ARCTIC PEOPLE, CHANGING PLANET

Citizens and Partners at the Top of the World

Igor Krupnik, Smithsonian Institution
"The State and Fate of the Arctic"
Wilson Center, March 19, 2014

Inupiat hunters on ice floe off Wales, Alaska.
Photo: Winton Weyapuk, Sr., April 2007

1990s: The First Call

http://globalwarming.markey.house.gov/impactzones/alaska.html

Photo by Bryan and Cherry Alexander
http://forces.si.edu/arctic/index.html

The Potential Consequences of Climate Variability and Change

ALASKA

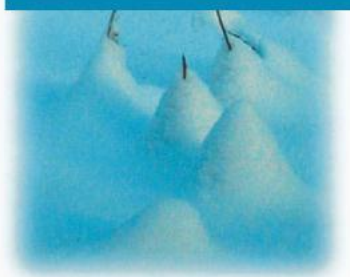
A Report of the Alaska Regional Assessment Grou

For the U.S. Global Change Research Program

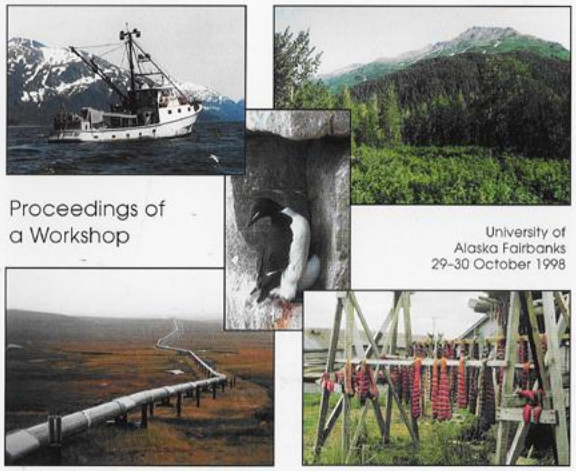
Published by the Center for Global Change and Arctic System Research
University of Alaska Fairbanks
Fairbanks, Alaska 99775-7740

December 1999

PREPARING FOR A CHANGING CLIMATE



Assessing the Consequences of Climate Change for Alaska and the Bering Sea Region



Proceedings of a Workshop

University of Alaska Fairbanks
29-30 October 1998

An Activity of the U.S. National Assessment of the Consequences of Global Change and the International Arctic Science Committee

THE IMPACTS OF GLOBAL CLIMATE CHANGE IN THE BERING SEA REGION

AN ASSESSMENT CONDUCTED BY THE INTERNATIONAL ARCTIC SCIENCE COMMITTEE UNDER ITS BERING SEA IMPACTS STUDY (BESIS)

RESULTS OF A WORKSHOP

Arctic Science Conference
American Association for the Advancement of Science

Girdwood, Alaska 18-21 September 1996

BESIS Project Office
University of Alaska Fairbanks

Published in 1997 by:

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Campus Box 7740
University of Alaska Fairbanks
Fairbanks, Alaska 99775-7740

We would like to acknowledge the fi
contributions to this workshop of
International Arctic Science Comm
University of Alaska Fairbanks, U
IASC Global Change Programme
Rovaneimi, Finland

Photos: Regions and activities that could be affected by climate change:
a) Subsistence lifestyles, as shown by a whaling camp at the ice edge. (Photo by Don Schell)
b) Coastal processes of erosion and sea level rise on barrier islands. (Photo by Gunter Weller)
c) Boreal forest ecosystems when permafrost thaws. (Photo by Tom Osterkamp)
d) Village life (Kaktovik Village on the Beaufort Sea coast. (Photo by Gunter Weller)

Climate Change Impacts on Northern Communities:

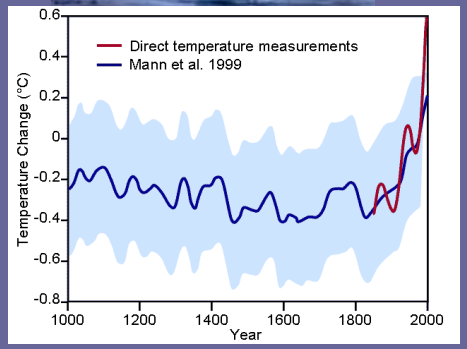
- Coastal erosion
- Thawing permafrost
- Warming weather
- Advance in shrub vegetation
- Increase in tundra and forest fires
- Change in species distribution
- Reduced access to subsistence resources

Young ice is being formed off Shaktoolik, in Norton Sound, Alaska, a small community that is threatened by storm flooding triggered by climate change *Photo: Igor Krupnik, 2008*

Canary in the Coalmine?


http://arstechnica.com/science/2012/09


Photo © UNEP/V. Romanovsky




http://www.eoearth.org

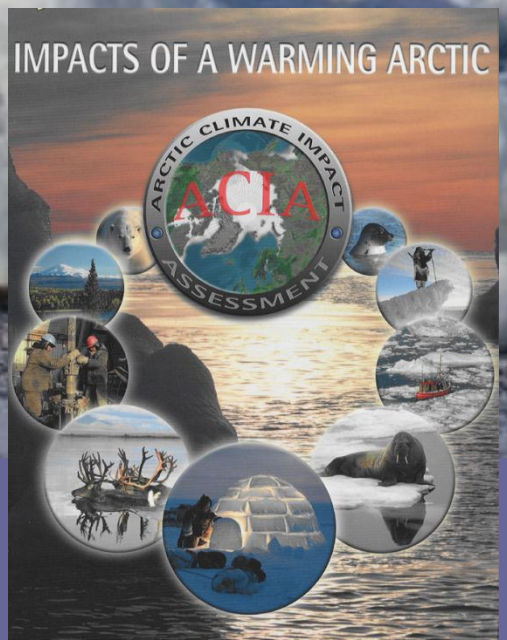

Joe Moore, State Soil Scientist (retired) USDA-NRCS


http://www.eoearth.org

By 2000, the Arctic was viewed as the 'Canary' of the Global Change processes. These images from the Arctic became the familiar symbols of our warming planet, as were also the famous 'hockey-stick' graph and polar bears on shrinking ice

The Tipping Point:

Arctic Amplification *or* It's Cold but Not Cold Enough



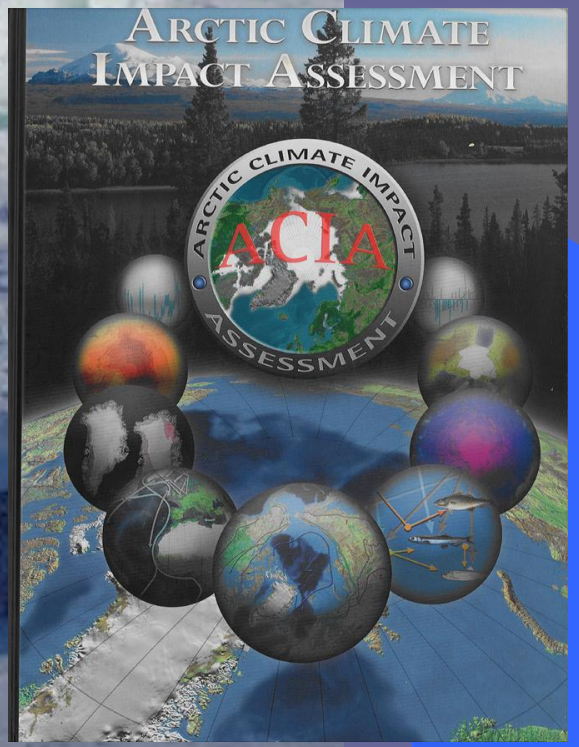
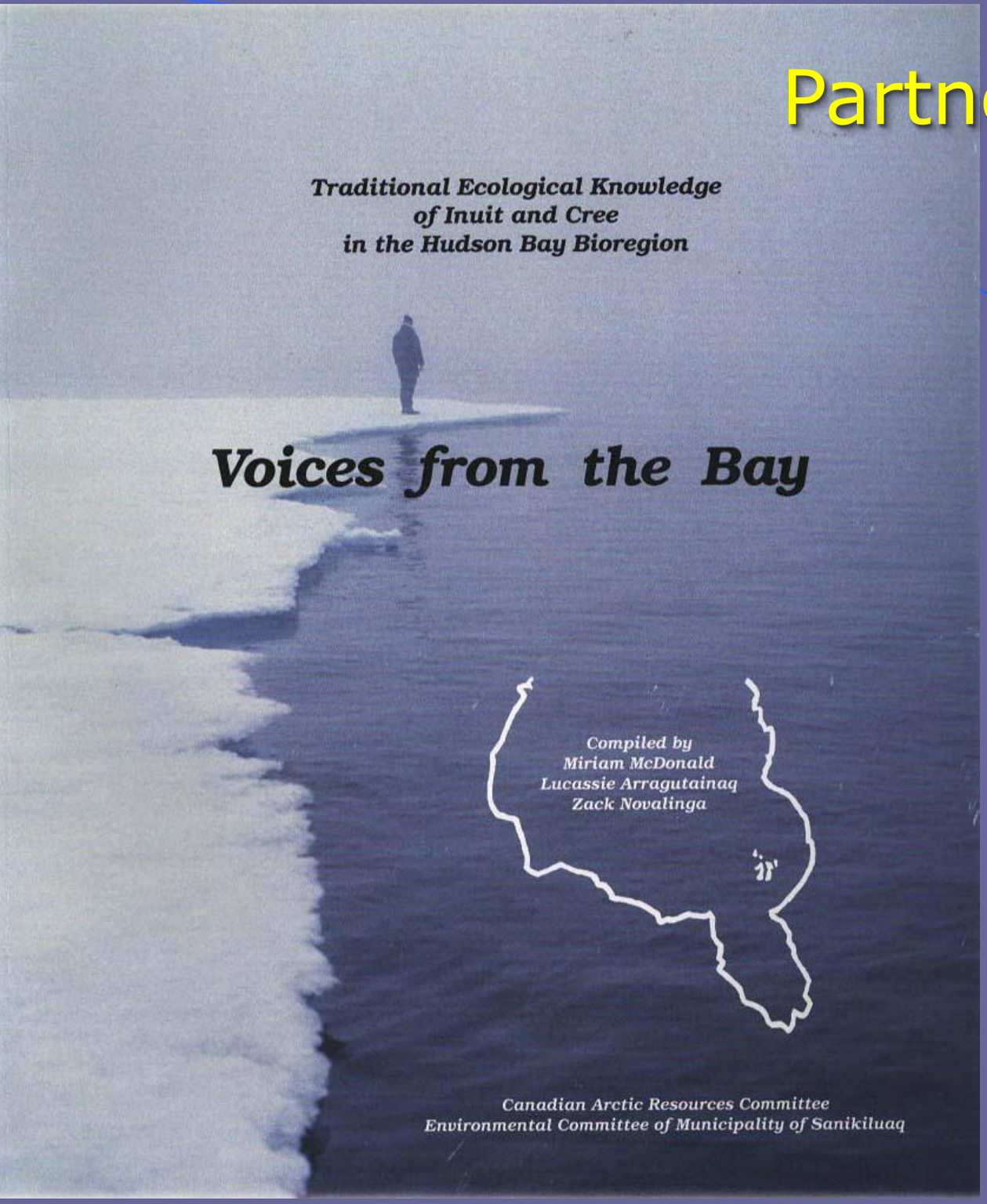


Photo: Igor Krupnik

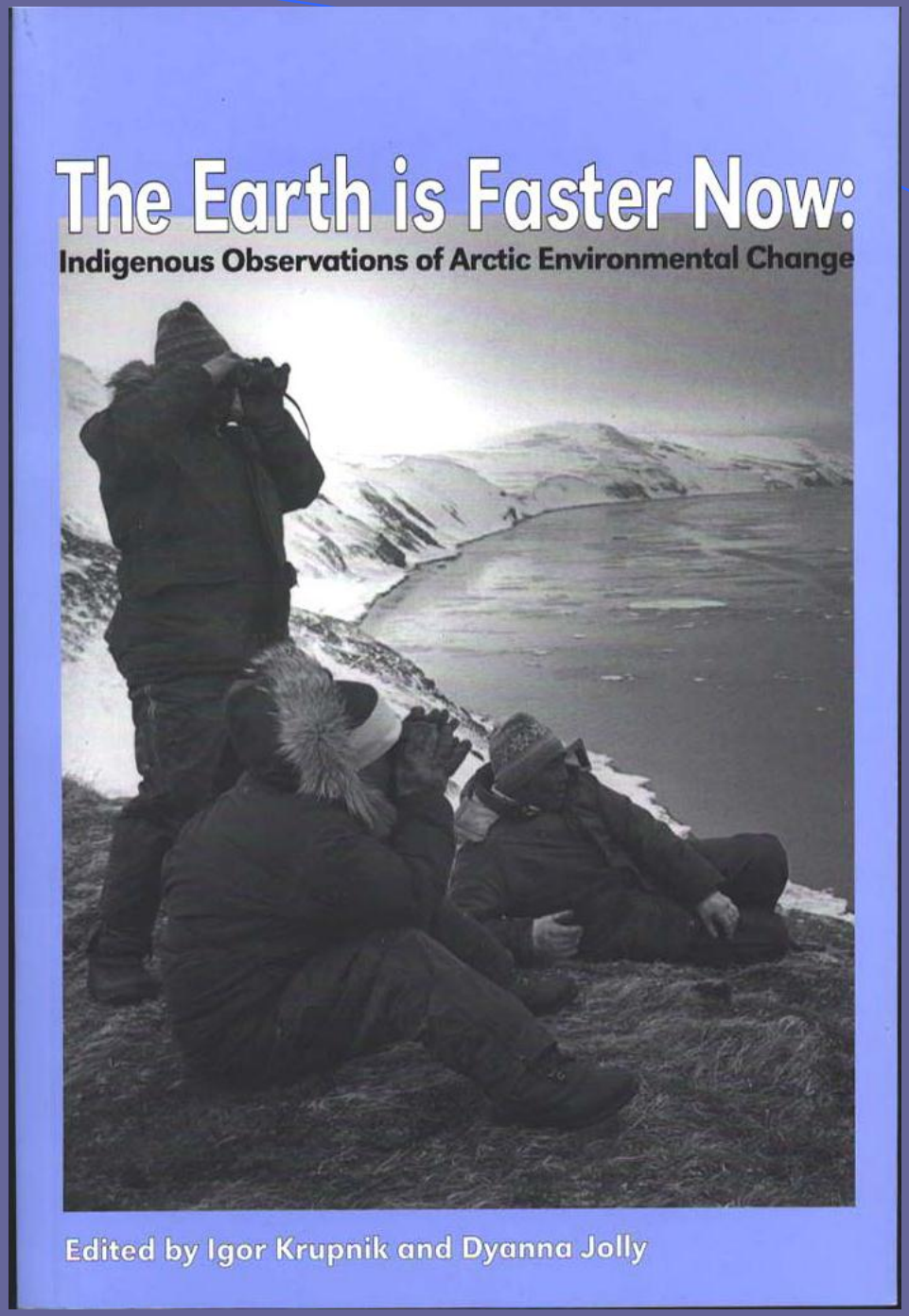
The role of the Arctic as the harbinger of climate change and new threats to its residents were amply documented in the *Arctic Climate Impact Assessment* report (2004-2005)

Partners in Knowledge



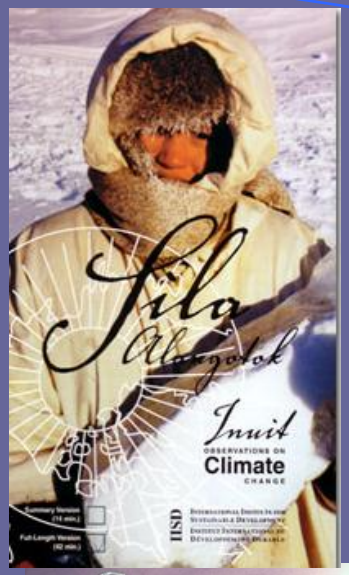
The first study of Arctic change using local indigenous people's knowledge was the Canadian 'Traditional Ecological Knowledge and Management Systems' (TEKMS) of 1992–1994 and its publication, *Voices from the Bay* (McDonald et al. 1997)

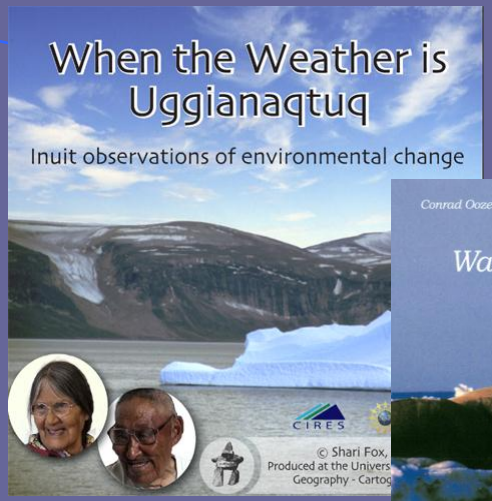
Reading Early Signal

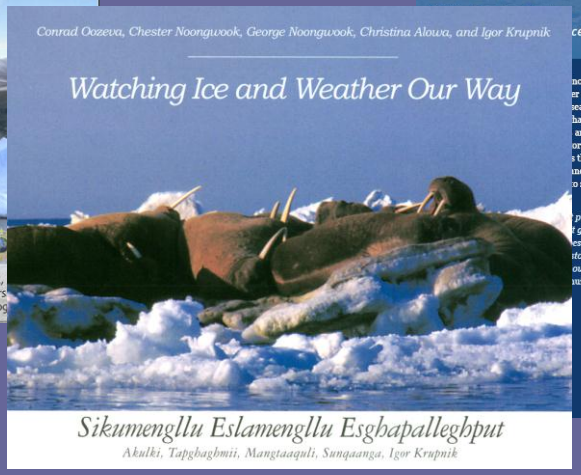


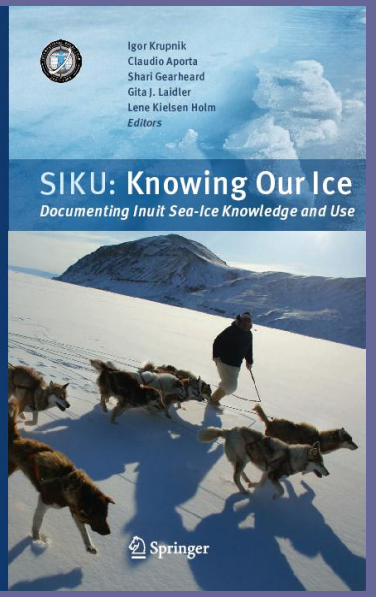
Already by the year 2000, polar residents were reporting a sustained and consistent warming trend in their home environments, while many climate scientists were still 'sitting on the fence'

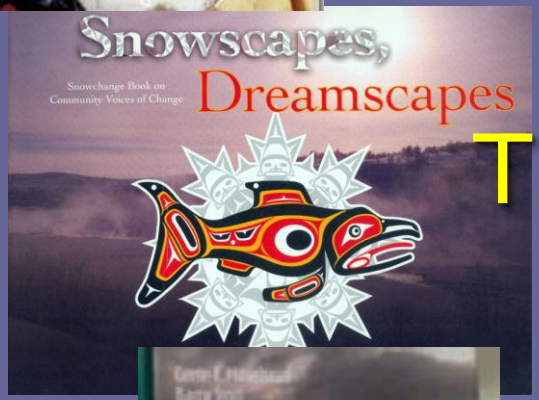
Photo: G. Carleton Ray



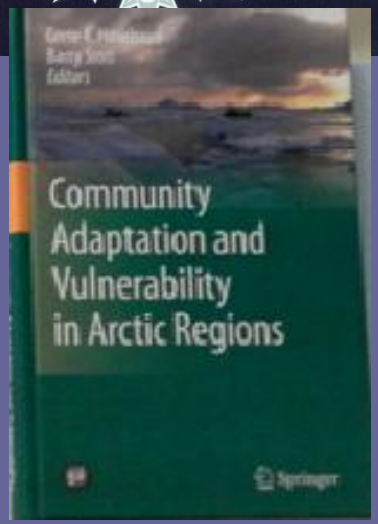


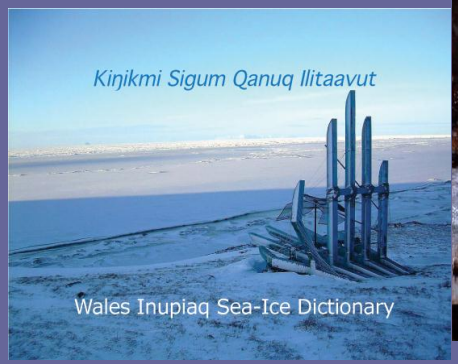


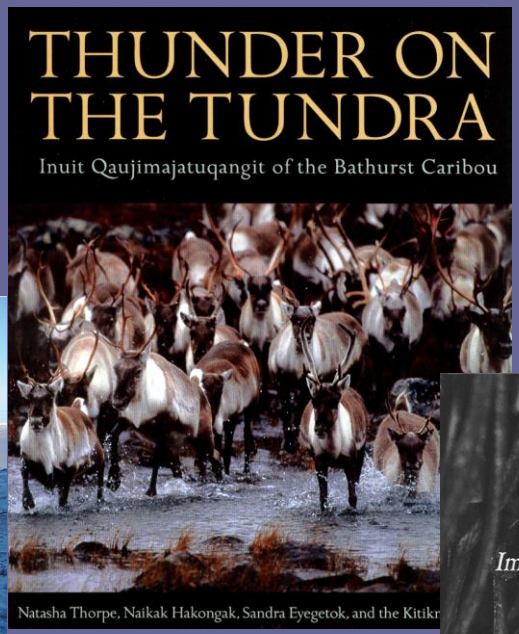


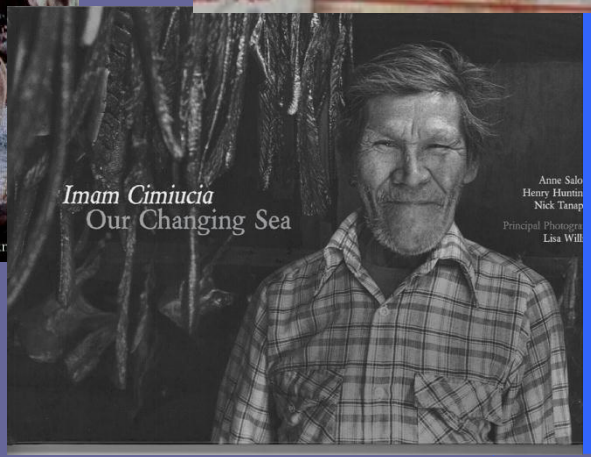


The Treasure of Local Knowledge



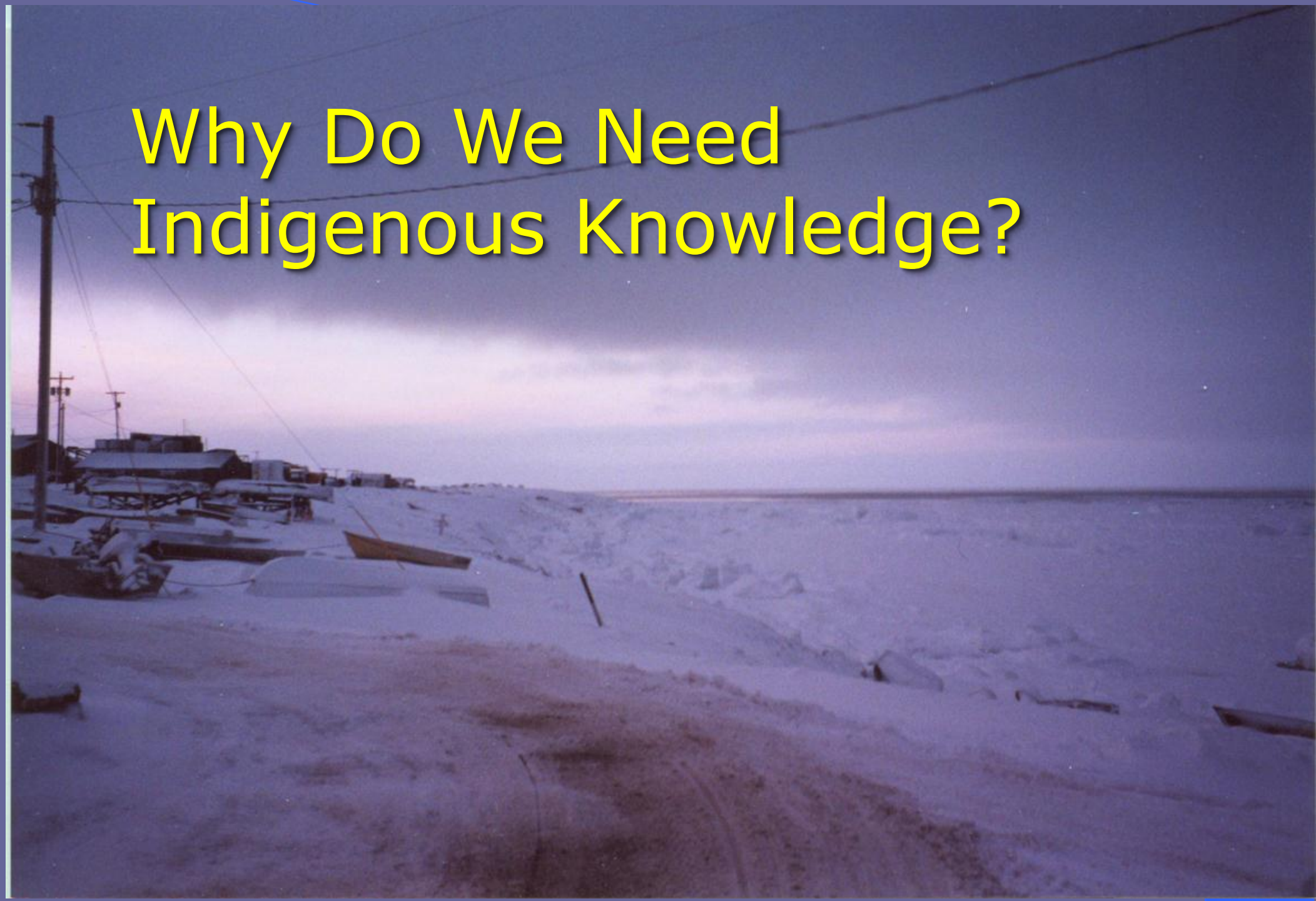






Some recent publications on indigenous peoples' knowledge and monitoring of Arctic climate change

Why Do We Need Indigenous Knowledge?



Frozen sea off the town of Savoonga, St. Lawrence Island, Alaska. *Photo: Igor Krupnik, 2000*

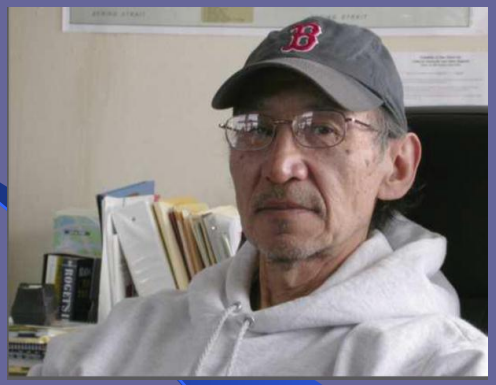
Many Eyes, Experienced Monitors

A small northern community can easily beat a good university by the number of experienced people it puts on weather, ice and wildlife watch 24/7, year after year.

Gambell, Alaska, winter 2008. Photo: Igor Krupnik

SIKU – Sea Ice Knowledge and Use

Documenting Arctic Environmental and Social Change



SIKU Project village monitors (clockwise): Clara-Mae Sagoonick, Arthur Apalu, Winton Weyapuk, Jr., Alexander Borovik, Roman Armaergen, Leonard Apangalook, Paul Apangalook, Joe Leavitt

High Resolution at Local Scale

The use of many indigenous terms and indicators allows hunters document ice conditions with the high level of precision

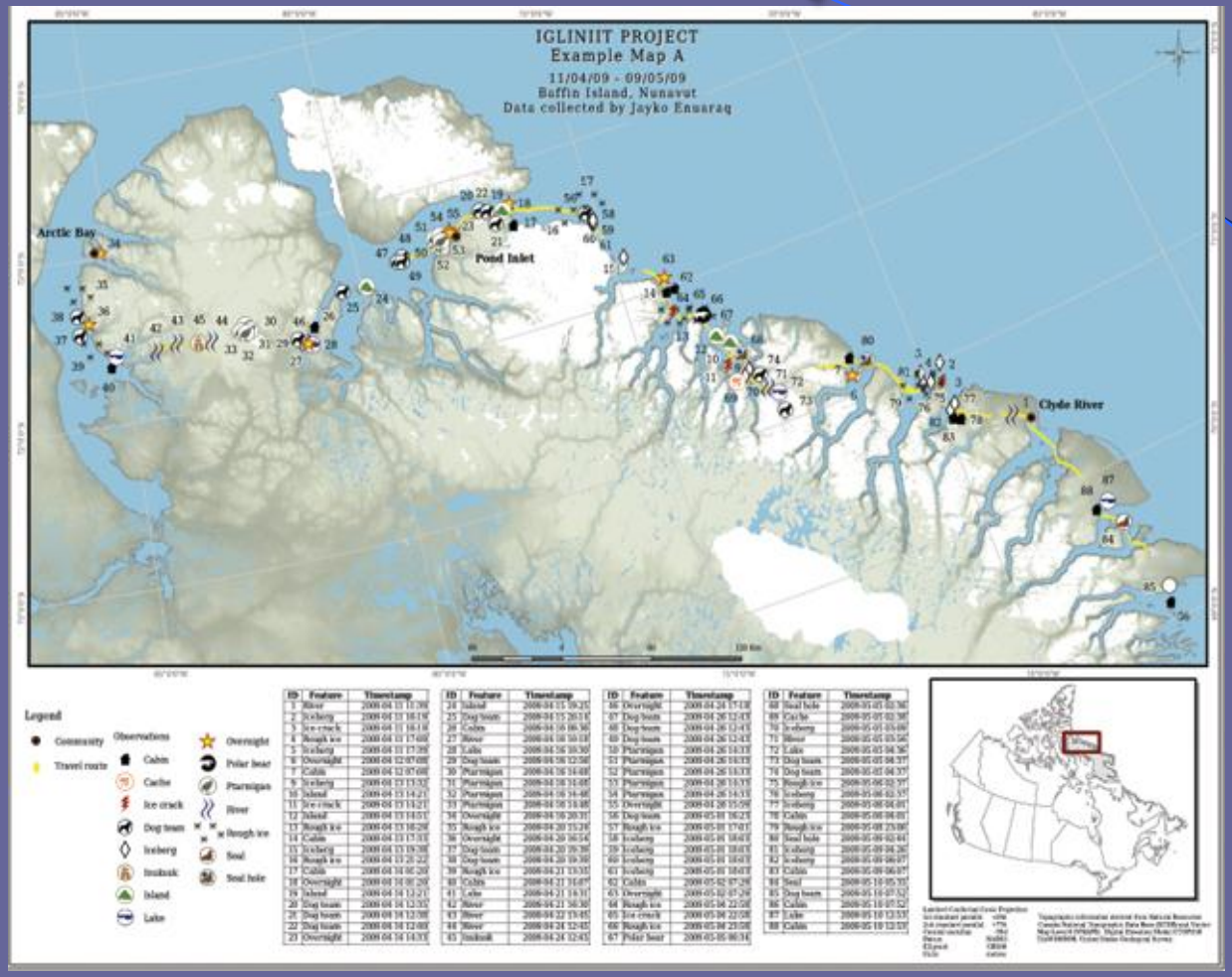
Photo and captions by Winton Weyapuk, Jr.(to the right)

Team Work and Data Sharing

Indigenous monitors in their daily observations share data and routinely perform what scientists practice only while working in teams.

Photo: G. Carleton Ray

Citizen Science, Modern Technologies



Sample map documenting GPS-based observations by one indigenous monitor, April-May 2009
http://sikuatlas.ca/clyde_river_igliniit.html

Top right: David Iqaqrialu from Clyde River, Nunavut logs ice and snow information with his portable GPS-based system

http://ittaq.ca/projects/research-projects/research-current-projects/igliniit-trails-project

Bottom right: Eric Joamie and Gita Laidler work with Pangnirtung elders and hunters , 2005 *(Pulsifer et al. 2010)*

Melting Arctic:
Fellow Citizens at Risk

Barrow, Alaska, the U.S. northernmost community of 4500, faces the wrath of the warming ocean and increased threat of storm-triggered floods and coastal erosion

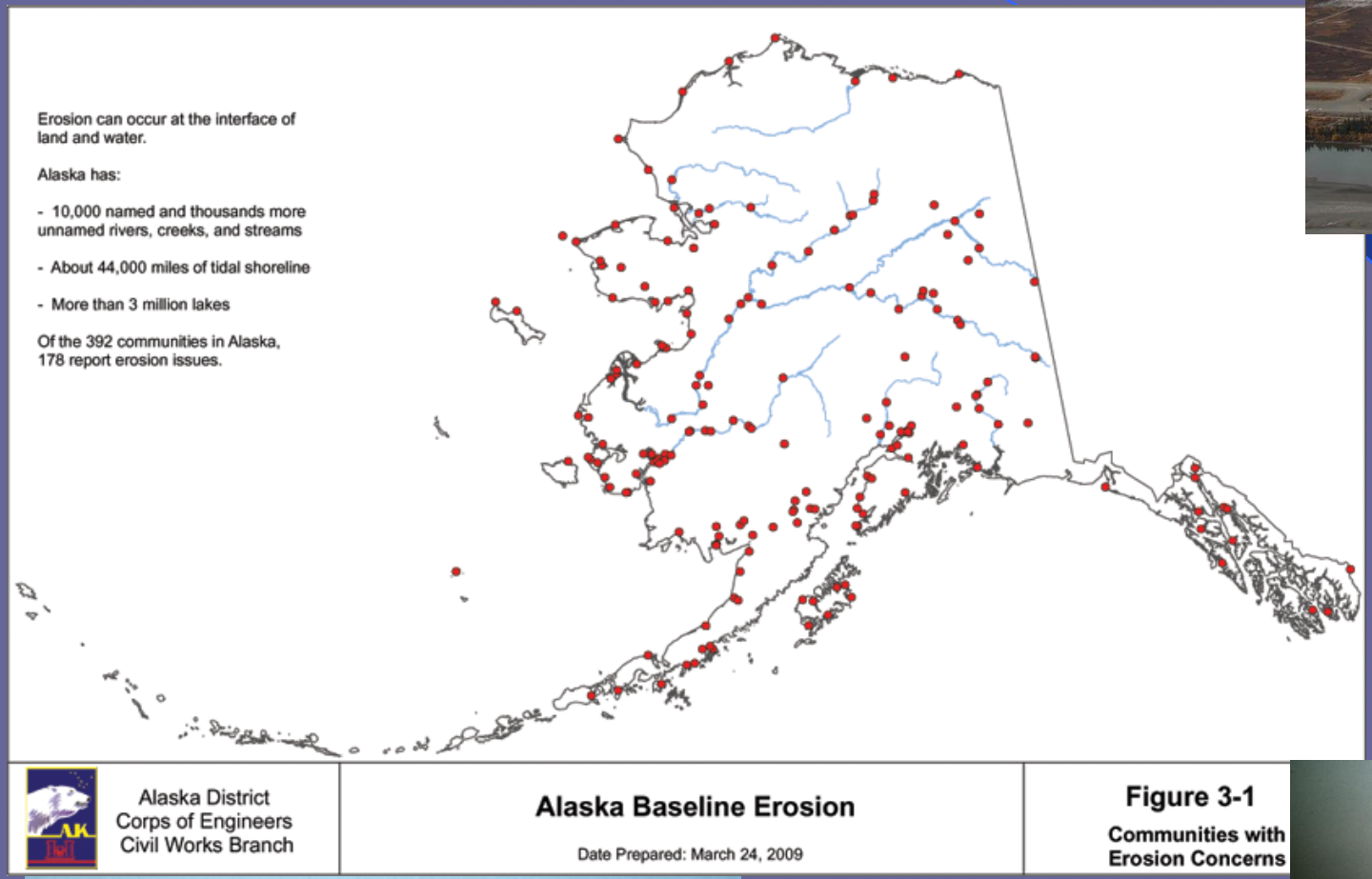
The 'Double-dip' of Climate Warming

Over the past 50 years many Arctic rural communities have been transformed into modern towns. The costs of new construction, local services, and infrastructure maintenance have increased exponentially. More Arctic residents are now at risk and at a higher cost…

Left: Alaskan Inupiat village of Kivalina in 1964 (Photo by Ernest S. Burch); modern town of Kivalina, 2007 (Photo by James Magdanz, ADFG

178 Alaskan Communities at Risk

Photo: James Magdanz



2009 Army Corps of Engineers' Study reports that 178 rural Alaskan communities are facing erosion problems, due to heavy storms, permafrost thawing, and seasonal floods

Photo: www.3rnet.org

Photo: Lars Krutak

http://www.climatechange.alaska.gov/docs/iaw_USACE_erosion_rpt.pdf

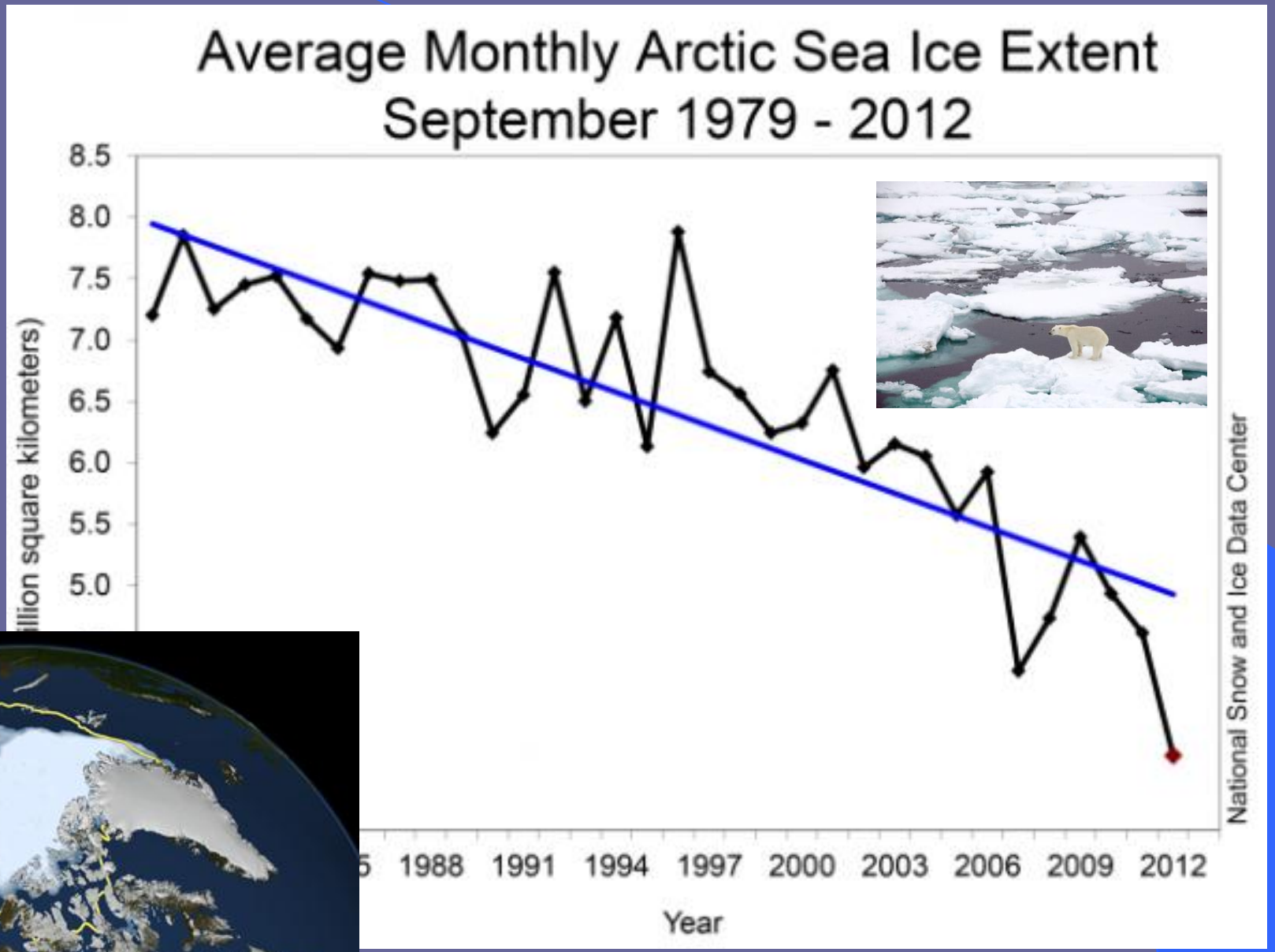
Sand-bagged and Storm-bound

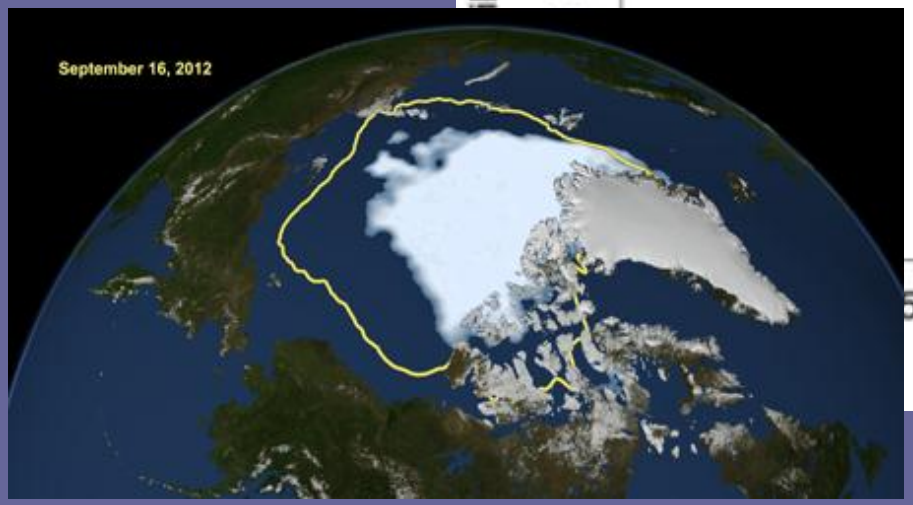
26 Native Alaskan communities are declared as 'high-risk'; some are literally sand-bagged year-round

12 communities have already decided to relocate to higher ground at enormous estimated cost: $95-125M for Kivalina (population 374), $80-130M for Newtok (population 354), $100-200M for Shishmaref (population 563), about $2M per household

http://tribalclimate.uoregon.edu/files/2010/11/AlaskaRelocation_04-13-11.pdf

Arctic Warming: It's Everybody's Bell !





2012 sea ice minimum

http://svs.gsfc.nasa.gov/vis/a000000/a003900/a003998/index.html


Thank you!