



Alaska Climate Change Adaptation Planning Tool

“The future ain’t what it used to be.”—Yogi Berra

It’s no joke. Alaska is changing before our eyes.

- Spring is coming earlier and freeze-up later.
- Sea ice is disappearing from the Arctic.
- Permafrost is thawing in places where it never did before.
- Severe storms and floods are occurring more frequently.

What’s more, scientists who study Alaska’s lands, oceans and atmosphere predict even greater changes between now and the end of this century.

Not all change is harmful, and some may be beneficial. Milder winters may lower heating costs, agriculture may prosper, and useful stocks of fish or wildlife may become established in your area. But many changes are already causing problems and indications are that in the long term, life in Alaska will be very different from what it is now.

About this Adaptation Planning Tool

This adaptation tool can help you and your community think about ways to adapt to changes you are already experiencing or that you expect in the future. It will help you identify impacts environmental changes may have on your community (“assess vulnerabilities”), devise strategies for coping with these changes, and locate resources to help. It consists of **eight steps** to help you create your own **adaptation plan**.

To **create your plan**, read through this document and then, using it as a guide, fill in your answers using the “**Adaptation Plan for this Community**” template file, a Microsoft Word document. Replace the text in brackets in that document with your own information. Download the template file on the *Adapting to Climate Change in Coastal Alaska* web page at <http://marineadvisory.org/climate>.

1. Why Adaptation?

Many people are working to halt climate change through efforts to cut emissions of greenhouse gases. But this will take decades, if it succeeds at all, and the effects of changes now under way will last many decades more. Meanwhile, you can begin to prepare for change to minimize the harm to your family and community. Adaptation saves money, protects lifestyles, and in some cases could actually save lives.

The goal of adaption is a **resilient community**. A community can be a town or village, a social or cultural group such as a Native tribe, or a group of people with a common interest, such as commercial fishermen or coastal property owners. Everyone is a member of at least one community. “Resilient” means able to absorb disturbance while continuing to exist in the usual way.

Step 1: Identify your community or communities. If your community is a place, write a line or two about the planning area you’re concerned about.

2. Why Plan?

Why do adaptation planning? What do you want to accomplish? Different people have different motivations.

- Some people are just **curious**. They’re not sure whether climate change is real, or what they can do about it, so they just want to find out what the fuss is about.
- Some people are concerned about their **property** or community **infrastructure**; they want to know how to protect houses, roads or airstrips.
- Others wonder if there is still a **future for their fishing or other business**.
- For some, the biggest concern is whether they will be able to continue **subsistence harvesting** or other traditional activities.
- Some may be looking for new **business opportunities**.

Step 2: Write a short statement about your reasons for doing adaptation planning.

3. Climate-Related Environmental Change

We confront many kinds of change in life—political, social and technological. In Alaska **changes in the natural environment** are especially important since most Alaskans live close to nature and are directly dependent on natural resources.

Examples of potential change in Alaska related to climate and weather

Natural systems

- Fewer (or more) fish may be available to commercial, sport, or subsistence users.
- Abundance or distribution of game animals may change.
- Drought or flooding may increase.
- Land- and water-navigation seasons may become longer and ice-road seasons shorter.

Infrastructure (the “built environment”)

- Homes and public buildings may be damaged by erosion, fire, or permafrost thaw.
- Roads, bridges and airstrips may be damaged or destroyed.
- Destruction of seawalls and other structures to control water may occur.
- Town or village water and sewer systems may be damaged or services disrupted.

Health and culture

- Disease may increase, and some kinds of injuries may occur more often.
- Healthy food sources may decrease (or increase).
- Sanitation may be compromised.
- Graves or sites of archeological importance may disappear.

Other economic activities

- Oil, gas and mining exploration may become easier or (more difficult).
- Transportation patterns may change.
- Some tourism opportunities may expand, and others may diminish.

Changes to the physical environment already observed in Alaska

- **Rainfall** has increased in many areas, and **snowfall** has decreased.
- Some regions are experiencing more **flooding** and **riverbank erosion**.
- Most of Alaska's **glaciers** are retreating.
- **Storms** are becoming more frequent, and **storm surges** are becoming more destructive.
- **Sea ice** forms later in the fall and retreats earlier in the spring, and sea ice is thinner.
- The **growing season** (the number of frost-free days) is getting longer.
- The **tree line** is moving north and up slope to higher elevations.
- **Permafrost** is thawing where it previously didn't.
- **Ice-dependent animals** (walrus, polar bears) are changing locations.
- Commercially valuable **fish and shellfish** stocks are shifting north.
- Some **migratory birds** no longer fly south in the fall.
- Some kinds of **wildlife**, including moose and beaver, are expanding their ranges.
- **Invasive plants** have become established where they previously could not survive.
- **Harmful algal blooms** have caused sickness from shellfish poisoning.
- A **fish disease** has made large numbers of Yukon River king salmon inedible.
- **Insects** have killed large expanses of forest.
- More **people get sick** from water-borne diseases, are being stung by insects, and have suffered from allergies that result from increases of certain plants.
- The **ocean water is becoming more acidic** and eventually will reduce the availability of plankton that is important food for salmon.

Alaskans are witnessing all of these changes, and their observations are backed up by measurements and records kept by scientists.

Step 3: List changes you have observed or have heard about from friends or relatives in your community. Note how those changes impact your community.

4. Assessing Your Vulnerability to the Effects of Climate Change

Vulnerability is “the capacity to be harmed.” Every person and every community is vulnerable to some kinds of change. You can do a simple vulnerability assessment to identify potential environmental impacts on your community.

Based on the list you made in Step 3, identify ways you or your community could be affected by environmental change. Perhaps your home could be damaged, lost or flooded; subsistence food resources or commercially important fish might disappear; clean drinking water may be threatened. **Exposure** is the term for these potential impacts. **Risk** is a measure of the severity of an impact if it occurs, and the likelihood that it will occur.

You can indicate your community’s level of risk by doing a simple **vulnerability risk matrix** (see page 7). For each exposure indicate the sensitivity (potential severity or seriousness) of an event by giving it a number (ranging from 1 for low to 5 for high) and the risk (probability or likelihood) that it will occur (from 1 for unlikely to 5 for very likely or certain). Multiply the two numbers. Doing this kind of numerical assessment helps you prioritize your exposures so that you plan to adapt to those that pose the greatest threat.

A community’s risk can be balanced by its **adaptive capacity**. For example, if you are trained in hazard mitigation or if you have access to technology that can help minimize the harm, your community has adaptive capacity. For a vulnerability assessment, assign your adaptive capacity a number (from 1 for little to none to 5 for very high) and subtract that number from the risk assessment totals that you calculated above.

Step 4: Assess your community’s vulnerability by calculating the risk of each potential impact you identified in the section above. Factor in adaptive capacity. Prioritize your exposures, with priority # 1 being your community’s greatest vulnerability.

5. Being Prepared—What Are Your Goals?

The first step in planning is to **determine what you want to accomplish**. State some goals you want to achieve and objectives to reach in pursuit of those goals.

Goals are general statements about the desired long-term outcome you want. A goal statement could be “Prevent damage or loss of property to flooding or inundation resulting from severe storms and sea level rise.”

Objectives are statements about particular accomplishments or outcomes important for achieving a goal. For example, “By year 2020 at least 90 percent of residents in our community will live in homes that are out of the reach of predicted flooding.”

Planners use the expression **SMART objectives** for objectives that are *s*pecific, *m*easurable, *a*chievable, *r*esults-oriented, and *t*ime-bound.

Step 5: Write goal and objective statements for each of the vulnerabilities you identified in the previous step.

6. Adaptation Measures

Measures are specific actions that increase adaptation and resilience. Measures can include anything from gathering information to creating zoning plans to protect property, to building protective structures.

Adaptation measures can either build **adaptive capacity** (for example, gathering information, building technical expertise or enlisting assistance) or deliver **adaptive actions** (for example, installing defensive structures or cutting firebreaks to limit wildfire damage). **Governments, individuals, families or small groups** can take measures to achieve their goals.

Each proposed adaptation measure should be considered in light of the following:

- Does it **provide direct benefits**, such as protecting property or health?
- How **effective** is it at solving the problems it is intended to address?
- How much **would it cost** and **who would pay**? What's the benefit/cost ratio?
- Is it **practical**? Is it technically **feasible**, socially and culturally **acceptable**, and **equitable**; would it help some people while harming others?

“No-regrets” measures produce benefits independent of any climate change-related effects. Benefits exceed costs whether there is climate change or not. For example, in an area where inundation is a threat, designating a protected space to serve as a buffer against higher water levels can also be used for parking or storage. **“Low-regrets”** options can produce big benefits at relatively low cost and produce a high benefit-cost ratio. An example might be protective land-use planning for areas not yet developed. **“Win-win”** measures enhance adaptive capacity or have other social or economic benefits; they address climate change impacts and also contribute to solving other community problems. A win-win measure could be developing a community hazard and prevention response team that could provide services in the event of climate-related or other kinds of community emergencies.

Flexible or **adaptive management** options can be applied one step at a time, so they can be modified if new information becomes available or the situation changes.

Doing nothing may be appropriate for low-priority impacts or where other factors outweigh climate-related risks, but shouldn't simply result from lack of information.

There is no catalog of adaptive measures to climate change impacts in Alaska. Ingenuity is the key. Alaskans have long overcome environmental challenges.

Step 6: List adaptation measures for each of the change impacts identified in Step 3. Consider costs, benefits, effectiveness and practicality.

7. Implementation

Implementation means applying measures to achieve your goals and objectives. It may take years. You may need help from technical specialists, local governments or agencies of the state or federal government. It is important to **build a team** for climate change adaptation. Even if you see yourself as “just” a community member, you can help motivate and direct the efforts of agencies and governments.

To guide this process, develop a simple **implementation plan**. It should address:

- Partners and sources of technical assistance if needed
- Costs, and sources of funding
- Sequence of steps, including a timeline

Step 7: Write a brief implementation plan for your community, taking into account the points listed above.

8. Looking Forward

Once you have begun applying adaptation measures, it’s important to measure your progress and evaluate your results. This can be done with a formal or informal **evaluation**. Be sure to stop and take stock once in a while, and look for ways to improve your program, even if that means redesigning parts of it. Information on project evaluation is available from many sources.

Your implementation plan may require you to find **funding, technical expertise, and organizational support**. Many federal, state and local government agencies and organizations stand ready to assist.

Sharing information is an important part of adaptation, and by working with others everyone can be more effective. Please contact the Marine Advisory Program, the Cooperative Extension Service, or the Alaska Center for Climate Assessment & Policy to tell us what you have learned.

Step 8: Write out notes for future reference on locating sources of support, conducting evaluations, and sharing experiences and results with other communities.

Vulnerability Risk Matrix

Total = (Sensitivity × Risk) – Adaptive Capacity

Exposure	Sensitivity	Risk	Adaptive Capacity	Total
Example: Homes damaged	5	3	4 (e.g., can rebuild; alternate homesites are available)	11



Adaptation Plan for [This Community]

[Replace text in brackets with information specific to your own plan and community.]

Our Community

[Identify your community or communities, including the planning area you're concerned about.]

Our Motivations

[A short statement of your reasons for doing adaptation planning.]

Observed, Measured and Predicted Changes

[A list of changes and how those changes impact your community.]

Our Community's Vulnerabilities

[A description of your community's vulnerabilities and adaptive capacity. Prioritize exposures, with priority #1 being your community's greatest vulnerability.]

Goals and Objectives to Address These Vulnerabilities

[Goal and objective statements for each of the vulnerabilities identified above.]

Adaptation Measures

[A list of adaptation measures for each of the change impacts, including costs, benefits, effectiveness and practicality.]

Implementation Plan

[A brief implementation plan for your community.]

Follow-up

[Notes and ideas for the future, including sources of support, evaluation of progress, and plans for sharing results.]

Template created by Alaska Sea Grant Marine Advisory Program (MAP) as part of a climate change adaptation project supported by the Alaska Center for Climate Assessment and Policy. For more information, visit MAP's climate change adaptation website at <http://www.marineadvisory.org/climate>.