Alaska Center for Climate Assessment and Policy

A musher travels across sea ice near Kotzebue. UAF photo.
See page 5 to learn how ACCAP is helping improve the information people in rural Alaska have about sea ice.

Annual Report

June 1, 2023 - May 31, 2024 of Award NA21OAR4310314

Team members

ACCAP core team from left to right Alison Hayden, Rick Thoman, Adelheid Herrmann, Zav Grabinski, Sarah Trainor, Heather McFarland, Nathan Kettle.

Core team

Sarah Trainor, Director
Nathan Kettle, Deputy Director
John Walsh, Co-Investigator through August 2023
Adelheid Herrmann, Co-Investigator
Alison Hayden, Program Manager
Rick Thoman, Alaska Climate Specialist
Zav Grabinski, Geospatial Analyst and Data Visualization Specialist
Heather McFarland, Science Communications Specialist
Caroline Erickson, Extreme Events Fellow
Danielle Meeker, Sustained Assessment Specialist through February 2024
Delores Gregory, Small Grant Coordinator

Additional team members

Tina Buxbaum, Staff
Malinda Chase, Alaska Climate Adaptation Science Center, Tribal Liaison
LaVerne Demientieff, UAF Dept. Social Work
Elizabeth Figus, Figus Consulting Services
Roberta Glenn, Research Associate
Greta Goto, Research Associate
Davin Holen, Alaska Sea Grant Coastal Community Resilience Specialist
Rick Lader, Research Associate
Carolyn Rosner, Website Developer
Alison York, Science Communication Editor

Students

Margaret Rudolf (Ph.D., graduated 2024)
Amy Hendricks (Ph.D.)
Sherri Wall (Ph.D.)
Abigail Hicks (M.S., graduated 2024)
Eva Burk (M.S.)
Jesse Endert (M.S.)
Ryan Owens (undergraduate)

Advisory board

Kevin Berry, Associate Professor of Economics, University of Alaska Anchorage
Jessica Cherry, Climate Services Director, NOAA Alaska Region
Aimee Devaris, Director, U.S. Geological Survey Alaska Region
Stephen Gray, Director, Alaska Climate Adaptation Science Center
Diane Hirshberg, Director, UAA Institute of Social and Economic Research
Davin Holen, Coastal Community Resilience Specialist, Alaska Sea Grant
Amy Holman, Coordinator, NOAA Alaska Regional Collaboration Team
Kathy Jacobs, Director, Center for Climate Adaptation Science and Solutions, University of Arizona
Scott Lindsey, Director, NOAA-NWS Alaska Region
Molly McCammon, Sr. Advisor, Alaska Ocean Observing System
Vera Metcalf, Director, Eskimo Walrus Commission
Cheryl Rosa, Deputy Director, U.S. Arctic Research Commission
Dee Williams, Deputy Director, U.S. Geological Survey Alaska Region
Sheyna Wisdom, Executive Director, Alaska Ocean Observing System

Executive summary

This report highlights the expertise, passion and reach that ACCAP researchers, staff and students — both past and present — draw from in their combined effort to build healthy and thriving Alaska communities, economies and ecosystems in a changing climate. The ACCAP team transitioned in 2023 as we bid farewell to our founding climate scientist John Walsh and welcomed two staff with a wealth of expertise, vision and energy. Our new geospatial analyst and data visualization specialist Zav Grabinski and science communication specialist Heather McFarland expand ACCAP's capacity to respond to community needs and develop tailored products for our audiences.

ACCAP's focus on extreme events continued through several research projects including the development of a library of historical weather and climate events that significantly impacted Alaskans. The resource, which was compiled by Alaska Fellow Caroline Erickson, fills important data gaps in the historic record. Another actionable research project is helping the National Weather Service improve sea ice forecasts for Utqiaġvik and Kotzebue, where people rely on the ice for hunting, fishing and travel.

In May 2024, ACCAP was thrilled when graduate students Margaret Hope Cysewski Rudolf and Abigail Hicks completed their degrees. Rudolf's PhD adds particular value to ACCAP's research approach by deepening our understanding of co-production of knowledge and highlighting the importance of boundary spanners when partnering with Arctic Indigenous communities.

Given that ACCAP's co-production work hinges on authentic partnership, our core team dedicates considerable time to relationship building at scientific conferences and other events where our partners and audiences gather. These networking activities helped Adelheid Herrmannn connect rural communities to research partners and funders in several tangible ways that support Tribal resilience. These activities are just a few examples of how ACCAP continues to prioritize research with, for and by Alaska Native Peoples. We look forward to continuing this work in the future.

Tribute to John Walsh

This annual report is dedicated to ACCAP's climate scientist John Walsh and the revolutionary contributions he has made and continues to make at ACCAP, in Arctic climate research and in the lives of our team. In September 2023, Walsh retired after serving as Co-Investigator, leader, climate scientist and mentor at ACCAP since its inception 17 years prior.

ACCAP has been deeply shaped by Walsh. Before it became the program's mission, he was already pushing the team to help build healthy and thriving Alaska communities, economies and ecosystems in a changing climate. His interest and expertise in extreme events became a key focus area of ACCAP. He had an extraordinary ability to connect interesting climate science questions with the needs of people and communities in Alaska, something he prioritized before it became popular. He led the creation of three of ACCAP's most-used decision-support tools and supported new ideas and ways of looking at things, including embracing Indigenous Knowledge in a way that set the stage for ACCAP standards today.

Walsh had a long illustrious career studying Arctic climate variability, attribution and sea ice that resulted in 350 peer-reviewed publications. He conducted groundbreaking research linking Alaska wildfire, sea ice loss and marine heat to human driven climate change and developed an atlas of sea ice concentrations going back over one hundred years. He received the Mohn Prize — one of the premier Arctic research awards — and many other accolades for his extensive contributions. As one of the Arctic's top climate scientists Walsh was a meaningful contributor to an astounding number of projects and initiatives. In addition to his role at ACCAP, he co-led the Arctic Monitoring and Assessment Programme's Climate Experts Group, served as chief scientist at the International Arctic Research Center, joined UAF as the president's professor of climate change and many other leadership positions. Through this vast network, Walsh brought more research and visibility to ACCAP than any other scientist could on their own.

But what sets Walsh apart from other great scientists is his eagerness to shape and mentor people and programs. Walsh mentored ACCAP team members at every level from NOAA Hollings Scholars and graduate students, to staff and leadership. "He's the most modest genius," said Sarah Trainor, ACCAP director. "That's part of what makes him a good mentor, he doesn't need praise for his successes, and he always helps others do great work. It's a gift." The climate scientists he mentored are now among Alaska's brightest scholars. The approachableness and teaching style that make Walsh a great mentor, also make him an outstanding science communicator. "He is as at ease and effective talking with undergraduates as he is prime ministers," said Rick Thoman, ACCAP climate specialist.

While producing top notch science and molding the next generation of Arctic researchers, Walsh modeled humility, kindness, dedication, patience, humor, and so many other admirable qualities. In addition to supporting hard work, he constantly reminds people to get outside and spend time with their families. There is not a person at ACCAP who has not been deeply impacted by John Walsh. He is missed by many, though we are also so grateful to see him taking time for himself and enjoying the world that he spent his career studying.

Better NWS seasonal to subseasonal sea ice forecasts for rural Alaska

ACCAP leads: Nathan Kettle, Rick Thoman, John Walsh, Danielle Meeker

Partners: National Weather Service; Alaska Arctic Observatory and Knowledge Hub

In coastal Arctic Alaska people rely on sea ice as a platform for hunting, fishing and travel. Yet reliable forecasts of sea ice conditions and associated weather are not always readily available. ACCAP was asked by the National Weather Service to gather feedback from communities to guide future delivery of NWS seasonal to subseasonal sea ice information to rural Alaskans.

In autumn 2023, ACCAP, the NWS and our partners at the Alaska Arctic Observatory and Knowledge Hub interviewed Indigenous Elders, hunters, borough workers, search and rescue staff and community researchers in Utqiaġvik and Kotzebue. People were asked questions like: What sea ice features and weather conditions do communities monitor? Do they use NWS products and services? How do they want to receive NWS information?

One interviewee from Kotzebue said, "If I could have one thing on a day, if somebody could give me one useful piece of information for today and for tomorrow and for the next day, it's wind... Because that controls everything. That controls how we make decisions...There's nothing more important than wind for figuring out whether you leave town or not."

This focus on wind emerged throughout the interviews along with other feedback such as communities caring about current sea ice conditions and those 10 days out. Taking into consideration where there is predictability and what information is feasible to share via NWS products, ACCAP provided NWS with guidance on potential wind forecasts. NWS is exploring how to provide that information and they have already developed test products for ACCAP to review. The team is using an iterative process to share draft guidance and potential products back with the communities.

Beyond these outcomes, the effort is exploring ways to make the delivery of NWS information more equitable and accessible to Alaska Native Peoples. The interviews revealed things like communities value holistic perspectives that incorporate both land and water; they want to receive information on the platforms they already use, like local radio and community Facebook pages; inclusion of local place names and Iñupiaq terminology reduces confusion and is more inclusive; and much more.

Funding: NOAA Climate Program Office via the Weather Program Office of OAR; ACCAP core grant; AAOKH

Top: Kotzebue road sign with Iñupiaq and English. Bottom: Roberta Tuurraq Glenn-Borade (AAOKH), Nathan Kettle (ACCAP) and Donna Hauser (AAOKH) take a selfie during a visit to Kotzebue to interview local people and groups about sea ice information and their use of NWS products.

Visualizing the landscape of Tribal communities

ACCAP leads: Adelheid Herrmann, Sarah Trainor, Heather McFarland

Alaska Native Peoples are disproportionately affected by rapid climate change, including shifts in extreme events as well as long-term change. In response, more funding than ever before is being directed toward the Arctic and climate change. Simultaneously, Arctic research is shifting to center Indigenous knowledge and co-production with communities and Tribes. A December 2023 executive order from President Biden called for federal agencies to work together to boost funding and support for Tribal nations. In 2024, the National Science Foundation began requiring researchers to gain approval from Tribal governments for proposals that may impact Tribal resources or interests.

This energy toward Arctic climate research and Indigenous priorities is both needed and taxing for Tribal communities in Alaska. Adelheid Herrmann, co-investigator at ACCAP, developed a set of resources to help researchers, academics, federal and state agencies working in rural Alaska understand the current landscape and complexities of Tribal communities. Over 1,000 people accessed the materials in the first two weeks they were available online (released on June 13, 2024).

Herrmann's graphics help people visualize the overwhelming number of external and internal forces that Tribes and Tribal members deal with daily. The "Day in the life of an Alaskan Tribe" schematic shows dozens of outside entities that Tribes engage with and receive requests from. Her second graphic, "Internal stressors Tribal members face" focuses on activities and stressors that individuals juggle while trying to protect their livelihoods, culture and subsistence ways of life.

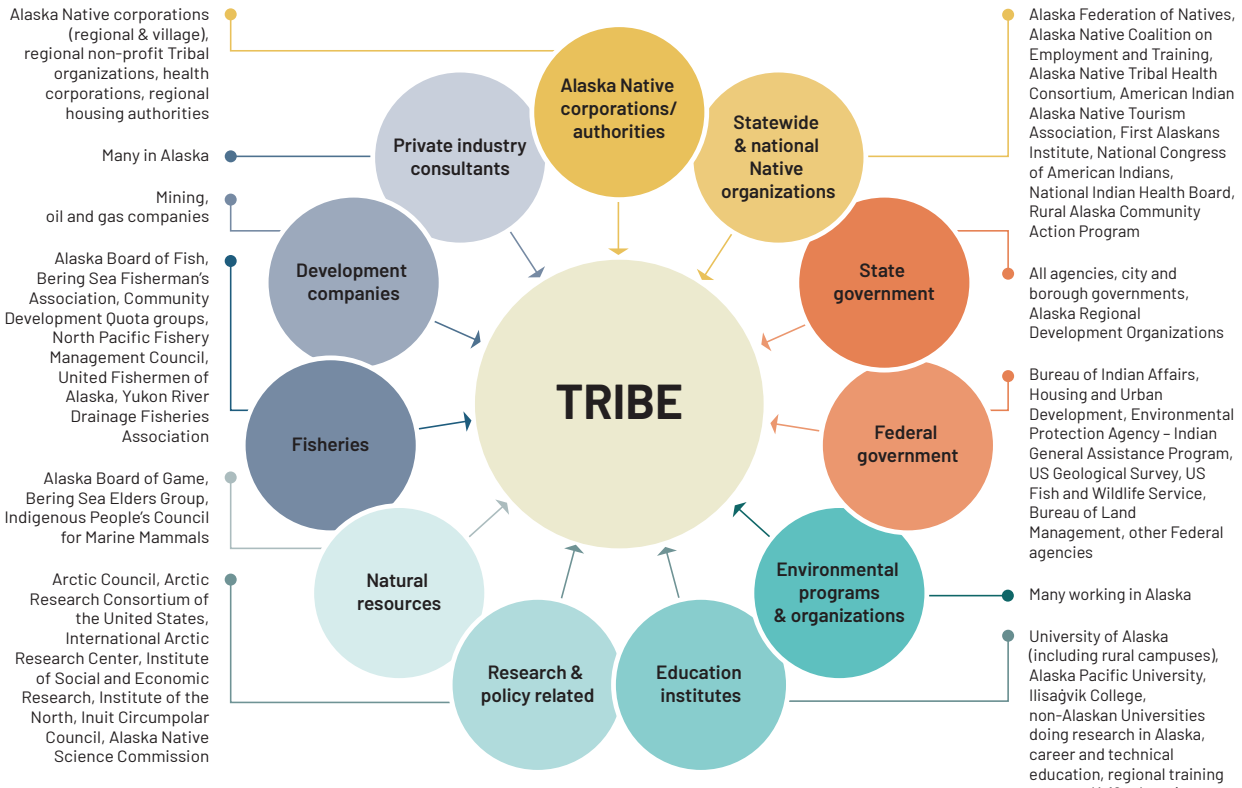
Herrmann — who is of Dena'ina and German descent from the community of Naknek, Alaska — initiated the "Day in the life of an Alaskan Tribe" concept in the 1990s following over a decade of travel throughout the Bristol Bay, Aleutians and Pribilof Islands region as an Alaska State Representative. She refined the material during her ongoing research at ACCAP.

Herrmann hopes that these graphics will not only be a resource for researchers and academics intending to work in rural Alaska, but that Tribes, Tribal members and Tribal regional organizations will use the materials to educate the outside world and elevate and amplify their voice.

"It's a continuous process educating those unfamiliar with Alaska and our governing systems to help them understand the depth of the worldview of Alaska Native Peoples," said Herrmann.

Herrmann recently combined the graphics into a short article that covers other important factors that academics and researchers should know, such as: capacity limitations at Tribal organizations; the complex governing system within Alaska Tribes; and climate grief that individuals and communities may experience while facing the potential

A day in the life of an Alaskan Tribe



destruction of lifeways, sacred lands, and personal and community property. Herrmann urges academics and researchers to educate themselves on these issues and investigate and comply with research and engagement protocols from Tribal entities.

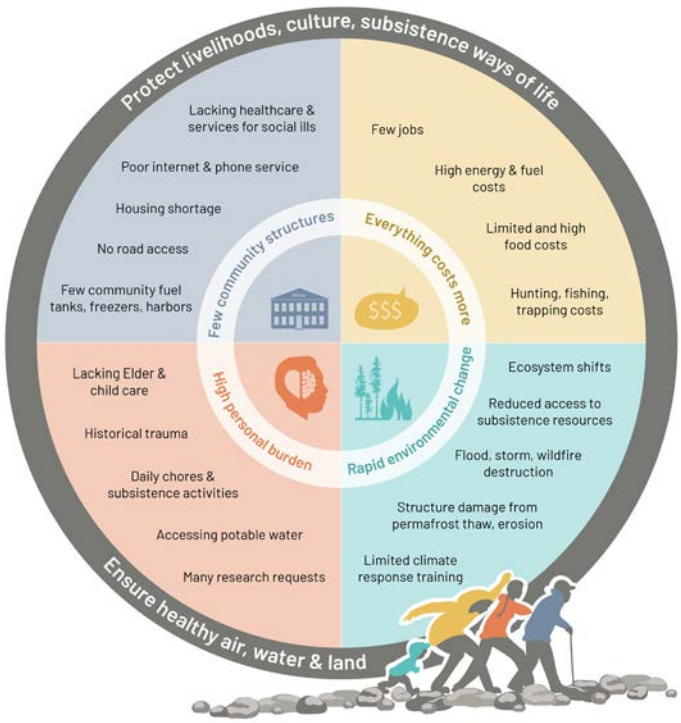
"I believe Dr. Herrmann's work will accurately summarize and portray in a snapshot the complex layers of Alaska Native governance and what individual Alaska Native professionals living in rural Alaska experience on a daily basis," Olin said.

This work ties into another project led by Herrmann, funded by the NOAA CSI Adaptation Sciences program. Fiscal Pathways assesses the effectiveness of federal Tribal climate funding, and offers suggestions for removing obstacles in communities being able to access and utilize funding opportunities surrounding federal Tribal climate funding. Herrmann is a leader at ACCAP in our work building capacity in rural communities to respond and adapt to climate change.

Herrmann, A. (2024). Landscape of Tribal communities: Context for working in rural Alaska. Alaska Center for Climate Assessment and Policy, UAF International Arctic Research Center

Funding: ACCAP core grant; USDA NIFA Hatch (project 1018914)

Internal stressors Tribal members face



Authoring climate reports to make climate science more useful

ACCAP leads: Rick Thoman, Adelheid Herrmann, Danielle Meeker, Sarah Trainor, Nathan Kettle, John Walsh

Partners: U.S. Global Change Research Program; NOAA's Arctic Research Program; Arctic Council

ACCAP is widely recognized as a trusted source of climate change information in Alaska. To support trustworthy and useful Arctic climate science, five team members synthesized the state of our knowledge in national and international climate reports during 2022/23. Their efforts raise awareness about community impacts and hasten action by attracting greater attention and responsibility from governments, funders and other leaders.

Rick Thoman was the lead editor of the 2023 Arctic Report Card, a role he rotates into every three years. Under his leadership, the report prominently featured local Indigenous observers and salmon extremes. John Walsh also co-authored chapters of the report on air temperature and precipitation. This marked Walsh's 18th year contributing to the report card.

As is customary, content from the report will be used in the Arctic chapter of the 2023 State of the Climate report from the Bulletin of the American Meteorological Society.

Adelheid Herrmann, Danielle Meeker, Sarah Trainor and Rick Thoman were among the authors and contributors of the Alaska chapter of fifth National Climate Assessment. They emphasized that adaptation in Alaska will be costly, and require increased capacity and strong collaboration across agencies and Tribes. The report shared how climate change exacerbates disparities in access to healthcare, especially among Alaska Native and rural residents.

Nathan Kettle is serving as a coordinating lead author of the societal impacts and implications chapter of the upcoming Arctic Monitoring and Assessment Programme report. Walsh led the AMAP Climate Expert Group, before retiring.

Funding: ACCAP sustained assessment; NOAA Arctic Research Program


USFWS photo by Kentaro Yasui

Climate Partnership model expands with Hoonah Indian Association

ACCAP leads: Sarah Trainor, Elizabeth Figus

Partner: Hoonah Indian Association

The climate adaptation co-production model developed with the Kake Climate Partnership in 2020 is now being applied with the Federally-recognized Tribe in Hoonah, Hoonah Indian Association (HIA). Hoonah is a Tlingit Indigenous village of about 1,000 residents located in southeast Alaska on Chichagof Island, which is about 45 miles from Juneau and 95 miles from Kake. Traditional hunting and fishing are very important to the local community and they have historic and contemporary ties to commercial and charter fishing. The region also supports sport hunting and has seen explosive growth in tourism since a large cruise ship facility was built in 2001. HIA's strong environmental department has led cutting edge climate research and adaptation projects for decades.

Elizabeth Figus, who helped develop the Kake Climate Partnership as an ACCAP postdoctoral fellow, is working with HIA and the Hoonah Stewardship Council (HSC) to outline projects that she, ACCAP and our new funding partner — the U.S. Geological Survey — can support. According to a survey by HIA of local residents, the top project priorities are landslide monitoring, wild berry support/cultivation and a city water assessment. The HSC will narrow down these results to one or two projects for the partnership to focus on in the summer 2024. Figus and Sarah Trainor will also work with HIA and the Kake Climate Partnership to create a practical framework for implementing co-production research, regional networking and capacity building in other Indigenous communities. Efforts are being made to partner with Indigenous evaluators to develop robust metrics and processes for evaluating climate co-produced research with Indigenous communities.

Funding: ACCAP core grant; USDA NIFA Hatch (project 1018914); USGS National Climate Adaptation Science Center (G22AC00604); USGS

Equity in Alaska weather and climate data

ACCAP leads: Rick Thoman, Zav Grabinski, Nathan Kettle

ACCAP initiated a new project to assess the extent that weather and climate station data from the Federal Aviation Administration and National Weather Service are accessible to Alaskan communities. The project aims to foster greater equity in Alaska weather and climate data.

From 1990 to 2015, Alaska saw a dramatic increase in automated weather stations at community airports. The state now boasts about 150 airport stations, nearly all supposedly(nominally) collecting observations 24 hours a day. Despite the abundance of data, two issues prevent the public from easily accessing and using weather and climate information, especially in rural Alaska.

Though weather station observations are publicly available online, the data are retrieved through specialized networks that most Alaskans don't know how to navigate. The public typically views weather information on smartphone weather apps or National Weather Service webpages. Automated airport weather stations typically supply the data for these platforms. In rural Alaska, telecommunication issues have made these reports increasingly unreliable over the past five years.

The automation of airport weather stations created a new problem. FAA and NWS staff are no longer tasked with collecting daily precipitation and snowfall observations. Since most of Alaska's long term climate sites were maintained at airports, this resulted in a near total loss of climatologically reliable snowfall information in rural mainland Alaska, and a significant increase in missing and unreliable observations.

ACCAP's analysis explores how the availability of weather and climate station data has changed over time, whether some regions of Alaska are underserved relative to others (particularly rural versus urban communities), and if data availability differs between FAA and NWS weather stations.

Funding: ACCAP core grant

Wolverine weather station. USFWS photo by Kentaro Yasui

Caroline Erickson and Rick Thoman visit a historic roadhouse near Nome, while conducting outreach including a presentation by Erickson about the extreme events project.

Alaska Fellow chronicles past impactful extreme events

ACCAP leads: Rick Thoman, Alison Hayden, Caroline Erickson

Partners: Alaska Fellows Program

The frequency and intensity of wildfires, coastal storms, flooding, landslides, avalanches and other extreme events are increasing in Alaska. An understanding of past events helps people plan for the future, but historical records of extreme events are often incomplete and very difficult to locate. Partnering with the Alaska Fellows, ACCAP worked with recent graduate Caroline Erickson to compile a library of historical weather and climate events that significantly impacted Alaskans.

Erickson combed newspapers, disaster declarations, agency briefings and other sources to create a suite of over a dozen outreach products. Each visually appealing handout clearly communicates the timeline and physical details of the event and its associated impacts. Erickson spent the most time on pre-internet era extreme events — though she still created a two-pager for the high-profile 2022 typhoon Merbok. For example, Rick Thoman, who championed the project, explained that even though an entire community was relocated, people are less likely to remember and find information about the 1994 Allakaket flood than an incident today.

Thoman and Erickson hope that communities, policymakers, researchers and others will find the resources helpful when making decisions about the future. The team hosted a well received webinar about the resource on June 11, 2024. Of the 88 attendees, over 20 were from rural communities or Alaska Native serving organizations. Kendra Zamzow from Chickaloon Native Village attended and said that she had recently undergone the process of pulling information about past extreme events while writing a Hazard Mitigation Plan for the Sutton to Chickaloon area. She commented on the federal databases noted by ACCAP, pointing out which resources were helpful and those that covered too large of regions for local planning, ending with, "I'm glad you are doing this work!"

Erickson participated as an Alaska Fellow, a fall-to-spring postgraduate fellowship program that pairs talented young people with strong communities and professional mentors. Hosting a fellow brought fresh ideas and enthusiasm to the ACCAP team. The fellowship gave Erickson a unique opportunity to learn from ACCAP's seasoned climate scientists while conducting research and outreach that makes a difference for people impacted by climate change.

Funding: ACCAP core grant

USFWS photo by Joel Garlich-Miller

Evaluation services for the Sea Ice for Walrus Outlook

ACCAP leads: Nathan Kettle, Amy Hendricks

Partners: Alaska Sea Grant; Arctic Research Consortium of the U.S.; Eskimo Walrus Commission

Program evaluation is a service that ACCAP often provides to other climate and adaptation focused groups in Alaska. Kettle and Hendricks recently published a paper in Polar Geography about an evaluation of the Sea Ice for Walrus Outlook (SIWO). The work contributes to a broader understanding of processes that make information sharing more usable among Indigenous Knowledge holders in rural communities, scientists and climate communicators in the context of a rapidly changing environment. SIWO was designed in 2010 as a web-based resource for Alaska Native coastal communities interested in receiving regular reports on sea ice, weather and marine mammal distribution. The outlooks pull information from local community observations, National Weather Service forecasts and other sources.

To evaluate SIWO, the team used 22 indicators to assess a dataset of 13 semi-structured interviews and 35 online questionnaires. The outcomes suggest that SIWO supports several community needs, including providing information that supports travel, documents historical impacts for disaster relief and shares Indigenous Knowledge among villages. The evaluation revealed that rural and Indigenous communities value local observations from within and nearby villages.

In their paper, Kettle and Hendricks recommended that other organizations providing climate services in rural communities consider: budgeting to support equitable engagement and compensation; including both local and scientific observations; using multiple channels to disseminate information; and designing evaluations to align with funding cycles.

Kettle, N.P., A. Hendricks, L. Sheffield Guy, O. Lee, V. Metcalf, D. Holen (2023) Climate services in a rapidly changing environment: an evaluation of the Sea Ice for Walrus Outlook (SIWO). Polar Geography, Vol 46, Issue 1. https://doi.org/10.1080/1088937X.2023.2286383

Funding: Alaska Sea Grant (NA18OAR4170078); ACCAP core grant; USDA NIFA Hatch (project 1018914); NSF (PLR-1928794); State of Alaska

Rick Thoman, Alaska's trusted source for climate information

Partners: KUAC radio; KNOM radio; KYUK radio; KDLG radio; Nome Nugget

Each year ACCAP's climate specialist Rick Thoman appears in hundreds of news stories as a trusted source of climate change information in Alaska. Reporters across the state, nation and world recognize him as an excellent science communicator and expert in Alaska climate and weather. "Rick Thoman" has become a household name in many Alaska communities where the frequency of extreme events is increasing. Alaskans value his ability to shed light on locally-relevant climate and weather events that impact their lives and livelihoods.

Since June 1, 2023, Thoman has been mentioned in 279 Alaska news stories from 20 communities across the state; 984 stories from all U.S. states; and 365 stories from 42 countries around the world. The words Arctic, Alaska, weather and climate appeared most often in the headlines. Thoman also hosts weekly and seasonal radio spots for Alaska communities and writes columns for several newspapers.

- Beyond the Weather (KUAC Fairbanks and Interior Alaska) - Weekly, 90 seconds: historical events, climate drivers & models, Interior Alaska
- Climate Highlights (KNOM Nome; KYUK Bethel, KDLG Dillingham) - Weekly, 90 seconds: sea ice, ocean temperatures, west and southwest Alaska
- Iditarod Radio Weather (KNOM Nome) - Weather and historical content for Alaska's Iditarod sled dog race to augment Iditarod race coverage
- Fish Reports (KDLG Dillingham) - Weekly in June-July during commercial salmon fishing season in Bristol Bay
- Nome Nugget - Weekly column: weather and climate concerns in Seward Peninsula and Bering Strait, sea ice conditions and outlooks

Thoman's outreach efforts extend well beyond media mentions and radio spots. In Nome, his presentation at a high school spurred student-written articles to the school newspaper about climate change and local impacts. He also shared temperature and precipitation data that the students used for a final assignment graphing Nome climate trends. "Thank you so much Rick!" said biology teacher Sarah Liben. "You have been very helpful and I appreciate all that you do for my students."

Rick Thoman's media mentions

BLM photo by Craig McCaa

Thoman also shares information to help communities prepare for and respond to climate change through three social media accounts: a blog on Substack called the Alaska and Arctic Climate Newsletter (600 subscribers); as it's happening Alaska climate, environment and Indigenous cultures posts on Mastodon (2,500 followers); and a Facebook group with tailored weather and climate information for the Seward Peninsula and Bering Strait (1,700 members).

Following a keynote presentation at the Kodiak Area Marine Science Symposium, Julie Matweyou, chair of the conference steering committee and Kodiak's Alaska Sea Grant Marine Advisory Agent said, "Thank you so much for coming to Kodiak… I heard a lot of great feedback on your presentation. Everyone I spoke to was very pleased with KAMSS. Thank you for all your hard work for the Kodiak community." Thoman's unique expertise as a communicator and climate specialist was also recognized through keynotes at the Western Alaska Interdisciplinary Science Conference, Alaska Forum on the Environment, and 20 plus other presentations at conferences and public events. These presentations are in addition to over two dozen webinars annually for ACCAP.

Funding: ACCAP core grant

ACCAP webinars reach thousands

ACCAP leads: Alison Hayden

Partners: National Weather Service; Geographic Information Network of Alaska

ACCAP hosts three webinar series each month to help communicate current research, useful tools and products and community activities related to climate change and adaptation. The series include:

- ACCAP Topical Webinars. This series covers a wide range of Alaska climate-related topics that are directed at a broad audience, including Alaska community members, Tribal organizations, academics, and state and federal agencies. These webinars have been held monthly since 2007 and include annual favorites such as the Alaska River Breakup and the Boreal Forest Green-up webinars. There were a total of 12 webinars and 1008 participants this reporting period.
- National Weather Service Alaska Climate Outlook Briefing. Rick Thoman reviews recent climate conditions around the state, highlights interesting climate topics or anomalies and shares the NOAA Climate Prediction Center's forecast for the upcoming months. These webinars are held monthly since 2014. There were 12 webinars and 510 participants in this reporting period.
- Virtual Alaska Weather Symposium. This series brings cutting edge satellite-based information to a statewide audience. It has been held monthly since 2017 and is a collaboration with the Geographic Information Network of Alaska and the NOAA National Weather Service. There were a total of nine webinars and 536 participants in this reporting period.

Left: Herrmann and Thoman at a gathering with NOAA and the Alaska Native Tribal Health Consortium.

Aleknagik in Bristol Bay. USGS photo

The value of networking in supporting Tribal resilience

ACCAP lead: Adelheid Herrmann

During this performance period, ACCAP's Adelheid Herrmann became co-investigator of ACCAP. In addition to her previous work on climate adaptation and workforce development, she now supports Tribal resilience by working with Tribes, Tribal regional non-profits and Indigenous communities to build capacity for climate adaptation. This includes investigating boundary spanning and knowledge co-production as well as workforce and economic development and adaptation planning.

Effective Tribal resilience work requires showing up in the spaces where Tribal groups gather and where emerging opportunities and resources are shared. Hence, Herrmann attends many meetings, conferences and workshops in Alaska, the rest of the United States, and Internationally. These meetings allow Herrmann to listen, network, share her knowledge of ACCAP along with her professional and lived experience and facilitate groups working more closely together.

There are often large communication gaps among the many different organizations, entities, government agencies and academic institutions working in the climate adaptation spacer. By bridging these gaps, Herrmann better understands the landscape of work that is happening and can foster deeper collaborations and more effective outcomes for ACCAP and Tribal communities. For example, conversations Herrmann participated in at the Alaska Federation of Natives, and subsequent meetings, led to a successful proposal to the Denali Commission by the Alaska Venture Fund collaborating with local community members to support wildland fire fighting training in Dillingham. Herrmann also helped the Bristol Bay region, where she is from, apply for two NOAA grants: the Climate Resilience Regional Challenge grant and the Climate Ready Workforce grant.

Below is a subset of events Herrmann attended this reporting period and their link to Tribal groups:

- Alaska Forum on the Environment (Anchorage). Attended by Tribes, local, regional, statewide and national audience. Recently AFE began bringing Indigenous Peoples to the main stage to present, this is mainly due to efforts by Patricia Cochran (an Indigenous Elder) who has been involved since AFE began.
- BIA Providers Conference (Anchorage). Hosted by Bureau of Indian Affairs, featuring workshops and one-on-one sessions for Tribal members to work on issues related to land, trusts, workforce development, 638 compacting, etc.
- Alaska Conference on Tribal Environmental Management (Anchorage). Organized by the Alaska Native Tribal Health Consortium and from an Alaska Native perspective. Gathers Tribal members to address health, climate, energy and other issues facing rural Alaska.
- Alaska Tribal Administrator's Association. Provides resources, including fiscal and administrative training, for Tribal administrators and Tribal council members. Tribes' need for grant writing/grant management, and other fiscal duties is an ongoing theme.
- Arctic Encounter Symposium (Anchorage). Expanding conference addressing issues about the Arctic in Alaska. In 2024, Alaska Native Peoples appeared on main stage discussions.
- Southwest Alaska Municipal Conference (Bristol Bay Region). The Alaska Regional Development Organization for Southwest Alaska. Regional ARDORs work on Comprehensive Economic Development Strategies for their regions. Local CEDS plans reflect community priorities.
- Bristol Bay Native Corporation's Leadership Summit (Bristol Bay Region). Addresses issues important to shareholders including Alaska Native languages, education, workforce development and lands.
- Tribal Climate Initiatives Gathering. Tribal led convening of Tribes and Tribal Organizations, as well as federal and state agencies. Discussions on the Unmet Needs of Environmentally Threatened Alaska Native Villages: Assessment and Recommendations report by Alaska Native Tribal Health Consortium. This meeting is part of a larger relationship building effort between ANTHC, NOAA, and ACCAP.
- Herrmann also networks through her role as a member of the Polar Research Board and the Alaska Pacific University's Elder's Council. APU is transitioning to a Tribal College University.

Coordinated response to extreme weather in Southeast

ACCAP leads: Rick Thoman, Zav Grabinski, Rick Lader, Danielle Meeker

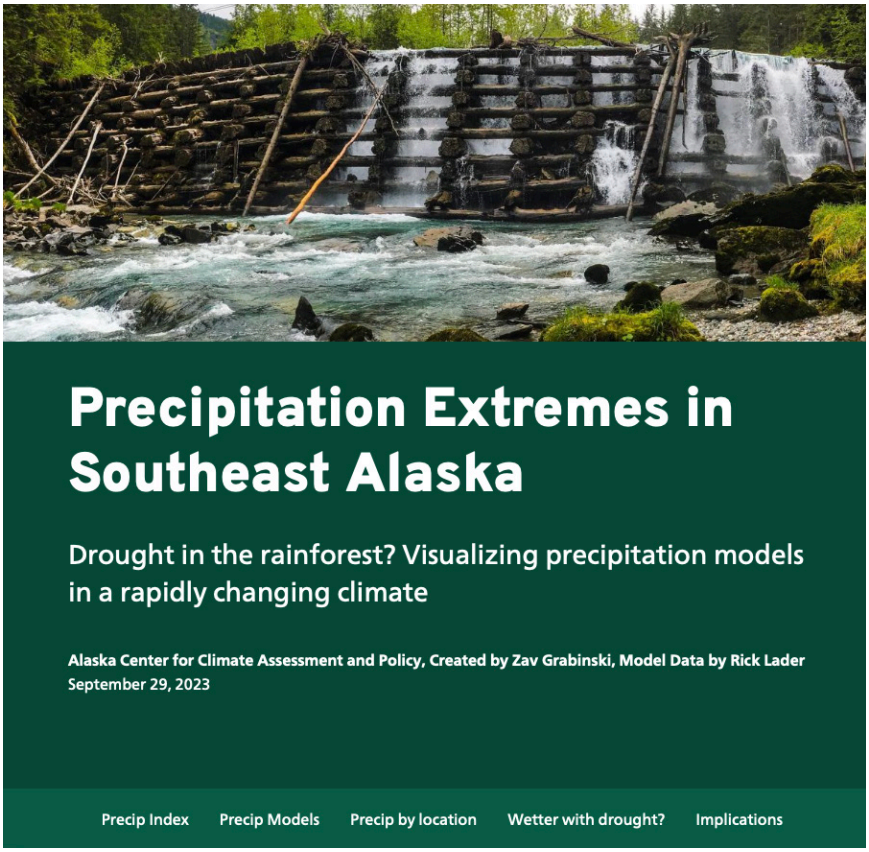
Partners: USDA Natural Resources Conservation Service; Alaska Sea Grant; International Arctic Research Center

The southeast Alaska temperate rainforest experienced a prolonged severe drought from 2016 to 2019. Communities saw water shortages, hydropower cut-offs and other impacts. Following this historic drought, record-setting rainfall triggered landslides and flooding across the region. ACCAP responded in a coordinated effort to document the extreme events and impacts, understand the future threat, and communicate information through a variety of methods.

With leveraged funding from the USDA Natural Resources Conservation Service and in close collaboration with Davin Holen of Alaska Sea Grant, ACCAP held a workshop in March 2022 in Juneau to build collaboration around drought and extreme weather events. The workshop provided an opportunity to share the latest research, decision support tools and local monitoring efforts. Among other resources, ACCAP shared a series of handouts that documented the drought history, causes, impacts and future likelihood.

On-going USDA NRCS funding supported analysis of a precipitation dataset specific to southeast Alaska during this reporting period. An accompanying StoryMap and webinar showcased the dataset in an easy to understand format. The products derived from the modeled data highlight how extreme weather events may change in the future, shedding light on how often we may see droughts at the 2016-19 scale. One finding spotlighted by the StoryMap is an increase in the frequency of extreme weather. The modeled dataset predicts more frequent severe drought, particularly during the summer warm season, and severe precipitation events across most regions within southeast Alaska. These changes have profound implications on water availability, ecosystem health, hydroelectric power and industries dependent on natural resources.

StoryMap about drought in Southeast Alaska



Funding: USDA Natural Resources Conservation Service (NR203A750025C004); ACCAP core grant

USFWS photo by Lisa Hupp

Nome following Merbok, USGS photo

Declining sea ice shifts the timing of storm impacts in Nome

ACCAP leads: Nathan Kettle, Rick Thoman, John Walsh, Zav Grabinski, Ryan Owens

Partners: UAF Climate Scholars Program

People in the Arctic depend on sea ice for travel, subsistence and to protect communities from coastal storms. ACCAP research assessed the relationship between sea ice concentrations and extreme weather event impacts in Nome, Alaska. The team combed through three decades of news articles in the Nome Nugget looking for storms that caused flooding, erosion and other local impacts. For the purpose of the research, the impacts had to be somehow related to sea ice. During the same timeframe, they also assessed trends in sea ice near Nome using satellite-derived ice concentrations.

The study documented that sea ice now forms about two weeks later compared to 1980. Impacts are shifting too. In the 1990s and early 2000s, Nome experienced the most storm-related impacts in October, but now impacts are popping up in November. These impacts are related to open water and don't occur when sea ice buffers shorelines from waves and weather. The probability of open water in November and even December in front of Nome is increasing. This could mean more storm impacts, later in the season, for Nome in the future. A publication about this work is currently being reviewed and should come out in the next year.

Funding: ACCAP core grant

ACCAP advisory board restructure

ACCAP leads: Sarah Trainor, Nathan Kettle, Adelheid Herrmann, Rick Thoman, Alison Hayden, Heather McFarland, Zav Grabinski

Partners: CNC North Consulting LCC; Susanne Moser Research and Consulting

ACCAP's advisory board — originally structured to help us connect with key partners — has been dormant for several years as we worked to clarify its role and composition in order to fulfill the justice, equity, diversity and inclusion focus of the current CAP program and contribute more to ACCAP's focus areas. During our annual team strategic planning workshop in January, we began revisioning the role of ACCAP's advisory board. ACCAP's evaluator Susi Moser and consultant Nikoosh Carlo and select advisory board members provided guidance.

Our team recognizes the value of a board for networking, feedback and exploring different perspectives and after reviewing different options, we decided on a structure that gathers thought partners around ACCAP's key veins of work. We are in the process of creating three smaller advisory groups that align with ACCAP's focal areas of climate science, building capacity for Tribal resilience, and outreach and science communication. The smaller veins — comprised of 3-5 people — will include subject matter experts who can contribute to lively discussions and thoughtful feedback related to ACCAP initiatives and emerging ideas within each vein.

This restructuring is still in progress. Small teams within ACCAP are developing goals and identifying potential members for each vein. We are revising the advisory board structure and governance documentation and redefining terms and responsibilities for the board members. Within the coming months, we expect to invite potential members to be part of the three veins and create a schedule to meet regularly. We are also exploring the possibility of an additional board to provide guidance to ACCAP leadership.

Setting the stage for a future avalanche warning system

ACCAP leads: Nathan Kettle, Rick Thoman

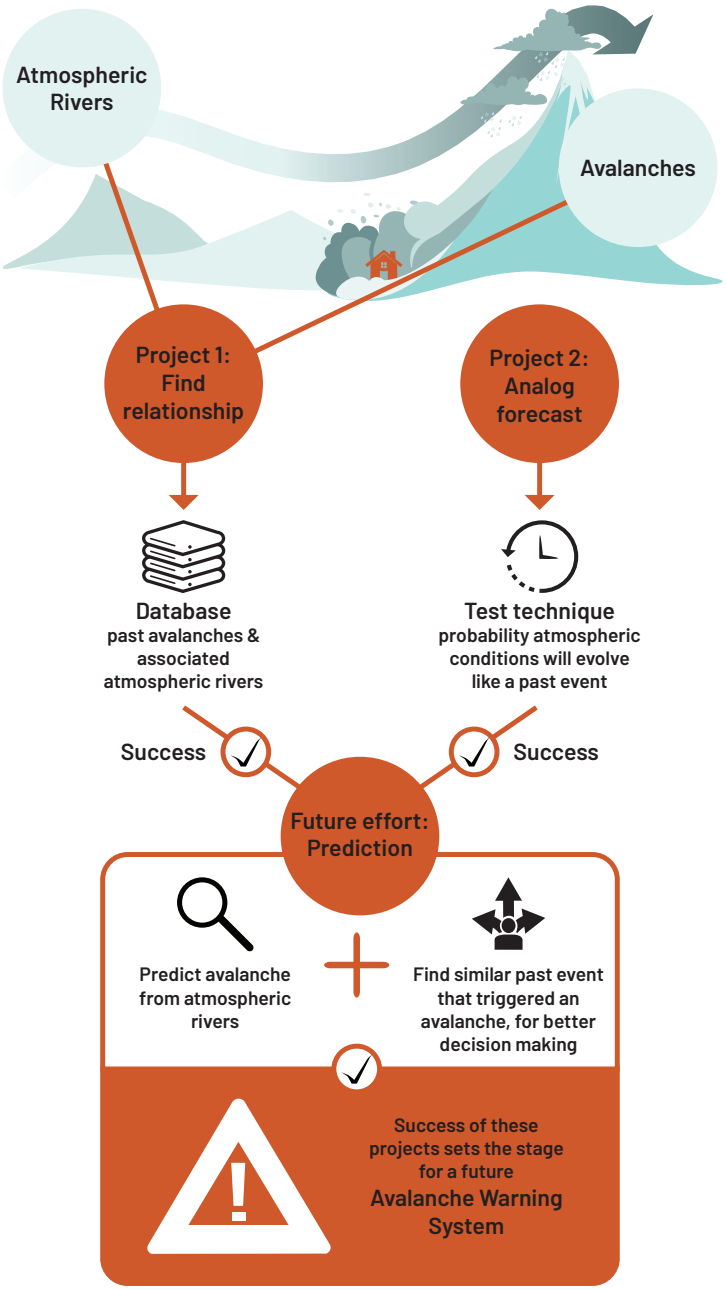
Partners: Alaska Department of Natural Resources Geological and Geophysical Surveys; Scenarios Network for Alaska + Arctic Planning; International Arctic Research Center; Experimental Arctic Prediction Initiative

Avalanches are Alaska's deadliest natural hazard. They affect about 30 percent of the state and regularly damage or destroy infrastructure and block transportation corridors. Despite the danger, Alaska lacks an avalanche warning system. ACCAP Deputy Director Nathan Kettle is coordinating two projects that lay the groundwork for a future warning program. The efforts are in partnership with the Alaska Department of Natural Resources Geological and Geophysical Surveys (DGGS).

IARC's Tom Ballinger is leading the first project and looking for a relationship between atmospheric rivers and avalanches. He's exploring the connection by using a compiled set of atmospheric river events and a database Kettle built of historic avalanches in Alaska. This work sets the stage for predicting avalanches from atmospheric rivers.

A second project with IARC's Rick Lader is testing a method called climate analogs to determine its usefulness forecasting on the two-week timescale. The approach was developed by ACCAP alumni Brian Brettschneider to forecast seasonal sea ice. It leans on knowledge of past atmospheric events to create a probability that current conditions will evolve in a similar manner. If we suspect that atmospheric conditions are ripe to trigger an avalanche, the analog forecasting tool can produce a list of past avalanches with similar conditions. This knowledge can improve on-the-ground decision making.

Once these projects are complete, ACCAP will work with the DGGS' Climate and Cryosphere Hazards Program to assess whether the predictions are usable to transportation planners and avalanche forecast centers. "I am excited about advancing avalanche prediction through [this] work," said Gabriel Wolken, CCHP manager, in a letter of support for the project. "Their combined use of analog forecast techniques and state-of- the-art weather and climate prediction models should enable us to optimize the use of present atmospheric science capabilities in applications to avalanche and landslide prediction."



Funding: ACCAP core grant; Experimental Arctic Prediction Initiative

Valdez avalanche, Alaska DOT&PF photo

USFWS photo by Lisa Hupp

Sustained assessment

During this reporting period Sustained Assessment Specialist Danielle Meeker coordinated and contributed to several statewide engagement activities. As the communications lead for the Alaska chapter of the Fifth National Climate Assessment, Meeker contributed as co-author of the Alaska Chapter, helped to create author presentations, and directed media requests to subject matter experts. She is also a co-author on a peer-reviewed article on the role of engagement in assessment processes that has been submitted for a special issue of the journal Climatic Change (in review at the time of this report writing).

Meeker was lead coordinator of the Alaska Climate Adaptation Community of Practice (CoP), a group of practitioners working at the regional, state and federal levels (e.g., state and federal agency representatives, staff from environmental and Tribal nonprofits and researchers) to serve Alaskan communities engaged in climate adaptation efforts. The CoP grew out of an observed need for practitioners working with communities to have an informal space to share updates, learn from each other and avoid duplication of effort to reduce the burden of participation in Alaska communities. The group has met virtually, bimonthly since spring 2021, and held one in-person meeting in Anchorage in Fall 2022. This work helps maintain and improve state-wide communication and coordination in the sphere of climate adaptation in Alaska.

In addition, Meeker participated in the Alaska Municipal Climate Network (AMCN), a group of municipal government representatives and community group members interested in local climate adaptation solutions. In monthly virtual meetings, members shared success stories, lessons learned, challenges and opportunities for coordination. Through her participation in the AMCN, Meeker helped raise awareness of ACCAP's expertise, resources and capacity to assist in addressing local climate adaptation needs.

Meeker also participated in the NOAA CAP Sustained Assessment Specialists network which, following the CAP Network Meeting in late 2023, grew to include CAP team members who are not funded as sustained assessment specialists. In monthly virtual meetings coordinated by the Pacific RISA Sustained Assessment Specialist, network members shared updates and identified opportunities for coordination.

As part of her sustained assessment work, Meeker initiated an assessment of climate adaptation efforts underway around Alaska, focusing on the "who, where, what and how" of projects geared towards increasing community resilience in the context of climate change. The project, known as the "Landscape Assessment of Alaska Climate Adaptation", grew out of an observed need to better understand the key players, financial investments and geographic focal areas for climate adaptation around the state, with a goal of identifying opportunities for collaboration. With assistance from ACCAP consultant Nikoosh Carlo, Meeker developed a proposal to establish an advisory group and use qualitative research methods (e.g., surveys, interviews, focus groups) to engage climate adaptation practitioners in an assessment of adaptation projects and collaborations. As a first step in this project, Meeker surveyed ACCAP team members to inform the creation of social network maps.

Meeker moved on from ACCAP in March 2024 to begin a new position as climate adaptation specialist with the Alaska Municipal League. We are currently assessing the most strategic approach to continuing ACCAP's sustained assessment work.

Small grants

ACCAP leads: Adelheid Herrmann, Sarah Trainor, Delores Gregory, Alison Hayden, Rick Thoman

Partners: U.S. Arctic Research Commission; Alaska Sea Grant

In 2022, four Alaska Native organizations received small grants from ACCAP in collaboration with the U.S. Arctic Research Commission. Grant recipients include the Chugach Regional Resources Commission, Copper River Native Association, Kodiak Area Native Association and Yukon River Inter-Tribal Watershed Council. Alaska Native regional organizations like these were targeted for our small grants program because they work directly with Tribes and communities, have local and regional relevance throughout the state, and have the infrastructure and service capacity to meet the needs of Alaska Native Peoples and communities. These groups have also expressed a need and desire for improved co-production practices and increased collaboration with scientists studying environmental change in Alaska.

ACCAP team members, or "champs," partnered with the grant recipients to provide tailored information and resources. In this reporting period, we hosted a networking webinar for grant recipients to share information about useful tools and resources for climate adaptation planning and mitigation. Thoman and AKCASC science communicator Mike Delue showed examples of tools that provide information about past extreme events, seasonal weather predictions and the future effects of climate change at a community level. AKCASC Tribal climate resilience liaison Kaitlyn Demoski covered funding and training opportunities from the Tribal Liaison Program that is supported by the Alaska Tribal Resilience Learning Network and the Native American Fish and Wildlife Society.

In May 2024, Herrmann and the Yukon River Inter-Tribal Watershed Council co-presented at the National Adaptation Forum in Minneapolis, Minnesota with other small grant teams from the Climate Adaptation Partnerships. The session, "Innovations in Federal Climate Research Funding for Frontline Communities," shared insights about the small grant funding and partnership model. The session was discussion-based with thoughtful reflection on the experiences of the panelists and providing an opportunity for audience participation.

The small grant projects are now in the final phase. Recipients submitted two progress reports and a final report is due in September 2024. The table below provides examples of some of the deliverables they reported. Two of the organizations hired and trained climate coordinators to increase regional capacity for climate change planning. Colleen Merrick, the climate change coordinator hired by Copper River Native Association, stressed the value of the position to their region, saying, "We learned that having a single point person to facilitate networking, opportunities, and programming was very helpful." Other recipients used the small grant funding to hold training and networking workshops, increase proposal writing capacity and collect and analyze tissue samples to better understand changes to subsistence food resources.

Evaluation of the small grants project is in the initial stages and is being conducted by an Alaska-based consulting company. The evaluation reviews the overall program, identifies the local scale impacts, assesses the effectiveness of this mechanism for supporting community led climate adaptation, and recommends how the program could be improved if future funding were available for the project to continue. Our team plans to continue engaging, building relationships and networking with the recipient organizations and the communities they serve.

Funding: ACCAP core grant; U.S. Arctic Research Commission

Copper River Native Association

Hired a climate change coordinator

Supported six Ahtna villages to include climate adaptation, research and solutions in work and strategic development plans

Quarterly climate adaptation meetings brought communities together to discuss solutions

Wrote proposal to support food security/sovereignty goals

Made connections with local schools

Built research and agency networks to support further work

Kodiak Area Native Association

Collected and analyzed samples to assess risks from paralytic shellfish poisoning; data used in climate adaptation plans

Increased staff capacity to serve Kodiak Archipelago Tribes

Completed the first Kodiak Tribal Climate Adaptation Plan

Included part of climate adaptation planning in the Kodiak Rural Regional Comprehensive Economic Development Strategy

Chugach Regional Resources Commission

Hosted workshop to train staff on:

- *Conducting subsistence harvest surveys; sharing regional marine mammals research with the community; building internal capacity for traditional ecological knowledge research*
- *Helping Tribal members understand science concepts on climate-induced ecosystem response and marine mammals*

Initiated a bio-sampling project

Supported marine mammal sample collection by local hunters

Yukon River Inter-Tribal Watershed Council

Hired a Tribal climate resilience coordinator and supported their climate change and grant writing training

Networked to learn about resources and increase capacity

Built partnerships to address climate related water challenges

Wrote proposal for additional grants to support climate change adaptation goals

Challenges

ACCAP experienced several changes in our team composition this past year, causing project and publication delays and the need for significant restructuring. John Walsh, a founding member of our team, stepped down unexpectedly in September 2023. He was the ACCAP climate lead for over a decade, a leader in the field of climate research, and an exceptional team member. As such, the gap left by his departure has been difficult to fill. We are working with other climate scientists at the International Arctic Research Center, where ACCAP is housed, to complete John's projects and are in the process of recruiting a climate scientist to join our team.

Danielle Meeker, ACCAP's Sustained Assessment Specialist, also transitioned out of ACCAP to work on climate adaptation projects for the Alaska Municipal League. Over the summer 2024, we will continue work on several of Meeker's projects with the help of Caroline Erickson, who was ACCAP's 2023/24 Alaska Fellow.

Several funding opportunities for climate research and adaptation planning came up in Alaska this past year. Many of these opportunities aligned with ACCAP's research priorities and goals but our personnel limitations reduced our ability to take on new work. These capacity issues are also shared by many of ACCAP's Tribal partners. Though it may take time, ACCAP is hopeful that the current influx of funding toward climate adaptation work in Alaska will continue to attract additional people and support training and development processes that will eventually increase capacity.

ACCAP continues to face challenges due to frequent turnover and the limited capacity of the IARC business office and the UAF Office of Grants and Contracts. Fiscal functions and efficient processing previously performed by these offices have had to be absorbed by ACCAP team members, which diverts our capacity to focus on research and project activities. Problems with the implementation of the University of Washington's new financial system and NOAA's new eRA grant management system have delayed reimbursements related to the Arctic Report Card and the availability of leveraged funding associated with other projects. We hope these issues will be resolved within the next reporting period.

Evaluation

ACCAP engages in both program and project level evaluation that supports ongoing learning and reflection. We are working with Susi Moser for our program evaluation, which assesses the effectiveness of our work, reveals what motivates our team and helps us strategize how to improve our program. Moser was on leave for an extended period during this reporting period, and we have engaged with her upon her return. In both program and project evaluation, we set metrics and indicators of success so that our work advances effective strategies that support transformation via co-production. Both program and project level evaluations are in progress and we anticipate having results to report in next year's annual report.

The ACCAP team spent time reflecting on our program evaluation during our annual retreat in January, 2023. Moser helped us build on our theory of change and ACCAP consultant, Nikoosh Carlo, provided guidance on advancing community-based solutions to climate change in Alaska. We identified the individual networks of our team and discussed how to develop relationships that strengthen the partnerships we already have and expand our collective work across Alaska. These discussions revealed the diverse expertise and networks within ACCAP. We agreed that strengthening our internal communication will help us work more closely together and accomplish more of our goals. We also reviewed our advisory board structure and created a strategy to align our board with our current program goals. See more about the advisory board restructure in the "next steps" section of this report.

We take guidance from project partners to identify and engage project level evaluators who help us understand the impacts of our research and think critically about how Indigenous perspectives and methodologies can be better included and made central in our work. In this project period we have contracted with two different Alaska-based evaluation teams in our project evaluation of the small grants program and the Kake Climate Partnership. Evaluation is also an important component of the fiscal pathways project funded by the NOAA CSI Adaptation Sciences program. Through the work of Nathan Kettle, ACCAP's internal evaluation expertise has flourished, on the Sea Ice for Walrus Outlook and seasonal to subseasonal forecasting projects covered elsewhere in this report.

Societal impact

We have noted ACCAP's societal impacts throughout this report. Contributions to scientific knowledge have been listed as publications and impacts to individuals and communities are described in the stories where relevant.

Photo of Wolverine Glacier weather station by Louis Sass, III USGS Alaska Science Center. See page 8 to learn how ACCAP is working to improve access to weather and climate station data in rural Alaska.

NOAA Climate Adaptation Partnerships

ACCAP Alaska Center for Climate Assessment and Policy
A NOAA CAP team

International Arctic Research Center

UAF University of Alaska Fairbanks