



# **Promoting Generations of Self-Reliance:**

Stories and Examples of Tribal  
Adaptation to Change

August 12, 2011

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## INTRODUCTION

The world is our one and only home. We are all on a long road and it will take all of our best efforts to preserve this beautiful world for our children's children. The challenges associated with a changing climate are not new to tribal communities. Since time immemorial, Native peoples have shown resiliency and adaptability in the face of extreme conditions and changing ecosystems. More recent and rapid change in the environment, and the resulting pressures on culture and ecology, require immediate attention and planning on the part of tribal communities throughout Alaska and the Pacific Northwest.

To support self-determination as Native people and to adapt to environmental changes, action must be taken now by Tribes, perhaps in partnership with other communities, agencies, and organizations. This collection of adaptation practices and strategies presents practical examples for tribal environmental managers and leadership to consider applying to their own unique circumstances. Although there is no strategy that can be universally applied, this guide may spark new ideas for creating effective tribal responses. Tribes can incorporate these models into their planning, programs, strategic plans and funding requests.

This document suggests three components for communities to consider when planning for, implementing, and evaluating long-term adaptation goals. Adapting to change first requires a plan with strong community support. Tribes must then have practical steps for realizing this plan and for taking immediate action. Finally, because change is on-going, continuous evaluation is required to assess the success of actions already taken and ensure the long-term health of the community. Additional adaptations to climate change will become apparent with time; these strategies can be incorporated into this framework. Forming partnerships with organizations outside of the tribal community may also provide a great support system to continue building the capacity to adapt for many generations.

We recognize that each tribal community will begin and continue this journey to adapt to climatic change at a different place. While each component is important for building long-term resilience, each community will have to decide which models are most appropriate in their particular context.

The following Tlingit legend beautifully highlights the perseverance and core values demonstrated by Native people as they adapt to the change around them. This is just one example of many tribal stories and legends which speak of the strong will of the people needed to create resilient communities.

## THE BEGINNING OF THE TLINGIT NATION & THEIR PERSEVERANCE IN ADAPTATION

As retold by Mr. Robert Willard Jr., or Kitch Nautht of the Raven/Beaver Clan, Angoon, Alaska.

This is the story of the Tlingit National Anthem, a song that entwines our people with their past and keeps our ancient heritage alive. At potlatch ceremonies, Tlingit Elders sing the anthem and tell how the Tlingit Nation came to be, passing the story on to new generations.

Long ago, the Tlingit Indians lived in the area now called British Columbia and the Yukon Territory. They decided to move from this region of lakes to the great ocean, now called the Pacific, where they heard the fish were abundant. When all the clans assembled they began a great trek through the mountain canyons leading to the sea.

Many, many miles later the way was blocked by a glacier that filled the canyon. Going back in search of a different route would be a long and wasting journey; so the leaders, both women and men, climbed the mountain to look for a safe way around the ice. There was none. They saw a stream flowing from the narrow mouth of the glacier which emptied into a great bay on the distant side. This passage under the glacier seemed too dangerous, though, the ice caverns too narrow to pass through. Determined to continue the migration to the ocean the leaders met to plot a new course.

Then, four women stepped forward and volunteered to journey beneath the glacier. Two were barren, one was a widow and the fourth was well along in years. The women had no children to nurture and protect so, the men built a raft of logs and the women set forth early next morning. The hopes of the leaders were renewed and they once again climbed the mountain keeping watch all morning and into the afternoon.

Toward evening they heard distant voices calling from the bay. It was the four women waving their arms and shouting, "We made it, we made it through under the ice". Then, the youngest and strongest of the Tlingits set out for the other side. When they arrived they began building large boats for the next part of the journey and explored the region beyond the glacier for a safe place abundant in resources. Then, all of the Tlingit people followed behind them on the path. Three days and three nights later they came through the ice caverns. So, they set up camps and rested.

The next day, the people asked the Great Spirit to be with them on their journey. They decided to row in all directions and settle as much unoccupied territory as possible. It was a sad, sad day as the people sang goodbye to their uncles, aunts, cousins and friends. They wept as they rowed, but it was the beginning of the Tlingit Nation which today occupies more than twenty-three million acres of land and water in Southeast Alaska.

# COMPONENT 1:



## FORMULATE A PLAN WITH HOLISTIC COMMUNITY SUPPORT

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### Establish Support from Tribal Leadership

Ultimately the best strategies require participation by the entire Tribe. Effective programs start when tribal leadership makes addressing climate change a priority. It is helpful to bring the tribal members together to talk about the changes they have observed and experienced in the environment. Many strong partnerships begin with community-wide discussions of the problems created by climate change. Collect and share data and observations as you begin to prioritize community actions based on burden and magnitude of risk. Keep lines of communication open with everyone who is affected and encourage their participation.

#### Plan of Action:

**1) Raise awareness and create pathways where climate change adaptation planning supports traditional Tribal practices.**

With their climate initiative, the Swinomish Indian Tribal Community in LaConner, Washington built alliances with local organizations, used video storytelling, used the Tribal newsletter and brought together youth and elders to take collective action to address climate change. They recognized existing mechanisms of support and integrated climate concerns into other sectors of the community such as Enforcement, Education, Cultural Groups, Social Services, Health, and Fisheries.

**2) Develop data mapping capabilities to further understand climate change specific to your community and region.**

Document and track environmental changes and, following Council approval, share this information with other communities in the surrounding region. The data can be entered into free and accessible mapping software, similar to

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Website:

[http://www.swinomish.org/climate\\_change/Docs/SITC\\_CC\\_AdaptationActionPlan\\_complete.pdf](http://www.swinomish.org/climate_change/Docs/SITC_CC_AdaptationActionPlan_complete.pdf)



more expensive Geographic Information System (GIS) programs, which allows you to observe conditions geographically and spatially on a map. One idea is to follow step-by-step instructions to create an inexpensive data collection tool which looks like a balloon.

The Center for Climate and Health at the Alaska Native Tribal Health Consortium also helps tribal communities gather and assess health and climate data. A complimentary resource may be to contact neighboring Tribes to see what kind of mapping they've done and what systems or agencies they have used to gather the information.

### **3) Use and contribute to observation and data collection networks.**

Consider using Sustaining Arctic Observing Networks (SAON) which are comprised of representatives from the eight Arctic countries, permanent participants in the Arctic Council, and Arctic Council working groups. They are also connected to Arctic science and data collection groups as well as global observing systems. These networks rely on observations and input from communities and researchers in the Arctic region. Their findings are available for all users and they promote communication, cooperation and coordination.

Another developing model is to partner with Landscape Conservation Corps (LCC) and USGS Climate Science Centers (CSC). By joining these efforts, Tribes can join data collection and exchange as well as receive technical and scientific support within their own geographic region. There are multiple LCCs and CSCs in the Pacific Northwest and Alaska.

### **4) Arrange for experts working on climate change projects in your general vicinity to hold a community workshop.**

Scientists often have this function as a requirement to their project and will embrace being asked to speak to community members. Scientists can also work in conjunction with tribal leaders to address aspects of change. Many changes, such as ocean acidification, have not been experienced by humans so traditional knowledge will need partnership with western science as we navigate the next 100 years.

#### **Contact**

Jeffery Warren

Email: warren@mit.edu

Website:

<http://grassrootsmapping.org/about/>

*Guidebook:*

<http://grassrootsmapping.org/illustrated-guide.pdf>

#### **ANTHC Website:**

<http://www.anthc.org/chs/ces/climate/index.cfm>

#### **Contact**

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Website:

<http://www.arcticobserving.org/>

#### **Contact**

LCC Website:

<http://www.fws.gov/science/shc/lccbasics.html>

CSC Website:

<http://www.doi.gov/whatwedo/climate/strategy/CSC-Map.cfm>

#### **Contact**

Please refer to the organization and university listings in Component 3

# Create a Climate Action Committee

**W**ith the direction and support of the tribal leadership, consider forming a climate committee who will be able to support research, implementation, and evaluation efforts as well as facilitate communication among stakeholders such as community members, tribal leadership, and local, state, and federal governments. This committee can then begin to take the gathered information and integrate it into an Adaptation Plan in order to prioritize risk and begin to highlight important next steps.

## Plan of Action:

- 1) Identify a group of people from multiple areas of expertise such as emergency planning, forest management, and facilities management and then give the group a specific vision for their role in adaptation planning.**

The Coquille Indian Tribe in North Bend, Oregon established a diverse Climate Change Committee which was tasked to understand the specific causes and effects of climate change in their community, evaluate the impacts of current and future practices and policies, and make recommendations to tribal membership for appropriate action.

**Contact:**

Website:

[http://www4.nau.edu/tribalclimatechange/tribes/northwest\\_coquille.asp](http://www4.nau.edu/tribalclimatechange/tribes/northwest_coquille.asp)

- 2) Use an Adaptation Planning Manual to determine community-specific vulnerabilities and risks.**

This provides an opportunity to document and organize observations, goals, and strategies. This can be started by someone in the tribe and reviewed both internally and externally by tribal leadership and local experts. There are a variety of manuals describing this process and there are more being developed. Under a vulnerability assessment, the hazards exacerbated by climate change are identified within the region and response initiatives are conducted according to priority of risk.

The community of Whitehouse, Canada provides an example of a vulnerability assessment and adaptation plan conducted in partnership with the Northern Climate Exchange.

**Contact:**

Website:

<http://www.taiga.net/nce/adaptation/whitehorse.html>

One example of an adaptation planning guide can be found through the Alaska Sea Grant program at:

<http://seagrant.uaf.edu/map/climate/docs/adaptation-planning-tool.pdf>

Or by accessing the website at:

<http://seagrant.uaf.edu/map/climate>

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ITEP has also developed a template which provides guidelines and suggestions for writing an adaptation plan and includes key terms and additional resources. The template is intended to be used for organizing and presenting information but is not meant to create a "one-size fits-all" plan, as each Tribe will have unique needs and approaches to planning for climate change.

A Climate Change Scenario Guide has been produced by The Victorian Centre for Climate Change Adaptation Research (VCCCAR) and is a great resource for decision-makers trying to understand, manage, and plan for change.

*Guidebook:*

[http://www.vcccar.org.au/files/vcccar/SPCA%20REPORT\\_FINAL\\_200711.pdf](http://www.vcccar.org.au/files/vcccar/SPCA%20REPORT_FINAL_200711.pdf)

Another more formal adaptation tool which may be more appropriate for larger Tribal communities can be found through the ICLEI: Local Governments for Sustainability website.

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Email:  
enquiries-vcccar@unimelb.edu.au  
Website:  
<http://www.vcccar.org.au/>

**Contact:**

Website:  
<http://www.icleiusa.org/adaptation>

## Identify a Point-Person

Many efforts to initiate change in a community begin with one passionate person. This person commits time and energy to seeing projects through from inception to completion. This coordinator will be the main point of contact for further implementation strategies and for finding sources of funding to cover project costs. It is important for Tribes to identify someone who knows the community well and who is willing to attend meetings and trainings to learn about available resources and opportunities.

### Plan of Action:

#### 1) Attend an Institute for Tribal Environmental Professionals (ITEP) Training

Courses include:

- *Climate Change on Tribal Lands*

This course provides the basic science of climate change and its impacts on human health and the environment. This is an entry-level course open to tribal environmental professionals interested in learning about climate change and who wish to educate their communities about it.

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Website:  
<http://www4.nau.edu/itep/climatechange>



- *Climate Change Adaptation Planning*

This course provides an introduction to planning for climate change impacts, highlighting the efforts of local Tribes. This course is intended for tribal environmental professionals who will be involved in climate change adaptation planning.



**2) Attend a 7 Generations training through the Alaska Native Tribal Health Consortium.**

These trainings build community strength and help managers and planners tackle complex environmental issues by prioritizing risk and management strategies. This training includes climate change but also considers related issues such as drinking water, wastewater, solid waste, fuel tank farms, air quality and energy.

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Website:

<http://www.anthc.org/chs/cs/hve/7-generations.cfm>

**3) Participate in conferences** which may highlight the impacts of climate change on the environment, present ideas for improving our response to these effects, and provide the opportunity to share concerns and observations with other Tribes and organizations.

Conferences may include:

- *Affiliated Tribes of Northwest Indians Conference:* <http://www.atntribes.org/>
- *Alaska Forum on the Environment:* <http://akforum.com/>
- *Alaska Marine Science Symposium:* <http://www.alaskamarinescience.org/>
- *Alaska Tribal Conference on Environmental Management:*  
<http://www.anthc.org/cs/dehe/sustops/atcem.cfm>
- *Native American Fish & Wildlife Society PNW Conference:*  
<http://www.nafws.org/events/regional-events.html>
- *Pacific Northwest Climate Science Conference:*  
<http://cses.washington.edu/cig/outreach/pnwscienceconf2011/index.php>

## Integrate Traditional Wisdom

One of the best and most effective ways to encourage the long term success of adaptive strategies is to make sure traditional wisdom is passed down from Elders to the youth. Traditional wisdom helps people stay connected with the land in order to continue the practices that respect and preserve the environment. Traditional Wisdom must be integrated into the entire planning and implementation process. Without this priority, adaptation efforts will fall short.

## Plan of Action:

**1) Involve children in observation, collection, and species identification. Two available tools are the Budburst or Alaska Next Generation websites.** The Budburst website encourages communities to recognize local plant species, to share trends and changes in plant and animal lifecycle events, and to learn how these events are being influenced by seasonal and interannual variations in climate. It teaches children to learn the story of every plant and look for ways to protect them in the face of future landscape changes. The Alaska Next Generation website is another great environmental education resource for students of all ages and is specific to Alaskan climate and topics of concern.

### Contact:

Budburst Website:

<http://www.neoninc.org/budburst>

Alaska Next Generation:

Charlene Dubay, Telida Tribal Council

Email: Charlenedubay@hotmail.com

Phone: (907) 488-7007

Website:

<http://www.aknextgeneration.org/>

**2) Use curriculum and resources from Traditional Knowledge Networks online.**

Throughout the Pacific Northwest, there are regional American Indian cultural resources including the Ndakinna Cultural Center and the The NativeBiz Learning Center.

The ALASKOOL and the Alaska Native Knowledge Network (ANKN) are based in Alaska and creatively teach children traditional ways of life, encourage new curriculum in schools, and provide cultural resources.

### Contact:

*Regional Website:*

<http://www.ankn.uaf.edu/IEW/amerind.html>

*ANKN Website:*

<http://www.ankn.uaf.edu/>

*ALASKOOL Website:*

<http://www.alaskool.org/>

Paul Ongtooguk, founder

Email: [afpo@uaa.alaska.edu](mailto:afpo@uaa.alaska.edu)

**3) Encourage students to attend culture camps** which provide opportunities to gather and prepare traditional foods, hear stories from Elders, and learn valuable skills for living more closely with the land. The Native Village of Selawik, Alaska has teamed up with Selawik Davis-Ramoth School and the U.S. Fish Wildlife Service to run an annual Inupiaq Culture Camp each fall for the students in their community.

### Contact:

Neale Tatmik Caffen

Phone: (907) 442-3472

Website:

<http://www.nwarctic.org/2010/09/30/selawiks-fall-inupiaq-culture-camp>

**4) Organize a community potlatch with traditional foods to exchange observations, pictures and ideas, and learn from elders.** The Kenaitze Indian Tribe in Kenai, Alaska suggests creating digital copies of traditional knowledge and stories which can be preserved and passed on to future generations. Raising awareness about environmental change can also be valuable for informing current and future adaptation plans.

### Contact:

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Kenaitze Indian Tribe

Phone: (907) 283-3288

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**5) Empower youth to communicate their concerns about tribal issues.**

With the support of their communities, students have used multi-media resources including YouTube to make a global impact and raise awareness about the climate impacts facing tribal communities in Alaska and the Pacific Northwest. They also provide an opportunity for young people to express their heritage as well as initiate change within their own communities and among the international community.

**Examples:**

*Haskell Indian Nations University Presentation:*

[www.teachersdomain.org/resource/nasa09.la.rv.visual.students/](http://www.teachersdomain.org/resource/nasa09.la.rv.visual.students/)

*Suquamish Tribe Youth Summit Participation:*

<http://nwifc.org/2011/03/suquamish-teens-participate-in-climate-change-summit-with-peers/>

*Save our Shishmaref Video:*

<http://www.youtube.com/watch?v=ocpXDiqRfsA>

*Alaska Youth for Environmental Action:*

<http://ayea.org/about>



**From left:** Alie Hassett, Erica Cardiel, Charissa Sigo, Angeline Narte and Bearon Old Coyote present their work on ocean acidification at the 3rd National Summit on Oceans and Coasts in Washington, D.C.

Photo and caption from NWIFC website.

- 6) Organize storytelling sessions** where people within the community are given a voice and empowered to speak of their experiences of the past, fears for the future, and reemphasize the common vision, values and language among them. Such expression is a foundational part of respecting traditional practice and an important precursor to the creation of meaningful climate adaptation policy or action.

**Contact:**

Website:

<http://www.storycenter.org/>

**With appreciation to Caleb Pungowiyi for sharing with us:**

<http://jukebox.uaf.edu/ClimateChange/htm/cmnu.htm>

The time will soon be here when my grandchild will long for the cry of a loon, the flash of a salmon, the whisper of spruce needles, or the screech of an eagle. But he will not make friends with any of these creatures and when his heart aches with longing he will curse me. Have I done all to keep the air fresh? Have I cared enough about the water? Have I left the eagle to soar in freedom? Have I done everything I could to earn my grandchild's fondness?

~Chief Dan George (First Nations, Tseil-Waututh Nation, Canada)

# COMPONENT 2:

## ADOPT PRACTICAL IMPLEMENTATION STRATEGIES



The change in human behavior and practice often is in response to changes in the land, water, and wildlife. Indigenous cultures often have respectful relationships with the natural world and with other human beings. The traditional way of life remains resilient when steps are taken to promote environmental and cultural stability and health.

Change in practice can occur at the most basic level and in the most practical ways. Tribal communities have shown their adaptability for millennia and their efforts towards building resiliency amidst current instability are shown through the following examples. Many strategies are interconnected in daily life, but are individually outlined to provide ideas Tribes can adjust to their own contexts. These strategies may be part of a more formal Adaptation Plan or implemented immediately as dictated by pressing need.

### Health of the Land

#### *Reduce the threat of Forest Fire*

Be proactive and reduce the increasing threat of forest fires by following helpful principles of maintenance and prevention. This includes reducing surface fuels, increasing the spacing between tree crowns, keeping larger trees of more fire-resistant species, and promoting more fire-resistant forests at the landscape level by reducing available fuel material. Instructions and guides for implementation can be found through the Pacific Northwest Extension.

The FireWise Alaska website also includes suggestions for safe burn barrel practices and how to be proactive about reducing fire risk in all season.

#### **Contact:**

Pacific Northwest Extension:  
<http://ext.wsu.edu/forestry/documents/pnw618complete.pdf>

#### FireWise Website:

<http://www.firewisekp.com/>



### ***Prevent Coastal Erosion***

Coastal erosion is one of the greatest threats to many coastal tribal communities and is difficult to prevent. Planting native vegetation or altering the surface structure along banks can be crucial for stabilization. The Alaska Coastal Revegetation and Erosion Control Guide provides project ideas and case studies which demonstrate site specific adaptation measures used to fight erosion.

### ***Improve Aquatic Habitat***

Changes in watersheds and increases in glacial melt are raising stream temperatures and causing problems for aquatic life. The Columbia River Inter-Tribal Fish Commission (CRITFC) and its member Tribes are aggressively addressing climate change and its effects on tribal fisheries and water resources. CRITFC has many technical resources and support to provide for projects.

Another resource are the step-by-step guides from the Alaska Department of Fish and Game to protect the integrity of salmon streams by minimizing erosion and by planting native vegetation along its banks. Options include Brush Layering, Coir Logs, Dormant Cuttings, Grass Rolls, Live Bundles, Live Staking, Root Wads, Silt Fences and Spruce Tree Revetments.

Diagrams and instructions can be found at the department's website or in the guidebook at:

<http://www.adfg.alaska.gov/index.cfm?adfg=streambankprotection.step>

### ***Reroute Off-Road Vehicles to Reduce Erosion***

Motor vehicles contribute to erosion along ocean coasts and river banks by increasing the speed of degradation. One of the best practices would be to walk and ride your bike more frequently to reduce emissions and erosion while also promoting physical health. For example, changing conventional ATV trails from areas of high risk can reduce erosion and instead encourage vegetation growth in those areas. This is especially true along beach areas where additional protections may slow erosion. Signs can also be constructed to make community members more aware of areas which are off-limits to vehicles. In addition, lowered ATV speeds reduce dust, a contributor to many health problems.

#### **Contact:**

Alaska Department of Natural Resources, Division of Agriculture  
Website:  
[http://www.plants.alaska.gov/pdf/sec04\\_case-studies\\_web.pdf](http://www.plants.alaska.gov/pdf/sec04_case-studies_web.pdf)

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Website:  
<http://www.adfg.alaska.gov/index.cfm?adfg=habitatrestoration.stream>

#### **Contact:**

<http://www.itk.ca/publications/unikkaaqatigiit-perspectives-inuit-canada>



### **Reduce the Spread of Invasive Species**

Invasive species are increasing and spreading due to changes in ecosystems and in human behavior. Create a Weed Hiker to identify and control invasive weeds while enjoying a fun family activity. To do this, help children peel the bark from a sturdy willow or spruce pole and then decorate the "handle" with ribbons, feathers, and maybe bear bells. Attach a laminated index card with printed pictures of the common invasive weeds in the area. Encourage parents and kids to look at the flowers and plants while they are hiking and pick and dispose of weeds properly whenever they identify them on their walk.

The Quinault Indian Nation in Taholah, Washington also has a very successful invasive weeds control program. The Tribe has hired an Invasive Species Coordinator to lead eradication efforts both on the Quinault Indian Reservation and in surrounding areas of interest.

Invasive species require a compellation of prevention and control to reduce their impact. The Coastal Invasive Plant Committee, based out of British Columbia, provides suggestions for integrative invasive plant management which tribal councils and managers can consider adopting at large within their communities

**Contact:**

Brenda Trefon  
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Phone: (907) 283-3288  
Email: btrefon@kenaitze.org

**Contact:**

<http://www.fws.gov/pacific/news/news.cfm?id=2144374784>

**Contact:**

Website:  
<http://www.coastalinvasiveplants.com/take-action/how-to-control-invasive-plants>



**Children using their Weed Hikers**  
Photos courtesy of Brenda Trefon



## Energy and Infrastructure

### *Develop Heat Recovery and Ventilation in Homes*

Listen to and explore *Home-Wise* recommendations for increasing air flow in your home in order to reduce health hazards, such as mold, and reduce energy use through Heat Recovery Ventilators (HRVs) or bathroom fan systems. Also included on this site are building techniques for more energy efficient homes. These recommendations are offered through the Cold Climate Housing Research Center (CCHRC) and are echoed by many local utility companies throughout the Pacific Northwest.

**Contact:**

Ilya Benesch  
Email: [ilya@cchrc.org](mailto:ilya@cchrc.org)  
Phone: (907) 457-3454  
Website:  
<http://www.cchrc.org/alaska-homewise>

### *Pursue Renewable Energy*

High energy costs and the negative environmental and human health effects associated with fossil fuels are causing communities to re-think their reliance on present energy sources. Renewable energy can provide economic, ecological and human health benefits. Both the Intertribal Council on Utilities and the Yukon River Inter-Tribal Watershed Council provide resources for Tribes interested in pursuing renewable energy infrastructure and trainings.

**Contact**

Intertribal Council on Utilities  
Website:  
<http://www.intertribalcoup.org>  
Yukon River Inter-Tribal Watershed Council Website:  
<http://www.yritwc.org/Departments/Energy.aspx>

### *Use Flood Management Techniques*

Flooding and its effects pose a threat to human health and safety as well as to surrounding infrastructure. As a response to flash flooding, the community of Glen Urquhart, Scotland worked across an entire river basin to address concerns with an integrative management plan. Multiple small projects were implemented in conjunction with the long-term action plan.

**Contact:**

Website:  
<http://www.climatechangeadaptation.info/case-studies/community-led-sustainable-flood-managment/>

### *Ensure Emergency Preparedness*

As the climate changes and becomes more unpredictable, emergency preparedness becomes more crucial to ensure Tribal safety and timely responses. Enroll in one of FEMA's trainings for Tribal managers and leadership to build emergency management capability and create partnerships. These courses include Continuity of Operations, Emergency Management Framework, and Mitigation of Risk training. These trainings could also lead to the formation of Local Emergency Planning Committee which manages the organization and funding.

**Contact**

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Website:  
<http://www.fema.gov/government/tribal/training.shtm>

### **Maintain Clean and Safe Solid Waste Storage**

Unmanaged dumps pose a significant human and environmental health hazard. Increasing flood and fire risk, storm events, and thawing permafrost can also cause problems for communities with unlined or uncovered dumps. The solid waste solutions manual, co-produced by ANTHC and ITEP, includes examples of tribal participation.

**Contact:**

Solutions Manuel:

<http://www.anthc.org/cs/dehe/sustops/swm/upload/SW-Solutions-in-Rural-Alaska-07.pdf>



**Community volunteers clean-up trash and place fencing along pathways for containment**

All photos from Solutions Manuel

### **Get Flood Insurance**

Increasing coastal and river-bank erosion and the heightened risk of flood damage is threatening and inundating tribal communities. Enroll in the National Flood Insurance Program which protects against flood damage and encourages new building ordinances to further protect against further damage. Tribal communities in the Pacific Northwest have already begun to participate such as the Burns Paiute, Lummi and Quileute Indian Tribes. Alaskan Tribes can participate in the program by forming a beneficial partnership with local city governments who have land authority.

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Email: smck461@ecy.wa.gov

Website:

<http://www.fema.gov/plan/prevent/floodplain/index.shtm>

Fact sheet: <http://www.fema.gov/library/viewRecord.do?id=3310>





### **Create an Early Warning System**

When a natural disaster strikes, there needs to be an effective and comprehensive warning system for the affected community. Communicate warnings and a community action plan by using alert messages via phone or text message. The County of Sogn og Fjordane, in Western Norway, has demonstrated a comprehensive strategy which reaches nearly all members of the community and has improved rescue operations by optimizing available resources and conveying information quickly.

#### **Contact**

Website:

<http://www.climatechangeadaptation.info/case-studies/sogn-og-fjordane-early-warning-system>

### **Plan to Relocate**

Some communities are being forced to relocate or migrate away from harm's way as coastlines are eroding and communities are affected by increased flooding. Village relocation is a difficult course of action to implement for many tribal communities. The community of Newtok, Alaska has modeled a preliminary strategy for moving the village to a new site at Mertarvik. Using a strategic management plan, the moving process is viewed as incremental and realistic in terms of community expectations and available resources.

#### **Contact**

Sally Cox

Email: [sally.cox@alaska.gov](mailto:sally.cox@alaska.gov)

When the Report is finalized you can access it at:

[http://www.commerce.state.ak.us/dcra/planning/npg/Newtok\\_Planning\\_Group.htm](http://www.commerce.state.ak.us/dcra/planning/npg/Newtok_Planning_Group.htm)



**Children from the village of Newtok.**

Photo from the Mertarvik Report

The Hoh Tribe in Forks, Washington has lost much of the land that protects them from flooding to erosion. They made a significant effort to relocate their community by securing land off of their reservation. This model demonstrates the importance of political advocacy and persistence in assuring that climatic threats do not destroy the way of life for Tribal communities. The U.S. Congress passed legislation authorizing additional lands for the Hoh people that will allow them to move out of harms way.

#### **Contact**

[http://www.hohtribe.com/?page\\_id=193](http://www.hohtribe.com/?page_id=193)

### ***Implement a Weatherization Program***

Make sure your community buildings and homes can withstand the extreme weather conditions by entering into a weatherization program. The Ketchikan Indian Community Housing Authority in Ketchikan, Alaska has modeled a program available for low to moderate income residents who qualify for assistance. The U.S. Department of Energy also provides a Weatherization Assistance Program.

#### **Contact:**

Ketchikan Website:

<http://www.kictribe.org/programs/housing/index.html>

DOE Website:

[http://www1.eere.energy.gov/wip/wap\\_apply.html](http://www1.eere.energy.gov/wip/wap_apply.html)

## Human Health

### ***Identify Greatest Regional Threats to Health***

Climate change brings numerous threats to community health and the magnitude of risk varies depending on your location and exposure. The Natural Resource Defense Council has broken down the most serious human health threats by state and county or borough in order to provide communities with specific information on risk in your area. They also make suggestions for how to protect your families from harm.

#### **Contact**

Website:

<http://www.nrdc.org/health/climate>

### ***Monitor Harmful Algae Blooms***

The changing climate is potentially increasing the presence of Paralytic Shellfish Poisoning (PSP) and domoic acid during seasons and in regions once safe. The best way to avoid eating contaminated shellfish is to test for PSP. The Aleutian Pribilof Island Association has modeled an effective strategy for a PSP project which helped communities monitor occurrence and distribution of these toxins and create a mechanism to respond to the poisoning risk. This approach combined traditional knowledge with tools to assess new and often invisible threats to community health.

#### **Contact**

Bruce Wright

Aleutian Pribilof Islands Association

E-mail: [brucew@apiai.org](mailto:brucew@apiai.org)

Phone: (907) 276-2700

Website: <http://www.apiai.com/psp.asp>

Quality Assurance Project Plan:

[http://www.apiai.com/CSD/PSP%20QAPP%20updated%203-27-10%20\(3\).pdf](http://www.apiai.com/CSD/PSP%20QAPP%20updated%203-27-10%20(3).pdf)

**Bruce Wright holding a small butter clam secured from the primary clamming beach at Sand Point.**

Photo by Ray RaLonde. Used with permission.



### *Protection from the Sun*

A decreasing Ozone Layer is giving rise to higher levels of UV radiation and sun damage. Protect yourself and your children by wearing sun screen and covering bare skin to reduce exposure. Sunburns and rashes can not only be uncomfortable but can also lead to more serious and permanent damage like skin cancer. Inuit communities in Canada have become much more proactive in their efforts to mitigate the effects of increasing sun intensity.

#### **Contact**

Website:

<http://www.itk.ca/publications/unikkaaqatigiit-perspectives-inuit-canada>

## Subsistence and Traveling

### *Establish a Food Security System*

Maintain production and collection of Native food sources to encourage self-reliance and encourage healthy eating habits by providing fresh and organic foods. The White Earth Land Recovery Project provides an excellent example of community participation and involvement in the entire farm to fork process by passing down generations of knowledge about the land. Greenhouses and small community gardens also provide a way to increase food security. The village of Minto, Alaska has already begun to create a garden in their own community to encourage long-term resilience.

#### **Contact:**

Phone: 1-(888) 274-8318 or  
(218) 375-4602

Main Website:

<http://nativeharvest.com/>

Farm to School Program:

<http://nativeharvest.com/?q=node/255>



**Chief Patrick Smith, Minto Alaska**

Photos © 2010 by Philip A Loring, used with permission.

### **Construct Safety Cabins**

Unpredictable weather patterns and changing game migration paths are causing more safety hazards for rural communities that are off the road system. Build cabins along common travel routes and near popular hunting and fishing areas to reduce the risk of getting stranded in remote locations without emergency supplies or shelter. Although this is a traditional practice in some parts of northern Alaska, it may need to become more widespread among tribal communities. This is a strategy that the Aklavik and Tuktoyaktuk native people of Canada use to make sure there is safe access to traditional food sources.

**Contact:**

**Website:**

<http://www.itk.ca/publications/unikkaaqatigiit-perspectives-inuit-canada>



### **Track Sea Ice Flow and Walrus**

Melting sea ice and diminishing multi-year ice is changing the patterns of walrus use and causing safety concerns for ocean travel. Hunters in the Northern Bering Sea and southern Chukchi Sea regions of Alaska use the Sea Ice Walrus Outlook (SIWO) website to get weekly reports from April through June with information on sea ice conditions. This information can be extremely useful for hunters and travelers seeking safer and more productive travel routes.

**Contact:**

**Website:**

<http://www.arcus.org/search/siwo>

### **Track Polar Weather Conditions and Reindeer**

Changing ice and snow patterns in the interior are having an effect on animal migration routes including Reindeer. Use real-time satellite technology offered through the Polar View Initiative to determine snow and ice characteristics on a given day in your region. Since snow quality is instrumental in determining reindeer feeding patterns, these satellite-based snow maps allow hunters to better predict a herd's location.

**Contact:**

Thomas Puestow

Email: [Thomas.puestow@polarview.org](mailto:Thomas.puestow@polarview.org)

**Website:**

<http://www.polarview.org/>

**Our roots mean our life-style. Our life-style is into the ground, the land we live on.**

*~ Leonard Nowpakahok (Gambell, Alaska)*

### **Revise and Map Travel Routes**

With losses in snow cover and ice fields, travel routes have become more dangerous, or at times impassible, for sleds and vehicles. Gather as a community and talk about where routes may need to be changed and map the current and future pathways. The community of Sisimiut, Greenland models this process by assessing seasonal change in snow and ice and then engineering routes which bypass obstacles and is accessible to the entire community. The community of Ilulissat has placed “snow fences” along the most vulnerable parts of the trail to increase snow accumulation and maintain better sled routes.

#### **Contact**

Website:

[www.climatechangeadaptation.info/case-studies/adapting-sledge-and-snow-mobile-tracks-in-sisimiut/](http://www.climatechangeadaptation.info/case-studies/adapting-sledge-and-snow-mobile-tracks-in-sisimiut/)

Website:

<http://www.climatechangeadaptation.info/case-studies/dog-sledging-in-a-melting-arctic>



Photo from Climate Change Adaptation website



Photo from ANTHC website

### **Wear Float Coats**

Increasing storm intensity and travel hazards have forced ocean hunters to adopt more security precautions. Some hunters have begun to use white float coats provided through the Alaska Native Tribal Health Consortium and in partnership with the U.S. Coast Guard and the British Columbia-based Mustang Survival, to reduce the risk of drowning, increase adaptability to extreme weather conditions, and blend-in more affectively with the camouflage of the Arctic. The year 2011 marks the first time that these coats were made directly available to the public.

#### **Contact:**

Website:

<http://www.anthc.org/chs/wp/injprev/drowning.cfm>

# COMPONENT 3:



## ENGAGE IN LONG-TERM EVALUATION AND EXTERNAL PARTNERSHIPS

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**E**volving climatic conditions require the community to continually revisit and readjust adaptive responses. The best strategies will provide long-term assistance and promote self-reliance for generations. Often adaptation strategies arise from trial and error and thus require continued monitoring and re-evaluation. Building adaptive capacity means looking at the indicators of healthy communities and asking reflective questions about the Tribe’s progress towards these ends. It also requires partnerships to be formed between governments and organizations to combine resources and expertise. Partnerships will be integral in the success of many implementation strategies.

### **Plan of Action:**

#### **1) Understand the Long-term Indicators of community well-being.**

The Arctic Social Indicators report offered by the Nordic Cooperation seeks to help communities identify indicators that will measure community conditions and cultural change over time. Any indicator of cultural integrity may not apply equally to all societies in Alaska or to all Tribes in the Pacific Northwest. However, the report emphasizes that cultural well-being generally is a concern felt most keenly by minority cultures – especially those that have been targeted by state policies of cultural assimilation.

A self-reliant community will be challenged to find ways to express their cultural autonomy in the face of constant pressure and change. The report provides a starting place for Tribes to begin thinking about how their adaptation plans can facilitate long-term goals.

Some indicators of community well-being include:

- Population stability
- Cultural Viability
- Closeness to nature
- Language Vitality
- Fate control
- Student success in education
- Community Health
- Political Representation

#### **Contact**

Third ASI Report:

<http://www.norden.org/en/publications/publications/2010-519>

## 2) Team up with governmental and non-governmental organizations.

Have regular group meetings with affected stakeholders and combine expertise and resources. The City of Homer, Alaska created a Climate Change Action Plan (CCAP) which models this collaboration among sectors such as Energy Management, Transportation, Purchasing and Waste Reduction, Land Use/Planning and Zoning and Outreach and Advocacy. Routine collaboration helps insure that no major area of concern is overlooked and streamlines the evaluation process.

### Website:

[http://www.cityofhomer-ak.gov/sites/default/files/fileattachments/climate\\_action\\_plan.pdf](http://www.cityofhomer-ak.gov/sites/default/files/fileattachments/climate_action_plan.pdf)

## Examples of Partnering Organizations:

### City, State and Federal Agencies

- *The Environmental Protection Agency*  
Tribal Trust and Assistance Unit  
Michelle V. Davis, Climate Change & Tribal Coordinator  
Email: [Davis.MichelleV@epa.gov](mailto:Davis.MichelleV@epa.gov)  
Phone: (907) 271-3434  
Website:  
<http://yosemite.epa.gov/R10/TRIBAL.NSF>
- *US Department of Agriculture Forest Service*  
Pacific Northwest Research Station  
Phone: (503) 808-2592  
Website:  
<http://www.fs.fed.us/pnw/research/climate-change/index.shtml>
- *U.S. Department of Energy*  
Tribal Energy Program  
Website:  
<http://apps1.eere.energy.gov/tribalenergy>
- *US Fish and Wildlife Service*  
C3 - Climate Change Collaboration in the Pacific Northwest  
Lief Horwitz, Rotating Coordinator

Email: [lief\\_horwitz@usgs.gov](mailto:lief_horwitz@usgs.gov)

Phone: (206) 220-4616

Website: <http://www.c3.gov/>

- *U.S. Department of Interior*  
USGS Climate Science Centers  
Northwest Science Center Website:  
[http://www.doi.gov/whatwedo/climate/strategy/Northwest\\_CSC.cfm](http://www.doi.gov/whatwedo/climate/strategy/Northwest_CSC.cfm)  
Alaska Science Center Website:  
[http://www.doi.gov/whatwedo/climate/strategy/Alaska\\_CSC.cfm](http://www.doi.gov/whatwedo/climate/strategy/Alaska_CSC.cfm)
  - *U.S. Department of Interior*  
FWS Landscape Conservation Corporations  
Michael Carrier, Pacific Northwest Coordinator  
Email: [Michael\\_Carrier@fws.gov](mailto:Michael_Carrier@fws.gov)
- 5 Alaska Contacts determined by region, please reference website  
Website:  
<http://www.fws.gov/science/shc/lccinfocontacts.html>

### **A Guide for Tribal Leaders on US Climate Change Programs**

- Kathy Lynn, University of Oregon  
Publication:  
<http://tribalclimate.uoregon.edu/publications>

### **Alaska Native Tribal Health Consortium**

- Michael Brubaker  
Center for Climate and Health  
Email: [mbrubaker@anthc.org](mailto:mbrubaker@anthc.org)  
Phone: (907) 729-2464  
Website: <http://www.anthctoday.org/>

### **Climate Change Resource Center**

- Website: <http://www.fs.fed.us/ccrc/hjar>  
Website for Land Managers:  
<http://www.fs.fed.us/ccrc>

### **Cold Climate Housing Research Center**

- Ilya Benesch  
Email: [ilya@cchrc.org](mailto:ilya@cchrc.org)  
Phone: (907) 457-3454  
Website: <http://www.cchrc.org/>

### **Columbia River Inter-Tribal Fish Commission**

- Laura Gephart  
Email: [gepl@critfc.org](mailto:gepl@critfc.org)  
Phone: (503) 238-0667  
Website:  
<http://www.critfc.org/wana/climate.html>

### **Institute for Tribal Environmental Professionals**

- Sue Wotkyns  
Phone: (928) 523-1488  
Email: [Susan.Wotkyns@nau.edu](mailto:Susan.Wotkyns@nau.edu)  
Website:  
<http://www4.nau.edu/itep/climatechange>

### **Model Forest Policy Program**

- Jeff Morris  
Phone: (530) 355 - 9880  
Email: [jeff@mfpp.org](mailto:jeff@mfpp.org)  
Website: <http://www.mfpp.org/>

### **Upper Columbia United Tribes**

- D.R. Michel  
Phone: (509) 209-2412  
Email: [dr@ucut-nsn.org](mailto:dr@ucut-nsn.org)  
Website:  
<http://www.ucut.org/index.ydev>

### **Upper Snake River Tribes Commission**

- Heather Ray  
Phone: (208) 608-4131  
Email: [heather.ray@uppersnakerivertribes.org](mailto:heather.ray@uppersnakerivertribes.org)  
Website:  
<http://www.uppersnakerivertribes.org/>

### **3) Team up with a university to work on projects.**

There are many research centers, law schools, and working groups that have resources, financial and otherwise, that can be of use to tribes. The University of Idaho and the Coeur d'Alene Tribe have formed an award-winning partnership which is aimed at fighting poverty and increasing the self-reliance within this community. The project brought students, faculty, and community members together to foster meaningful dialogue and action.

#### **Contact:**

Website:

<http://www.uidaho.edu/newsevents/item?name=university-of-idaho-partnership-with-coeur-dalene-tribe-and-communities-named-finalist-for-national-engagement-award>



### **Alaska Pacific University**

#### *Institute for Village Resilience*

Victoria Hykes Steere

Email: [vhsteere@alaskapacific.edu](mailto:vhsteere@alaskapacific.edu)

Phone: (907) 564.8294

### **University of Alaska, Fairbanks**

#### *Alaska Center for Climate Assessment and Policy*

Philip Loring

Email: [ploring@alaska.edu](mailto:ploring@alaska.edu)

Phone: (907) 474-7163

Website: <http://ine.uaf.edu/accap>

### **University of Idaho**

#### *Professional Science Master's Program*

Marci Miller

Email: [mamiller@uidaho.edu](mailto:mamiller@uidaho.edu)

Phone: 208-885-6113

Website:

<http://www.uidaho.edu/cogs/psm/degrees/climatechange>

### **University of Oregon**

#### *Environmental Studies Program*

Kathy Lynn, Tribal Climate Change Project Coordinator

Phone: (541) 346-5777

Email: [kathy@uoregon.edu](mailto:kathy@uoregon.edu)

Website: <http://tribalclimate.uoregon.edu/>

#### *Environmental and Natural Resources Law Program*

Email: [enr@uoregon.edu](mailto:enr@uoregon.edu)

Phone: (541) 346-3876

Website: <http://www.enr.uoregon.edu/>

### **Oregon State University**

#### *Oregon Climate Change Research Institute*

Philip Mote, Director

Email: [pmote@coas.oregonstate.edu](mailto:pmote@coas.oregonstate.edu)

Phone: (541) 737-5694

Website: <http://occri.net/>

### **University of Washington**

#### *Climate Impacts Group*

Lara Whitely Binder

Email: [lwb123@uw.edu](mailto:lwb123@uw.edu)

Phone: (206) 616-5349

Website:

<http://cses.washington.edu/cig>

#### *The Three Degrees Project*

Jen Marlow and Jeni Krencicki

Barcelos

Email: [jen@threedegreeswarmer.org](mailto:jen@threedegreeswarmer.org)

Phone: (206) 616-6608

Website:

<http://threedegreeswarmer.org/>

### **United Nations University – Institute of Advanced Studies**

#### *Traditional Knowledge & Climate Change Initiative*

E-mail: [tki@ias.unu.edu](mailto:tki@ias.unu.edu)

Website: <http://www.unutki.org/>

*This document will be followed in the fall of 2011 by a funding resource guide to address help Tribes address Climate Change in their Communities.*

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Painting by Ken Lisbourne