

About LEO

The *Local Environmental Observer* Network

Mike Brubaker

Director, Center for Climate and Health
Alaska Native Tribal Health Consortium

May 29, 2015

Google us: “LEO Network”



Healthy Environment



Healthy People



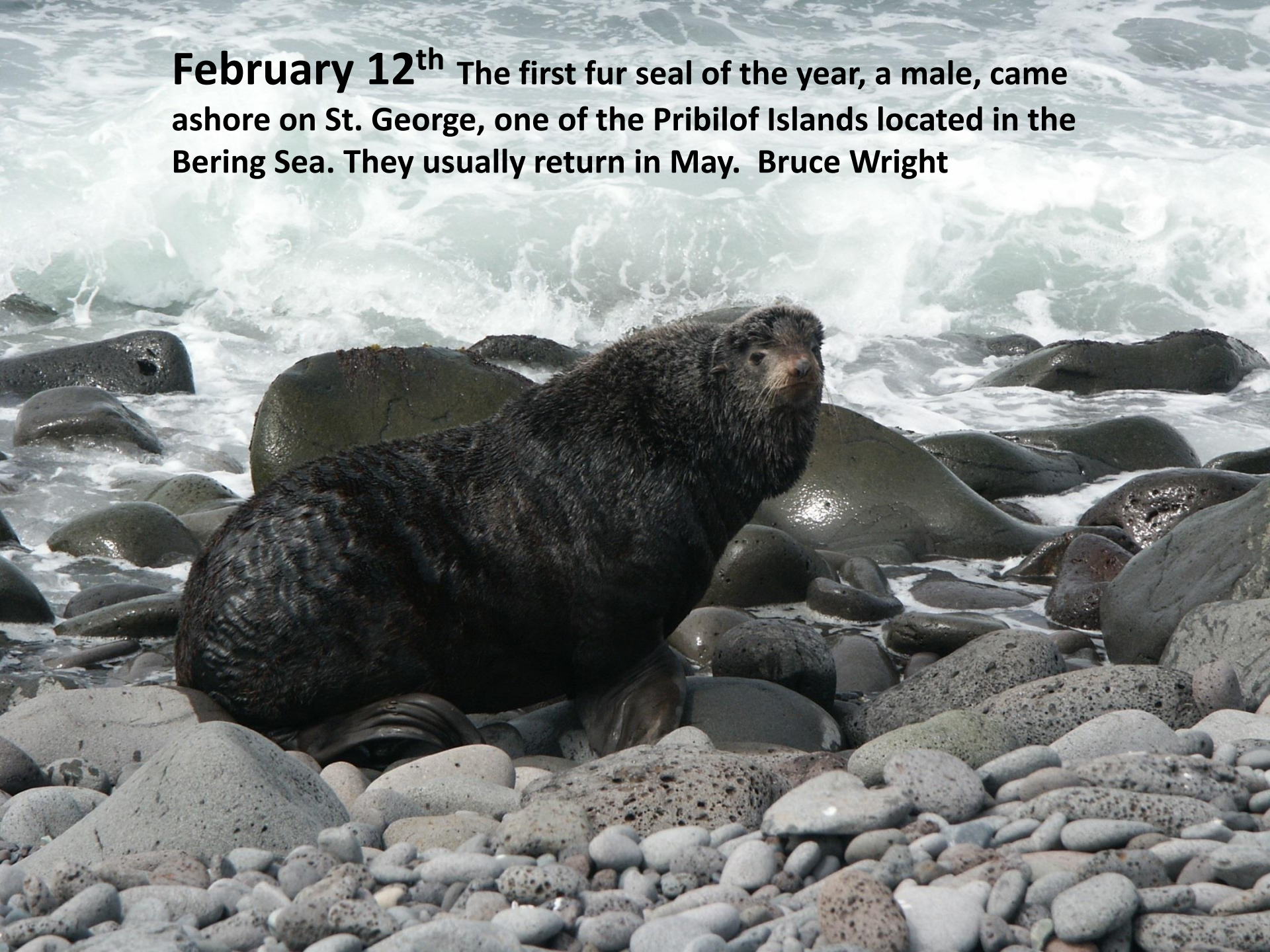
A few intro questions about LEO Network:

- **When did it start? Formed in 2012 by the Alaska Native Tribal Health Consortium.**
- **What is the purpose? To provide a system for communities to share information about environmental change and to connect with the resources needed to address impacts.**
- **Who is involved? Local environmental managers and a wide range of agencies and organizations that provide technical support.**
- **What is the mission? To provide the eyes, ears and voice of environmental change.**

January 24th There is no snow! The mountain right behind the village provides water in the summer time, the lack of snow has many people concerned. Nancy Yeaton - Nanwalek



February 12th The first fur seal of the year, a male, came ashore on St. George, one of the Pribilof Islands located in the Bering Sea. They usually return in May. Bruce Wright



March 14th The absence of snow did not allow caribou harvest except by two hunting parties, otherwise families would have been out hunting more often. Toby Anungavuk, Jr. - Golovin



April 13th Very little snow this year in the Bethel area makes traveling in the springtime on the Kuskokwim River very dangerous and difficult. Travelers need to look out for open water and thin ice. Ben Balivet - Bethel



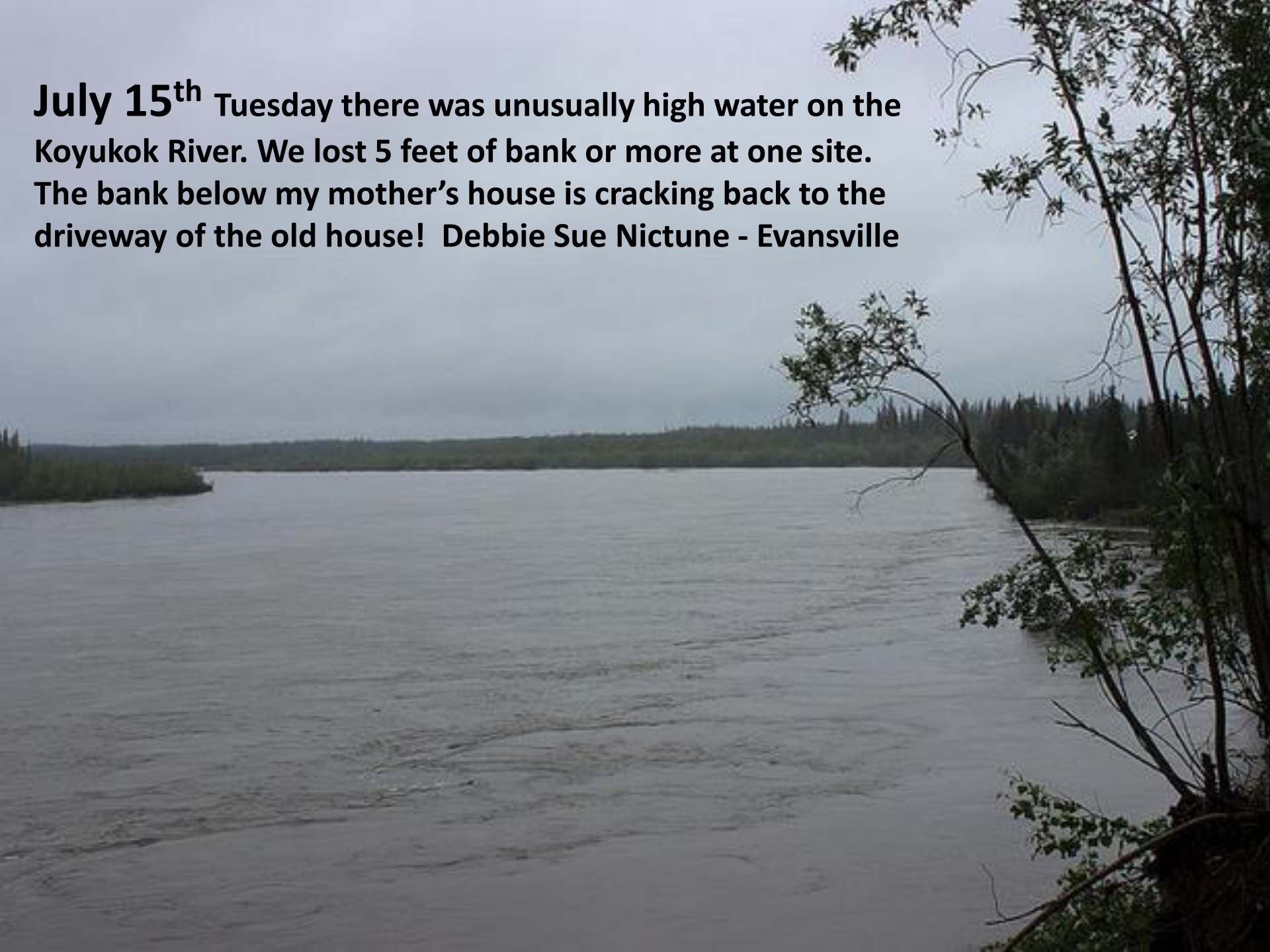
May 16th Herring has arrived early this year! Last night some of the hunters noticed some were starting to spawn near Cape Denbigh. Herring season was scheduled for May 25th 2014 but due to the early arrival, i'm not sure what will happen. Jolene Auliye - Shaktoolik



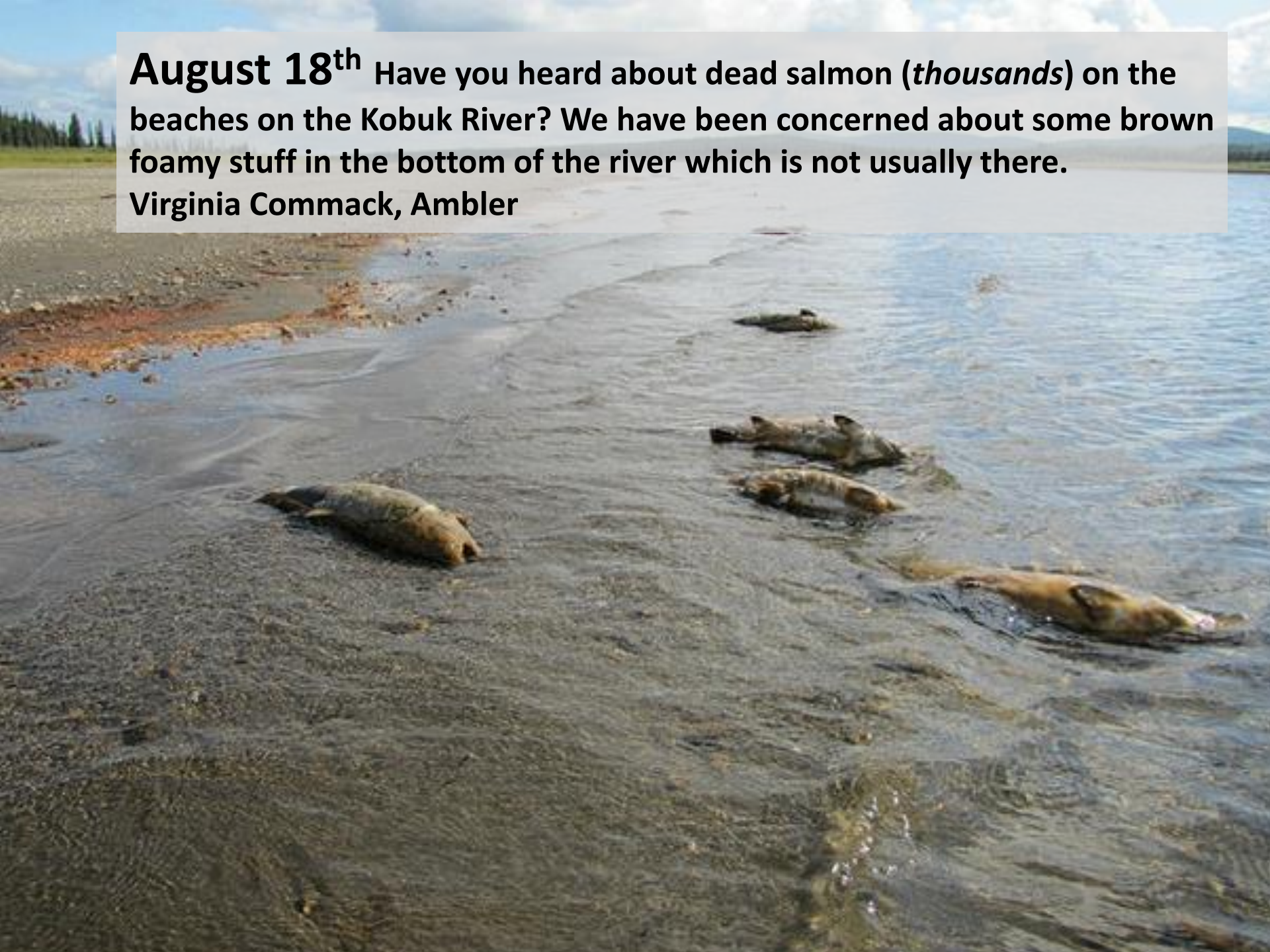
June 6th An abundance of kelp on one side of the island is the most I've ever seen during the low tide. There is also a large deposit of herring eggs covering the kelp, which was harvested. Anna R. John – Toksook Bay



July 15th Tuesday there was unusually high water on the Koyukok River. We lost 5 feet of bank or more at one site. The bank below my mother's house is cracking back to the driveway of the old house! Debbie Sue Nictune - Evansville



August 18th Have you heard about dead salmon (*thousands*) on the beaches on the Kobuk River? We have been concerned about some brown foamy stuff in the bottom of the river which is not usually there.
Virginia Commack, Ambler



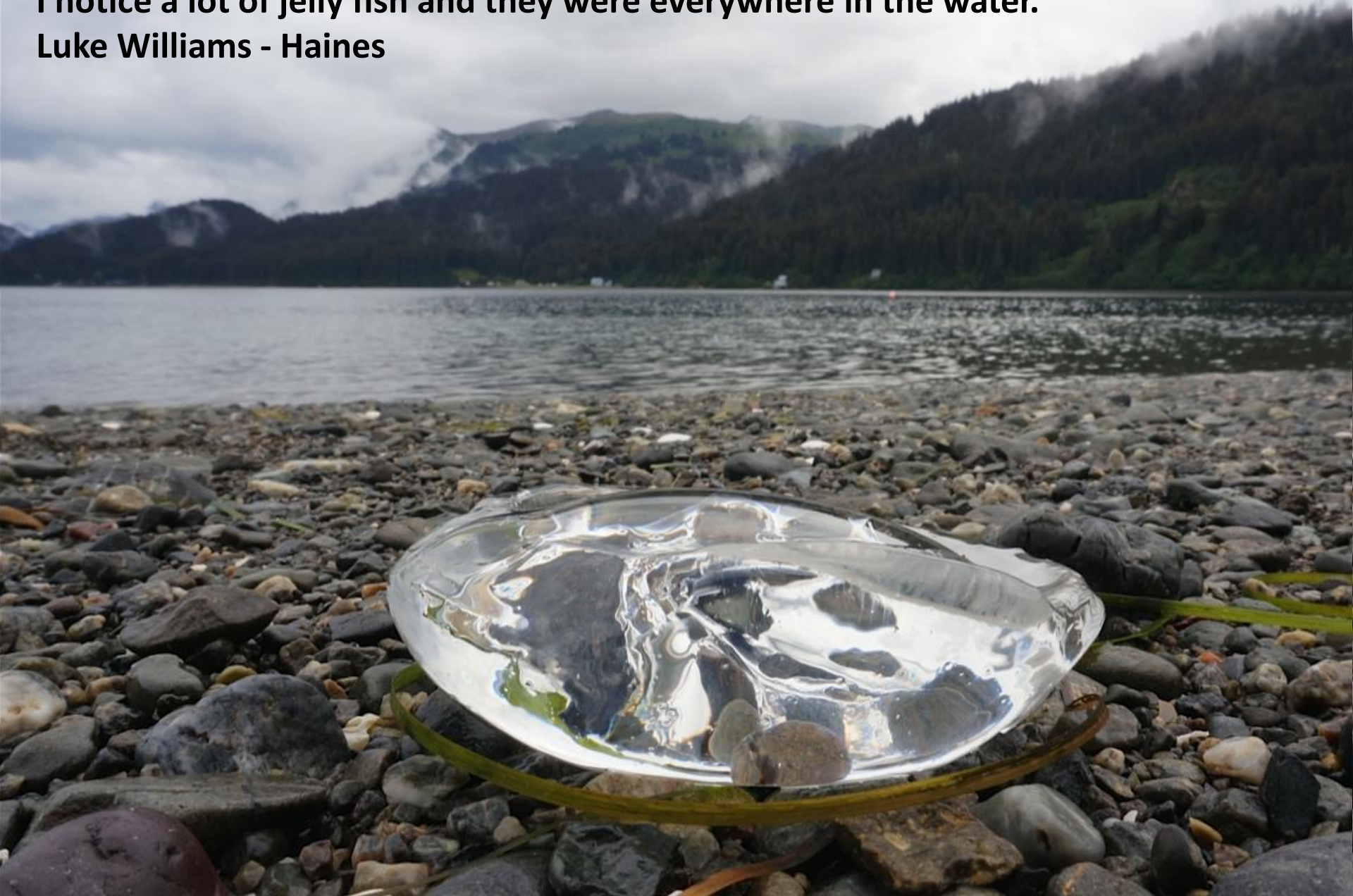
September 25th This has been a terrible year for berry harvest in the Upper Nushagak River. There is an absence of salmon (cloud) berries, blue berries, cranberries and black (crow) berries. Unusual weather conditions over the past few months have contributed to the poor harvest. Sylvia Kazimirowicz - Ekwok



October 29th - We found hard mollusks inside the stomach of a moose we harvested. There were hundreds of them. I collected them, took pictures and put them in a ziplock bag. We were concerned about sharing this moose with elders, because some have weak immune systems. Jessica Chernikoff - Egegik



November 14th While I was commercial crabbing in Chilkoot Inlet
I notice a lot of jelly fish and they were everywhere in the water.
Luke Williams - Haines

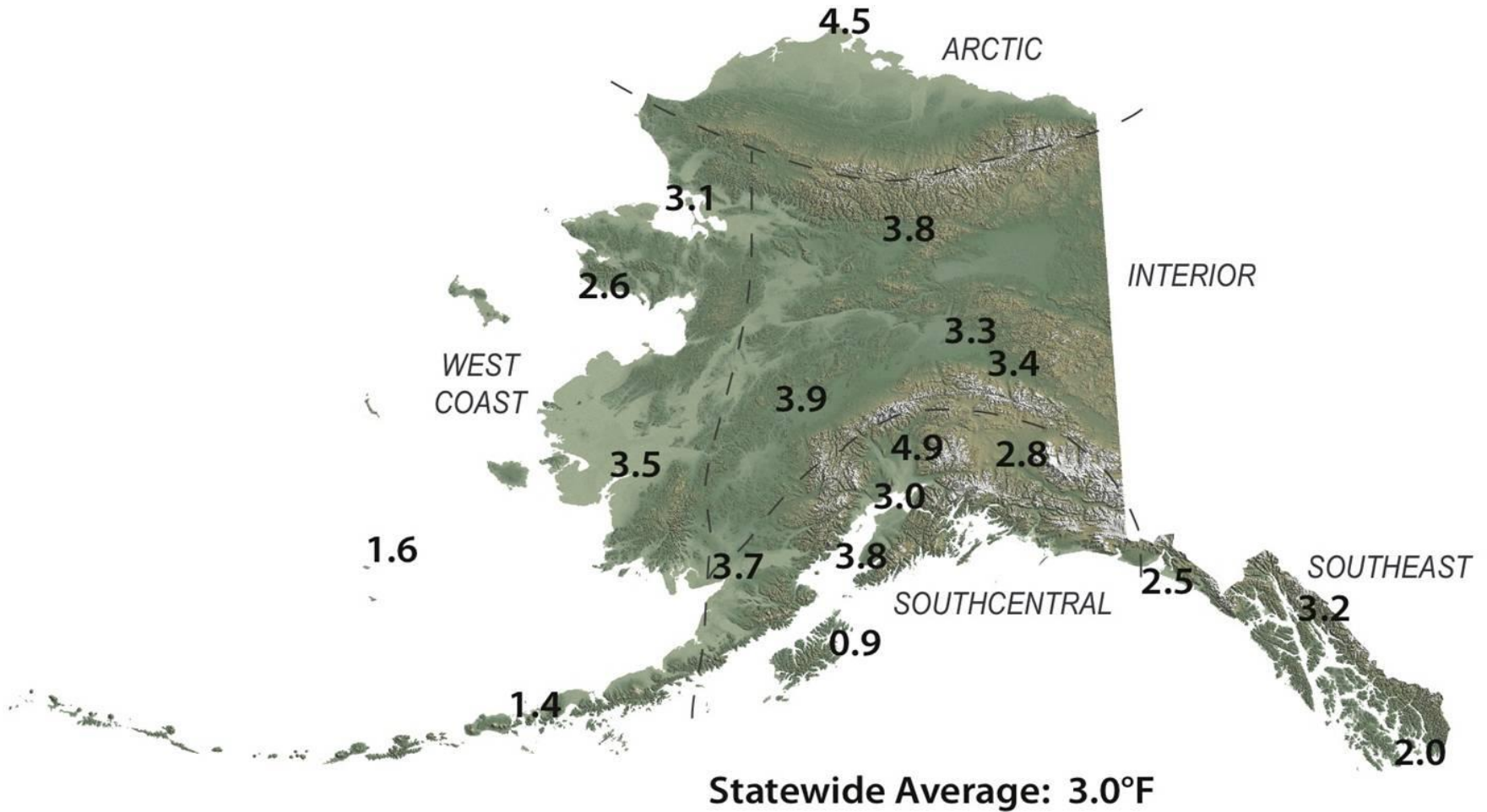


December 13th We observed Coho salmon in the stream going up to spawn. On the river the temperatures was at 52° degrees Fahrenheit, clear skies and no winds; eagles, ravens and sea gulls could be observed feeding on salmon carcasses on a sunny day. Could the sockeye be adapting to climate change and coming in to spawn later waiting for river flow to be up? We need to adapt and maybe change current regulation governing subsistence fishing .

Veronica Redifer - Klawock



Total Change in Mean Annual Temperature (°F), 1949 - 2009



The climate is warmer



Noatak River, 2011

and weather is changing and more extreme.



Kivalina, 2005

Photo Millie Hawley

There is less ice on the land and on the sea,



Near Lake Clark Pass, 2014

and a shorter ice season.



Barrow, June 2004

Photo Charles Wohlforth



Barrow, June 2013.

There are fewer lakes,



Thaw related drying near Deadhorse.

Photo Vladimir Romanovsky

and some rivers are becoming wide and shallow.



Wulik River, 2009

Alaska is getting smaller each year.



Cape Halkett, 2009.

Photo Ben Jones

Animal behavior and health is changing.



Point Lay, 2014.

and so is the sea, ice and conditions for hunting,



Sisaulaq, 2014

preparing foods,



Teller, 2014

and storing foods.



Wainwright, 2014

Increasingly there have been unusual die-offs.



Kobuk River, 2014

Photo Suzanne Georgette

and declines.



Western Alaska Caribou Herd, 2011

ADF&G

Some animals are increasing their range.



Photo Brian Sharp

Others are seeing their range decline.



Photo Eric Regehr

Transportation routes are being disrupted.

Taylor Highway, 2010

ADOT



and travel can be more hazardous.



Shishmaref, 2014

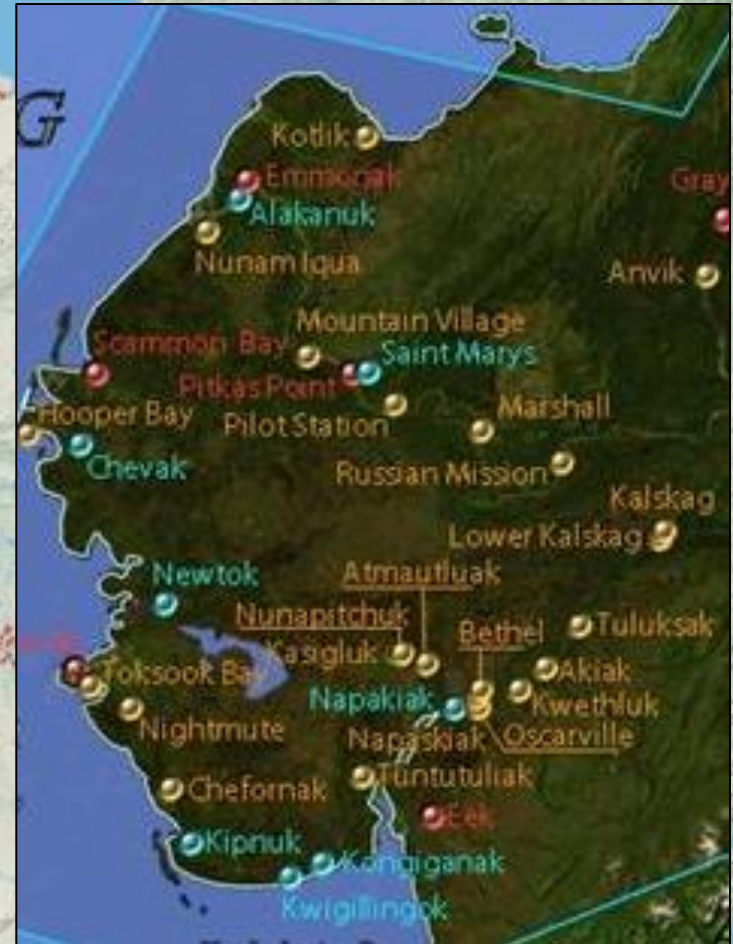
Many communities are vulnerable to land change,



Shishmaref, 2014

and some to sea change.

Projected 1 meter sea level rise inundation.





Golovin, Flooding November 2011

Photo by Toby Anungazuk Jr.

**So we need to design and site our projects
for the climate conditions of the future.**



Golovin, new water plant above flood zone - 2014

And build infrastructure that is resilient to change.



Thawing pipe - Selawik, 2012

For elders climate change is new and can be troubling.



Selawik, 2014

**But youth are growing up with climate change.
They are accustomed to a changing world.**



Nondalton, 2013

Alaskans are finding ways to benefit from a warming climate and longer growing season.



Photo courtesy of Linda Stotts

Kiana, 2011

The climate has changed in the past.

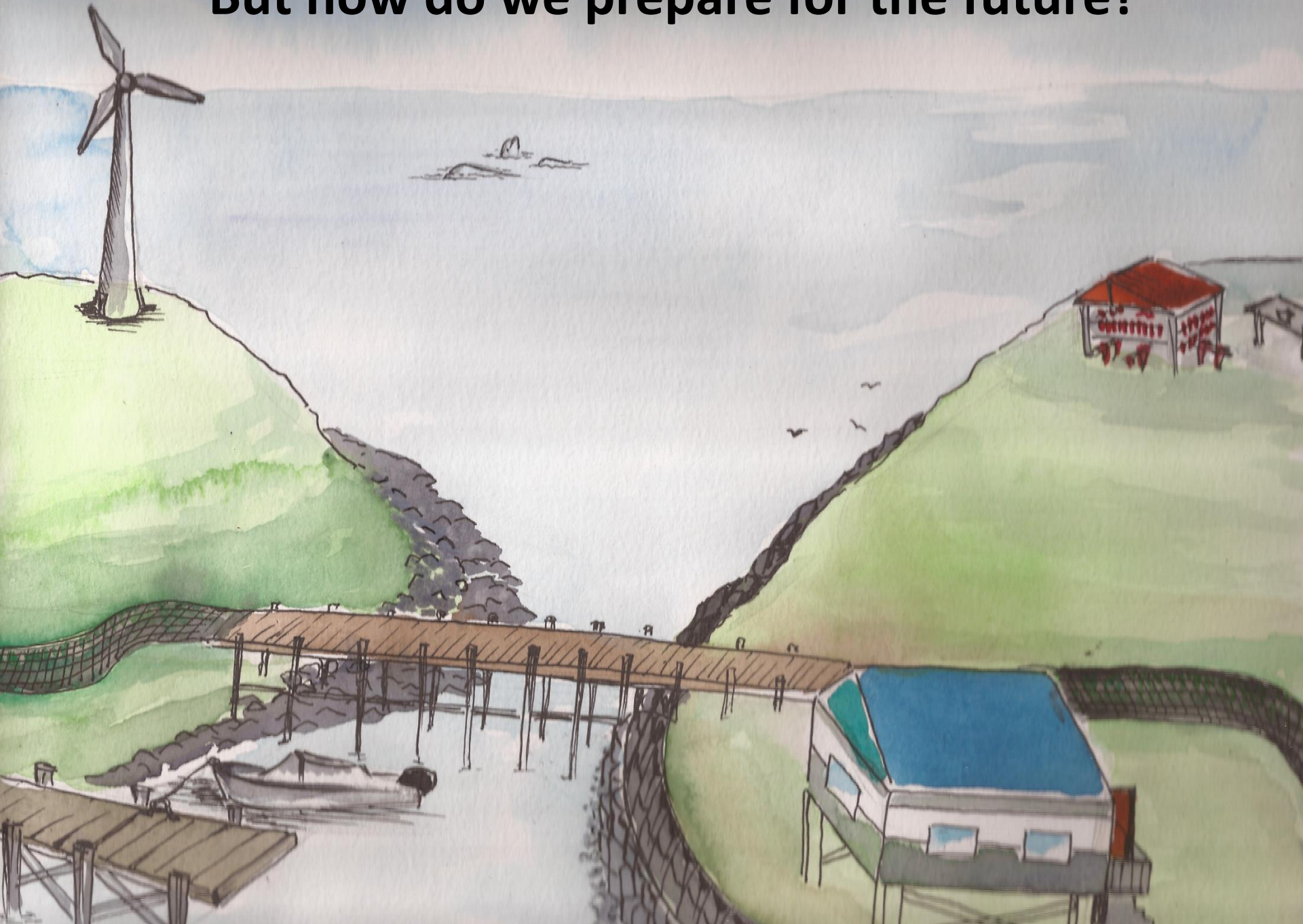


Khulan Bazarvaani

And communities have adapted to the changes.



But how do we prepare for the future?





LEO was developed as a tool for communities to use for sharing information about environmental change and connecting with resources.



Golovin, 2012. Photo Toby Anungavuk Jr.

LEO is a about unusual, extreme or unprecedented events,



Kivalina 2012

Members decide locally if they want to share an observation with LEO,

Get direction

My place

LEO Network - September 2014

This map provides observations posted by the Local Environmental Observers (LEO) Network. For more information visit our website at the Alaska Native Tribal Health Consortium, Center for Climate and Health. Google us at "LEO Network"

User Agreement: The posts on this map are shared publically by LEO members and our partners to raise awareness about environmental change, and to help connect with technical resources. Use of any information from the map must be approved by LEO Administrators. You can contact us at antholeo@anthc.org. Thank you for your consideration.

Public · 2 Collaborators · 15,804 views
Created on Aug 29 · By [mbrubaker](#) · Updated 5 days ago
[Rate this map](#) · [Write a comment](#) · [KML](#) ·  0

Circumpolar Climate Events Map

Click here to view this month's Circumpolar Climate Events Map, including web links to news articles from across the circumpolar north. See also Center for Climate and Health website.

Caterpillar with reddish tail observed

September 02, 2014; Tyonek, Alaska (Insects) A resident of the village came to me with a caterpillar that was never seen before here. The caterpillar was moulting when I got the insect, with a pointy re ...

Interesting song bird in Wales.

September 04, 2014; Wales, Alaska (Birds) Observed this tiny bird approximately 4-5 inches tall in my shop this afternoon. Greenish-yellow plumage. Past few years have been seeing more and more birds ...

New kind of snails observed in Seldovia

September 09, 2014; Seldovia, Alaska (Invertebrates) On Tuesday, couple people were outpicking high bush cranberries and blue berries in a swamp in the Barbara Heights subdivision, approximately 5 ...

Fuzzy black caterpillar observed near Wasilla

September 10, 2014; Mile 52 of George Parks Hwy, Alaska (Insects) ...

Interesting song bird in Wales.

Last updated by [mbrubaker](#) on Sep 30

Observed this tiny bird approximately 4-5 inches tall in my shop this afternoon. Greenish yellow plumage. Past few years have been seeing more and more birds that are not normally found in our region, (so far north). With the advent of more non native birds and insects species, you can see climate change occurring right before our eyes. What species of bird is this and is this particular bird commonly seen this far north? Brit Oxereok, LEO



[Directions](#) [Search nearby](#) [Save to map](#) [more](#)

LEOs submit photos and text to be posted on public Google Maps, and



Koliganek, 2014

and connected with network members and other technical experts.

LEO Network Communities

This map shows the locations of all Local Environmental Observer (LEO) Network communities. If you have comments or would like to [more](#)

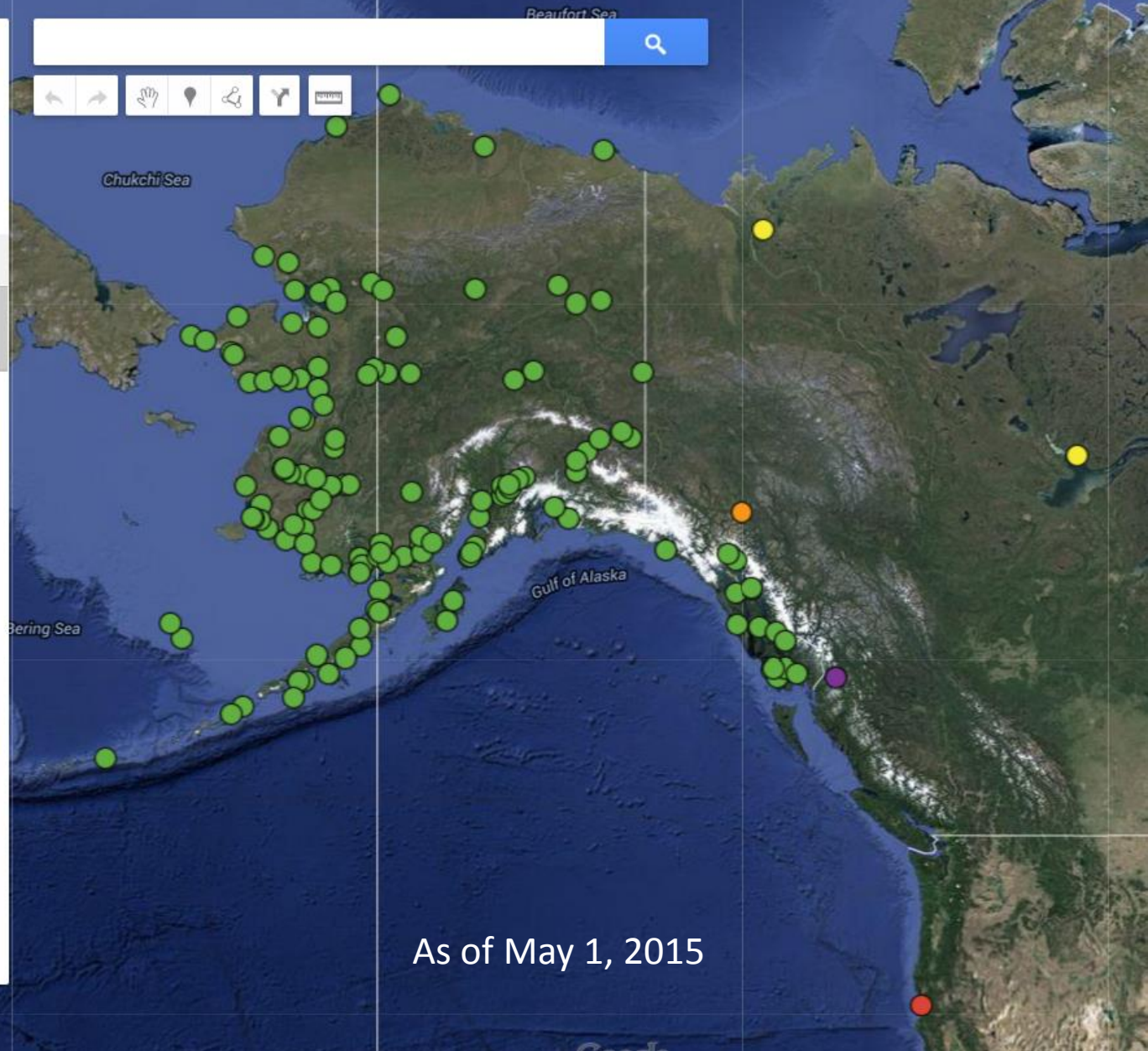
All changes saved in Drive

 Add layer  Share

☒ LEO - Alaska, USA

 Individual styles

-  Akutan Alaska
-  Aleknagik Alaska
-  Ambler Alaska
-  Anchorage Alaska
-  Aniak, Alaska
-  Anvik Alaska
-  Atka Alaska
-  Barrow Alaska
-  Belkofski Alaska
-  Bethel Alaska
-  Big Lake Alaska
-  Brevig Mission Alaska
-  Buckland Alaska
-  Chalkyitsik, Alaska
-  Cheformak, Alaska
-  Chevak, Alaska
-  Chickaloon, Alaska
-  Chignik, Alaska



LEO started in January 2012 , a network of local observers across Alaska. There has now been over 200 participants.

Weather
Erosion
Permafrost
River
Seasonal
Coastal
Plants
Wildlife
Infrastructure
Climate Change
Transportation
Disease
Food
Water



Kiana, 2012

the focus for LEO is environmental change, and observers report on a wide range of local events that are time and location specific.



The LEO participants apply local and traditional knowledge to decide what kinds of events are relevant, important and appropriate to share.

Daniel Chythlook - Aleknagik



Many LEOs are also experienced with western scientific methods.



Selawik 2013

Observations can be from anyone in the community. LEOs serve as local contacts for collecting, reviewing and completing the information and for follow-up based on the findings and technical consultations.



LEOs decide within their own organizations what information to share.

LEO is built on open and available web-based services and uses social media. You can find links to our Facebook, flickr and YouTube pages on our website (see arrow).

You are here: [ANTHC](#) > [Community Health Services](#) > [Community Environment and Safety](#) > [Climate and Health](#) > [LEO Home](#)



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.

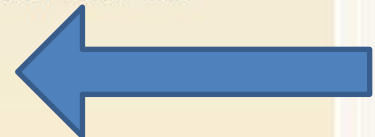


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"Join LEO"

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. Checkout our LEO Public Maps, and resource links to learn more. You can view our observation data on our [2012](#) and [2013](#) spreadsheets.



LEO May 2014

has been deleted. [Undo](#)

Map Sat Ter

Navigation icons: back, forward, pan, zoom in, zoom out

Map of Alaska with a red location pin and a blue location pin

POWERED BY Google Imagery ©2014 Google ©2014 NASA

View LARGE: [click here](#)

Monthly Maps
October 2013

Category Maps
Air Quality

Alaska Region Maps
Aleutian & Pribilof Isl

Canada Region Maps
British Columbia

LEO communities at a glance, click icon:

- Related Pages
- [About LEO](#)
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LEO is an information archive – you can find observation maps organized by month, category and geographic region (see arrow).

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LEO May 2014

has been deleted. [undo](#)

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POWERED BY Imagery ©2014 NASA

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All LEO data is also available in Excel spreadsheet format, organized by the year when it was posted (see arrow).

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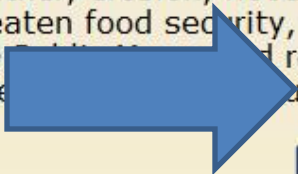


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LEO May 2014

has been deleted. [Undo](#)

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OBV No. (B000)	Observer Name	Date of Observation, time & google map link		What is the location? (landmarks)	or		(All Communities Map)					
					Latitude	Longitude	Community	Weather	Air Quality	Community Water	Community Food	Seasons
B001	Toby Anungazuk Jr.	16-Nov-11	n/a	Mouth of the Kichavik River near Golovin	64° 36' 08"N	-163° 06' 35"W	Golvin				X	
B002	Warren Daniels	27-Dec-11	9:00 AM	Elim beach front	64° 36' 57"N	-162° 15' 30"W	Elim					
B003	Brian Holter Jr.,	22-Feb-12	n/a	Klawock Alaska - On a fishing boat at the cannery. The boat is from Klawock and had been their through the winter.	55° 33' 08"N	-151° 30' 35"W	Klawock					
B004	Gavin Phillip	22-Feb-12	n/a	Coastline Kwigillingik	59° 51' 03"N	-163° 07' 59"W	Kwigillingok					
B005	Tim Greene	09-Mar-12	n/a	Coastal area	59° 21' 33"N	-151° 55' 20"W	Nanwalek					
B006	Oxenia O'Domin	17-Mar-12	5.00pm	Seward Hwy, near Mchugh Creek	61° 01' 47"N	-149° 45' 35"W	Anchorage					
B007	Bruce Wright	20-Mar-12	n/a	Behind the village of Akutan	54° 08' 04"N	-165° 46' 32"W	Akutan					

All observations are available the map archives as well as in a spread sheet format located on the LEO website.



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leaders in life care

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Webinar/Teleconference Archive

[March 24, 2015 Webinar](#)

Presentation title: [SIZONet/ELOKA community-based sea ice observations: Education, Outreach and update on ice conditions](#) (3.11 MB .pdf)

Presenters: *Hajo Eicken*, Deputy Director — International Arctic Research Center Professor of Geophysics, University of Alaska Fairbanks; *Mette Kaufman*, Geophysical Institute, University of Alaska Fairbanks; *Irene Holak*, Science Director, Watershed Association, Seasonal Ice Zone Observing Network (SIZONet) Local Barrow, Alaska

Presentation title: [Avian pathogen, the flu, and how disease in birds may perturb](#) (3.11 MB .pdf)

Presenters: *Andy Ramey*, U.S. Geological Survey, Alaska Science Center, and Department of Fish & Game, Division of Wildlife Conservation

[February 24, 2015 Webinar](#)

Presentation title: [Knowing Our Traditional Foods: During a time of rapid environmental change](#) (3.11 MB .pdf)

Presenter: *Desirae Roehl*, Environmental Program Manager, Community Environment, Alaska Native Tribal Health Consortium

[January 20, 2015 Webinar](#)

Presentation title: [Coastal Storms in Alaska](#) (2.09 MB .pdf)

Presenters: *Aimee Fish*, Public, & Fire Weather Programs Manager and Local Public & Severe Weather Programs Manager; NOAA National Weather Service



Webinar Host – Moses Tcheripanoff

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EDIT

Explore making custom maps in an [interactive tutorial](#).

Local Environmental Observer (LEO) Map, May 2012

Local Environmental Observer (LEO), May 2012
This map provides a monthly record of unusual or noteworthy events that have occurred across Alaska. The purpose is to increase communication and understanding about our changing environment and to encourage healthy ways to adapt. Reports are provided through the network of Local Environmental Observers (LEO); environmental professionals located in local or regional tribal organizations across Alaska.

For more information visit our site at the [Alaska Native Tribal Health Consortium](#), Center for Climate and Health:

<http://www.antho.org/chs/ces/climate/leo/>
Email: antholeo@antho.org

Funded by the Environmental Protection Agency

Public · 2 Collaborators · 8,470 views
Created on May 3 · By [mbrubaker](#) · Updated Jul 9

[Rate this map](#) · [Write a comment](#) · [KML](#) ·



Deer with fur loss in Southeast



Discolored seal with sores on side flipper (photo)

Last Updated by [moe](#) on Jul 9



Shishmaref, May 19, 11:30 PM, (sea animal)

This ringed seal was taken in Shishmaref Inlet, approximately 3 miles up the staked trail to 7 mile ice pond. There was no breathing hole present, the seal had traveled from the east of the stakes heading westward. There seems to be a BB size lump on one of the forearms, and showing evidence of sores on one side flipper. Hopefully this seal will bring us closer to understanding what may be causing the illness and disease that our marine mammals are being affected by. According

[Directions](#) · [Search nearby](#) · [Save to map](#) · [more](#)

A good observation provides information about the nature of the observation as well as why it is unique and important, and any interpretations by the observer. Ideally it also includes photos or video.

LEO Network Member Directory

This is a private map (Please Do Not Distribute) for LEO Network Participants. It shows the locations of all LEOs and has contact information to encourage more

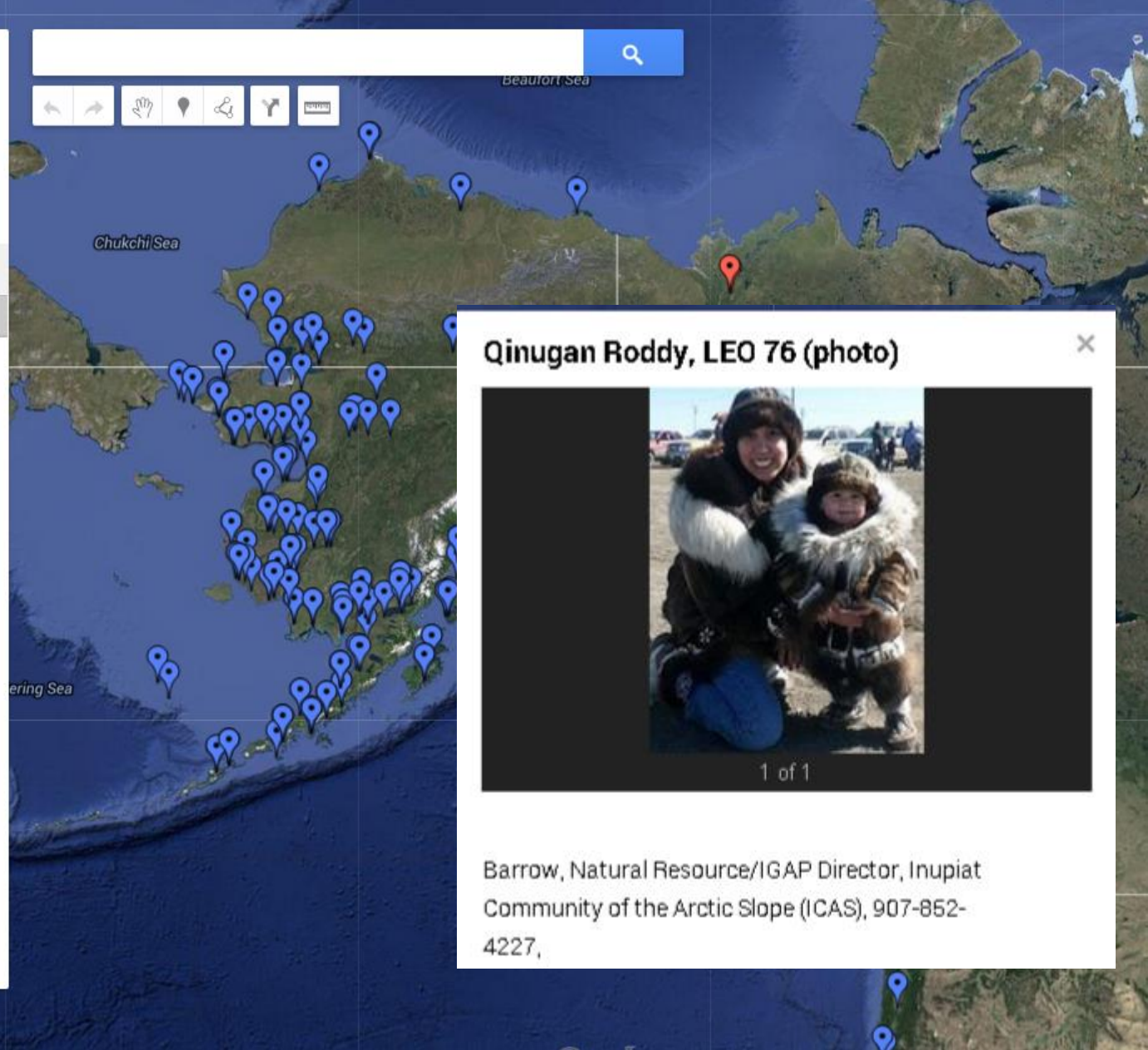
All changes saved in Drive

Add layer + Share

☒ LEO Membership & Contact Info

Individual styles

- Moses Tcheripanoff, LEO 01
- Mike Brubaker, LEO 02
- Robert (Bob) Absher, LEO 04
- Oxcenia Odomin, LEO 05 (ph...
- Lorraine Lloyd, LEO 07 (photo)
- Scott Anderson, LEO 08
- Desirae Roehl, LEO 10 (photo)
- Karen Pletnikoff, LEO 11
- Tina Tinker, LEO 12
- Jake Bell, LEO 13 (photo)
- Charles Prince, LEO 14
- Ursula Prince, LEO 15
- Toby Anungazuk Jr., LEO 16 ...
- Anahama Shannon, LEO 17 (...)
- Violet Yeaton, LEO 18 (photo)
- Carol Oliver, LEO 19
- Millie Hawley, LEO 20 (photo)
- Maria Magsuk, LEO 21



Qinugan Roddy, LEO 76 (photo)



Barrow, Natural Resource/IGAP Director, Inupiat
Community of the Arctic Slope (ICAS), 907-852-
4227,

LEO is also a social network and participants correspond with each other directly to discuss local concerns and exchange information.



Observations are shared with other LEOs, networks and technical experts to assist with interpretation and work with the LEO on the issue.



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The Northern Climate Observer

Climate Change and Health in the Circumpolar North

February 05, 2015 (No. 235)

Local Environment Observer (LEO) Network – Please see our [2015 Map](#) for new observations about January dandelions in Klawock, and caterpillars and earthworms in Haines. See also a new post to our [Fall 2014 Map](#) about a late run (December 13) of Coho salmon. Do we need to revise harvest seasons?

See also our [LEO Map Archive](#)

Circumpolar Climate Events – Find links on our [2015 Map](#) to reports and stories about heavy rains in Vancouver and Ketchikan, drought at Lake Baikal in Russia, culling of the burgeoning snow goose population in Northwest Territory, and more thaw-related infrastructure failure in the Yukon Territory. See also our [CCE Map Archive](#)

Bristol Bay Sockeye's prey quality affected by ocean temperature January 26, 2015. Josh Edge - Having healthy and plentiful returns of salmon each season is important for subsistence, sport and commercial fishing. But, relatively little is known about what happens to the fish once they head out to sea. Biologist Ellen Yasumiishi's team discovered a difference in diets between warm and cold years, and diet can effect survival. [Alaska Public Media](#)

Melting glaciers making Iceland spring upward like a trampoline February 2, 2015. Sarah Kaplan - Sea levels aren't the only things rising due to climate change — swaths of land are too, including the nation of Iceland. That's according to a [new study](#) published by the University of Arizona. Relieved of their frozen burden, parts of the country could rise as fast as 1.6 inches per year by 2025 — growing at nearly the same rate as an elementary schooler. [Washington Post](#)

Scientists look for links between tides and quakes January 30, 2014. Nad Rosell - A scientist once noticed a connection between the stress that tides inflict on the planet and the number of small earthquakes. She saw a pattern to these earthquakes leading up to great tsunamis. A graduate student is now looking for a similar signal in Alaska. [Arctic Sounder](#)

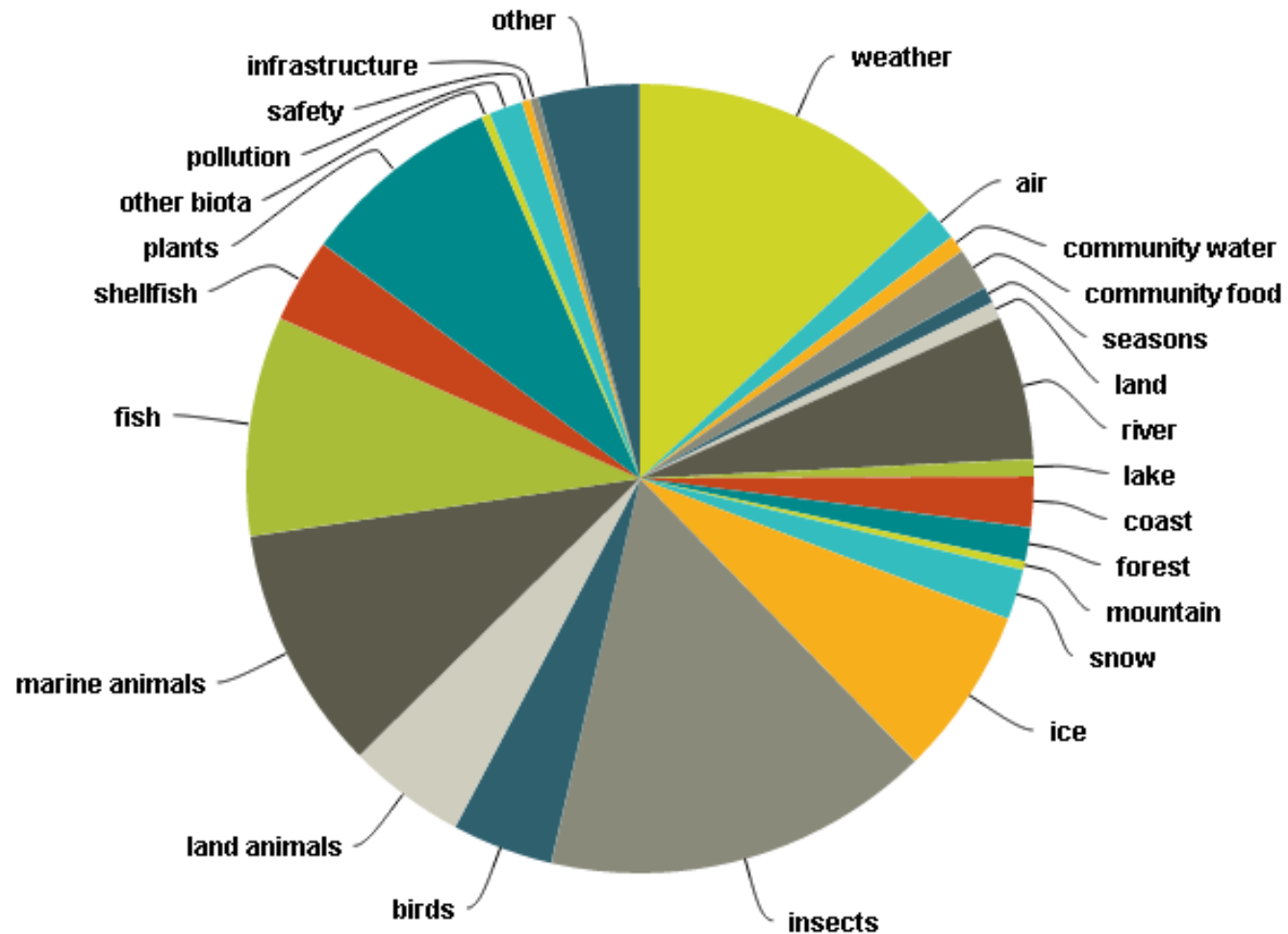
Preventing greenhouse gas from entering atmosphere February 3, 2015. A novel class of materials that enable a safer, cheaper, and more energy-efficient process for removing greenhouse gas from power plant emissions has been developed by a multi-institution team of researchers. The approach could be an important advance in carbon capture and sequestration. [ScienceDaily](#)

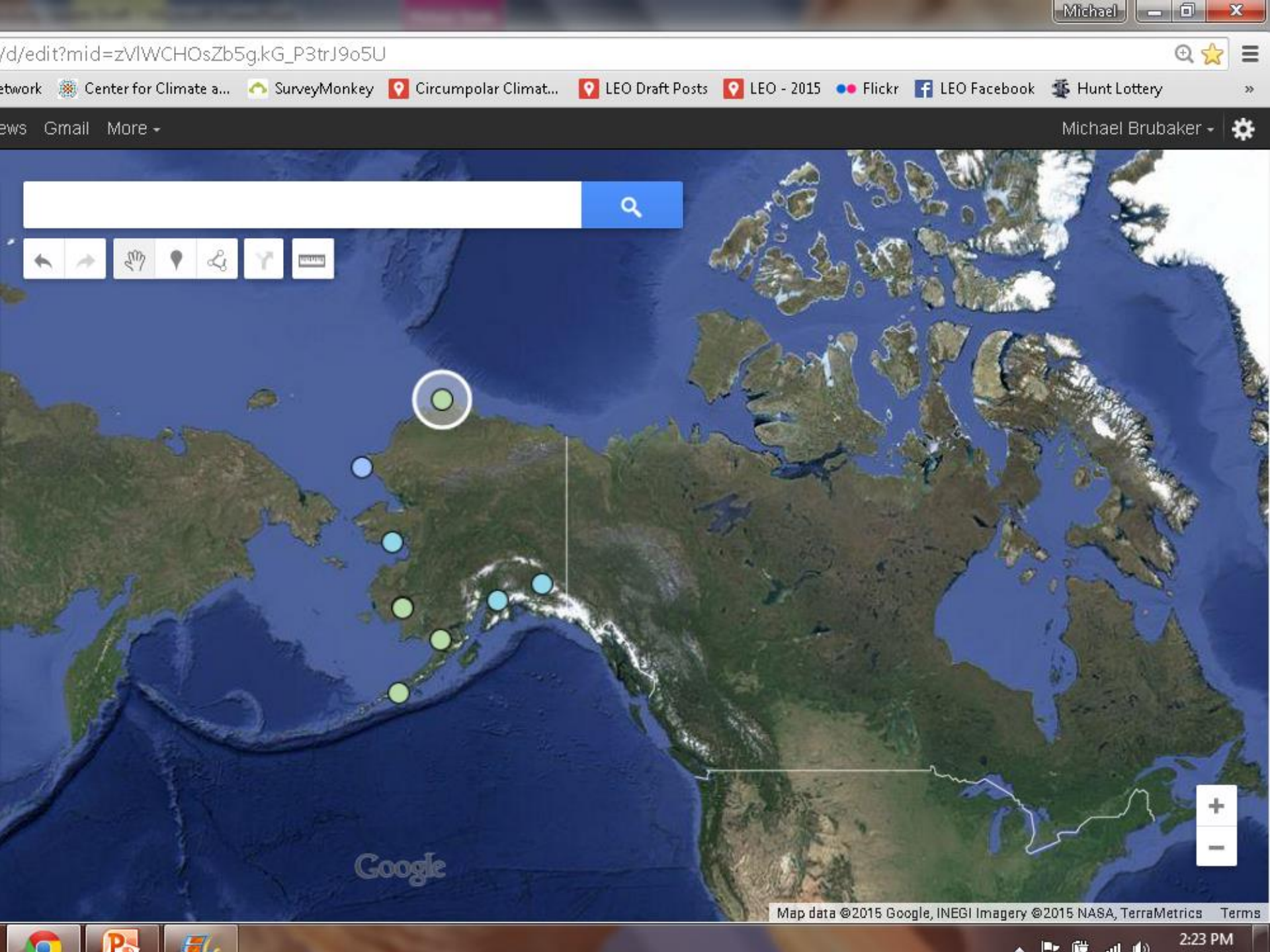
Video – Orcas beach rubbing February 2, 2015. Chris Wilton - An amateur videographer has captured footage of northern resident orcas rubbing themselves at a beach in B.C.'s Discovery Islands near

The maps with LEO posts and climate events maps are shared publically through the weekly Northern Climate Observer. There are over 1500 subscribers around the circumpolar north, who receive weekly updates on LEO Observations.

What is the type of observation?

Answered: 289 Skipped: 4





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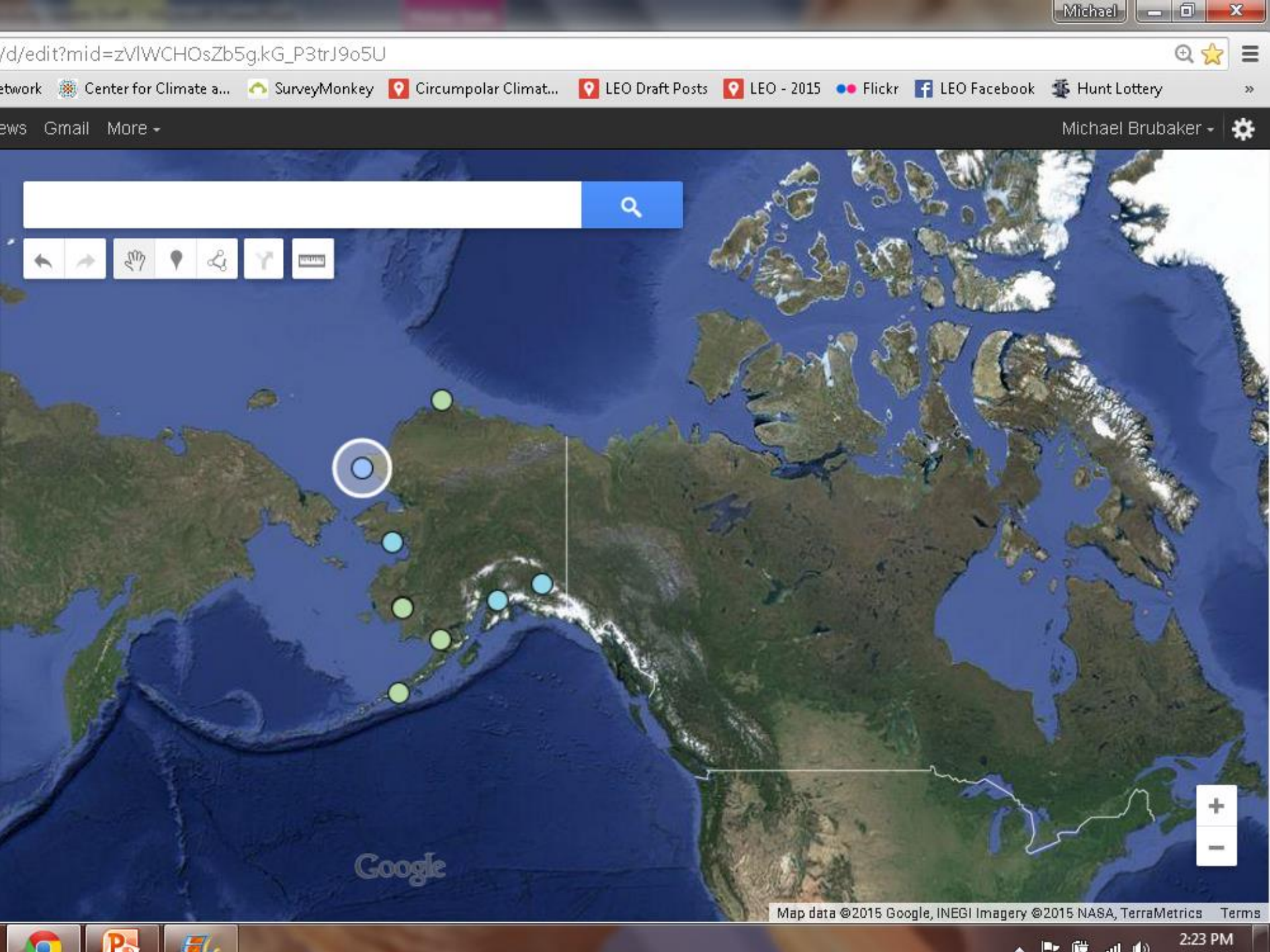
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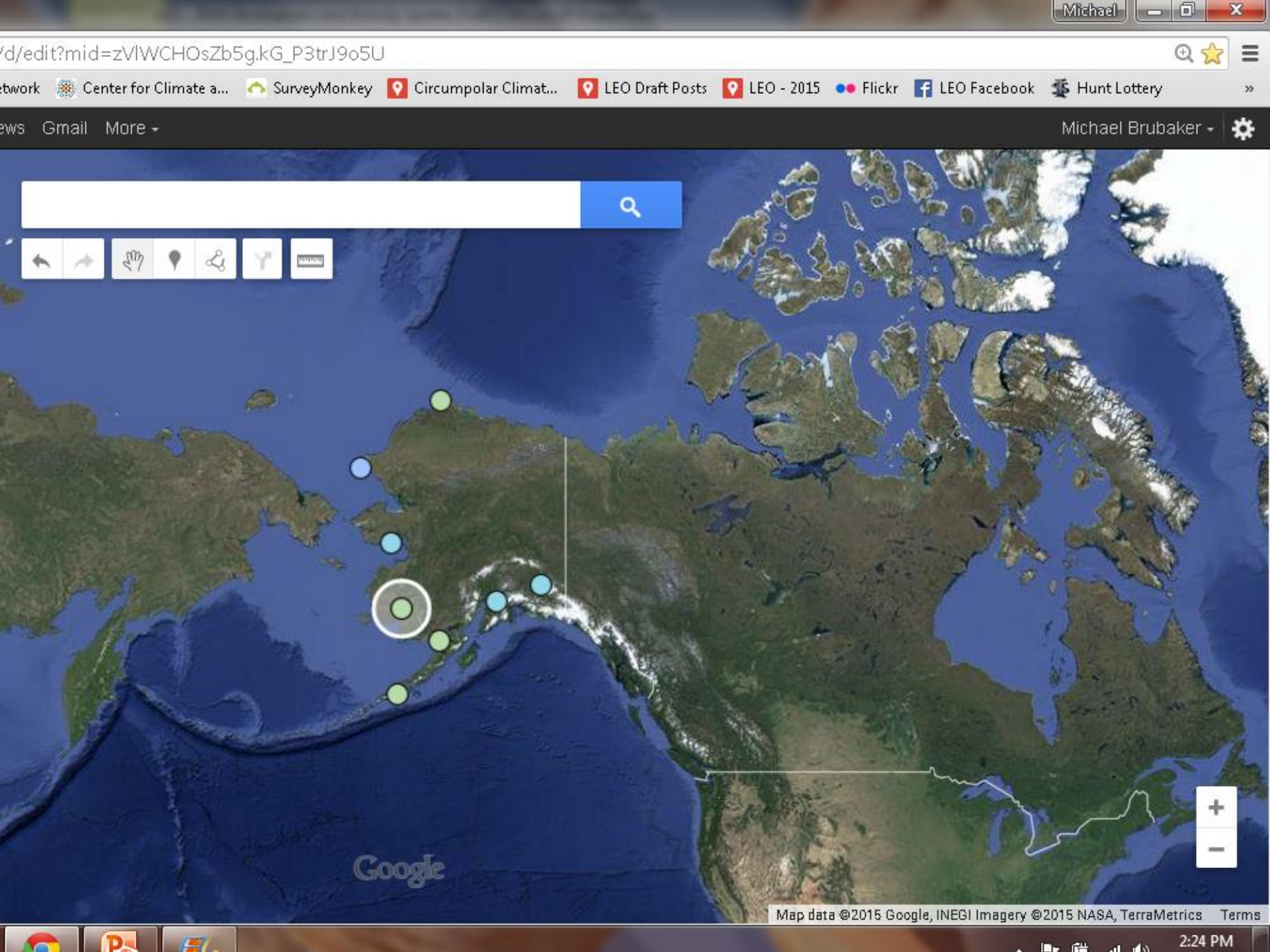


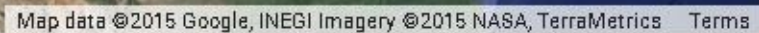
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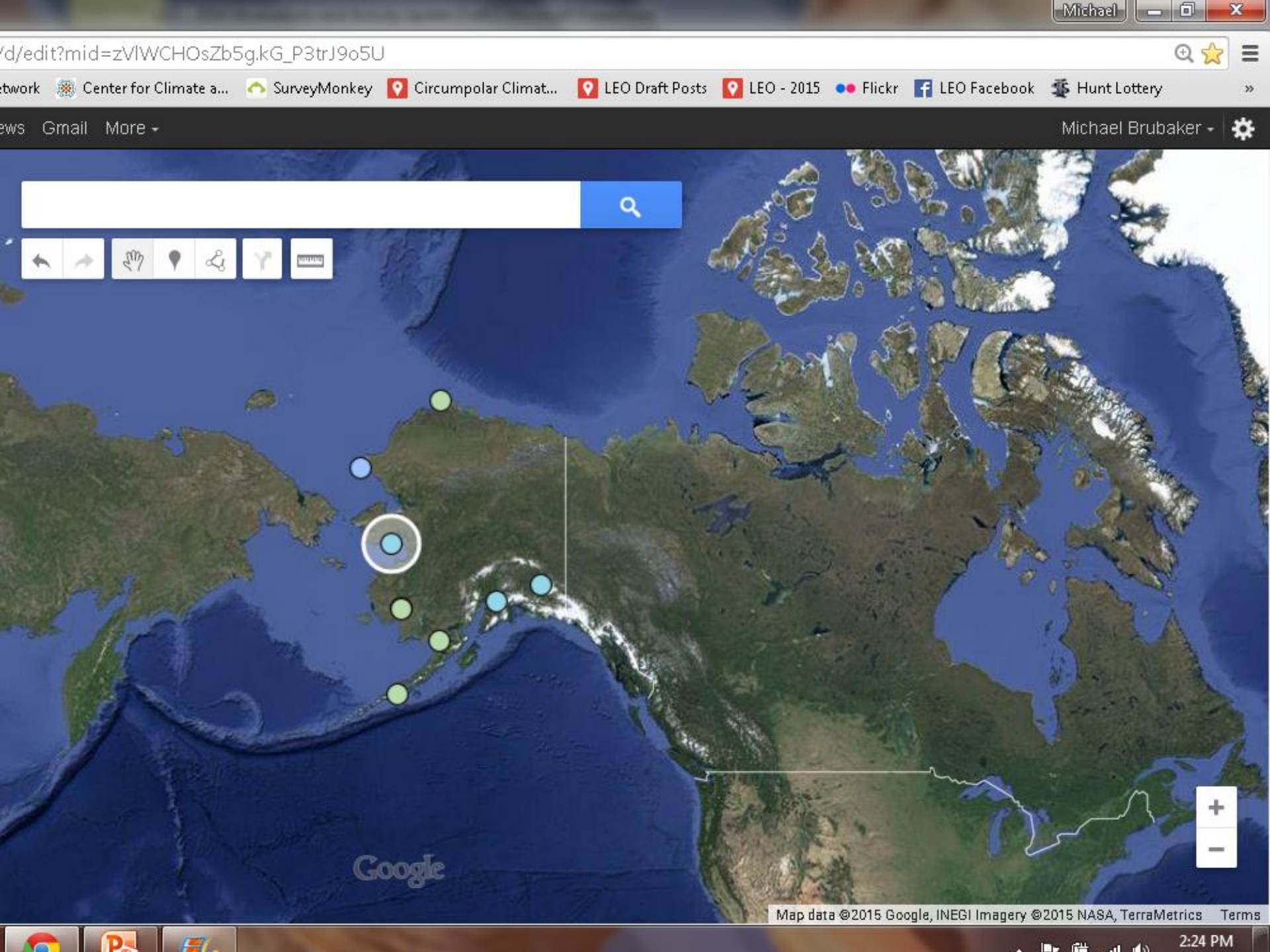
Map data ©2015 Google, INEGI Imagery ©2015 NASA, TerraMetrics Terms

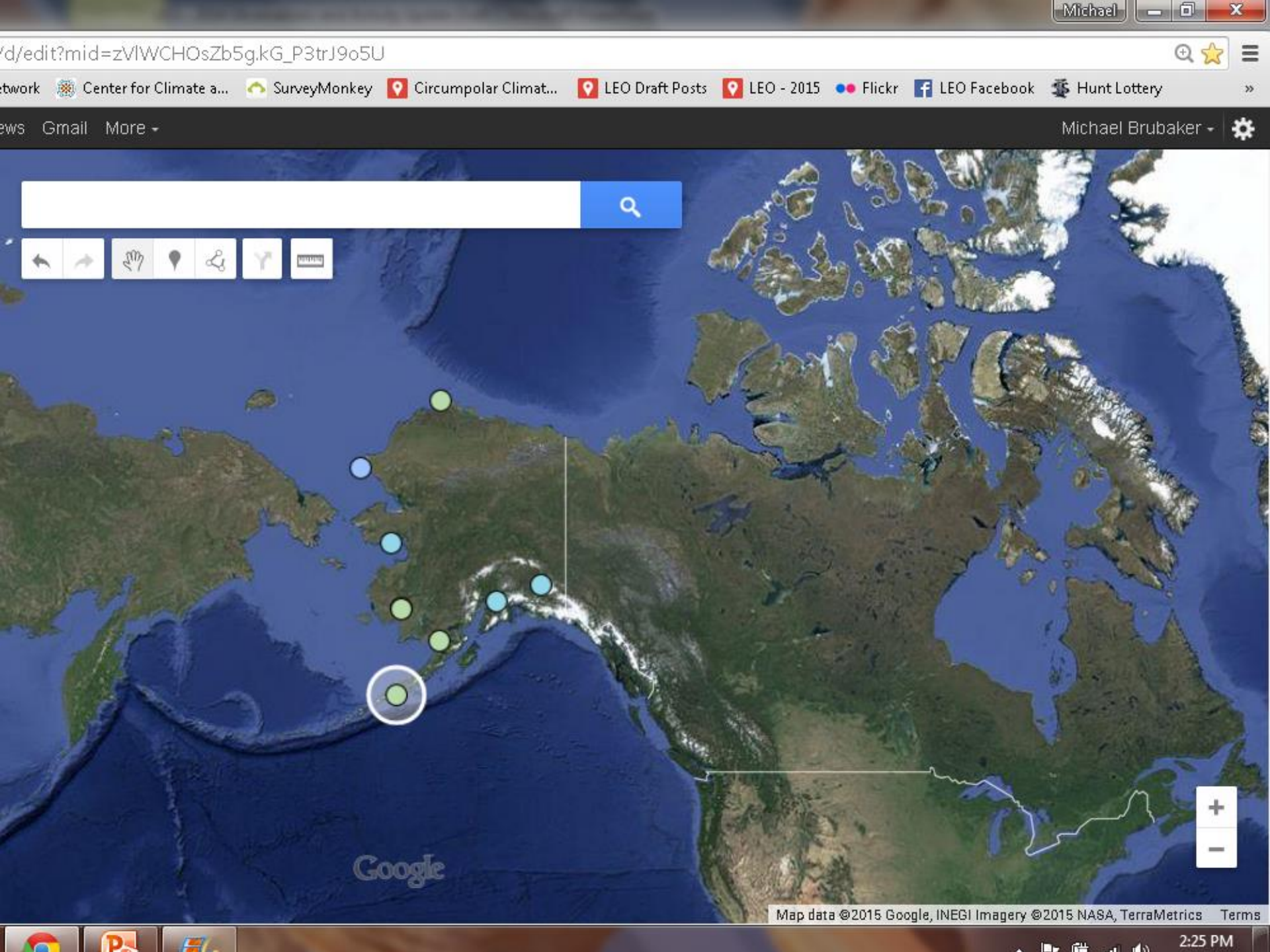
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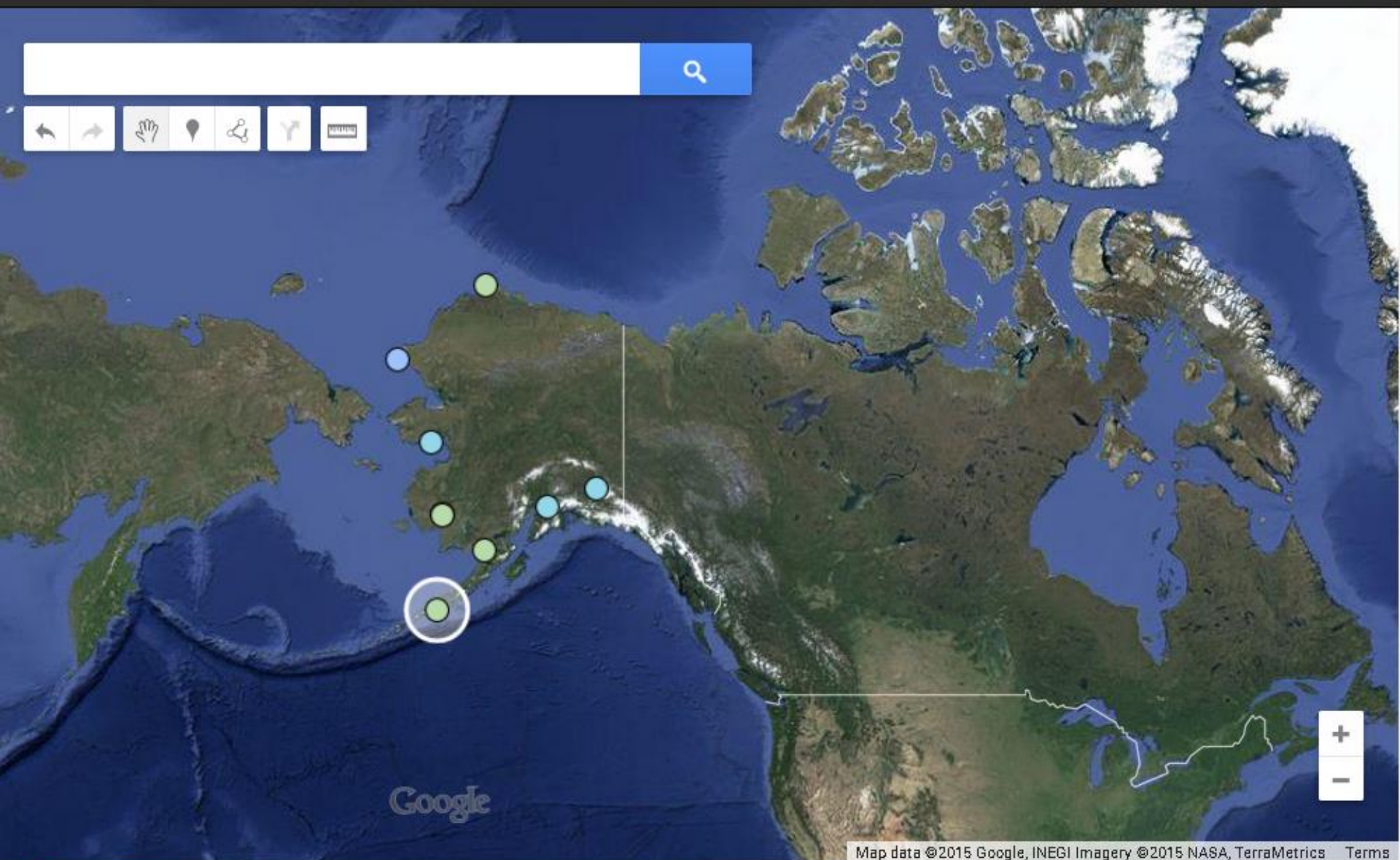


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2:25 PM

May - Seldovia



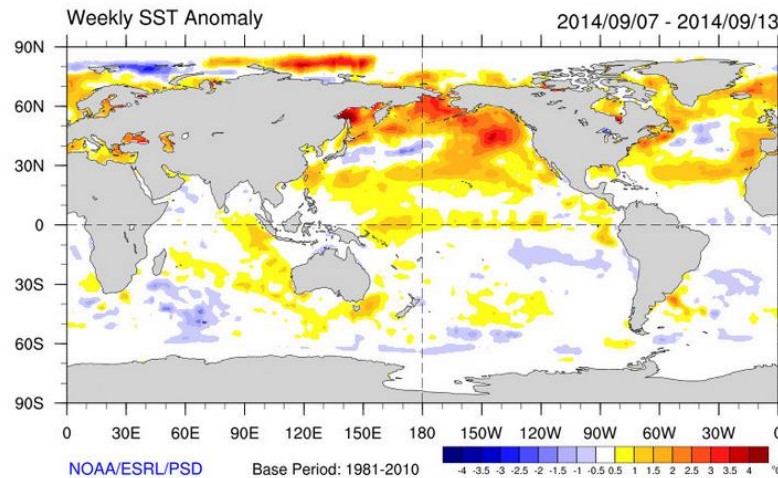
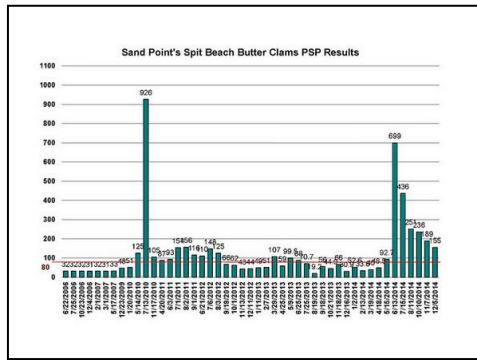
June – Togiak



July – Golovin



December – King Cove



August – Bering Sea



November – Haines



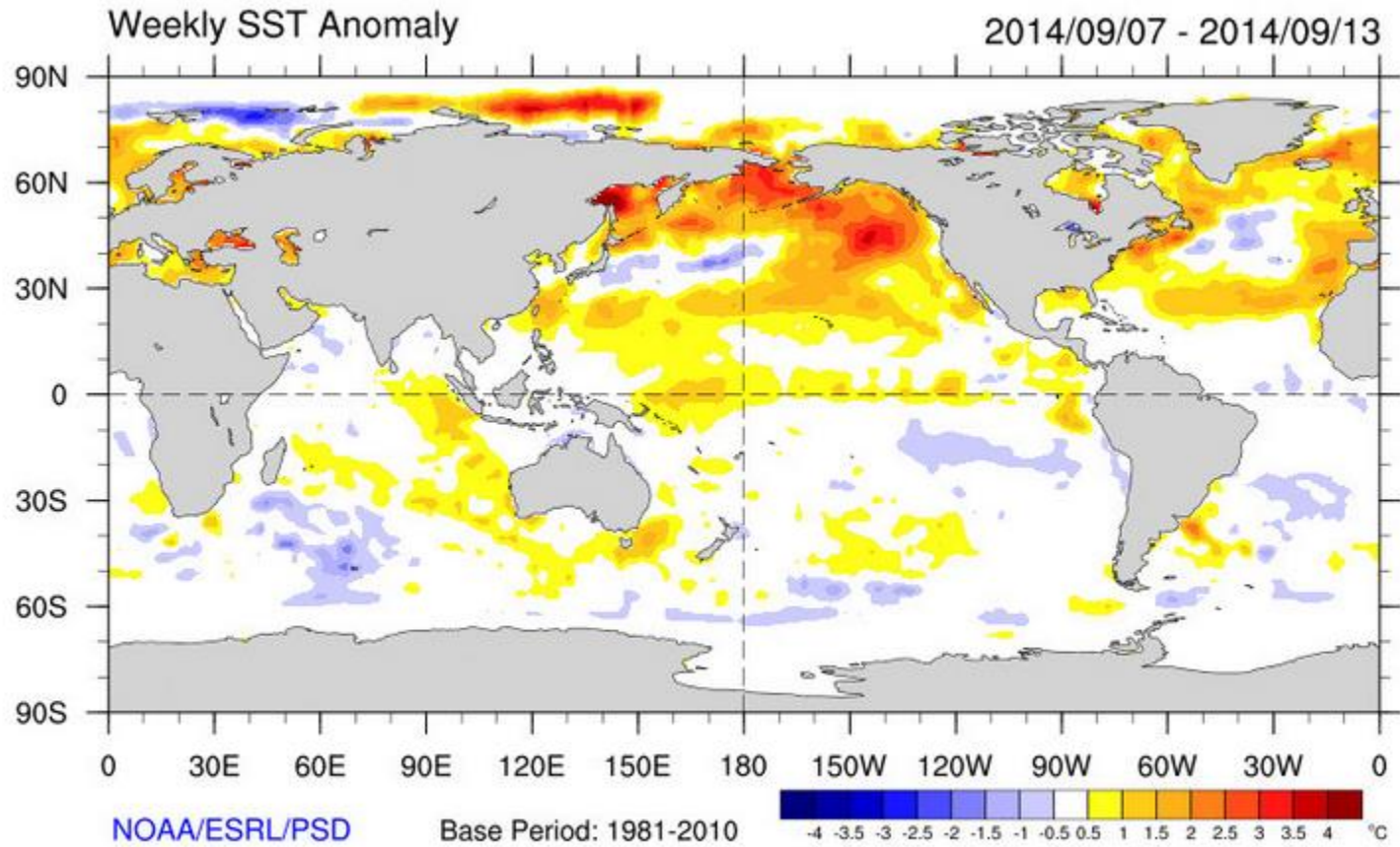
October – Shishmaref



September – New Stuyhok



Extreme Warm Waters





LEO Yurok



LEO Alaska



The take home

Our environment is changing very quickly.

Communities seek assistance responding to impacts.

LEO members posts observations on publically available maps.

LEO members engages directly with technical experts.

LEO is helping to improve understanding and response to climate change.

