



Climate Change

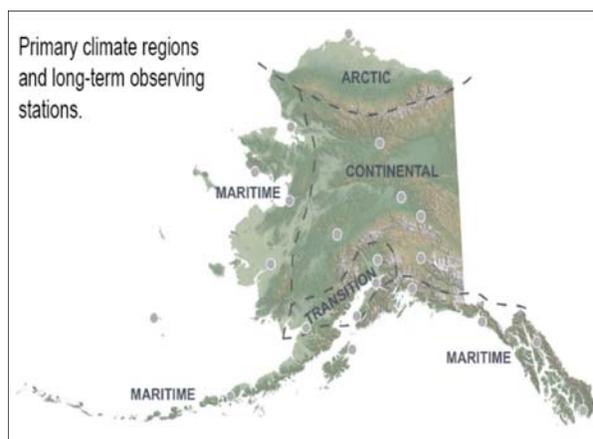
Climate Change

Who to ask: village residents & village councils, water operators, search and rescue

Alaskans depend upon the land for food and water, for traditional practices, for transportation, recreation, and for making a living. But the land is changing rapidly, because of a warming climate. The average annual air temperature has been increasing for decades, warming is changing the weather, the seasons, the wildlife and the landscape. It is also affecting people. This section will help you understand some of the recognized climate impacts that are occurring in Alaska.

Climate change has been described as the change over time, due to natural variability or of human activity. That means that climate can change either by natural processes or by those that are man made. But before we can talk about the climate changing, we first need to be clear about what climate is.

Climate and weather are different. Weather is changing all the time, measured as temperature, precipitation, humidity, wind, and other conditions that we experience on a daily basis. Climate, on the other hand, is based on long-term weather trends. To understand both we rely upon local weather stations and the observations and life experience of local people. Mark Twain put it very nicely when he wrote that **climate is what we think is going to happen, and weather is what we get.**



Three major climate regions in Alaska
Photo Courtesy of Alaska Climate Research Center

Alaska’s climate can be divided into three major regions. There is the Arctic, the Maritime and the Continental, each has its own characteristics. These climate regions were once considered to be mostly set. But we now know that the boundaries of these regions, are changing, some getting larger and others smaller. In fact new climate regions may also be emerging. As these regions change, so also do the associated weather and ecosystems.

How to find your information about the climate of your communities. See if you can find the description of climate for your community. Use the [Alaska Community Profiles](#) available from the State of Alaska, Department of Community Commerce and Economic Development.

120. Do you know what weather data is recorded in your community?

Yes No ?

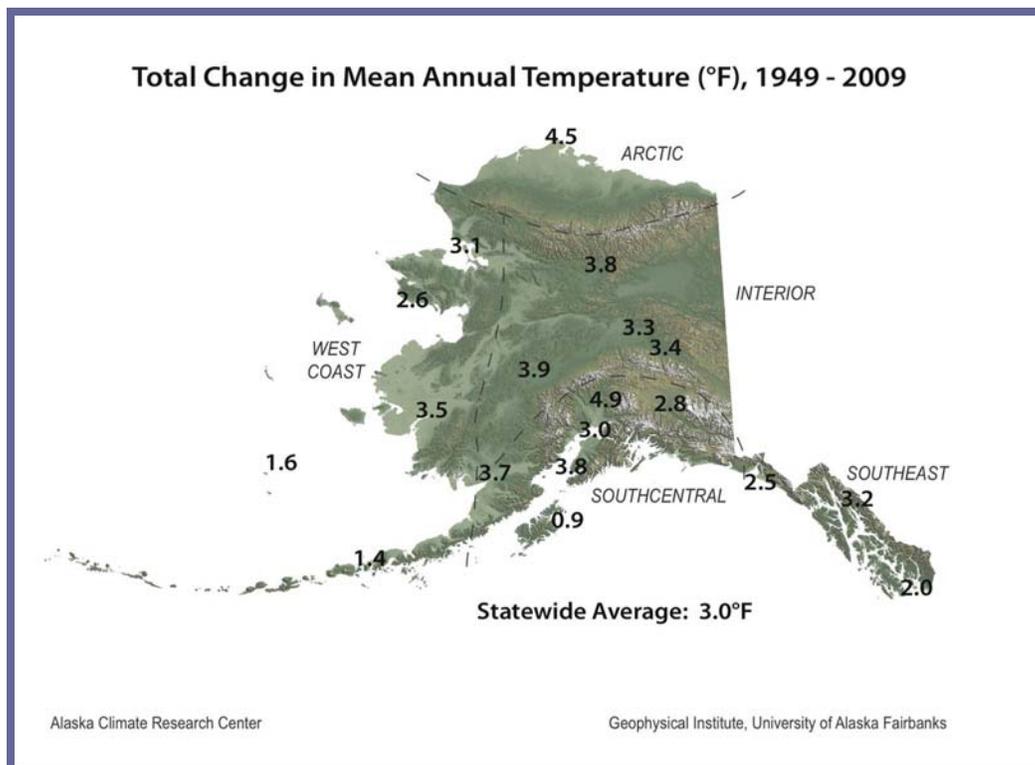
If yes, what is collected? Can you get information about the data?



The first recorded funnel cloud in Sand Point, Alaska
Photo Courtesy of Dana Osterback, 2007

Climate change is caused by increases in carbon based gas in the atmosphere. This occurs both naturally and because of human activities. Examples of these gases include methane and carbon dioxide. A lot of the earth's carbon is in the form of oil and natural gas. By extracting these resources and then burning them, we transfer the carbon from the earth to the atmosphere. These gases act very much like the glass in a green house, trapping hot air inside. As a result the atmosphere becomes warmer.

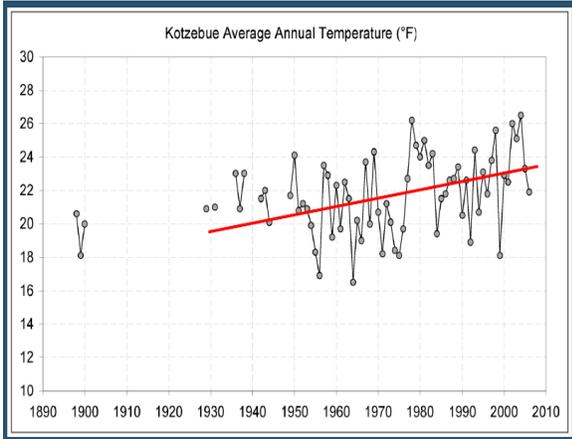
In Alaska, the water temperature in the North Pacific and Bering Sea also strongly influence climate, resulting in alternating warm and cold periods. Over the past 50 years Alaska has experienced warming at more than twice the rate of the rest of the country.



121. Do you think summers are warmer then they used to be?
 Yes No ?

Do you think winters are warmer then they used to be?
 Yes No ?

Boy is it hot! In many places summers are warmer then they were a decade ago.



Annual temperature for Kotzebue, Alaska, 1930 to 2009
 Photo Courtesy of Alaska Climate Research Center



Enjoy the beach in Noatak
 Photo Courtesy Ryan Brubaker, July 2010

Since 1949, the average annual air temperature in Alaska has increased by 3.4°F. There are big differences across Alaska as far as the amount of temperature change that has occurred. In Kotzebue, the average annual air temperature has increased an average of 3.1°F. What is just as interesting is when the temperature change is occurring. Most of the change (6.8 °F) occurred in the winter, and a much lower (though still significant) change of 1.5°F occurring in the fall.

Not all impacts of climate change are bad. These kids are enjoying warm summer air and water temperatures while playing on the beach in Noatak. Noatak has been experiencing increasingly hot, dry summer conditions. This can be bad for air quality as it increases dust and potential for wildfire and smoke. It is good however, for play time on the beach.

Understanding snow and other precipitation is important. Many communities get their water from gradual snow melt throughout the summer, or depend on snow cover for winter travel. It is also important for builders, so they have a better understanding about how strong to build a roof for instance.

How to find information about your communities weather past. See if you can find out what the weather was like on your birthday. How about on your birth date? Use the community weather archive tools at [Weather Underground.](http://WeatherUnderground.com)



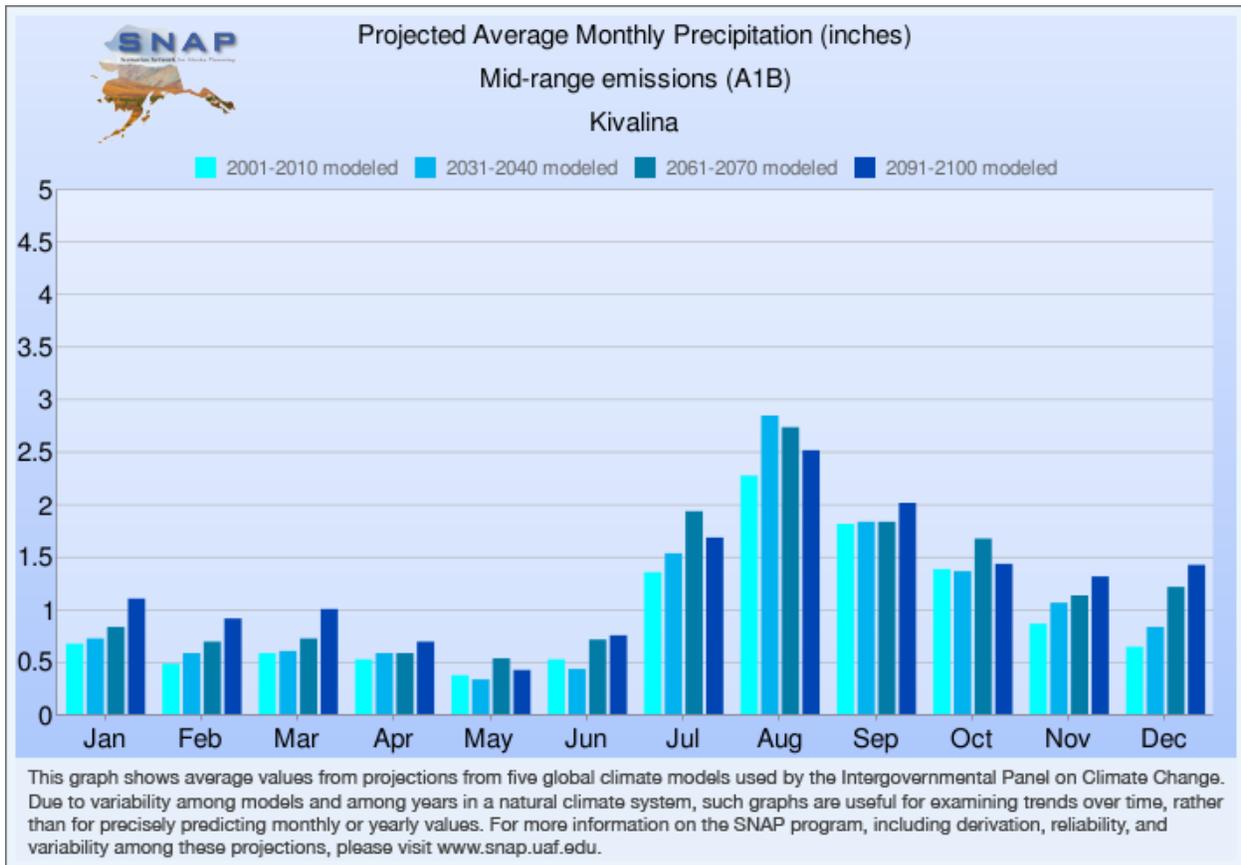
Kivalina, after the blizzard
Photo Courtesy Millie Hawley, 2011

How to find information about your communities climate, past and future.

See if you can find out what has happened to average monthly temperature and precipitation since the 1980s. Use the [Community Charts](#) function at Scenario Network for Alaska Planning (SNAP).

The Community Charts developed by the Scenario Network for Alaska Planning (SNAP) provides past temperature and precipitation data as well as projections for the future. These projections are based on the best available data, but are still limited by the many unknowns of our climate future. There are three scenarios, for each community, based on high, low, or medium future global CO2 levels. The graph below are the medium CO2 level projections for Kivalina.

In most months precipitation in Kivalina is expected to increase. Despite projections for more annual precipitation. Parts of Alaska expect less winter snow and summer rain, potentially affecting hydrology and water supply for some communities.



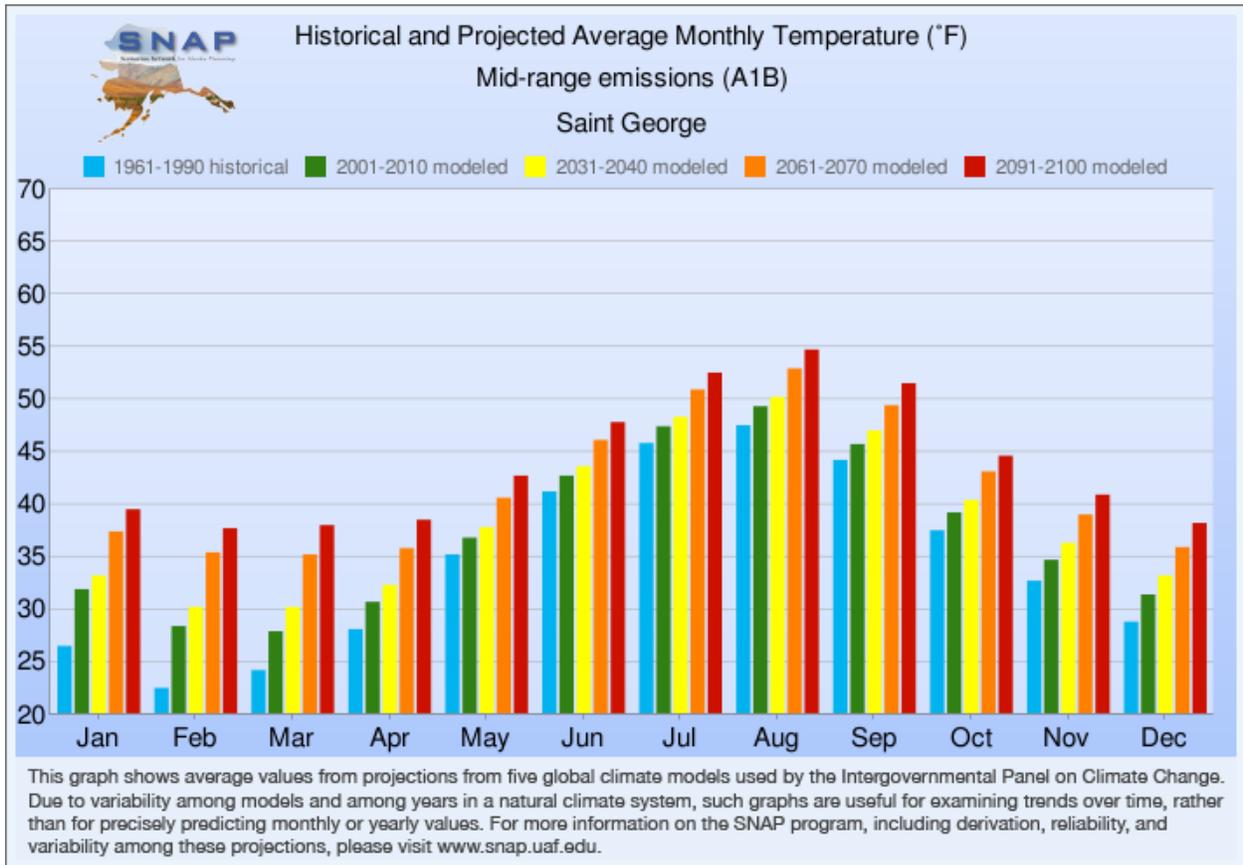


Wind Clouds over St. George, Alaska
Photo Courtesy Maya Brubaker

Having good information on local weather is important. It improves forecasting, keeps air service informed about flight conditions, increases confidence for hunters and fishermen, and can improve the warning time to prepare for extreme weather. Good weather data is also important for understanding weather trends and ultimately our changing climate.

Many communities do not have local observers to collect weather measurements like snowfall.
The [National Weather Service](#) provides training to become a spotter or [observer](#). Observers can record daily on a web-based weather network called [CoCoRahs](#).

Alaska needs more reliable weather observers in communities all across the State. This is one of the single most important things that you can do to help adapt to climate change. If you are interested in being a weather spotter, or observer you can contact your regional National Weather Service Office.



122. Do you think climate is effecting air quality in your community?

Yes No ?

If so, how?



Burning spruce trees
Photo Courtesy of State of Alaska



Dust from a plane in Noatak
Photo Courtesy Wanda Sue Page

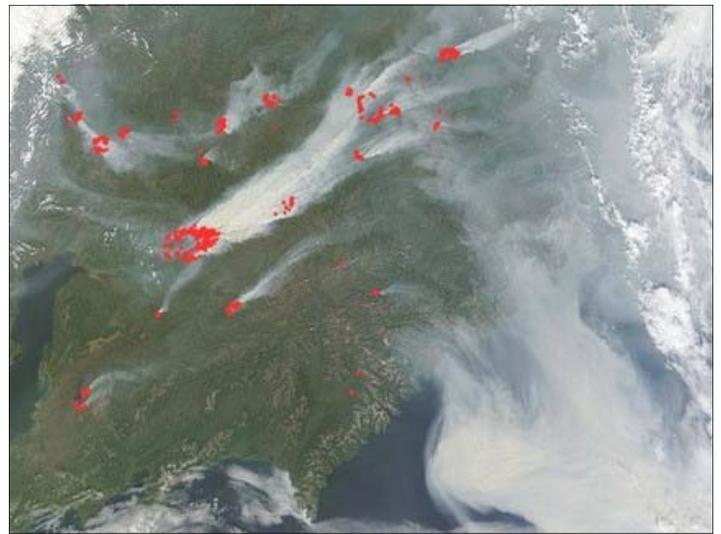
Air quality in Alaska is impacted by climate. As tundra and forest are increasingly dry in summer, plants become water stressed and the risk of wildfire increases. The spruce bark beetle infestation was climate related and resulted in the loss of 2.3 million acres of trees in Alaska. Health effects included mental stress and an increase in smoke related respiratory ailments. For communities that are downwind of wildfires, health and quality of life are both affected.

Another important impact is dust, especially since roads and airstrips in many rural communities are unpaved. Changing climate conditions can increase the number of days with bad dust conditions. One good example is the Northwest Arctic community of Noatak. In the summer, when conditions are dry, billowing clouds of dust, kicked up by wind, heavy equipment, planes at the airstrip or passing trucks and ATVs drift across the village. There is no dust suppression and dust can cover food drying on racks, or drift into homes. In 2001, the State of Alaska Department of Environmental Conservation tested the air quality in Noatak and five other Northwest Arctic communities: Ambler, Buckland, Kiana, Kotzebue and Noorvik. All six communities had summer dust levels that exceeded the EPA national standard for particulates. Dust suppression technology is currently being pilot tested by the Alaska Department of Environmental Conservation.

123. Is smoke or dust increasing in your community?

Yes No ?

Allergens are also an important and emerging air pollutant in many parts of Alaska. Changing climate mean that allergy season can become more extreme. In the Spring of 2010, Fairbanks had some of the highest tree pollen levels recorded anywhere in the world. In the north new vegetation including deciduous trees are becoming established introducing new sources of pollen.



Alaska was downwind of dozens of wild fires in Siberia during the summer of 2010
Photo Courtesy NASA Image



Spruce bark beetle kill in Southcentral Alaska
Photo Courtesy NFS

Are you effected by allergies? Do you want to monitor the pollen levels in your area?

Check out the Weather Underground' [Pollen Forecast](#) page and the [Allergy, Asthma, and Immunology Center of Alaska.](#)

You can also check for [air quality alerts](#) and [learn more about wildfire smoke](#) with the State Department of Environmental Conservation.

124. Are you noticing change in the timing of the seasons?

Yes No ?

Seasons are an important measure of climate change in Alaska. The meaning of the word “season” for Alaska Natives is different than in the western context. Rather than spring, summer, winter and fall, traditional Alaska Native seasons are tied to timing of subsistence and important cultural activities.

For example, the community of Point Hope has at least seven traditional harvest seasons.



Hauling out bowhead
Photo Courtesy Steve Oomittuk

Caribou are hunted in four different seasons, but primarily in the September and October season. How caribou and other seasons have changed, and may still in the future, is an important public health question as it relates to diet, potential for injury during travel and food security.

Finding effective ways to measure seasons is the first step to documenting community specific climate impacts. A baseline seasonal calendar can help to measure change throughout the year.



Snow go ride in Noatak
Photo Courtesy Mike Brubaker

Active monitoring of seasonal weather, ice conditions, subsistence activities and other measures are one way to understand climate change and for developing effective adaptation strategies.

125. How many seasons do you have in your community?



Mapping harvest areas in Kivalina
Photo Courtesy Mike Brubaker 2010

The following table provides an example of a subsistence harvest calendar that can be used to measure community specific seasons and seasonal change. This method is being used in the Northwest Arctic to improve monitoring and communication between local observers and researchers.

Seasonal Calendar Exercise
Working with a partner from your community, develop your own harvest season calendar, and try to describe the seasons and whether they are changing.

Harvest Seasons Traditional versus Current:

Season	Traditional Period	Current Period	Description	Observed Change
Tom-cod	January		Men and women chop holes in ice near shore and jig for Tomcod.	Delayed sea ice development.
Winter Caribou Crab	February March		Men go caribou hunting inland. Women and elders use baited wire to catch crab through ice.	Variable weather conditions.
Whaling	April May		In late March or early April flocks of snowbirds are migrating and in the ice leads, bow-head and beluga.	Thin ice conditions interrupt sea ice based hunting.
Bearded Seal Seal Ducks Geese	June July		Sea ice breaks up and hunters switch to open boats to hunt bearded seal (Ugruk) and seal species. Bird hunting.	Poor ice conditions.
Summer Caribou Egg Gathering Salmon Sea Trout	August		Caribou often come down to the coast in summer and can be hunted by boat. Catch fish and trout with beach seine nets.	Temperature is too hot for drying fish and meat.
Fall Caribou River Fish	September October		Hunting for caribou until river freeze up, also time in fish camps, berries picking, and hunting ptarmigan and other birds.	Delayed caribou arrival.
Seal Polar Bear	November December		Men are venturing out onto the sea ice hunting seal and occasionally polar bear.	Delayed sea ice development.

126. Is your community located in a permafrost zone?

Yes No ?

If yes, have you noticed any impact from thawing?

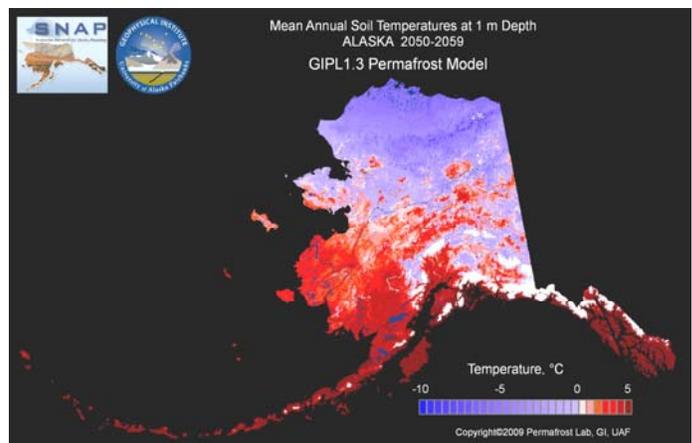
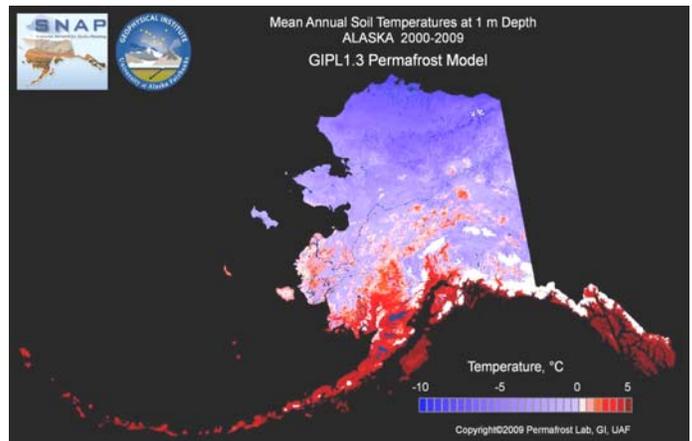
Yes No ?

The land in Alaska is changing. In particular the permafrost areas are thawing. Permafrost means ground that has been frozen continuously for at least two years. Permafrost thaw can dramatically alter the land, causing subsidence (sinking), erosion, land slides, and thermokarsts slumps (left).

Above the permafrost is the active thaw zone where the ground thaws every summer. In many parts of Alaska the thaw zone has been increasing with each passing year. Permafrost thaw can result in a lot of damage to community infrastructure including buildings, roads, airports, utilities and water and sanitation infrastructure. These maps by UAF show soil temperature change during two periods, current and projected future.



Inside a slump caused by thawing permafrost
Photo Guido Grosse



Got permafrost?

See if your community is located in a permafrost zone, and whether it is an area that is changing. You can learn more about permafrost conditions around Alaska by visiting the website of the UAF [Permafrost Laboratory](#) or [Water and Environmental Research Center](#). Read one of UAF Researcher Kenji Yoshikawa's, awesome "[Tunnel Man](#)" adventure comic books, about permafrost thaw.



Sink hole

Photo Courtesy Vladimir Romanovsky



Tundra slide

Photo Courtesy Vladimir Romanovsky



Thaw related coastal erosion

Photo Courtesy Ben Jones

Permafrost thaw combined with erosion can result in changes to the landscape. Soil that has been frozen since the last ice age is now thawing and as warming increases, the rate at which these land changes occur is accelerating. Changes once measured in centuries, are now measured in years or months.

Ice provides strength to otherwise soft and fragile Arctic soils. In many places freezing has prevented the soil from sinking, eroding and washing away. When the permafrost thaws, a void is created where there use to be ice. Into this void the ground can settle or sink, creating a sink hole. This creates a place where water can gather, increasing thaw beneath, or a nice place for insects like mosquitoes.

Vegetation on top of frozen soils are also fragile, and when the soil thaws, or when thaw water creates a slippery surface, the root structures can become unhinged resulting in a ground slide. The photo at left was taken beneath a small hill. When the top of the slope was cut by a caribou trail, the tundra slid downward, rolling up like a carpet at the bottom.

Along parts of Alaska's Arctic Slope the coastline is not characterized by rock, but rather by frozen soil. When the soil thaws, the coastline loses its structural strength, and can be undercut by wave action. The result is a series of regular fracture lines and collapse of enormous pieces of land. The image at left shows shore line loss that occurred over the course of one summer.

127. Do you think climate change is effecting the community's water source?

Yes No ?

If yes, Why?



A thermocarst slump on the Selawik River
Photo Courtesy Yuri Gorokhovich



A collapsed bank, on the Wulik River near Kivalina
Photo Courtesy Mike Brubaker



Drying tundra lakes near Prudhoe Bay
Photo Courtesy Vladimir Romanovsky

Permafrost thaw can also result in erosion to lakes and rivers. South facing river banks are vulnerable to thaw because of their orientation to the sun, and exposure to warm air. Up river from the community of Selawik a enormous sink hole has developed and is continuing to grow. The Selawik slump has dumped hundreds of tons of soil into the river, effecting water quality. Downstream in Selawik the water plant operators are concerned about impacts to the water treatment plant.

Kivalina is another community that gets its water from surface sources. Warming of the bank of the Wulik River has caused the permafrost to warm and then thaw resulting in bank collapse for many miles. Here also, the added turbidity (cloudiness) of the water is a concern for water operators. Sections of bank also cause a navigation obstacle for boats. Here permafrost thaw is making rivers wider, shallower and dirtier.

Some Arctic communities rely upon tundra lakes for their water supply. When the permafrost thaws around lakes, the size of the lakes can change. In some places the lakes expand, as they collect runoff from thawing soil. In others, the lakes can disappear, sometime in a matter of weeks. This is caused by the permafrost under the lake thawing, and providing a pathway for the water to percolate down and away under the lake. In the picture at left, lakes in the foreground are dry or drying.

128. Do you think climate change is effecting the village's food safety and security?

Yes No ?

If yes, Why?

Permafrost thaw is effecting food safety and security. In Barrow, the northern most community in Alaska, some ice cellars are no longer providing a safe or effective method of food storage. The reason is climate change related warming, and the resulting thaw of permafrost. There are many cellars in Barrow used by whaling crews and their families to store meat and blubber.



Stanley Hawley at a ice cellar in Kivalina
Photo Courtesy Mike Brubaker

The failures of these cellars are a crisis, as the cellars are a critical part of the northern marine subsistence culture, and have always provided an inexpensive and effective method for storing large quantities of harvested subsistence food. As they thaw, and the storage temperature of the food increases, consumers of the food are increasingly at risk of food-borne illness, food spoilage and even injury from structural failure of thawing cellars.

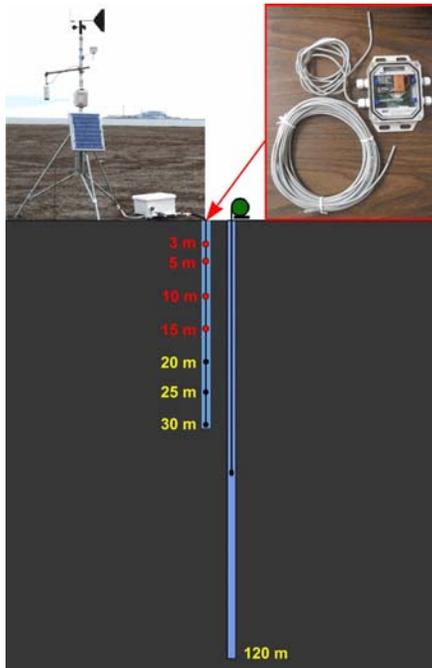


Looking into a Barrow ice cellar
Photo Courtesy Mike Brubaker

Some food cellars continue to perform adequately. This raises questions about the factors that influence temperature in the soil, and in the cellars. Are all permafrost cellars vulnerable to thawing? What is it that makes a cellar more vulnerable? What options are available for improving food storage? Understanding the condition of ice cellars and the factors that influence thawing, are the first step in developing effective strategies to address a problem faced by many Arctic communities.

129. Is there permafrost temperature monitoring in the community?

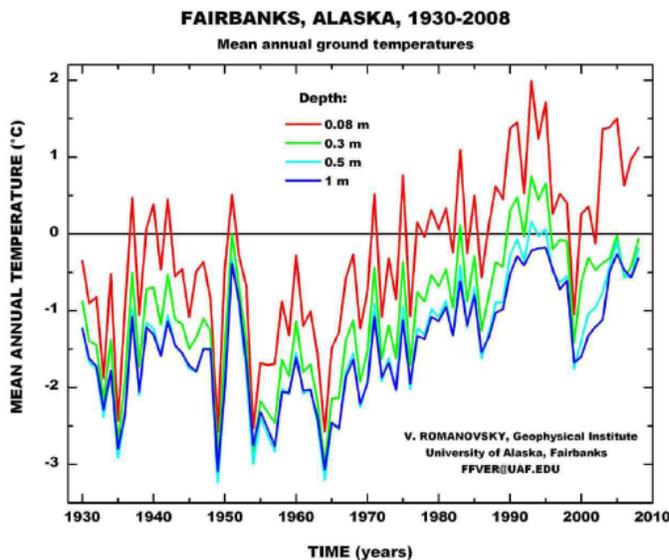
Yes No ?



Permafrost probe diagram
 Courtesy Vladimir Romanovsky

To understand changing permafrost conditions, researchers are using underground temperature monitoring technology. It has been already used in many Alaska communities and is a practical approach to monitor permafrost in vulnerable areas like coastlines or river banks. It can also be used to check the subsurface conditions for existing or future infrastructure.

The data is then compiled and graphed to provide a timeline of temperature at different depths and then used to study trends. The permafrost in Fairbanks has been monitored at one location since the early 1930s. There is a lot of year to year variability, but temperature has been gradually warming since the mid 1960s, and the surface soil (at a depth of .08 meters) has been mostly above freezing since the mid 1980s.



Dr. Vladimir Romanovsky from UAF's permafrost laboratory checking permafrost temperatures

130. Is the community vulnerable to flooding?

Yes No ?



Holding back the sea in Kivalina
Photo Courtesy Millie Hawley



Flood damage in Naknek
Photo Courtesy John Warren



Flood damage in Naknek

Flooding is an important impact related to climate change. It affects coastal areas and rivers, caused by storm activity, high precipitation, and unusual ice and thaw conditions. In coastal areas, delay or diminished ice formation is resulting in larger waves and increased coastal erosion. Flooding can also be related to rapid melting of snow, and breaking of ice dams below glacial lakes.

Up river, extreme precipitation events, and ice jams are two common causes for flooding. NOAA also provides information about river flood risks for major river systems throughout Alaska.

Sea level rise is an emerging concern as glaciers melt and transfer water into the ocean. In formerly glaciated areas of Alaska the ground is rebounding resulting in apparent sea level drop. But, in areas not characterized by glaciers, sea level rise is expected. Permafrost thaw in some areas is resulting in land subsidence which causes a relative increase in sea level. Buoy data on sea level change is available through the National Oceanographic and Atmospheric Administration. The United Nations has global estimates of sea level rise of one-to-two feet over the next 100 years, however these estimate are seen by many as overly conservative.

Exercise

*Describe flood risk in your community and how climate change might change this risk.
Do you know what to do in an emergency?*

131. Has climate change affected your subsistence resources?

Yes No ?

If yes, how?



A drum dump in Chukotka
Photo Courtesy Mike Brubaker, 2008



Storm caused razor clam die off Ninilchik 2010
Photo Courtesy Jamie McKellar



Algae bloom in Kotzebue
Photo Courtesy Alex Whiting, 2009

Food security means having adequate access to safe food all year long. Although Alaskans enjoy an abundance of healthy traditional foods- climate change in some areas is decreasing food availability, mobilizing, man made contaminants, increasing risk of infection and creating conditions that allow natural toxins to thrive.

Some contaminants are natural, such as toxins in wild mushrooms, or those created by algae blooms. There are also bacteria that can grow on food if not stored properly, or that can be passed from animals to people. In a rapidly changing climate understanding these risks is increasingly important.

Alaska has a problem with harmful algae blooms (HAB) in our coastal waters. HABs can produce natural toxins that contaminate shellfish such as mussels and clams. When eaten, these toxins can result in a numbing sensation, paralysis and even death. The most dangerous HAB is *Alexandrium* a dinoflagellate that can cause paralytic shellfish poisoning, also known as PSP.

Warming waters caused by climate change are thought to be one factor increasing the frequency of HABs in Alaska. Shellfish harvested for commercial use is tested by the State of Alaska, and some communities like King Cove, have their own monitoring program to try and provide better information about shellfish harvest risks.

132. Are you concerned about food security in your community?

Yes No ?



Hanging caribou meat on the Kobuk River
Photo Courtesy Mike Brubaker



Charlene Lestenkof cleans salmon at Nikolski
Photo Courtesy Mike Brubaker, 2001



Cleaning oogruk at Sisaulaq
Photo Courtesy Mike Brubaker, 2010

Infectious disease is also a food security issues related to climate change. One example is “brucella” a bacterium that sometimes infects land and sea mammals. It is also a “zoonotic disease”, meaning that people can become infected by coming in contact with the same bacteria that causes the disease in animals. This only occurs very rarely. Since 1973, there have only been 17 reported cases in Alaska. But the fact that brucellosis is difficult to diagnose may mean the disease is not often recognized, and that the rates are actually higher.

The first reported case in traditional foods was in 1959 when an otherwise healthy nineteen year old woman fell ill after eating raw bone marrow from caribou. She was admitted to the hospital with flu-like symptoms, and cured after months of diagnosis and treatment.

Climate change may be playing a role in the spread or increase of this disease and others. Today brucella is still found occasionally in caribou but is now also found in some sea mammals. Infections can be prevented by wearing gloves while butchering game, by cleaning surfaces thoroughly, and by cooking meat.

Are you concerned about food security in your community? Are you able to harvest the amount of food that you need. Are there any food security benefits that you are seeing?



Kwigillingok water supply suddenly disappeared
Photo Courtesy John Warren



Ice storm in Savoonga resulted in power outages and
loss of water service
Photo Courtesy ADN



Water filters in Point Hope become
clogged with organic material
Photo Courtesy Mike Brubaker

Water security means having access to adequate amounts of safe water all year long. But climate change is threatening water security in some communities. Water and sanitation infrastructure is vulnerable to damage or interruption because of extreme weather, permafrost thaw, erosion, flooding, and drought. Communities that depend on surface water such as lakes, reservoirs and rivers are particularly vulnerable. A compromised water system can increase the risk of waterborne diseases such as giardiasis and cryptosporidiosis. Loss of sanitation can result in increased rates of Hepatitis A, Hepatitis B, Bronchitis, Impetigo, Meningitis. Extreme weather such as storms can bring large amounts of rain or snow, causing flooding and pollution. Hot dry weather can quickly melt the snow pack causing floods, while drought can cause water shortages.

Examples of potential climate-related water and sanitation events include:
Nelson Lagoon — Declining shore ice causes damage to water line. (2000)
Kwigillingok—community source water lakes disappears because of permafrost thaw. (2004)
Nunam Iqua—storm surge resulted in salt water contamination of water supply. (2004)
Kiana - erosion canyons resulted from water discharge over vulnerable ice rich soils. (2004)
Kivalina—Delayed freeze up results in increased storm erosion and damage to washeteria. (2004)
St. Paul—Drought results in the drying up of community source water lake. (2005)
Point Hope - increase in organic material in tundra lake fouls water plant filters. (2008)
Kivalina—rapid river bank thaw is linked to high turbidity in water treatment plant (2009)
Savoonga — Delayed freeze up causes ocean spray that downs electrical and water systems. (2011)

133. Is there any infrastructure in your community that is being impacted by climate change?

Yes No ?

If yes, which ones?



Landslide on the Taylor Highway
Photo Courtesy of DOT 2010



Erosion damage to a home in Kivalina
Photo Courtesy Mike Brubaker



Ice road problems on North Slope
Photo Courtesy Ben Greene

Critical infrastructure such as roads, clinics, airports, bridges, waste water systems, land fills, health clinics, railroads, and pipelines are impacted by climate change.

In some cases the impacts are positive, such as increasing the season for making water in Arctic communities. But most are negative such as increasing costs for operation and maintenance. Designing for the future is also a huge challenge as climate is changing rapidly, and what environmental conditions will be like in the future is unknown.

In some communities the threats are so great from erosion and flooding, that they are either relocating or gradually moving to higher ground.

In the community of Newtok relocation efforts are underway. In order to address mounting climate challenges, the State of Alaska developed a Climate Change Strategy which includes a subcommittee and advisory groups to engage different departments and agencies. The group tasked with addressing urgent needs in the most imperiled communities is called the Immediate Action Working Group. Their reports are available online.

Other advisory groups have addressed adaptation, mitigation and research. **Guidance documents have been developed to help communities plan for climate change.** The Sea Grant Marine Advisory Program has published a Climate Change Adaptation Planning Manual. The Center for Climate and Health at ANTHC has been performing climate change health impact assessments at the community level.

134. Are there any other health concerns related to climate change?

Yes No ?

If yes, explain?

Climate change affects the health of wildlife and people. The effects can be either positive or negative. In wildlife, this can mean behavioral change, premature or delayed migrations, increased or decreased competitiveness, changes in forage availability, range change, hunger, disease and illness among many other

effects. In people we can characterize health effects into five general categories: disease, injury, changes to food safety and security, changes to water safety and security, and affects to mental health. Examples of some climate-health connections include:

- High temperatures cause stress in wildlife, making the animals, and the people that use them for food, more vulnerable to infectious diseases.
- Changing ice conditions can makes travel more dangerous, increasing risk of injury.
- Rising temperatures can increase the risk of food poisoning such as from salmonella or botulism in stored traditional foods.
- Thawing permafrost can causes river banks to erode, reducing water quality, and increasing challenges in treating drinking water.
- Violent storms, flooding, and the erosion of the land threatens safety in some communities and can cause stress, anxiety and fear.

Health Impact Assessments look at connections between environmental change and human health. In Alaska, these have been performed in relation to large natural resource development programs and climate change impacts in rural communities.

Interested in health impact assessment? You can get more information by contacting the State of Alaska Department of Health and Social Services, or the Alaska Native Tribal Health Consortium.



Health impact assessment encourages health outcomes
Photo Courtesy ANTHC



Testing blood for contaminants
Photo Courtesy Dr. Valery



Warming can increase the hazards associated with travel in the Arctic
Photo Courtesy of Dr. Alan Parkinson

Here are five things you can do to increase your capacity to address climate change in your community:

1. Sign up for the ANTHC Center for Climate and Health E-News.
2. Become a Local Environmental Observer (LEO) for your community.
3. Host a climate meeting in your community to discuss observations and concerns.
4. Host a 7 Generations Climate Change Training in your community.
5. Participate in the monthly Climate Change Webinars through ACCAP.



Understanding the affects of climate change on people and communities is the first step towards healthy adaptation. Lucy Kenezuroff at her home in King Cove, Alaska
Photo Courtesy of Delores Kochuten