impacts of a changing climate on Alaska's landscape, its natural resources and the built environment
- DGGS has developed fertile partnerships with federal, state, university, local, regional and tribal entities throughout Alaska to improve the quality and quantity of the critical baseline data that are necessary to support sound, science-based decision making on climate change issues
- DNR has the capability to manage and disseminate information that can be utilized by communities, resource managers, decision makers and the public to better understand, plan for and mitigate the effects of changing climate



Learn more online at dggs.alaska.gov
Climate Change Hazards | dggs.alaska.gov/climatehazards
Coastal Hazards | dggs.alaska.gov/sections/engineering/profiles/coastalhazards.html