

University of Alaska Fairbanks Combined Research and Extension Plan of Work 2022-2026

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I. Plan Overview

1. Executive Summary

Alaska is recognized for its immense size, dispersed 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. The state also contains an array of mineral deposits, including gold, zinc, boron, molybdenum and rare earth minerals. Alaska has a varied geography that offers soils for production of food, fiber and biomass fuels as well as a multitude of recreational and tourism activities. Waters surrounding Alaska's shoreline and riparian habitats contain large stocks of salmon, cod, pollock, halibut, herring, crab and shrimp that support thriving commercial, sport and subsistence fisheries.

Alaska's natural resources have historically been the foundation of the state's economy, though resource industries have been mostly extractive in nature. Alaska's economy has become dependent upon revenues related to petroleum development. To diversify its economy, the state is moving toward nonpetroleum natural resources for economic opportunities that are cost-effective and sustainable. The use and management of these resources is a predominant force in the planning and delivery of any teaching, research, Extension and engagement programs. The University of Alaska Fairbanks (UAF) in general and Cooperative Extension Service (CES) and Agricultural and Forestry Experiment Station (AFES), 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.

As a result of a university reorganization, in July 2019, UAF's Mining and Petroleum Training Service (MAPTS), along with CES and AFES, became an entity now known as the Institute of Agriculture, Natural Resources and Extension (IANRE). The realignment allows for greater coordination in meeting the tripartite mission of teaching, research and service. The programs of IANRE, provided by personnel of AFES and CES, play a vital role in linking the knowledge generated at the university to meet the needs and interests of Alaskans. Citizens are provided opportunities through engagement to influence future research and education priorities. CES delivers the latest research findings, education and outreach opportunities to the public.

While Alaska imports a high percentage of foods and other agricultural products, growers in the agricultural sector produce fresh market potatoes, vegetables and herbs; forages, grains and manufactured livestock feeds; controlled environment products, which include bedding plants, florals, landscape ornamentals and short season vegetables; and a variety of niche market crops. Livestock enterprises in Alaska are varied in size and species of animal in production. Producers need information specific to northern latitudes that will protect the environment and ensure an abundant and safe food supply. 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 and game meat. 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, with the most recent death in 2019, so it is imperative to provide much needed information on safe preservation of dietary staples. Food safety is also a concern for food industry workers who need state-required training. Alaska has one of the fastest growing senior populations. Alaska's senior citizens face the challenge of remaining active and healthy in a demanding environment. Other concerns that define health and nutrition programming are the high rates of child and adult obesity, chronic conditions like diabetes, and indoor air quality.

High energy costs remain a critical issue, particularly in rural Alaska, where fuel oil can cost double and gasoline can cost triple the average price per gallon compared to urban areas. Research and outreach will continue to focus on new and alternative sources of energy, wood and biomass and energy conservation. AFES will work to provide new information to manage renewable resources and to improve technology for enhancing the economic well-being and quality of life at

high latitudes. While foresters, farmers and land managers use research results, all Alaskans benefit from the wise use of land resources. Research projects will be in response 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 will continue to publish research in scientific journals, conference proceedings, books, and in experiment station bulletins, circulars, newsletters, research progress reports and miscellaneous publications. Scientists will also disseminate their findings through conferences, public presentations, workshops and other public information programs 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. CES provides 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, nonformal education, including conferences, workshops and cooperative work with community, regional and tribal partners. Outreach is also provided through numbered publications, faculty consultations, newsletters, blogs and social media platforms like Facebook pages, YouTube channels and Twitter feeds. CES priorities address 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 respects cultural and ethnic diversity and is responsive to emerging stakeholder needs and interests. Programs result from client requests, various regional and subject matter advisory groups, surveys and needs assessments. Collaborations with other universities and with other units within UAF, the University of Alaska statewide system, federal and state agencies, nongovernmental organizations and private industry are planned to continue. Stakeholders include 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 CES and AFES bring the university to Alaskans while bringing community concerns and issues back to the university.

IANRE is sensitive to internet issues in rural areas. Inclement weather, small customer bases, and lack of local power grids are significant challenges. While Alaska remains one of the lower ranked states for connectivity, significant progress has been made in the last decade in moving from more expensive options like satellite to cable. Government subsidies, combined with hundreds of millions in investments from telecommunications companies, have increased broadband access to many remote locations. Across Alaska, schools and libraries get discounts on communication services, and IANRE works with these community locations to take advantage of their more reliable Wi-Fi connectivity when offering distance classes. According to the Anchorage Daily News, the microwave and fiber Terrestrial for Every Rural Region in Alaska (TERRA) system has improved accessibility; General Communications, Inc. reports that as of 2017, it is already operating in 70 Alaskan communities. Quintillion Subsea Operations recently laid fiber optic cable in the Northwest Passage, a region that includes Extension's Nome office, as well as Utqiagvik, the location of Alaska's 1994 Extension. According to Quintillion Network, in addition to connecting commercial customers and schools in 2017, it was able to triple available residential speeds in Nome in 2018 at a rate comparable to what customers were already paying.

Due to COVID-19 limitations on face-to-face gatherings, IANRE has pivoted to expanded use of online platforms and pick-up or mail-home kits to continue providing educational services. Instructional opportunities have been successfully hosted through Facebook Live, Zoom, Google Classrooms and more. IANRE will continue to communicate with rural leaders to identify the best remote locations for hosting distance learning successfully.

State-defined critical issues link specific public needs with our broad mission in order to allow the concentration of resources (money and people) that will promote high-quality work. Critical issues will be 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 affects all the program areas.

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 "niche market" crops and products. Commercial horticulture includes ornamentals, greenhouse operations, turf management, lawn maintenance and sod production. Proper knowledge and planning of soil-disturbing activities can prevent major impacts on other resources. Animal enterprises in Alaska include dairy, beef, swine, reindeer, poultry and nontraditional livestock such as muskox, elk and bison. Agriculture research and outreach 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. Our statewide Integrated Pest Management (IPM) education program has operated since 1981 assisting individuals to understand invasive pests and control options. Agriculture outreach includes 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.

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 are now centered in the oil and gas industries. Headquarters for these industries are located in the urban centers where there is access to various transportation and advanced communication systems. However, urban communities lack infrastructure to engage in value-added activities that would enhance development of nonpetroleum industry. Additionally, these efforts should provide underserved populations in rural areas real options for economic development and improved quality of life. Outreach will address stakeholder needs for unbiased, science-based information about natural resource management issues in forestry, mining, water, recreation and alternative, sustainable energy sources. Alaska's forest and agricultural resource potential for bioenergy production is immense but requires more research. 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 will continue 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.

Healthy Individuals, Families & Communities: Concerns for Alaskans include high rates of obesity and recurring food safety issues, such as botulism. The state records frequent earthquakes, which underscores a need for emergency preparation as well as periodic radon testing related to ground shifts. Food safety programming will encompass food preservation, safety, preparation and product development. Food safety education will utilize 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. Home and energy programming addresses indoor air quality, home maintenance and repair, energy use and conservation. Emergency preparedness impacts such areas as families and communities responding to natural and man-made disasters. Nutrition outreach will address childhood obesity with nutrition education in after-school programs and nutritional programs in community venues as well as cooking programs that emphasize preparing healthy foods. Training is 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.

4-H & Youth Development: Research shows that youth need sustained, healthy relationships with adults in order to thrive. CES will continue 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 will continue to achieve youth development goals. The focus of Alaska's 4-H program is supporting the healthy maturation of youth from childhood to adulthood. Training throughout the state, promoting life skills and using the 4-H model of youth development will be the foundation of all youth development programming.

During the last five years, the state's appropriations to the University of Alaska have decreased significantly. A 2019 compact agreement between Alaska's governor and the UA Board of Regents plans reductions totalling \$70 million during FY20 through FY22. To meet the reduction and reallocation goal of \$24 million for UAF in FY20, most departments were asked to plan for a 15 percent reduction in general funds. With this in mind, CES and AFES have had to adjust their expectations of how many faculty and staff they can continue to provide salary funding for until there is an increase in state funding. Thus, the FTE projections in the next section show a gradual reduction during the POW cycle.

2. FTE Estimates

Year	1862 Extension	1862 Research
2022	24.1	11.7
2023	22.2	10.7
2024	20.4	9.8
2025	18.8	9.0
2026	18.8	9.0

II. Merit / Peer Review Process

The Agricultural and Forestry Experiment Station uses scientific peer review to evaluate proposals and publications. Extension uses the merit review process and the general review process for the joint annual report and Plan of Work (POW). The Agricultural and Forestry Experiment Station (AFES) complies with sections 3(c)(1) and (2) of the Hatch Act and section 1445 of NARETPA (Hatch Regular Capacity Funds) and the amendment to the Hatch Act of 1887 to Section 104 by AREERA for programs funded under section 3(c)(3) of the Hatch Act (Hatch Multistate Research Funds) by using its established scientific review process for all proposals and publications.

All new and revised Hatch (and McIntire-Stennis) project proposals undergo peer review. The blind peer review panel is composed of a minimum of three members and consists of competent authorities from the discipline of the proposal/publication or related disciplines, generally at other land-grant universities. Each reviewer completes a Peer Review Form that includes specific criteria, provides for other comments and suggestions, and makes a recommendation to the director. Reviews are returned to the author(s) for revision if needed. The director reviews all comments and recommendations from the reviewers along with the revised proposal/publication before it is sent to USDA.

Scientific peer review of multistate research projects is carried out for individual projects under the aegis of the Multistate Review Committee (MRC- formerly RCIC). The director of AFES is a member of the MRC. All faculty who are participants in Hatch multistate projects are required to have an approved Hatch Regular Research project that is related to the field of study of the multistate project.

Peer review of the Extension components of the POW consist of internal and external reviews by a panel of faculty and administrators. The different review panels assess how well the activities and resources proposed in the plan contribute to achieving the proposed goals and establish emphases on food security, food safety, climate adaptability, health, positive youth development and sustainable energy as priorities for the future. Collective feedback is incorporated into each iteration of the POW. Extension has an evaluation specialist who conducts needs assessments, documents outreach outcomes and works with faculty and staff on formative and summative evaluations of individual programs. Participant feedback is collected regularly following workshops and conferences.

III. Stakeholder Input

1. Actions to Seek

Methods of soliciting stakeholder input include using television, radio, newspaper, newsletter and social media ads to announce public meetings and listening sessions; sending targeted invitations to stakeholder groups and key community members; engaging stakeholders at culturally relevant community meetings; conducting surveys and collecting feedback on public priorities during open houses and local and state fairs; and providing online platforms for engagement including blogs, Facebook pages, Twitter feeds and YouTube channels. As required by the AREERA of 1998, these points of contact for public input will be advertised as broadly as possible. CES also sponsors agricultural and horticultural conferences and outreach activities with AFES participation where the units gather formal and informal stakeholder input. Outreach faculty and staff will also identify ways to overcome barriers like income, transportation, literacy, etc. when reaching out to underserved populations. CES utilizes advisory groups as an important part of the stakeholder needs assessment process. In addition to traditional feedback options including email, surveys, open houses and discussions, IANRE increasingly utilizes citizen science activities to engage stakeholders in local agriculture topics. Such activities make use of

faculty-designed phone applications to enhance the experience, such as Grow & Tell and Alaska Weeds ID. Smartphone apps are a contemporary way to attract stakeholders to participate in pest mapping and variety testing while IANRE gains insight into lay understanding of Alaska's critical issues.

CES and AFES will meet with audiences on demand throughout the state in both formal and informal settings each year. Examples of these audiences include agriculture associations, livestock associations and reindeer herders, Alaska Native villages, tribal organizations and regional corporations, borough and city governments and municipalities, grower groups meeting at regional and statewide conferences, industry stakeholders involved in food, fiber and fuel/energy production, soil and water conservation districts (SWCDs), and state and federal partners including but not limited to USDA, NRCS and the Forest Service.

2. Methods to Identify

CES and AFES plan to engage with advisory committees, focus groups and participants in listening sessions as well as continue to conduct needs assessments and stakeholder surveys as methods to identify groups and individuals from whom to collect input. Faculty and staff will utilize U.S. Census Bureau data to determine potential audiences and parity goals. AFES relies on stakeholder input from agricultural advisory groups, collaborators, federal and state agencies, colleagues, faculty and students for assistance in establishing priorities and developing project directions. Members from the public who have participated in or who have an interest in CES program offerings represent an important segment of the organization's stakeholders who can be contacted after their experience to offer feedback on program improvement and interest in future programming. Stakeholders often identify themselves by emailing or calling Extension faculty or staff. Other significant stakeholder groups are public and private agencies and organizations that have professional and programmatic relationships with Extension or direct interest in CES programming.

A primary goal of the University of Alaska Fairbanks 2019-2025 strategic plan is to "solidify our global leadership in Alaska Native and Indigenous programs." IANRE has built strong relationships with Native groups across the state, from Fort Yukon to Dutch Harbor, and has two FRTEP agents that advise the unit on tribal community needs. IANRE has been proactive over the past several decades providing culturally relevant and responsive programming, including but not limited to: advising on cold climate housing and indoor air quality; providing research-based publications on traditional foods like walrus and bullwhip kelp; offering culturally relevant youth activities like dog mushing and trapping; gathering survey data on Native use of public lands; and teaching hands-on skills for community gardening, reindeer processing, and more.

3. Methods to Collect

- Meetings with traditional stakeholder groups
- Surveys of traditional stakeholder groups
- Meetings with nontraditional stakeholder individuals
- Surveys of nontraditional stakeholder individuals
- Surveys of the general public
- Meetings with key community members from the general public

CES and AFES will continue generating a feedback loop that provides information to research and outreach programs and from research and outreach programs to stakeholders and individuals. Conferences, meetings and workshops are scheduled around themes relevant to stakeholder concerns. Post-activity surveys and debriefing opportunities will establish how well information needs are addressed. Meeting minutes, videoconference archives and other records of stakeholder engagement and input will be used in planning of research and Extension programs.

Extension collects stakeholder input through in-person surveys following conferences and workshops, by email surveys and through public presentations with discussion opportunities made available to a variety of groups and agencies. The evaluation specialist will work with district agents and program assistants to determine culturally relevant methods for documenting behavior changes implemented by stakeholder groups. Input is also collected individually by agents who work with stakeholders, and through meetings with advisory groups. Blogs and more than 20 social media pages also provide venues for stakeholder input.

4. How Considered

Stakeholder input will be considered in program planning to: identify emerging issues; redirect extension and research programs; guide staff hiring and action plans; set district and unit-wide priorities; and identify underserved populations. AFES and CES will continue to serve the needs of the people of the state of Alaska. Input will reflect 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 reflect the concerns of all major stakeholder groups, and will continue to be the highest priorities in workload planning and resource allocation. Requests for specific speakers and topics at conferences guide conference agendas. Requests for programming help shape what is offered. Needs assessments will continue to help CES and AFES faculty and staff identify emerging issues. Community needs are an important consideration when assessing how to create or fill staff and faculty positions. Stakeholder needs will continue to be a driving factor in determining CES priorities for programming and AFES priorities for research.

IV. Critical Issues

1 Agriculture & Food Security

Description:

Alaska's agricultural opportunities and their relationship to food security are a critical issue because Alaska imports over 90 percent of its food. To become adaptable to economic, climate and other changes, it is critical to provide support to growers in the state. CES and AFES are well positioned to provide information about high-latitude agriculture and horticulture. Areas emphasized in the close collaboration of CES and AFES include agronomic crop and livestock production, commercial and home horticulture best practices, new technology applications, IPM and control of invasive pests, youth involvement in agriculture, best practices for controlled environments small-scale agribusiness, and cultivar testing for climate-adapted crops.

Term: Long

Science Emphasis Areas

Agroclimate Science
Sustainable Agricultural Production Systems

2 Natural Resources, Ecosystems & Sustainable Energy

Description:

Collaborative efforts are key to ensuring proper stewardship of Alaska's complex ecosystems. CES and AFES faculty and staff will maintain partnerships and participate in multistate and integrated activities with stakeholder groups, government agencies and other institutions that enhance outreach regarding natural resource management and renewable energy sources. Faculty and staff will work to expand capacity for public involvement in natural resource, ecosystem and sustainable energy issues, including distributing newsletters and maintaining online platforms for education and engagement. Public workshops, presentations and consultations will offer opportunities for stakeholders to increase their awareness of biomass and other sustainable energies.

Term: Long

Science Emphasis Areas

Bioeconomy, Bioenergy, and Bioproducts
Environmental Systems

3 Healthy Individuals, Families & Communities

Description:

Alaska faces challenges such as high rates of botulism, obesity, food insecurity and other risks to public health. Cold climate housing also presents challenges in balancing fresh air flow with energy conservation. To address such concerns, CES faculty and staff will offer educational opportunities regarding nutrition and physical activity, chronic disease prevention and management, home modifications, air quality and energy efficiencies, food safety practices and food preservation techniques.

Term: Long

Science Emphasis Areas

Family & Consumer Sciences

Food Safety
Human Nutrition

4 4-H & Youth Development

Description:

Research shows that to increase resilience and reduce risky behaviors, youth need connections to caring adults. Faculty and staff will continue to provide mentorship and life skills programming to youth, including nutrition lessons. CES seeks to increase participation in STEAM activities as well as provide youth with local and statewide opportunities for community involvement. 4-H educators will continue to offer culturally relevant activities for the many diverse groups in Alaska while providing learning experiences within the national mission mandates of science, healthy living and civic engagement.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances
Youth Development