

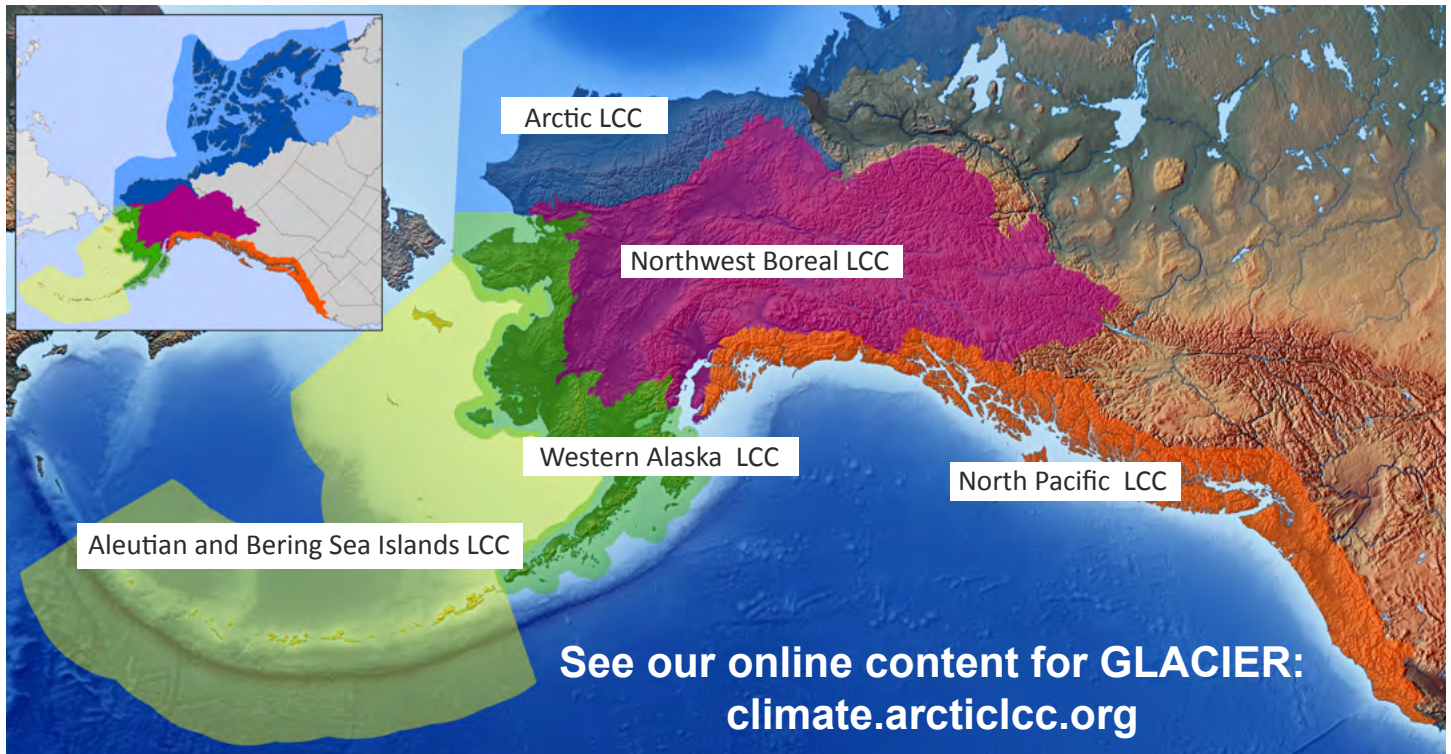
# CLIMATE SCIENCE FROM ALASKA & NORTHWEST CANADA

## LANDSCAPE CONSERVATION COOPERATIVES



LANDSCAPE CONSERVATION  
COOPERATIVES

Landscape Conservation Cooperative (LCC) partnerships across Alaska are at the forefront of efforts to address climate impacts on permafrost, coastal erosion, subsistence hunting and gathering, food security, freshwater resources, and much more. This snapshot of LCC-funded projects showcases the expansive ongoing climate efforts and proactive management of human activities throughout Alaska.



### ALASKA LCC CONTACTS

#### Aleutian and Bering Sea Islands LCC

[absilcc.org](http://absilcc.org)

Douglas Burn • Coordinator • [douglas\\_burn@fws.gov](mailto:douglas_burn@fws.gov) • (907)786-3807  
Aaron Poe • Science Coordinator • [aaron\\_poe@fws.gov](mailto:aaron_poe@fws.gov) • (907)786-3834

#### Arctic LCC

[arcticlcc.org](http://arcticlcc.org)

David Payer • Coordinator • [david\\_payer@fws.gov](mailto:david_payer@fws.gov) • (907)456-0327  
Philip Martin • Science Coordinator • [philip\\_martin@fws.gov](mailto:philip_martin@fws.gov) • (907)456-0325

#### North Pacific LCC

[northpacificlcc.org](http://northpacificlcc.org)

John Mankowski • Coordinator • [john\\_mankowski@fws.gov](mailto:john_mankowski@fws.gov) • (360)534-9330  
Mary Mahaffy • Science Coordinator • [mary\\_mahaffy@fws.gov](mailto:mary_mahaffy@fws.gov) • (360)753-7763

#### Northwest Boreal LCC

[nwblcc.org](http://nwblcc.org)

Amanda Robertson • Coordinator • [amanda\\_robertson@fws.gov](mailto:amanda_robertson@fws.gov) • (907)786-3694  
Dawn Magness • Science Coordinator (acting) • [dawn\\_magness@fws.gov](mailto:dawn_magness@fws.gov) • (907)260-2814

#### Western Alaska LCC

[westernalaskalcc.org](http://westernalaskalcc.org)

Karen Murphy • Coordinator • [karen\\_a\\_murphy@fws.gov](mailto:karen_a_murphy@fws.gov) • (907)786-3501  
Joel Reynolds • Science Coordinator • [joel\\_reynolds@fws.gov](mailto:joel_reynolds@fws.gov) • (907)786-3914



## PERMAFROST

Thawing permafrost is the crumbling foundation for both northern infrastructure and ecosystems. As permafrost degrades it releases more greenhouse gases into the atmosphere that will likely further accelerate climate change across the globe.



### Permafrost Characterization and Mapping

This project produced the first intermediate-scale permafrost maps for northern Alaska, and includes information such as ground-ice content, which is critical to risk analyses. As ground ice melts, the surface is expected to sink up to 30 meters in some areas, relatively little in others; this map shows managers where those places are.

<http://www.tinyurl.com/PermafrostMapping>, Torre Jorgenson, [ecoscience@alaska.net](mailto:ecoscience@alaska.net)

### Permafrost Change Observations in Western Alaska

Twenty-six new permafrost monitoring stations were established in the Selawik and Seward Peninsula regions of western Alaska. All sites show sharp warming trends from the mid-1970s to today and some sites may completely lose shallow permafrost by 2040. Detailed permafrost maps derived from this work will be used by managers to project habitat change and plan infrastructure.

<http://www.tinyurl.com/PermafrostObservatory>, Vladimir Romanovsky, [veromanovsky@alaska.edu](mailto:veromanovsky@alaska.edu)

## SUBSISTENCE/FOOD SECURITY

Most communities throughout Alaska and Northwest Canada rely heavily on harvested, rather than store-bought, foods. Climate change is affecting the distributions of traditionally harvested species, making travel conditions hazardous, and impacting food processing and storage options for rural residents.



### Visualizing Subsistence Data Across Alaska

This project provided a map interface for subsistence harvest data from over 270 Alaskan communities, supporting greater investigation of climate impacts on food security in remote communities.

<http://www.tinyurl.com/SubsistenceHarvest>, David Koster, [david.koster@alaska.gov](mailto:david.koster@alaska.gov)

### Risk and Resiliency of Subsistence Berries

This project helped the Chugachmiut tribal consortium better predict where important subsistence berry plants will grow and survive despite threats, such as increased moth attacks, brought on by climate-related changes in Southcentral Alaska.

<http://www.tinyurl.com/Berryharvest>, Nathan Lojewski, [nathan@chugachmiut.org](mailto:nathan@chugachmiut.org)

### Climate Change Vulnerability for Communities in Bering Strait and Bristol Bay

Alaska Native communities in western Alaska are already experiencing climate change impacts. In order to maintain resiliency, these communities need to identify risks and potential actions. Through two projects, communities in Bristol Bay and Bering Strait developed vulnerability assessments to identify climate change threats.

<http://www.tinyurl.com/BristolBayClimate>, Susan Flensburg, [sflensburg@bbna.com](mailto:sflensburg@bbna.com);

<http://www.tinyurl.com/BeringStraitClimate>, Michael Brubaker, [mbrubaker@anthc.org](mailto:mbrubaker@anthc.org)



## FRESHWATER & FRESH FISH

Water is life for a fish; and fish are life for Alaskan residents and many industries. As the climate changes, Alaskans are worried about potential impact to fish species like salmon. Research has shown that increased water temperatures affect the ability of salmon to reproduce and thrive, yet little is known about current effects on spawning habitat of Alaskan fish populations. Even less is known about how our freshwater systems are changing through time.



### Linking Climate, Hydrology, and Fish Migration

Warm dry spells in summer can result in “no-flow” events when fish migration is interrupted, delaying arrival at critical overwintering sites.

<http://www.tinyurl.com/NorthSlopeHydro>, Erica Betts, [betts.eric@gmail.com](mailto:betts.eric@gmail.com)

### Are Our Salmon Populations in Hot Water?

Currently there are only 387 continuous sensors recording freshwater temperature in all of Alaska; there are 15,000+ in the Pacific Northwest. A suite of 13 projects will 1) obtain more information about existing temperature conditions so we can predict change and 2) document the effect of changes on Alaska freshwater systems and their fish populations.

<http://www.tinyurl.com/13WaterProjects>, Western Alaska LCC, [lccstaff@westernalaskalcc.org](mailto:lccstaff@westernalaskalcc.org)

## COASTAL EROSION

Later formation and earlier melting of Arctic sea ice, storm surges, and thawing permafrost contribute to some of the highest coastal erosion rates in the U.S., damaging habitat for species and infrastructure in the most remote communities in the country.



### National Assessment of Shoreline Change

Arctic LCC helped provide aerial imagery that the US Geological Survey used to analyze historical rates of coastline change across northern Alaska.

<http://www.tinyurl.com/ShorelineChange>, Ann Gibbs, [agibbs@usgs.gov](mailto:agibbs@usgs.gov)

### Coastal Change Time-series Analysis for western Alaska

Comprehensive historical photographs of the western Alaska coast do not exist. An interactive tool, created using an assessment of satellite images, was developed to show the extent and timing of coastal changes like erosion and loss of coastal freshwater bodies.

<http://www.tinyurl.com/CoastalChangeTool>, Matt Macander, [mmacander@abrinc.com](mailto:mmacander@abrinc.com)

### Predicted Future Changes in Storm Surge Impacts on the Yukon-Kuskokwim Delta

Storm surges accelerate coastal erosion. On low-lying river deltas these surges also cause flooding in communities and introduce saltwater into highly productive freshwater systems. Modeling future storm surges on the Y-K Delta shows that only a 40 cm sea level rise could increase the extent of flooding by about 8 km inland.

<http://www.tinyurl.com/YKStormSurge>, Tom Ravens, [tmravens@uaa.alaska.edu](mailto:tmravens@uaa.alaska.edu)

## SMART DEVELOPMENT IN THE FACE OF CLIMATE CHANGE

Climate change is already affecting Alaskans, but it's not too late to understand, manage, and adapt to a changing environment. We have an opportunity to incorporate consideration of climate impacts alongside infrastructure and economic development, ensuring that activities do not magnify impacts but instead provide for the wellbeing of humans and ecosystems.



### Marine Vessel Traffic in the Arctic

This project has already enhanced safety of vessel routing in the Aleutians, and will next examine the increased shipping traffic through the Bering Strait resulting from reductions in Arctic sea ice.

<http://www.tinyurl.com/VesselTraffic>, Martin Robards, [mrobards@wcs.org](mailto:mrobards@wcs.org)

### How Can We Develop while Maintaining Functioning Ecosystems?

Climate change and associated uncertainties require adaptive management. Selecting a network of ecological benchmarks to serve as experimental controls with which

### Are Conservation Lands Connected in a Changing World?

As the climate changes, plants and animals will need to move to survive. We are bringing together multiple land-management partners to ensure habitat connectivity for the boreal forest in interior Alaska and northwest Canada. LCCs are engaged in planning that maintains landscape connectivity while allowing for economic development to support human needs.

Dawn Magness, [dawn\\_magness@fws.gov](mailto:dawn_magness@fws.gov).

## IN THE WORDS OF OUR PARTNERS

*"The LCCs' focus on partnering to provide essential science to understand these threats and inform decision makers, makes the LCCs valuable to our organization"* Dimitri Philemonof, President and CEO, Aleutian and Pribilof Islands Association

*"It's about time we have more regional, relevant, cooperative, collaborative information sharing and planning. We all wish we could have been doing this throughout our careers."* Phil Burton, Regional Chair, University of Northern British Columbia

*"The LCCs are different. Administered by the U.S. Fish and Wildlife Service, LCCs address real community and conservation needs in truly collaborative and creative ways across Alaska."* Courtenay Carty, Bristol Bay Native Association, and Karen Pletnikoff, Aleutian and Pribilof Islands Association

*"It is imperative that natural resource management agencies, science providers, Tribes, and First Nations, conservation organizations, and other stakeholders work together to understand the drivers and impacts of landscape change and to determine how best to address those challenges."* Carl Markon, Deputy Regional Director, U.S. Geological Survey, Alaska Region

*"These conservation science partnerships between federal agencies, states, tribes, NGOs, universities and stakeholders have taken a huge leap forward in terms of promoting collaboration amongst government agencies, NGOs and the people of Alaska... enabling better land management and more effective planning for future conditions."* Larry Hinzman, Vice-chancellor for Research, University of Alaska Fairbanks



August 30, 2015