Climate Change Strategy in Alaska

West Coast Managers Meeting
San Francisco, CA
January 26, 2009

Kim Kruse
Alaska Coastal Management Program

www.a laska.gov
www.climatechange.alaska.gov

Alaska Climate Change Strategy

Photo: Dept. of Commerce, Community, and Economic Development

Governor Palin signs Administrative Order 238 creating the Climate Change Sub-Cabinet on September 14, 2007. The Sub-Cabinet advises the Office of the Governor on the preparation and implementation of an Alaska climate change strategy.

Click to read the Governor's Report on the Climate Change Sub-Cabinet (July 2008).

"My hope is the Climate Change Strategy will be a living document reflecting the best knowledge on the effects of climate change in Alaska. It will be of great use to Alaskans by conveying state plans for adaptation to warming as well as presenting realistic approaches to mitigating the root causes of climate change."

Larry Hartig, Chair, Executive Sub-Cabinet on Climate Change

Climate Change News:

February 2009:

Of Interest...

Climate Change Webpages

- Home
- What will Climate Change mean to Alaska?
- Sub-Cabinet Meeting Handouts
- Advisory Groups Background
  - Adaptation
  - Mitigation
  - Immediate Action
  - Research Needs
- Relevant Documents and Links
- Climate Change Photographs
- Sub-Cabinet Members

Associated Groups

- Joint Alaska Climate Impact Assessment Commission (Legislative Commission)
- ACIA (Arctic Climate Impact

Alaska Climate Change Strategy

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Alaska Climate Change Strategy

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Larry Hartig, Chair, Executive Sub-Cabinet on Climate Change and Commissioner of the Alaska Dept. of Environmental Conservation

Alaska Climate Change Strategy

- The Sub-Cabinet is charged with preparing and implementing an Alaska Climate Change Strategy. This will be a transparent document which deals with state policies for anticipated climate change.
- The Sub-Cabinet's strategy will discuss: Building the state's knowledge of the actual and foreseeable effects of climate warming in Alaska
- Developing appropriate measures and policies to prepare communities in Alaska for the anticipated impacts from climate change
- Providing guidance regarding Alaska's participation in regional and national efforts addressing causes and effects of climate change

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- Global warming is currently impacting Alaska and will continue to impact it a number of ways. These impacts include melting polar ice, the retreat of glaciers, increasing storm intensity, wildfires, coastal flooding, droughts, crop failures, loss of habitat and threatened plant and animal species.
- Globally, 2005 was the warmest year on record (using records dating back to 1880) with a sustained period of warming in the arctic during 2000-2005. Convincing evidence includes NASA satellite data that shows Arctic perennial sea ice decreasing by 9% per decade since 1979. Less ice means more open water-which means greater absorption of solar energy-which leads to increased warming in the ocean, and in turn accelerates more ice loss. This has led to a wide range of impacts in Alaska, including:

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- **melting glaciers, rising sea levels, and flooding of coastal communities.** Warming of oceans and melting of land-based ice increases the volume of ocean water. Loss of sea-ice cover changes habitat for arctic species and leaves coastal communities more exposed to larger waves generated by severe storms.

- **thawing permafrost, increased storm severity,** and related infrastructure damage to roads, utility infrastructure, pipelines and buildings. Extremes in weather patterns, precipitation and rising sea levels will affect safe water sources in villages, and contributes to increased erosion along Alaska coasts and rivers and undermines Alaska boreal forests.

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- **loss of the subsistence way of life** as animal habitat and migration patterns shift and as hunting and fishing become more dangerous with changing sea and river ice. Warming streams and increased silt from melting glaciers affect fish habitat. Boreal forests advance northward and to higher elevations, displacing tundra. Invasive species compete with native vegetation. Humans, animals and plants may be exposed to new infectious diseases as habitat changes.

- **forest fires and insect infestations** increasing in frequency and intensity. In the past decade, Alaska has witnessed a record loss of forests to fires and spruce bark beetles.

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- **Background on Alaska's Climate Change Advisory Groups**

- The Climate Change Sub-Cabinet's efforts are organized into two broad themes. "Adaptation" includes those measures that can be taken to respond to the effects of climate change. "Mitigation" refers to measures to reduce Alaska's greenhouse gas emissions and to address other sources and causes of climate change. See the Adaptation Advisory Group and the Mitigation Advisory Group pages for members, meeting information, and documents.
- Over the course of the next year, the efforts of the Adaptation Advisory Group and the Mitigation Advisory Group will each be supported by the efforts of four or five technical work groups.

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- **May 2008:** The Sub-Cabinet selected more than 100 Alaskans in April to help craft the State's Climate Change Strategy. For the latest stakeholder information, please see the climate change website at *www.climatechange.alaska.gov.*
- Advisory Groups - main advisory group website for Alaska with schedules, background, members, meeting documents and links

- Adaptation Advisory Group
- Mitigation Advisory Group
- Immediate Action Needs Advisory Group
- Research Needs Advisory Group

Alaska Climate Change Strategy

- **Alaska Climate Change Adaptation Advisory Group**
- Four Technical Work Groups (TWGs) are analyzing options for adapting to the impacts of climate change upon Alaska. These work groups meet regularly by teleconference, and the public is invited to listen in on these calls. The Adaptation technical work groups are focusing on areas such as how to address present and future impacts on:
  - Public Infrastructure
  - Health & Culture
  - Natural Systems
  - Economic Activities

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- **Alaska Climate Change Mitigation Advisory Group**
- Five Technical Work Groups (TWGs) are analyzing options for mitigating greenhouse gases in Alaska that contribute to climate change. These work groups meet regularly by teleconference, and the public is invited to listen in on these calls. The Mitigation technical work groups will examine ways in which greenhouse gas emissions can be reduced through conservation, efficiency and technological advances. Technical work groups have been assembled around general greenhouse gas mitigation action categories:
  - Forestry, Agriculture & Waste
  - Cross Cutting Issues
  - Energy Supply & Demand
  - Oil & Gas
  - Transportation & Land Use

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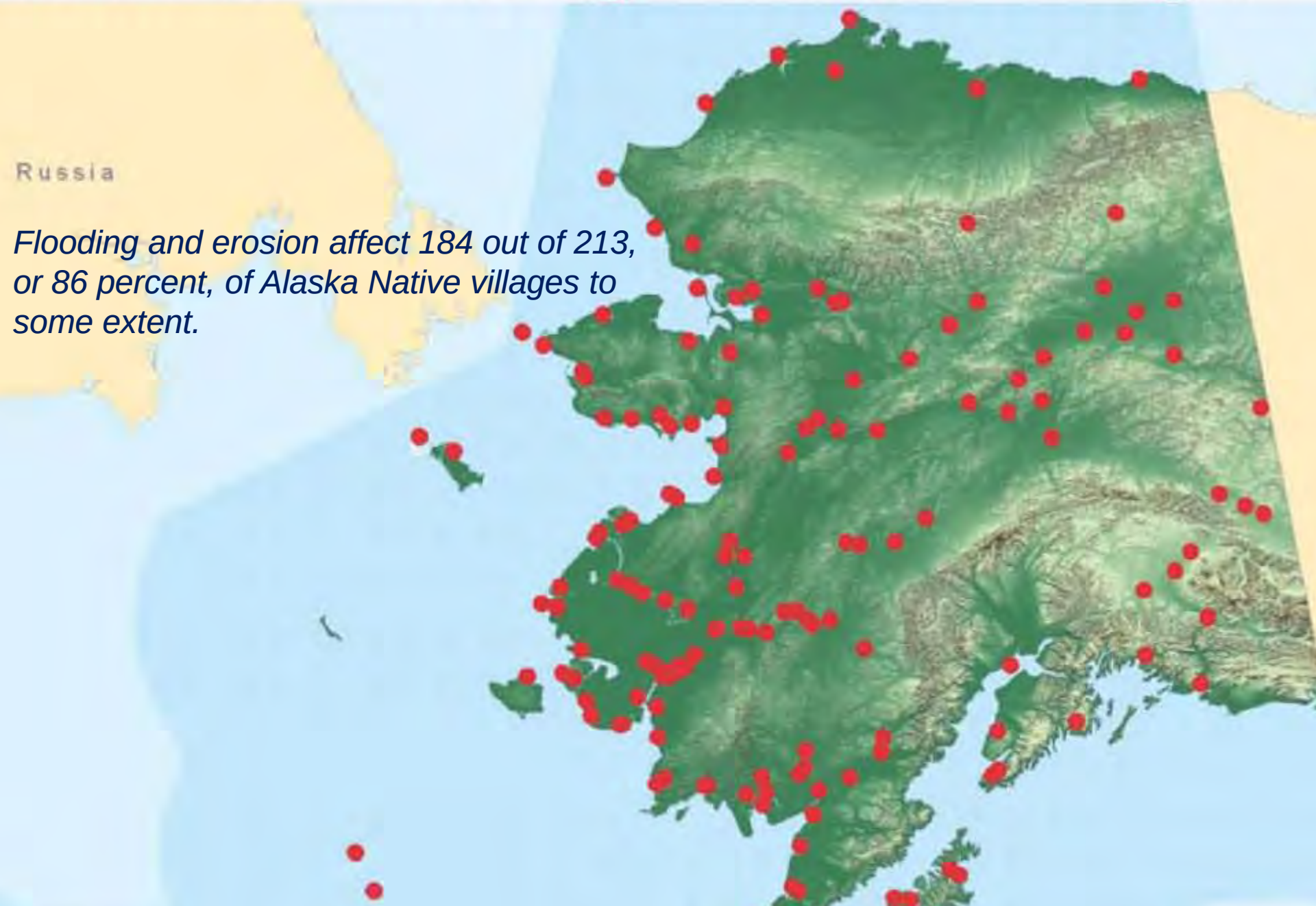
- **Immediate Action Work Group**
- The Immediate Action Work Group deals with the early assessment and development of an action plan addressing climate change impacts on coastal and other vulnerable communities in Alaska.

Alaska Climate Change Strategy

- Near Term Focus for Immediate Action Workgroup
- Executive Summary
- Community Profiles
- Immediate Actions for Communities
    1. Kivalina
    2. Koyukuk
    3. Newtok
    4. Shaktoolik
    5. Shishmaref
    6. Unalakleet

rosion and Flooding in Alaska's Villages



Flooding and erosion affect 184 out of 213, or 86 percent, of Alaska Native villages to some extent.

Identifying New Priority Communities

Community	GAO	USACE	DCCED	EM	ADOT	By Ot
Nunam Iqua		✓	✓		✓	
Nunapitchuk			✓			
Point Hope					✓	
Port Heiden		✓				
Saint Michael		✓				
Selawik		✓			✓	
Seward			✓			
Shageluk					✓	
Shaktoolik	✓	✓			✓	
Solomon and Safety Sound					✓	
Shishmaref	✓	✓			✓	
Teller			✓			Kawe
Tuntutuliak			✓			

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- Immediate Action Workgroup Relocation Assistance POLICY Recommendations with

- Implementation Actions and Rationale
  - 1. Data Needs and Recommendations – Alaska Native Tribal Health Consortium
  - 2. Sustainability Recommendations for Community Relocation
  - 3. Statements of Need from the Communities of Golovin and Little Diomede

IAW Meeting Schedule

Website Reference for IAW Meeting Agendas, Handouts, and Summaries

The photographs on this page show some of the impacts Alaska faces with a changing climate. Stronger storms and lack of sea ice leads to coastal erosion. Thawing permafrost results in subsidence of soils and the failure of foundations for roads and buildings. Warmer, drier weather results in beetle and other pest infestations, forest die-off and record setting forest fires.

Shishmaref, where the coastline has eroded 100-300 feet in the past 30 years. Photo: The Nome Nugget

Shishmaref house after storm. Photo: Shishmaref Relocation Coalition

Breach in Kivalina sea wall, fall 2006, an ongoing concern. Photo: DEC presentation January 2007.

Breach in Kivalina sea wall, fall 2003. Photo: DEC presentation January 2007

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- ACIA (Arctic Climate Impact Assessment)
- University of Alaska ACCAP (Alaska Center for Climate Assessment & Policy)
- Western Climate Initiative

Contact the Climate Change Sub-Cabinet

Breach in Kivalina sea wall, fall 2006, an ongoing concern. Photo: DEC presentation January 2007.

Breach in Kivalina sea wall, fall 2003. Photo: DEC presentation January 2007

Reddish-brown needles indicate spruce beetle killed forest, southcentral Alaska. Photo: eMagazine

Fire hazards increase significantly after insect infestations. Photo: Kenai National Wildlife Refuge

Boundary Fire near Fairbanks, 2004. Summer 2004 fires consumed over 6.6 million acres breaking all previous records for Alaska. Photo: International Arctic Research Center, University of Alaska Fairbanks

Beetle killed spruce trees readily ignite. Photo: Alaska Dept. of Natural Resources

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- **Research Needs Workgroup**
- The Research Needs workgroup will deal with the assembly of scientific research, modeling, and mapping information in ways that will help the public and policymakers understand the actual and projected effects of climate change in Alaska, including the time frames in which those effects are likely to take place.

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- March 30th 2009 - The RNWG will meet to review and discuss draft reports. Summaries of prioritized research:

Needs will follow a one-page template format that includes:

- 1) Statement of problem or research question (link to policy)
- 2) Why is information needed
- 3) Describe the scope/narrative (following the matrix)
- 4) What research is being done
- 5) Gaps in current knowledge
- 6) Urgency/sequence (is other info needed first)
- 7) Research products
- 8) Who would implement (recommend the leader)

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DEC Emissions Summary (January 10, 2008)

- Calculated human-caused emissions of green house gas pollutants in Alaska 52.8 million metric tons of carbon dioxide equivalent. (Feb 2007)
- Emissions in Alaska are comparable to those in Connecticut and Nevada and approximately 50% those emitted in Washington state.
- Industries in Alaska account for approximately 41.5 percent of total emissions, while transportation – mostly aviation – accounts for appr9ximately 36.5 percent of the total.
- While cars and trucks are major sources of total emissions in other states, such as California, they account for around 7 percent in Alaska.
-

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- Not only do Alaskans fly often, but Anchorage and Fairbanks airports are international air cargo centers where sales of jet fuel are big business. When Alaska-sold jet fuel is burned it accounts for 12 million metric tons of greenhouses gases a year – or 23 percent of total Alaska emissions. (It should be noted that most of these emissions are not released above Alaska skies.)
- Producing energy takes energy. Consequently, it is not surprising that Alaska's oil and gas business accounts for the largest industry source of these emissions, roughly 15 million metric tons of greenhouse gases per year.

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- Alaska's electricity production – typically a state's major source of greenhouse gas emissions – accounts for just 6% of its total emissions for three major reasons. Alaska has a relatively small population; our use of renewable energy sources, mostly hydropower, is higher than most states at about 20%; and, in the populous Southcentral area, our natural gas energy base is a low carbon fuel. Change in energy sources in the future would change the level of emissions. Expanded use of hydro, wind, and geothermal electricity sources would lower greenhouse gas emissions in the state.

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State of Alaska > Governor > News > News Details

Governor Palin Releases Energy Guide
Renewable Sources by 2025

Governor Palin Releases Energy Guide Goal: 50 Percent of Electricity Generation from Renewable Sources by 2025 January 16, 2009, Anchorage, Alaska – Governor Sarah Palin today praised energy coordinator Steve Haagenson and the Alaska Energy Authority for the release of their comprehensive guide to energy in Alaska. The guide, Alaska Energy - - A First Step Toward Energy Independence, identifies energy options for communities across the state.

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- The guide identifies and prioritizes energy projects; puts into place legal and government structures needed to allow them to go forward; and identifies potential funding sources.
- “This tool will focus each community on their relative options for generating electricity and heat through the use of locally available resources,” said Haagenson.
- The plan calls for Alaskans, the Legislature, local and regional governments, the University of Alaska and the private sector to work together to ensure that by 2025 half of the state’s electricity comes from renewable sources.
- A copy of Alaska Energy - - A First Step Toward Energy Independence can be found at:
- www.akenergyauthority.org

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- SNAP - Scenarios Network for Alaska Planning
  http://www.snap.uaf.edu/

- Browse by Topic Development (2)
- Ecosystem Change (4)
- Hydrology (3)
- Subsistence (4)
- Browse by Region Far North (4)
- Interior (2)
- Southcentral (2)
- Southeast (3)
- Southwest (2)

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NAP: Scenarios ... Page Tools

SNAP

ios Network for Alaska Planning

Spotlight

New Analysis of Validity of SNAP Climate Models

A new analysis of the validity of SNAP climate models is now available... read more »

Objective data for people who make policy, management, and economic decisions

communities • transportation • coastlines • forests • resources • infrastructure

Home

Welcome to SNAP, the Scenarios Network for Alaska Planning. We are a collaborative organization linking the University of Alaska, state, federal, and local agencies, and NGOs.

Our mission is to provide timely access to management-relevant scenarios of future conditions in Alaska.

Quick Links

- Climate change projections in Google Earth format
- SNAP fact sheets and documents
- Governor's Subcabinet on Climate Change

News Highlights

Temperature Projections: Summer

The projections below show mean temperatures for June, July, and August for selected decades. SNAP models project that summer temperatures will increase across all regions of Alaska. Temperature increases are predicted for every month, and increases are expected to continue throughout the century.

2000-2009

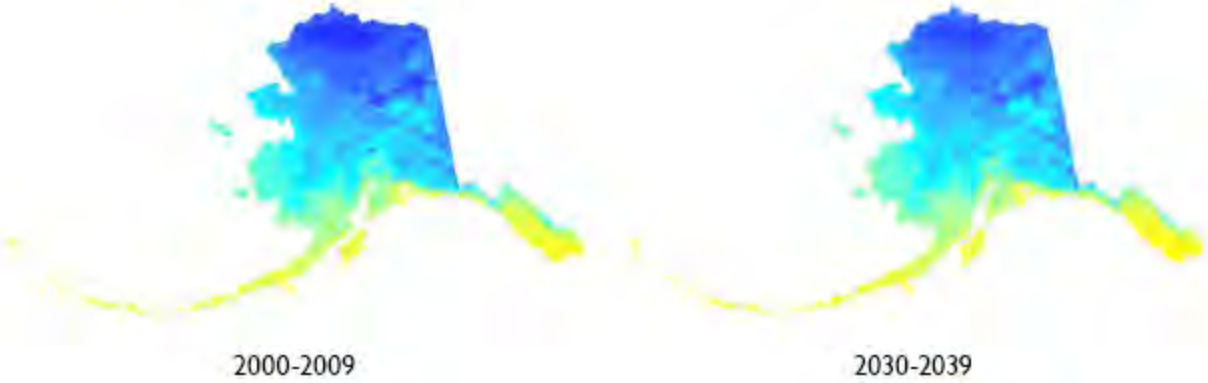
2030-2039

2060-2069

2090-2099

Statewide Temperature Projections: Winter

In general, SNAP models project that temperature increases will be greater during winter months (December, January, and February) than summer months. The maps below show particularly marked increases in the state's interior and far north.



2000-2009

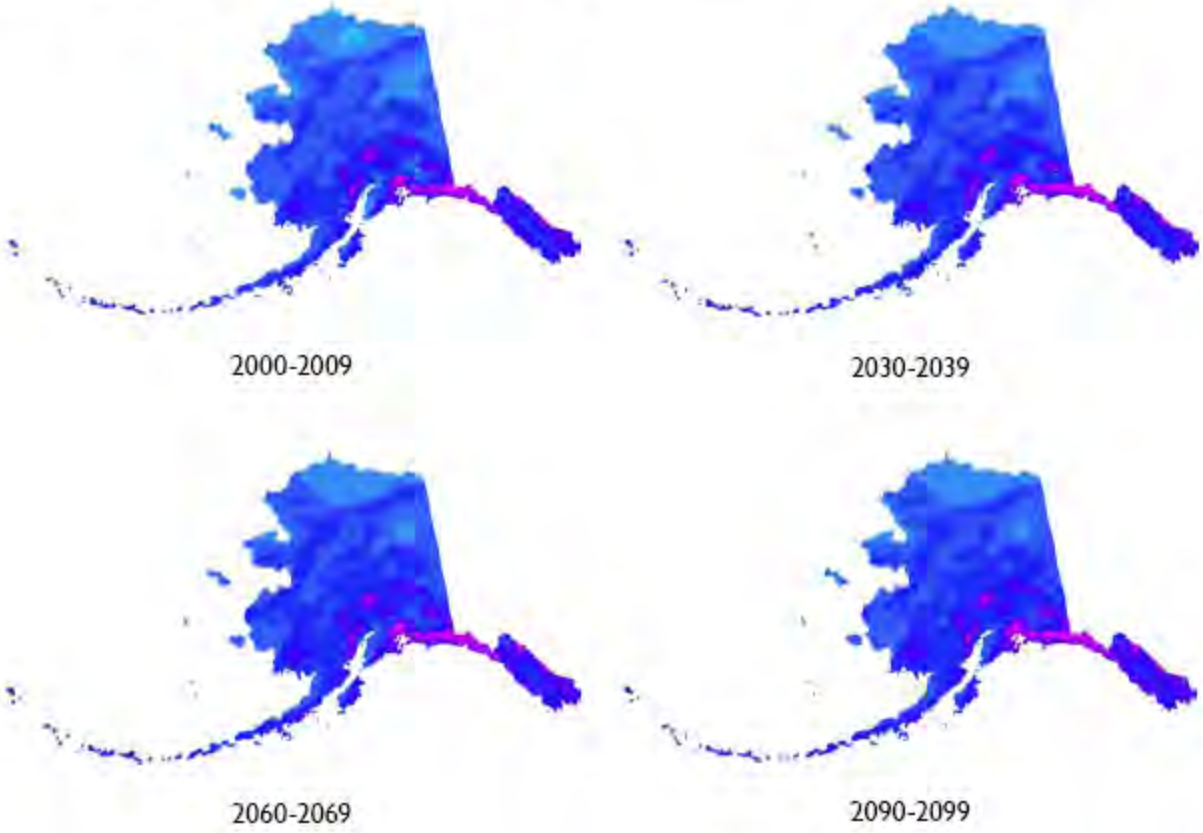
2030-2039

2060-2069

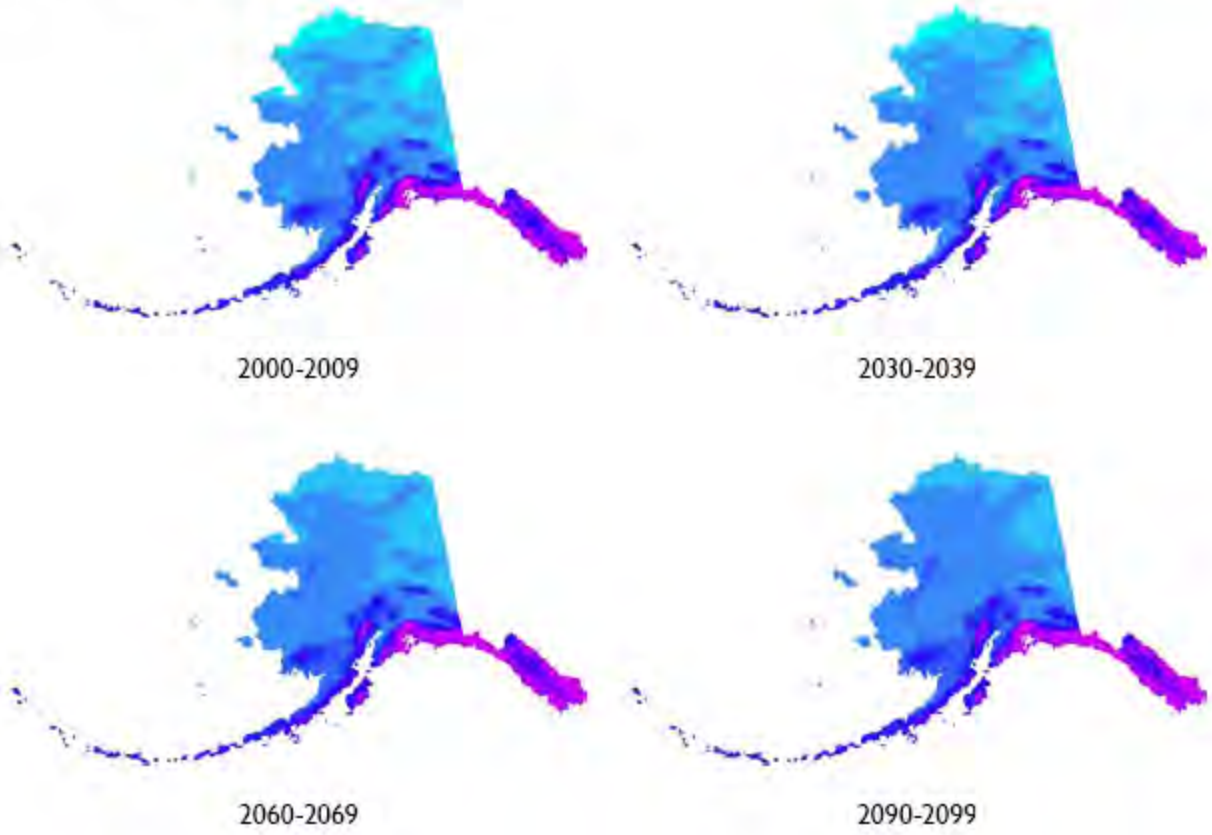
2090-2099

Statewide Precipitation Projections: Summer

Precipitation during summer months (June, July, and August) is projected to increase statewide. However, it is important to note that precipitation alone does not predict ecosystem moisture limitations. In some areas, increased plant growth and increased evapotranspiration due to higher temperatures may more than offset the additional precipitation, resulting in overall drying of soils. In addition, the timing of precipitation can greatly affect its impacts. For example, low spring rainfall or early loss of snowpack can cause drought stress even if annual rainfall is relatively high.



Winter (December, January, and February) precipitation is projected to increase statewide. However, concurrent increases in temperature may result in a smaller percentage of winter precipitation occurring as snow, and may reduce the time in which snowpack remains on the ground. Large storms or rain-on-snow events can trigger flooding or erosion.



Projections of mean winter precipitation (December-February).
These maps are based on mean monthly outputs from five downscaled GCMs.

Although SNAP's climate projections are based on the best available models, they are estimates only. Variation between model outputs is to be expected. Each of the five GCMs used is based on different algorithms. In addition, annual variation within each model mimics the stochastic nature of weather patterns.

The maps on the preceding pages are based on mean values from the five best-performing GCMs identified by SNAP. The maps below and on the following page show a spatial representation of the variability (standard deviation) among the outputs of these five models. Concurrence among models is relatively high for short-term projections, but uncertainty tends to increase as projections move further into the future.

2000-2009

2030-2039

2060-2069

2090-2099

Standard deviation of values for summer temperature among outputs from five downscaled GCMs

WCMM Questions:

- 1. What estimates of sea level rise is Alaska using and over what time period?
- 2. What are we asking of our permit applicants?
- 3. How are we handling GHG emissions and SLR in the environmental review processes?
- 4. What studies are we engaged in at the present time, recently completed, or about to start?

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Visit

www.climatechange.alaska.gov

www.akenergyauthority.org

www.alaska.gov

Thank You!

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