

2017 University of Alaska Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report 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 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 diverse 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. During the past 40 years, Alaska's economy has become dependent upon revenues related to petroleum development. To diversify its economy, the state is moving toward non-petroleum 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 teaching, research, Extension and engagement programs.

Our combined unit has been known as the School of Natural Resources and Extension (SNRE) since July 1, 2014, after the formal merger of the School of Natural Resources and Agricultural Sciences (SNRAS) and the Agricultural and Forestry Experiment Station (AFES) with the Cooperative Extension Service (CES). The programs 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. SNRE is a critical partner for the university, providing a linkage among researchers, Extension and Alaskans to deliver the latest research findings, educational and outreach opportunities.

Planned programs for purposes of this report include Agriculture and Food Security; Natural Resources and Community Development; Healthy Individuals, Families and Communities; Climate Change and Ecosystem Management; Youth Development; and Sustainable Energy. Climate change, while addressed primarily in one planned program, affects all the program areas.

Alaska imports over 90 percent of foods and other agricultural products. As the population grows and transportation costs increase, more locally and regionally produced food will be needed to provide greater food security. To this end, 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. One such crop, peonies, has been one of our success stories and *Rhodiola rosea* also continues to show potential.

Many Alaskans live a subsistence lifestyle or supplement their diets with local fish and game meat. Alaska also has a large military population, and most have not previously preserved game meat or fish. Our state has one of the nation's highest rates of botulism, with the most recent suspected case in 2018, making it 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, and small food business entrepreneurs.

Alaska also has one of the fastest growing senior populations, who 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 and diabetes. Alaskans need help managing chronic conditions and planning healthy meals in food insecure environments.

High energy costs remain a critical issue, particularly in rural Alaska. Research and outreach have focused on new and alternative sources of energy, wood and biomass and energy conservation. There is a consistent need for research based cold climate building and maintenance information. Homes are tightly built to try and reduce heating costs; however, this leads to other consequences, such as indoor air quality concerns.

The mission of SNRE is 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 our research results, all Alaskans benefit from the wise use of land resources. Our research projects are in response to requests from producers, industries, and state and federal agencies for information in plant, animal and soil sciences; forest sciences; and resource 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 scientists publish their research in scientific journals, conference proceedings, books, and in experiment station bulletins, circulars, newsletters, research progress reports and other miscellaneous publications. Scientists also disseminate their findings through conferences, public presentations, workshops and other public information programs like websites and blogs.

Administratively, AFES is an integral part of SNRE. This association provides direct links between research, teaching and outreach. Scientists who conduct research at the experiment station also teach, sharing their expertise with undergraduate and graduate students, adult learners and Extension faculty and staff. Researchers also collaborate with Extension faculty by inviting them for guest lectures and collaborating on integrated grant projects.

Cooperative Extension's mission is to educate, engage and support the people and communities of Alaska, connecting them with their university. Extension 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, non-formal education, including conferences, workshops and cooperative work with community, regional and tribal partners. Outreach is also provided through publications, consultations, newsletters and social media outreach dedicated to district information and locally useful subject matter. CES programs address national priorities by helping families, youth and individuals be physically, mentally and emotionally healthy; enhancing workforce preparation and life skills; strengthening the profitability of animal and plant production systems; protecting our rich natural resources and environment; ensuring an abundant and safe food supply through horticulture and food preservation education; preparing for and responding to natural disasters; 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, a state advisory council, various regional and subject matter advisory groups, surveys and needs assessments. Our national partnership with eXtension has also helped with reaching stakeholders. Agents answer stakeholder questions through eXtension Ask an Expert, participate in communities of practice, and incorporate eXtension resources into their programming. The eXtension provision of Qualtrics access has been critical in maintaining our evaluation efforts.

Extension will continue to work with researchers to support agriculture, horticulture, forestry, and rural and economic development. Collaborations continue with other universities and with other units within the University of Alaska Fairbanks, the University of Alaska statewide system, federal and state agencies, nongovernmental organizations and private industry. 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. SNRE brings the university to Alaskans while bringing community concerns and issues back to the university.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	45.0	0.0	15.0	0.0
Actual	38.1	0.0	19.1	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

The Agricultural and Forestry Experiment Station (AFES) uses the scientific peer review process to review and evaluate proposals, publications and specific annual reports that include the annual narratives that are required to report activities related to the Plan of Work. Extension uses the merit review process and the general review process for this joint annual report and Plan of Work. 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, publications and specific annual reports.

All new and revised Hatch (and McIntire-Stennis) project proposals undergo scientific peer review. The blind peer review panel is composed of a minimum of three members and consists of competent authorities in the discipline of the proposal/publication/annual report or related disciplines. 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/report. Scientific peer review of multistate research projects are carried out for individual projects under the aegis of the Multistate Review Committee (MRC- formerly RCIC). The director of research is a member of the MRC. All faculty who are participants in Hatch multistate projects are required to have an approved Hatch General project that is related to the field of study of the multistate project.

SNRE has an evaluation specialist who helps design outcome and impact evaluations, working with faculty to evaluate individual programs. Various program partners sometimes provide survey instruments or facilitate data collection as well. In FY17, outreach faculty were again required to include hours dedicated to evaluation in their workloads. Many workshops and all conferences are evaluated.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other (SNRE websites, newsletters, blogs, Facebook and Twitter pages, YouTube channel and interactive citizen science based phone applications)

Brief explanation.

AFES' Advisory Council has seven members drawn from agriculture, natural resources, forestry, mine engineering and economic development. SNRE interacts with regional audiences around the state in both formal and informal settings each year. Examples of these include:

- Alaska Livestock Producers
- Alaska Food Policy Council
- Alaska Peony Growers Association
- Alaska Produce and Greenhouse Growers
- Delta Farm Forum
- Delta Harvest Wrap-Up
- Kawerak Native Association
- On-demand meetings at the request of stakeholders
- Regional and Statewide Farm Bureaus
- Reindeer Owners and Breeders Association

State stakeholders include:

- AHTNA Native Corporation
- Afognak Native Corporation
- Alaska Natural Fiber Business Association
- Chena Hot Springs Resort
- Department of Environmental Conservation
- Department of Natural Resources
- Diversified Livestock Association
- Division of Agriculture
- Division of Forestry
- Fairbanks Economic Development Corporation
- Fairbanks North Star Borough

- Farmers markets around the state
- Matanuska-Susitna Borough
- North Slope Borough
- Pike's Waterfront Hotel & Greenhouse
- School districts around the state

Since much of Alaska land is under federal and state agency control, natural resource stakeholders include government land managers. Federal stakeholders for SNRE include:

- Bureau of Indian Affairs
- Bureau of Land Management
- National Park Service
- U.S. Fish and Wildlife
- U.S. Geological Survey
- USDA/NRCS, ARS, Forest Service

Extension sponsors agricultural and horticultural conferences and outreach activities. Formal and informal stakeholder input is gathered there. Stakeholders are also invited to serve on various conference planning committees. Outreach events in FY17 included the Delta Farm Forum, Alaska Sustainable Agriculture Conference, the Alaska Invasive Species Conference and the Harvest Wrap-Up.

Extension has a 13-seat Statewide Advisory Council, which provides guidance about programming across the state. Representatives serve 3-year terms and are drawn from all regions of the state. The State Advisory Council usually meets face to face once a year as well as through four audio conferences. Local advisory committees provide community input related to local program needs and interests. Additionally, advisory councils provide guidance on mining and 4-H programming. Extension faculty members gather stakeholder input as part of their program planning and development process as well as surveys following instructional activities. Faculty, staff and administrators within Extension are also members of the advisory committees and boards of organizations that are stakeholders of the organization. This service on committees and boards provides another venue for stakeholders to provide input to Extension. 4-H has programmatic audios with stakeholders that generate suggestions.

Newsletters with information on youth development, home economics, and gardening as well as blogs about housing & energy, backyard chickens, and Master Gardeners also provide outlets for stakeholders. CES further invites stakeholder participation through social media via statewide and district Twitter feeds, statewide, district, 4-H and other subject matter Facebook pages, a YouTube channel and citizen-science based phone applications that help document issues in local agriculture and pest management.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

Stakeholders include individuals and groups who would logically benefit from Extension's services. Other stakeholders are partner agencies organizations and related stakeholder organizations. Examples include the Farm Bureau, Grange and Farmers Union, as well as Master Gardener associations and food banks. Additional stakeholder groups are Alaska Native tribal organizations, school districts and village governments who request services to help build community educational and development capacity.

A number of stakeholders identify themselves by calling or e-mailing Extension faculty or staff. Individuals and groups have been identified through advisory committees, working with agencies that have similar missions, and work with community, religious and workforce groups and other units of the university. Advisory groups like the 4-H leaders' organization provide stakeholder input.

AFES stakeholders are research collaborators, partners in federal or state agencies who approach us with funding or needs, the public who often call and solicit assistance, graduate and undergraduate students, public schools that connect through reindeer programs or the OneTree program, K-12 teachers, and agriculturalists, forest land owners, entrepreneurs and other end user groups.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Survey of the general public
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

Brief explanation.

SNRE relies on stakeholder input from advisory groups, collaborators, federal and state agencies, colleagues, faculty, students and other appropriate constituencies for assistance in establishing priorities and developing program direction. Current major stakeholders include the Fairbanks North Star Borough, Matanuska-Susitna Borough, Reindeer Herders Association, Northern Forest Cooperative, Peony Growers Association, Fairbanks Economic Development Corporation, and industries involved in food, fiber and fuel/energy production.

Feedback from the Georgeson Botanical Garden Society, local community supported agriculture groups, local restaurants and resorts provide research direction. Other significant stakeholder groups include state and federal and private organizations that have professional and programmatic relationships or direct interest in the unit's programming. Some of Extension's major stakeholder organizations include but are not limited to the Farm Bureau, Grange, Alaska Energy Authority, greenhouse growers, food banks, Boys and Girls Clubs, school districts and research units of the university.

Additional stakeholder groups are Alaska Native tribal organizations, school districts and village governments that request services to help build community, educational and development capacity. Input is collected from workshop participants through surveys following conferences, classes and workshops, either immediately through paper and/or guided discussion, or as follow-ups by electronic or mail-in surveys. Input is also collected individually by agents, through needs

assessments and through programmatic advisory groups and memberships on relevant partner committees.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities
- Other (Underserved populations identified)

Brief explanation.

SNRE joint research and outreach planned programs are directly related to the strategic plans produced by faculty as well as the direction set by administrative leadership. The AFES plan reflects ideas and advice given by client user groups, students, expert advisors, state and national peers and cooperators, and UAF administration. During the FY17 reporting period, the focus areas of sustainable energy, local and regional food production and food safety, and the need for adult and youth education and training to fill Alaska job and career demands were addressed. These focus areas were used to set priorities in meeting the need for knowledge about Alaska and circumpolar resources. Input was considered in the budget process. Capacity funds were used in response to research needs based on the emerging focus areas.

CES and AFES will continue to build on past focus areas of food safety and security, health, climate, energy, youth, families and communities, and economic development by adding emphasis on strengthening SNRE's relevancy, capacity and collaboration in those areas. Agents' planned workloads reflect district community issues. Stakeholder needs will continue to be a driving factor in determining Extension priorities and programming.

Stakeholder input in FY17 continues to support the need for youth outreach in rural Alaska, health and nutrition programming, pest management and programs on biomass and responsible wood burning. Interest in locally raised agricultural animals and food production continues to be high. Agents use stakeholder input to identify programming needs and work to offer programs and information that meet those needs. For example, stakeholder involvement on conference planning committees and input at conferences led to specific topics and speakers at subsequent conferences.

Brief Explanation of what you learned from your Stakeholders

Alaskans continue to desire information necessary to make decisions related to a healthy lifestyle and a healthy economy. Food security, energy, climate change, obesity, chronic health issues and youth development have risen to the forefront as areas of particular importance and are therefore leading to development of research and Extension programming, particularly in subsistence, small farm agriculture and energy. Interest continues for research on animal reproduction and quality meat production techniques. There is also strong interest in culturally relevant programming, local food production, health and nutrition programming, family finance, budgeting and estate planning, and programs that focus on improving communities and reducing energy consumption.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{No Data Entered}	{No Data Entered}	{No Data Entered}	{No Data Entered}

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	1490756	0	1108743	0
Actual Matching	1122530	0	1434453	0
Actual All Other	5814543	0	812654	0
Total Actual Expended	8427829	0	3355850	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Agriculture and Food Security
2	Natural Resources and Community Development
3	Healthy Individuals, Families and Communities
4	Climate Change
5	Youth Development
6	Sustainable Energy

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Agriculture and Food Security

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		20%	
205	Plant Management Systems	20%		22%	
212	Diseases and Nematodes Affecting Plants	0%		3%	
213	Weeds Affecting Plants	15%		0%	
216	Integrated Pest Management Systems	23%		0%	
301	Reproductive Performance of Animals	5%		15%	
302	Nutrient Utilization in Animals	5%		10%	
305	Animal Physiological Processes	2%		10%	
401	Structures, Facilities, and General Purpose Farm Supplies	5%		5%	
405	Drainage and Irrigation Systems and Facilities	0%		5%	
601	Economics of Agricultural Production and Farm Management	5%		0%	
903	Communication, Education, and Information Delivery	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	10.0	0.0
Actual Paid	4.9	0.0	5.1	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
527555	0	1018826	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
396115	0	1030990	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1666518	0	764767	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and outreach continued to assure that best management practices appropriate to Alaska are provided to target audiences. Growing trials provided new directions on the resilience and adaptability of crops as changes in the subarctic and arctic climate occur. Research and Extension programs continued to be revitalized to remain relevant to regional and local agricultural production. Group and one-on-one educational activities with specific sectors of the pest management industry, the agricultural community and the horticultural industry provided individuals and businesses with important information. Increased reliance on the internet and technology enhanced communication with more people, as faculty and staff utilized distance education platforms. Increasing and maintaining partnerships was an important strategy in keeping pest species below threshold levels. Outreach included conferences, workshops, forums, tours and consultations with stakeholders.

2. Brief description of the target audience

The target audiences included producers and consumers, communities, entrepreneurs, agribusinesses, industry leaders, individuals and groups concerned about the quality of the Alaska environment, public resource agencies, public and private resource managers, other faculty and researchers, and undergraduate and graduate students. Others consulted included arborists, farmers, garden and plant associations, public and commercial greenhouses, homeowner associations, landscapers, state and federal park employees, gardeners, museums, military base personnel, boroughs and urban municipalities, pest control operators, property managers, public health organizations, public and private schools, recreational facilities, resorts and hotels, rural residents, youth groups and school districts. Advisors and the target audience included the Alaska Farm Bureau, USDA Natural Resource Conservation Service, the USDA Forest Service, the Alaska Department of Natural Resources, borough governments and Alaska Native corporations.

3. How was eXtension used?

Continued use of eXtension resources has been very valuable to Extension outreach in Alaska. In FY17 faculty and staff answered 77 agriculture and horticulture related questions through eXtension's Ask an Expert interface. Topics included cover crops, tree health, pruning, lawn care, mosses, fungi, insect identification, berry and vegetable cultivation, citizen science, invasive species and soil testing. Agent and educator memberships in eXtension's communities of practice (CoPs) included the Food Systems Impact Collaborative, Invasive Species, Citizen Science, and Homepage Authors. Agents have used eXtension-provided Qualtrics access to survey stakeholders and document changes in knowledge and behavior. The Extension veterinarian was a 2016 i-Three Issue Corps member. A tribes Extension educator was an Innovation Partner and developed a mobile application for citizen scientists to contribute to crop variety

research.

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	11410	357253	2249	18803

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	3	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Output 1: Faculty will provide agricultural and horticultural workshops, short courses, classes, field days and conferences, including IPM.

Year	Actual
2017	120

Output #2

Output Measure

- Output 2: Faculty will provide agricultural, horticultural and pest management information through one-on-one consultations and consultations with other organizations. Output measure will be contact hours.

Year	Actual
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2017 5004

Output #3

Output Measure

- Output 3. Horticultural crop research will concentrate on home and commercial varieties appropriate to Alaska. Publications and presentations are the output measures.

Year	Actual
2017	25

Output #4

Output Measure

- Output 4. Controlled environment horticulture will focus on CEA technology and technology transfer and appropriate crops and best management practices for crop production in specific environments. Output measures will be publications and presentations.

Year	Actual
2017	3

Output #5

Output Measure

- Output 5. Focus will be on best management practices for livestock management and production. Output measures will be publications and presentations.

Year	Actual
2017	15

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Outcome 1: Increase agronomic crop producers' ability to understand and assess best management practices of crop production. Measure will be number of producers who adopt practices.
2	Outcome 2: Increase livestock producers' ability to understand and assess optimum production practices. Measure will be number of producers.
3	Outcome 3: Increase participants' commercial and home horticulture best management practices. Measure will be number of individuals who adopt better management practices.
4	Outcome 4: Increase the number of adopters of new technology and management practices.
5	Outcome 5: Increase the number of activities that monitor and control invasive species and pests. Measure will be the number of outreach activities and publications.
6	Outcome 6: Demonstrate effective collaboration between research and Extension to resolve agriculture and horticulture issues.
7	Outcome 6: Increase reindeer producers' ability to understand and assess optimum production practices. Measure will be number of producers.
8	Outcome 7: Increase the number of youth appreciating agriculture and considering agricultural careers. Measure is number of youth contacts.
9	Outcome 8: Provide support for emerging agricultural industries. Measure will be number of presentations and consultations.
10	Outcome 9: Research will determine best practices for controlled environment horticulture. Measure will be number of cultivars tested.

Outcome #1

1. Outcome Measures

Outcome 1: Increase agronomic crop producers' ability to understand and assess best management practices of crop production. Measure will be number of producers who adopt practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Variety trials are time consuming. Seed companies tend to develop their products for the market at-large in the Lower 48. Though they may offer varieties described as cold-tolerant, they are rarely tested in growing seasons as extreme those of Alaska. As a result, Alaskan growers struggle with the trial and error of identifying viable crop varieties in their growing zones. Publicly funded variety trials reduce the expense, time and effort that gardeners and farmers need to put in to figure out what will be successful on their plots.

What has been done

In 2017, four varieties of beets, carrots, radishes and turnips were tested in Fairbanks. A randomized complete block experimental design was used and plots were replicated three times, with 16 cultivars planted according to recommended commercial spacing guidelines. Results were published in a variety trials report made available on the Extension website, publicized on social media and shared by the agent at the Alaska Food Policy Council conference. The agent facilitating the trials also encouraged gardeners and farmers to document how different varieties grow on their own land using a newly launched mobile app, Grow & Tell, described in a later outcome.

Results

The vegetable trials have revitalized university experiment plots, which had ceased annual variety trials in 2009 due to budget cuts. In addition to weight and number harvested, uniformity, plant vigor, and susceptibility to pests and disease were rated on a scale of 1 to 5, ranging from very poor to excellent, averaged for each replication and then by cultivar. Results will inform planting choices by local growers. For turnips, the best pick was Tokyo Cross, rated at 4.6 or above for all metrics with a yield of 1.2 lbs per foot, and described as uniform and sweet. All beets

were similar in uniformity, plant vigor, and productivity with all scores above 4. For carrots, Napoli and Scarlet Nantes were the better germinating and easier to harvest, with both described as crisp and yielding 1.4 and 1.5 lbs per foot, respectively.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Outcome 2: Increase livestock producers' ability to understand and assess optimum production practices. Measure will be number of producers.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	269

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Many Alaskans do not live near easily accessible services. Those involved in farming and ranching have a need for information on how to best monitor the health of their flock and herd so that they can identify problems early, where there will be time for navigating the logistics of getting veterinarian and other expert help in more remote areas. There are also concerns over food security and high costs of living. Livestock raised in Alaska also provides food products for both home and commercial use. There is continued interest in raising chickens for backyard flocks as a source of both meat and eggs.

What has been done

Clients representing 19 Alaska farms participated in hands-on labs with trained technicians demonstrating a five-point check on livestock. A total of 43 4-H youth and nine adults participated in hands-on labs utilizing cattle, sheep, and goats, assessing composition, lung sounds and rumen function. The Kenai agent offered an agricultural training program series to 11 individuals in several locations on Kodiak Island. An agent's "Chicken University" held in four communities

was attended by 135 adults, and 11 attended a distance poultry production class. Two workshops on artificial insemination reached 41 people.

Results

Farmers were able to submit fecal samples from 10% of their herds. Qualitative fecal analysis was performed on 93 composite samples, with results reported back to the producers, informing herd management. In Old Harbor, a city on Kodiak Island, the tribal government built a chicken coop producing about 40 eggs a day, which the tribal administrator says will help "supplement our subsistence way of life."

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Outcome 3: Increase participants' commercial and home horticulture best management practices. Measure will be number of individuals who adopt better management practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	697

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Horticulture is the largest agricultural industry in Alaska amounting to more than 50 percent of cash receipts for all agricultural crops. Alaska imports most of its food and costs are high, particularly in rural areas. Dependence on imports poses a food security risk if supply lines are interrupted. Teaching more residents research-based methods for gardening or growing crops increases the quality of food available to consumers and can lower the risk of food insecurity.

What has been done

Workshops helped inform the public of developments on high tunnels as an option to augment the growing season. Extension trained 73 Master Gardeners and 45 Junior Master Gardeners. Ten people were trained in weed free forage, and 149 were trained in pesticide safety. Composting classes were offered by three agents to 200 people in seven different communities. Twenty-two attended a class on growing peonies. Gardening basics like seed starting and how to start a community garden were taught to 155 people.

Results

Forty-three people attended workshops on high tunnels including 20 who participated in a 15-hour class in which they immediately applied skills by constructing a demonstration hoop house at the Matanuska Experiment Farm. The Delta agent consulted with the Department of Transportation (DOT) on appropriate spray technology and specifications for a truck purchased for roadside herbicide application. The agent also provided the training DOT personnel needed to acquire certified applicator credentials, increasing community capacity to manage invasive species moving along Alaska’s highway corridors. Master Gardeners contributed greatly to community capacity; they agree to 40 hours of service in their communities, and some of them have continued volunteering for 20 years or more.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
401	Structures, Facilities, and General Purpose Farm Supplies
405	Drainage and Irrigation Systems and Facilities
601	Economics of Agricultural Production and Farm Management

Outcome #4

1. Outcome Measures

Outcome 4: Increase the number of adopters of new technology and management practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	4404

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

New technologies help everyone in the agriculture field stay up-to-date through information sharing, diagnostics, and other improvements and efficiencies related to growing and managing crops. Alaskans need more opportunities for reporting and identifying crop issues in real-time, sharing observations from experienced growers, and watching demonstrations of best practices for managing animal and plant production. Increased exposure to new technology and practices raises the possibility Alaskans will adopt such tools.

What has been done

The Alaska Weeds Identification app continued to be offered for both iPhone and Android devices, and garnered interest from the Department of Natural Resources and Tongass National Forest, whose staff received training on its use. The new Grow & Tell app invited gardeners to act as citizen scientists and rate the varieties they have grown for taste, yield and reliability. An agent developed an online soil test calculator that has augmented soil test results reporting, allowing users to estimate soil fertility needs and understand soil amendment scenarios.

Results

The Grow & Tell app has seen over over 3200 installations on iOS and 446 on Android systems since its launch in 2017. Comments include "Very useful and easy to use." Entries for over 50 additional species have been prepared for addition to the Alaska Weeds Identification app, which had 582 new downloads and has seen over 2000 downloads since its launch. Natural Resource Conservation Offices use the soil calculator for each high tunnel program soil analysis they work on, and the tool has seen 176 unique pageviews.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems
903	Communication, Education, and Information Delivery

Outcome #5

1. Outcome Measures

Outcome 5: Increase the number of activities that monitor and control invasive species and pests. Measure will be the number of outreach activities and publications.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	77

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alaska hosts thousands of visitors every year. The state also imports most of its food and many horticultural products, so it remains vulnerable to imported pests. Retail sales of plant materials contaminated with a variety of pests continue to challenge the state. Invasive weed infestation can reduce land values and agricultural productivity and negatively impact recreation, tourism and subsistence harvesting. Improving citizen, farmer and land manager ability to assess pest management practices is critical.

What has been done

Seasonal IPM technicians and permanent staff, with support from faculty, provided community education and technical assistance. Agents and IPM staff had 1,496 consultations, most of which were requests for plant and insect identification. IPM staff maintained and reporting web portal where the public submitted digital photos. An IPM technician assisted with pesticide applicator training and presented to nine members of the university grounds crew about how to identify spruce beetles.

Results

Local growers were set up for success. Out of 17 responses to a survey on working with IPM field technicians during site visits, all 17 planned to adopt a demonstrated practice and 16 agreed they felt prepared to scout their own fields afterward. Comments included "We learned a wealth of information and plan on implementing the recommendations for controlling pests and gardening" and "Without CES help we could have probably struggled several more years with minimally productive plants."

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
903	Communication, Education, and Information Delivery

Outcome #6

1. Outcome Measures

Outcome 6: Demonstrate effective collaboration between research and Extension to resolve agriculture and horticulture issues.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	52

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Women are a traditionally underserved group among farmers and ranchers. According to USDA's state agriculture overview for Alaska, as of 2012 over a third, or 250 of 762, principal farm operators in Alaska are women. This represents a significant need for support and mentorship in the farming community.

What has been done

A researcher coordinated the sites in Alaska for the 2017 Women in Agriculture Conference. The UAF School of Natural Resources and Extension hosted an event on the Fairbanks campus and, in conjunction with Alaska Farmland Trust, a site at the Matanuska Experiment Farm and Extension Center in Palmer. The Salcha-Delta Soil and Water Conservation District hosted the event at the Delta Career Advancement Center in Delta Junction. Agriculture students, farm interns, and FFA and 4-H youth members were offered registration at a reduced cost.

Results

Fifty-two Alaska women farmers and agency representatives joined about 550 participants at 37 videoconference sites in Washington, Oregon and Idaho for the conference. Guest speakers encouraged participants to develop and use leadership skills to increase capacity for mentoring new farmers. Each videoconference site had a panel of local women farmers who discussed challenges and how mentorship has been helpful.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes

401	Structures, Facilities, and General Purpose Farm Supplies
405	Drainage and Irrigation Systems and Facilities
601	Economics of Agricultural Production and Farm Management
903	Communication, Education, and Information Delivery

Outcome #7

1. Outcome Measures

Outcome 6: Increase reindeer producers' ability to understand and assess optimum production practices. Measure will be number of producers.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Livestock raised in Alaska provides food products for both home and commercial use. Educating livestock producers facilitates the development of sustainable, high-latitude livestock production. Alaska only produces 5 percent of its red meat food supply, leaving residents vulnerable to high prices, shortages, and product demands in other markets. Some villages in Alaska have seen their subsistence harvests decline, and are looking for more reliable ways to feed their communities. Domestic reindeer (*Rangifer Tarandus tarandus*) are very well adapted to cold climate and have the potential to become a commercial red meat source for Alaskans.

What has been done

Collaborations continue with the Kawerak Reindeer Herders Association, the Reindeer Breeders and Owners Association (RBOA), and others that reached at least 80 producers. The manager of the reindeer research program spent over hundreds of hours consulting 343 people about reindeer research, slaughter, and health and production issues. A reindeer research professional made site visits and consulted at least two herd managers at local tourist attractions on hoof trimming and production issues. A project on the use of Depo-Provera to reduce aggressive behavior was concluded.

Results

Reindeer meat continues to be sought for use in restaurants and grocery stores, and SNRE expertise has been key to its safe supply. The researcher helped meat processors in Savoonga

adopt more efficient methods with hands-on carcass instruction, and they have generated \$20,000 in meat sales. Results from comparisons of the Depo-Provera treated bulls and control groups indicated that treated bulls ceased rut associated aggression, maintained normal food consumption, and had reduced semen quality but were still capable of successfully mating with some estrus females. Results were presented at a regional meeting and used to inform university herd management and recommendations to the RBOA.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
305	Animal Physiological Processes
401	Structures, Facilities, and General Purpose Farm Supplies
601	Economics of Agricultural Production and Farm Management

Outcome #8

1. Outcome Measures

Outcome 7: Increase the number of youth appreciating agriculture and considering agricultural careers. Measure is number of youth contacts.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1831

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A graying population combined with increases in new technologies make outreach to younger generations critical to maintaining agricultural infrastructure. Across the U.S., farmers on average are over a decade older than other work groups in America; the average age of Alaskan farmers is 57. Ongoing engagement with young people is needed to inspire the next generation of growers, stewards and scientists. SNRE is in a position to reach out to youth of all age ranges to communicate the value of agricultural careers.

What has been done

The annual Alaska Agriculture Appreciation Day at the experiment farm gave around 600 youth an opportunity to interact with plants and animals. The 4-H market livestock auctions and

gardening projects around the state provided hands-on experience and raised public awareness of agricultural possibilities in Alaska. Student participation was encouraged in the multistate Women in Agriculture video conference.

Results

Many youth attending the agriculture appreciation activities got hands-on experience harvesting vegetables. Tours of farms allowed campers, conference attendees, and students to see operations firsthand, which increased engagement. Through 4-H, 5 youth participated in Agriculture in the Classroom activities. There were also 1,181 animal projects that allowed youth to gain firsthand knowledge and experience of raising livestock in Alaska. Several school gardens continue to thrive with support from SNRE faculty and staff or trained volunteers. IPM staff presented to 45 middle school students at a STEM career day.

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
601	Economics of Agricultural Production and Farm Management
903	Communication, Education, and Information Delivery

Outcome #9

1. Outcome Measures

Outcome 8: Provide support for emerging agricultural industries. Measure will be number of presentations and consultations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	114

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Commercial and home growers face many production challenges including a short growing season, cold soils and limited soil fertility. Some crops also need several years of growth before they become harvestable. Rhodiola rosea and peonies are two such crops. Rhodiola rosea, harvested for the compound rosavin found in its roots, is a viable high value crop for Alaska, with dried roots selling for \$25/pound. Peonies also continue to be in demand from Alaska growers. It

is important that growers receive support for the longevity of these emerging industries.

What has been done

There were 80 hours of estimated consultations with 25 members of Alaska Rhodiola Products and over 56 hours of consultation with 84 people including the Alaska Peony Growers Association, peony farmers and other interested members of the public. The Fairbanks area 4-H agent coordinated an annual peony root sale that raised funds for youth programming. Researchers and agents presented on peonies to 119 people at five venues. A research technician collaborated on a multistate publication, "Tobacco Rattle Virus in Peonies: A Reference Guide for Cut Flower and Rootstock Producers."

Results

SNRE continued to support peony growers as they cultivated and sold flowers at local farmers markets and shipped orders to wholesalers in the Lower 48. There are roughly 100 peony farms in Alaska, and 2016 saw a harvest of 200,000 stems. If current success continues, the Alaska Peony Growers Association estimates nearing a million stems by 2025. The Alaska Peony Growers Association gave a researcher its Growers Cup Award for providing key support to the peony industry. Rhodiola has proven to be hardy in Alaska but may take up to a decade to prove profitable. Extension estimates that rhodiola is growing on about 25 to 30 acres of land from up in Nome down to the Mat-Su Valley and the Kenai Peninsula.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #10

1. Outcome Measures

Outcome 9: Research will determine best practices for controlled environment horticulture. Measure will be number of cultivars tested.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Greenhouse vegetable production extends the short Alaska growing season, but challenges exist to growing in-demand crops such as spinach and bell peppers. Most spinach selections bolt quickly and flower under the long Alaska summer days. Development and flowering of spinach may be altered under spectrums more limited than natural light. Bell peppers are a potential greenhouse crop, but more research is needed to provide production guidance.

What has been done

A study was initiated to evaluate the response of spinach to LED lighting. A preliminary study on bell pepper production suggested increased productivity when three leaves compared to one leaf were left on side branches of a two stem trellising system. To further evaluate the importance of side shoot pruning, an experiment with three bell pepper cultivars was initiated. The lateral side stems developing on the two primary stems were trimmed over one or three leaves through the study.

Results

Preliminary results suggest significantly delayed spinach flowering under monochromatic LED lighting. Based on these findings, production protocols for quality local spinach may be developed. The three bell pepper cultivars, Striker, Fantasy and Paramo, produced significantly higher results with the three-leaf system. Along with a larger yield, the three-leaf system also resulted in additional fruits per plant. Individual peppers were heavier in the one-leaf system for all cultivars but the size difference did not make up for fewer peppers. Protocols for greenhouse bell pepper production have been communicated at state, national and international science conferences, as well as in postsecondary education and producer-oriented gatherings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
401	Structures, Facilities, and General Purpose Farm Supplies

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Alaska continues to be severely impacted by the falling price of crude oil. The state provides a significant portion of the university's funds, and the university has experienced several consecutive years of reductions. Almost half of SNRE funding comes from the state. Between 2014 and 2017, the university system's budget dropped from \$378 million to \$325 million, resulting in 50 discontinued or suspended academic degree and certificate programs and 933 fewer faculty and staff. SNRE, in particular, has faced difficulties with the combination of budget cuts and fixed-cost increases restricting hiring for vacant positions. In FY17, key agriculture personnel departed, including a research agronomist, an agriculture program assistant and an IPM field technician. The merger between AFES and CES has helped maintain research and service, but both units have heavy workloads as we try to keep our productivity high in challenging times.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Kenai agriculture agent surveyed 369 participants in 21 classes in FY17 to assess changes in knowledge and skills on topics including vegetable and root crops, seed starting, livestock tagging, composting and soil testing. Ninety-eight percent of the participants indicated they had gained knowledge and skills from the classes. In eight classes behavior was assessed, with 87 percent of 119 participants able to apply new skills.

All nine attendees of pesticide applicator trainings in Fairbanks responded to a survey, rating both the instructor's effectiveness and question-answering highly at 3.8 on a 4-point scale with 4 as excellent. Six said their knowledge about pesticide labels, formulations, calculations and toxicity improved, while knowledge for three remained the same.

Six out of thirteen people attending a composting workshop responding to a survey about their composting experience and plans. Before the class, five had composted previously, and only one rated their composting as successful; four rated it as somewhat successful, and one not successful. After the class, they were able to list causes for previous issues, such as problems with green and brown ratios. All six are considering composting again, and several plan to use techniques learned in class such as turning piles with a pitchfork or gauging proportions with an online calculator. At another composting workshop at an Extension promotional event, six people responding to a survey rated it highly at 4.17 on a 5-point scale. Three people had attended the event in previous years and had made changes because of it. For example, one respondent said they had used information on composting, a second said they were still composting with worms one year later, and the third stated they had rebuilt two compost bins and were using them.

Ten participants in the Delta Farm Forum responded to a survey about changes to their

practices. Five were first-time attendees. Two had attended past sessions and had not made changes to their practices. Three past attendees did make changes including how they watch for pests and their awareness of how to mitigate or eliminate them, and changes to the feed and housing of backyard chickens.

Ten out of 11 respondents to a survey for a gardening workshop planned to share the information with others. Nine felt confident using the skills on their own, and 10 believed the information will help improve their self-sufficiency. All 11 respondents plan to use the skills taught within a year.

Twelve attendees responded to a survey about the Sustainable Agriculture Conference. Four respondents were first-time attendees. All eight returning attendees said they made changes to their practices as a result of attending a past conference, including crop rotation, use of fertilizers, an increase in use of compost and mulch, installation of automatic irrigation, and a greater understanding of soils management. Four returning attendees were agricultural educators who shared information from past conferences with others, including talking to suppliers and buyers, and making recommendations about nutrient management and varieties appropriate for cold climates.

Key Items of Evaluation

Extension brought research to the public and increased stakeholder knowledge and skills on a variety of agriculture and horticulture topics. Stakeholder groups such as pesticide applicators, agricultural educators, farmers, and home gardeners are using better practices.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Natural Resources and Community Development

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	5%		0%	
112	Watershed Protection and Management	30%		0%	
122	Management and Control of Forest and Range Fires	5%		0%	
123	Management and Sustainability of Forest Resources	10%		50%	
131	Alternative Uses of Land	10%		0%	
134	Outdoor Recreation	5%		30%	
605	Natural Resource and Environmental Economics	5%		0%	
608	Community Resource Planning and Development	30%		0%	
610	Domestic Policy Analysis	0%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	3.0	0.0
Actual Paid	1.5	0.0	0.1	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
163601	0	65105	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
119426	0	403463	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
72212	0	47887	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research products provided science-based information in resource planning, economic and environmental impact of natural resource use involving market and nonmarket value of resources, and planning issues in urban and rural communities. Measurable outcomes were peer-reviewed publications, educational opportunities and citizen participation.

Partnerships were developed and maintained that addressed emerging natural resource issues. Multi-institution and interdisciplinary collaboration continued in research, education and outreach. Integrated and multistate projects concerning natural resources stewardship provided collaboration and engagement with other land-grant institutions, extension and federal partners. Activities also involved partners from other UAF units to assure engagement that continued to make the information provided to stakeholders relevant to their needs, especially Alaskans most directly impacted by natural resource matters.

Activities included reviews of contemporary research relevant to the program; lay publications that provided unbiased, scientific information about natural resource issues; website development for natural resources issues; Extension workshops, demonstrations and basic skill trainings; public meetings and discussions; and 4-H and FFA projects that can help prepare youth for work in natural resource related fields.

2. Brief description of the target audience

This program focused on industry professionals, entrepreneurs, communities, families, cooperatives and businesses, and both nonprofit and for-profit development corporations. Efforts were made to address problems of the traditionally underserved rural populations within the limit of resources available. Stakeholders were those directly impacted by contemporary natural resource issues related to forest and land resources, mining resources, water resources, young adults wanting entry-level skills needed for employment in natural resource-related businesses, agencies or organizations, persons in natural resource-related occupations who wish to increase their skills and/or knowledge levels, and federal and state agencies.

3. How was eXtension used?

Increased use of eXtension resources in FY17 has been valuable to Extension outreach in Alaska. Several employees maintained memberships in natural resources and community development-related Communities of Practice (CoPs). A researcher was a member of the Rangelands community. A program assistant was a member of Forest Health and Stewardship. Qualtrics training provided by eXtension helped the evaluation specialist continue to assist with a multi-state land management survey project.

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4137	5767	633	304

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	6	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Output 1: Active partnerships with other land grant institutions, government agencies, stakeholder groups and organizations.

Year	Actual
2017	93

Output #2

Output Measure

- Output 2: Develop and deliver public issues education workshops and classes for stakeholders on locally relevant natural resources and related issues.

Year	Actual
2017	64

Output #3

Output Measure

- Output 3: Develop and maintain a web-based platform for discourse and information sharing on relevant areas of interest in natural resource issues that connect people to information.

Year	Actual
2017	4

Output #4

Output Measure

- Output 4: Conduct needs assessments of natural resource management stakeholders.

Year	Actual
2017	5

Output #5

Output Measure

- Output 5. Develop regional economic models for Alaska resource management scenarios. Output will be models, presentations and publications.
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Output 6. Develop and implement public involvement in natural resource issues. Output measure will be public input sessions and publications.

Year	Actual
2017	6

Output #7

Output Measure

- Output 7. Provide analysis of natural resource and environmental laws. Output measure will be presentations, workshops and publications.
Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Outcome 1: Increase and maintain partnerships with stakeholder groups, government agencies and other institutions that will enhance the land-grant mission. Measure will be number of partnerships.
2	Outcome 2: Increase and maintain the number of integrated and multistate research-Extension activities. Measure will be number of activities.
3	Outcome 3: Increase the recruitment and retention of youth and college-age students appreciating and considering natural resource management careers. Measure will be number of graduate and undergraduate students enrolled and number of youth participating in natural resource management activities.
4	Outcome 4. Increase public involvement in natural resource and community development issues. Outcome measure will be the number of participants.
5	Outcome Measure #5: Demonstrate effective collaboration between research and Extension to resolve issues.

Outcome #1

1. Outcome Measures

Outcome 1: Increase and maintain partnerships with stakeholder groups, government agencies and other institutions that will enhance the land-grant mission. Measure will be number of partnerships.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	93

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Of the 375 million acres of land in Alaska, 44 million are Native lands, about 100 million acres are state lands and 218 million are federally managed. AFES provides research that meets the needs of the private, state and federal stakeholders and with Extension assures that stakeholders are engaged with UAF in the application of research. Extension promotes economic development and meets other community and rural needs. Partnerships are critical to ensuring this happens. There is a mutual benefit when partners assist SNRE with research and outreach efforts.

What has been done

Key partnerships included the Alaska Energy Authority, the U.S. Forest Service, Alaska Department of Fish and Game and the National Park Service. The Division of Forestry supports CES forest stewardship outreach and coordination of Project Learning Tree program. Tourism and community development are augmented by Extension partnerships with the Alaska Department of Commerce, Community and Economic Development (ADCCED) and the U.S. Small Business Association (SBA).

Results

The economist working with ADCCED held three AlaskaHost trainings that taught 30 people visitor industry best practices. Two were train-the-trainer workshops that built community capacity. The economist also presented at the National Extension Tourism Conference and locally to other stakeholder groups including museum staff, chambers of commerce, borough town halls, Alaska Native corporations, and educational entities like UAA and the Alaska Job Center Network. A partnership with the Bureau of Land Management resulted in the BLM issuing a statement of programmatic interest regarding setting up a national research center for land use studies. The economic development specialist received SBA's District Director Excellence Award and worked with statewide partners to develop a statewide community economic development strategy that

informed investment decisions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
134	Outdoor Recreation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #2

1. Outcome Measures

Outcome 2: Increase and maintain the number of integrated and multistate research-Extension activities. Measure will be number of activities.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The need for economic diversification in times of state budget constraints has renewed interest in Alaska's non-petroleum resources, including fish, fiber and timber. At the state level, the administration has indicated support for natural resource management that exemplifies the core values of stewardship, transparency, integrity and science-based decision making. The combined efforts of research and outreach personnel can help Alaska overcome challenges to effective natural resource management.

What has been done

Research efforts included multistate projects on fishery resources and outdoor recreation benefits. A researcher presented at the Northeast Recreation Research Symposium and also collaborated with other states on recreation research for the Bureau of Land Management (BLM). Extension personnel worked with the recreation researcher to gather data for the BLM collaborative visitor transportation project and provided guest lectures for natural resources courses.

Results

Collaborations helped bolster educational outcomes for members of the public. Stakeholders gained research-based information that was specific to Alaska. Students benefitted from integrated teaching in graduate seminars such as NRM 290, a 10-day trip around the state offering students tours and real-life examples to enhance their knowledge of natural resources management at high latitudes. Students met with farmers, foresters, land managers, educators, Extension agents and biologists. The Extension economic development specialist worked with two researchers to advise a village on the costs and logistics associated with establishing a reindeer herd in Delta Junction.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
134	Outdoor Recreation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

Outcome 3: Increase the recruitment and retention of youth and college-age students appreciating and considering natural resource management careers. Measure will be number of graduate and undergraduate students enrolled and number of youth participating in natural resource management activities.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1143

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alaska is a great natural classroom that attracts students who love the outdoors. To reverse the effects of climate change, it is essential to educate youth to care for the environment. We must communicate the need for sustainable management. Alaska's educators need support in engaging youth in natural resource management activities that inspire good stewardship and career paths that will build state capacity to manage natural resources well.

What has been done

4-H offered natural resource-related activities including 47 environmental stewardship projects, 199 outdoor education projects and 56 youth in the Junior Master Naturalist program. Workshops and presentations on natural resources issues were attended by 151 youth. An agent presented on environmental education as part of a career day for 38 middle school students. The OneTree Alaska program enhanced STEAM learning and teaching outcomes for 188 K-12 students by collaborating closely with teachers at five schools. Among the 502 students enrolled in NRM classes, faculty also supported several undergraduate and graduate research projects that can lead to long-lasting engagement in natural resource work.

Results

At the post-secondary level, three graduates of the NRM program returned as guest lecturers for a watershed management class. A student in NRM 483 (research design, writing, and presentation methods) presented findings at the Northeast Recreation Research Symposium. An NRM 366 student said the class on survey research in natural resources helped them obtain summer employment, with the possibility of a continuing position, at a natural resources department in the student's home state. Alaska also leveraged its international appeal when eight students and two professors from Hokkaido University visited for a natural resources field course and did a taste panel for a researcher's birch soda project. The researcher leading the tours for the course earned degrees at Hokkaido before receiving a PhD in Alaska and staying on as a postdoc.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land

134	Outdoor Recreation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #4

1. Outcome Measures

Outcome 4. Increase public involvement in natural resource and community development issues. Outcome measure will be the number of participants.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	144

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alaska's rich natural resources require ongoing management. Public understanding and support is key to progress on implementing best practices. Research and outreach personnel must communicate the need to manage sustainably. Alaska's educators, in particular, need support in engaging youth in natural resource management activities that inspire good stewardship and career paths that will build state capacity to manage natural resources.

What has been done

The Alaska Master Naturalist certification program had 52 participants with an additional eight taking a teacher training and 11 participating in an eco-retreat. A Facebook page was maintained that currently has 307 followers. Thirteen classrooms and 22 households along with other volunteer individuals and OneTree staff collected 6,000 gallons of birch sap this past spring to process it and assess trends in production and purity. Volunteers received a portion of the birch syrup that was made in exchange for their labors.

Results

Participants who completed the entire master naturalist course also pledged 40 volunteer hours, which ensured engagement with the community. Alaska Master Naturalists continued to build local conservation literacy and capacity from Willow to Seward. The birch sap program recently won an international award for best tasting syrup in the Birch Syrups World Challenge. The five members of PSTAR (Participatory Scientist-Teacher Action Research) working with

OneTree had an application accepted to present findings at a local curricula conference. Extension co-hosted a community tree harvest and helped educate the public on appropriate holiday tree species, care and harvest practices, with 16 Southeast households successfully procuring their own trees.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
134	Outdoor Recreation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #5

1. Outcome Measures

Outcome Measure #5: Demonstrate effective collaboration between research and Extension to resolve issues.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Alaska continues to be severely impacted by the falling price of crude oil. The state provides a significant portion of the university's funds, and the university has experienced several consecutive years of reductions. Almost half of SNRE funding comes from the state. Between 2014 and 2017, the university system's budget dropped from \$378 million to \$325 million, resulting in 50 discontinued or suspended academic degree and certificate programs and 933 fewer faculty and staff. SNRE, in particular, has faced difficulties with the combination of budget cuts and fixed-cost increases restricting hiring for vacant positions. In FY17, key natural resource personnel departed including a program assistant working with forestry and mining, and a faculty member working in economic development.

The merger between AFES and CES have helped maintain research and service, but both units have heavy workloads as we try to keep our productivity high in challenging times.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

An evaluation of an AlaskaHost training session at a museum revealed that all six respondents found the topics good or excellent, and thought the trainer responded well to questions from the group. Comments included "captivating" and "related directly to our organizational needs." They also felt the trainer was relatable and knowledgeable about Alaska's visitor industry.

Seven classes from four schools responded to a postcard survey regarding a watershed education program. The students were asked to recall whether salmon can or cannot live in their watershed, and to provide an open-ended response with evidence for why or why not. Nineteen of twenty students at one school responded that salmon cannot live in their watershed, and gave reasons that clearly referred back to a stream field trip. Out of 160 total responses, 19 percent of students responded with one type of evidence to support their answer; 46 percent were evenly split between two or three types of evidence; and 5 percent answered with four types of evidence. The presence of macroinvertebrates or food was mentioned most often, followed by oxygen, temperature, pH, and velocity. The instructor analyzed the answers for any confusion in terms and common misspellings, and provided recommendations for improvements to future curricula delivery and evaluation cards.

Key Items of Evaluation

Youth increased their knowledge of natural resources and earth sciences. Training programs enhanced capacity for the tourism industry.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Healthy Individuals, Families and Communities

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
502	New and Improved Food Products	5%		0%	
504	Home and Commercial Food Service	15%		0%	
703	Nutrition Education and Behavior	20%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		0%	
724	Healthy Lifestyle	20%		0%	
801	Individual and Family Resource Management	5%		0%	
802	Human Development and Family Well-Being	15%		0%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	10%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	7.9	0.0	0.0	0.0
Actual Paid	5.6	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
444939	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
309431	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1525844	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Faculty and staff developed and delivered curriculum through conducting workshops and meetings and providing training. They consulted with clients to develop products, and partnered with other agencies and organizations for capacity-building. Outreach was augmented by videos, fact sheets and articles written for public consumption, through working with the media. Personnel facilitated events, activities and teachable moments.

2. Brief description of the target audience

Outreach activities targeted the following stakeholders:

- Clients interested in food preservation and safety
- Clients interested in local foods or a subsistence lifestyle
- Clients needing assistance with finances
- Food banks
- Home and building owners
- Housing and energy authorities and organizations
- Human development and social work professionals
- Individuals interested in healthy lifestyles
- Individuals and professionals interested in emergency preparedness
- Low income individuals and families
- Parents and caregivers of children
- Teachers
- Schoolchildren

3. How was eXtension used?

Continued use of eXtension resources has been very valuable to Extension outreach in Alaska. In FY17 faculty answered 37 food and home-related questions through eXtension's Ask an Expert interface. Topics included canning and smoking fish, sewing fur, pickling, berry and juice processing, food regulations, roofing, insulation and radon. Agent memberships in eXtension's communities of practice (CoPs) included Just in Time Parenting, Financial Security for All, Food Safety, Home Energy, and Families, Food and Fitness. Agents have used eXtension-provided Qualtrics access to survey stakeholders and document changes in knowledge and behavior. The Nome agent was a member of the Diversity & Inclusion Issue Corps and attended the eXtension Designathon regarding a project to develop racial equity training for Extension personnel.

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	7592	980590	1915	51610

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	1	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Output 1: Extension faculty will offer workshops in a wide range of home economics and family and consumer science topics. Measure will be the number of workshops.

Year	Actual
2017	145

Output #2

Output Measure

- Output 2: Extension district offices will update emergency planning for internal operations and constituent communities. Measure will be the number of offices and constituent communities who have updated plans.

Year	Actual
2017	10

Output #3

Output Measure

- Output 3: Home energy extension workshops and conferences will provide individuals and families with immediate and long-term actions they can implement for energy conservation. Measure will be the number of workshops and conferences.

Year	Actual
2017	1

Output #4

Output Measure

- Output 4: Field faculty will provide physical activity and nutrition programming for teachers and parents. Measure will be the number of teachers and parents who are trained.

Year	Actual
2017	1112

Output #5

Output Measure

- Output 5: Field faculty will provide physical activity and nutrition programming through one-on-one consultations and consultations with other organizations. Measure will be the number of consultations.

Year	Actual
2017	248

Output #6

Output Measure

- Output 6: Extension faculty will offer workshops in harvesting and food preservation techniques. Measure will be the number of workshops.

Year	Actual
2017	58

Output #7

Output Measure

- Output 7: New food products will be developed using Alaska-produced ingredients. Measure will be the number of food products developed.

Year	Actual
2017	6

Output #8

Output Measure

- Output 8: Extension faculty will offer workshops in food safety. Counting number of workshops.

Year	Actual
2017	72

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Outcome 1: Participants in healthy lifestyle classes and workshops will adopt knowledge gained to maintain healthy lifestyle practices one year after participation.
2	Outcome 2: Increase consumer knowledge about home energy efficiencies.
3	Outcome 3: Participants in food preservation and food safety classes will improve their food preservation and food safety practices.
4	Outcome 4: New varieties and new uses of animal and plant products will result in increased production of Alaska-based products. Counting number of products and publications.
5	Outcome 5: Increase youth and parents' understanding of healthy food choices. Counting contacts with youth and parents.
6	Outcome 6: Youth and families have a more positive attitude toward healthful foods and/or willing to try new foods. Counting number of families.
7	Outcome 7: Increase knowledge, attitudes, skills and aspirations to increase physical activity habits. Counting number of youth.
8	Outcome 8: Increase consumer knowledge of best practices in financial planning and debt management. Measure is number of educational opportunities and publications produced.
9	Outcome 9: Promote healthy families and communities. Counting number of people reached through cultural awareness and violence prevention classes.

Outcome #1

1. Outcome Measures

Outcome 1: Participants in healthy lifestyle classes and workshops will adopt knowledge gained to maintain healthy lifestyle practices one year after participation.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	313

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alaska's senior population must remain active and healthy in a difficult environment. Alaska, per capita, has one of the fastest-growing population of seniors in the nation, and the state expects the number of seniors to double in the next 30 years. All of Alaska is considered medically underserved, and costs to individuals for medical care are higher than the national average. It is imperative that Alaskans focus on health strategies to maintain health and independence throughout life.

What has been done

StrongWomen, Chronic Disease Self-Management and Diabetes Self-Management are high-demand, evidence-based programs that have increased community capacity through train-the-trainer opportunities. Volunteer leaders received support from Extension in Anchorage, Big Lake, Bethel, Chugiak, Delta, Fairbanks, Homer, Ketchikan, Kodiak, Meadow Lake, Palmer, Seward, Soldotna, Sutton, Talkeetna, Wasilla and Willow. In FY17, forty-six people participated in leader trainings for the diabetes and chronic disease management programs.

Results

An estimated 223 participants in Anchorage and Wasilla StrongWomen groups have continued over a year, with 77 of them continuing for six years. The Kenaitze Indian Tribe group has been meeting since 2004 and has 20 participants, the Kenai Senior Center group since 2009 with 15, and the Homer Senior Center group since 2010 with 12 participants. Ten participants in Bethel have continued over a year. Thirty-three participants in Fairbanks have continued over a year, including a few involved for almost a decade. All five participants completing pre and post surveys from a diabetes workshop strongly agreed the workshop gave them tools to better manage their condition. Average confidence in being able to live a healthy lifestyle with diabetes increased from 7.2 to 9.2 (10-point scale); as a result of the workshop, they are participating in new healthy behaviors such as exercise, keeping food records, and visiting with friends.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Outcome 2: Increase consumer knowledge about home energy efficiencies.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1063

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

To manage costs, Alaskans want to keep winter heat loss to a minimum in their homes. This is a challenge, particularly in rural areas where some Alaskans rely on diesel generators. Natural gas is not yet available statewide, and wood burning has caused concerns about air quality. Many look for ways to make their home "tighter," which can be more energy efficient. But tight homes allow for less clean air circulation and higher concentrations of radon, a rare radioactive gas that can cause lung cancer over time. Thus, homeowners should be educated about radon and air quality in conjunction with building efficiency.

What has been done

The energy specialist maintained an energy blog with periodic posts about energy efficiency. Extension maintained a wood energy website that covers topics like BTUs and stove choice and offers an online heating cost calculator. The Bethel agent taught two workshops radon and two on wood stoves and health to 126 people. The energy specialist taught six workshops on radon to 37 people. Further information on classes such as wood burning, biochar and greenhouse heat, are reported in the sustainable energy section.

Results

Participants learned about what potential sources of energy they might use to lower heating costs and how to balance those choices with protecting their health. The wood heating website received several hundred hits a month, for a total of over 900 annually. Clients performed radon

tests in their homes and shared the results with the energy specialist, who continued to track levels across the state and offer mitigation advice. A new collaboration with the Department of Health and Social Services Division of Child Care allowed the specialist to offer free test kits and analysis to childcare providers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #3

1. Outcome Measures

Outcome 3: Participants in food preservation and food safety classes will improve their food preservation and food safety practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1030

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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, which occurs in low-acid foods; multiple cases were documented in 2017. It is particularly important to teach people how to safely preserve local staples. Over 90 percent of Alaska's food is imported, so food preservation training can also improve food security.

What has been done

Agents delivered 72 food preservation and food safety workshops with 1,030 client contacts in 38 communities around the state. Over half the communities were reached with assistance of video technology. The Bethel agent began researching possible causes of lead exposure in his region, which resulted in multiple presentations about lead ammunition and game meat. He assessed informational needs on the issue by surveying attitudes and awareness at multiple events, including public talks and conference meetings with professionals and tribal members.

Results

Participants in food preservation classes immediately build skills through hands-on training with equipment. Clients had 708 canner gauges tested with many needing adjustment and an average of 15 percent needing replacement, highlighting the importance of this service. The needs assessment by the Bethel agent revealed most audience members were not aware what type of ammunition was used to harvest local game meat, and that they did not have a strong preference for lead over other types of ammunition. This created opportunities to use research-based information to change knowledge and behavior regarding food safety. Because of the agent's work and advocacy, Alaska updated its lead risk questionnaire to include a question about whether children have consumed wild game meat shot with lead bullets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
504	Home and Commercial Food Service
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

Outcome 4: New varieties and new uses of animal and plant products will result in increased production of Alaska-based products. Counting number of products and publications.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alaskans are demanding more locally grown and sourced options. Advocacy for local foods has led to state incentives such as farmers market vouchers for SNAP participants and a program that assists school districts in purchasing local products. The state budget crisis has highlighted the need for economic diversification. However, the cost of shipping supplies to Alaska is expensive and can be cost-prohibitive to entrepreneurs. Ventures like small farms and small

foods businesses deserve increased support if we hope to improve food security in the state.

What has been done

Extension continued rental of its DEC-certified test kitchen. An agent taught three classes on cottage foods to 35 people. Over 11 hours were spent by an agent consulting over 20 clients on food entrepreneurship. A publication on batch-sized recipes for parties or catering, using local ingredients like reindeer, salmon, and berries, was reviewed and updated. Additional publications on starting and operating a home-based food business and producing acidified foods for sale continued to be offered for free download on the Extension website.

Results

One of the clients renting the test kitchen notes on their small business website that "we continue to work with the University of Alaska Fairbanks to stay on the cutting edge of science and technology." Use of the kitchen allows the client to continue to prepare and market both food and non-food products made with locally harvested ingredients put into teas, chocolate bars, tinctures and soap. Participants in cottage foods classes gained knowledge needed to maintain compliance with DEC guidelines.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
504	Home and Commercial Food Service

Outcome #5

1. Outcome Measures

Outcome 5: Increase youth and parents' understanding of healthy food choices. Counting contacts with youth and parents.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	2372

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Childhood obesity is a major concern in Alaska, as elsewhere. In 2011, 65 percent of Alaskan adults were overweight or obese. A 2013 State of Alaska report says that 26 percent of Alaska

high school students were overweight or obese. Helping parents and students learn about better nutrition and eating habits is essential to combating obesity in youth and in adults.

What has been done

Six nutrition educators based in Anchorage, Bethel, Fairbanks, Palmer, Soldotna and Tok presented USDA-approved curricula and activities in one-time and multipart programs at public schools, Head Start programs, shelters, WIC programs, community centers, public housing and libraries that reached a combined total of 1966 adults and youth. Agents provided workshops and presentations for 406 contacts on dietary challenges, making healthy breads, dining with diabetes, healthy juices and smoothies, wild berries, and using legumes.

Results

Pre-post surveys for SNAP-Ed series programming indicate that at the K-2 level, of the 24 respondents in a school-based series 38 percent improved in their ability to identify healthy snacks. At the 3-5 grade level, of 227 respondents in a school-based series, 33% improved their fruit consumption and 36% improved vegetable consumption, respectively. Over 40 respondents also reported starting to ask adults to have fruits and vegetables available. Seventeen of 49 adults surveyed reported an increase in the number of days each week they usually eat vegetables, 22 reported an increase in the number of days they eat fruits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #6

1. Outcome Measures

Outcome 6: Youth and families have a more positive attitude toward healthful foods and/or willing to try new foods. Counting number of families.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	93

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Aside from an increased likelihood of becoming overweight adults, children and adolescents who are overweight or obese are at increased risk for a variety of negative physical, social and emotional problems. According to one survey, 77 percent of Alaska elementary students eat breakfast every day. Families have an important influence on making healthy food choices available and enticing to youth.

What has been done

Agents provided training on healthy food choices and nutrition in hands-on food preparation classes. SNAP-Ed worked with 73 adults in series on how to prepare nutritious meals on a lean budget. Nutrition educators partnered with Alaska Tilth, which supplied locally grown produce for public recipe demonstrations. Staff also serve on coalitions and wellness councils. 4-H leaders also assisted 730 youth with food and nutrition projects, and nutritious food preparation was modeled at camps and afterschool activities. Extension also continued collaboration with the Children's Healthy Living Program.

Results

Surveys from recipe demonstrations and tastings indicated the majority of participants increased their willingness to try new foods. Enthusiasm was documented for locally grown rhubarb, radishes, turnips, bok choy, kale and kohlrabi. At least 20 participants made comments indicating they intended to change or had already changed their vegetable consumption, with statements like "[the class] gives me confidence to try Alaska veggies" or "I have been having more salads since I started coming here."

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #7

1. Outcome Measures

Outcome 7: Increase knowledge, attitudes, skills and aspirations to increase physical activity habits. Counting number of youth.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	5099

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The 2015 Youth Risk Behavior Survey published by the Department of Health and Social Services found that Alaska youth are less active than their peers, with only about 21 percent compared to a national average of 29 percent reporting physical activity for at least 60 minutes on each of the past seven days. There has also been a significant increase since 2007 in the time spent on gaming or other non-school computer use for three or more hours a day. Alaskan youth are in need of education and encouragement regarding physical activity to combat these trends.

What has been done

Nutrition educators discussed the importance of being active every day as well as led physical activity demonstrations, reaching 1088 youth. Educators also worked with teachers and staff to encourage activity among youth at eligible low-income sites. The Alaska 4-H program offered 4011 youth across the state in clubs, camps and afterschool programs a number of projects that emphasized physical activity, including fitness and sports skills and healthy living. Activities included hiking, dance, shooting sports, rock climbing, skiing, camping, martial arts, dog mushing, sailing, luge, yoga and more.

Results

Pre-post surveys of SNAP-Ed series indicate that at the K-2 level, 25 percent of the 24 respondents in a school-based series improved in their ability to identify physical activities; At the 3-5 grade level, 63 of 222 respondents improved their reported rates of physical activity. At the 6-8 grade level, three of five respondents in a school-based series improved in the number of days they were active and the days upon which they were active at least one hour. Twenty-five middle and high-school youth got regular exercise and put skills into practice by participating on a 4-H Nordic ski team.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #8

1. Outcome Measures

Outcome 8: Increase consumer knowledge of best practices in financial planning and debt management. Measure is number of educational opportunities and publications produced.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	69

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Debt levels have long been a concern in regards to family stability. In 2017, USA Today reported that the average U.S. Household carries an average of \$16,883 in credit card debt, \$29,539 in auto loans, \$50,626 in student loans and \$182,421 in mortgages despite a median household income of \$59,039. This trend indicates people may be spending more than they make, which increases risk for negative outcomes like lowered credit scores or even bankruptcy. Teaching financial management skills can help people achieve more balanced household budgets.

What has been done

Three agents served as screen personalities for a series of 15 YouTube videos, Mastering Money Management, covering topics such as allowances, automated payments, bankruptcy, seasonal income, and credit reports and scores. An agent also held two workshops on living on less and retirement planning. An agent continued writing a weekly news column, in its eighth year, on family finances. Extension launched a new publication on knowing your rights when a debt collector calls, distributed to 45 people in FY17. Results of an annual Alaska food cost survey continued to be published on Extension's website.

Results

The news column, which began in the Fairbanks News Miner, is now statewide after being picked up by the Sitka Sentinel, Delta Wind, Juneau Empire, and Seward News. The eight Mastering Money Management videos have a combined total of almost 800 views with several upvotes. The food cost survey continues to inform both individuals and policy makers, and is linked to by entities such as the Alaska Department of Health and Social Services.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #9

1. Outcome Measures

Outcome 9: Promote healthy families and communities. Counting number of people reached through cultural awareness and violence prevention classes.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	281

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Historical trauma and race-based bullying contribute to unhealthy views of self for youth. There is a need for opportunities that allow youth to explore and form their racial and ethnic identities in a positive and healthy way. Research shows that positive interaction with caring adults can be a transformative part of youth development. To this end, the State of Alaska's Office of Children's Services (OCS), tribal partners, and tribal organizations have committed to train all welfare workers under the same process called Knowing Who You Are (KWYA).

What has been done

Extension's Nome agent served as a co-facilitator for Knowing Who You Are (KWYA) workshops, where the curricula provided a framework for child advocates, juvenile justice staff, educators, and community partners to better understand the impacts of racial and ethnic identity. The agent also co-facilitated workshops on decolonization and healing from historical trauma; Ten administrators and staff of a health corporation attended, and as a result the corporation plans to adopt the training for all of their 300 employees.

Results

Retrospective pre-post surveys from 22 respondents at a KWYA workshop indicated that all respondents improved their understanding or skills in at least one area. Retrospective pre-post surveys from 13 respondents at a healing and decolonization workshop indicated some participants experienced an increase in comfort level with engaging in conversations about race and ethnicity and an increased understanding of how Alaska history impacts the lives of Alaska Native people today. When asked about plans to take the information to their communities, respondents said based on their experience in the class, they would initiate more conversations, speak more openly, provide encouragement and support to others, share the information in parenting classes and use it to bring community members together.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Alaska continues to be severely impacted by the falling price of crude oil. The state provides a significant portion of the university's funds, and the university has experienced several consecutive years of reductions. Almost half of SNRE funding comes from the state. Between 2014 and 2017, the university system's budget dropped from \$378 million to \$325 million, resulting in 50 discontinued or suspended academic degree and certificate programs and 933 fewer faculty and staff. SNRE, in particular, has faced difficulties with the combination of budget cuts and fixed-cost increases. The small food business coordinator and food research assistant departed in FY16 and no replacements were hired in FY17. Services like nutrition labeling and recipe development had to be discontinued.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Surveys from 16 participants across two Certified Food Protection Manager (CFPM) courses indicated the knowledge and skills gained were highly beneficial, with eight reporting the course helped them keep their job and four reporting it helped them start a new food business. Most participants estimated they saved hundreds of dollars by having a videoconference delivery option instead of having to travel from remote areas to take the class.

Nine participants in a cottage foods business class responded to a survey on the changes to their knowledge and intent to use the information. All participants changed their knowledge in at least one area, from understanding DEC regulations to understanding small business basics and how to safely prepare and preserve foods. Three participants now plan to start their own cottage foods business after the class. When asked what ideas they plan to use, multiple participants mentioned pH testing. Some were also interested in exploring pickling and candy making.

Nutrition education evaluations indicate that at the K-2 level, 25 percent of the 24 respondents in a school-based series improved in their ability to identify physical activities, and 38 percent improved in their ability to identify healthy snacks. At the 3-5 grade level, of 227 respondents in a school-based series, 33 percent improved their fruit consumption and 36 percent improved vegetable consumption, respectively. Over 40 respondents also reported starting to ask adults to have fruits and vegetables available, and 63 of 222 respondents improved their reported rates of physical activity. At the 6-8 grade level, three of five respondents in a school-based series improved in the number of days they were active and the days upon which they were active at least one hour. Seventeen of 49 adults surveyed reported an increase in the number of days each week they usually eat vegetables, 22 reported an increase in the number of days they eat fruits, and 41 percent reported an increase in frequency of being active at least 30 minutes a day; at entry, only 78 percent met the daily recommendation, but after an educational series, 94 percent met the

recommendation.

Surveys from six cooking classes throughout the summer documented intent to change or actual change of vegetable consumption. Participant statements included: "I will definitely use the rhubarb; I will be preparing these recipes several times each month; My husband & I have been changing our diet to incorporate more fruits & veggies; Will make at home and share recipe with family and friends; It gives me confidence to try AK veggies; Motivating- I want to eat better and use all the produce I grow & buy; I have been having more salads since I started coming here; Love the recipes. Will now cook radishes & turnips; Informative- found out I can eat bok choy! Plus I now know what I can do with it; It's great to have the recipes to be able to make this dish at our home; I write them [recipes] in the cookbook at home; Salad was amazing and I do plan on making it at home."

Key Items of Evaluation

Attendees continue to improve job prospects through food safety trainings. Nutrition educators reached out to underserved groups and improved the physical activity and vegetable and fruit consumption of clients. Extension continues to provide resources that allow small foods businesses to flourish.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%		10%	
122	Management and Control of Forest and Range Fires	10%		0%	
123	Management and Sustainability of Forest Resources	0%		70%	
132	Weather and Climate	70%		20%	
605	Natural Resource and Environmental Economics	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	4.0	0.0
Actual Paid	0.1	0.0	0.2	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
14224	0	24812	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
10928	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
9758	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research documented weather factors and agricultural land characterization, including soils and crop types. High latitude soil research centered on the evaluation of the relationship between local climate and soil carbon balance. Research, education and outreach activities focused on climate change adaptation as it relates to communities, including emergency preparedness in the face of extreme weather events.

2. Brief description of the target audience

The target audience included producers and consumers, communities and small business entrepreneurs, individuals and groups concerned about the quality of the Alaska environment, public resource agencies, public and private resource managers, other faculty and researchers, and undergraduate and graduate students. Efforts were directed toward environmentally and economically sustainable development and conservation of our natural resources for the benefit all citizens to help them adapt and become resilient as the climate changes. Advisors and the target audience included various emergency planning organizations, USDA Natural Resource Conservation Service, the Alaska Department of Natural Resources, borough governments and Alaska Native corporations.

3. How was eXtension used?

Increased use of eXtension resources in FY17 has been valuable to Extension outreach in Alaska. Three agents were members of the Extension Disaster Education Network Delegates community. A program assistant maintained membership in the Extension Wildfire Information Network. The program assistant and another agent were part of the Climate, Forests and Woodlands community. The access to Qualtrics provided through eXtension increased the online survey skills of the program assistant working on the Renewable Resources Extension Act.

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	778	47066	30	2475

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
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Actual	0	1	1
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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Output 1. Soils research will concentrate on the soil carbon properties in relation to climate change and soil disturbance dynamics in upland and lowland forest ecosystems. Publications and presentations are output measures.

Year	Actual
2017	1

Output #2

Output Measure

- Output 2. Long-term forest productivity data sets will be converted to formats compatible with existing megadata systems for compatibility with long-term ecological research, fire management and forest disturbance dynamics. Outputs measured will be publications and data sets converted.
Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Output 3. Development of data sets providing information on wildlife and domestic (traditional and alternative) livestock impact on rangelands will continue. Output measures will be data sets developed and publications.

Year	Actual
2017	1

Output #4

Output Measure

- Output 4. Curricula that train future and present land managers in ecosystem stability and geospatial technology will be developed and implemented. Output measure will be curricula implemented and updated.

Year	Actual
2017	7

Output #5

Output Measure

- Output 5. Research providing base line data for modeling timber availability will continue. Forest management specific to fuel/energy demand drives the research. Measurable outputs will be publications and presentations.

Year	Actual
2017	2

Output #6

Output Measure

- Output 6. Recreation opportunities are important in urban and rural forests. Recreation management in Alaska are primarily tied to national and state parks and forest. Measurable outputs are publications and presentations.

Year	Actual
2017	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Outcome 1. Increase knowledge of arctic and subarctic soils and forest productivity among peer scientists, managers and governments. Knowledge outcome measures will be publications, conferences and workshops.
2	Outcome 2. Increase knowledge through classroom and field course delivery. The outcome measures will be curricula delivered and number of students reached.
3	Outcome 3. Respond to community and individual knowledge needs on the impact of climate change in northern ecosystems and effects on cultural lifeways, economies and individual well-being. Outcome measures will be publications, workshops and conferences.
4	Outcome Measure #4: Demonstrate effective collaboration between research and Extension to resolve issues.
5	Outcome 5. Educate producers on best practices for growing climate adapted crops. Measure is varieties tested.

Outcome #1

1. Outcome Measures

Outcome 1. Increase knowledge of arctic and subarctic soils and forest productivity among peer scientists, managers and governments. Knowledge outcome measures will be publications, conferences and workshops.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Climate warming is projected to continue. The Alaska Public Lands Information Centers note that permafrost can be found in various thicknesses in up to 85 percent of Alaska's surface. Also making Alaska's soils complex are multiple historically active volcanoes. Basic research provides information about weather, soil nutrients, moisture stress and insect predation. Predictions regarding soil warmth, moisture and stability will impact decision-making for farmers, homeowners and forest land managers.

What has been done

Researchers have collected data on permafrost and farmed soils. Climate parameters have been collected from NOAA, and databases have been maintained on the Arctic Long Term Ecological Research website. The weather station at the Matanuska Experiment Farm has collected National Weather Service data since 1917, providing the longest available weather record from a single location in Alaska. Agroclimate data were extracted to determine which Major Land Resource Areas (MLRAs) provide an adequate environment for each of the major economic crops in Alaska.

Results

Instruction on soils has led to increased dissemination of the soils research. A documentary on arctic soils that was filmed in FY15 related to a researcher-led field trip was released in February 2017. The documentary was shown in Fairbanks, Palmer, Anchorage and Kotzebue and more than a dozen universities in the U.S. NRM 380, Soils and the Environment, was taught in two different semesters to 30 students. A researcher published an article on methane production in lake sediment and made a presentation about spring wheat selection for arctic climates at a multi-state annual meeting.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
132	Weather and Climate

Outcome #2

1. Outcome Measures

Outcome 2. Increase knowledge through classroom and field course delivery. The outcome measures will be curricula delivered and number of students reached.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	187

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nationwide, there is an increased interest in local and sustainable production and interdisciplinary approaches to managing ecosystems and combatting the effects of climate change. Alaska is a great natural classroom and attracts students who love the outdoors. To reverse the effects of climate change, it is essential to educate youth to care for the environment.

What has been done

Researchers teach a wide variety of classes for the natural resource majors and minors that include instruction on issues of climate change, ecology and sustainable management of resources. SNRE introduced a new sustainable agriculture minor in 2016. Two of the required classes are NRM 101, Natural Resources Conservation and Policy and NRM 210, Principles of Sustainable Agriculture. Students also need a class on natural resource economics and must complete three additional classes from a list that includes introductory plant and animal science, soils and the environment, environmental ethics and environmental decision making.

Results

In FY17, there were 65 students in NRM 101, and 28 students in NRM 210. There were 18 students in NRM 111, an introduction to sustainability science. There were 10 students in NRM 277, an introduction to conservation biology that covered ecological developments and the status of important habitats and endangered species. There were 17 students in NRM 375, natural resource ecology. There were 31 students in NRM 403 on environmental decision making. Seven

students completed NRM 595 on signs of arctic change, and 11 students completed NRM 647 on global to local sustainability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
123	Management and Sustainability of Forest Resources
132	Weather and Climate
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Outcome 3. Respond to community and individual knowledge needs on the impact of climate change in northern ecosystems and effects on cultural lifeways, economies and individual well-being. Outcome measures will be publications, workshops and conferences.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	14

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Over the past 50 years, Alaska has warmed at over twice the rate of the rest of the United States. Alaska continues to see hundreds of wildfires each summer that result in millions of acres burned. Alaska has also seen substantial flooding in populated areas, and the state experiences earthquakes on a frequent basis. As the climate warms, Alaska's coastlines recede and permafrost melts. Extreme weather events may increase in both frequency and severity, hence a need for continuing emergency and disaster preparedness training for the public to mitigate potential damages to property and life.

What has been done

Extension kept abreast of research-based best practices through its relationship with the Extension Disaster Education Network. AFES maintained important community connections. A researcher has been the director of Alaska Center for Climate Assessment and Policy since 2006, director of the Alaska Fire Science Consortium since 2009, and is the stakeholder liaison for the

Scenarios Network for Alaska and Arctic Planning. Another researcher has taken on grant work to create climate change educator trainings in Alaska.

Results

Extension personnel across program areas helped Alaskans plan for the aftermath of extreme weather events such as floods and fires with research-based information to help people prepare for emergencies. A new publication, "What to Do Before, During and After a Natural Disaster in Alaska," drew public interest with 950 distributions in FY17. The energy specialist maintained an Alaska emergency preparedness blog and helped communities better connect with their Local Emergency Planning Committees. Twelve workshops covered topics like emergency energy, the changing forests, and emergency preparation at both the individual and community levels.

4. Associated Knowledge Areas

KA Code	Knowledge Area
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
132	Weather and Climate

Outcome #4

1. Outcome Measures

Outcome Measure #4: Demonstrate effective collaboration between research and Extension to resolve issues.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Outcome 5. Educate producers on best practices for growing climate adapted crops. Measure is varieties tested.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food security and climate change are serious issues in Alaska. With over 90% of food imported, transportation costs adds considerably to prices. If transportation were interrupted, it is widely acknowledged that Alaska has three days of food on grocery shelves. Thus, it is critical that Alaska is able to produce more local food crops. A challenge to increased production is changes to the landscape due to variations in water and soil temperatures. Growers see the impact of climate on agricultural performance. Planning for crop and animal management is highly influenced by climate predictions. Research and outreach is needed regarding crop adaptability in changing climates.

What has been done

In 2017, field experiments were carried out at Palmer and Fairbanks experiment farms where plots were seeded in May and harvested in late August/early September. Growing degree days, dates of emergence, heading, flowering and maturity were recorded. Feed barley varieties were tested, including five from Alaska, one from Alberta, and a hooded forage. Two hullless barley varieties from Alaska were tested, Thual and Sunshine. Two yellow feed oat varieties were included in demonstration plots. Five hard red spring wheat varieties were planted for demonstration, variety comparison and seed increase along with two sets of spring wheats from plant breeders. A local canola variety and semi-dwarf sunflower were tested as well.

Results

Results were disseminated to Alaska farmers through local meetings, workshops and emails. Average yields for all spring grain and oilseed varieties at both farms were roughly equal to the standard test varieties. The average Fairbanks location yield for feed barley were 2108 lbs/acre and Palmer yields were 2091 lbs/acre. The canola Deltaana now has a similar maturity date to feed barley, showing potential as an oil seed crop for Alaska.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
132	Weather and Climate

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Alaska continues to be severely impacted by the falling price of crude oil. The state provides a significant portion of the university's funds, and the university has experienced several consecutive years of reductions. Almost half of SNRE funding comes from the state.

Between 2014 and 2017, the university system's budget dropped from \$378 million to \$325 million, resulting in 50 discontinued or suspended academic degree and certificate programs and 933 fewer faculty and staff. SNRE, in particular, has faced difficulties with the combination of budget cuts and fixed-cost increases restricting hiring for vacant positions. The faculty member studying the effects of climate change on arctic soils retired in FY16 and was not replaced in FY17.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

A community preparedness survey was used to assess the needs of Alaska residents regarding emergency preparation and knowledge of community resources. Responses from 86 attendees at outreach events indicate that the vast majority, 76, do not know any members of their Local Emergency Planning Commission and over half (45) do not yet have an emergency kit with seven days of supplies. Responses to other questions indicated a need for education regarding emergency kit building, and cooking and heating plans when faced with power outages. Respondents were asked to share a phone number or email address if they wanted a follow-up from the agent, and 70 percent provided contact information.

Key Items of Evaluation

Extension responded to community needs for updated emergency planning.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Youth Development

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	5%		0%	
806	Youth Development	90%		0%	
903	Communication, Education, and Information Delivery	5%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	8.5	0.0	0.3	0.0
Actual Paid	4.8	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
276458	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
233677	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2531162	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Agents and program assistants collaborated with other youth-serving agencies and organizations, including Alaska Native associations, military installations, schools, and National Guard and Reserve. Volunteers were trained and assistance was provided to teachers and after-school providers. Programming and promotion utilized distance technology and social media. Activities supported life skill development of youth through experiential learning in science, healthy living and citizenship. Experiential learning activities were offered at the local, state, regional and national levels.

2. Brief description of the target audience

- 4-H Extension educators
- 4-H adult volunteers
- Adults interested in positive youth development
- Community leaders
- Federal and state agency representatives
- Grades K-12
- Military youth educators
- Native corporations and tribal representatives
- Other Extension educators
- Parents of school-age children
- Youth-serving organizations, including FFA

3. How was eXtension used?

Increased use of eXtension resources in FY17 has been valuable to Extension outreach in Alaska. 4-H agents and program assistants maintained memberships in communities including 4-H Learning Network, 4-H Curriculum & Development, Horsequest and Makers. Agents have used eXtension-provided Qualtrics access to survey 4-H members and leaders. Civil rights compliance efforts have been bolstered by the involvement of two agents in the Diversity & Inclusion Issues Corps including participation in an eXtension-sponsored Designathon followed by presentations at the Tri-State Diversity Conference.

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10737	99789	11702	42766

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Output 1: Volunteers will complete positive youth development training. Measure will be the number of volunteers trained.

Year	Actual
2017	655

Output #2

Output Measure

- Output 2: Extension will offer relevant workforce skill development projects for youth. Measure will be the number of workforce and skill development projects.

Year	Actual
2017	198

Output #3

Output Measure

- Output 3: 4-H will offer opportunities for engagement with underserved and minority youth. Measure will be the number of opportunities offered in underserved areas and number of culturally responsive programs.

Year	Actual
2017	41

Output #4

Output Measure

- Output 4: Youth Development will offer programming in science, engineering and technology. Measure will be the number of programs offered in this area.

Year	Actual
2017	28

Output #5

Output Measure

- Output 5: 4-H educators will offer inter and intra-district educational and service collaborations. Measure will be the number of education and service collaborations.

Year	Actual
2017	47

Output #6

Output Measure

- Output 6. Integrated activity on childhood obesity will lead to new knowledge. Measure will be databases and publications.

Year	Actual
2017	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Outcome 1: 100% of faculty and staff associated within the program area will understand the Essential Elements of Youth Development.
2	Outcome 2: After receiving training in the Essential Elements of Youth Development, volunteer leaders and youth will apply at least two of the Essential Elements in their interactions during programming.
3	Outcome 3: 4-H educators will offer opportunities for membership or involvement for underserved and minority youth. Measure will be demographic parity.
4	Outcome 4: Youth will experience opportunities for civic engagement. Measure will be number of youth participating.

Outcome #1

1. Outcome Measures

Outcome 1: 100% of faculty and staff associated within the program area will understand the Essential Elements of Youth Development.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Positive youth development through 4-H is made possible through a cadre of caring adult leaders. Creating environments in which youth have a sense of belonging, experience independence, master skills and give back to the community through generosity becomes more complex each year with changing environments and demographics. Faculty and staff must increase their understanding of positive youth development and the Essential Elements of 4-H in order to deliver quality programs and train volunteer leaders.

What has been done

All Alaska 4-H agents and others with 4-H responsibilities have been trained in Essential Elements. The Alaska 4-H program uses four primary delivery modes in fostering positive youth development clubs, special interest classes, school enrichment and camping. All are designed using the Essential Elements. Agents, staff and leaders participate in trainings that emphasize delivery of the subject matter within the context of the Essential Elements. An annual state volunteer forum and audio conferences also include Essential Elements.

Results

Training has been given in these areas and they are part of everyday 4-H language. All 4-H activities are grounded in the Essential Elements. Sixteen staff and program assistants with the Alaska 4-H program received information on the Essential Elements and incorporated that information into their program designs in order to facilitate belonging, generosity, independence, and mastery for their constituents.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Outcome 2: After receiving training in the Essential Elements of Youth Development, volunteer leaders and youth will apply at least two of the Essential Elements in their interactions during programming.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	693

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The 4-H Essential Elements of belonging, mastery, independence and generosity are based on research that the youth development field recognizes as a source for best practices in fostering positive development. Applying the Essential Elements in program development and delivery is what makes 4-H unique from other programs. The elements define volunteer roles in the lives of 4-H members as mentors, role models and coaches.

What has been done

Leaders were trained through both online programs and face-to-face workshops. Leaders are asked to provide information on events throughout the 4-H year for their clubs showing connections to Essential Elements. A step in the club chartering form includes the identification of Essential Elements in club activity planning, making it an intentional step in the planning of club activities. Agents discussed how to increase the use of 4-H Common Measures to assist clubs in assessing whether youth are being effectively engaged in the areas of belonging, mastery, independence and generosity.

Results

A number of service projects reflect the application of the element of generosity, such as picking up trash and bringing food to local shelters. 4-H'ers across districts also engage in livestock projects that foster mastery and independence, culminating in exhibits at various local and state fairs. 4-H'ers volunteer in many ways that build responsibility and a sense of belonging in their community and state, and attend camps that encourage an appreciation of Alaska. Overall, 579 adult volunteers and 114 youth volunteers in FY17 provided opportunities for engagement of all kinds, from dance to gardening to science programming.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #3

1. Outcome Measures

Outcome 3: 4-H educators will offer opportunities for membership or involvement for underserved and minority youth. Measure will be demographic parity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alaska is a uniquely diverse state. For example, CNN reported in 2015 that Alaska has the top three most diverse census tracts in all of the U.S. Outside of cities, there are many areas with minority youth that can only be reached by boat or plane. Thus, in many rural communities, activities for youth are limited. As the 4-H Essential Elements note, the youth development field recognizes that positive development requires structure, support, skill-building, and "strong links between families, schools and broader community resources." 4-H is uniquely positioned in Alaska to provide such opportunities to underserved youth.

What has been done

4-H harnessed the power of carefully screened volunteers and evidence-based curricula to provide guidance from caring adults in underserved locations like Dillingham and Bethel. 4-H offered programming to underserved groups including youth in foster care or youth facilities. A dog mushing club is held at a local charter school. 4-H also maintains partnerships with Title 1 schools to deliver after-school programming. In total, mentorship programs reached 415 youth including 28 who speak English as a second language. The Kenai agent participated in the eXtension Diversity & Inclusion Issues Corps and worked on culturally relevant programming with youth.

Results

The most recent ES237 showed that representation of 4-H youth in Alaska exceeded parity in the areas of Hispanic/Latino youth and participants of multiple races. Less than half of the youth enrolled in Alaska 4-H identify as white only. As a result of volunteer connections through 4-H camp, a new club is being planned for a group of students with special needs in Homer. Mentees learned skills that allowed them to serve as peer mentors to younger children, teaching them traditional Polynesian dance and volunteering at local food banks and soup kitchens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Outcome 4: Youth will experience opportunities for civic engagement. Measure will be number of youth participating.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	19

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

An informed constituency is essential to a thriving democracy. Starting from early schooling, youth can learn about legislative processes so that they are better prepared and engaged when they reach voting age. State laws and practices vary, so it is essential for youth to learn about law-making in their own states in addition to those of the federal government.

What has been done

Alaska 4-H provides multiple opportunities annually for youth to learn about how states and the country are governed. Ten youth from Alaska participated in the first Citizenship Washington Focus Presidential Inauguration. Nine teens participated in Alaska's FY17 Youth in Governance (YIG) program. Youth traveled to Juneau, the state capitol, touring the offices and observing a committee meeting.

Results

Youth were able to put their experience in Juneau into practice immediately by holding their own mock committee meeting and serving as pages for a day, with local senators or

representatives introducing each youth on the floor. The youth also shared their 4-H stories with legislators and hosted an appreciation breakfast for legislators and their staff. In a follow-up survey, 80 percent of YIG participants responding stated that as a result of their experience, they pay attention to news that affects their community and talk to friends about issues affecting the community, state or world; all respondents listen to everyone's views whether they agree or not. When asked about the most important thing they gained from participating in YIG, answers included becoming less judgmental and gaining a better understanding of how state government works.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Alaska continues to be severely impacted by the falling price of crude oil. The state provides a significant portion of the university's funds, and the university has experienced several consecutive years of reductions. Almost half of SNRE funding comes from the state. Between 2014 and 2017, the university system's budget dropped from \$378 million to \$325 million, resulting in 50 discontinued or suspended academic degree and certificate programs and 933 fewer faculty and staff. SNRE, in particular, has faced difficulties with the combination of budget cuts and fixed-cost increases restricting hiring for vacant positions. The Anchorage 4-H agent retired in FY16 and is now served by an agent based in Soldotna, as the Anchorage office was changed to an outreach center that hosts traveling faculty.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

4-H'ers and their parents in Bethel, Fairbanks, Juneau, Kenai and the Mat-Su district were asked to respond to an end-of-year survey asking about the impact of 4-H in their lives, with 102 responses in total. Some select quotes about the most important thing youth learned in 4-H include: "How to get along with others." --2nd grader, Bethel District; "I had learned how to be a better sister, friend and much more." --6th grader, Bethel District; "I have learned how to care for my horse better and how to work together." --7th grader, Mat-Su District; "Besides all the valuable animal information, I also learned how to be part of a team." --10th grader, Mat-Su District; "With a community working together, nearly anything is possible." --12th grader, Tanana District. When asked in what way, if any, 4-H has helped youth become a better leader, respondents wrote: "It has helped me learn to talk to people better." --4th grader, Mat-Su District; "4-H has taught me to be more

confident." --6th grader, Kodiak District; "It gave me a responsibility to tackle and gave me a challenge." --7th grader, Mat-Su District; "I've learned to treat others the way you want to be treated. I've learned that 4-H teaches you to care about others." --8th grader, Kodiak District; "It's helped me mature and to see the bigger picture." --8th grader, Mat-Su District; and "I am now able to gather and lead fellow teens." --9th grader, Kenai District.

All three participants in a workshop about building and enhancing youth-adult partnerships plan to use the information after the workshop. One participant commented they plan to be more thoughtful about cultivating youth partnerships, another plans to apply the knowledge to their work with coaching and the Boys & Girls Club, and a third plans to foster more youth ownership of current programs. In the retrospective pre-post survey, all three indicated a knowledge change, rating their understanding of the material as very little or somewhat understood before the workshop, and clearly understood after the workshop.

Participants in the Youth in Governance (YIG) program responded to a survey using 4-H Common Measures. Seventy-eight percent agreed that participation in this program resulted in exploring cultural differences and all respondents agreed or strongly agreed they have learned about people who are different from them. Eighty-eight percent agreed or strongly agreed they can apply knowledge in ways that solve "real-life" problems through community service. All respondents agreed or strongly agreed they gained skills through serving their community that will help them in the future. Almost 90 percent indicated they are able to lead a group in making a decision, and feel they treat everyone fairly and equally when in charge of a group. As a result of YIG, youth stated they would like to be more informed about laws, go on more government-themed 4-H trips, be an aide for a senator, be a part of government, and be able to help others.

Key Items of Evaluation

Agents facilitated positive youth development and trained caring adults to provide a supportive environment for 4-H participants. Youth developed valuable peer relationships, built leadership skills, and became more knowledgeable about aspects of state and federal government.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Sustainable Energy

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
123	Management and Sustainability of Forest Resources	20%		0%	
125	Agroforestry	10%		0%	
131	Alternative Uses of Land	10%		0%	
205	Plant Management Systems	10%		0%	
511	New and Improved Non-Food Products and Processes	10%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	40%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	0.0	0.0
Actual Paid	0.6	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
63979	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
52953	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
9049	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Extension assisted communities on use of biomass products and worked with producers to develop value-added forest products. Outreach helped educate the public on using biomass and biofuels. Faculty worked with communities and organizations regarding the use of biomass and with producers interested in biomass production. Research and outreach efforts addressed public education on the sustainability of biomass harvesting, new technologies and community planning.

2. Brief description of the target audience

The target audiences included producers and consumers, communities, agriculture and forestry businesses, industry leaders, entrepreneurs, individuals and groups concerned about the quality of the Alaska environment, public resource agencies, public and private resource managers, other faculty and researchers, and undergraduate and graduate students. Efforts were directed toward environmentally and economically sustainable development and conservation of our natural resources that benefit all citizens and help them adapt and become resilient as the climate changes. Advisors and the target audience included various forestry organizations, greenhouse managers, Alaska Farm Bureau, the Alaska Wood Energy Task Force, Alaska Energy Authority, the Alaska Department of Natural Resources, borough governments and Alaska Native corporations.

3. How was eXtension used?

Continued use of eXtension resources in FY17 has been valuable to Extension outreach in Alaska. A program assistant maintained membership in the Wood Energy and Forest Health and Stewardship communities. The access to Qualtrics provided through eXtension increased the online survey skills of the agent working with partners on renewable resource projects and allowed for feedback from biomass tour and wood energy conference participants.

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	564	19	6	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Output 1: Workshops, demonstrations, short courses, classes, field days and conferences on sustainable energy issues organized and conducted.

Year	Actual
2017	31

Output #2

Output Measure

- Output 2: Community, organizations and one-on-one consultation concerning bio-based energy opportunities conducted.

Year	Actual
2017	136

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Outcome 1: Maintain a forestry biomass database.
2	Outcome 2: Monitor adoption of bioenergy technologies.
3	Outcome 3: Increase community awareness about the use of biomass and other sustainable energies. Measure is number of people participating in relevant workshops and presentations.

Outcome #1

1. Outcome Measures

Outcome 1: Maintain a forestry biomass database.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Outcome 2: Monitor adoption of bioenergy technologies.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	32

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Energy costs remain high, particularly in rural communities. According to the Alaska Energy Authority (AEA), over 200 remote villages are not connected to grids or roads, which means paying \$10 a gallon for diesel delivered by boat or plane. Oil production in Alaska is slowing. Biomass can offer a lower-cost source of heat in areas where the forest supply is plentiful. Alaska communities want to see investment in local resources that are renewable, and that harvest and management of resources is compatible with local lifestyles and traditions. The AEA reports that in addition to the 30 communities currently heating with biomass, at least 50 more have expressed interest in pursuing biomass.

What has been done

The Extension agent in Thorne Bay chairs the Alaska Wood Energy Development Task Group (AWEDTG), which facilitates monitoring of biomass boiler adoption. In FY17, the agent coordinated the Alaska Wood Energy Conference sponsored by Extension, the Alaska Energy Authority, USDA Forest Service, Alaska Center for Energy and Power, Alaska Department of Natural Resources, Ketchikan Gateway Borough, The Nature Conservancy, Seaalaska, and U.S. Bureau of Land Management. An agent was on the steering committee and a researcher was an author for a new publication, Biomass-Heated Greenhouses: A Handbook for Alaskan Schools and Community Organizations.

Results

The task group facilitated by an Extension agent has funded over 70 prefeasibility studies since 2006, resulting in over 30 wood heat installations across the state, which represents a significant displacement of fossil fuels and costs savings to the entities adopting the technology. For example, the Southeast Island School District has seen a cost savings of \$15,000 per year. The district now has four greenhouses with a fifth under construction as of fall 2017. As a result of the Wood Energy Conference, the hotel hosting the conference is planning to install a biomass system.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
511	New and Improved Non-Food Products and Processes
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #3

1. Outcome Measures

Outcome 3: Increase community awareness about the use of biomass and other sustainable energies. Measure is number of people participating in relevant workshops and presentations.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	434

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Sustainable energy is an increasingly popular issue in Alaska where transportation and heating costs are prohibitive. In the face of declining oil prices and production, there is a need for Alaska to invest in alternative energies. A fundamental shift in the state's energy focus requires constituent support to gain momentum. Community-level change begins with improving knowledge and awareness at the individual level, and Extension is uniquely situated as source of research-based information that can provide outreach across Alaska on relevant energy topics.

What has been done

Two agents and the energy specialist held biomass, biochar and greenhouse heating presentations for 269 contacts at venues like the experiment farm and sustainable agriculture and wood energy conferences. The energy specialist also conducted 18 workshops for 165 participants on wood burning, greenhouse heat, and biochar in six different Alaska communities including Anchorage, Craig, Delta, Fairbanks, Healy and Tok.

Results

The energy specialist collected feedback on biochar and solar energy workshops. All 13 respondents to a survey of the biochar workshop indicated they intended to use the information, including for research, gardening, and sales. The average rating of the practical value of the biochar ideas presented was 4.2 on a five-point scale. One participant stated they would like to build a system for their village as it would be very practical for rural Alaska. All 11 respondents to a survey of the solar energy workshop indicated they intended to use the information presented, for purposes such as heating greenhouses and remote cabins. The average rating of the practical value of the solar energy ideas presented was 4.5 on a 5-point scale.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Alaska continues to be severely impacted by the falling price of crude oil. The state provides a significant portion of the university's funds, and the university has experienced several consecutive years of reductions. Almost half of SNRE funding comes from the state. Between 2014 and 2017, the university system's budget dropped from \$378 million to \$325 million, resulting in 50 discontinued or suspended academic degree and certificate programs and 933 fewer faculty and staff. SNRE, in particular, has faced difficulties with the combination of budget cuts and fixed cost increases restricting hiring for vacant positions. In FY17, the faculty member that worked with the Alaska Wood Energy Development Task Group departed, as did a program assistant working on the RREA grant. No replacements are planned.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Extension hosted its third Alaska Wood Energy Conference (AWEC), which included tours

of installed greenhouse and biomass systems in the state. Changes in action and capacity were tracked after the conference and included the formation of a Biomass Operator Training Working Group that is looking at offering several "hands on" trainings for people interested in installing wood boiler systems. There are also plans to offer a "Biomass Decision Makers Tour" that will feature a several day tour in the interior of Alaska to look at various systems. Finally, the hotel which hosted the conference has decided to install a biomass heat system.

Results from the post-conference survey for AWEC indicated overall satisfaction with the information provided. Of fifteen respondents, 11 said they were likely or very likely to recommend AWEC to a friend or colleague, while only four were neutral or very unlikely. All but one respondent were satisfied or somewhat satisfied with the organization, content, and amenities of the conference. The conference was seen as valuable to community development; seven of 14 responses indicated AWEC is effective for stimulating wood energy projects in Alaska, with three rating it as somewhat effective and four as very effective. When asked about intent to use new information, four respondents listed biochar, biomass boiler system design, assisting wood energy projects, and transitioning to combined heat and power as topics they planned to pursue. Responses to questions about future topics, dates, locations and tours will be used to plan the next biannual conference.

The energy specialist collected feedback on biochar and solar energy workshops. All 13 respondents to a survey of the biochar workshop indicated they intended to use the information, including for research, gardening and sales. The average rating of the practical value of the biochar ideas presented was 4.2 on a five-point scale. One participant stated they would like to build a system for their village as it would be very practical for rural Alaska. All 11 respondents to a survey of the solar energy workshop indicated they intended to use the information presented, for purposes such as heating greenhouses and remote cabins. The average rating of the practical value of the solar energy ideas presented was 4.5 on a 5-point scale.

Seven attendees at a greenhouse heat workshop offered during Extension week rated the class at 4.85 on a 5-point scale where five is excellent. One attendee wrote that they plan to change their greenhouse design. Another noted they had attended the specialist's classes before and at a past class they had built a rocket stove and used it.

Key Items of Evaluation

The conference on wood energy raised awareness of and interest in biomass heating systems and led to an increased community capacity to educate people on installation. At least one new system for a commercial entity is planned because of the conference. Workshops at a sustainable agriculture conference and local Extension promotional events on alternative, sustainable energy sources were rated as practical and of great value to participants who intend to use the information in their home communities.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
82	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
1	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.