NORTHERN CLIMATE REPORTS USER GUIDE

Sample scenarios for climate and health data

These scenarios were co-created by the **JUst Solutions to Impacts of Climate Exposures for Health in Alaska (JUSTICE-HIA) Project Team** comprised of representatives from:

Copper River Native Association
Igiugig Village Council
Louden Tribe
Native Village of Gakona
Anchorage Health Department Environmental Health Program
Alaska Department of Health Environmental Public Health Program
Alaska Fire Science Consortium
Alaska Native Tribal Health Consortium Air & Healthy Homes Program
Alaska Native Tribal Health Consortium Center for Climate & Health
University of Alaska Anchorage Institute for Circumpolar Health Studies
University of Alaska Fairbanks Scenarios Network for Alaska + Arctic Planning
University of Washington Collaborative on Extreme Event Resilience

Cover Photo: UAF photo by Todd Paris

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NEW TO NORTHERN CLIMATE REPORTS? WELCOME!

What is Northern Climate Reports?

Northern Climate Reports displays comprehensive climate model data at the community level, including projected changes in temperature, vegetation, permafrost, precipitation, hydrology, and flammability.

Users can explore these projections alongside health and demographic information, providing valuable context about the communities that may be affected by environmental changes.

How can I use Northern Climate Reports?

You can use the tool to access community-level information to better understand and reduce climate-related risks, plan infrastructure, manage natural resources, and communicate about changes happening in your community.

This user guide demonstrates how to use the health and demographic information available on the tool alongside climate projections to understand who may be most impacted by these changes. The step-by-step guide walks you through two specific scenarios: program implementation and grant planning.

In this guide, you'll find:

- Example questions related to climate and health that can be answered using the data available in Northern Climate Reports
- Where to locate different types of data on the tool
- How to download and interpret climate and health data from the tool

SCENARIO #1: PROGRAM IMPLEMENTATION

Example topic: Air Quality

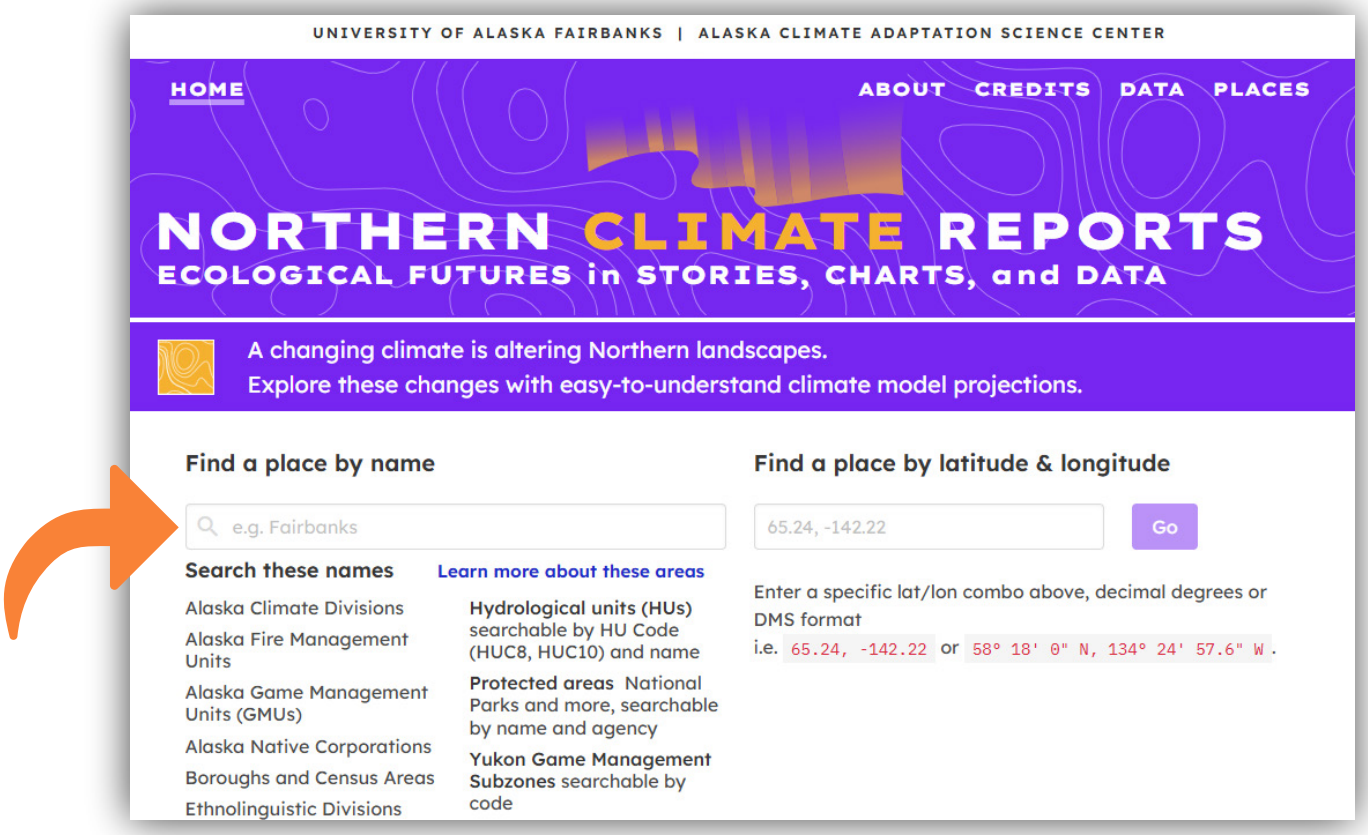
In this scenario, you work on promoting healthy indoor air for a regional community health organization in Alaska. Your organization has received funding to distribute air purifiers to households with residents who have a respiratory/cardiovascular health condition (e.g., asthma, COPD). The organization supports many small communities spread out over a large geographic area. You have a limited number of purifiers and are wondering which of the communities you serve would most benefit from this opportunity. You use **Northern Climate Reports** to answer the following questions about two potential distribution sites:

1. **Is the future risk of wildfire different between the two communities?**
2. **Which community has a higher percentage of residents with respiratory conditions?**

Begin your search with a place name

Begin by searching for each community you are interested in by entering the community name into the search bar or clicking on the map below it.

TIP! If you want a simple way to compare the search results for two locations side by side, search for each one in a separate browser tab or window.

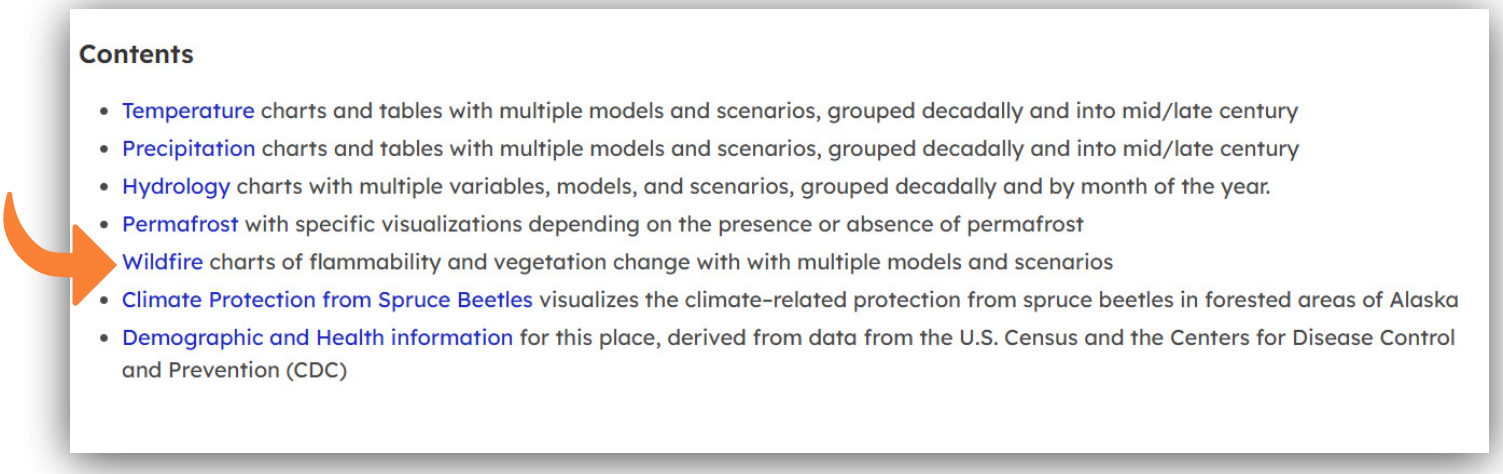


SCENARIO #1: PROGRAM IMPLEMENTATION (cont.)

Question #1: Is the future risk of wildfire different between the two communities?

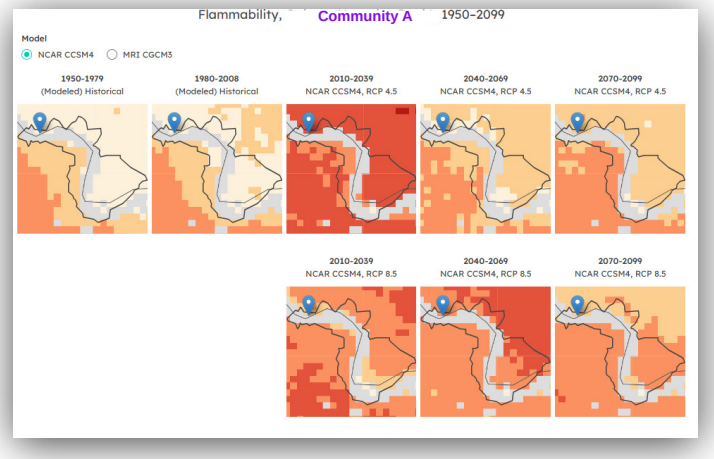
To answer this question, we can look at whether the **projected flammability** (i.e., modeled risk of fire) differs between the two communities of interest.

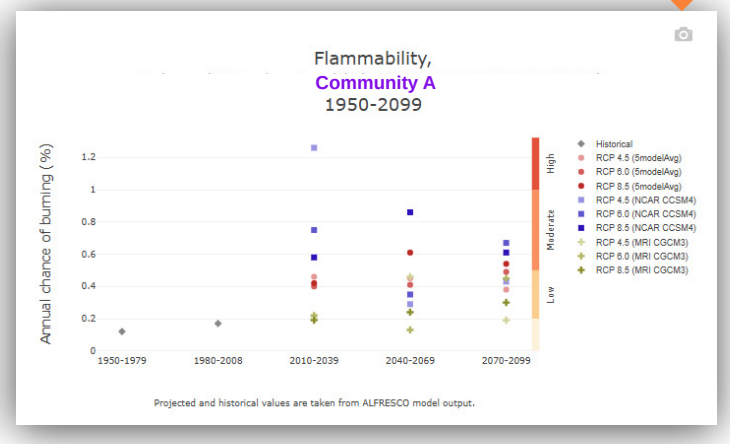
On the community landing page, scroll down to **Contents** in the **Introduction** section.
Click on the **Wildfire** hyperlink.



In the Wildfire section, you will see historical and projected flammability presented in two ways: as maps and a chart.

TIP! You can download a PNG image of the chart by clicking the camera icon in the top right corner:





Projected flammability is displayed and calculated for the area outlined in black on the maps. This area represents the watershed (hydrologic unit) containing your chosen community, which is shown as a blue pin.

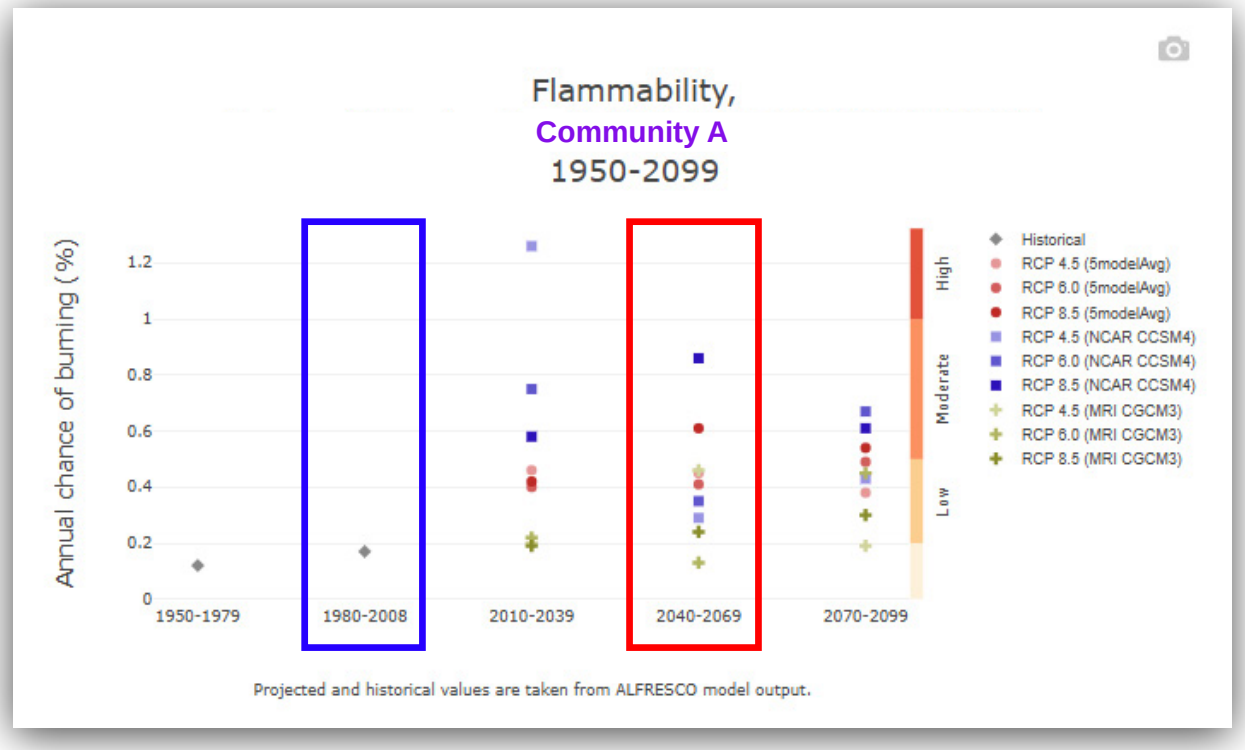
SCENARIO #1: PROGRAM IMPLEMENTATION (cont.)

Interpret the environmental data

The chart shows projected flammability in the area surrounding your chosen location as predicted by several different climate models using different emissions scenarios.

TIP! If you'd like to learn about the different climate models and emissions scenarios in more detail, you can visit the **Data** link at the top of any Northern Climate Reports page.

Projected flammability (shown as individual points in the chart below) can vary widely between climate models even within a single time period, so to answer your question about future wildfire risk in each community, it can be useful to look at general trends over time. Comparing a chosen historical timepoint with a future timepoint can help you understand projected trends in the data:



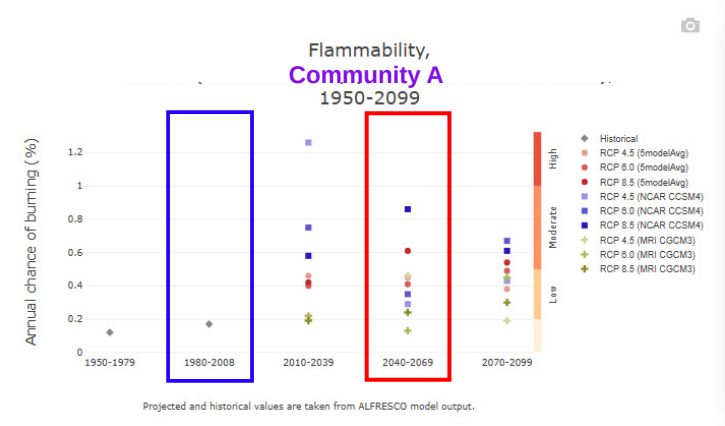
The **blue box (left)** on the chart above shows **historical flammability** in one community. The **red box (right)** shows **projected future flammability for 2040-2069** based on the underlying model data.

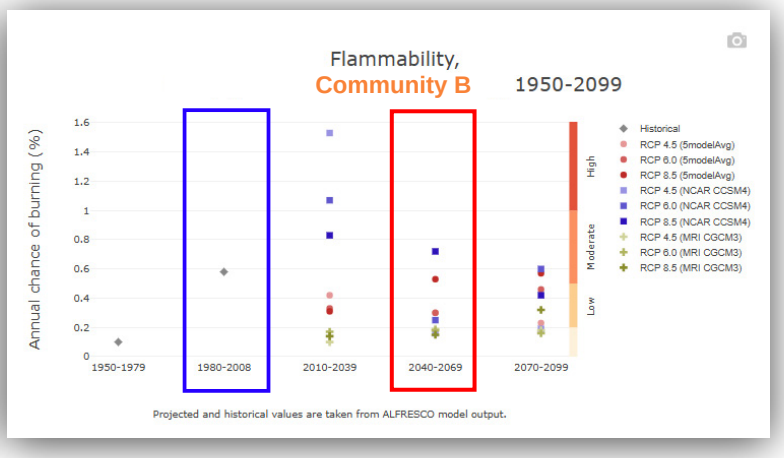
The right side of the chart shows flammability (annual percent chance of burning) grouped into categories to help you interpret the model output: **Low**, **Moderate**, and **High**.

In this case, you can see a general trend toward increased flammability in the future, from **Very Low** to **Low to Moderate.**

SCENARIO #1: PROGRAM IMPLEMENTATION (cont.)

Comparing **historical** and **future** flammability between two communities of interest can help you assess which community may be more at risk of the effects of wildfire in the future:



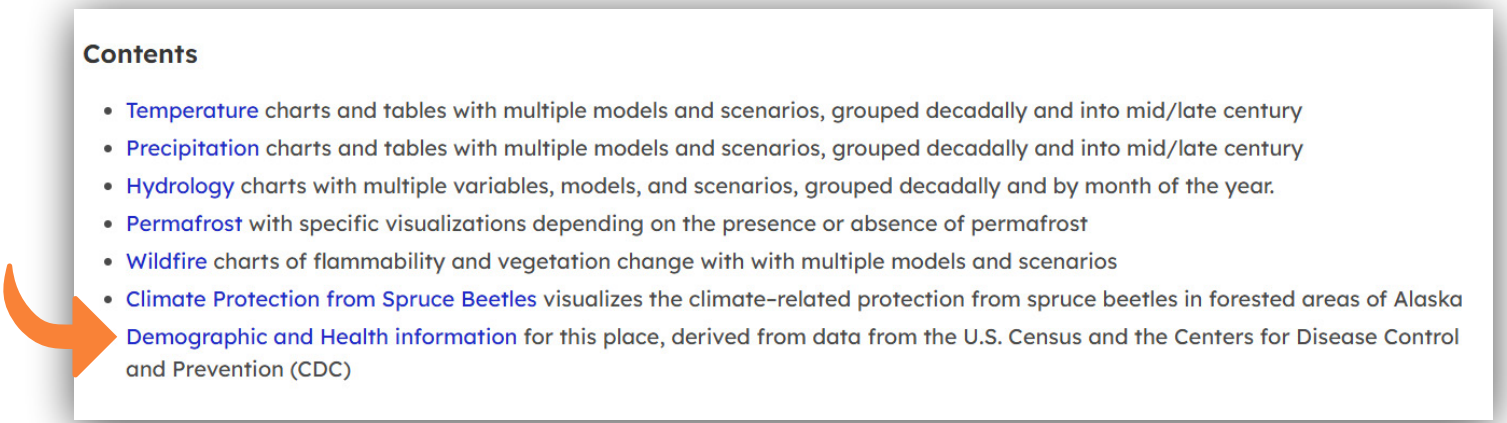


In this example, Community A (left) shows a general increase in projected flammability in future scenarios, from **Very Low** to **Low to Moderate**, while Community B shows projected flammability staying generally about the same or lower compared to historical flammability (**Low to Moderate**).

Question #2: Which community has the highest percentage of residents with respiratory conditions?

To answer this question, we can look at **prevalence of respiratory diseases (asthma and COPD)** in each of the two communities of interest.

On the community landing page, scroll down to **Contents** in the **Introduction** section.
Click on the **Demographic and Health Information** hyperlink. (Note: communities with fewer than 50 adult residents as of the 2020 Census will not have this link available.)



SCENARIO #1: PROGRAM IMPLEMENTATION (cont.)

Scroll to the **Health** section, and find the **Health conditions** table. **Current asthma** and **chronic obstructive pulmonary disease** prevalence for the community will be shown compared to the prevalence in Alaska and the United States:

Health conditions among adults aged ≥18 years, Community A compared to Alaska and U.S.

Condition (Crude prevalence*)	Community A	Alaska	U.S.
Current asthma	12.9% (11.4–14.6)	10.9% (9.7–12.2)	10.5% (9.3–11.8)
Chronic obstructive pulmonary disease	8.7% (7.8–9.6)	6.5% (5.8–7.2)	7.1% (6.4–7.9)
Coronary heart disease	8.1% (7.3–8.9)	6.2% (5.6–6.8)	6.8% (6.1–7.5)
Diagnosed diabetes	12.3% (10.6–14.0)	9.2% (8.0–10.4)	12.1% (10.6–13.6)
Stroke	4.9% (4.5–5.3)	3.3% (3.0–3.6)	3.6% (3.3–3.9)
Frequent mental distress	19.5% (17.6–21.5)	16.7% (15.1–18.3)	17.0% (15.4–18.7)

The **prevalence** is shown as a percentage, with the **confidence interval** in parentheses next to it:

Interpret the health data

Prevalence of chronic disease refers to the percentage of people surveyed (in this case, through a U.S. Census survey) who report being affected by a particular disease. For example, if we survey 1,000 people and find that 100 of them have asthma, the crude prevalence of asthma in this group is 10% (100 out of 1,000). The *crude prevalence* doesn't take into account how things like age or gender might influence the prevalence of asthma; it's just the raw percentage for the whole group.

For our purposes, a **higher prevalence of asthma and/or COPD** in a community indicates a higher percentage of people who might be susceptible to the negative health effects of wildfire smoke.

Confidence intervals (shown in parentheses for each value) show the range where the true value is likely to fall, based on the data collected, with a 90% confidence level. For example, if a confidence interval is 45%–50%, it means we're 90% confident the true value is between 45% and 50%. Wider intervals suggest more uncertainty, while narrower intervals mean more precise estimates.

SCENARIO #1: PROGRAM IMPLEMENTATION (cont.)

Comparing our two communities side by side shows that Community A has a higher prevalence of both asthma and COPD in the population:

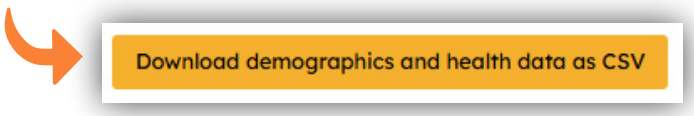
Community A:

Condition (Crude prevalence*)	Community A
Current asthma	12.9% (11.4–14.6)
Chronic obstructive pulmonary disease	8.7% (7.8–9.6)

Community B:

Condition (Crude prevalence*)	Community B
Current asthma	10.1% (8.8–11.5)
Chronic obstructive pulmonary disease	5.7% (5.0–6.3)

TIP! You can download health and demographic data in CSV format for use in common spreadsheet programs by clicking the yellow button at the bottom of the NCR page:



Summarize the data and make decisions

Now let's revisit the questions you asked about your two communities of interest:

1. **Is the future risk of wildfire different between the two communities?**
2. **Which community has a higher percentage of residents with respiratory conditions?**

Based on the data you've accessed from NCR, you determine that **Community A may have higher risk of wildfire in the future**, with flammability projected to increase (from **Very Low** to **Low to Moderate**) by 2070. **Community A also has a higher percentage of residents with current respiratory disease** (12.9% asthma prevalence and 8.7% COPD prevalence, compared to 10.1% and 5.1% respectively in **Community B**).

Based on these data, you decide to distribute your first round of air purifiers in **Community A**, while keeping **Community B** in mind for future outreach efforts.

SCENARIO #2: GRANT PLANNING

Example topic: Traditional Food Sources

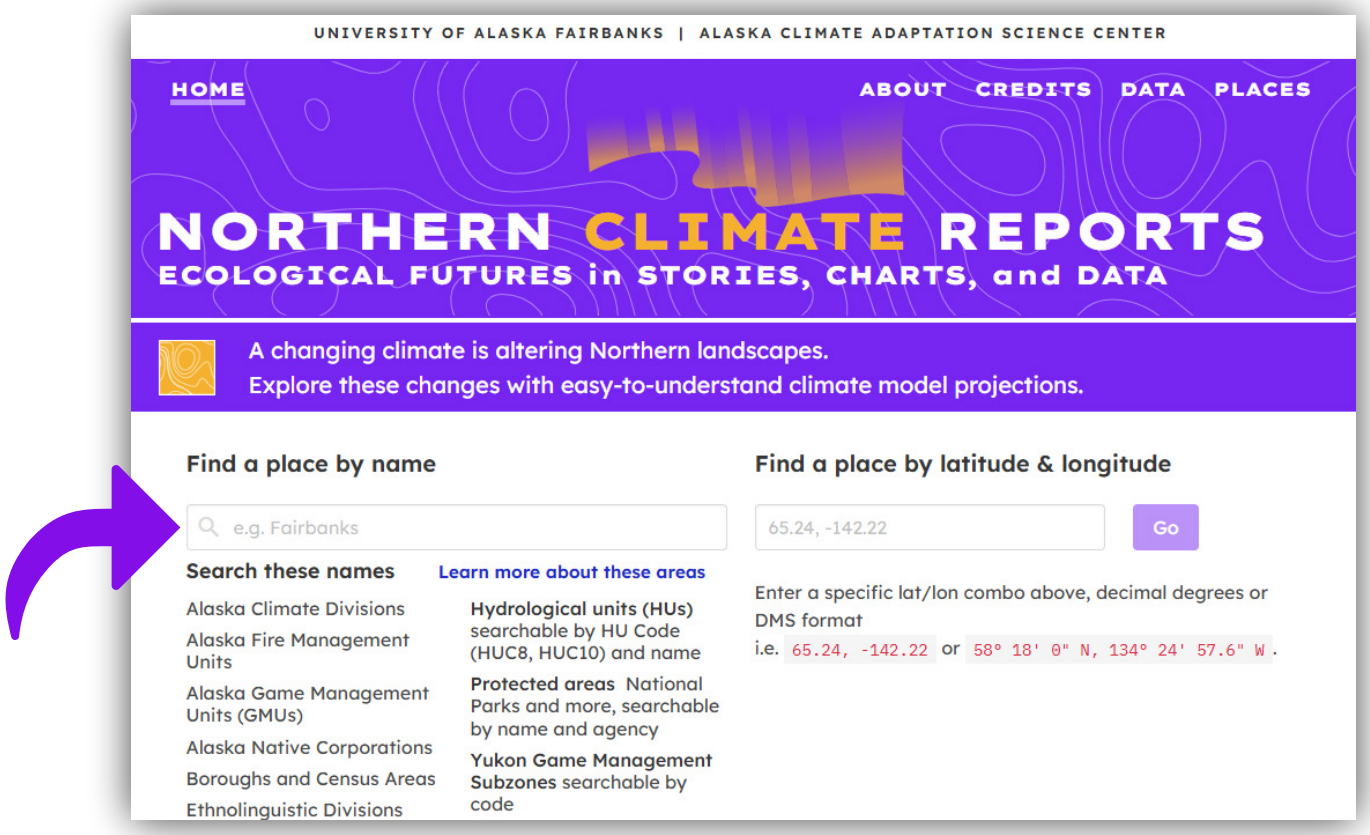
In this scenario, you are the environmental manager for a Tribal community. The community is interested in applying for a grant that will help them better understand and plan for the impacts of climate change on their traditional food sources. Community members are aware, through observation, that warmer spring temperatures are affecting the quality and quantity of important subsistence plant species. In order to complete the grant application, you use Northern Climate Reports to illustrate how spring temperatures are projected to change in the near future and describe why wild foods are important for food security in the community. You start with the following questions:

1. **How are spring temperatures in our community projected to change over the next 20 years?**
2. **What percentage of our community receives food stamps? How does it compare to the statewide percentage?**

Begin your search with a place name

Begin by searching for your community by entering the community name into the search bar or clicking on the map below it.

Note: See below the search bar for other types of places you can search.

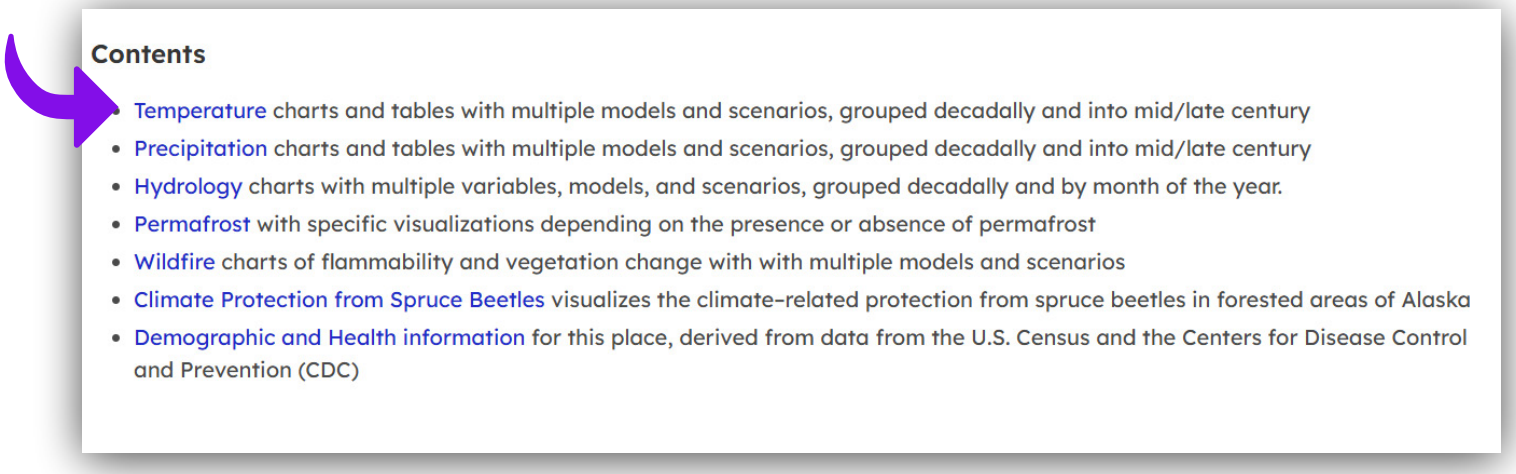


SCENARIO #2: GRANT PLANNING (cont.)

Question #1: How are spring temperatures in our community projected to change over the next 20 years?

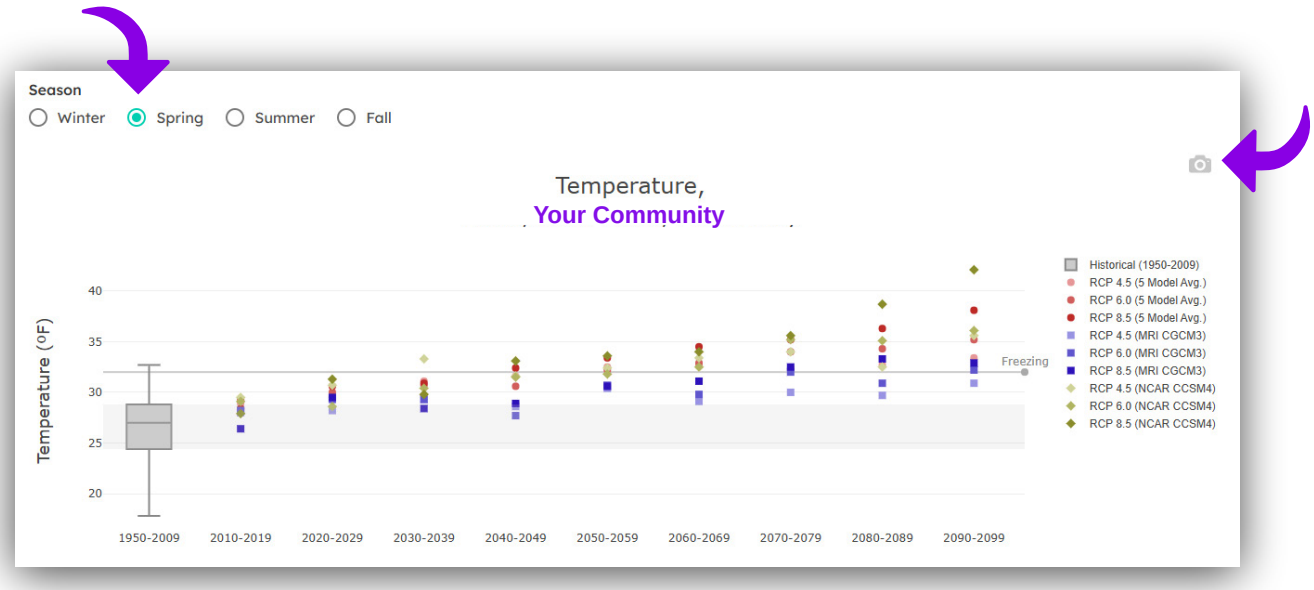
To answer this question, we can look at **spring temperatures** (March through May), both as historical data and projections for the future.

On the community landing page, scroll down to **Contents** in the **Introduction** section.
Click on the **Temperature** hyperlink.



The **Temperature** chart shows historical recorded temperatures alongside projected temperatures for future time ranges, grouped according to season. Click the **Spring** radio button to view spring temperatures.

TIP! You can download a PNG image of the chart by clicking the camera icon in the top right corner.



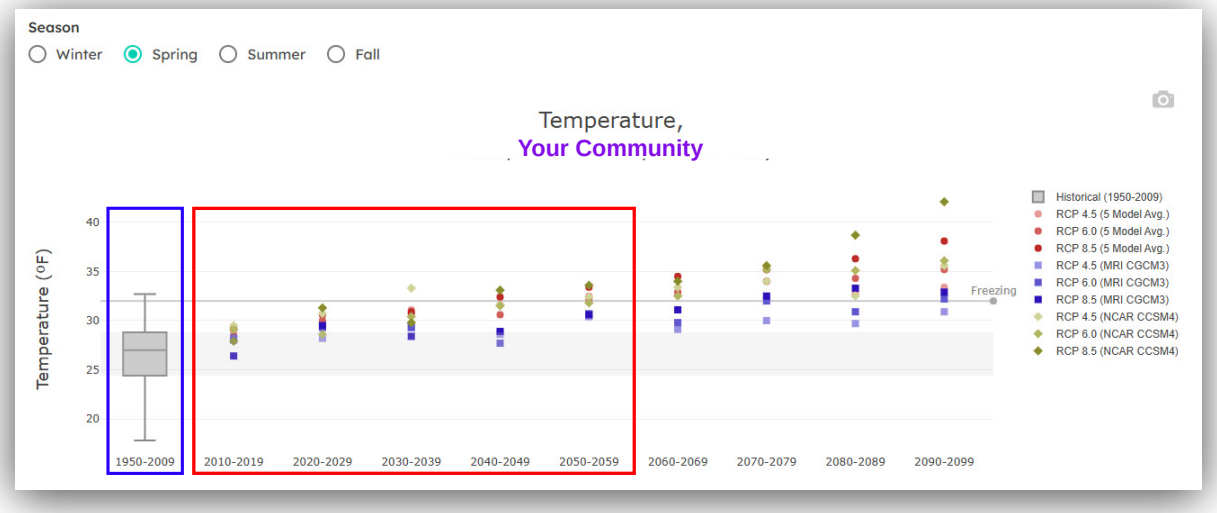
SCENARIO #2: GRANT PLANNING (cont.)

Interpret the environmental data

The chart shows projected spring temperatures at the location you've chosen as predicted by several different climate models using different emissions scenarios.

TIP! If you'd like to learn about the different climate models and emissions scenarios in more detail, you can visit the **Data** link at the top of any Northern Climate Reports page.

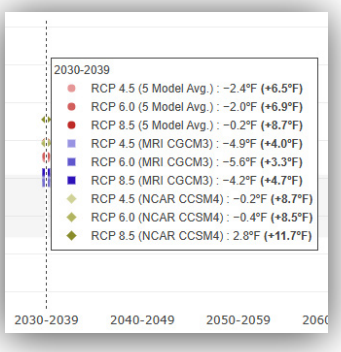
To answer your question about spring temperature change in your community, you can look at general trends shown by the models over the time period of interest (in your case, the next 20 years) as compared to historical measured temperatures:



The **blue box (left)** on the chart above shows historical temperatures in your community. The **red box (right)** shows **projected temperatures** through 2060, grouped into decades, based on the underlying model data.

In this case, you can see general trend toward **increased spring temperatures** during the chosen time period. You can also see model data beginning to project **above-freezing spring temperatures starting in 2030-2039**.

TIP! Hover your cursor over each decade to show numerical values for the model outputs.

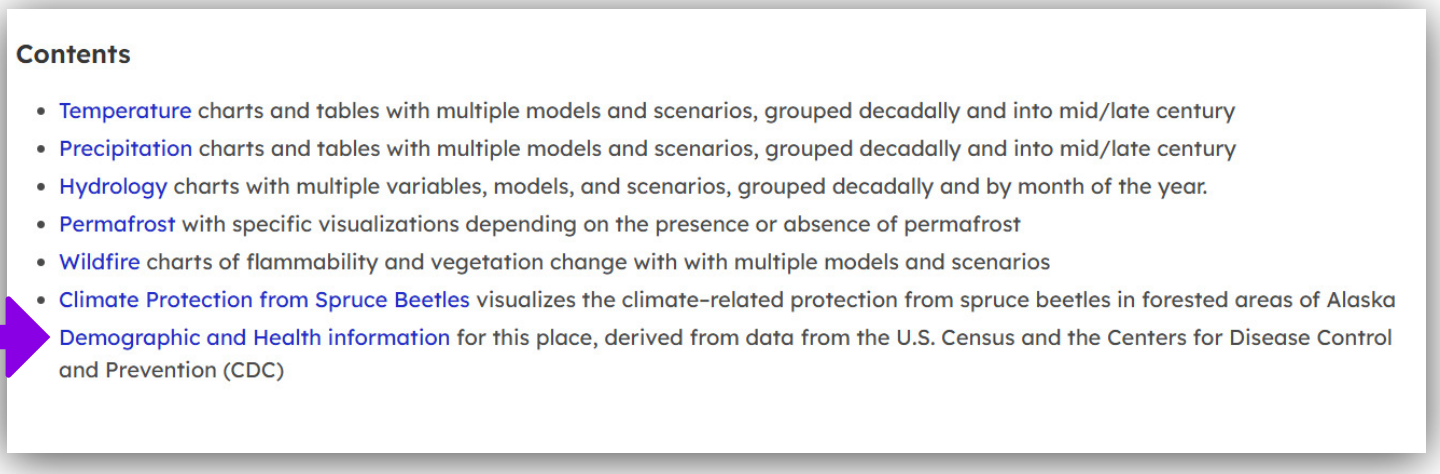


SCENARIO #2: GRANT PLANNING (cont.)

Question #2: What percentage of our community receives food stamps? How does it compare to the statewide percentage?

To answer this question, we can look at **the percentage of the population who received food stamps in the past 12 months**, both in your community and in Alaska as a whole.

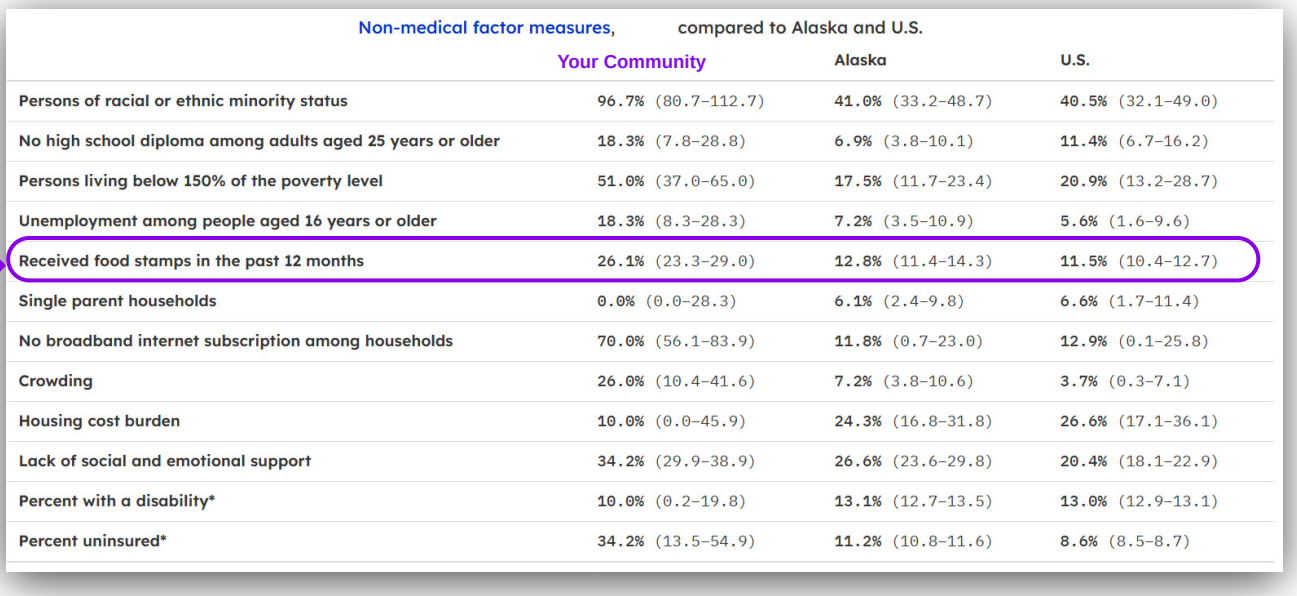
On the community landing page, scroll down to **Contents** in the **Introduction** section.
Click on the **Demographic and Health Information** hyperlink. (Note: communities with fewer than 50 adult residents as of the 2020 Census will not have this link available.)



Contents

- Temperature charts and tables with multiple models and scenarios, grouped decadally and into mid/late century
- Precipitation charts and tables with multiple models and scenarios, grouped decadally and into mid/late century
- Hydrology charts with multiple variables, models, and scenarios, grouped decadally and by month of the year.
- Permafrost with specific visualizations depending on the presence or absence of permafrost
- Wildfire charts of flammability and vegetation change with with multiple models and scenarios
- Climate Protection from Spruce Beetles visualizes the climate-related protection from spruce beetles in forested areas of Alaska
- Demographic and Health information for this place, derived from data from the U.S. Census and the Centers for Disease Control and Prevention (CDC)

Scroll to the **Health** section, and find the **Non-medical factor measures** table. Data for **Received food stamps in the past 12 months** will be shown as a percentage of the community population, compared to percentages of Alaska and the United States:

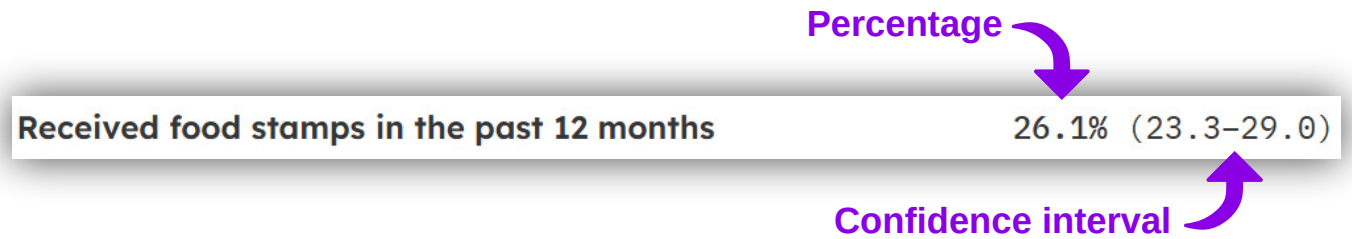


Non-medical factor measures, compared to Alaska and U.S.

	Your Community	Alaska	U.S.
Persons of racial or ethnic minority status	96.7% (80.7–112.7)	41.0% (33.2–48.7)	40.5% (32.1–49.0)
No high school diploma among adults aged 25 years or older	18.3% (7.8–28.8)	6.9% (3.8–10.1)	11.4% (6.7–16.2)
Persons living below 150% of the poverty level	51.0% (37.0–65.0)	17.5% (11.7–23.4)	20.9% (13.2–28.7)
Unemployment among people aged 16 years or older	18.3% (8.3–28.3)	7.2% (3.5–10.9)	5.6% (1.6–9.6)
Received food stamps in the past 12 months	26.1% (23.3–29.0)	12.8% (11.4–14.3)	11.5% (10.4–12.7)
Single parent households	0.0% (0.0–28.3)	6.1% (2.4–9.8)	6.6% (1.7–11.4)
No broadband internet subscription among households	70.0% (56.1–83.9)	11.8% (0.7–23.0)	12.9% (0.1–25.8)
Crowding	26.0% (10.4–41.6)	7.2% (3.8–10.6)	3.7% (0.3–7.1)
Housing cost burden	10.0% (0.0–45.9)	24.3% (16.8–31.8)	26.6% (17.1–36.1)
Lack of social and emotional support	34.2% (29.9–38.9)	26.6% (23.6–29.8)	20.4% (18.1–22.9)
Percent with a disability*	10.0% (0.2–19.8)	13.1% (12.7–13.5)	13.0% (12.9–13.1)
Percent uninsured*	34.2% (13.5–54.9)	11.2% (10.8–11.6)	8.6% (8.5–8.7)

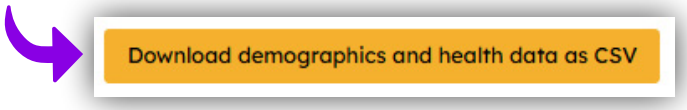
SCENARIO #2: GRANT PLANNING (cont.)

The **percentage** is displayed with the **confidence interval** in parentheses next to it:



Confidence intervals show the range where the true value is likely to fall, based on the data collected, with a 90% confidence level. For example, this confidence interval of 23.3%–29.0% means we're 90% confident the true value is between 23.3% and 29%. Wider intervals suggest more uncertainty, while narrower intervals mean more precise estimates.

TIP! You can download health and demographic data in CSV format for use in common spreadsheet programs by clicking the yellow button at the bottom of the community page:



Summarize the data

Now let's revisit the questions you asked about your community:

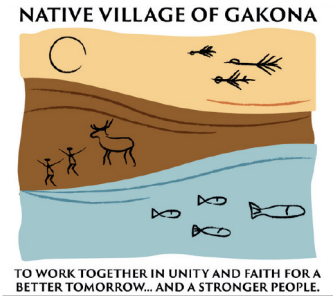
1. **How are spring temperatures in our community projected to change over the next 20 years?**
2. **What percentage of our community receives food stamps? How does it compare to the statewide percentage?**

Based on the data you've accessed from NCR, you can see that:

- Spring temperatures are **projected to increase** over the next 20 years, and **may increase from below freezing to above freezing**. Based on community observations, this could lead to changes in quantity and quality of important plant food sources and may affect when foods are ready for harvest in future seasons.
- As of 2020, about **26% of people in your community receive food stamps**, compared to about **13% of Alaska's population**. These numbers suggest that your community may be more food-insecure in general than the state average.

In preparing your grant application, you can use these data as evidence that continued access to wild foods is important for the well-being of your community members, and that this access may be increasingly affected by the near-term effects of climate change.

NOTES



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