About LEO

The Local Environment Observer Network

Mike Brubaker
Center for Climate and Health
Alaska Native Tribal Health Consortium

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Google us at “LEO Network”
The Alaska Tribal Health System applies a “One Health” approach recognizing that healthy environment,
and healthy wildlife, is important for healthy people.
Climate change is occurring in Alaska as evident from the change in mean annual temperature.

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

Statewide Average: 3.0°F
Climate change is also causing major changes in the environment, permafrost is a good example. Thawing on the North Slope is causing coastal erosion.
Thawing in communities is causing damage to infrastructure. Here an arctic pipe in the village of Selawik.
Climate change is also resulting in health benefits.
Center for Climate and Health

To assist the tribal health system in understanding effect, raise awareness and encourage strategies and responses that protect public health.

How can we minimize risk and maximize benefit?
The health effects of climate change (positive and negative)

- Disease
- Mental Health
- Injury
- Food Security
- Water Security
So in 2009 we started three activities to describe potential impacts: the first was scanning northern news media for evidence of climate change.
We post these articles on publically available Google maps.
Secondly, we began to visit communities and document the kinds of climate sensitive changes they are experiencing.
The result has been over a dozen community scale reports about climate change and health effects.
The third was training and working with local environmental managers to describe the kind of environmental change they are experiencing, and to connect them with experts who can provide technical assistance.
LEO is a free network of environmental and natural resource professionals. There are over 200 members from more than 100 communities.
LEO is focused on observation not structured monitoring. Participants post observations about environmental change that is unique or unusual.
LEO is public. All information is accessible via Google maps.

LEO Network - January 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".

Public · 2 Collaborators · 35,973 views
Created on Dec 19, 2013 · By mbrubaker · Updated Feb 24
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Link: Circumpolar Climate Events Map
Click here to view this months Circumpolar Climate Events Map including web links to news articles from across the circumpolar north. See also Center for Climate and Health website.

No snow: roads open and harvesting time change
Solomon, Alaska, January 3, 2014 (weather) The Solomon-C Road is usually closed by end of October. Last year we were camping down in Solomon until end of November. This year the snow and the road...

Lack of sea ice observed in the Bristol Bay Region
Port Heiden, Alaska, January 7, 2014 (ice, weather) We've or sea ice once this year and I think that was only for one or two days and then it all melted away. The sea ice usually shows up aro...

Coastal erosion disrupts bulk fuel farm
Port Heiden, Alaska, January 7, 2014 (erosion, sea ice) During observation for erosion and weather condition, we came across yellow fuel headers pipes for our bulk fuel farm. The city has...

What a warm winter season - climate change
Shakttooik, Alaska, January 20, 2014 (weather) Last week we received a huge amount of snow during our snow storm. Unfortunately, it rained yesterday! Making the road conditions ice. It fe...

Coyote near Norton Sound Community
Shakttooik, Alaska, January 23, 2014 (land animal) My son check his traps and ran across a coyote, at first he though it was a fox. I haven't heard of anyone here or around our neighboring communities...

The plants are blooming early - the ice is melting
Bethel, Alaska, January 24, 2014 (weather) I noticed that the plants are budding in Bethel. I looked out my office window and there were trees in bud. Also water on the Kuskokwim River and thin ice.

LEO had 192,725 Google map site visits in 2013.
LEO is community driven. Members decide within their own organizations what is important and appropriate to share.
LEO looks at broad environmental effects. Members post observations on changes to wildlife, plants, weather, landscape and many other topics.
This graph shows observations by category during 2013.
LEO is inclusive. Anyone can share observations, however the local LEO is the go to person who reviews observations before posting.
LEO connects communities with technical experts. Dr. Hajo Eicken is a regular collaborator on sea ice observations.
This graph shows technical referrals by organization during 2013.
LEO provides surveillance for emerging environmental issues.

October 13, 2014. Skin illness in white fish “In all the years I've been fishing I never caught any fish like this” Sam Kunaknana, Nuiqsut

A determination of illness caused by the mold *Saprolegnia* was made by the Alaska Fish Pathology Lab.
LEO maps include rich content about type of event, local knowledge, implications, adaptation, resources, photos and video.
LEO is also a social network and members correspond with each other directly to discuss local concerns and to exchange information.
LEO is built on open and available web programs and uses social media. You can find links to our Facebook, flickr and YouTube pages on our website.

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.

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.
St. George is located in the Pribilof Islands, one of the most remote communities in Alaska.
In September 2012, Aaron Merculief Environmental Manager and LEO, was presented with an environmental mystery: why had the harbor turned red? Was the source living or non living, organic or inorganic? Most importantly as environmental manager, was the substance harmful?
Aaron went to the St. George harbor and using a point and shoot camera on a broom stick, took underwater photos and video of the red substance in the water.
Aaron went to the LEO website and posted this observation:

**Saint George, Harbor, September 14, 2012** The community members who work around the harbor noticed the redness in the harbor as the water doesn't get disturbed too much from the weather like the waters around the island. The community members who brought this to my attention said they haven't seen anything like this. It appears the red goo was only on the surface of the water and no more that 1 to 1.5 feet deep. The raises concern about food safety on St. George. Aaron Merculief, LEO
This is the way the observation post appeared on the LEO – September 2012 Google Map.
Aaron collected water samples from the harbor and then used the only microscope available on island for analysis ... It was a microscope he found in his closet that belonged to his daughter.
Using the microscope and his digital camera, he collected pictures and video that showed the movement of living organisms, rather than some kind of dust.
ANTHC LEO Managers sent the map post in and email to Dr. Dean Stockwell with the University of Alaska Fairbanks who consulted on the LEO post. He forwarded the post onto an expert on marine plankton in Massachusetts.
The map post and video were reviewed by Dr. Matthew Johnson, a Marine Biologist at the Woods Hole Oceanographic Institute. We consulted with LEO informing that the organism was not a harmful algae, but rather a marine ciliate called *Mesodinium rubrum*. 
Mystery solved: the red color was not a food safety risk. Aaron collaborated with Matt to then collect water samples for genetic analysis in Woodshole.
Through these three activities we are beginning to describe climate and health relationships in Alaska.

Health Effects of Climate Change in Alaska

- Allergic reactions
- Food spoilage
- Infrastructure damage
- Wildlife disease
- Dangerous seas
- Allergies
- Drought and infestation
- Snow hazards
- Dangerous travel
- Poor water quality
- Respirator illness
- Ice zard injury
- Unsafe food

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Understanding about local impacts has helped the health system develop targeted advisories that can help in adaptation.
LEO maps are shared publically with readership of the weekly Climate and Health E-News. They are also reviewed quarterly by agency officials who participate in the Alaska One Health Group.
The take home

The northern environment is changing very quickly.

Communities seek assistance responding to impacts.

LEO member select, qualify and post their own observations.

They can apply traditional as well as western science.

LEOs engage directly with technical experts.

LEOs help their communities and the region to adapt to change.

For more information contact mbrubaker@anthc.org