Climate Change Effects on Community Health
Observations from the Northwest Alaska

University of Alaska Anchorage
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Center for Climate and Health
Our Mission:

To improve the capacity of the tribal health system and Alaska communities to identify and address health effects associated with climate change.

The Take Home

1. Climate change is effecting communities in many ways.

2. Specific mechanisms are not well understood, but the vulnerability to negative health outcomes is well established.

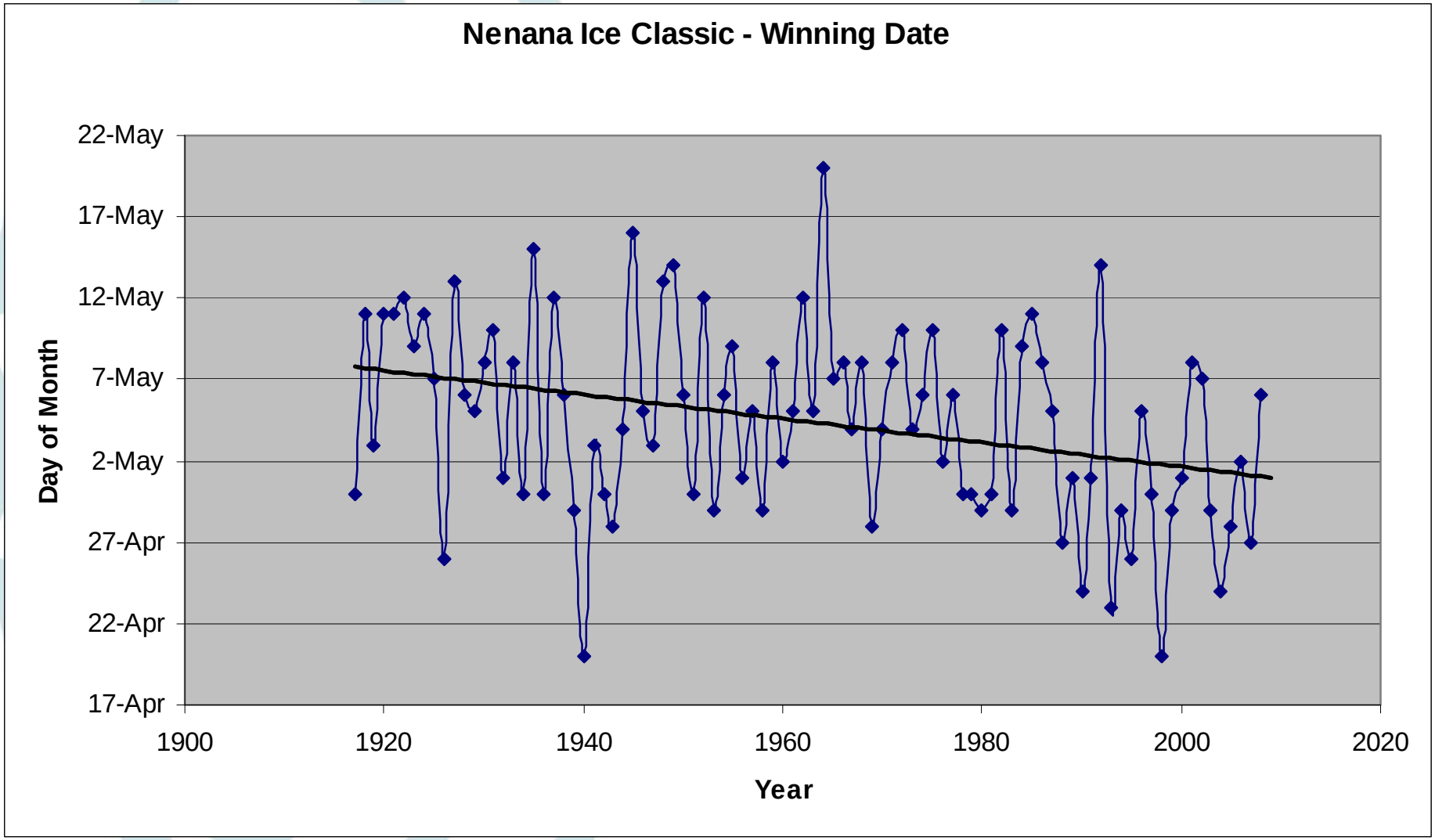
3. Participatory research that focuses on local observations is an effective way to assess community conditions and impacts.

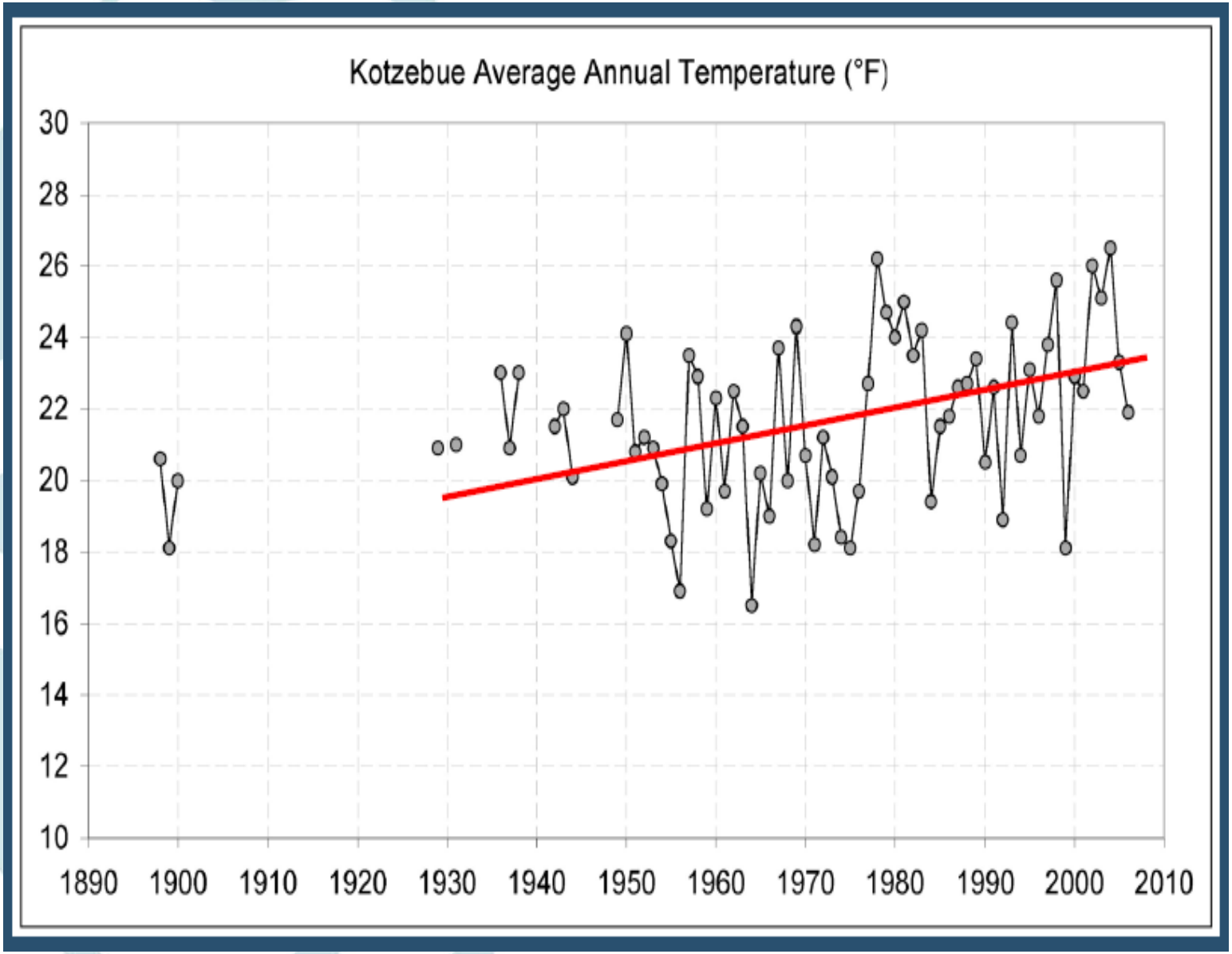
4. By better understanding impacts, we can begin to develop responses that protect community health.

What are Climate Change Health Effects?

Outcomes resulting from climate change that either positively or negative effect community health or health infrastructure.

Five Types of Climate Change Health Effects





Source: National Weather Service

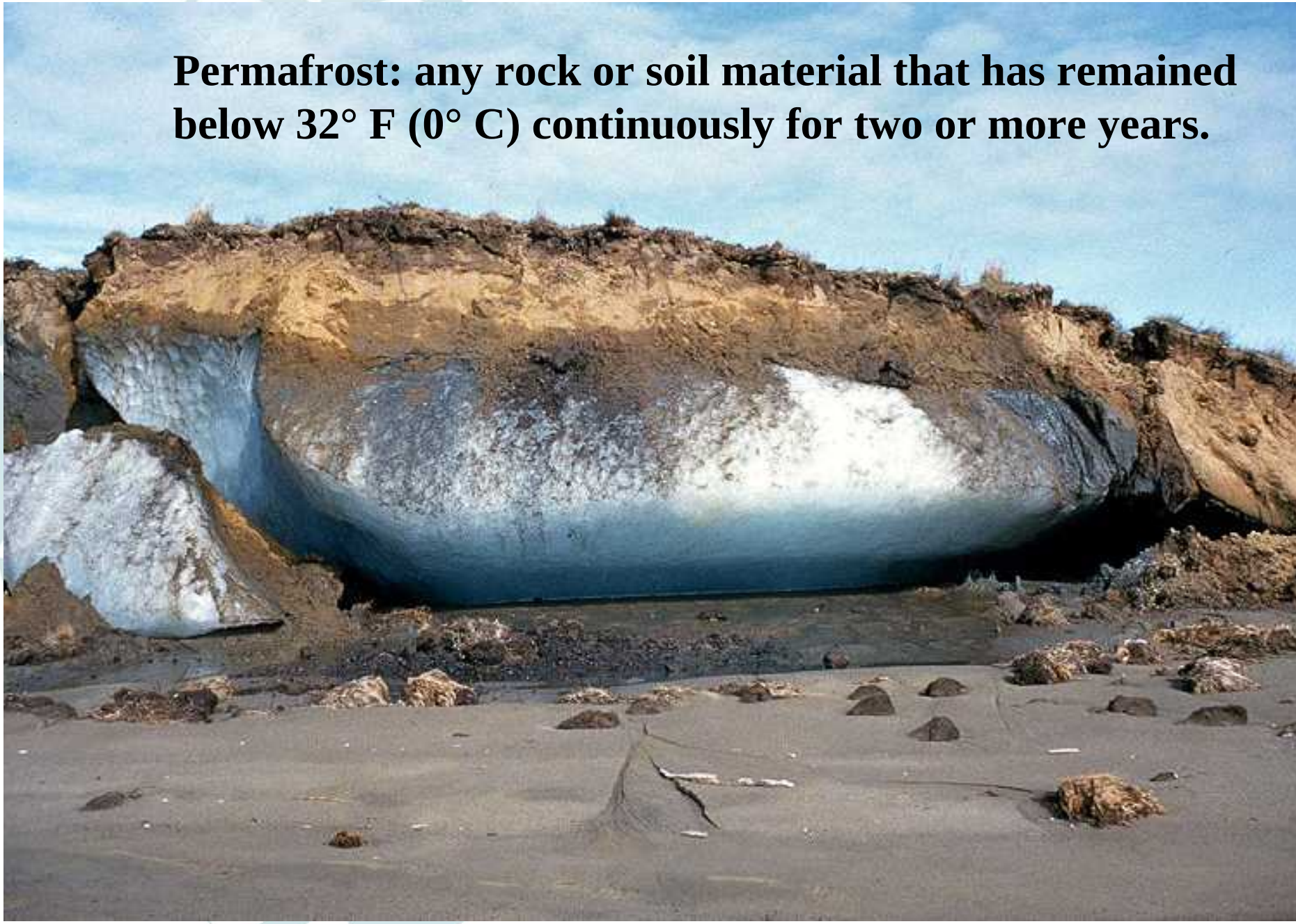
Change in average annual and seasonal temperatures, 1949-2006

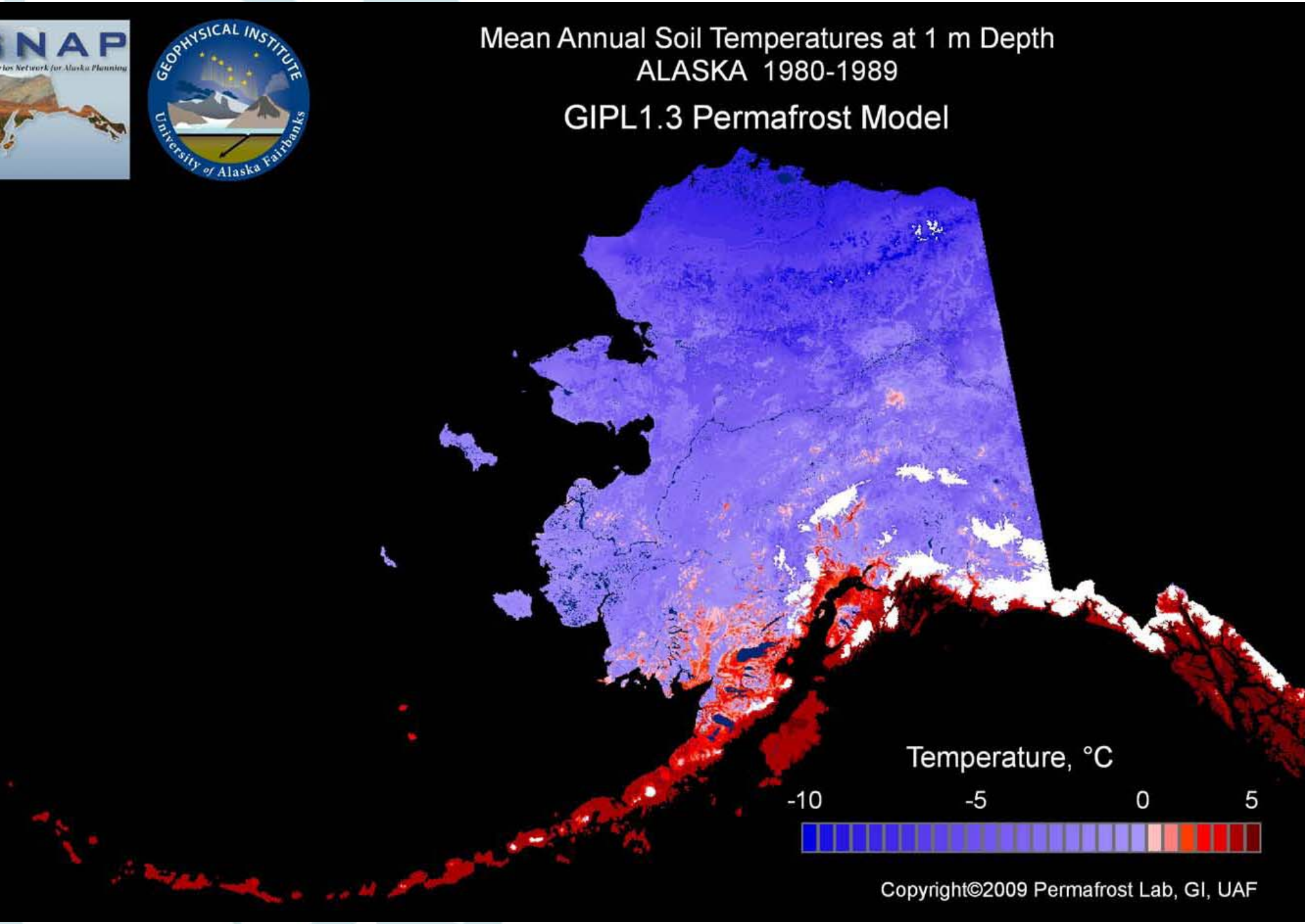
- Dec – Jan. +6.8 degrees
- March – May +2.1 degrees
- June – August +2.4 degrees
- Sept – Nov +1.5 degrees

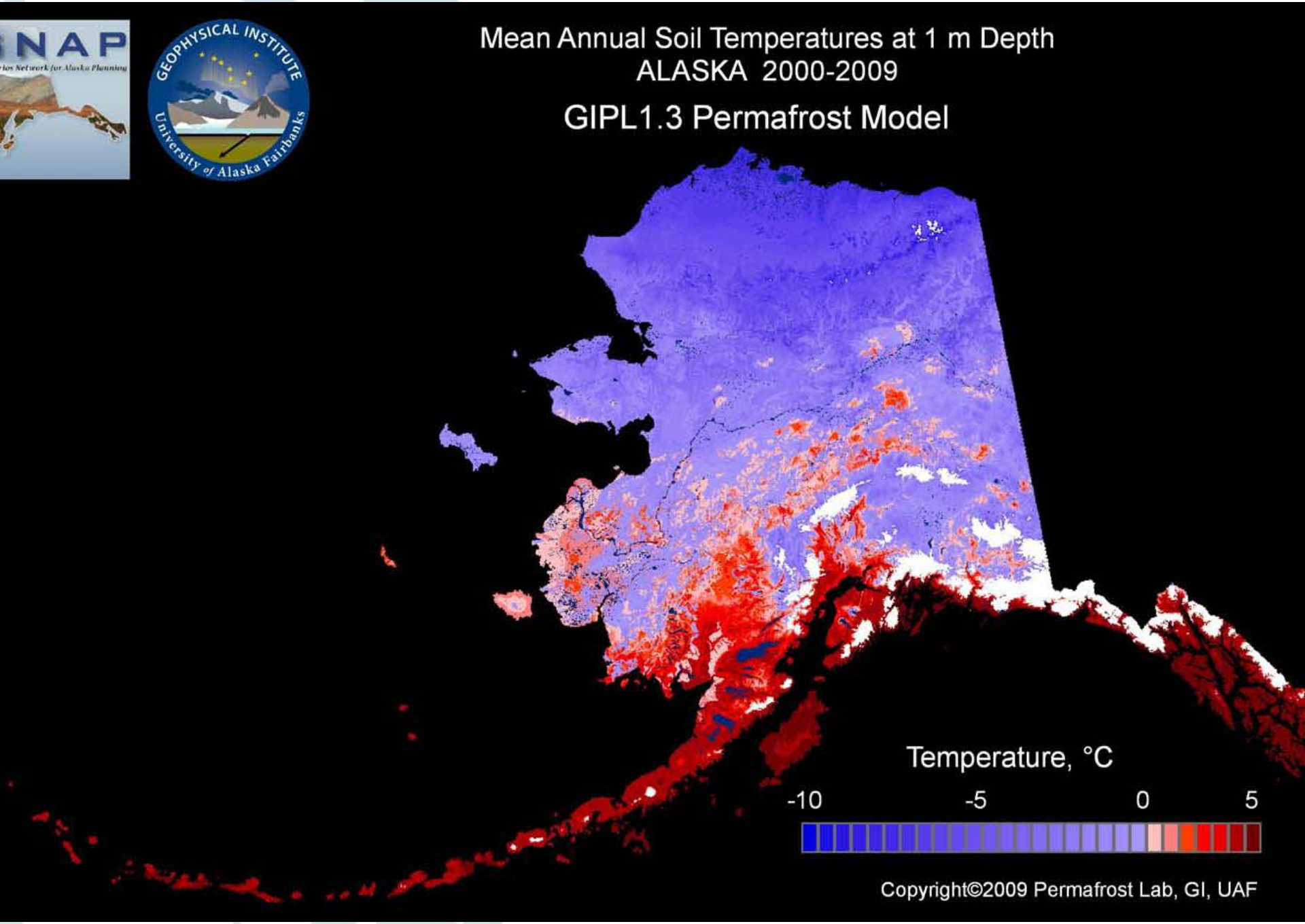
Source: UAF: Alaska Climate Research Center


Point Hope
Kivalina
Noatak
CHUKCHI SEA
Kotzebue
Kiana
Ambler
Kobuk
Noorvik
Shungnak
Selawik
ARCTIC
Deering
Buckland
SCALE IN MILES

Permafrost: any rock or soil material that has remained below 32° F (0° C) continuously for two or more years.




Mean Annual Soil Temperatures at 1 m Depth
ALASKA 1980-1989
GIPL1.3 Permafrost Model
Temperature, °C
-10
-5
0
5
Copyright©2009 Permafrost Lab, GI, UAF


Mean Annual Soil Temperatures at 1 m Depth
ALASKA 2000-2009
GIPL1.3 Permafrost Model
Temperature, °C
-10
-5
0
5
Copyright©2009 Permafrost Lab, GI, UAF


Cape Lisburne
Point Hope
LISBURNE PENINSULA
TIKIGAQ
POINT HOPE, ALASKA
Kivalina
CHUKCHI SEA
Marryat Inlet
Kukpuk River
Tigara Peninsula
Point Hope
CHUKCHI SEA
Aiautak Lagoon
LISBURNE PENINSULA


NAVAL
COMPANY

Sea Ice

Climate Change Impacts: sea ice has been forming later in the fall and departing earlier in the spring. More ice free days. Thick multi-year sea ice is being replaced by thinner first-year ice.

Potential Health Effects: injury from unsafe ice conditions, anxiety due to increased risk, changes in environment and resource availability, food insecurity and chronic disease if healthy food alternatives are not established.


Photo: Yuri Gorokhovich

Permafrost Thaw and Erosion

Climate Change Impacts: Point Hope is currently at risk from seasonal storm events. Sea level rise and coastal erosion is increasing this risk.

Potential Health Effects: risk of injury during a flood or evacuation, injury or disease afterward if conditions are unsafe or if critical infrastructure is damaged and services disturbed.

Photo Courtesy of Vladimir Romanovsky

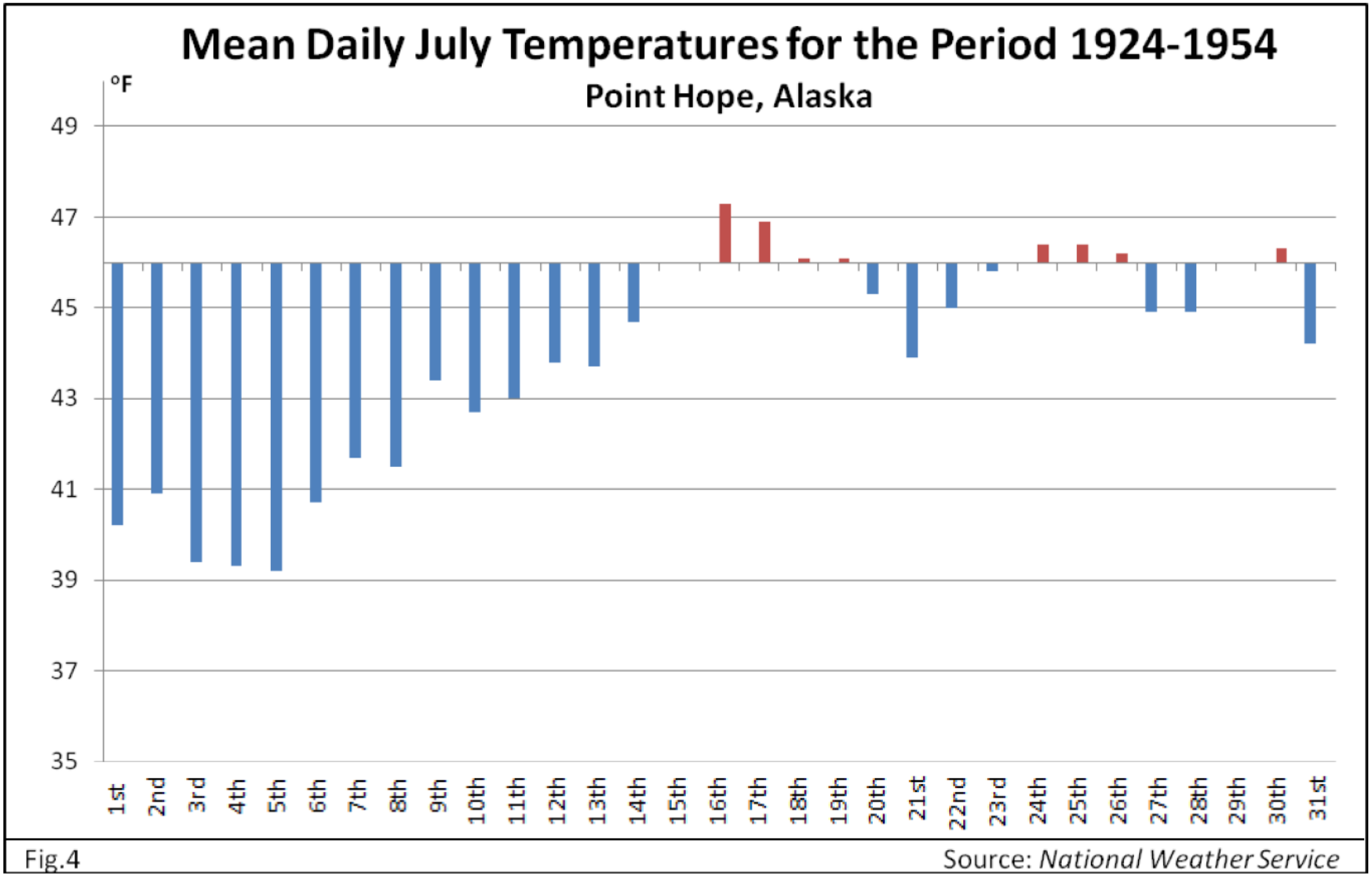
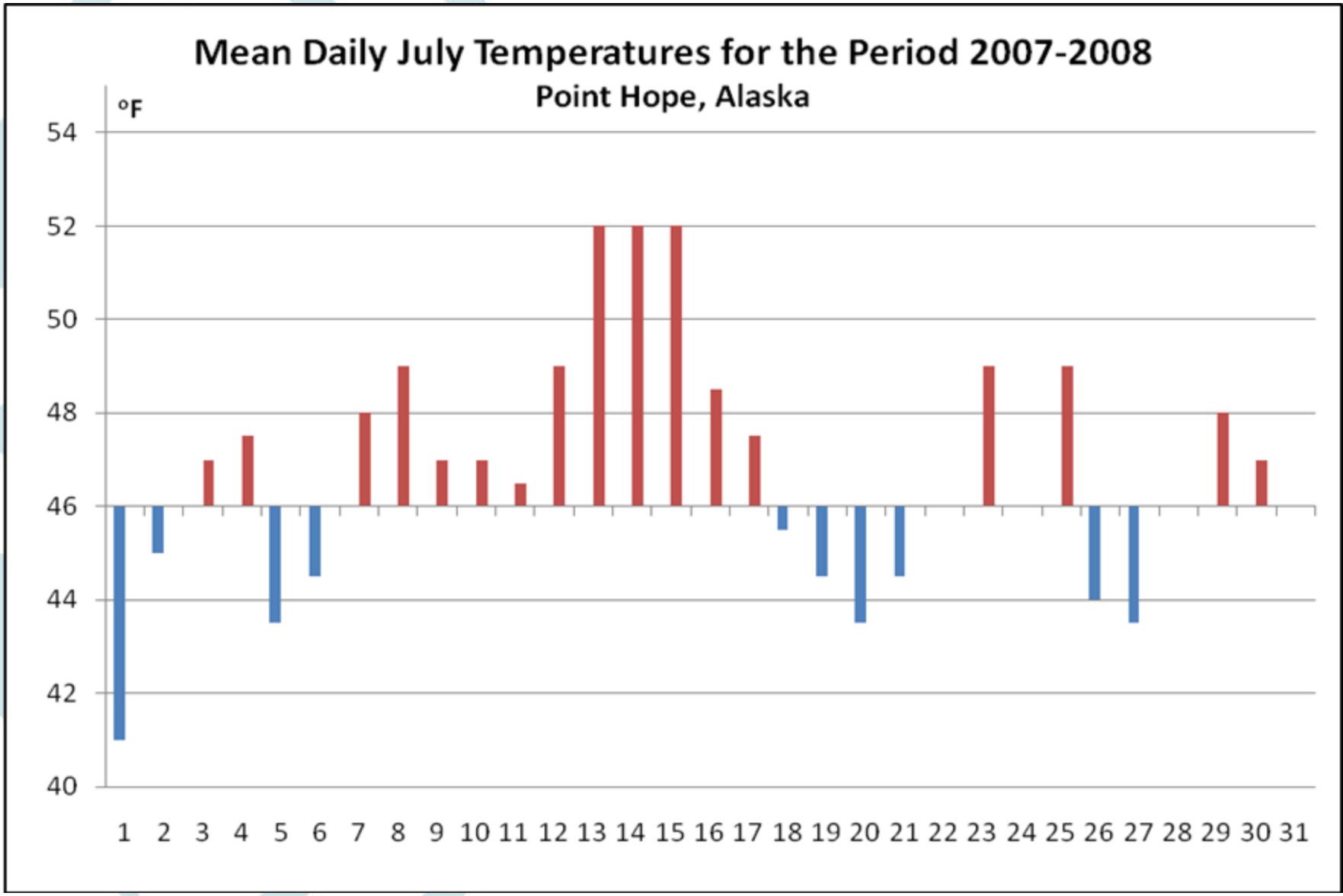
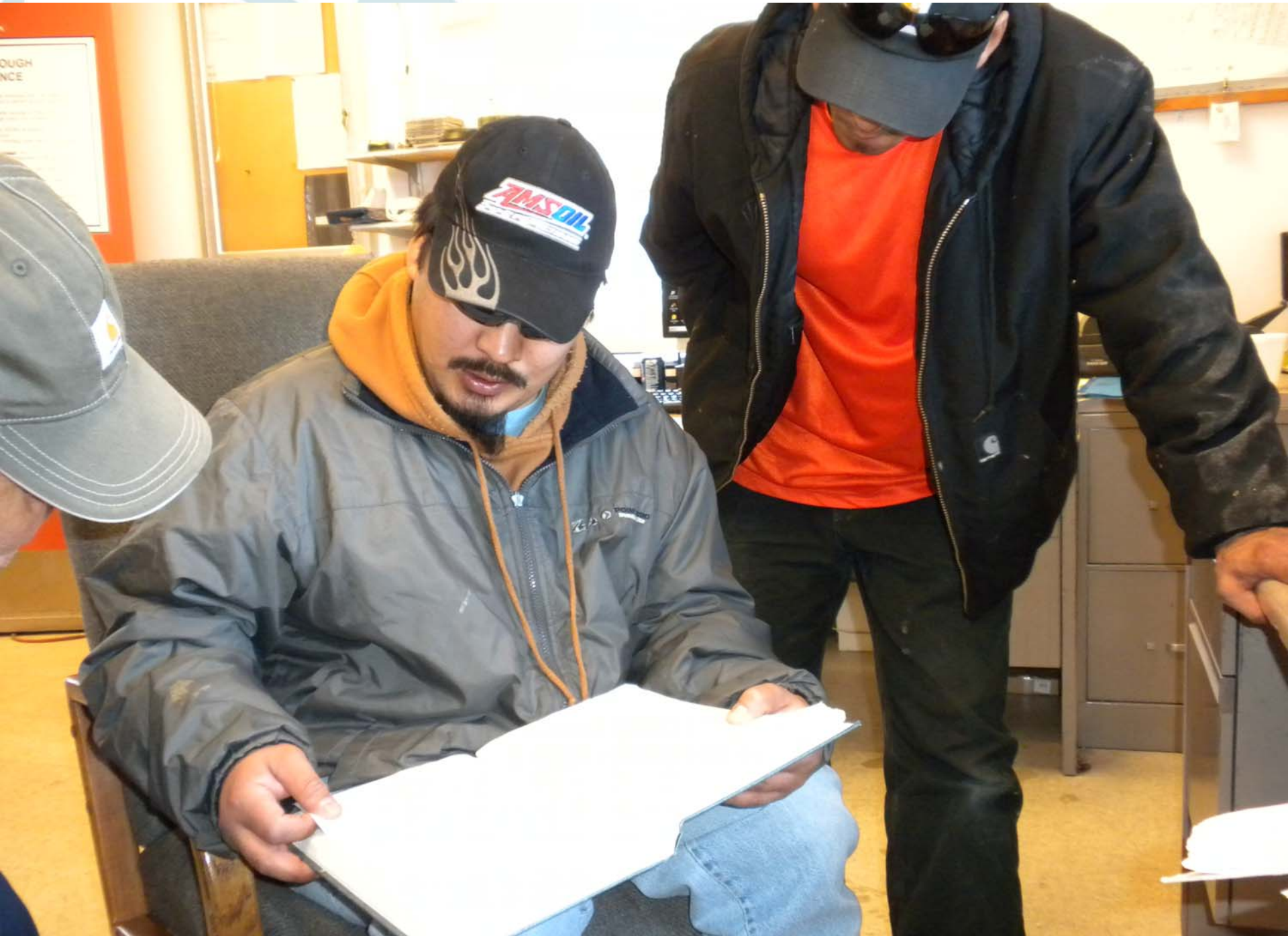
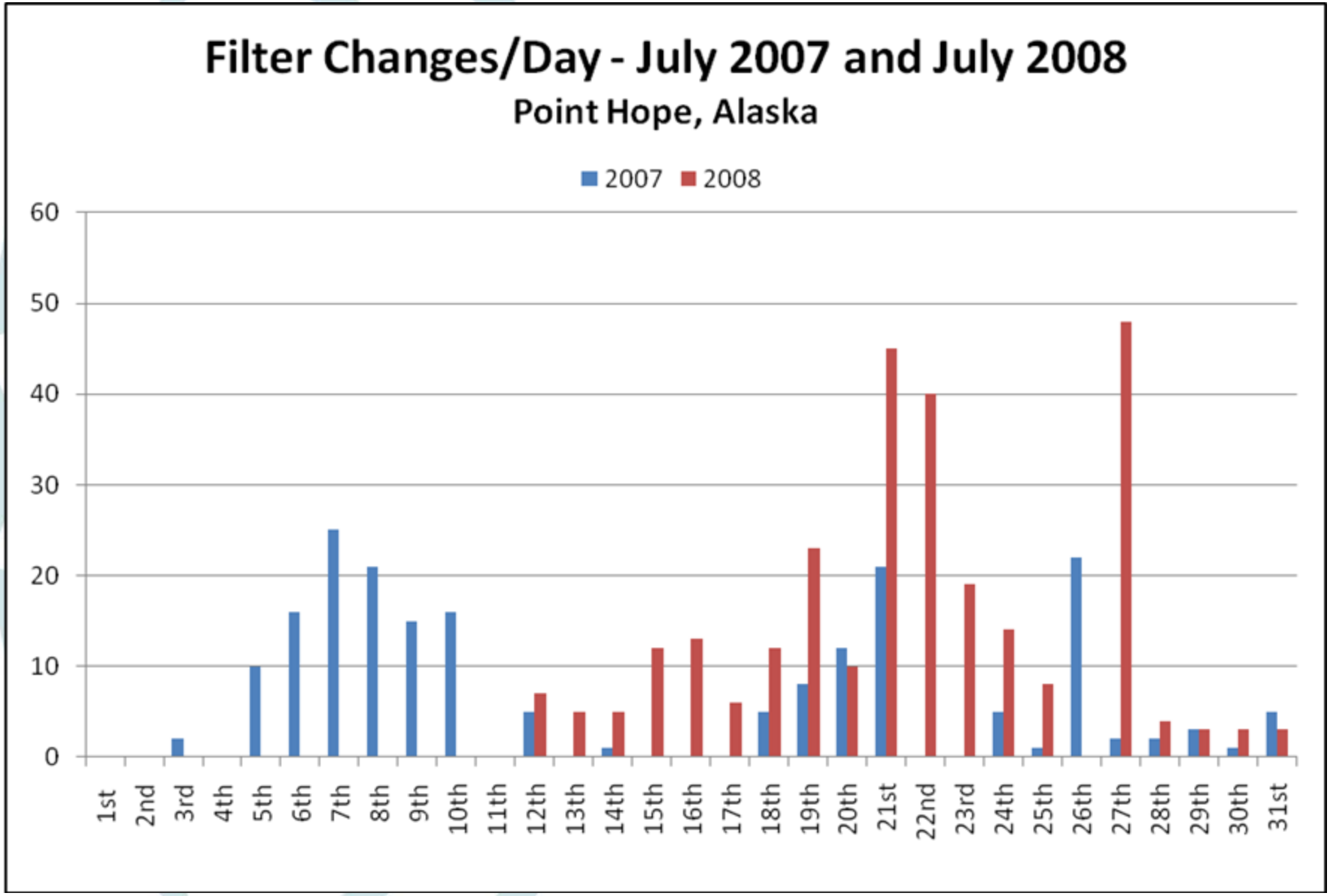


Fig.4

Source: *National Weather Service*


Mean Daily July Temperatures for the Period 2007-2008
Point Hope, Alaska
°F
54
52
50
48
46
44
42
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

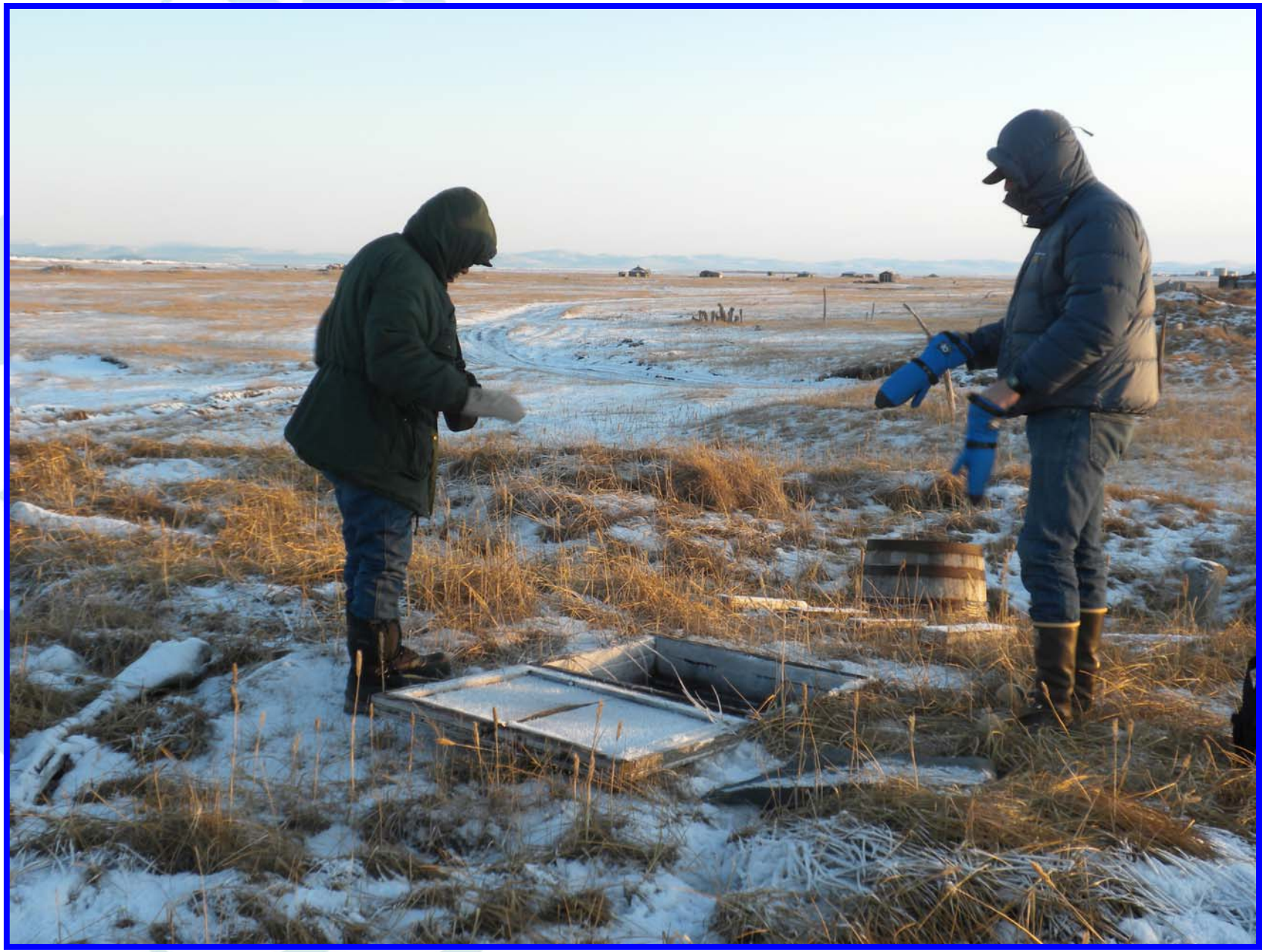

AMSOIL

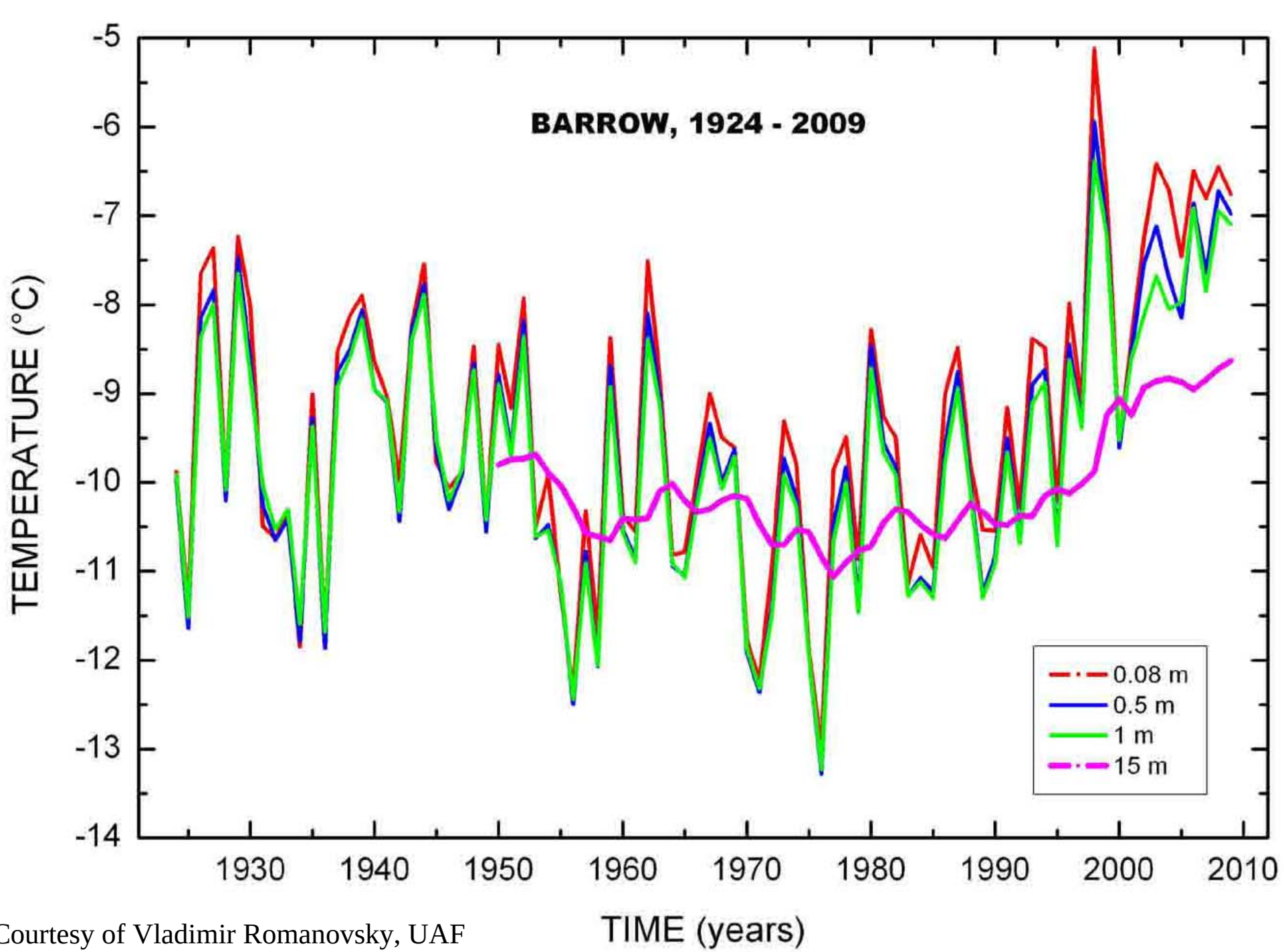

Filter Changes/Day - July 2007 and July 2008
Point Hope, Alaska
2007
2008
60
50
40
30
20
10
0
1st
2nd
3rd
4th
5th
6th
7th
8th
9th
10th
11th
12th
13th
14th
15th
16th
17th
18th
19th
20th
21st
22nd
23rd
24th
25th
26th
27th
28th
29th
30th
31st

Water Security

Climate Change Impacts: Low precipitation and high temperatures during the summer of 2007 and 2008 contributed to decreased water quality at 7 Mile Lake, the community water source.

Health Effect: An increase in organic material in the raw water fouled filters and interrupted water making operations and created unnecessary utility costs.





Courtesy of Vladimir Romanovsky, UAF

Food Security

Climate Impact: thawing permafrost is undermining food security by increasing the temperature in traditional cold cellars.

Potential Health Effect: inadequate storage condition is resulting in spoiled meat and blubber and may be increasing the risk for foodborne illnesses.

Climate Change Health Effects in Point Hope

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Eight Recommendations

1. Increase local climate surveillance
2. Assess permafrost, food storage, and source water
3. Assess flood risk
4. Plan for evacuation
5. Develop water source contingencies
6. Improve food storage
7. Expand climate dialogue
8. Develop local and regional climate capacity.

Leading Cause of Death, Age Adjusted Mortality Rate per 100,000 (1999-2003)

Mortality Rates Age adjusted per 100,000		Maniilaq AN	Statewide AN	US Whites	Healthy Peoples 2010	Rate Ration (Maniilaq AN vs. US Whites)
1	Cancer	347.8	245.4	193.5	159.9	1.8
2	Heart Disease	321.3	211.4	234.6	166.0	1.3
3	Unintentional Injuries	133.6	116.1	36.4	17.5	3.7
4	Cerebrovascular Diseases	80.4	64.4	55.6	48.0	1.4
5	Suicide	79.5	36.3	11.6	5.0	6.9

AN - Alaska Native
US Whites - a population commonly used as a comparison measure
Healthy People 2010 – Statewide Health Objectives
Alaska Data Source: Alaska Bureau of Vital Statistics. Analysis conducted by Alaska Native Epidemiology Center.
US Data Source: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute.

[j1]These figures get referenced before “patterns of Illness” so probably best to put them before that section…
[j2]There are data sources at the bottom of each table but we need to reference the whole document, which is?

Figure 5. Top 15 Maniilaq Health Center, Discharges by ICD Code, All Ages, Fiscal Year 2005

Rank	Cause	Number	% Total
1	Pneumonia	55	55.6
2	Deliveries (childbirth)	36	36.4
3	Accidents and Injuries	17	17.2
4	Heart Disease	12	12.1
5	Neuroses & Personality Disorders	9	9.1
6	Psychoses	8	8.1
7	Bronchitis, Emphysema	7	7.1
8	Urinary Tract Diseases	7	7.1
9	Complications of Pregnancy	7	7.1
10	Disease of the Blood	6	6.1
11	Injected Skin	6	6.1
12	Nutrition and Metabolic Disorders	4	4.0
13	Cerebrovascular Disease	4	4.0
14	Disease of the Gall Bladder	3	3.0
15	Convulsions	3	3.0

Data Source - Indian Health Service, NPIRS (Patient Registration System)
ICD - International Classification of Diseases (WHO)
Note: ICD Recode combines similar primary diagnoses into categories

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Chart | Map

How to use | Share graph | Full screen

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Ant
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Arm
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Aus
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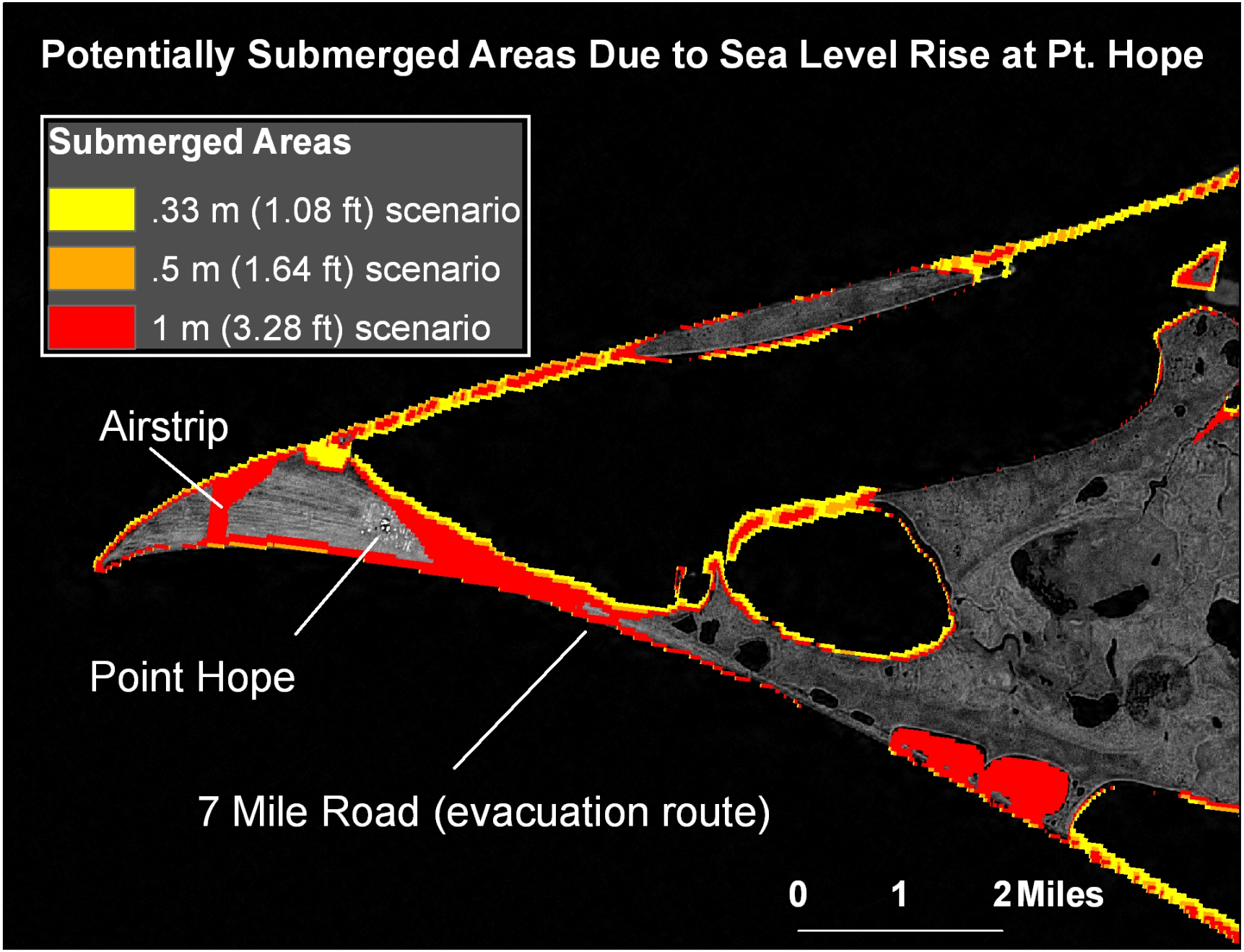
Des

Size
Yearly


Potentially Submerged Areas Due to Sea Level Rise at Pt. Hope
Submerged Areas
.33 m (1.08 ft) scenario
.5 m (1.64 ft) scenario
1 m (3.28 ft) scenario
Airstrip
Point Hope
7 Mile Road (evacuation route)
0
1
2 Miles