

# Alaska (University of Alaska Fairbanks) Annual Report - FY2023

## Contributing Organizations

University of Alaska Fairbanks

## Directors

Jodie Anderson

Signed

## Executive Summary

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### Overview

Alaska is recognized for its immense size and sparse population and its cultural, geographic and environmental diversity. The state represents a major region of renewable and nonrenewable natural resources in the United States. Its 365 million acres include the nation's largest oil reserves, coal deposits and the two largest national forests. Alaskans harvest many non-timber forest resources including berries, mushrooms, saps, oils, chaga, roots, wildflowers and more. Alaska has a diverse geography that offers soils for production of food, fiber and biomass fuels as well as a multitude of recreational and tourism activities. The vast stretches of boreal forest offer insight into arctic ecology, tree growth trends and the effects of climate change.

Alaska's natural resources have historically been the foundation of the state's economy though resource industries have been mostly extractive in nature. The use and management of these resources continued to be a predominant force in the FY23 planning and delivery of teaching, research, Extension and engagement programs. The University of Alaska Fairbanks (UAF) in general and its Agricultural and Forestry Experiment Station (AFES) and Cooperative Extension Service (CES), in particular, meet the challenges of increasing demands for research, education, outreach and community engagement that are relevant to sustainable management of Alaska's resources and bring community ideas to the university for further development of the state's resources.

The Alaska Department of Labor and Workforce Development projects that Alaska's population will increase by almost 25,000 people by 2050. As the population grows, more locally and regionally produced food will be needed to provide greater food security. Many Alaskans live a subsistence lifestyle or supplement their diets with fish, game meat, berries, herbs and other local foods. Alaska also has a large military population, and most have not previously preserved game meat or fish. Alaska has one of the nation's highest rates of botulism, so it is imperative to provide much-needed information on safe preservation of dietary staples.

Alaska also has one of the fastest growing senior populations, which faces the challenge of remaining active and healthy in a demanding environment. Other concerns that defined health and nutrition programming in FY23 are continued high rates of child and adult obesity and diabetes. Due to high levels of fine particulate matter that occurs during Alaska's cold winters, and high levels of radon detected in some areas, indoor air quality remained a particular Alaska concern.

High energy costs remained a critical issue, particularly in rural Alaska, where fuel oil continued to run \$8 or \$9 a gallon. Research and outreach focused on new and alternative sources of energy, wood and biomass and energy conservation. AFES worked to provide information to manage renewable resources and to improve technology for enhancing the economic well-being and quality of life at high latitudes. When foresters, farmers and land managers use research results, all Alaskans benefit from the wise use of land resources. Research projects responded to requests from producers, industries, and state and federal agencies for information on plant, animal and soil sciences, forest sciences and resources management.

AFES priorities, like national priorities, are to enhance sustainability of food and agricultural systems; adapt to and mitigate the impacts of climate change; support energy security through the development of renewable natural resources; ensure a safe, secure and abundant food supply; improve human health, nutrition and wellness; support environmental stewardship through the development of sustainable management practices; and strengthen individual, family and community development and resilience. Experiment station researchers continued to publish research in scientific journals, conference proceedings, books, and in experiment station bulletins, circulars, newsletters, research progress reports and miscellaneous publications. Scientists disseminated their findings through conferences, public presentations, workshops, field days and mediated platforms like websites and blogs.

The mission of CES is to use research-based knowledge to educate, engage and support the people and communities of Alaska, connecting them with their university. In FY23, CES provided factual and practical information while bringing Alaskans' issues and challenges to the university. CES is committed to promoting the sustainability and economic security of individuals, families and communities by providing practical, informal

education, including conferences, workshops and cooperative work with community, regional and tribal partners. Outreach was provided through numbered publications, faculty consultations, newsletters, blogs and social media platforms including Instagram, Facebook pages, and YouTube videos.

CES priorities addressed national priorities by helping families, youth and individuals be physically, mentally and emotionally healthy; enhancing workforce preparation and life skills; strengthening food safety and security; and fostering greater energy independence. Programming respected cultural and ethnic diversity and was responsive to emerging stakeholder needs and interests. Programs resulted from client requests, various regional and subject matter advisory groups, surveys and needs assessments. Collaborations continued with other universities and with other units within UAF, the University of Alaska statewide system, federal and state agencies, nongovernmental organizations and private industry.

Stakeholders included K-12 students, higher education students, researchers, individuals, businesses, industry, government, nongovernmental organizations, and families and communities throughout Alaska, the circumpolar North and the nation. The combined efforts of AFES and CES bring the university to Alaskans while bringing community concerns and issues back to the university. State-defined critical issues linked specific public needs with our broad mission in order to allow the concentration of resources like funding and people that promoted high-quality work. Critical issues were used to provide guidance for faculty, staff and administrators to direct current and new programs and find or retain faculty expertise.

The next section of this summary explains the rationale driving a five-year focus on four critical issues: Agriculture & Food Security; Natural Resources, Ecosystems & Sustainable Energy; Healthy Individuals, Families & Communities; and 4-H & Youth Development. Climate change is not listed separately, as it is woven throughout our work on all four critical issues.

### **Critical Issue: 4-H & Youth Development**

Research shows that youth need sustained, healthy relationships with adults in order to thrive. CES continued to promote positive youth development through education with a focus on leadership skills, using the 4-H mission mandates of science, citizenship and healthy living. Organized 4-H clubs, school enrichment programs, after-school activities and summer camps helped educators and leaders achieve youth development goals.

The focus of Alaska's 4-H program has been supporting the healthy maturation of youth from childhood to adulthood, with engaging activities that reach across the geographic and cultural diversity of Alaskan communities. Training throughout the state, promoting life skills and using the 4-H Thriving Model of youth development was the foundation of FY23 youth development programming. 4-H continued to offer positive youth development opportunities as diverse as the communities it serves.

### **Critical Issue: Agriculture & Food Security**

Alaska imports over 90 percent of foods and other agricultural products consumed in the state. Growers' products are primarily for in-state consumption and use, including fresh market potatoes, forages, grains and other livestock feeds, greenhouse flowers and vegetables and a variety of specialty crops and products. Commercial horticulture includes cut flower and peony production, greenhouse operations, turf management, lawn maintenance and sod production. Proper knowledge and planning of soil-disturbing activities can prevent major impacts on other resources. Peonies are a high-value specialty crop, and both CES and AFES faculty and staff have worked over the years with Alaskan growers to develop best practices.

Extension continued to reach out to diverse audiences and agencies to provide community based support for food security. One pathway to local food security has been the identification and education of food leaders across Alaska through the Local Food Leader training program, developed at Iowa State University Extension. CES-led training equipped food leaders to work toward equitable, sustainable, and balanced local food structures. This has the potential for increased food security and healthier food systems. Partnerships continued with the Alaska Food Policy Council, the Alaska Farmers Market Association, and the State of Alaska Division of Public Health to deliver certification courses and outreach throughout Alaska.

Animal enterprises in Alaska include dairy, beef, swine, reindeer, poultry and nontraditional livestock such as muskox, yak and bison. Agriculture research will address areas of animal agriculture, home animal production, agronomic crops including oil seeds and cover crops, and home and commercial vegetable production. Agricultural soils, fertilizer and compost research and outreach are also part of this program area. We provide pesticide applicator certification courses and Master Gardener courses. Alaska Extension's statewide Integrated Pest Management (IPM) education program has operated since 1981 and continues to assist individuals to understand invasive pests and control options.

Agriculture outreach in FY23 included the primary areas of animal agriculture, animal health, horticulture, soil science and agroforestry. As Alaska expands its in-state consumption and export markets, producers will require increasing access to research-derived information specific to northern latitude environments and knowledge applied from research in other states.

## **Critical Issue: Healthy Individuals, Families & Communities**

Concerns for Alaskans in FY23 included high rates of obesity and recurring food safety issues such as botulism. Food safety programming in FY23 encompassed food preservation, safety, and preparation. Food safety education utilized various resources and strategies to ensure that all types of foods, including Indigenous foods, are properly stored, prepared and preserved so that food is safe for consumption.

CES offered programming both virtually and face-to-face across the state to meet stakeholders in their communities. IANRE offered Certified Food Protection Manager courses as well as workshops on preservation methods such as canning, pickling, drying, fermenting, and freezing. Rural locations were supported by the continued maritime Extension program that brought canner gauge testing and preservation education to remote communities by boat.

Nutrition outreach addressed childhood obesity with nutrition education in after-school programs and nutritional programs in community venues as well as cooking programs that emphasized preparing healthy foods. Extension's EFNEP and SNAP-Ed educators helped improve fruit and vegetable consumption and increase physical activity for Alaskan families. The CES SNAP-Ed program was awarded the sole implementing agency grant from the State of Alaska in FY23.

Extension's home and energy programming addressed indoor air quality, home maintenance and repair, energy use and conservation. Emergency preparedness impacted such areas as families and communities responding to natural and man-made disasters. The state records frequent earthquakes, flooding and other natural disasters, which underscores a need for emergency preparation as well as periodic radon testing related to ground shifts.

Training was conducted with youth, teachers, 4-H leaders, youth group organizers, parents and community partners to provide techniques for working directly with youth in the area of nutrition and physical activity. StrongPeople groups and diabetes education helped community members increase their physical activity and manage chronic illnesses.

## **Critical Issue: Natural Resources, Ecosystems & Sustainable Energy**

Communities increasingly depend on Alaska's natural resources for viable economic development. Policies to sustain this growth that mirror sociological and technological change will be critical. Major Alaska resource development activities have been centered in the oil and gas industries. Headquarters for these industries are located in the urban centers where there is access to transportation and advanced communication systems. However, urban communities still need to build infrastructure to fully engage in value-added activities that would enhance development of non petroleum industry. CES continued to educate the public on energy alternatives like biomass, primarily through Renewable Resources in Extension Act programming. Outreach addressed stakeholder needs for unbiased, science-based information about natural resource management issues in forestry, recreation and alternative, sustainable energy sources.

The economic potential of Alaska's forests is under-realized in timber and non timber products. The forest ecosystem and agricultural lands can play a role in diversifying the economy of Alaska. Concern for the health and survival of resource biodiversity continued to be a central issue in resources management in Alaska and elsewhere. As energy continues to become a growing concern throughout the world, the boreal forest has the potential to provide products necessary for fuel alternatives to petroleum and coal. Several Hatch projects in FY23 investigated how best to utilize Alaska's lands.

## **Merit and Scientific Peer Review Processes**

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### **Updates**

None.

## **Stakeholder Input**

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### **Actions to seek stakeholder input that encouraged their participation with a brief explanation**

None.

### **Methods to identify individuals and groups and brief explanation**

IANRE continued to host a variety of events to solicit stakeholder input, such as the Harvest Wrap-Up, as well as reaching out to community members. For example, a researcher connected with local producers to gather information on plant varieties for a research project.

IANRE has made improvements to making all reasonable efforts to raise awareness about its educational resources to a wide variety of Alaskans. IANRE continued its website redesign, resulting in improved digital accessibility of pages and documents for stakeholders utilizing assistive technology.

## Methods for collecting stakeholder input and brief explanation

In FY23, the IANRE director traveled across south central and southeast Alaska conducting five listening sessions. These physical community visits allowed for meetings with community stakeholders, agencies, tribal and industry partners to identify needs. The director interacted with 4-H clubs, Extension volunteers, producers, and folks using our products to understand how CES and AFES can help them meet their needs.

## A statement of how the input will be considered and brief explanation of what you learned from your stakeholders

Input was gathered at public events like fairs, where public feedback was recorded by booth sitters and routed to the appropriate employees for a response. Targeted events like the Delta Farm Forum and Soil Health Field Day reached audiences in need of faculty and staff expertise in particular program areas such as agriculture and horticulture.

IANRE continued to adapt to the post-pandemic environment and offered "Walkabout Wednesdays" where stakeholders could join conversations on agriculture virtually through the broadcast on Facebook Live. This format allowed for engagement with the public through in-person questions, social media comments, and post-broadcast views.

In FY23, stakeholder requests for specific speakers and topics at conferences continued to guide conference agendas. AFES and CES continued to serve the needs of the people of the state of Alaska. Unit plans reflected ideas and advice given by client user groups, students, expert advisors, state and national peers and collaborators, and UAF administration. The four critical issue areas identified reflected the concerns of major stakeholder groups, and continued to be the highest priorities in workload planning and resource allocation. Stakeholder needs continued to be a driving factor in determining AFES priorities for research and CES priorities for programming.

## Highlighted Results by Project or Program

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Critical Issue

### 4-H & Youth Development

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[Fostering positive youth development through mentoring and culturally relevant education in healthy living, STEM, civic engagement and leadership for Alaskan youth](#)

Project Director  
Alda Norris

Organization  
University of  
Alaska Fairbanks

Accession Number  
7000098

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### [Alaska 4-H Leverages Learning for All](#)

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Research confirms that the most important factor contributing to a student's success in school is the quality of teaching. Professional development ensures that educators continue to strengthen their practice throughout their careers. The most effective professional development engages teams of educators to focus on the needs of the youth they work with. When time set aside for professional development is used effectively, adults and youth show increases in skills gained from the experience.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Bethel, Alaska, is a city of about 6,000 people in Southwest Alaska. It is the commercial center and port for the Yukon-Kuskokwim Delta region, which has a population of mostly Indigenous Yup'ik and Cup'ik peoples. The only access is via air, and seasonally by boat. Bethel is 400 air miles from Anchorage. The Bethel 4-H program was faced with a shortage of staff during the summer of 2023. To meet the immediate needs of fulfilling a commitment to the community to offer summer camp to elementary-aged youth, 4-H Positive Youth Development staff from across the state of Alaska and Oregon traveled to Bethel to assist in running the summer 2023 programming. This quick resolution became the base

for a professional development opportunity the following summer that would not only expose the youth of Bethel to youth development professionals from across the United States, but also offer professional development to Alaska 4-H staff in Bethel, many of whom are recent graduates and new to the field of youth development.

Eleven leading Positive Youth Development professionals were selected from seven Land Grant Universities across the country. These individuals traveled to the remote village of Bethel with several learning objectives for the three Alaska staff and nearly 200 youth:

- Lead a weeklong day camp experience for youth ages kindergarten through sixth grade
- Provide professional development to Bethel Alaska 4-H Positive Youth & Development staff through the development and gifting of educational materials, explanation and demonstration of use of curriculum, role modeling of effective group management, and evaluation of the impact of their work
- Allow the youth development professionals an opportunity to gain understanding of other cultures and an appreciation of the challenges of remote education and outreach

**Briefly describe how your target audience benefited from your project's activities.**

Evaluation of the summer 2023 experience supports the national research. The program was evaluated with the Common Measures Tool 2.0, a national evaluation tool, which found that 100% of the youth reported that they feel safe at the 4-H Center. The majority indicated that their sense of belonging and leadership improved following their participation in the program. Examples of lesson-specific learning also show significant growth. Below are findings from a one-week camp that focused on art and nature.

- 91% of respondents understand how art and science work together to help us learn.
- 96% feel more confident in their ability to mix any color they imagine.
- 96% learned the skills of reading and creating maps.
- 92% have a better understanding of how drones can solve real-world problems.
- 90% have a better understanding of how scientific sketches help us identify species.
- 86% have more knowledge about the life of a tree based on what they observed.
- 90% are more aware of the soil (permafrost) where they live.
- 71% intend to spend more time being artistic.
- 85% intend to spend more time outdoors.

Evaluation of the adult participants, the national experts, and Alaska staff also showed positive outcomes. All Alaska staff involved reported that they had an opportunity for professional growth, learned how positive youth development principles could be applied to the youth they serve, and experienced appropriate methods of adapting curriculum for their particular cultural and geographic needs. Here is what the staff involved reported learning:

“How to assess the effectiveness of the Bethel 4-H Program through participant and volunteer feedback, program evaluations, and outcome measurements. We can use this feedback to identify areas for improvement and implement changes to enhance program quality and impact.”

“I learned that music has a unique way of fostering self-expression, boosting confidence, and developing important life skills such as teamwork, discipline, and perseverance.”

“The youth absolutely love the idea of exploring outside cultures (maybe culture isn't the correct word, but just the world outside of Bethel).”

The circle of learning continued with the visiting experts. The purposeful and engaged learning strategies allowed all parties involved to take something away from the experience. A visiting expert stated,

“I learned a tremendous amount about Alaska, and specifically about Native cultures in Alaska. I also learned that what we do in 4-H still works, is applicable, and is adaptable to a new audience. Adjusting to a tribal culture, as compared to more individualistic Western culture, was more challenging than I expected, caused me to really think about my approach and valuing the youth, their perspectives, and what they bring and making sure not to push my values.”

**Briefly describe how the broader public benefited from your project's activities.**

The ability of Alaska 4-H to convene caring adults and engage them in educating rural youth helps build statewide capacity for positive youth development. Collaboration with Extension professionals from peer states raises national awareness of Alaska’s cultural needs and assets, networking our state to additional national resources.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

Alaska 4-H provided opportunities for professional development and youth engagement in remote areas. Participating youth in Bethel reported high levels of STEM learning, recognizing the Bethel program as a safe place for the broader public to pursue leadership opportunities. A multi state team of instructors reported increased cultural knowledge and enhanced program evaluation skills, which will benefit future programs.



**[Alaska 4-H Links Livestock Projects to Life Skills](#)**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The 2019 Alaska Youth Risk Behavior Survey notes that less than half of the high schoolers that responded, or only 48.6 percent "felt comfortable seeking help from three or more adults besides their parents." The community connections offered by Alaska's 4-H programming can increase the chances that youth will form bonds with additional caring adults like leaders and mentors, helping mitigate feelings of sadness, hopelessness and isolation. Several U.S. studies between 1996 and 2007 have found that youth participants in 4-H and livestock projects learn responsibility, gain confidence and practice other important life skills.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Each year, Alaska 4-H youth care for and show livestock or horses as part of their 4-H learning projects. Youth participated in horse clubs and a statewide horse contest. Many youth showed livestock and horses at multiple local fairs statewide, demonstrating their changes in knowledge. Both small and large livestock from rabbits and chickens to beef cattle were sold at auctions held across the state.

Alaska youth were given a chance to learn about topics like animal husbandry, feed ratios, conformation and processing while practicing skills like time management, record-keeping, interpersonal communication and more. Youth engaged potential buyers and followed up post-sale. They also worked collaboratively with other youth in the barns, and learned from visiting experts like volunteer veterinarians.

**Briefly describe how your target audience benefited from your project's activities.**

Two youth in a Wasilla 4-H family raising hogs and chickens stated in a radio interview that 4-H has allowed them to raise their own meat for the past two years. They noted they had to learn a lot about the animals and check their weight along the way to reach their goals for auction. The parent stated, "There's a wealth of knowledge in the community that are willing to help kids and families with their projects," and through service opportunities "there's just a really good sense of being a part of the community with 4-H."

Overall, 4-H livestock auctions have brought more than 15,000 pounds of beef, pork, yak and lamb to local Alaska markets. Three Bears markets highlighted the meat they purchased to sell in their stores, bringing a sense of pride and accomplishment to youth in communities across the state.

**Briefly describe how the broader public benefited from your project's activities.**

In addition to the families that benefit directly from raising livestock, members of the broader public also benefit from educational displays and demonstrations at local fairs. Extension works to show Alaskans of all backgrounds some of the best practices for raising small and large livestock in northern climates.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

The public's opportunity to attend equestrian events, livestock-related demonstrations, showmanship competitions and auctions are broadly advertised through multiple methods including radio, newspaper and social media.

Critical Issue

## Agriculture & Food Security

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[Implementing and Correlating Soil Health Management and Assessment in Western States](#)

Project Director  
Caley Gasch

Organization  
University of  
Alaska Fairbanks

Accession Number  
7003946

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**[W1196: Implementing and Correlating Soil Health Management and Assessment in Western States](#)**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The objectives of the project address the need to combine and interpret soil health-related data across the western US to develop inference and recommendations across the region. The objectives are as follows: (1) Identify best soil health management practices for western US agroecosystems or knowledge gaps that prevent identification, and (2) Identify best soil health assessment approaches for western agroecosystems.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Prior to my involvement with the project, Alaska was not represented within the project. Since my involvement, the western region has expanded to include Alaska data and perspectives. In working with the co-lead on the project (Jim Ippolito), we have successfully organized the participants to inventory available soil health datasets that can help us address our objectives. According to the project proposal, we are on schedule toward our goals and objectives.

**Briefly describe how your target audience benefited from your project's activities.**

One target audience that benefited during the period of activity is Alaskan producers. My research team visited 93 individual farms, gardens, and community farm projects to sample soils and consult with the producers. We have provided extensive soil test results and interpretation to all individuals and have fielded follow-up questions. This work directly serves the citizens of the state of AK in the area of soil health.

**Briefly describe how the broader public benefited from your project's activities.**

Involvement in this project will help Alaska citizens better understand the status of soil health and management across diverse agricultural systems in the state, directly through our on-farm research and outreach efforts. Integration with the multistate project will allow us to learn how Alaskan agroecosystems and soils differ from those across the western US. By understanding the status of soil health in Alaska, we can refine our recommendations on how best to manage them, by leveraging our in-state knowledge with that across the western region.

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**Breeding small grain crop cultivars for Alaska**

Project Director

Organization

Accession Number

Muhammad

University of

7003500

Hasan

Alaska Fairbanks

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**Breeding Small Grain Crop Cultivars for Alaska**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

This project aims to establish a small grain breeding program at the University of Alaska Fairbanks and breed high-yielding spring barley, wheat, and oat cultivars for Alaska. Right now, Alaska produces a small amount of the food it needs, and imports most of it from other places. However, experts say that the climate in Alaska is changing and that it will become better for growing certain types of cereal crops. This research will develop new types of barley, wheat, and oat varieties that will grow well in Alaska. Improved varieties will also increase in-state food production and promote food security in the state.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

As part of the project, a comprehensive selection of barley, wheat, and oat accessions has been obtained from the USDA-ARS GRIN (USDA-ARS Germplasm Resources Information Network) and NordGen (The Nordic Genetic Resource Center) Genebank. The collection of barley comprises 680 accessions, including food, feed, and malt quality 2- and 6-row type commercial cultivars, advanced breeding lines, and landraces originating from 26 countries. The spring wheat accessions, totaling 491, consist mainly of hard-red and a few hard-white commercial cultivars, along with advanced breeding lines originating from 15 countries. Lastly, the spring oat accessions, totaling 317, primarily consist of food and forage-type commercial cultivars developed by publicly funded breeding programs originating from 10 countries, including the USA and Canada. This wide-ranging acquisition of accessions from different countries promises to be a valuable resource for the project.



Two nurseries were set up during the 2023 cropping season in Alaska to assess the germplasm. One was located at the Fairbanks Agriculture Forestry Experiment Station (AFES), located in the interior of Alaska, while the other was established at the Matanuska AFES, located in Southcentral Alaska. The accessions were planted carefully in single-row plots, each measuring 10 feet long, at both locations. Growth stage data were collected every two weeks from both nurseries with utmost care.

During the summer of 2023, there were noticeable differences in the weather between Fairbanks and Matanuska. Fairbanks experienced warmer temperatures, while Matanuska AFES received almost twice as much rainfall during the cropping season. Most of the rainfall in Matanuska occurred towards the end of the season, whereas in Fairbanks, rainfall was distributed almost evenly throughout the season. As a result, the cropping season in Matanuska lasted about 27 days longer than that of Fairbanks. However, almost 25% of barley, 15% of wheat, and 17% of oat accessions were identified for their agronomic phenology for adaptation to the interior Alaska climate and traits desired for breeding improved cultivars.

#### *Develop populations to conduct genetic analysis and breeding commercial cultivars*

A diverse set of 30 elite 6-row barley germplasm accessions from various geographic locations were cross-pollinated with the goal of developing a population for breeding food and feed-quality 6-row barley cultivars for the Alaskan farmers. This led to the creation of 80 F1 lines, out of which 45 exhibited heterosis and traits related to enhanced grain yield (as depicted in Figure 2). We are using a combination of speed-breeding techniques and pedigree breeding methods to generate over 2000 F4 generation breeding lines. These F4 lines will be evaluated for agronomic phenology in a single-row (1 × 10 ft<sup>2</sup>) field nursery during the summer of 2024 at the Fairbanks AFES. All of the research is taking place at the UAF Arctic Health Research Building (AHRB) Greenhouse.

#### **Briefly describe how your target audience benefited from your project's activities.**

Small grain crop producers/farmers in Alaska are the target audience. This project has just completed activities proposed for the first fiscal year and shared this information on the progress with Alaskan farmers through a presentation at the Delta Junction Harvest Wrap-up in late November 2023. Long-term economic impacts include the availability of spring barley, wheat, and oat varieties optimized for production in the sub-arctic interior Alaska climate. Barley, wheat, and oat varieties with improved yield and agronomic performance will increase farm productivity and profit.

#### **Briefly describe how the broader public benefited from your project's activities.**

Expected economic impacts include establishing a small grain breeding and research program and developing spring barley, wheat, and oat varieties optimized for production in the sub-arctic interior Alaska climate. Alaska currently uses only 6% of its croplands for food production while importing 95% of its food supply. Therefore, developing suitable varieties of small grain crops will improve in-state food production and promote food security in the state. Moreover, agro-climatology modeling predicts that climate change will make interior Alaska more suitable for small grain crop production, making this program even more beneficial in the long run.

#### **Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

**Problem encountered:** During the summer of 2023, an effort was made to produce F1 lines through cross-pollination of feed and malt quality 2-row barley accessions. Unfortunately, the attempt failed to achieve the desired results. A new effort is underway to produce approximately 200 new F1 lines for 2-row and 6-row barley.

**Result dissemination:** An announcement has been made to the plant breeding and research communities about the establishment of a small grain breeding program at the University of Alaska Fairbanks through an oral presentation at the ASA, CSSA, and SSSA International Annual Meetings held from October 29 to November 1, 2023, in St. Louis, Missouri, USA.

Thanks to the establishment of this program, we have developed collaboration with various institutions, including the USDA-ARS Edward T Schafer Agricultural Research Center in Fargo, ND, for research on perennial wheat and kerana. We have also partnered with the University of Minnesota for Winter Malting barley, Agriculture and Agri-Food Canada for spring barley, and the University of Alberta, Canada, for spring canola (*Brassica napus*) breeding and research. These collaborations are crucial steps toward a sustainable and self-sufficient future for Alaska.

**Proposing additional plan for the next reporting period:** The project activities will proceed as planned. Additionally, I plan to introduce an off-season nursery option in Winter 2024 in a southern hemisphere country, such as New Zealand. This will enable the rapid development of advanced breeding lines, which will be evaluated in Alaska during the 2025 cropping season.

[High-latitude agricultural production systems: producer needs assessment and agriculture trials to improve food system resilience and health outcomes for Alaskans](#)

Project Director  
Glenna Gannon

Organization  
University of  
Alaska Fairbanks

Accession Number  
7000575

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 [High-latitude agricultural production systems: producer needs assessment and agriculture trials to improve food system resilience and health outcomes for Alaskans](#)

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Currently, there are few, if any, publicly funded, scientifically rigorous vegetable variety trials happening in Alaska. This project also builds off of past research efforts to provide up-to-date information on which crops and cultivars are best suited to Alaska's changing growing conditions. This project also seeks to identify the needs of Alaskan producers with regard to research and technical assistance needs, which is critical to understand in order to best serve the growing Alaskan agricultural sector.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

In FY23 (year 2 of this project), the Variety Trials program **evaluated 17 crops and over 150 cultivars at the Fairbanks AFES farm**. Data was collected on both standard, "check" crops and varieties that have historically been grown in Alaska, as well as, crops considered marginal for Alaska's current growing conditions (i.e. hot peppers, artichokes and sweet corn). Local Growing Degree Days (GDD) were calculated for certain crops (e.g. Sweet Corn) in order to monitor how changes in growing season might create new opportunities in Alaskan agriculture. The Variety Trial program also experienced growth during this period through the addition of a high tunnel to the Fairbanks Farm in order to conduct experiments under high tunnel conditions. The project also made efforts to hire staff for and re-establish trials at the Palmer Matanuska Experiment Farm and Extension Center (MEFEC). Additionally, the project succeeded in the establishment of a perennial fruit and berry trial with project partner, Gardens in the Arctic located in Anaktuvuk Pass, which is located approximately two degrees latitude above the Arctic circle. Notably, this means that this project supports the farthest North (known) fruit and berry trials research in the world. Another area of growth that is relevant to this project's original goals and capacity building at the Fairbanks AFES was the continued and expanded partnership with the Georgeson Botanical Garden (GBG) to start efforts toward a composting system for the farm, which will ideally support student research projects in the future.

The AFES Variety Trials also strengthened its outreach and education impact and strengthened the local food system by formalizing its partnerships with several community outreach, education and conservation organizations. These efforts include: The Ester Seed Library "Growing Biodiversity" program which the AFES VTs is supporting by conducting garlic trials, growing and saving locally-adapted seed, and through public education events like the annual spring "Seedy

Saturday” event where the Variety Trials had a table with Extension publications on growing garlic and provided research-based information to attendees who were interested in growing garlic. Another partnership included the Alaska Harvest Collaborative (formerly the Harvest Project Collaborative) which experienced continued support from the Variety Trials program by providing opportunities for UAF students to gain experiential learning opportunities pertaining to agricultural production at Variety Trial site, and provided produce donations for the student-run Food Pantry and weekly Produce Stand. Finally, this project continued to support the Fairbanks Soil and Water Conservation District’s, Alternative Fairbanks Farm Educational and Cooperative Training Program (AFFECT) program (USDA NIFA grant no. 2020-33800-33139) through educational support for program participants, and as of 8/2023, PI Gannon accepted a role as PI for a subaward from the AFFECT project that will increase collaboration, and provide some funding towards increasing experiential learning opportunities for underrepresented populations, including Tribal Producers at the Fairbanks AFES farm through a series of workshops in the 2024 growing season.

Research findings were disseminated to the public through a number of outreach and education opportunities which include: multiple field-based outreach events/presentations held at the Fairbanks AFES Farm and Georgeson Botanical Garden for research, state agency, and general public stakeholders; production of a YouTube video available on the UAF Extension Channel; 2 scientific/ professional presentations, and; 5 virtual workshops/ public presentations to share out variety trial results to a broad cross-section of stakeholders.

In addition to Variety Trials work, several research collaborations were formed with other researchers at UAF that will broaden the scientific knowledge generated from the variety trials work. Some of these partnerships were formalized, and capitalized on and resulted in a partnership between the NSF-funded *NNA Permafrost Grown: Cultivating convergence between farmers and researchers to foster sustainability for intensifying permafrost-agroecosystems* research project to evaluate the interactions between agricultural activities and permafrost was funded, and uses the Variety Trials and AFES farm as a replication site to compare findings from other local on-farm trials to. Additionally, collaboration on another Hatch grant (developed by PI J. Young Robertson) titled, *Development of a Boreal Plant Hydraulic Model: Applications for Spruce Beetle Infestation* was developed in which the AFES Variety Trials will be used to test how the ensuing hydraulic model to assess drought in native boreal plant species may be applied, and further refined to evaluate drought effects on agricultural crops in Alaska as well.

### **Briefly describe how your target audience benefited from your project's activities.**

Stakeholders for this project are most specifically Alaskans - including rural, and urban populations - and secondarily include other populations living in high-latitude locations who may benefit from this work. Target stakeholders of this project include agricultural producers, home gardeners, academic researchers, agency personnel and tourists with an interest in Alaskan agriculture/ horticulture. Alaskan as well as international stakeholders were reached in the following ways in FY23. First, many individuals who visited the Georgeson Botanical Garden were able to view Variety Trial program research demonstration plots and educational signage. Stakeholders were also reached through presentations (professional and informal) at events such as: The Alaska Food Policy Council’s annual Conference and Food Festival; the Alaska Sustainable Agriculture Research and Education conference; the UAF Arctic Research Open House, the Fairbanks Garden Club's annual Meeting, at Tanana Valley Master Gardener’s Club Meetings; the Nenana Agriculture Field Day; to a Cohort of Science, Climate and Environment Counsellors of European Union Member States as part of a UAF AFES tour, and the UAF Board of Regents Research Expo.

Stakeholder also were reached through workshops and formal education opportunities for: The AAFECT Farmer Training program on seed starting and plant propagation; the Alaska AARP annual Gardening Workshop series; the Fairbanks Native Association on Seed Starting for Youth; the NASA GLOBE: Climate Change in My Community Program with a workshop on building community Food Security through food forests and gardens. The Variety Trials Program (PI Gannon) was also responsible for organizing and hosting a new Festival - The Far North Currant Festival - with partners from the Georgeson Botanical Garden (GBG) that focused on the possibility of currants as a specialty crop for Alaska and as an excellent cold-hardy berry and source of nutrition for small-scale/ home gardeners. The inaugural FNCF in 2023 had over 350 participants from nine communities in Alaska; U.S. national visitors from Tennessee, New Mexico, California, South Carolina, Montana, Texas, Massachusetts, Idaho, Florida and Virginia; and international visitors from Italy and Germany. There are plans to host the FNCF annually at the Fairbanks AFES farm.

Research findings were also shared with stakeholders through: detailed Technical Notes with harvest data through AFES website; An updated Cooperative Extension publication entitled, "Recommended Varieties for Interior Alaska" (HGA-00032); A new YouTube video on the history and purpose of the AFES variety Trials which is available on the UAF Extension Channel and has over 285 unique views (<https://www.youtube.com/watch?v=j84LMo7BZcE>), and; social media posts to the UAF Extension accounts with topics on different vegetable and berry crops including tips on growing, harvesting and use.

As a result of the numerous ways different stakeholder groups were reached and engaged, many stakeholders experienced an increase in knowledge about what kinds of crops can, and are being successfully grown in Alaska, and in some instances were able to participate in hands-on learning which allowed them to learn how to start seeds and maintain certain crops, while others were able to taste and learn how to use the produce that is being grown as part of the AFES Variety Trials. Of note, many participants often comment that they "feel inspired" in some way with regards to the information that is presented to them on the variety trials. This includes examples of individuals exclaiming they "didn't know all these different things could be grown here [in Alaska]" after visiting the demonstration plots in the GBG, or that they, "...feel like I can actually go home and grow this [vegetables] for myself now, and actually get something" with the knowledge provided at educational events, and finally, stakeholders at the Far North Currant Fest were, in many cases, introduced to an entirely new berry (crop for Alaska), and the single most asked question to festival organizers was, "where can I get/buy currant plants" after visiting the various educational and taste testing stations. This demonstrates not only an increase in awareness through exposure of a potentially high-value crop for Alaska, but suggests a rapid appreciation for/ willingness to adopt this nutritionally-dense berry into Alaskan diets.

### **Briefly describe how the broader public benefited from your project's activities.**

During FY23, the broader public benefited from the research activities through learning about the project and research findings on several television and radio appearances by PI Gannon, and public-facing events like the Far North Currant Festival (described above). The general public, especially lower income individuals, also greatly benefited from the "research by-products" as a result of the excess produce from the Variety Trials getting donated to local hunger relief organizations including the Food Bank and Non-profit soup kitchen, The Bread Line and Stone Soup Cafe. In Fairbanks over 5,500 pounds of produce was donated in FY23, and just over a hundred pounds were donated in the Palmer/ Mat-Su valley to the Food Bank.

Benefits to the general public include: increased scientific knowledge on agricultural production and well-researched variety selection information. Increased awareness of the agricultural research that is happening at the University of Alaska Fairbanks AFES, and how this work either directly or indirectly impacts society. Tangible benefits also include increased food production in Alaska - which imports the majority of fresh-produce for human consumption - which is used for educational purposes as well as hunger relief locally.

### **Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

In FY23 efforts were made to hire staff for the revitalization of the Variety Trials at the Palmer AFES sister-farm. Recruitment and filling the staff position took longer than expected, and as such the trials at the MEFEC did not get planted until very late in the growing season. The resulting crops were such that data was considered skewed at best. Therefore, this year was considered a training period for the new staff person, and the project team is working to ensure this part of the AFES trials program will be successful in the future.

Another delay in project goals in FY23 pertains to the Alaska agricultural stakeholder needs assessment. Launching this survey effort was put on hold for a second year due to both limited project personnel capacity, and efforts toward creating a collaborative survey effort with the USDA Northwest Climate Hub (NWCH) and Agriculture Research Service (ARS). This collaboration will focus on creating a stakeholder needs assessment in partnership with the recently hired NWCH Climate Hub Fellow (onboarded in fall 2023) and ARS Mandan, ND station staff - with which UAF AFES has a

cooperative agreement - in order to address programmatic needs of multiple projects, and reduce survey fatigue among stakeholders. The NWCH Fellow, ARS staff, and PI Gannon will continue to work collaboratively on building and launching a survey that benefits all collaborating agencies/ programs in FY24.

Project team members will continue to work to incorporate and collaborate with other researchers both at UAF and elsewhere to increase the scope and relevance of the research we are currently performing at the AFES in order to reach a broad cross-section of stakeholders.

[Selecting and Evaluating Wheat, Barley, Oil Seed Crops and Developing Integrated Crop Management System in Alaska](#)

Project Director  
Mingchu Zhang

Organization  
University of  
Alaska Fairbanks

Accession Number  
1019139



[Selecting and Evaluating Wheat, Barley, Oil Seed Crops and Developing Integrated Crop Management System in Alaska](#)

Final Result

**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Alaska food independent is very low, and nearly 95% of food are imported from lower 48 states. To develop locally grown spring wheat varieties becomes urgent and are an approach to increase Alaska food security and safety.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Field experiments were conducted in Palmer (southern Alaska, maritime climate) and Fairbanks (interior Alaska, continental climate) during the project period. Five spring wheat (including Ingal Intrepid crosses), three oats, and 17 feed/malting barley cultivars were included in the field experiments of both sites. The spring wheat cross of Ingal x Intrepid in this project period showed a differentiation in height and kernel size. However, higher stem height with smaller kernel size and lower stem height with large kernel size can both reach maturity in Fairbanks and Palmer showing a good potential for use in Alaska as a spring wheat. Our next step is to work with plant breeders to uniform the cross, and then test its protein content and baking quality based on USDA standard so that it can be released as a spring wheat grown in Alaska. The tested barley cultivars were collected globally and they consisted of 2-row, and 6-row feed barley, malting barley (as check), and hulless barley. In the project time, variation of maturity among the tested barley existed in both sites. The earliest date of maturity and harvesting was in Aug. 7, 2023, while in most other years, most barley cultivars were matured and harvested in late August. Even with such variation, three feed barley cultivars showed consistent in early maturity, and large kernel size. We planned to test their protein content, and continued to evaluate them in next project period in the field so that their performance in Alaska climatic conditions are better understood. The Polish canola Deltana was stable and can reach maturity during this project period. Apparently, it showed its potential as a rotational crop in Alaska.

**Briefly describe how your target audience benefited from your project's activities.**

For years, feed barley is a major small grain crops grown in Alaska, and small grain growers' income is limited by solely growing feed barley. There is no wheat cultivars suitable for Alaska climatic condition. Lack of rotational crops limits Alaska growers to adopt no till to improve soil organic matter content. This project targeted three major areas for the need of Alaska growers, development of a spring wheat, selecting feed barley cultivars to be used as a malting barley, and development of Polish canola used as a rotational crop. All of the three areas if success would benefit Alaska farmers in the Interior and Palmer. First, spring wheat development will allow growers to grow a local wheat variety directly being used for human consumption. Thus, its value is higher than feed barley and in addition, the new spring

wheat also increase Alaska food security and safety. Feed barley has been grown in Alaska for many years. To find an alternative feed barley to be used for malting purpose would increase farmers income since none of malting barley variety is currently grown in Alaska and local brewing companies imported their malting barley from other state. If an alternative malting barley is found through this project, the farmers' income will dramatically be increased. Alaska soil is poor in organic matter content, no till practice can increase soil organic matter, but lack of a broad leaf rotational crop makes weed control becoming a problem (based on previous long-term no till study). Polish canola has a short growing season crop. Our previous study showed it has potential being used as an oil seed crop grown in Alaska. However, seed transportation from Canada or other states can be expensive. Therefore, this local developed canola is a promise for Alaska growers for both as an oil seed crop and as a rotational crop for cereals. Thus growers can use no till practice and rotate cereal with canola for weed controls to improve soil organic matter content.

**Briefly describe how the broader public benefited from your project's activities.**

Food security and safety is a public concerns in Alaska. As such, Alaska government organized a task force "Alaska Food Security and Independence Task Force" to identify the areas needed to develop so that Alaska people have a more food security and safety. In the report released by the committee, small grain production is one of the primary area for food security and safety in the state. Our research project directly addressed small grain production. First, the outcome of the project was to find a spring wheat with high baking quality, no shattering after maturity, and matured in a short growing season. In this project period, we are a step close of releasing the spring wheat in Alaska. It is certain that release of this spring wheat cultivar will enhance Alaska food self-reliance and improve food security status in Alaska. Secondly, one of the goals of the project was to find a feed barley that can matured in Alaska climatic condition, yet it can be used for malting for local brewing companies. For years, only feed barley can be grown in the state, and feed barley market is limited due to the size of the animal industry in the state. However, if a feed barley with malting barley potential can be found through evaluation of cultivars collected globally in this project, it will contribute to the local small grain growers in two ways: (1) increase of farmers' income; and (2) diversifying barley grain production to withstand market variations. Lastly, successfully finding a canola crop used for rotation with small grain in this project would lay the foundation for Alaska small grain production system, and allow growers to use no till practice to improve soil health. After this project period, we were close to finalize the "Deltana" Polish canola, which will help the improvement of Alaska cereal crop production system.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

In summary, over the five year of project time, we evaluated 17 cultivars of 2-row and 6-row barley collected both domestically and globally for their suitability for malting. Off those 17 cultivars, we identified 3 feed barley varieties, which can mature in Alaska climatic conditions with no green seeds and large kernel size. We will know if those three varieties can be used as malting barley after determination of their N content (results not available yet). For spring wheat, selection of the cross of Intrepid and Ingal is continuously on. The cross differentiated two groups: large and small kernel size and both can reach maturity in Alaska climatic conditions. In the last year of the project period, we cooperated with a plant breeder, and hope in the next project period, a stable in height, kernel size, early maturity, and high protein content spring wheat will be released from the project. A locally canola variety is close to be done in this project period.

This agronomy program is crucial to identify proper crops grown in Alaska. Thanks to the Hatch program, we released a hullless barley "Sunshine" from the passed funded Hatch project, and now the hullless barley is used by Alaska Flour Company to produce barley flours. We expect, with the continuation of the current project in the next phase, spring wheat, feed barley for malting, and a rotational canola can be expected to be released. As such, thanks should be brought to Hatch Fund project managed by NIFA. Continuity for this fundamental research for Alaska makes a great difference.



## **Alaska Experiment Farm boosts availability of traditional foods**

### **In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Food security is an ongoing concern across the nation, and especially in more remote states like Alaska that depend heavily on imported goods. The health of Indigenous peoples is better supported when they have access to traditional foods. Though subsistence gathering is an option for many, sometimes Alaskans are unable to go out and procure food for themselves. Traditional foods are typically not available for purchase. Demand from entities like hospitals can compete with other areas of the community. By utilizing Experiment Farm lands to grow new crops of traditional foods, Extension and research help build capacity and mitigate community burden while providing culturally appropriate food options for local residents in need.

### **Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The Matanuska Experiment Farm and Extension Center worked with Executive Chef Foote of the Alaska Native Tribal Health Consortium. The chef reached out about collaborating on traditional foods for the hospital, and the Experiment Farm helped make a plan for growth and cultivation that will track yields of Haida and Tlingit potatoes. The chef stated, “We’re going to see what the plants teach us and hopefully be able to serve those to our patients.” In FY23, the Matanuska Experiment Farm planted potatoes donated from the Plant Materials Center for the Division of Agriculture in Palmer, which has more than 330 varieties of potatoes. The Matanuska Experiment Farm typically grows about 135 varieties each year in test plots to see which varieties grow best. A row of 50 hills each were dedicated to growing Haida and Tlingit potatoes. Leftover potato material will be used as seed stock for future seasons.

### **Briefly describe how your target audience benefited from your project's activities.**

In summer 2023, more than 280 pounds of Alaska Native Tlingit (Lingít) potatoes were harvested by Alaska Native Tribal Health Consortium employees and volunteers and will be used by the Alaska Native Medical Center as part of a program to ensure patients have access to traditional foods during times of crisis. Locally grown foods can be more nutrient dense and less processed or treated than commercially grown foods that spend a long time in transport. As many Indigenous communities pass knowledge through oral tradition, recipes are not always written, and reintroducing traditional foods also makes space for recovering traditional methods of preparation.

### **Briefly describe how the broader public benefited from your project's activities.**

Chef Foote noted that in addition to providing more food, these collaborations also support cultural well being: “How that act of harvesting and growing and being out and doing that can be an act of healing for you, whether it’s emotional or because you’re more physically active or just that time of peace being out. There’s definitely healing in that. And then the harvesting, when you go out and you bring it in and you go to share with people, that sort of act of giving or that act of sharing is another way that food is medicine for people.”

### **Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

A YouTube video about the potato collaboration has 225 views as of April 2024: <https://www.youtube.com/watch?v=Nw1DP5kCzqE>



**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Alaska's large tourism industry and the importation of most of its food and many horticultural products makes the state vulnerable to imported pests. Invasive weed infestation can reduce land values and agricultural productivity, and ecologically disruptive plants and insects can also negatively impact recreation, tourism and subsistence harvesting. Improving citizen, farmer and land manager ability to assess pest management practices is critical to protecting agriculture, foraging and other activities that are essential to the Alaska way of life.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Seasonal IPM technicians and permanent staff, with support from faculty, provided community education and technical assistance. They answered agricultural questions from Alaskans, many of which were requests for plant and insect identification. They also offered direct education to hundreds of participants on a variety of topics, including backyard pollinators, insect ecology and diversity, non-native species, forest health and more.

Mediated outreach included "Bug of the Week" posts on Facebook. The public showed continued interest in Extension's IPM videos on YouTube, which included 850 views in FY23 of information on invasive species like bird cherry and chokecherry trees. Extension also engaged Alaskans as citizen scientists and provided opportunities for them to gain knowledge and contribute to statewide tracking by using Extension's IPM portal online, downloading the Alaska Weeds ID application, or visiting the new Slugwatch site, which is tracking the distribution of both native and nonnative slugs, as reported by citizen scientists.

Extension held Pesticide Safety Education Program events in partnership with the Alaska Department of Environmental Conservation (DEC) and Alaska Division of Agriculture. Extension also offered online courses to complement face-to-face workshops, with fee options for learners to obtain CEUs for licensed professionals. Online participants completed 143 classes in FY23.

**Briefly describe how your target audience benefited from your project's activities.**

Data from citizen scientists has expanded the understanding of slug spread in Alaska, with the ranges of both native and non native slugs shown to be far larger than expected.

Extension arranged for the removal of invasive chokecherries from the landscape of its state offices on the University of Alaska Fairbanks campus and from the Tanana Lakes Recreation area, a popular 750-acre multi use site in south Fairbanks. This can aid in restoration of native plants, and reduces the risk of harm to local moose, for which the berries are toxic. Signage about these removal efforts will continue to raise public awareness about nonnative species.

Responses from 32 attendees of the FY23 Alaska Invasive Species Workshop indicated a high level of satisfaction with the information provided by Extension and its collaborators. The majority, 73%, rated the amount they learned as either a 4 or 5 (excellent) on a 5-point scale. Regarding intent-to-change, 54.8% of respondents agreed they plan to use information gained from the conference in their invasive management practices, with all other respondents considering "maybe" using the information. Examples provided of intent to use the information included changes to herbicide application, action plans, monitoring efforts and language choice. Over 61% percent of returning attendees said they have made changes to their practices as a result of attending past workshops. Examples of behavior changes included becoming more culturally considerate, using more effective application methods, and improving working relationships with other managers in the state. Respondents also provided valuable recommendations regarding information needs and desired speakers for future workshops.

**Briefly describe how the broader public benefited from your project's activities.**

Extension's educational efforts on combating ecologically disruptive plants and insects helps protect Alaska's land for all Alaskans including foragers, recreationists and agricultural producers across the state.



**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

Expert consultations, identification services, collaborative workshops and multimedia tools all help to improve knowledge and behaviors applied to reducing the harmful effects of invasive species. Alaska Extension maintained partnerships across the state with garden clubs, municipalities, tribal administrators, soil and water conservation districts, school leaders, Natural Resources Conservation Service (NRCS) personnel, and others to leverage knowledge and resources for improving Alaska's communities. Alaska Extension plans to continue all of these activities during the next reporting period.

Critical Issue

## Healthy Individuals, Families & Communities

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[Supporting wellness, safe food handling and use of food preservation best practices in Alaskan communities](#)

Project Director  
Alda Norris

Organization  
University of  
Alaska Fairbanks

Accession Number  
7000201

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### [Alaska Extension Meets Need for Food Protection Managers](#)

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Alaska state regulations require that all food establishments have at least one certified food protection manager on staff. Such managers are responsible for monitoring and managing all food establishment operations to ensure that the facility is operating in compliance with regulations.

Staff aren't the only ones who need training to keep food safe. The current FDA food code requires the person in charge of a food service operation to become a certified food protection manager. This person must be onsite at all times during operating hours. This certification is used by people who work in restaurants, bakeries, food trucks; cook for schools, hospitals, daycares or any group offering food to others. Certificates are only valid for five years, so training is an ongoing need for everyone in the food industry.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Certified food protection management classes were offered as a statewide public service for areas with food service managers needing the certification. Classes were held in far-flung locations in Alaska, from Fairbanks in the Interior to Klawock in Southeast Alaska to Unalaska in the Aleutians, all of which are hundreds of miles apart and not connected by the road system.

The Health, Home and Family Development agent in Palmer worked to find locations, set up class sites, submit workshop requests, enable registration, arrange publicity, find proctors, order and send books, schedule Zoom meetings and/or meeting rooms and answer inquiries. The agent also coordinated proctors from CES offices, public libraries, UA college campuses, and vocational and technology education centers.

This workforce training was offered four times in FY23. Participants were located in Fairbanks, Haines, Homer, Juneau, Klawock, North Pole, Palmer, Sitka, Skagway, Tok, Unalaska, Valdez, and Wasilla. One class was held over two days (12 hours), which was appreciated by the majority of the clients. The timing allowed interactions and questions. Some clients, primarily those with limited time allowed through their job, indicated a preference for a one-day class. This was the preference for those needing re-certification, also. Others who did not take the class requested a one-day class, so three were offered through that format.

Training was also conducted in Palmer for leaders and teens participating in the 4-H clubs' food sale at the Alaska State Fair.

**Briefly describe how your target audience benefited from your project's activities.**

For many this was the first time the person took this exam; others had expired certificates and needed to retake the exam. Of those who took the exam, 80 passed the proctored exam the first time the exam was taken; 12 failed; two re-tested and passed the exam. Certification allows food workers to get, keep, or advance in their jobs.

Additionally, FDA's Retail Food Risk Factor Studies suggest that the presence of a certified manager has a positive correlation with more effective control of certain risk factors, such as poor personal hygiene, in different facility types.

**Briefly describe how the broader public benefited from your project's activities.**

A Centers for Disease Control and Prevention study suggests that the presence of a Certified Food Protection Manager reduces the risk of a foodborne illness outbreak for an establishment. The study also suggests that it was a distinguishing factor between restaurants that experienced a foodborne illness outbreak and those that had not.



**Alaska Extension expands nutrition education**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Obesity is a growing problem in the state of Alaska. According to the Alaska Health and Social Services Department, in 2019, two out of every three adults in Alaska were overweight or obese. They further state that 31% of Alaska's high school students, 53% of middle schoolers and grade schoolers and 36% of toddlers under the age of 3 are overweight.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The UAF Cooperative Extension Service offers evidence-based nutrition and physical activity education, aligned with policy, systems and environmental change services in community environments through leveraging Extension expertise in conjunction with educators funded through the Expanded Food Nutrition and Education Program (EFNEP) and SNAP-Ed program.

Extension teaches nutrition and physical activity classes across Alaska. In FY23, EFNEP classes were taught to 915 youth and 57 adults throughout the state. The program uses the evidence based curricula *Eating Smart • Being Active* to promote healthy eating and activity levels based on the Dietary Guidelines for Americans. SNAP-Ed served 845 people in communities from the Northwest in Nome to the Southeast in Juneau. Nutrition education staff use and distribute Extension-generated publications on healthy recipes and food preservation to extend the public's ability to use their food benefits. Extension provides program oversight and development of program resources, bolstering EFNEP and SNAP-Ed's success. This combination of Smith-Lever funded efforts along with special nutrition grants and state support helps Alaska reach more communities in meaningful ways.

In addition to collaborating with the EFNEP and SNAP-Ed programs, Extension faculty taught standalone classes for the general public in home freeze drying, gardening and food security, making yogurt at home, diabetes prevention, dining with diabetes, chronic disease management, cooking with whole grains, StrongPeople fitness classes and more to reach several hundred additional contacts in FY23.

**Briefly describe how your target audience benefited from your project's activities.**

EFNEP builds community capacity as paraprofessionals work with multiple community partners including women's shelters, school districts, food banks, and more. EFNEP also maintains inter-organizational relationships with the Dept. of Education, Dept. of Health, Head Start, WIC, State Dietetic Association and other important community supports.

The EFNEP series of classes has changed people's nutritional behaviors in a positive way. Pre and post assessments given to participants show that 32% more youth participants in grades 3-5 report eating vegetables as a snack, including at lunch, 34% improved in their response to whether or not they read nutrition facts labels, and 40% increased their physical activity duration. They also improved their food safety practices, with about a third of respondents overall indicating they improved in washing fruits and vegetables, washing their hands, and returning cold foods to the refrigerator. For youth in 6th-8th grade, about a third of youth improved their consumption of fruits, vegetables and whole grains. Over a third improved the number of days they were active at least one hour, and almost a third learned food management practices including following recipes and measuring ingredients. Youth in 9th-12th grade showed the most improvement in healthy eating, with at least 50% increasing their recent consumption of vegetables and fruit.

One school teacher reported that the children in her class, after participating in an EFNEP series, were more open to eating different types of fruits and vegetables at lunchtime. Women participating in EFNEP classes at a rehabilitation center have been much more conscious of the foods they feed their young children, steering them away from sugary foods and drinks. An adult group at a transitional living center, after joining an EFNEP series of classes, became much more open and eager to eat healthy foods and requested more fruits and vegetables for their meals.

**Briefly describe how the broader public benefited from your project's activities.**

Nutrition programming indirectly reached thousands of Alaskans, as family members pass on information they learn about healthy eating, budgeting and more. Such programs help to eliminate hunger and food insecurity in Alaska communities. Extension conducted train-the-trainer programs that built community capacity to sustain efforts in helping Alaskans manage their risk of diabetes.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

Alaska's Extension faculty and nutrition educators will continue to partner with nonprofit organizations and Title 1 schools to bring nutrition education to the public. Alaska has a new Office of Food Security which reflects its legislative focus on improving the food security of the state. EFNEP and SNAP-Ed are just two of many programs that can contribute to better food security in Alaska.

Critical Issue

## Natural Resources, Ecosystems & Sustainable Energy

[19-06 Hatch Regular: Understanding Human and Community Benefits and Mechanisms](#)

Project Director  
Peter Fix

Organization  
University of  
Alaska Fairbanks

Accession Number  
1019421



[19-06 Hatch Regular: Understanding Human and Community Benefits and Mechanisms](#) Final Result

**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

This project addressed the issues of managing to optimize benefits associated with recreation on public lands. The focus groups with communities of color in Fairbanks and Anchorage, Alaska, addresses the issue of equitable provision of outdoor recreation resources. By many measures, outdoor recreation shows disparity in use across various groups, including racial, ethnic, and cultural groups (Davis 2019; Flores et al. 2018; Floyd 1999; OIA 2022, p8; Otak, Inc., et al. 2023; RSG & WYSAC 2019; Ryan et al., 2020; USDA Forest Service 2021; Xiao et al., 2021).

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

One phase of this project conducted recreation visitor surveys with over 3,500 visitors at nine sites across six states (Logandale Trail System, NV; Kingman, AZ; Bears Ears National Monument, UT; SanRafael Swell, UT; Upper Colorado River, CO; Gunnison Gorge National Recreation Area, CO; Upper Missouri River Breaks National Monument, MT; areas outside of Butte, MT, and the Dalton Highway corridor, AK). This allowed direct input from concerned stakeholders that might not otherwise be represented. The resulting data provided insight into beneficial outcomes the visitors were seeking, guidance for management with respect to providing those benefits, and perspectives on critical issues such as the implementation of visitor fees. At a broader level, having multi-state data across numerous sites allows for investigation of broader trends that have implications for the provision of meaningful outdoor recreation experiences.

Based on the projects mentioned above, research team members participated in four BLM recreation management training workshops (June 2022; November 2022, July 2023, and October 2023). Those workshops increased BLM staff's knowledge of recreation management techniques, specifically how to incorporate research findings to develop data-driven management decisions. Ultimately, that knowledge will increase efficiency in recreation management and lead to increased public benefit.

Another phase of this project conducted an onsite survey of visitors to the Matanuska Greenbelt Trails in southcentral Alaska (n = 928). That survey included measures of physical activity that were comparable to CDC physical activity guidelines. Those data provided insight into the contribution of the trail system to the physical health of the community. The survey also included questions related to barriers to increased participation in physical activity on the trail system. That information is useful not only to managers of the area, but also to organizations such as the Matsu Health Foundation and the Matanuska-Susitna Recreation and Trails Advisory Board. Further, the Matanuska Greenbelt Trails survey led to a general population survey that included measures of physical activity, location of that physical activity, and constraints to participation in physical activity (n=285). That survey included a spatial component to correlate rates of physical activity to the amount of different type of recreation facilities available (e.g., parks, trail systems, school playgrounds). Those data have the potential to identify constraints to physical activity, which is the first step towards policy actions by recreation and park agencies, and local government, to increase physical activity, and in turn positively impact community health.

A M.S. thesis was produced during that time (Diamond, 2021). The thesis examined issues related to policy decisions related to outdoor recreation management. There were approximately 20 Bureau of Land Management staff present at the thesis defense. The defense provided an education opportunity for the managers, as well as a forum to engage in a discussion that advanced their understanding of the topic.

Major activities in the focus groups with communities of color in Fairbanks and Anchorage, Alaska project during the last year included conducting eight focus groups (four each in Fairbanks and Anchorage with 49 total participants, continued collaboration forming four volunteer review committees (made of 17 community members of Anchorage and Fairbanks) in creating culturally relevant research instruments, as well as working with four culturally-competent members of the research team who conducted focus groups and are a key part of data analysis, which is ongoing. The collaborative creation of culturally-relevant focus group questions and other research materials has included and engaged the leadership of culturally diverse parts of the Fairbanks and Anchorage communities. Engaging members of these communities in the design of the research is a key aspect of the methods we are piloting. The objective of collaborative research design has been met, and has contributed to progress toward the goal of creating research more relevant and appropriate for diverse cultural groups. A more complete assessment of the success in creating more effective research with communities of color will be available after analysis is complete. However, anecdotally, in conducting the focus groups, it appeared that the vast majority of participants were highly engaged in the topic and discussion. Many participants expressed joy and gratitude for the opportunity to participate in a facilitated conversation

about outdoor experiences and race or ethnicity. This pilot project is intended to lay the groundwork for new research methods that, if applied regularly along with other recreation research, will lead to decision making and governance of recreation resources that is representative of the cultural diversity of the public.

**Briefly describe how your target audience benefited from your project's activities.**

The data provided to land managers via visitor surveys provided quantitative measures of desired experience and benefits, as well as evaluation of management actions. Without such data, managers must rely on anecdotal information. Having data that was systematically gathered leads to more-informed management actions, hopefully allowing for greater realization of recreation benefits by the public and local communities. In addition, the data can serve as a baseline for monitoring performance of management actions, allowing for adjustments if outcomes are not realized. The surveys at that Matanuska Greenbelt Trail System and the general population of the Palmer area provided assessment of one aspect of community health: physical activity. More importantly, the studies identify constraints to participation in physical activity. Those data can be used to guide public policy towards programs/resource allocation decisions that maximize positive impacts to physical activity within budgetary constraints.

The training workshops held with the BLM increased knowledge of BLM staff with regards to incorporating data into management decisions.

With regard to the focus groups with communities of color in Fairbanks and Anchorage, Alaska, members of communities of color and Indigenous communities have participated in every level of this project, so the benefits vary depending on the type of involvement. Research collaborators and team members benefited through opportunities to discuss and create research connected with cultural diversity, recreation, and relationships to land and the natural world. These benefits could include greater social connection, a sense of purpose and belonging through collaboration, and potential professional and skill benefits due to volunteer or employed participation in a research project. Focus group participants could have benefited by enjoying, learning, and socially connecting with other community members who share some similar cultural backgrounds around the topic of the land, outdoor recreation, and cultural connections and relationships with nature.

**Briefly describe how the broader public benefited from your project's activities.**

The visitor surveys on BLM land allow users to provide input about their desired management. This improves the recreation experience of local, national, and international visitors. This includes not only current visitors, but those who will visit in the future. In addition, improved management can positively impact the local recreation-based economy. Finally, the data provided by visitor surveys, combined with the training workshops that resulted, improve the efficiency of decision making in publicly-funded land management agencies.

The surveys on the Matanuska Greenbelt Trail System and the general population study in the Palmer area, provide data that can serve as support for policy actions designed to increase physical activity among residents of the area. Given the CDC has linked physical activity to a wide range of positive health benefits, increasing physical activity has the potential to increase health benefits.

The focus groups with communities of color in Fairbanks and Anchorage, Alaska continues to lay groundwork for research that will improve how well recreation resource decision making represents the true diversity of the public. Aspects of this foundational work include, relationship building between the university, communities of color and Indigenous communities, and recreation resource managers; designing a flexible research tool that can adapt to current contexts by engaging culturally diverse groups in deciding what issues are most relevant for their communities; pilot data collection that can help to improve the research design and serve as preliminary or baseline data against which to compare future research findings. Recreation planning that is informed by a more representative and diverse part of the public will allow managers to offer outdoor spaces and experiences that can more fully serve the public's needs and

wishes. The broader public will likely benefit from improvements to safety, accessibility, a sense of welcome for many kinds of people, and the inclusion of the wisdom and creativity of new members of the public feeling welcome and valued in recreation resource planning and decision-making.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

The next steps for the focus group project, include continued analysis of data from audio recordings of the focus groups, having committees review data interpretations, report writing, and public presentations of findings.

Planning and relationship-building continues in creating outdoor activity research relevant to Alaska Native people. Currently employees of the UAF Rural Student Services (RSS) is collaborating with us to design focus groups with and for Alaska Native people. This collaboration has recently achieved IRB approval for and distribution of an outreach memo with a qualifying survey and signup sheet within the College of Rural and Community Development. We will continue outreach to engage the collaboration of RSS students.

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Alaska and the Arctic are warming twice as fast as lower latitudes with far-reaching consequences for ecosystem management, natural resources, and community development. Natural resource managers are struggling to keep up with these changes while working to integrate the best available science into decision making. This research addresses three interrelated aspects of research, management, and training. (1) the need to better understand actions, processes, mechanisms by which actionable science, translational ecology and use-inspired science are conducted, (2) the need to build capacity and advance rural community development, (3) the need to develop integrated student research conducted in partnership with stakeholders. The focal areas of this work include wildfire management, food security, economic and workforce development, and co-production of knowledge with Alaska Native communities.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

### **1. Continuing and expanding the Kake Climate Partnership**

In this reporting period, we provided continued support for ocean and stream monitoring in the Kake Climate Partnership, in Kake Alaska. Target sample collection goals were met for all but one sample site. This achievement created a 4th consecutive year of collecting data on ocean water and shellfish tissue, and a 2nd consecutive year of collecting data about water in streams near Kake. We expanded the co-production climate adaptation work in southeast Alaska to the community of Hoonah and the Hoonah Indian Association Alaska Youth Stewards program. Funds supported an extra week for 5 crew members and 2 crew leaders during July 2023 to inventory forest plots, assess berry habitat, core trees, harvest and process traditional food for Hoonah's annual "Food Fair," attend a Culture Camp, and conducting road surveys to inventory structures.

### **2. Advancing actionable science and use-inspired science by developing and conducting Indigenous evaluation of Kake Climate Partnership**

We advanced knowledge and understanding of the actions, processes and mechanisms of actionable science and use-inspired science by developing and implementing an Indigenous evaluation process for the Kake Climate Partnership. Meetings were held in Kake and Hoonah, including an evaluation of youth participant experiences in the Kake Climate Partnership.

### **3. Building capacity, supporting Indigenous student success & promoting respect and awareness for cross-cultural knowledge in order to develop capacity in rural development and support Indigenous student research in partnership with communities.**

A series of workshops were hosted at the University of Alaska Fairbanks (UAF) campus. In May 2023, Unungan Elder Ilarion Mercurieff and Libby Roderik lead a 1.5-day workshop on "Indigenous Ways and Western Science: Working Together for a Thriving World." The hybrid-format workshop was targeted for faculty, staff, and administrators and had nearly 60 participants in person and over 20 virtual participants. In September 2023, Indigenous Scholar Dr. Cana Itchuaqiyag lead workshops for students, faculty and staff on cultural humility and lead multiple mentoring sessions for Indigenous students at UAF. All events filled room capacity, demonstrating an encouraging receptivity at UAF for cross-cultural learning.

We supported Tribal Wellness in Climate Adaptation Planning health and wellness training as part of the Alaska Tribal Resilience Learning Network. Fifteen Indigenous Elders and culture bearers were funded to share their specific expertise in an "Elders mentoring Elders Indigenous Culture Camp" designed to address systematic colonization and historical

attempted erasure of Indigenous culture in Alaska and to support up-and-coming Elders to continue the practice of intergenerational transmission of culture and language for the benefit of future generations.

We further built capacity for rural community development and student research in partnership with communities by supporting two mentors and counselors for the UAF Summer Rural Alaska Honors Institute who mentored seventeen students from fifteen communities across Alaska. The RAHI program offers college courses and community-building to promote the success of Alaska Native students.

Capacity building for rural development and support for Indigenous students at UAF also included, drafting a student internship plan with objectives and a list of potential internship partner organizations, creating a “Climate Change Baseline Knowledge” survey designed for students taking climate change courses in the Department of Alaska Native Studies and Rural Development, finalizing a course syllabus for “Climate change and communities” course, and drafting a syllabus for “Rural Development in the Era of Climate Change” course.

Salary and travel support was provided to graduate student A. Henricks to deepen relationships and collaboration with the Exchange of Local Observations and Knowledge in the Arctic (ELOKA) and the Calista Education and Culture (CEC) to support the Yup'ik Atlas (YA) climate module development and deepen her understanding of on-the-ground, regional climate change impacts. Work included multiple meetings, including an in-person meeting with Yup'ik Elders in Bethel, Alaska (Nov 22) to share climate research and update partners on the new climate module. A trip was also made to St. Mary's, Alaska (May 23) to accompany tundra and wildfire ecologists to speak with village residents about their experience and concerns following the extreme 2022 fire season. They spoke with village residents at a community meeting as well as surveyed the landscape and impacts of wildfire mitigation techniques (e.g., dozer lines). New partnerships were created with included local high school science educators, undergraduate Yup'ik language instructors, and climate data and observation platforms (e.g., Permafrost Discovery Gateway, SIKU app). Additionally, Henrick's wrote a thesis chapter documenting cross-cultural lessons learned from working in western Alaska as a climate scientist (expected publication 2024).

Our geotourism project helped build capacity and advance rural development by highlighting existing successful programs and outlining steps that other communities could take.

## **Briefly describe how your target audience benefited from your project's activities.**

### **1. Continuing and expanding the Kake Climate Partnership**

Our target audience for the Kake Climate Partnership is primarily residents of Kake, Alaska. Kake residents received training and experience in conducting field data collections. The project supported over 20 part-time local jobs. Kake residents also benefitted from this project by gaining another season of data collection that is archived locally for use by residents in the future. The target audience for our expansion of co-production and actionable science work in Southeast Alaska this project was the community of Hoonah, Alaska. This project was especially successful because it supported the continuation and expansion of the well-known and respected Alaska Youth Stewards program in the community of Hoonah. The project also strengthened ongoing collaboration among UAF and community members in Hoonah.

### **2. Advancing actionable science and use-inspired science by developing and conducting Indigenous evaluation of Kake Climate Partnership**

Rural community residents and students who took part in the evaluation activities and evaluation workshop benefited by gaining experience and exposure to an Indigenous evaluation process and the opportunity to co-author of a peer-reviewed paper. Students will be supported in their future activities by the workshop training and the networking opportunities provided by the workshop. The evaluation activities highlighted ways in which the project can and does provide more comprehensive community services to the community of Kake, including healing from historical trauma.

### **3. Building Capacity, supporting Indigenous student success & promoting respect and awareness for cross-cultural knowledge in order to develop capacity in rural development and support Indigenous student research in partnership with communities.**



Workshops on Indigenous Ways & Western Science and Cultural Humility were targeted to UAF students, faculty, staff and administrators. We conducted pre- and post-workshop surveys the results of which will help to guide future activities designed to support student education and research and to promote diversity, equity and inclusion at UAF. These workshops, together with the Indigenous student mentoring experiences and other trainings benefit UAF students by promoting cross-cultural awareness and respect and by supporting Indigenous student success. This work has also brought more awareness and understanding about Indigenous knowledge systems and the impact of trauma and potential for healing and wellness .

For the Elders Mentoring Elders Culture Camp, pre-and-post surveys and sharing circles highlight that participants were more confident and empowered to talk about and share Dena (Athabascan) knowledge and practices, specifically related to traditional food practices. Grounding participants in Athabascan values discussions is an essential foundation for cultural camps. The camp promoted healing, connection, and hope for participants.

The curriculum and internship development work was beneficial to community members because it enhanced the capacity for students to effectively support communities who are dealing with the multifaceted impacts of climate change. It also helped strengthen collaborations across the university because it brought together students, faculty and staff from across the university to explore and share ideas about how to meaningfully partner with communities.

The Yup'ik Atlas group benefitted in three major ways: (1) new partnerships help to direct progress on the climate module, currently in active development, based on user input; (2) boots-on-the-ground interaction helped to bring new partners and users to the discussion table; and (3) continuing long-term relationships with Elders have helped us communicate climate science, impacts, and observations, leading to one elder expressing it was the first time they felt western science beginning to correlate with Yup'ik science.

### **Briefly describe how the broader public benefited from your project's activities.**

#### **1. Continuing and expanding the Kake Climate Partnership**

The Kake Climate Partnership and the extension to Hoonah provide a model for research co-production with Alaska Native communities to address locally identified and defined research and community needs, including workforce development. The project report prepared by Hoonah Indian association staff further benefits people throughout Alaska as it serves as a template and teaching tool for how other communities might implement similar programs.

#### **2. Advancing actionable science and use-inspired science by developing and conducting Indigenous evaluation of Kake Climate Partnership**

Indigenous evaluation work in the Kake Climate Partnership has been submitted for publication and provides an on-the-ground, practical example of how Indigenous methodologies can be used to assess the public benefit of actionable science and knowledge co-production. Hatch supported graduate student M. Rudolf also submitted a publication related to factors of success for co-production partnerships between scientists and Alaska Native communities.

Papers submitted:

- E. Figus, S. Friday, J. O'Connor, J. McDonald, C. James, S. F. Trainor, M. H. C. Rudolf, N. O'Connor. (In Review) Sharing our story to build our future: a case study of evaluating a partnership for co-produced research in Southeast Alaska. *Community Science*.
- M. Rudolf, S. F. Trainor, J. O'Connor, E. Figus, R. Humm. (In Review) Multi-faceted perspectives of success: factors to achieving co-production of knowledge across cultures. *Community Science*.

#### **3. Building capacity, supporting Indigenous student success & promoting respect and awareness for cross-cultural knowledge in order to develop capacity in rural development and support Indigenous student research in partnership with communities.**

The broader public benefits from this project through the enhanced capacity of UAF students to support climate change adaptation efforts. These students are part of the essential workforce needed to lead climate change response measures.

The broader public benefits from A. Hendrick's work in direct interaction at several outlets. A highlight is when the community residents of St. Mary's described environmental conditions leading up to the intense fire season of 2022 and shared their concerns with the fire managers and scientists about orange fire retardants found on berries and other subsistence foods. Additionally, during the Nov 2022 Bethel visit, A. Hendricks presented her climate variability research, fielded questions about local climate change, and shared the YA climate module with a broad audience at University of Alaska Kuskokwim Campus, and local Bethel radio station KYUK recorded part of the Nov 2022 meeting with elders to later broadcast regionally. Interactions with the public continue to circle back to the question of how to engage climate science with youth populations to help bring more people to the discussion table.

The geotourism work provides a compendium and reference for other communities interested in building their economic development through developing cultural and environmental tourism.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

**Summary of the results achieved over the course of the award and explanation of the significance of these results.**

This project directly addressed the two core Hatch UAF theme areas of Natural Resources and Community Development and Climate Change and Ecosystem Management. The work centered around advancing the field of sustainability science, building capacity in rural Indigenous communities in Alaska for climate change adaptation and planning, and meeting the information needs of wildfire managers in Alaska. The project funded three postdoctoral fellows, two Ph.D. students, and two master's students.

The key target audiences were: 1) the scientific community studying the theory and process of conducting use-inspired basic research to advance sustainability science, 2) rural Indigenous communities in Alaska and the organizations that serve them, 3) the wildfire and land management community in Alaska, 4) UAF students.

Significant results include the establishment and development of the Kake Climate Partnership, a community driven, co-produced project involving ocean and stream monitoring, recording Elder's knowledge and workforce development and local student mentoring. In addition to building local self-determination, resilience, water quality data, and workforce development, this project advanced the field of sustainability science as a concrete example of co-production research in practice and in its innovative evaluation, which was embedded into the project from its inception (see publications list below).

The field of sustainability science was further advanced through the innovative work of PhD students who explored Indigenous self-determination in co-production of knowledge and the intersection of climate science and local Indigenous knowledge. The latter also contributed to local capacity building for climate adaptation through the development of a Yupik Atlas of climate change.

Capacity building in local Indigenous communities was additionally advanced through the work of a masters student who focused on exploring the potential for traditional foods and sustainable agriculture to build community resilience and shape solutions to food insecurity and health disparities in rural Alaska. This project included in local culture camp

for youth and a workshop on sustainable agriculture for community members. Impacts include advancing community-driven solutions to revitalize cultural food traditions, resulting in improved health and food security.

Partnership with the Alaska Fire Science Consortium (AFSC) resulted in significant advancements in bridging wildfire science and management needs. A project funded master's student assessed the efficacy of an innovative workshop approach to wildfire management in a changing climate. Working closely with boundary spanners at AFSC and refuge managers at the US Fish and Wildlife Service, the student assisted workshop organizers and attendees in understanding the outcomes of bringing together scientists, managers, and local experts to explore new approaches to carbon and wildfire management.

This project also supported several projects designed to meet wildfire manager needs and educate the public about wildfire management, wildfire processes, and wildfire risks in a changing climate. We created and printed a publication, [Alaska's Changing Wildfire Environment](#), which has been accessed on-line more than 8000 times and more than 1500 copies have been printed and distributed to wildfire manager partners who use the publication extensively in communications internally and with the public. A small wildfire in the wildland urban interface near the University of Alaska campus provided opportunity to create and install a half-mile interpretive trail with signage. Field trips on this trail have educated a range of visitors including federal agency administrators, congressional staffers, local school groups, and artists, about wildfire science, suppression and climate change in interior Alaska. We have also created a multi-media story map explaining burn severity in the boreal forest.

In addition, we have hosted and supported multiple trainings and workshops that have been well attended by UAF students, faculty, staff and administrators. The goals of these workshops are to promote respect for Indigenous knowledge, to advance awareness and understanding of tools for conducting equitable research in Alaska and the Arctic and, to support Indigenous students and faculty in their research, education, and professional development.

### **Project Publications**

E. Figus, S. Friday, J. O'Connor, J. McDonald, C. James, S. F. Trainor, M. H. C. Rudolf, N. O'Connor. (In Review) Sharing our story to build our future: a case study of evaluating a partnership for co-produced research in Southeast Alaska. Community Science.

M. Rudolf, S. F. Trainor, J. O'Connor, E. Figus, R. Humm. (In Review) Multi-faceted perspectives of success: factors to achieving co-production of knowledge across cultures. Community Science.

Figus, E.C., B. K. Jackson, S.F. Trainor. (2022) The Kake Climate Partnership: Implementing a knowledge co-production framework to provide climate services in Southeast Alaska. *Frontiers in Climate*. DOI 10.3389/fclim.2022.885494

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Not Provided

## Report Status

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Approved as of 07/03/2024

### Comments

The University is well-engaged with various industry groups, associations, and advisory committees. In FY23, the IANRE Director traveled across south central and southeast Alaska to conduct five listening sessions to identify the needs of diverse stakeholders. It is evident that research and Extension programs are stakeholder driven.

The University of Alaska Fairbanks continued addressing the four critical issues impacting the citizens of Alaska. The team developed relevant research and Extension programs to address those key priority areas. In addition to the impactful Extension programs associated with each critical issue, the university reported on 6 innovative research projects. The issues, actions, and results are well-described. This report includes outputs and impact data for most research and Extension efforts. For example, the “Alaska 4-H Leverages Learning for All” initiative demonstrated excellent collaboration, education, and impact for the community.

The research and Extension leaders at the University of Alaska Fairbanks are to be commended for their excellent preparation of the FY2023 Annual Report of Accomplishments, which fulfills the AREERA requirements.

## Appendix

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Research Projects

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Extension Programs

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Other Projects / Programs

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