

Impacts of Climate Change on Indigenous Peoples' and Communities

Pacific Northwest Pollution Prevention Resource Center



Patricia A.L. Cochran
Alaska Native Science Commission

www.nativescience.org

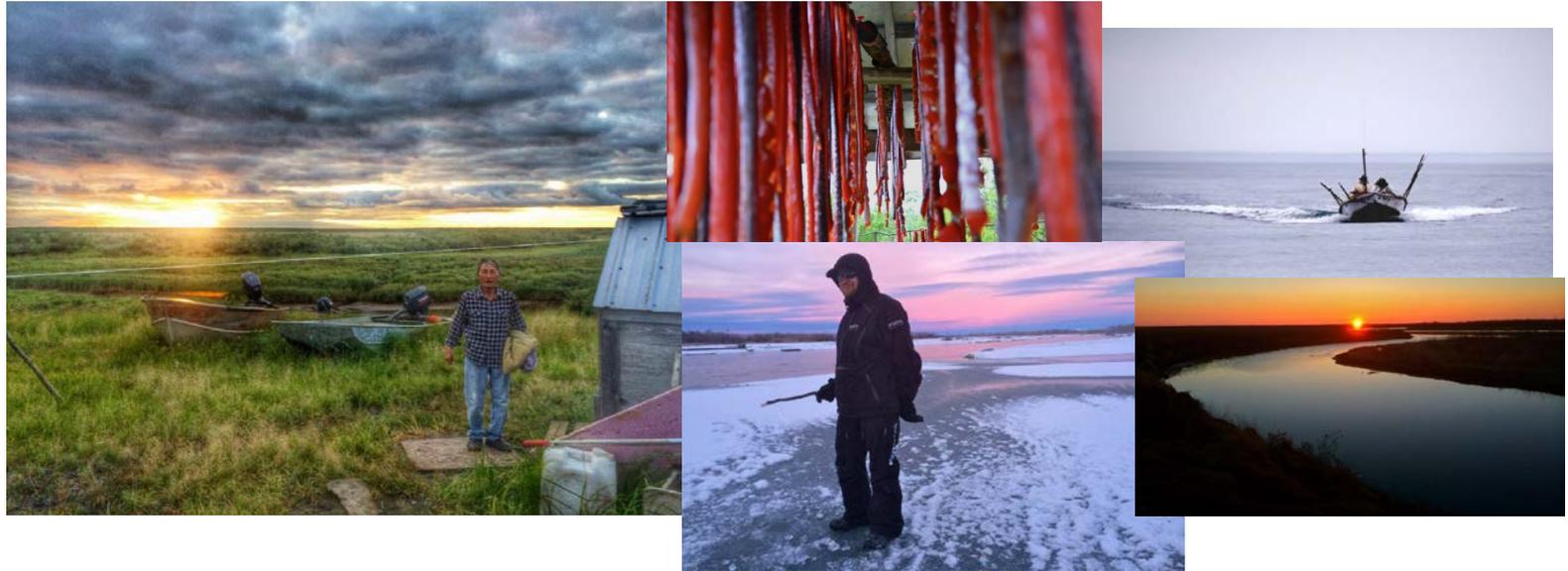
Alaska Forum on the Environment



- February 6-10, 2017
- Dena'ina Convention Center
- Anchorage, AK
- www.akforum.com

Understanding the Human Impacts

The changing climate threatens to erode our ways of life



Nome, King Island, Wales



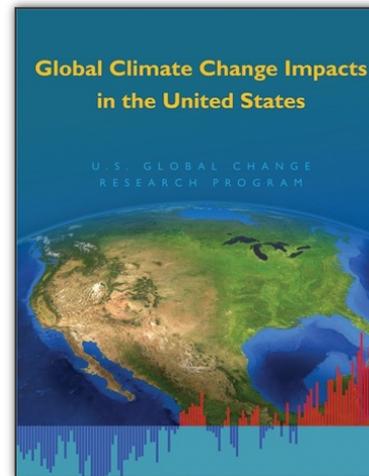
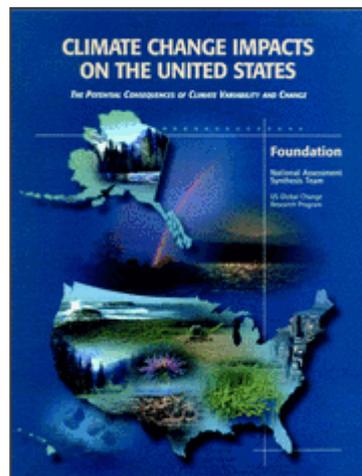
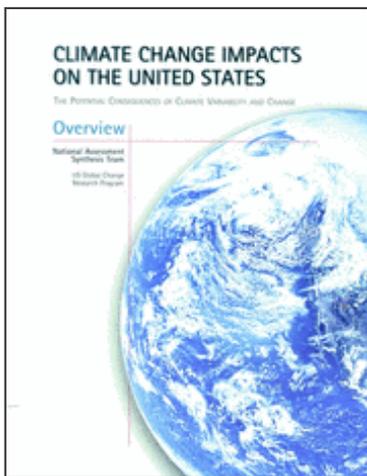


US Global Change Research Program

GCRA Mandate:

“To provide for development and coordination of a comprehensive and integrated United States **Research Program which will assist the Nation and the world to understand, assess, predict, and respond** to human-induced and natural processes of global change.”

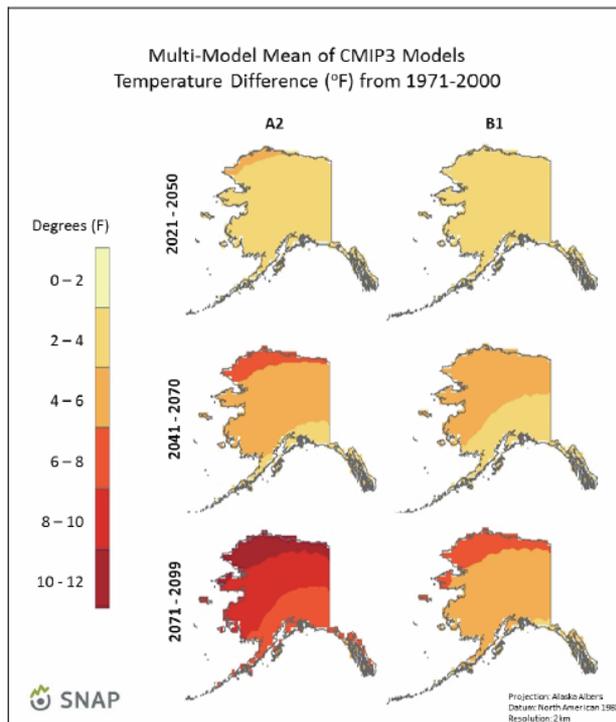
Produces National Climate Assessment reports every 4 years



National Climate Assessment

Key Issues - Warming

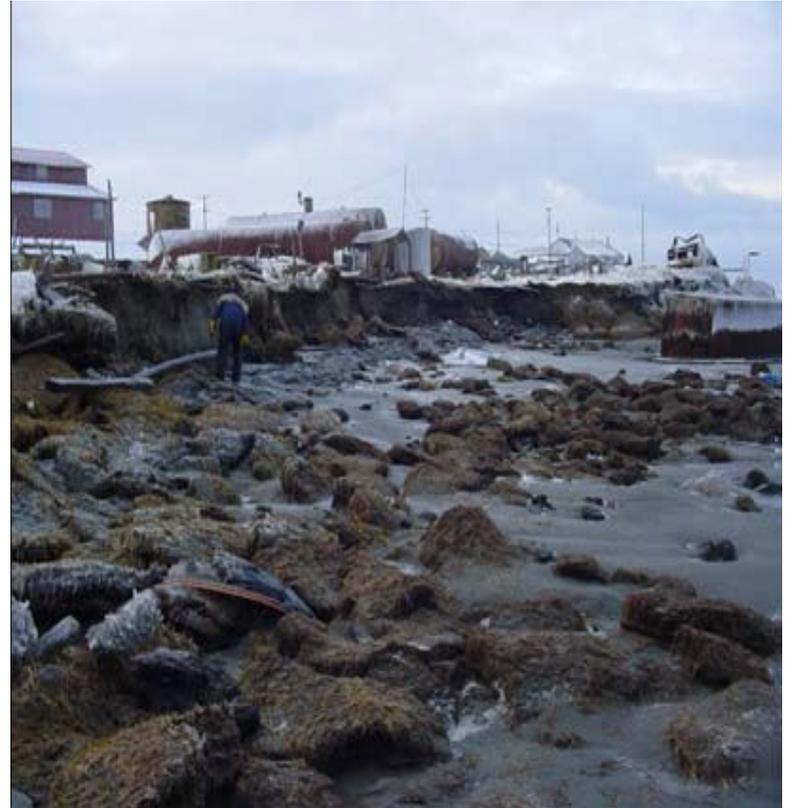
- Alaska has already warmed an average of 3degreesF with more warming projected.
(Record high temperatures break 100 year mark in Eastern Siberia)



Societal Consequences

- Human health
- Infrastructure damage
- Habitat for subsistence animals and fish
- Native food sources and way of life
- Ecosystem changes
- Invasive Species
- Tourism

Climate Change in Alaska



**Temperatures have increased an average of 3.5 Celsius since 1975.
Permafrost is melting and decrease in arctic sea ice.
Accelerated rates of erosion.**

Tribal Nations

- Northwest – tribal treaty rights to traditional territories and resources affected by reduced rainfall/snowpack, melting glaciers, rising temperatures, shifts in ocean currents
- Hawaii – shorter rainy season, increasing intensity of storms and flooding, rainfall pattern becoming unpredictable



Water

- Colorado Plateau
 - drought, long-term decreases in snowfall
 - decline in surface water features
 - sand dune mobilization
 - impacts on agriculture and livestock
 - loss of springs and medicinal and culturally important plants
 - impacts on drinking water supply



Health Issues



- Damage and disruption to water and sanitation infrastructure
- Range change in wildlife that can cause disease
- Changes in marine conditions may be increasing the risk for food-borne illness
- Milder winter temperatures increasing risk of injury from insect stings – more insects
- Arctic parasites being found in some subsistence species





Sea Ice

- Sea Ice is declining more rapidly than projected
- Some models project total loss of Arctic Sea Ice between 2030-2050
- Northern Sea Route – 50 days navigable waters now - 125 by 2050
- Opportunities for trans-Arctic shipping
 - Need for infrastructure
 - Need for oil spill response
- Impacts on subsistence hunting and whaling
- Impacts on marine mammals
- Warming feedbacks



Winter rain icing

Jim Dau photo

Erosion

- Declining sea ice has increased the erosion impacts of storms on coastal communities
- Threats to life and property
- Need for resources for relocation





Photos: Frank Myoumick-Kawerak

2003 US government report found 3 communities seeking to relocate in Alaska and 184 other communities are being affected by flooding and erosion.

2009 US government report found 12 seeking to relocate. Now more than 30.

Relocation

- CC impacts forcing relocation of entire tribal communities in AK, Louisiana, Pacific islands, other coastal locations
- Coastal AK Native Villages (example: Newtok)
 - Decreased sea ice, thawing permafrost, increased storm intensity → erosion. Loss of basic necessities and infrastructure
 - Relocation impeded by existing federal and state statutes and regulations, absence of authority and governance structure to facilitate relocation



Newtok, AK. Source: AK Dept. of Environmental Conservation



Kivalina, AK. Source: State of Alaska



Shishmaref, AK. Source: Shishmaref Erosion and Relocation Commission

Relocation

- Coastal Louisiana tribal communities
 - Sea level rise, saltwater intrusion, erosion and land loss
- Pacific Island communities
 - Sea level rise and storm surges



Source: NOAA

Impediments to relocation:

- US lacks institutional framework to relocate entire communities
- Government agencies lack legal authority and technical, organizational, and financial capacity to implement relocation processes



NEWTOK TRADITIONAL COUNCIL

Documented erosion since 1983

Identified 6 potential relocation sites and evaluated habitability

Community voted 3 times to relocate

Acquired land for relocation in 2003.

NEWTOK'S RELOCATION CHALLENGES

- Newtok Planning Group
 - Ad hoc
 - 25 different federal, state, tribal and non-profit agencies
 - No mandate to relocate; no statutory guidance to relocate and no relocation funding
- Agencies lack technical, financial and organizational capacity to relocate communities
- Statutory barriers
 - Stafford Act: Repair and rebuild in place

Ocean Acidification

- Ocean acidification is occurring more rapidly in cold northern waters
- Higher acidity – lower oxygen
- Arctic specialists warn that 10 per cent of northern polar surface waters will be corrosive for aragonite, a form of calcium carbonate, by 2018
- Impacts on ecosystems
- Commercial and subsistence fisheries yet to be determined



Food Security



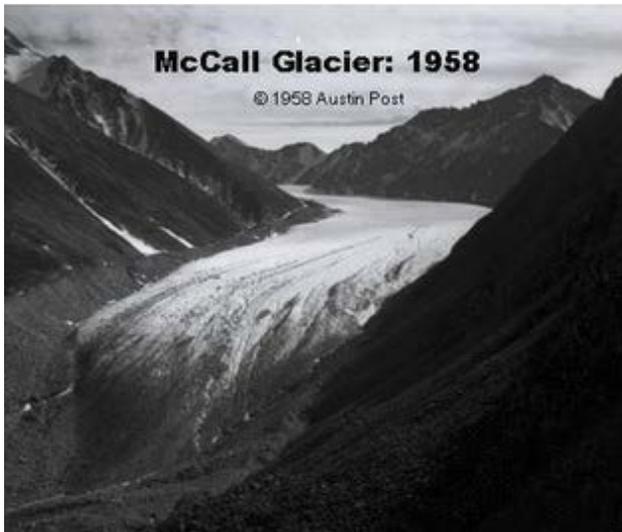
Traditional Foods

- Dependence on local plant and animal species for food (“traditional foods”), medicines, ceremonies, community, economic health
 - ex: seals, fish, shellfish, bison, bear, caribou, walrus, moose, deer, wild rice, cottonwood trees, and more...
 - CC affects availability, tribal access to, and health of these resources → threatens tribal customs, cultures, identities



Glaciers

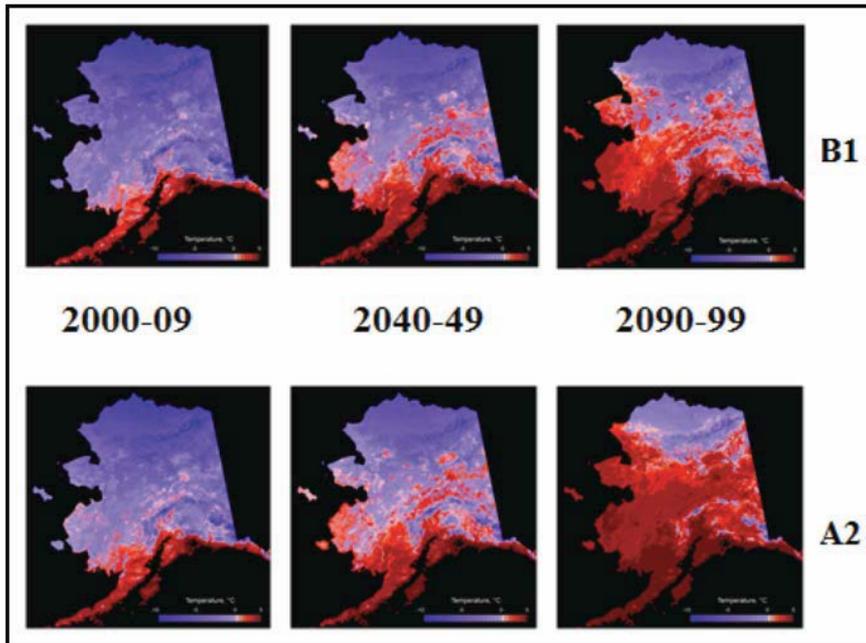
- Alaska's glaciers are losing mass
- Fresh water discharge to the ocean is approx. similar to that from Greenland Ice Sheet
- Implications for global sea level rise
- Implications for salinity, temperature & sedimentation related to salmon habitat, fisheries and marine ecosystems
- Implications for ocean currents



Permafrost

- Permafrost in Alaska has warmed about 3 degrees C in the last 30 years & continued warming is projected

- Impacts on rural fresh water and sanitation
- Infrastructure impacts
- Ecosystem impacts on surface water availability
- Associated methane release and feedbacks



Wildfires

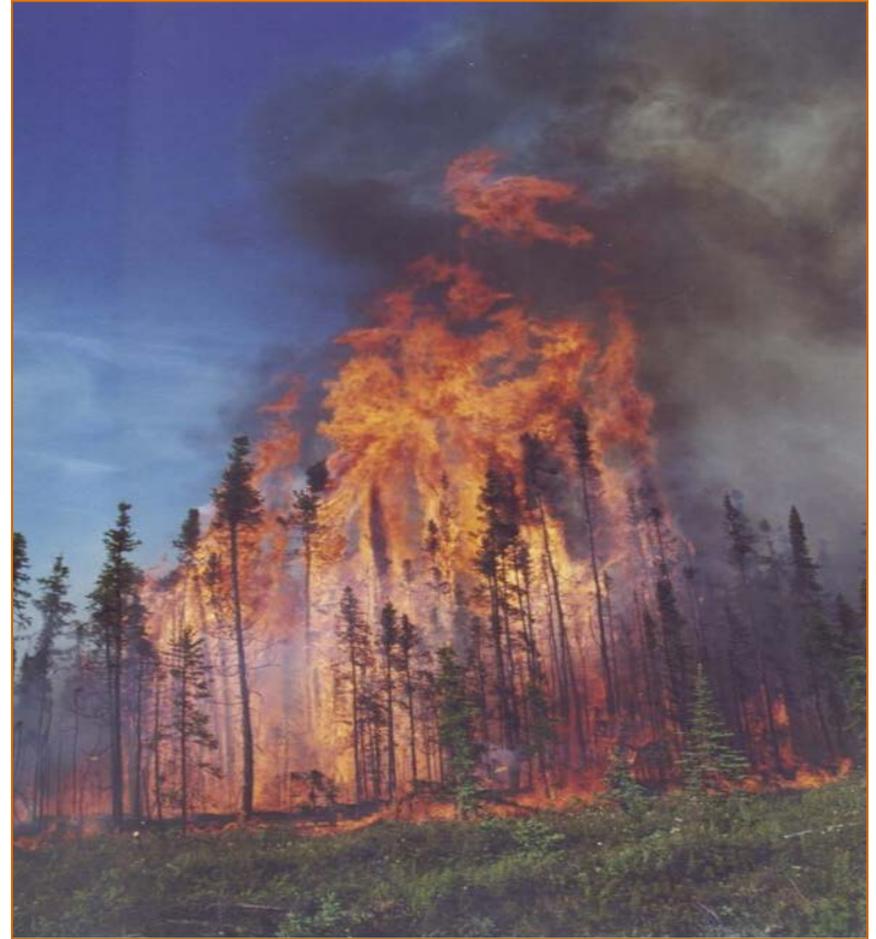
- Wildfire extent is increasing



- Threats to life and property
- Smoke impacts on human health and air traffic



Huslia



Tundra wild fire – Noatak River



Jim Dau Photo

Tribal Forests, Fires, and Food

- Bark beetle damage to forests
- Warmer, drier, longer fire seasons
- Increased fuel load
- Increased risk of wildfires
- Increased frequency/intensity of large wildfires
- Wildfire → threat to homes, safety, economies, culturally important species, medicinal plants, traditional foods, cultural sites



Adaptation – Ancient Wisdom & Modern Solutions



Traditional Knowledge (TK)

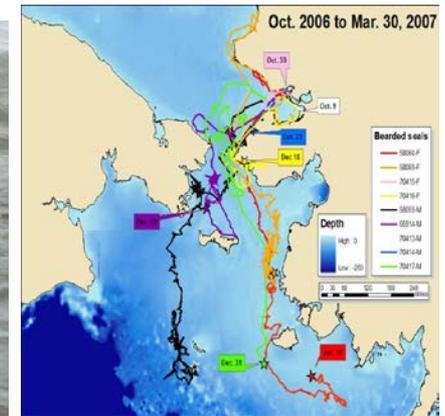
- “...cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed through generations by cultural transmission, about the relationships of living things (including humans) with one another and with their environment”
- All that is known about the world about us and how to apply that knowledge in relation to those beings that share the world
- Important information source for understanding climate change and developing natural resource management and climate adaptation strategies



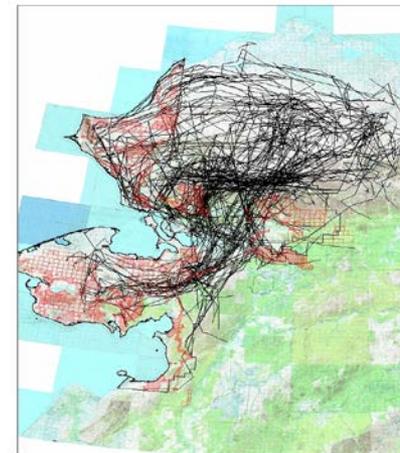


Incorporating Traditional Knowledge & Science

- Kotzebue IRA Bearded & Ring Seal Tagging Project- a partnership between local hunters & marine mammal scientists
- Western Arctic Caribou Working Group Satellite tagging program – A partnership between users groups, land managers, caribou biologist
- Alaska Native Science Commission Traditional Knowledge Project
- Indigenous Peoples Council for Marine Mammals
- Use of Satellites, GPS
- Climatic Change Journal publications



Fall



Alternative Energy

- **Kotzebue Electric Association Wind Mill Project – 18 wind generators – saves 100,000 gpy diesel-computer integrated for maximum efficiency**
- **Bering Straits Native Corporation Solar Power Project**
- **Igiugig Riv-Gen hydrokinetic system turbine installed on Kvichak River**



Adaptive Strategies – Using TKW

- Fire Management
- Subterranean Homes
- Traditional Medicine
- Erosion Control
- Dog teams
- Education systems
- New crops/species



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ALASKA NATIVE PERSPECTIVES ON EARTH AND CLIMATE

TRADITIONAL WAYS OF KNOWING

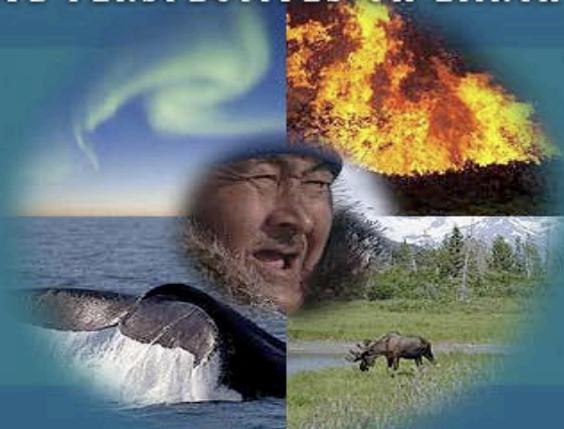
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EARTH AS A SYSTEM

[Atmosphere](#)

[Biosphere](#)

[Cryosphere](#)

[Hydrosphere](#)

[Lithosphere](#)

[Lesson Plans and Student Activities](#)

As the environmental, economic, and political consequences of climate change are felt in Alaska, the Arctic, and throughout the world, we have much to learn from both the traditional knowledge of Native peoples and ongoing scientific research. These two methods of observing nature and solving the challenges of survival can provide complementary perspectives on these issues. This collection looks at Alaska's unique geology and the impact of development and climate change using both of these tools, and features Alaska Native scientists who are working toward solutions.

Funding for this collection was provided by The Opportunities for Enhancing Diversity in the Geosciences (OEDG) Program of the Directorate for Geosciences, National Science Foundation.



National Science Foundation

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Local Environmental Observer (LEO) Network

Northern communities are changing due to environmental impacts, climate change and development. Monitoring the environment is important for understanding the risks and benefits and for adaptation. The LEOs are the eyes, ears and voice of environmental change in our communities.



[Click here](#)
Post an Observation



[Click here](#)
"Join LEO"

We are tribal professionals who apply traditional knowledge, western science and technology to document unusual plants and wildlife, extreme weather, erosion, flooding, droughts, wildfire and other events that can threaten food security, water security and community health. Check out our LEO monthly maps, and other links to learn more. To view the LEO Observations Dataset, [click here](#).



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LEO October 2013 Map



View LARGE: [click here](#)

Monthly Maps

October 2013

Category Maps

Air Quality

Alaska Region Maps

Aleutian & Pribilof Isl

Canada Region Maps

Inuvialuit Settlement

LEO communities at a glance, click icon:

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Alaska Native Science Commission & University of Alaska Fairbanks Community Partners – Igiugig, Koyukuk, Newtok, Nikolai **Community Partnership for Self Reliance & Sustainability**



Supporting Resilient Communities & Ecosystems

- NOAA Funded Project
- Develop Relocation Framework
- Project Partners
 - Alaska Institute for Justice
 - Alaska Native Science Commission
 - Alaska Native Tribal Health Consortium
 - University of Alaska
 - University of Victoria



Shishmaref

- June 8, 2016 3pm Walrus hunters left with calm waters 15 miles up channel
- June 9, 5am Winds produced large waves causing ice packs to close in and accumulate along the coastline so hunters couldn't travel safely to land or open waters
- US Coast Guard helicopter crew rescued six hunters after their two boats became stranded by sea ice



Guidelines for Considering Traditional Knowledges in Climate Change Initiatives

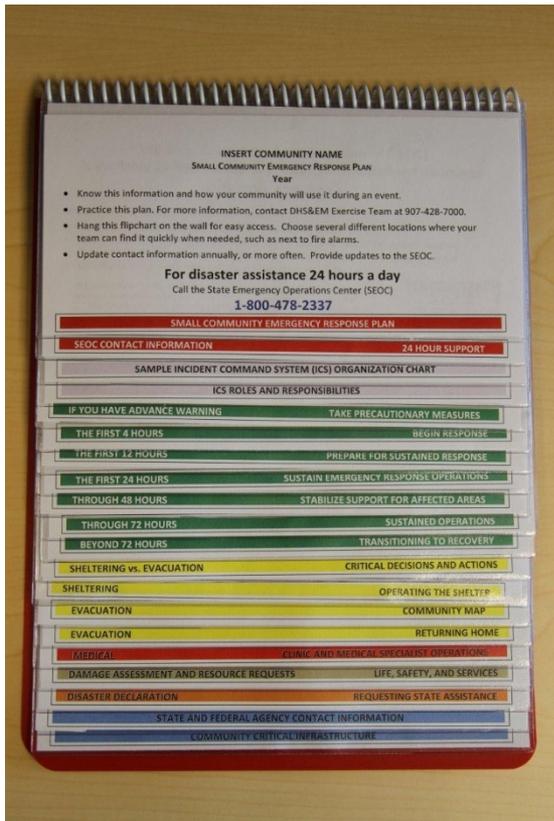
Climate and Traditional Knowledges Workgroup

<http://climatetkw.wordpress.com>

- **Guideline 1.** Understand key concepts and definitions related to TKs.
- **Guideline 2.** Recognize that indigenous peoples and holders of TKs have a right NOT to participate in federal interactions around TKs.
- **Guideline 3.** Understand and communicate risks for indigenous peoples and holders of TKs.
- **Guideline 4.** Establish an institutional interface between indigenous peoples, TK holders, and government for clear, transparent and culturally appropriate terms-of-reference, particularly through the development of formal research agreements.
- **Guideline 5.** Provide training for federal agency staff working with indigenous peoples on initiatives involving TKs.
- **Guideline 6.** Provide specific directions to all agency staff, researchers and non-indigenous entities to ensure that protections for TKs requested by tribes and knowledge holders are upheld.
- **Guideline 7.** Recognize the role of multiple knowledge systems.
- **Guideline 8.** Develop guidelines for review of grant proposals that recognize the value of TKs, while ensuring protections for TKs, indigenous peoples, and holders of TKs.

State of Alaska Responses

Div. Of Homeland Security & Emergency Management Small Community Emergency Response Plan



Dept. of Community & Regional Affairs

Planning & Land Management

- [Alaska Climate Change Impact Mitigation Program](#)
- [Alaska Community Coastal Protection Project](#)
- [Alaska Risk MAP Program](#)
- [Community Coastal Impact Assistance Program](#)
- [Community Profile Maps](#)
- [Floodplain Management](#)
- [Interactive Mapping](#)

Denali Commission

- Climate Change Adaptation & Governance

Dept. of Interior

- Coastal Climate Resilience Program
- Climate Toolkit

Shishmaref - Seychelles



International Indigenous Initiatives

- Indigenous Peoples Global Network on Climate Change and Sustainability

http://www.unutki.org/downloads/File/Publications/UNU_2009_Climate_Change_Summit_Report.pdf

- Many Strong Voices

www.manystrongvoices.org

- Arctic Alliance/Arctic Monitor

www.arcticmonitor.net

- Northern Research Forum

www.nrf.is

- The Arctic Circle

www.arcticcircle.org



IPCCSD – Indigenous Peoples’ Global Network on Climate Change and Sustainable Development

- Indigenous Peoples’ Global Summit on Climate Change
- Anchorage Declaration 2009
- Secretariat – Philippines
- 2017 IPs Climate Summit:”
“Rights, Resilience & Relocation”



For the Next Generations

- Elders say we must prepare to adapt. This is a simple instruction, but not so easy to understand what it really means. Adapting means more than adjusting hunting technologies and what kinds of foods we eat. It means re-learning how to garner information from a rapidly changing environment. There is a reason native people have been able to survive for centuries in the harshest of conditions, in the most difficult times; it is because of our resilience and adaptability. And it is that strength from within that our communities now have to rely upon as we face an uncertain future.



Questions?

