



A Citizen Observer System for Monitoring Environmental Change

**U.S. Canada Northern Oil and Gas
Research Forum**

October 6, 2017

Mike Brubaker

Director Community Environment and Health

Alaska Native Tribal Health Consortium



**ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM**



BOEM
BUREAU OF OCEAN ENERGY MANAGEMENT



ARCTIC OCEAN

BEAUFORT SEA

CHUKCHI SEA

NORTON SOUND

ARCTIC CIRCLE

BERING SEA

GULF OF ALASKA

BRISTOL BAY

PACIFIC OCEAN

Legend

- Village
- ★ Village with Clinic
- Subregional Clinic
- Regional Hospital
- Alaska Native Medical Center (jointly managed by ANCH & SO)
- Tribal or Local Health Program
- Regional Area Border
- Road



SCALE IN MILES

**OUR VISION: Alaska Native
people are the healthiest
people in the world.**



**Warming is causing
thawing and erosion on
the North Slope.**

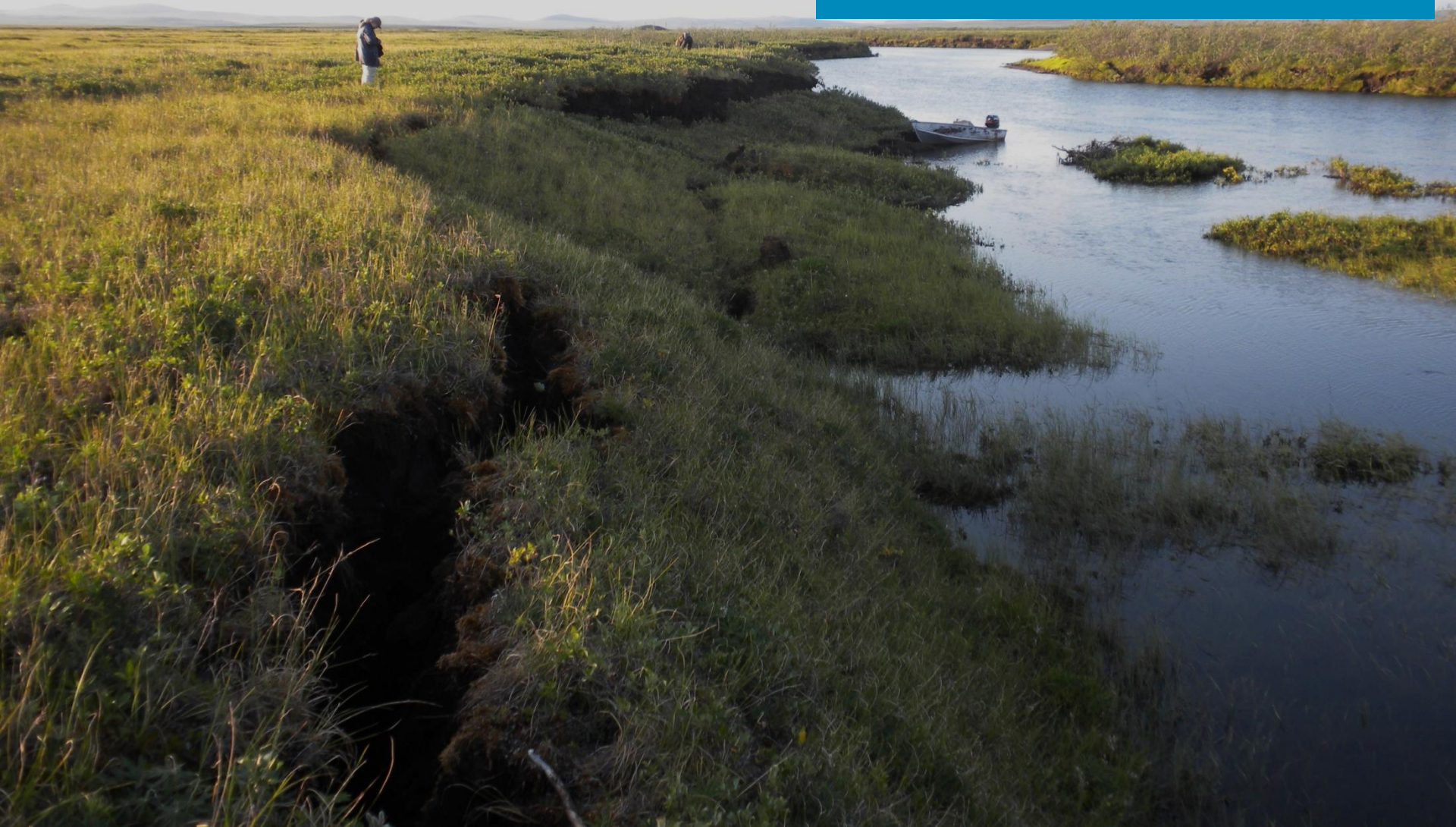


Photo by Ben Jones

**Wildfire on
Moose Mountain.**



**Thawing and erosion in Kivalina
affects river travel and source
water quality.**



Larger thaw features can be seen on many rivers include the Selawik.



Erosion turns stream water in Golovin the 'color of coffee'.



**Downstream in the village,
thawing permafrost causes
damage to infrastructure and
disruption of services.**



Center for Climate and Health



Disease



Food Security



Injury



Behavioral Health



Water Security



ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM





Source DOI

Social Network



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Toledo Washington United States
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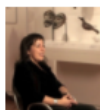
Allan Crow

Sooke British Columbia Canada
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Basic of Knowledge

- Local Knowledge 1055
- Scientific Knowledge 910
- Indigenous Knowledge 411

Community

- Anchorage, Alaska, United States 208
- Fairbanks, Alaska, United States 88
- Ensenada, Baja California, Mexico 50
- Victoria, British Columbia, Canada 26
- Vancouver, British Columbia, Canada 25
- Bellingham, Washington, United States 24
- Juneau, Alaska, United States 20
- Seattle, Washington, United States 20
- Washington D.C., Washington, D.C., United States 17
- Yellowknife, Northwest Territories, Canada 17

Showing top 10

Primary Organization

- ANTHC 56
- Royal Roads University 38
- UAF, University of Alaska Fairbanks 36
- Grupo de Ecología y Conservación... 33
- First Nations Health Authority (FNHA) 29
- Northwest Indian College (NWIC) 25
- Environmental Protection Agency - ... 22
- Alaska Department of Fish and Game 19
- Government of Northwest Territories 19
- Alaska Department of Environment... 15

Showing top 10

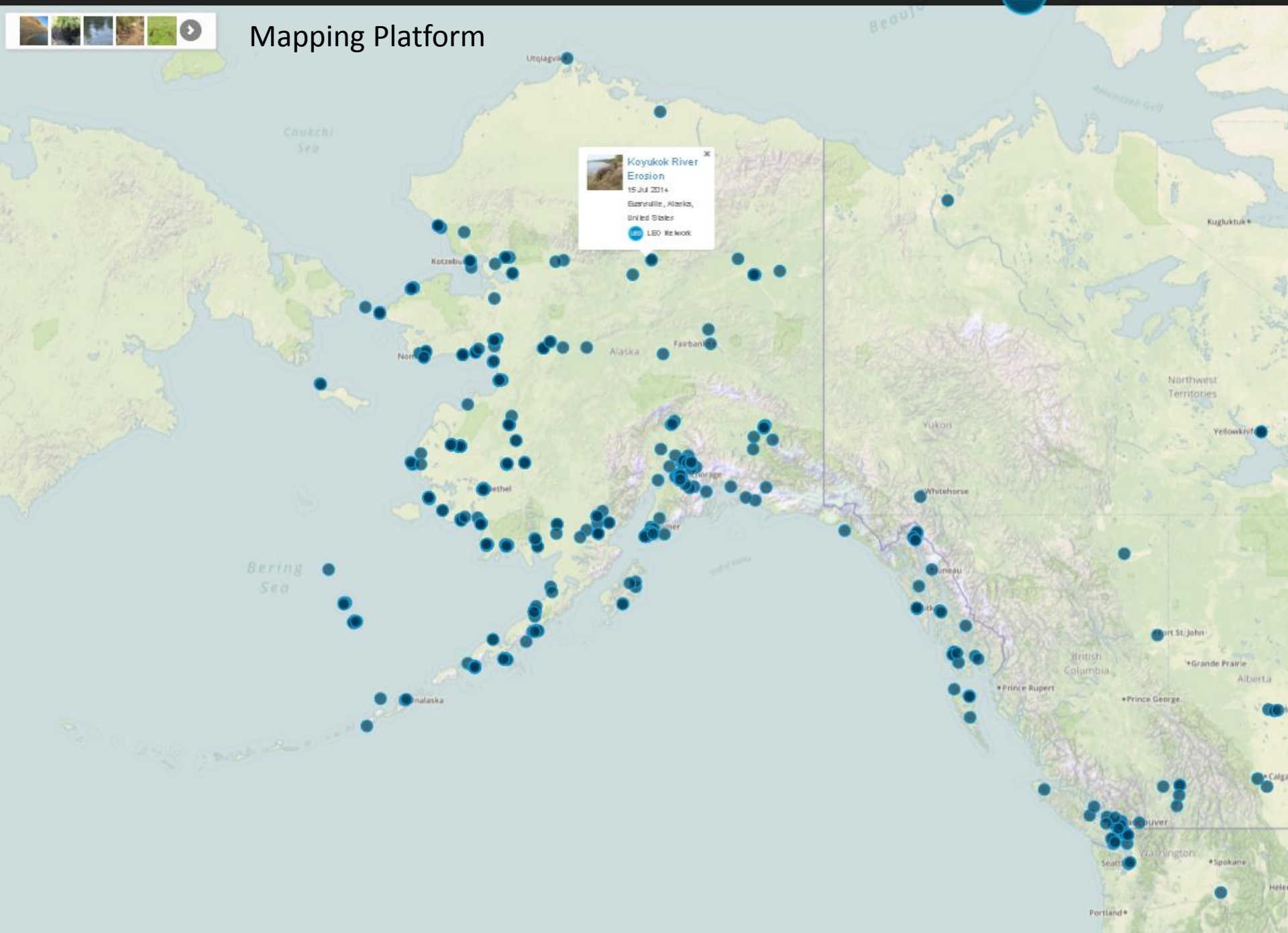
Affiliate Organization

- The Biosphere and Sustainability / ... 24
- GLOBE Program (Global Learning ... 5
- Northwest Indian College (NWIC) 5
- BeringWatch 4
- Local Environmental Observer Net... 4
- University of Victoria 4
- ANTHC 3
- Citizen Science Association (CSA) 3
- Cornell Lab of Ornithology 3
- Environmental Protection Agency - ... 3

Showing top 10



Mapping Platform





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Contributors

Observer	Consultant
 Maija Lukin Kotzebue, Alaska, United States	 Hajo Eicken Fairbanks
Tribal Environmental Manager Environmental Maniilaq Association	UAF, International Arctic Research Center







Observation: November of 2015, our sea ice had not yet frozen. Usually, caribou migrate over the thinner ice in late October, early November, and the seals are long gone by then. This year, there were caribou over the partially frozen ice, as well as seals in the water, with the caribou trying to figure out where to go. In the photos you'll see seals, caribou and ducks in mid-November, which is highly unusual.



Hundreds of seals in mid-November (Photo by Maija Lukin)

Related

View on Map Timeline

 Unusually Warm In Northwest Arctic Kivalina, Alaska, ... JAN 5, 2016 	 Unseasonably Warm and No Sea Ice Kivalina, Alaska, ... NOV 12, 2014 	 Trapped on sea ice Nome, Alaska, USA JAN 1, 2013 
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Add Comment

 Mike Brubaker
Oct 7, 2017

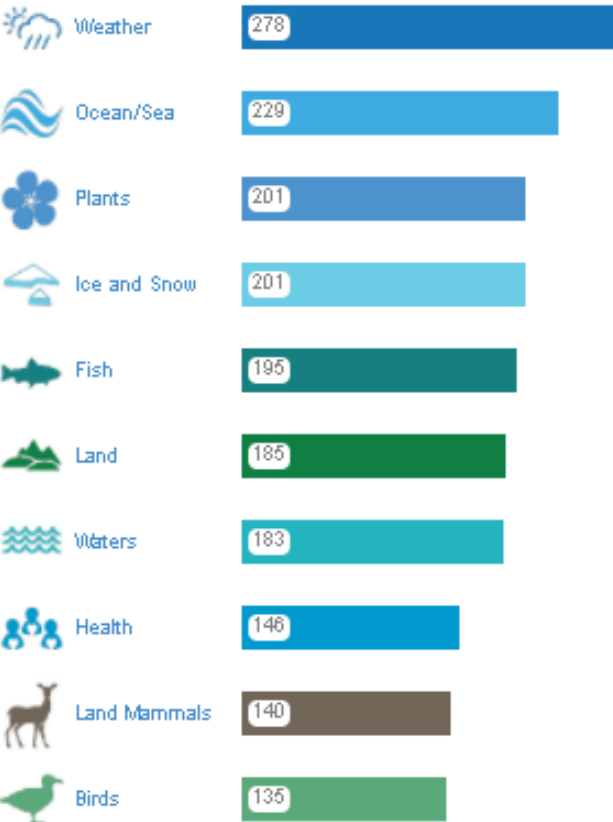
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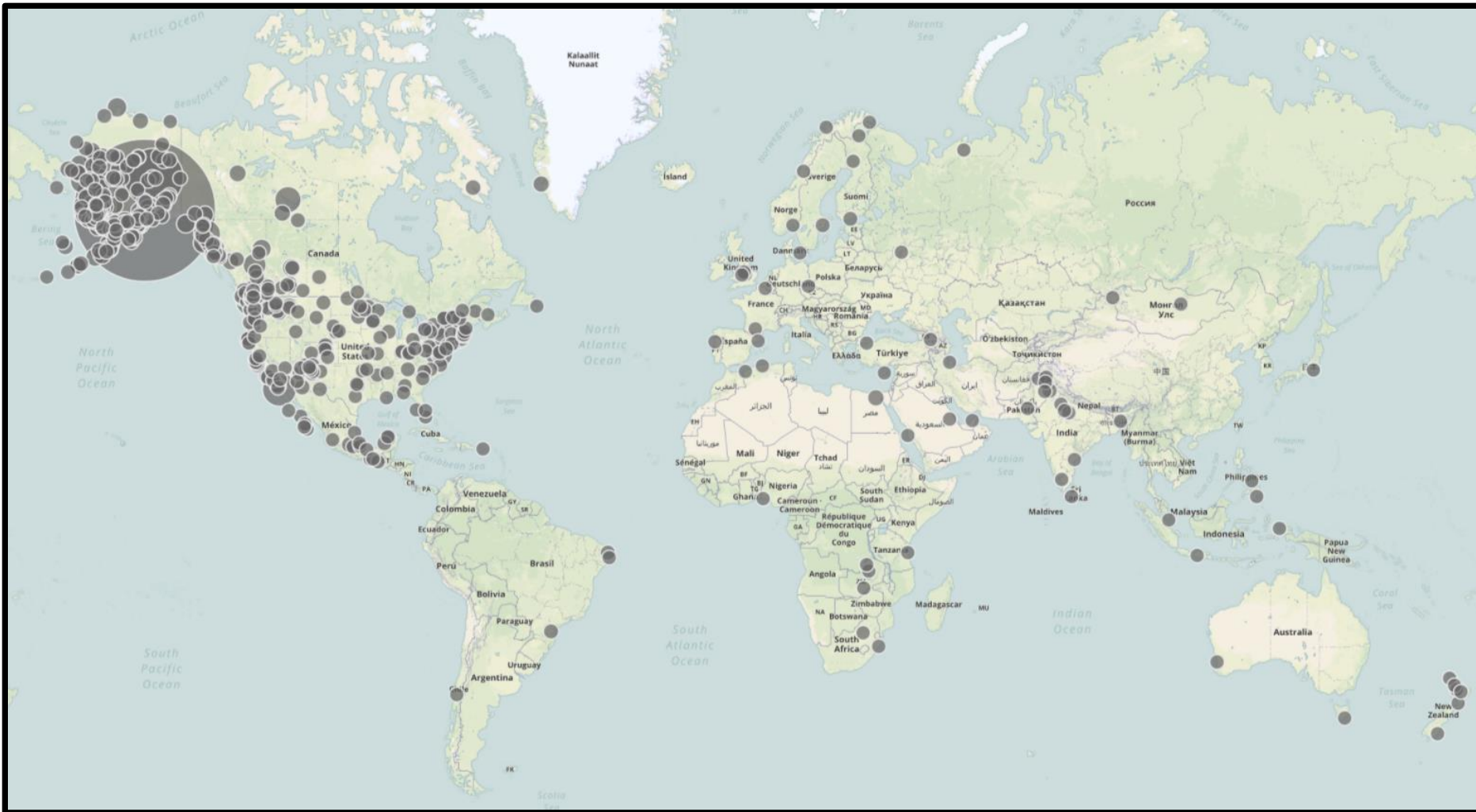
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Reference

Lukin, Maija, and Hajo Eicken. "Late Sea Ice Freeze Bring Together Seals and Caribou." *LEO Network* (leonetwork.org). Observed 11 November 2015. Accessed 7 October 2017.

810Observations [View >](#)
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Location of LEO Members
 October 6, 2017

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1 - 20 of 167 [Next](#) →



Ice of Change - Amid Waterfowl Sightings

Diomedea, Alaska, United States
27 JAN 2017

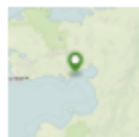
LEO Network



Ice Shelf Off of St George Island

Saint George, Alaska, United States
3 APR 2017

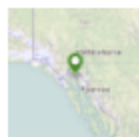
LEO Network



Sea Ice - No Sea Ice!

Elim, Alaska, United States
25 OCT 2016

LEO Network



Heavy Sea Ice

Haines, Alaska, United States
26 JAN 2014

LEO Network



No Sea Ice Yet

Wales, Alaska, United States
13 DEC 2014

LEO Network



Weather shifting ice flow

Unalakleet, Alaska, USA
22 DEC 2012

LEO Network



Trapped on sea ice

Nome, Alaska, USA

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Topic

- Ice and Snow 100
- Weather 58
- Ocean/Sea 31
- Seasons 31
- Waters 28
- Sea Mammals 18
- Land 14
- Fish 12
- Infrastructure 11
- Birds 9
- Transportation 8
- Plants 7
- Air 6
- Health 6
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- Sanitation 1

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Shishmaref

Alaska, United States


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7 LEO Members [View All](#) ▶



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Shishmaref Alaska, Unit...



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Shishmaref Alaska, Unit...

Shishmaref
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**Native Village of
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Environmental
Coordinator
Assistant
**Native Village of
Shishmaref**

14 Nearby Posts within 50 km [View All](#) ▶



Open Water in Our Ocean

Shishmaref, Alaska, United States
30 DEC 2016

LEO LEO Network



Unusual Spider (*Araneus marmoreus*)?

Shishmaref, Alaska, United States
21 JUL 2016

LEO LEO Network



Unusual Ladybug (*Calvia quatuordecimguttata*)?

Shishmaref, Alaska, United States
7 JUN 2016

LEO LEO Network



Odd Marine Debris

Shishmaref, Alaska, United States
28 AUG 2015

LEO LEO Network



Richard Kuzuguk
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Resident
**Native Village of
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Sharon Nayokpuk
Shishmaref Alaska, Unit...

Environmental
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**Native Village of
Shishmaref**



Ralph Sinnok
Shishmaref Alaska, Unit...



Stanley Tocktoo
Shishmaref Alaska, Unit...



Open Water in Our Ocean

Shishmaref, Alaska, United States

30 DEC 2016

LEO Network

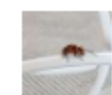


Unusual Spider (*Araneus marmoreus*)?

Shishmaref, Alaska, United States

21 JUL 2016

LEO Network



Unusual Ladybug (*Calvia quatuordecimguttata*)?

Shishmaref, Alaska, United States

7 JUN 2016

LEO Network



Odd Marine Debris

Shishmaref, Alaska, United States

28 AUG 2015

LEO Network



No Sea Ice

Shishmaref, Alaska, United States

26 FEB 2015

LEO Network



Bearded Seal (*Erignathus barbatus*) with Hair Loss

Shishmaref, Alaska, United States

18 NOV 2014

LEO Network



Pacific Sleeper Shark (*Somniosus pacificus*)

Shishmaref, Alaska, United States

20 OCT 2014

LEO Network



Extreme Shore Erosion

Shishmaref, Alaska, United States

2 JUN 2014

LEO Network



Hairless Seal

Shishmaref, Alaska, United States

19 OCT 2013



Ice and Snow 4



Sea Mammals 4



Ocean/Sea 3



Land 1



Land Mammals 1



Arachnids 1



Birds 1



Fish 1



Infrastructure 1



Insects 1



Spring 2



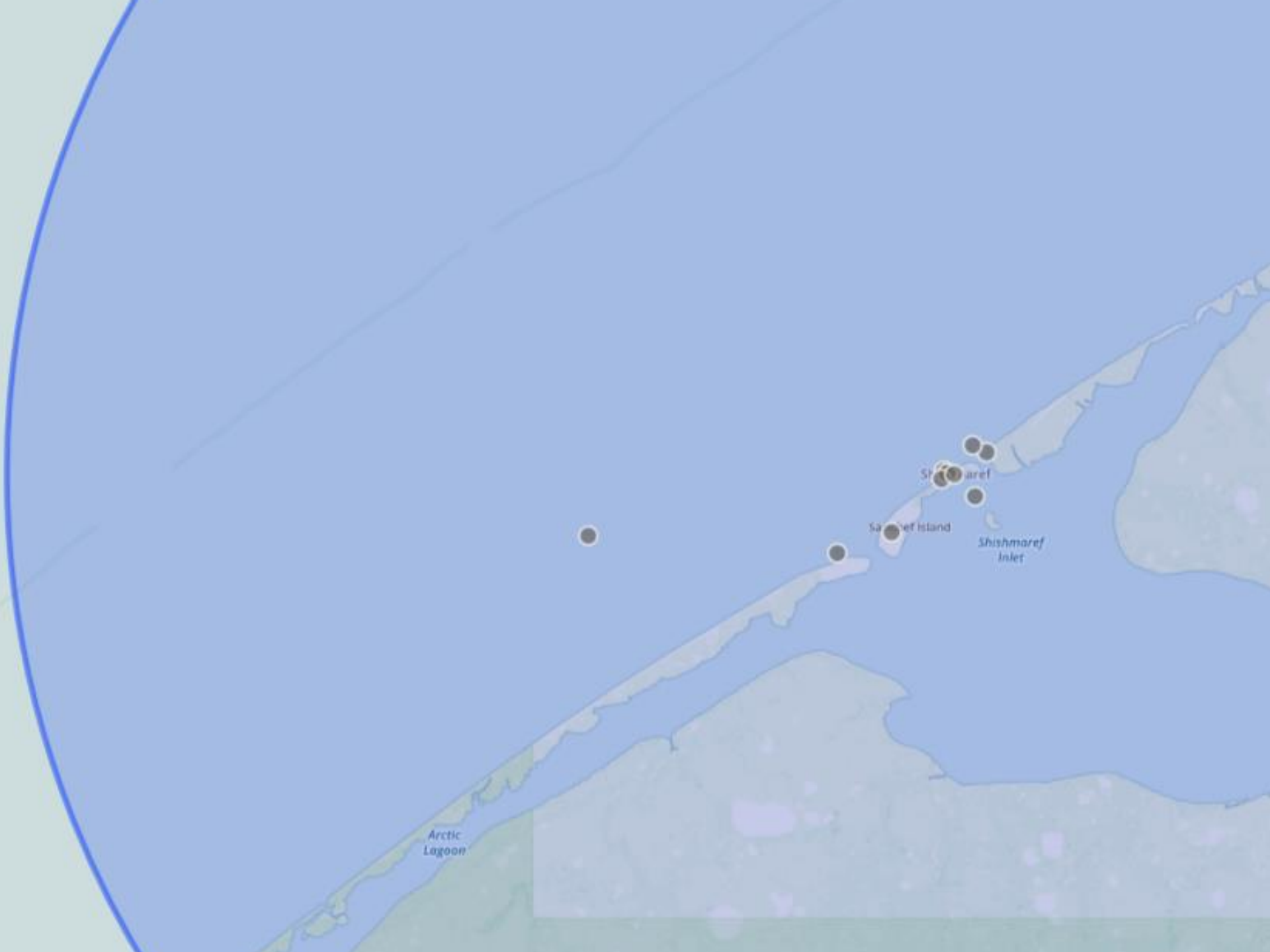
Summer 4



Fall 6



Winter 2



Arctic
Lagoon

Shishmaref Island

Shishmaref
Inlet



Open Water in Our Ocean

Sitka Inland, Alaska, United States
30 Dec 2016



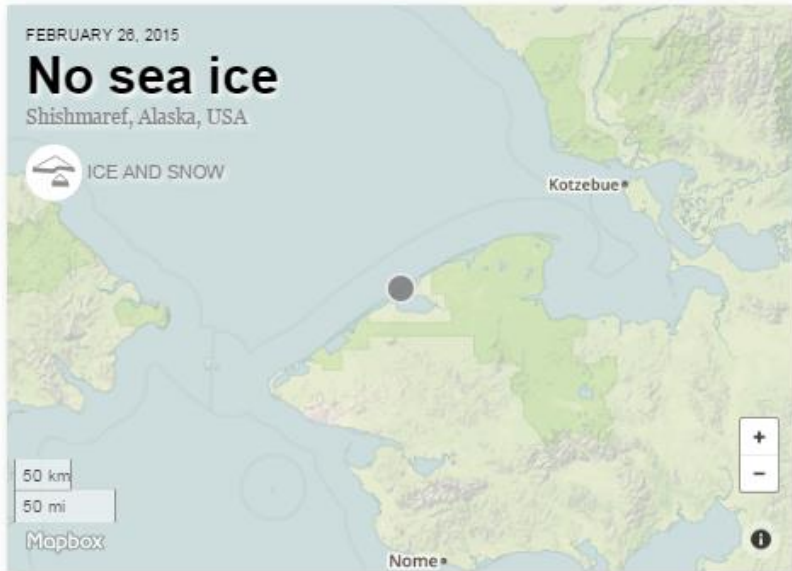
Unusual Spider (*Araneus marmoreus*)?

Sitka Inland, Alaska, United States
21 Jun 2016



Unusual Ladybug (*Calvia quatuordecimguttata*)?

Sitka Inland, Alaska, United States
7 Jun 2016



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Contributors

Observer



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Hajo Eicken
Fairbanks

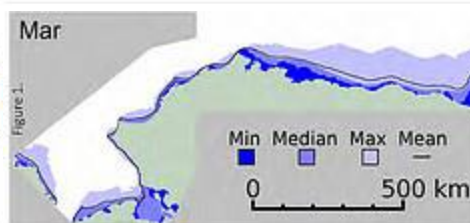
UAF, International
Arctic Research
Center

OBSERVATION: South winds blew out most of the sea ice. Going to be bad ice if it refreezes for spring hunt.

CONSULT: We have shared this observation with Dr. Hajo Eicken with the UAF Geophysical Institute; for the purpose of monitoring sea ice conditions in coastal Alaska. Hajo writes, "Thank you for passing on the observation about ice conditions at Shishmaref. Looking at satellite images, looks like these are unusual conditions since normally (as you describe) shorefast ice should extend further out. Nevertheless, there have been a few occasions in the past 20 years or so where ice has been lacking like this year as well. There's a bit more shorefast ice at Wales and Winton Weyapuk, Jr. from Wales describes in his daily ice observations how winds and currents help build pressure ridges in mid-January that then helped set up the shore-fast ice. Did you ever have any shorefast ice this winter that then blew out at Shishmaref? From the satellite images it's difficult to tell."

Figures 1 & 2 content: Hajo Eicken, UAF

Figure 1: Normal shorefast ice extent for the month of March. Note that a typical ("mean") ice extent is much further from shore, grounded on a shoal between Wales and Shishmaref.



Who can see your comment?

Latitude 66.2580108642578

Longitude -166.07585144043

Nearby

Reference

Nayokpuk, Sharon, and Hajo Eicken. "No sea ice." *LEO Network* (leonetwork.org). Observed 26 February 2015. Accessed 19 April 2017.



Projects

Changes in Mangroves
Global Tropics



Spill Event: Farmed Atlantic Salmon (*Salmo salar*)
Deepwater Bay, Cypress Island, Washing...



Wildfires and Smoke in British Columbia and Washington State
British Columbia, Canada and Washingto...



Slug Watch
Southern Alaska



Chukchi / Western Beaufort Coast Storm - July 2017
Chukchi Sea/Beaufort Coast, Alaska



Chronic Wasting Disease in BC
British Columbia, Canada



Rat Watch
Alaska



Hammerhead shark (*Sphyrna* spp.) range expansion
Northeast Pacific Ocean, Coastal Califor...



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- Ocean/Sea 20
- Fish 16
- Invertebrates 10
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- Waters 6
- Birds 7
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- Ice and Snow 7
- Health 6
- Land Mammals 6
- Land 6
- Air 5
- Infrastructure 4
- Weather 4
- Amphibians 3
- Insects 3
- Microbes 3
- Sanitation 3
- Crops/Livestock 2
- Pets 2
- Reptiles 2
- Aqua/Agriculture 1
- Arachnids 1
- Energy 1
- Seasons 1
- Transportation 1

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Project description: Alaska communities are experiencing erosion at a faster rate than in the past. Many communities are experiencing impacts as a result, some are being displaced. This project hosted by the State of Alaska Coastal Hazards Program and the University of Alaska Fairbanks, collects and maps observations about coastal erosion events and provides information about strategies to monitor coastal erosion at the community level. These observations are a signal of an environmental change, and potentially an active or emerging erosion problem. These observations provide an opportunity for communities to document these events, and for outreach on strategies for developing standardized monitoring systems.

Monitoring Guidance: There are few standardized erosion monitoring systems in Alaska. Most are in coastal communities, but some of the methods and strategies transfer easily to river and lake communities. Measuring the distance to an erosion feature, time-lapse cameras, using Emery Rods and probing the ground for erosion thaw zones are all strategies that can be used to help understand and measure erosion risk and extent.

State of Alaska Coastal Hazards Program at DGGS "is engaged in ongoing investigations that will expand our understanding of how the coastline has evolved and how it will respond to hazardous events and long-term changes." The Coastal Hazards Program is currently working with *Alaska Sea Grant* and the University of Alaska Fairbanks *Geoscience Department* to build capacity and share instruments and strategies for local monitoring of shoreline erosion and change. Monitoring stations are

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Lead Organization
Division of Geological & Geophysical Surveys (DGGS)



Lead Organization
UAF, University of Alaska Fairbanks

Project Contributors [All Contributors](#)

Lead	Lead	Lead
<p>Chris Maio Fairbank # Alaska, Unle...</p> <p>Assistant Professor Coastal Geography UAF, Geosciences</p>	<p>Richard Buzard Fairbank # Alaska, Unle...</p> <p>UAF, Geosciences</p>	<p>Jacquelyn Overbeck Fairbank # Alaska, Unle...</p> <p>Coastal Hazards Division of Geological & Geophysical</p>

View on Map Timeline

<p>Beach Sand - Coastal Erosion Hooper Bay, Alask... JUL 20, 2017</p>	<p>Coastal Shore Erosion Near Cape Blossom Cape Blossom, NW ... JUN 30, 2017</p>	<p>Erosion Could Drain Lake at Anytime Port Heiden, Alask... MAY 29, 2017</p>
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The Northern Climate Observer

Unusual ocean conditions persist around the circumpolar north. This week we feature reports about sea ice from the Gulf of Bothnia and from Newfoundland, and LEO Network posts from Diomedes and Twin Hills Alaska. Thank you Opik Ahkinga and Diane Abraham for sharing your observations.

Mike Brubaker - Editor



Photo by Malja Katak
Lukla

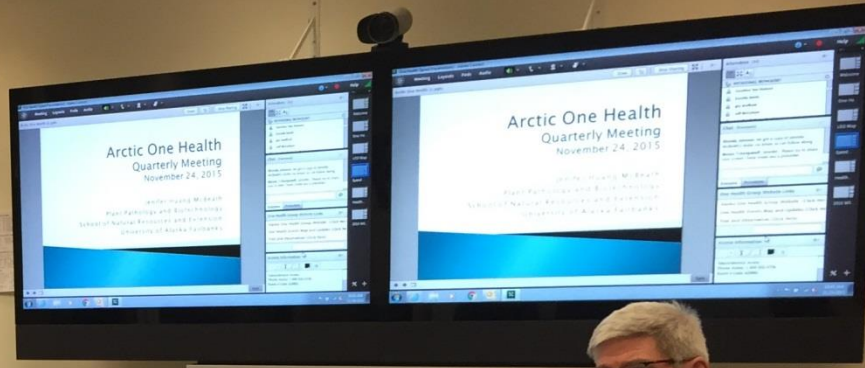


Alaska biologists research mystery of declining caribou herd

Kotzebue, Alaska, United States

Becky Bohrer / Associated Press / January 29, 2017

The size of a large caribou herd in Alaska's Arctic region has dropped by more 50 percent over the last three years, and researchers who have tentatively ruled out hunting and predation as significant factors for the decline are trying to determine why.



Identifying health effects of climate change in Alaska

Allergic Reactions



Travel Safety

Mental Health



Waterborne Disease

Food Spoilage



Respiratory Health

Food Confidence



Ice Hazards

Vessel Safety



Harmful Algae

Nutrition



Allergies



Infrastructure Damage



Food Security



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